

# Reassessing Authenticity: Heritage Management of Tanks

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## Summary

Conservation decisions concerning vehicles often result in one of two outcomes: a vehicle in working, running order, or a vehicle on static display. These two routes depend upon a variety of factors, including previous decision-making and conservation ethical guidance, practicalities such as resource availability and visitor opinions. Traditionally, conservation ethics have differed from visitor views in their assessment of authenticity and identification of value aspects. By reassessing authenticity and redefining what visitors value, conservation decision suggestions can be produced that truly benefit visitors and fulfil museum ethical guidance to produce engaging, inspiring and relevant museum experiences.

There is currently no set framework or decision-making process for the decision to run a tank or display it in static condition within The Tank Museum. Similarly, there is no set rationale for the decision to stop running a vehicle and display it in static condition. By considering and quantifying professionally identified and visitor-led factors through analysing and deconstructing current literature and carrying out visitor opinion studies, a rationale is contextualised, and decision-making framework formed that results in defined conservation routes.

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## Abbreviations

ABTEM	Association of British Transport & Engineering Museums
ACE	Arts Council England
AFV	Armoured Fighting Vehicle
APPG	All Party Parliamentary Group
APPGHR	All Party Parliamentary Group on Heritage Rail
Bn	Battalion
BSI	British Standards Institution
CyMAL	Museums Archives and Libraries Wales
DCMS	Department for Digital, Culture, Media & Sport
EATES	East Anglian Traction Engine Society
FHT	Fairground Heritage Trust
FIVA	Fédération Internationale des Véhicules Anciens
HLF	Heritage Lottery Fund
HRA	Heritage Railway Association
ICOM	International Council of Museums
ICOMOS	International Council on Monuments and Sites
IWM	Imperial War Museums
MA	Museums Association
MGC	Museums & Galleries Commission
MGS	Museums Galleries Scotland
MoD	Ministry of Defence
NCO	Non Commissioned Officer
NHMF	National Heritage Memorial Fund
NHS-UK	National Historic Ships-UK
NTET	National Traction Engine Trust
PRISM	Preservation of Industrial and Scientific Material Grant Fund
SHTP	Shipshape Heritage Training Partnership

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## 1. Introduction

Conservation decisions for working and transport collections are affected by a range of judgements, including a consideration of the potential for different types of value to be realised, the effect of a certain conservation decision routes on the material aspects of the object and limitations imposed by practical aspects such as resource availability. This multitude of factors will result in one of two possible outcomes: an object in working, functional condition that is able to move under its own power, or an object that is in static condition in either display or storage.

### 1.1. Decision-making at The Tank Museum

The Tank Museum has funded the research detailed in this thesis to identify the different factors that impact upon whether a vehicle at the museum is displayed in running order, with the opportunity to be driven around an arena during event days, or kept in static condition, either within the museum galleries or in storage.

The Tank Museum faces a complex set of decisions in deciding conservation routes for their historic vehicles which must consider public opinion and the museum's strategic objectives to:

- Become a centre of excellence for the care of our collections.
- Identify/ undertake priority projects to recover or enhance the heritage value of key items in the collection.
- Develop the facilities and skills required for the ongoing care, conservation and restoration of our vehicle fleet.

(The Tank Museum 2018b)

The Tank Museum does not currently have a set methodology or framework for assessing the current and potential value of individual tanks in static and running condition. Such a framework, based on a literature review of established theory and guidelines and incorporating the opinions of visitors and other stakeholders, is needed to support decision-making in determining whether a tank should be displayed in static or running condition in order to preserve and present the most valuable aspects of each vehicle. Without this framework, decision-making has no defined structure or established method of incorporating stakeholder opinions.

## 1.2. Research Aim and Objectives

The research aims to:

Establish evidence-based frameworks to facilitate conservation decision-making at The Tank Museum, reassessing the notions of authenticity and value in static and running vehicles.

This will be achieved by:

- Reviewing current ethical and professional thought within museums and the heritage sector.
- Understanding public and professional views on working and static objects in museum collections.
- Gathering qualitative and quantitative data on opinions of Tank Museum visitors regarding conservation and display routes for the vehicles and the values they deliver to audiences.
- Creating assessment frameworks to indicate whether restoration to working order or display in static condition is the more appropriate conservation route for a vehicle and when it has reached the end of its working life.
- Evaluating the potential application of the frameworks to other working collections, including industrial, military and vehicle museums as well as museums with collection items that had an original purpose in working, by using examples at Haynes Motor Museum.

## 1.3. Structure of Thesis

Table 1 presents the thesis structure. This initial chapter gives an overview of the overall aim and objectives of the thesis. The second chapter discusses the history of tanks and introduces The Tank Museum and its collections. Chapter three explores conservation ethics in greater depth. Chapter four introduces existing research into visitor views and opinions, which raises the need to consider sensory experiences in detail, covered in chapter five. Chapter six explores current frameworks for assessing, and reassessing, authenticity, including significance assessments and the point at which end-of-life should be considered for a museum object. Chapter seven contains an overall discussion of the literature review. The literature review highlights the need for considering visitor opinions when making conservation decision routes, so the studies in chapters eight, nine, ten and eleven consist of visitor surveys for both event and non-event days at The Tank Museum. From these results and the literature review, frameworks for decision-making at The Tank Museum have been produced, which

form chapter twelve. The final chapter discusses the thesis as a whole, including its contribution to the field and avenues for future research.

Chapter 1	Introduction, aim and objectives
Chapter 2	Introduction to Tanks and The Tank Museum
Chapter 3	Conservation Ethics
Chapter 4	Visitor Experiences and the Value of Authentic Experiences
Chapter 5	Sensory Experiences
Chapter 6	A Review of Frameworks for Reassessing Authenticity
Chapter 7	Literature Review Discussion
Chapter 8	Introduction to Studies
Chapter 9	Study of Visitors at a Tankfest Event
Chapter 10	Study of The Tank Museum Visitors to Non-Event Days
Chapter 11	Comparison and Further Discussion of Studies
Chapter 12	Frameworks for Decision Making
Chapter 13	Overall Conclusion

*Table 1. Table showing structure of the thesis.*

## 2. Introduction to Armoured Fighting Vehicles

The purpose of the tank as a highly technological military vehicle has inspired awe in human beings since their inception. Whether this manifested as fear or elation by soldiers on the battlefield or within crowds at military parades, there are endless historical accounts of the emotive impact tanks generate. This suggests that fully experiencing what a tank is, both technologically and emotionally, relies on it moving. This is backed up by eyewitness accounts referencing sensory impacts triggered by tanks on the move. Does a static tank embody only a part of what it really is, with the dormant remainder waiting for the engine to be turned over and the vehicle to move? How can museums unlock a full understanding of the tank for their visitors whilst preserving their value for future generations? Examining the development of tanks and their roles as working objects offers a starting point for reassessing their values.

Armoured Fighting Vehicles (AFVs) include both tracked and wheeled vehicles. The vehicles under study in this thesis are tanks which fall into the category of tracked AFVs and which have characteristics which relate closely to the term AFV. Firstly, tanks are armoured; they have protection against the enemy (Willey 2017,8), which refers to their physical armour in addition to other protective measures such as speed, height, camouflage and smoke screens (Cowper *et al.* 2011,7). They are fighting vehicles, so have means of attacking the enemy (Willey 2017,7) with firepower that can include rangefinders as well as guns (Cowper *et al.* 2011,7). They are also mobile vehicles, a driving factor in their development as a means of breaking the deadlock of the Western Front in the First World War (Willey 2017,7; Snow 2018,6). Their movement can be strategic to areas of operation, operational in areas where combat may occur or in tactical and battlefield contexts (Willey 2017,209). Over the last 100 years tanks have developed in many different ways, but they remain distinctive symbols of power (Willey 2017,216) and still possess the three main characteristics of armour, firepower and mobility (Cowper *et al.* 2011,7). The crew is also integral to a tank (Cowper *et al.* 2011,8; Willey 2017,9); without people, there is no movement or firepower, and a tank is reduced to being a stationary fort.

## 2.1. A Brief History of the Tank

Tanks were initially created as a response to the static battleground produced by trench warfare in the First World War (Willey 2017,8; Snow 2018,6). While the Germans focused on efforts such as experimenting with chlorine gas, the Allies<sup>1</sup> were creating a vehicle that could pass barbed wire, cross the ground between opposing trench systems and offer protection from defensive firepower (Tucker 2004,10; Misa 2011,134; Zaloga *et al.* 2011,5; Ogorkiewicz 2018,27; Snow 2018,6). In the autumn of 1914, Colonel Ernest Swinton received a letter from Hugh F. Marriot, a mining engineer, describing the military possibilities of caterpillar tractors (Snow 2018,7), and Maurice Hankey, then secretary of the War Council, was influenced by Colonel Ernest Swinton and suggested the creation of a vehicle with armour, a machine gun and caterpillar wheels (Black 2020).

### 2.1.1. Initial Tank Development

In February 1915, the Landships Committee was established by Winston Churchill, the First Lord of the Admiralty (Cowper *et al.* 2011,9; Fletcher 2016,6; Snow 2018,6). The idea of a tracked, armoured fighting vehicle was put forward by Churchill to the Landships Committee, who gave the order to build such a vehicle on the 29th July 1915 (Snow 2018,8). William Foster & Co. of Lincoln were contracted to build a prototype, known as the 'Tritton Machine' (Snow 2018,8). The tank's Bullock tracks were not entirely successful, so the vehicle was modified, fitted with a new track and named 'Little Willie' (Figure 1) (Ogorkiewicz 2018,33;www1). This prototype can be seen in The Tank Story Exhibition at The Tank Museum.

By the 26<sup>th</sup> January 1916, a further landship was developed with tracks running around the body of the vehicle, named 'Big Willie', 'Her Majesty's Land Ship Centipede' and then 'Mother' (Willey 2017,13; Ogorkiewicz 2018,36; Snow 2018,8). These vehicles began to be referred to as tanks rather than Landships when orders for hulls were described as water carriers in order to ensure secrecy (How the British "Tanks" Received Their Name 1918; Ogorkiewicz 2018,www2). Mother successfully completed trials at Hatfield in January and February 1916 (Tucker 2004,15; Ogorkiewicz 2018,36)

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<sup>1</sup> The Pact of London (1914) was signed by France, Britain and Russia, which formed the allied forces. Other countries subsequently joined throughout the war.



with the Ministry of Munitions authorising the production of 100 tanks (later 150) similar to Mother on 12th February 1916 (Cowper *et al.* 2011,9; Fletcher 2016,5; Willey 2017,22; Ogorkiewicz 2018,36). These tanks were delivered in 1916 and were effectively the same as Mother, but had hulls made of armour instead of mild steel plates, and half were armed with only machine guns (Pope *et al.* 2016,9; Ogorkiewicz 2018,42). These tanks were designated as Mark I (Ogorkiewicz 2018,42).



Figure 1. Little Willie crossing a trench during trials. Source: Imperial War Museums, Catalogue Number Q 70931.

#### 2.1.2. The First World War

The British Mark I tanks (Figure 2) with their maximum speed of 4mph (Cross *et al.* 2018,10) were used for the first time in the Battle of Flers-Courcelette on the 15th September 1916 during the Somme campaign (Cowper *et al.* 2011,7; Fletcher 2016,5; Pope *et al.* 2016,7; Snow 2018,4). Despite mixed success, with mechanical failures and vulnerability to obstacles such as shell holes (Macksey 1971,35; Cowper *et al.* 2011,9; Cross *et al.* 2018,17), the British Commander, Douglas Haig, ordered 1,000 more tanks (Cowper *et al.* 2011,9; Willey 2017,30; Snow 2018,4). Mark I tanks were also used in the Middle East in battles around Gaza (Cowper *et al.* 2011,9; Pope *et al.* 2016,24).



Figure 2. Photograph of a Mark I tank at The Tank Museum. Source: The Tank Museum, 2021.

The Mark II (Figure 3) and Mark III tanks were used primarily for training in Britain, although 26 Mark II tanks took part in the Battle of Arras in April 1917 due to tank shortages (www3). Several hundred of the Mark IV tank (Figure 4), first produced in 1917, were used at the battle of Cambrai between the 20th November and the 7th December 1917 (Cowper *et al.* 2011,12; Pope *et al.* 2016,17). This was the first large-scale deployment of tanks (Cowper *et al.* 2011,12; Willey 2017,18), and it opened a 6-mile gap in the Hindenburg line, but German command quickly cut off the breakthrough, and the tanks had inadequate infantry support to hold the progress (Cross *et al.* 2018,21; Black 2020,11). Mark IV tanks are often described as the first Main Battle Tank (MBT) and around 1,200 were built (Cowper *et al.* 2011,12).



Figure 3. Photograph of a Mark II tank at The Tank Museum. Source: The Tank Museum, 2021.





Figure 4. Photograph of a Mark IV tank at The Tank Museum. Source: The Tank Museum, 2021.

Mark V tanks (Figure 5) arrived in France in May 1918, with 400 built in total (Cross *et al.* 2018,34). These British tanks were a key factor in German retreat during the summer and autumn of 1918 (Snow 2018,4). During the Battle of Amiens in August 1918, 288 Mark Vs, along with 96 Whippet medium tanks, 12 Austin armoured cars and 90 French Renault FT tanks carried out a major offensive against German forces (Cowper *et al.* 2011,18; Cross *et al.* 2018,40,41).

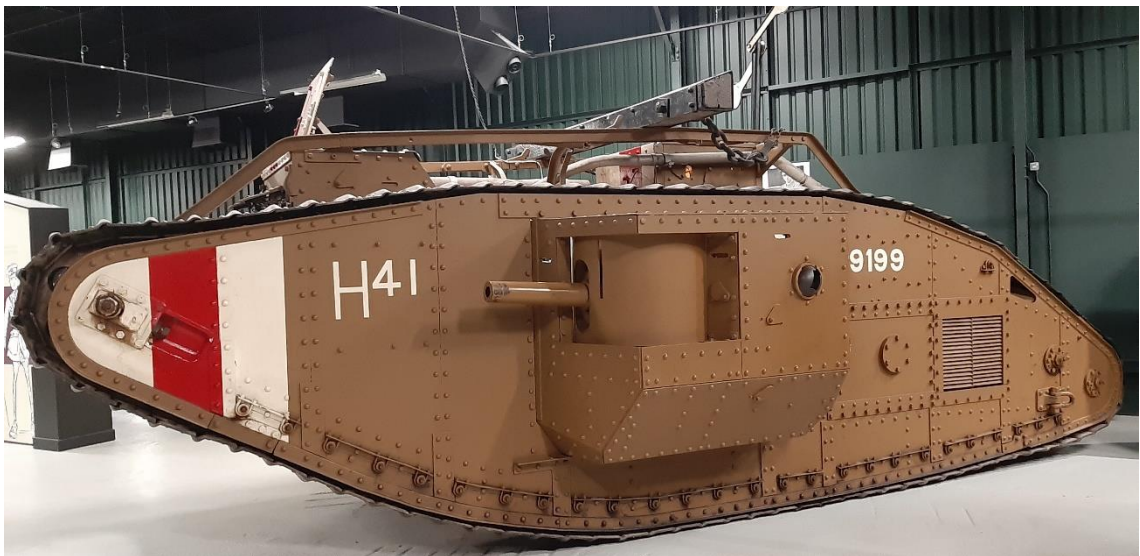


Figure 5. Photograph of a Mark V tank at The Tank Museum. Source: The Tank Museum, C. 2021.

The French were also developing a vehicle around the same times as Britain (Tucker 2004,10; Zaloga *et al.* 2011,4), an armoured tracklayer able to cut through barbed wire and cross trenches (Fletcher 2016,5). However, delays in production meant that French tanks were not used until 16th April 1917 (Fletcher 2016,5). The first French tanks, the Schneider CA-1 and the St Chamond, had difficulties in crossing

trenches. General Jean-Baptiste Estienne then worked on creating small, cost-efficient tanks that could be made en-masse and were very mobile (Zaloga *et al.* 2011,4). This resulted in the Renault FT-17 in May 1918, the first tank with a fully rotating turret containing the tank's armament (Figure 6), a design which has been used since (Zaloga *et al.* 2011,4; Willey 2017,23; Ogorkiewicz 2018,13).



Figure 6. A Renault FT-17 in American service. Source: Imperial War Museums, Catalogue Number A 72558.

The Germany Army had seen demonstrations of Holt tractors for gun-hauling in the early 1910s, but dismissed them as being of little military use (DeHaan 1953,57; Ogorkiewicz 2018,54). A month after the British first used tanks in action on the Somme, in October 1916, the German War Ministry set up a committee to draw up a tank specification, and purchased a Holt tractor in November 1916 (Ogorkiewicz 2018,54). The first German tank to enter service was the A7V Sturmpanzerwagen in 1918 (Willey 2017,23; Cross *et al.* 2018,36,37). This tank had thicker armour plates than British tanks of the time, and required 18 crew men (Ogorkiewicz 2018,55). Like the early French tanks, it had a limited ability to cross obstacles (Ogorkiewicz 2018,55). Only 20 were made, with the German army instead relying on captured British tanks (Willey 2017,23; Ogorkiewicz 2018,55). Three detachments of A7Vs were formed, and

in March 1918 all three were used to break through British lines. A7Vs were involved in the first tank versus tank battle on 24th April 1918 when an A7V came under fire from a British Mark IV (Ogorkiewicz 2018,55). The A7V knocked out two Mark IVs before having to be abandoned itself (Cowper *et al.* 2011,15). This event demonstrated the need for tanks to be armed to fight other tanks (Ogorkiewicz 2018,55). Most of the A7Vs were captured by the Allied advance (Cowper *et al.* 2011,15).

### 2.1.3. The Inter-War Period

At the end of the war the Allied commanders had expected fighting to continue, and so prepared specialist vehicles such as bridge layers, infantry carrier, artillery carriers and repair vehicles (Willey 2017,23). Most of the British army tank formations were disbanded (Cross *et al.* 2018,42) although tanks were used in Britain in 1919 for the Victory Parade and to suppress trade unionists (Cross *et al.* 2018,42). The British government's Tank Design Department was axed in 1921 (Cross *et al.* 2018,42) but the Experimental Mechanised Force was created in 1927 as a mixed battalion of Vickers Medium tanks, armoured cars and small, lightly armoured tanks known as tankettes (Ogorkiewicz 2018,69). It carried out experiments and trials, focusing on operational mobility and making developments such as the use of radios in 1929 (Ogorkiewicz 2018,69). During the 1930s the Great Depression affected military budgets, resulting in the creation of cheaper light tanks and tankettes (Willey 2017,46). The Treaty of Versailles prohibited German manufacture and importation of armoured cars and tanks (Treaty 1919, art. 171), but Germany secretly built and tested tanks in the Soviet Union (Willey 2017,39; Cross *et al.* 2018,46,47). In 1934 Germany began production of the PanzerKampfwagen I. The Soviet Union also produced thousands of vehicles with a focus on mobility (Wright 2000,204; Willey 2017,39). The inter-war period was a time of experimental vehicles, with the UK, Soviet Union, Germany, Sweden and the USA all focusing on vehicle development (Willey 2017,40,41).

### 2.1.4. The Second World War

Between 1939 and 1941 Germany used Blitzkrieg tactics to invade Poland, then Norway, Belgium, the Netherlands, France and the Soviet Union (Willey 2017,70; Cross *et al.* 2018,72). This tactic used tanks, artillery and airpower to quickly overcome



forces, and was largely successful due to the mobility of the German Panzer forces (Cowper *et al.* 2011,21; Willey 2017,65). Although Allied tanks were technically better, they were stretched thinly across the front (Willey 2017,70). The Soviet Union had around 22,600 tanks, but many were outdated and around 20,500 were lost in 1941 (Willey 2017,65). The German invasion meant that Soviet tank factories had to move hundreds of miles East, where tank production was greatly increased (Willey 2017,96).

The Soviet T-34 (Figure 7) was a well-armed, well-protected and mobile medium tank that began to be produced in great numbers from 1941 (Willey 2017,96; Cross *et al.* 2018,108). The T-34/76 was the most widely produced Allied tank of the Second World War (Cowper *et al.* 2011,36) and is now often stated as being the best tank of the war (Kaplan 2013,94). They greatly impacted German morale in Operation Barbarossa (Cowper *et al.* 2011,36) due to their superior armour firepower and mobility in addition to the sheer quantity produced (Cowper *et al.* 2011,36). The T-34s were relatively simple vehicles, which meant they were quick and easy to produce (Kaplan 2013,94). The German Panther tank was created as a response to Operation Barbarossa, and began to be mass-produced in May 1942 (Cowper *et al.* 2011,42). The Panther was a medium tank with strengths in long-range firepower and thick, sloped frontal armour (Wright 2000,303; Black 2020,95) but limited reliability due to its complex design (Tucker-Jones 2016).



Figure 7. T-34 tanks in 1942. Source: RIA Novosti Archive, Image 1274.

The American M3 Stuart, used by both American and British forces (Willey 2017,80), was created to meet short-term needs for a medium tank (Cowper *et al.* 2011,27). It was no longer useful as a tank by 1944, so was instead used for reconnaissance (Willey 2017,84).

The British Matilda I A11 and Matilda II (Figure 8) tanks were used in France in 1940 with little success (Fletcher 1994a; Bannerman 2004; Cross *et al.* 2018). When the British Expeditionary Force was evacuated, every infantry tank with the 1st Army Tank Brigade was abandoned in France (Fletcher 1994a,10). However, the Matilda IIs made an impression on Hitler after it became clear that German weaponry could not penetrate their armour (Willey 2017,74). This led to the production of the Tiger tank in 1942 (Willey 2017,74) which, although its weight limited its mobility and it was prone to breaking down, was very successful in combat, creating a great psychological impact upon the Allies (Cowper *et al.* 2011,45; Fletcher 2012,21; Willey 2017,74; Cross *et al.* 2018,118). Between July 1942 and August 1944, a total of 1,354 Tiger tanks (Figure 9) were produced before being succeeded by the Ausführung B or King Tiger, which was larger, better protected and up gunned (Cowper *et al.* 2011,63; Fletcher *et al.* 2011,22; Cross *et al.* 2018,118).



Figure 8. A Matilda II tank being transported, 22<sup>nd</sup> July 1940. Source: Imperial War Museums, Catalogue Number H 2418.



Figure 9. A Tiger I tank, captured by British forces in Tunisia, 1943. Source: Imperial War Museums, Catalogue Number STT 5603.

The Matilda tanks went on to prove successful in North Africa in the early 1940s. They were effective against the Italian M11/39 tanks and Italian anti-tank weapons in North Africa between 1940 and 1941 (Bishop 2002,27; Tucker 2004,252; Cowper *et al.* 2011,24; Ogorkiewicz 2018,144). As a result, they were nicknamed 'Queen of the Desert' (Fletcher 1994a,14; Bannerman 2004,4; Cowper *et al.* 2011,24). Although later German tanks outclassed the Matilda tanks in North Africa (Willey 2017,71), they played an important role until June 1942, and took part in the first battle of El Alamein in July 1942 (Cowper *et al.* 2011,25). The British Crusader Cruiser tank was introduced into service in 1941 and used in the North African desert (Cowper *et al.* 2011,33). The Second Battle of El Alamein in October 1942 saw the first combat use of the M4 Sherman which was designed to replace the M3 Lee medium tank (Willey 2017,86) and replaced all the British Crusader tanks in North Africa (Cowper *et al.* 2011,33).

Tank destroyers were used throughout the war by both sides (Willey 2017,106,110). These were AFVs with fixed anti-tank guns designed to destroy enemy armoured vehicles (Willey 2017,108; Cross *et al.* 2018,122), and were cheaper to produce than tanks (Black 2020,98). German Tank destroyers included Panzerjäger,



StuG (Figure 10), Marder, Brummbar, Ferdinand/Elefant, Jagdpanther and Sturmtyger (Willey 2017,106) while allied models included M18 Hellcat, M10, Valentine Archer the SU-76M and the SU-100 (Willey 2017,110).



Figure 10. Sturmgeschütz (StuG) III Ausf. B in Russia, 1941. Source: German Federal Archives.

On the 6<sup>th</sup> June 1944, the Normandy Landings successfully opened a second front against Germany, and were a turning point of the war (Cross *et al.* 2018,134). The Disastrous Dieppe Raid of 1942 made it clear that the invasion would require specialist tanks (Cross *et al.* 2018,128), and so Churchill and M4 Sherman tanks were adapted to overcome specific obstacles. These tanks were named Hobart's Funnies, and included amphibious Duplex Drive (DD) tanks (Figure 11), flame-throwing Churchill Crocodiles (Figure 12), Churchill Armoured Vehicle Royal Engineers with short-range mortars and Sherman Crabs with mine flails (Figure 13) (Willey 2017,116,117; Cross *et al.* 2018,129).



Figure 11. Sherman DD amphibious tank with float screens. The screens raise and rear propellers operate when the tank is in water. Source: Imperial War Museums, Catalogue Number MH3660.



Figure 12. A Churchill Crocodile tank, August 1944. Source: Imperial War Museums, Catalogue Number TR 2313.



*Figure 13. Sherman Crab Mark II minesweeping flail tank, during minesweeping test in the UK, 27th April 1944. Source: Imperial War Museums. Catalogue Number H 38079.*

Japan also produced tanks during the Second World War such as the Type 89, Type 95 and Type 97, although it relied on infantry support throughout the war (Cross *et al.* 2018,156). Japan produced around 500 tanks a year, and by 1945 tank production had almost halted as a result of American bombers (Cross *et al.* 2018,156).

#### 2.1.5. The Cold War

The relationship between the Soviet Union and Western Allies soon broke down after the Second World War (Cross *et al.* 2018,158). During the Korean War the Americans used M26 Pershings and reconditioned M4 Shermans (Cross *et al.* 2018,158) while the M48 Patton medium tank was used in the Vietnam war by the US and its allies, and was particularly important in holding cities (Black 2020,166). Tanks were made throughout the Cold War to be used if the war escalated. For example, the Soviet T-72 was designed in 1971, with a focus on ease of manufacture and maintenance (Willey 2017,134). Around 30,000 were made (Cross *et al.* 2018,168), and it is still used in over 40 countries (Willey 2017,134). West Germany produced the

Leopard 1 in 1965, then the Leopard 2 in 1979 (Willey 2017,150; Cross *et al.* 2018,173). Britain focused on creating a Main Battle Tank (MBT), resulting in the Centurion (Figure 14) at the end of the Second World War, which was then followed by the Chieftain (Cross *et al.* 2018,164,165). British, American and Soviet specialisation of vehicles based on a tank chassis followed on from Hobart's Funnies, with a great variety of vehicles being produced to achieve specific objectives (Willey 2017,186). Tanks and anti-tank weaponry began to spread to other countries as France and Britain exported tanks to their former empires (Black 2020,157). Britain also exported Centurions to Canada, Denmark, the Netherlands and New Zealand (Black 2020,158).



*Figure 14. Centurion tanks and men of the Gloucestershire Regiment advancing to attack Hill 327 in Korea, March 1951. Source: Imperial War Museums, Catalogue Number BF 454.*

#### 2.1.6. The Middle East

The practice of selling tanks to other countries continued throughout the period. Egypt obtained tanks in 1955 from the Soviet Union and, in response, France armed Israel with AMX-13s (Black 2020,158). Israelis used AMX-13s and Shermans to capture Egyptian tanks and occupy the Sinai Peninsula (Cross *et al.* 2018,176; Black 2020,159). Rising tensions resulted in the Six-Day War in 1967, where Israelis used US M48 and British Centurion tanks to beat the Egyptians who used Soviet T-54 and T-55s



(Oren 2017,182; Black 2020,160). The Six-Day War proved the importance of having tanks that were quick and easy to repair, which contributed to the Israeli success (Black 2020,161). The Yom Kippur War, in which Egypt and Syria launched surprise attacks on Israel in 1973, saw the successful use of updated Centurions by the Israelis against Soviet tanks (Bar-Joseph 2012,1; Black 2020,171).

The Gulf War in 1991 proved the continuing use of tanks in winning warfare, when the US led an attack on Iraqi forces in Kuwait (Black 2020,196). Again, in the Iraq War in 2003, US mobility was successful, while the British Challenger 2 tanks outranged the guns of opposing tanks in Basra (Griffin 2017; Black 2020,198).

#### 2.1.7. Recent Developments

In recent years, different countries have taken different approaches to tanks, with some continuing to manufacture their own, some buying tanks such as Leopard 2s, and others upgrading older tanks (Tucker 2004,181-189; MoD 2017,22; Willey 2017,226; Cross *et al.* 2018,188). The upgrading of tanks shows an increasingly widespread view that tanks are expected to undergo changes such as rebuilds during their lifetime to maintain an advantage and respond to new threats (Cross *et al.* 2018,188).

Tanks have come to be a physical representation of power and are certainly not vehicles confined to the trenches of the past. The combination of armour, mobility and firepower have continually proven tanks to have a place on the battlefield and in peacekeeping. Their development documents technological advances and their actions are interwoven with the history of 20<sup>th</sup> century conflict. Public interest in tank heritage has developed along with museums dedicated to telling their story.

## 2.2. Introduction to The Tank Museum, Bovington

### 2.2.1. The History of the Tank Museum

The land on which Bovington camp is built was sold to the War Office in 1899, the site being used initially as a military exercise area and rifle range (Lanning 1970,2,3,5; Dudley 2012,134). In October 1916 the Tank Training Centre moved from its initial site in Elveden to Bovington (Fletcher no date; Glanfield 2013) which became

the centre for training in tank driving, maintenance, gunnery, signalling, reconnaissance and the care of pigeons that were to be used in emergencies (Lanning 1970,24). This was run by the Heavy Section, Machine Gun Corps, which in 1917 became the Tank Corps (The Tank Museum no date,83). At the end of the First World War, it was envisaged that further use of tanks would be limited, so the Tank Corps was largely demobilised (Wells 1914,8; Lanning 1970,35; Jukes *et al.* 2013,13). However, tanks were still used in operational roles both abroad and at home and practice driving continued at Bovington (Lanning 1970,40).

In the summer of 1919, the Tank Repair Park (Figure 15) at Bovington received hundreds of tanks from France. The condition of each tank was assessed and, depending on this, the tank was either repaired, commemoratively displayed in a British town, or left on the heath at Bovington in a railed-off enclosure (Lanning 1970,44). The tanks on the heath were sold to the Slough Trading Company as scrap, who left 26 tanks as examples to teach Tank Corps soldiers about tank developments at Bovington military camp (Glanfield 2013) (www1).

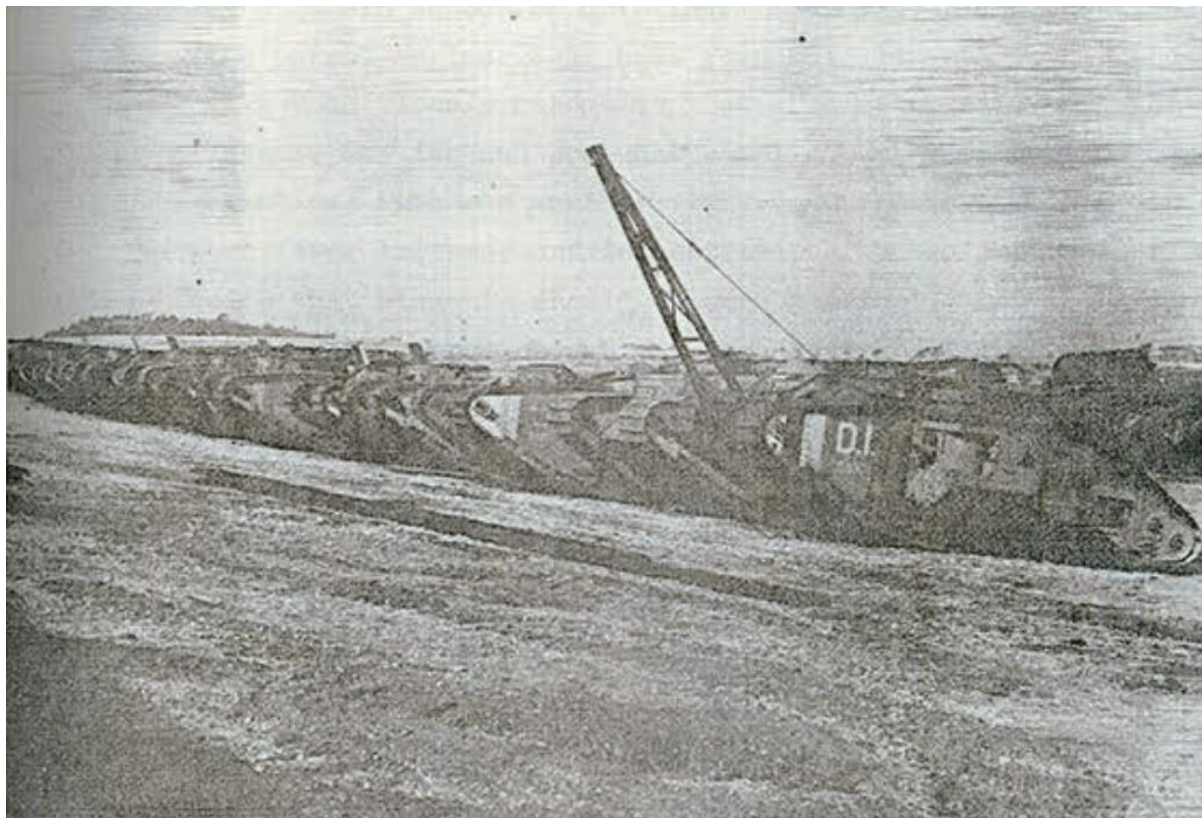


Figure 15. The Tank Park in 1920. Source: The Tank Museum Library and Archive, cited in Lanning 1970.

This collection of tanks was largely forgotten after 1920 (Lanning 1970,64; Glanfield 2013), thus, the beginnings of the collection at Bovington were not made

with the deliberate aim of forming a museum (Thwaites 1996,22). Experimental testing of new vehicles was carried out at Bovington in the 1930s, and vehicles were added to the initial collection, by this time housed within a shed, when trials and tests were completed (www1). Other vehicles were added as they came out of service and tank-related items were collected, forming the beginning of the Archive and Library (www1). In 1937 the Army Armoured Fighting Vehicle School was established to replace the Royal Tank Corps Central School, and was formed of Driving and Maintenance and Wireless wings at Bovington and a Gunnery wing at Lulworth (The Tank Museum no date,94). By 1945, there were fifty vehicles at the Driving and Maintenance School at Bovington (www1). This formed the beginning of the Tank Museum, which opened in 1947 in the current WW2 Hall.

The collection grew slowly until 1981, when George Forty took the position of Curator and obtained tanks through exchange with other museums or as gifts (www1). In 1984, the first conservation workshop was established and tanks began to be restored with a purpose-built workshop being created in 1990/1 (www1). Further museum buildings were built to house the collection, which increased following the Gulf War in 1991 (www1). In 1998, the first immersive experience, The Trench Experience, was created. In 2009, the Tank Story Hall opened and the remaining halls have since been re-displayed. The collection continues to grow and a workshop and vehicle conservation centre have been built for the maintenance and restoration of vehicles (www1).

### 2.2.2. The Tank Museum Today

‘The Vision of The Tank Museum is to be the world’s leader in the heritage of armoured warfare. Our Mission is to conserve, develop and interpret the national collection of tanks and armoured fighting vehicles to educate and inspire people with the story of tanks and the people who serve in them; past, present and future.’ (The Tank Museum 2018b).

#### 2.2.2.1. The Audience

Table 2 below shows the number of museum visitors, serving military visitors, school children and archive visits each year between 2017 and 2020 (The Tank Museum 2018b). Visitor numbers in 2020 were lower than previous years due to the

Covid-19 pandemic. Additionally, there were fewer archive visits in 2019 and 2020, as between September 2019 and April 2020 building works reduced access for researchers. On average, between 2017 and 2019 the Tank Museum received 201,894 museum visitors, 8,042 school visitors, 6,938 serving army members and 242 researchers annually.

<b>Year</b>	<b>Total Museum Visitors</b>	<b>Serving Military Visitors</b>	<b>School Children on Educational Visits</b>	<b>Archive Visitors</b>
<b>2017</b>	209599	8483	6524	289
<b>2018</b>	203265	8305	7646	286
<b>2019</b>	192817	7337	6644	151
<b>2020</b>	94887	3672	1569	20

*Table 2. Table showing the number of visitors to The Tank Museum each year between 2017 and 2020. Source: The Tank Museum 2018b.*

The Tank Museum also welcomes a significant number of virtual visitors; in 2017, its associated websites and social media accounts received over one million digital visitors (The Tank Museum 2018b). Their YouTube account currently has 290,000 subscribers (www2); the Tank Museum uploads videos on specific tanks restoration projects (Figure 16) and recently streamed their annual event, Tankfest, online. The Tank Museum also has 319,461 likes on Facebook, 39,300 followers on Instagram and 35,300 followers on Twitter where the museum shares images of tanks with accompanying historical information, details about events and products in the museum shop (www3;www4;www5). The museum also has 923 subscribers on Patreon, a subscription website where people can pay different amounts to have access to rewards such as early access to new videos, the ability to submit questions to a monthly Q&A video with the curator and Friends Membership (www6). Thus, in addition to physical visitors, the museum also has a wide online following.

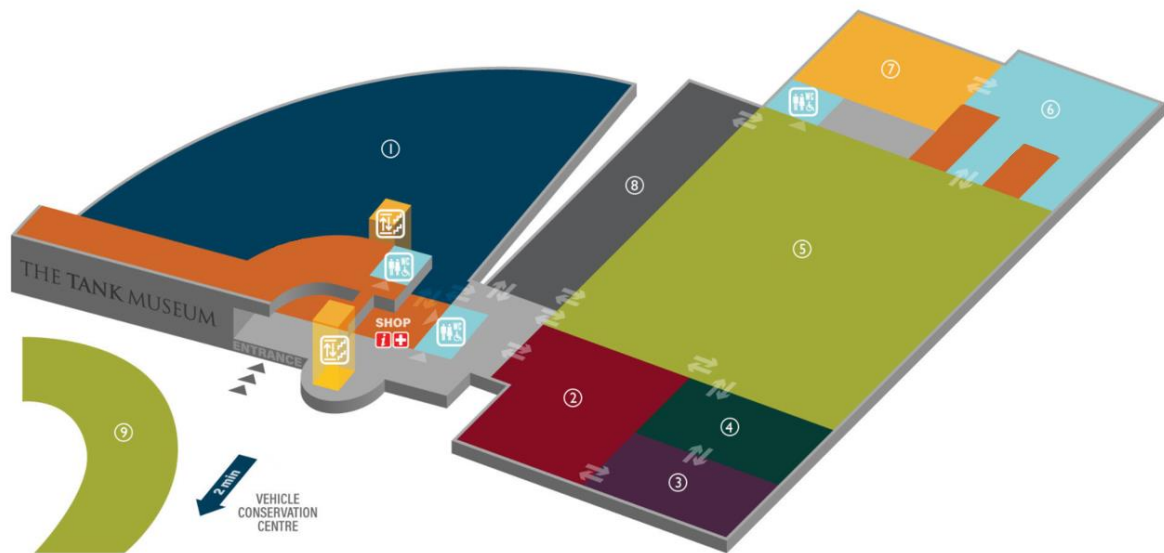




Figure 16. Work on the Turret Restoration phase of the Matilda II restoration project, *The Matilda Diaries*, YouTube. Source: [www7](http://www7).

#### 2.2.2.2. The Exhibitions

The museum has nine exhibitions (Figure 17) that detail the history of the tank from 'Little Willie' (Willey 2017,13), through to armoured vehicles used in recent conflict in Afghanistan ([www8](http://www8)). Static tanks are displayed in these exhibition halls (Figure 18) with accompanying descriptions, objects, images and first-hand accounts of tank warfare and conditions. In addition, the museum has a trench experience that takes visitors through the experience of a First World War soldier from signing up to being in the trenches. This experience has recorded voices and sound effects to simulate the experience of warfare in the First World War. Through displaying oral histories and encouraging visitors to understand experiences of warfare, the objects are used in the museum to engage visitor with the people behind the tanks. The Tank Museum also has an arena where vehicle displays of running tanks take place on event days, and a Vehicle Conservation Centre for the storage and maintenance of vehicles at the museum.



- |                         |   |                           |
|-------------------------|---|---------------------------|
| 1 The Tank Story        | 4 Warhorse to Horsepower                          | 7 Battlegroup Afghanistan |
| 2 The Trench Experience | 5 WW2: War Stories and temporary exhibition space | 8 Tank Factory            |
| 3 Tank Men              | 6 Cold War  | 9 Arena                   |

Figure 17. Map of The Tank Museum and corresponding exhibits. Source: [www9](#).



Figure 18. Image of the Tank Story exhibition at The Tank Museum. Source: [www8](#).

#### 2.2.2.3. The Collection

The Tank Museum has around 350 tanks and other AFVs in its collection (The Tank Museum 2018b), the earliest of which is the Hornsby Tractor, dating from 1910, (www10). 100 armoured vehicles are stored in the Vehicle Conservation Centre (Figure 19), which is open to the public on certain days to give visitors the opportunity to see a variety of tanks, including prototypes and experimental vehicles (www8).



Figure 19. The Vehicle Conservation Centre at The Tank Museum. Source: author.

The Tank Museum has a Display Fleet for public displays which consist of 55 operational and mainly non-accessioned vehicles that are not documented as part of the museum's long-term collection and 20 vehicles that are run on a less frequent basis (C. van Schaardenburgh 2021 pers. comm. 15<sup>th</sup> February).

#### 2.2.2.4. Collecting and Collection Management Objectives

Although The Tank Museum has a large static collection, its Collecting and Collection Management objectives include to 'collect running fleet vehicles and the associated spare parts for the purpose of carrying out public displays' (The Tank Museum 2018b). This shows an emphasis on increasing the running fleet and availability of parts for repairs. The Conservation and Preservation Objectives include



to 'undertake priority projects to recover or enhance the heritage value of key items in the collection' which involves the restoration of certain vehicles such as the Matilda II to working order, and to 'develop the facilities and skills required for the ongoing care, conservation and restoration of our vehicle fleet' (The Tank Museum 2018b), indicating a need to further the skills and decision-making frameworks for collections development and display.

### 2.2.3. Event Days at The Tank Museum

There are two main types of event days with running tank displays in the arena at The Tank Museum: Tankfest and Tiger Day. The Tank Museum also has running tank displays during school holiday periods.

Tankfest is a three-day event that takes place at The Tank Museum at the end of June each year. Presented by World of Tanks, a Wargaming game (www11;www12), it is described as 'the world's biggest and best live display of historic armour, living history, and much more at the Home of the Tank' (www11). It is the biggest yearly event at The Tank Museum, generating over 12% of The Tank Museum's annual revenue and attracting international visitors (The Tank Museum 2018b). In 2020 the event was streamed online and received 180,000 views (www13), indicating a virtual demand to see and hear vehicles in action. Thus, events at The Tank Museum are popular and their income aids the preservation of the museum's collection.

The Tank Museum also holds two sell-out Tiger Days a year featuring the running Tiger 131 (www14). Tiger Day 16 (23<sup>rd</sup> April 2022) was advertised as an opportunity to 'see a WWII tank display and explore The Tank Museum on a day dedicated to the world's most infamous tank' (www15). Tiger Days therefore rely on the Tiger 131 to provide a unique experience for visitors.



*Figure 20. Image of the running Tiger 131 at The Tank Museum Source: [www16](#).*

Vehicles have a limited running life and this reliance on live demonstration events highlights one of the key strategic risks at The Tank Museum, that of vehicles degrading to a non-operational level (The Tank Museum 2018b). The Tank Museum's forward plan identifies the reliance of the Tiger days on the one running Tiger 131 and the high likelihood of the vehicle failing at some point and requiring further repair. The finite lifetime of running vehicles raises questions about which vehicles should run, and for how long.

### 3. Conservation Ethics

#### 3.1. Conservation Routes at The Tank Museum

When making the decision to run a tank at an event or display it in static condition, different conservation routes must be considered. Preventive conservation can be defined as slowing down the rate of change or deterioration. It involves making changes to the condition in which objects are kept, rather than altering objects themselves (Staniforth 2013 xiii) . Interventive preservation or consolidation affects the object directly and involves carrying out treatment to improve its condition (Staniforth 2013 xiii). If it is decided that an object would produce more value for visitors through a conservation route that focuses on aspects other than just the preservation of the tangible materiality, other conservation routes such as restoration, reconstruction or adaptation should be considered (ABTEM 2018, 80). Restoration, reconstruction or adaptation, unlike preservation, often involve noticeable changes (Muñoz-Viñas 2009,54, 2011,25). An object can also be replicated for visitors to experience demonstrations without causing wear and tear to the actual object. Different conservation routes can therefore be used to conserve different values of a vehicle. Table 3 gives the definitions of different conservation routes that involve noticeable changes.

Conservation Route	Definition	Notes
Restoration	‘Returning...to a known earlier state by removing accretions or by reassembling existing elements without the introduction of new material’ (BSI 2011,11; Australia ICOMOS 2013,2).	<ul style="list-style-type: none"><li>Some definitions of restoration include the introduction of a small amount of new materials (FIVA 2017; ABTEM 2018).</li></ul>
Reconstruction	Introduction of ‘a significant amount of	<ul style="list-style-type: none"><li>Reconstruction is often carried out when worn parts cannot be replaced</li></ul>

	new material' (ABTEM 2018,30) to 'return to a known earlier state' (BSI 2011,13; Australia ICOMOS 2013,2).	<p>with parts of a similar age, and so new parts must be made.</p> <ul style="list-style-type: none"> <li>• New parts may also be used where the use of an old part will not greatly lengthen the object's lifespan (ABTEM 2018,30).</li> <li>• The parts that are removed during reconstruction should be recorded and stored (ABTEM 2018,29).</li> </ul>
Adaptation	Changes to a place or object 'to suit the existing use or proposed use' (Australia ICOMOS 2013,2).	<ul style="list-style-type: none"> <li>• Adaptation can ensure the object conforms to current health and safety standards, make the object more environmentally friendly, or enables the object or place to have a new use (ABTEM 2018,32).</li> <li>• Although some historic originality will be removed when the building or object is altered to suit modern use, adaptation ensures that historically significant buildings and objects remain in existence through creating an income to contribute towards their upkeep (The Landmark Trust 2017,2).</li> </ul>
Replication	Producing a 'copy of an object' (ABTEM 2018,81).	<ul style="list-style-type: none"> <li>• Replicas do not directly affect the object, so can ensure the object is kept static to preserve the original materials while giving audiences the opportunity to understand how the object functioned (Kearon 1999; Newey 2000).</li> <li>• Replicas can: <ul style="list-style-type: none"> <li>○ show the original appearance of an object (Caple 2000,123),</li> <li>○ operate and demonstrate other sensory aspects that the original, now static, object cannot (Newey 1999; Caple 2000; ABTEM 2018)</li> <li>○ may incorporate design changes to work more effectively than the original (ABTEM 2018,35).</li> </ul> </li> </ul>

		<ul style="list-style-type: none"> <li>○ can be run in ways that may not be possible with the original due to the risk of wear and tear (Fletcher <i>et al.</i> 2013,154).</li> <li>○ can be used to test hypotheses concerning manufacturing, operating and social impacts of objects (Gordon 1993,77; ABTEM 2018,35).</li> <li>● All replicas should be clearly marked as such (ICOM 2017,26).</li> <li>● The cost of building and maintaining a replica must be considered, as well as adequate storage space (Wain 2017,82-83).</li> </ul>
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Table 3. Table showing the definitions of restoration, reconstruction, adaptation and replication.

An additional conservation decision is to not carry out any interventive work. This decision may be reached based on a condition report, or because work elsewhere is prioritised and resources are limited (Taylor *et al.* 2008,7).

The conservation route chosen depends on assessment of the most significant value of an object or vehicle. Attributing significance is a complex decision-making process as many values are subjective and may change with time (Mason *et al.* 2000,16).

Conservation routes can be placed on a sliding scale based on the level of intervention. There are many different sliding scales of conservation decisions, each with slightly different categories and differing definitions of what fits into each category (Feilden 1982,27; Hume 2007,18; Taylor *et al.* 2008,5; Australia ICOMOS 2013,2). From these, the following scale of general conservation routes has been produced:

1. Do nothing
2. Preventive measures
3. Interventive preservation or consolidation
4. Restoration
5. Reconstruction
6. Adaptation

Replication does not fit on the scale as it does not affect the original object directly (Taylor *et al.* 2008,5).



Each route can also be carried out to varying extents, for example, replacing one small component may retain more historic evidence in situ than large scale reconstruction that affects many parts of the object (Hume 2007,18). A conservation project may involve more than one of these routes in the overall process, for example, one part may be consolidated while another is restored (ABTEM 2018,30) and preventive measures should constantly be carried out. When the scale is applied to a working object that is no longer running, the first three result in a static vehicle; a vehicle that does not move. The last three bullet points can result in a running vehicle; a vehicle that moves under its own power.

### 3.2. Should an Object be in Running Order?

When considering whether or not an object should be maintained, restored, reconstructed or adapted to working condition, the current arguments for and against running must be explored (Newey 2000,137).

Debates for and against working objects have expanded since the 1994 *Standards in the Museum Care of Larger and Working Objects*, which briefly states a few reasons for and against working objects, before moving onto the practicalities of doing so (MGC 1994, 25). The 1997 publication engages further with the debate, offering a longer list of reasons (Ball 1997, 24-26). The 2009 (Ball) update appears to be a copy of the 1997 text. The most recent publication (ABTEM 2018) provides a more comprehensive set of arguments on both sides of the debate and indicates a greater understanding of intangible factors, stating that the 'atmosphere' is an important aspect of running historic vehicles (ABTEM 2018, 20). These factors, amongst others, are discussed below.

#### 3.2.1. Against Running Objects

The main argument against running objects is that of the resultant damage to historic fabric (MGC 1994,25). Historic materials are primary sources of evidence for information about the past (Keene 1994,20), meaning that the static object can inform the audience or researcher about certain aspects of the object, such as technological advances, aesthetic changes (Brenni 1999,19) or material science. Thus, the material of

the object and the object as a whole are valued as a historical document (Caple 2000,146).

When machines are run, this material evidence is worn and damaged (Mann 1989,370; Newey 2000,137). If the machine is to continue operation, these parts will irreparably wear (Newey *et al.* 1999,12; ABTEM 2018,18,23), and so must be replaced (Brodie 1994,28,29; Mann 1994,136; Clavir 2002a,62; Fletcher *et al.* 2013,154; Wain 2017,81). Often the replacement is a new part to ensure the working lifetime of the object is extended, to make running more efficient, because the parts are no longer available or to comply with modern health and safety requirements (Newey 2000,138; Wain 2017,85). Even if the replacement is new old stock (a part contemporary with that being removed but never used) it can still be argued that this replacement is not authentic to the machine. As more parts are replaced over time, the machine loses its originality and authenticity, and material information is lost (ABTEM 2018,31). If this was to continue, then eventually the machine would have no original parts (Newey 1999,163; Newey *et al.* 1999,11; ABTEM 2018,31). This issue can be encapsulated in the Ship of Theseus paradox which asks the question: if a ship has all of its parts slowly replaced over time, is it the same ship? (Garrett 1985,212). Usually, it is argued that this is the same ship, but materially different (Gallois 2017,8). Thus, material authenticity and material originality are compromised if a machine or vehicle runs (Caple 2000,146; Clavir 2002a,62). The scientific and historical evidence value of a running object depreciates over time as this evidence is worn away (Wain 2017,86; ABTEM 2018,18).

Due to the fact that running a vehicle results in wear and tear and subsequent removal of historically significant parts, it may be decided that a particular vehicle is too significant to be run (Newey *et al.* 1999,163; ABTEM 2018,18). This significance may be due to the object being a complete example or a type specimen (Newey 2000,138). For example, The Tank Museum has decided not to continue running its Mark IV, which was last driven in the 1980s, as there are only seven known examples left (Fletcher *et al.* 2013,153). It was noted that the side of this tank began to split after the public access to the interior was enabled, so now only school groups are allowed inside the tank (C. Cooper 2018 pers. comm. 27<sup>th</sup> April). Another example is that of a Whippet at the Tank Museum which was refused funding by the HLF in the 1990s as it

was seen as a 'historic time capsule' (Fletcher *et al.* 2011,68) whose significance would be greatly reduced if it was returned to running order. The Whippet tank is associated with Lieutenant Cecil Sewell who, in the First World War, dismounted the tank to save the crew of another tank, and was killed doing so. He was awarded the Victoria Cross (www1). This shows that associated historic events may result in a machine remaining in static condition.

If an object that is not functional is restored to running order, then the part of its history that resulted in it no longer functioning is ignored (Clavir 2002a,62). Many objects were only given to museums when they ceased to function, so they are preserved because they cannot run (Clavir 2002a,62). The events surrounding the end of the working life for the object may have involved deaths, and so it would be insensitive to restore that object to running order. It may be seen as erasing or refusing to acknowledge these deaths if the machine is restored (Wain 2017,82). The object's complete history should be considered when deciding to keep it in static or running display.

There are tanks in The Tank Museum which have come straight from the factory line; in these instances, it can reasonably be argued that the tank contains its original parts, was never thoroughly run, and so should remain static. One such tank is the Churchill Mark VII Crocodile (Figure 21). This was the last Churchill Mark VII tank to be produced by Vauxhall in October 1945 when it was sent directly to the School of Tank Technology, then transferred to the Tank Museum in 1949 and is described as having 'practically no mileage beyond its acceptance test' (www2). There is a strong argument to keep this tank static, as it has few alterations, and so provides an important material record for present and future museum users.



Figure 21. Image of the Churchill Mark VII Tank at The Tank Museum on static display. Source: [www2](#).

Reduction of historic integrity has occurred in the past when machines have been restored to a false original. Traditionally, vehicles were restored and reconstructed to look brand new, with engineers using such projects to showcase their abilities (Caple 2000,142; Newey 2000,139). It was thought that worn surfaces meant a vehicle was neglected (Newey 2000,138), so parts and upholstery were replaced and surfaces repainted (Brodie 1994,29). The replacements and paints were often modern rather than historic (Newey *et al.* 1999,11) and this ‘showroom’ condition removed features that were seen as imperfections yet were a material record of the history of the vehicle (Brenni 1999,20; Newey 1999,11), and added a sense of material authenticity. They attributed to the vehicle’s significance through conveying historic, material and technical information. These vehicles were no longer original and may never have looked as they did after reconstruction. Thus, these traditional methods of restoring and reconstructing meant that an object’s history was not accurately portrayed.

The practical side of restoration and reconstruction must also be considered. There are costs involved with replacing parts (ABTEM 2018,20), training and keeping skilled members of staff, providing adequate workspace and equipment, renewing licenses and other legal requirements (Caple 2000,146; Wain 2017,86). Money is not only needed for the initial restoration project, but for continuous maintenance thereafter to ensure the vehicle keeps running (ABTEM 2018,20). Due to limited

museum budgets, only a proportion of vehicles in a museum can be maintained in working order (Mann 1994,1994) and it may be decided that some vehicles cannot be run in order to focus resources on keeping other vehicles functional.

Health and safety risks may be so great that it is not considered safe for a machine to be functional (Caple 2000,146; ABTEM 2018,21). For example, the risks associated with flying a historic plane include risk to life as well as risk of catastrophic failure of the object (Mann 1989,375; Ashley-Smith 2011,20; Fletcher *et al.* 2013,153). It must be decided whether a risk can be mitigated, such as the removal of asbestos (Newey 2000,139), or whether it is too great to run the machine.

### 3.2.2. For Running Objects

The notion of originality can also be applied to arguments supporting functioning historic vehicles. Machines and vehicles were made to move; often this was their original primary purpose and reason for being (Beerkeens *et al.* 2005; Wain 2017,91). When the decision is made to keep these vehicles static, their most important aspect and authentic purpose is not shown to the public. Some working objects were produced for their aesthetic values, such as clocks, and so it may be acceptable for these to remain static and still retain value related to their primary purpose (Newey 2000,138). However, this is not the case with industrial and military machines; the integral significance of these objects lies within their movement (Keene 1994,20; Caple 2000,143; Wain 2017,81). Although tanks were built to appear intimidating, this aesthetic purpose would have little impact if they were unable to move. Thus, the main argument supporting the continuation of functioning vehicles in museums is that, for some machines, their function is of greater importance than their use as material evidence (Mann 1989,383, 1994,136; MGC 1994,22).

When a moving object can work and perform its primary role, its history and purpose can be understood more completely (MGC 1994,25; Clavir 2002a,62) which is particularly beneficial for the majority of visitors who are non-specialists (Newey 2000,138). Seeing a static object does not enable these visitors to fully comprehend how it may have moved, so its function and significance is not wholly conveyed (Henderson 1999,18; Newey *et al.* 1999,161; Walker 1999, 129; Clavir 2002a,63). The

HLF funded the building of a £1m arena at The Tank Museum in which to parade the vehicles, thus recognising the importance of running vehicles as part of the work of The Tank Museum (Fletcher *et al.* 2011,68). This indicates that moving objects are a greater interpretation tool than those that are static (ABTEM 2018,19).

Moving objects do not just demonstrate how they worked, but can enable people to make personal connections through seeing the social story behind the object (Caple 2000,140; Wain 2017,83). Machines were made and used by people (Jones 1993,182; Lubar 1993,187; Maquet 1993,31) and their original significance is embedded in this use, so to retain this significance they must continue to be used by people and thus kept moving (Linsley 1980,46; Caple 2000,140,143).

The understanding and sense of personal involvement in experiencing an object moving is not solely visual but multi-sensory. Sounds, smells and vibration (Gordon 1993,88; Newey *et al.* 1999,163; Fletcher *et al.* 2011, 85) enable visitors to have a greater emotional response by adding to the intensity and the apparent 'reality' through creating a multi-dimensional experience (Henderson 1999,2; Caple 2000,140; Wain 2017,83). Movement of objects has great value in stimulating senses to produce an emotional reaction and involved understanding.

Another argument for keeping vehicles in a functional state is that they were often modified during their lifetime with parts that were seen as consumables (Nissan *et al.* 1999,42; Newey 2000,138; ABTEM 2018, 39), so material significance will not be greatly reduced if these parts are replaced. This calls the notion of originality into question; the vehicle's original state is already lost, and so keeping it static will not achieve the retention of material authenticity. For example, the Tiger 131 at the Tank Museum was analysed at Chobham so the army could gain intelligence on enemy tanks (Fletcher *et al.* 2011,66). This resulted in the modification of the tank. Thus, if a vehicle's parts have already been replaced, then further modification may not be deemed such a threat to the historic integrity of the vehicle.

By maintaining vehicles in working order, expertise and skills are preserved (MGC 1994,25). Many of the skills needed to restore and maintain vehicles are 'tacit knowledge that can only be acquired with practice and demonstration' (Gordon 1993,75; ABTEM 2018,31), so must be passed down through generations learning and

utilising such skills. This knowledge and skill adds to the object's significance, and so should be conserved (Henderson 1999,1; Wain 2017,91). Such skills may be at risk of being lost if museums do not take steps to preserve them. For example, when The Tank Museum restored the Tiger 131, they needed to learn the skills that were specific to the tank (Fletcher *et al.* 2011,78). If these skills are not passed on, then dissociation can occur, resulting in loss of value (ICOMOS 2011,5; Adams 2018,12). Traditional skills, heritage skills and conservation skills can tell us how an object was made and how it works, giving us a greater understanding of the object's significance. By preserving skills, the intangible associated memories and social histories can be preserved (ICOMOS 2011,1). Museums can also provide people with valuable skills which can help the museum become more resilient whilst contributing to the local economy and community (Heritage Fund no date,1; Bhati *et al.* 2014,120); [www3](#)). Thus, it can be argued that museums have a duty not just to preserve objects, but to preserve associated skills (1999,163; Newey 2000,139).

An example of efforts focusing on the preservation and teaching of heritage skills include the Heritage Skills Academy in Bicester Heritage (Figure 22). The Tank Museum currently has two apprentices training with the Heritage Skills Academy, which was established in 2016 'to ensure that the world's automotive engineering heritage is maintained and the skills to maintain it are preserved for future generations of engineers and enthusiasts' ([www4](#)). They found that modern light vehicle courses did not cover aspects such as the history of vehicles, how to return a vehicle to running order from long-term storage, the mechanics of older vehicles and parts found in historic vehicles that are not used in modern ones such as trembler coils, magnetos and distributors (J Pitchforth 2020, pers. comm. 19<sup>th</sup> May). Apprentices can train as a Vehicle Mechanical Technician or Coachbuilding and Trim Technician. Each course takes 3 ½ years (J Pitchforth 2020, pers. comm. 19<sup>th</sup> May). About 60% of the training is practical, and there is an emphasis on kinaesthetic learning through touch, smell and sound (J Pitchforth 2020, pers. comm. 19<sup>th</sup> May). All of the apprentices are employed from the start of the course, which means the course results in real employability and skills benefits, with 70 apprentices being trained in the first year (J Pitchforth 2020, pers. comm. 19<sup>th</sup> May), showing its success and consolidating the need for such a course.

The site upon which the Heritage Skills Academy is based, Bicester Heritage, also preserves heritage. The site is an ex-RAF base dating from 1918 (Cherwell District Council 2008,7,8) and was designated as a conservation area in 2002 (Reading *et al.* 2003,15). There are now over 40 specialist heritage vehicle businesses on the site (www5), one of which is the Heritage Skills Academy. By sympathetically altering buildings for modern use, the site preserves its history. Thus, the Heritage Skills Academy successfully meets the needs of training apprentices in the skills required by heritage institutions. By ensuring apprentices are employed from the very start, it gives them lasting benefits as well as the institutions. The site of Bicester Heritage is an embodiment of continuing use to preserve history through the sympathetic repurposing of built heritage.



*Figure 22. The Heritage Skills Academy at Bicester Heritage. In addition to teaching vehicle conservation skills, the HSA is housed within a historic RAF base, thus also preserving built heritage. Source: author.*

Although there is a strong argument for materials acting as an evidential record for archaeological materials, for which there often is little or no documentation (Gordon 1993,74), it is not as strong for objects which have lots of available written evidence (Caple 2000,142). Diagrams, drawings and accompanying texts are often available for machines produced in the last few hundred years (Mann 1994,137; Caple 2000,142). Thus, there is less stress on the value of these objects as evidence. Original parts or samples of original parts, when replaced, are often stored (Keene 1994,20) and so are still available for scientific analysis (ABTEM 2018,34), regardless of whether the object itself is running.



Documentary evidence is researched when an object is restored to working condition (MGC 1994,22) with an aim of achieving historical accuracy (Drury *et al.* 2008,9; Kennedy 2015,217). Consequently, knowledge about the object within a museum may actually increase. For example, when the Tiger 131 was restored, German wartime manuals were translated into English, thus adding to the museum's knowledge about the tank (Fletcher *et al.* 2011,79). It is important to document change during restoration and reconstruction of objects to running order (MGC 1994,20), ensuring that information is not lost and will itself act as a historical record (Malaws 1997,75).

The arguments for keeping a vehicle static that centre around the preservation of historic material do not always account for continuing deterioration in static objects. Vehicles will still deteriorate if static; lubricants are not spread between metal surfaces so surfaces corrode (Wain 2017,85), stress points are not moved (MGC 1994,25) and weight bearing parts of rubber components such as tyres will flatten. This is not to say that movement does not cause wear and tear; vehicles should be run carefully (MGC 1994,26), and unpowered motion may be a better option for some objects (Wain 2017,90). But objects cannot be preserved in perpetuity regardless of whether they are static or not. Therefore, their limited lifetime should be used in a way that has the best impact on visitors; this may be through keeping them in running order to carry out demonstrations.

### 3.2.3. Summary of Arguments for and Against Running

Theme	Against Running Objects	For Running Objects
Originality and degradation	<p>Wear and tear and replacement of parts will result in the loss of historic integrity.</p> <p>Removal of historic integrity has occurred in the past when machines have been restored to a false original.</p>	<p>Vehicles were often modified throughout their working life, so not all parts will be original. Parts that wear the most often during running are likely to have already been replaced.</p> <p>Machines and vehicles were made to move; this was their original purpose and reason for being.</p>

		<p>Objects are constantly degrading and will never be in true original condition.</p> <p>Keeping a vehicle in running order can prevent deterioration, for example by spreading lubricants and moving stress points.</p>
Evidence	<p>The historic material can be a source of evidence:</p> <ul style="list-style-type: none"> <li>• Historic objects can add to the historical record or provide evidence where there is little historic record.</li> <li>• Historic objects can show technological or aesthetic changes.</li> <li>• Materials and construction can provide scientific evidence.</li> </ul> <p>Running results in the loss of this evidence.</p>	<p>Diagrams, drawings and accompanying texts are often available for machines produced in the last few hundred years, so there is less stress on the object itself as the sole source of evidence, as may be the case with other museum objects.</p> <p>Original parts, when replaced, are stored so are still available for analysis.</p> <p>Documentary evidence is researched when an object is restored to working condition, so knowledge about the vehicle may increase.</p>
Historicity	<p>The fabric of the object may have particular historic significance such as being a complete example, type specimen or associated historic events.</p> <p>If an object that is not functional is restored to running order, then the part of its history that resulted in it no longer functioning is ignored.</p> <p>An object may not have run during its working lifetime. To run it in a museum would ignore its history.</p>	<p>Experiencing a moving object can enable its history and purpose to be greater understood.</p> <p>Machines were made and used by people, so running objects can enable people to understand the social history behind the object.</p>
Practicalities	<p>Restoration and reconstruction require resources, as does subsequent maintenance.</p> <p>Health and safety risks must be considered, as it may not be</p>	<p>It should be noted that static display also requires resources (although often not as much as a functional object).</p>

	safe for a machine to be functional.	
Sensory experiences	Static vehicles can provide sensory experiences through touch, visual and accompanying interpretation.	Sound, smells and vibration enable visitors to have a greater emotional response and involved understanding.
Intangible heritage	The fabric of the object may have intangible historic significance, which cannot be truly realised without the material remaining in situ.	Maintaining vehicles in working order conserves the intangible heritage of skills and expertise.

*Table 4. A summary of the current arguments for and against the running of historic vehicles in heritage collections.*

Both sides of the argument encompass the tangible and intangible. The arguments against running vehicles rely on the notion that the material authenticity of the object is of primary significance (Mann 1989,370), while the arguments supporting running vehicles assert that the function of the vehicle is of highest significance (MGC 1994,22). Whether or not an object is to run depends on which aspects are deemed to be of greatest value.

### 3.3. Previous Reasoning Behind Restoration to Running Order

Previous decision-making records provide information about the criteria on which it has been deemed acceptable to make the decision to restore or maintain a vehicle in order for it to run in the past, so provides a basis upon which to consider the question of displaying a vehicle in static or running condition. Such criteria are usually determined by funding bodies, as they enable the realisation of projects. Funding requirements will initially be examined, followed by a review of a previous successful funding application leading to restoration of The Tank Museum's Matilda II tank.

#### 3.3.1. Funding

Funding can be achieved through applying to organisations such as the National Lottery Heritage Fund, Arts Council England (ABTEM 2018,14), or to regional and national charitable trusts and foundations. As there are hundreds of individual heritage trusts and foundations, each with their own funding stipulations (Shone *et al.* 2017), these will not be discussed in further detail.

#### 3.3.1.1. The National Lottery Heritage Fund

The National Lottery Heritage Fund supports the acquisition and conservation of UK projects by funding projects to realise heritage values (ABTEM 2018,80). Since 1994, National Lottery grants have been distributed to more than 44,000 heritage projects (Heritage Fund 2019,10). The National Lottery Heritage Fund define heritage as ‘anything from the past that you value and want to pass on to future generations’ (www2). The National Lottery Heritage Fund strategy focuses on the value, preservation, contribution and impact of funded heritage projects, stating ‘it’s not enough to save something – you’ve got to make it live’ in order to contribute to the economy, society, communities and wellbeing (Heritage Fund 2019,2,14). The use of the word ‘live’ conveys the notion of bringing objects and places out of the past and into the present to benefit both individuals and communities.

Table 5 shows the National Lottery Heritage Fund’s outcomes and strategic objectives. The organisation focuses on the potential of funding to improve the condition, value, inclusivity of museum objects and experiences, the increased education, skills, wellbeing of people and communities and the resilience of organisations and beneficial economic impact. This looks at the value of objects themselves, and their impact on audiences and communities. Every project awarded funding must achieve the mandatory outcome of ‘a wider range of people will be involved in heritage’ (www3). This demonstrates that access and inclusivity is a priority.

Outcome	Strategic objective
Heritage will be in better condition	We will continue to bring heritage into better condition
Heritage will be identified and better explained	We will inspire people to value heritage more
A wider range of people will be involved in heritage	We will ensure that heritage is inclusive
The funded organisation will be more resilient	We will support the organisations we fund to be more robust, enterprising and forward looking
People will have developed skills People will have learnt about heritage, leading to change in ideas and actions People will have greater wellbeing The local area will be a better place to live, work or visit	We will demonstrate how heritage helps people and places to thrive
The local economy will be boosted	We will grow the contribution that heritage makes to the UK economy

*Table 5. Table showing National Lottery Heritage Fund outcomes and strategic objectives. Source: Heritage Fund 2019,49.*

The National Lottery Heritage Fund also prioritises heritage that is considered at risk. This includes tangible or intangible heritage and cultural practices that may be lost or neglected (Heritage Fund 2019,16). These funding stipulations show a consideration of the intangible and physical fabric of objects, buildings and places.

### 3.3.1.2. Arts Council England (ACE)

The Arts Council distributes funds from the National Lottery and the government to people and organisations across England (www4). This can be used for a range of projects, including art, music and heritage (Shone *et al.* 2017,7).

The Preservation of Industrial and Scientific Material Grant Fund (PRISM) was established in 1973 and closed in 2018 (ACE 2016b,3, 2018d,4)(www5). The aim of PRISM was to fund the 'acquisition and conservation of individual objects and

collections which are recognised for their importance in the history and development of science, technology, industry, and related fields' (ACE 2018d). It supported over 580 organisations to acquire or conserve almost 2,200 objects (ACE 2018d,4). A significance assessment formed an important part of the decision-making process in order to prioritise what objects were seen to be of greatest importance. Priority was given to items of national significance (ACE 2017,11). Thus, notions of historical value formed a large part of the assessment criteria.

Other stipulations of PRISM funding included a plan of how the public will access the object and be informed about the object (ACE 2017,11). It can be argued that collections only truly have value when people see and interact with them; without access, the value of the project is lost. Access and visitor engagement was certainly an important part of the decision-making process.

Current funding for museums can be accessed through the ACE National Lottery Project Grant (ACE 2019a). The four main criteria when assessing projects are quality, public engagement, finance and management. The finance and management sections look at the feasibility and practicality of carrying out the project. The quality aspect focuses on the importance of the project and how it will enable new audiences to be reached or develop the organisation (ACE 2019a,23, 2019b). This emphasis on audiences is reiterated in the public engagement section (ACE 2019a,29). ACE writes 'we want as many people as possible to engage with arts and culture, and so every project we support must reach people in England' (ACE 2018c,3). ACE write that they look for applications that 'will be interesting, challenging or inspiring' or 'offer something new for audiences' (ACE 2018c,3). ACE also want to fund projects that are authentic, or provide 'real' experiences (ACE 2018b,6). ACE focus on visitor and public engagement when assessing funding applications and ask for novel and impactful projects. When comparing the priorities for PRISM funding against the more recent ACE National Lottery Project Grant Funding, there appears to be a shift in priorities from historical value to value for users.

### 3.3.1.3. Summarising Funding Priorities

The stipulations for current National Lottery Heritage Fund and Arts Council England can be summarised into four main themes, as displayed in Table 6. The main criteria for funding appears to be based on public and community value, benefits to heritage, improved organisational resilience and the practicalities of carrying out the successfully funded project. The National Lottery Heritage Fund considers the significance of both tangible and intangible heritage. From looking at the change from the PRISM fund to the ACE National Lottery Project Grant, the focus on audience engagement appears to be increasing over time.

Theme	Specific Stipulation in Funding Guidance
Offer public or community value	<ul style="list-style-type: none"><li>• Engage the public</li><li>• Ensure value for users</li><li>• Offer authentic experiences</li><li>• Offer of something new</li><li>• Develop skills</li><li>• Educate the public</li><li>• Improve wellbeing</li><li>• Boost the local economy</li></ul>
Benefit heritage	<ul style="list-style-type: none"><li>• Identify and explain heritage</li><li>• Benefit the condition of the heritage</li></ul>
Benefit the organisation	<ul style="list-style-type: none"><li>• Develop the organisation</li></ul>
Take practicalities into account	<ul style="list-style-type: none"><li>• Provide feasible and practical project plans</li></ul>

*Table 6. Table summarising funding stipulations from ACE and NLHF guidance. Sources: ACE 2018b, 2018c, 2019a,23, 2019b.*

### 3.3.2. Case Study: Matilda II

The restoration of the Matilda II at the Tank Museum was funded by a £19,950 PRISM fund and a £10,000 grant from the David Webster Charitable Trust (ACE 2016b,14; Schaardenburg 2018,16); www6). In the ACE PRISM Fund Annual Report (2016b,14), the description of the project was heavily focused on the historic significance of the Matilda II tank, stating it ‘was the only British tank to see service throughout WW2...fighting to great effect against the Italian Army and the Africa Corps

in North Africa in 1940-1942...the tank could withstand any known anti-tank gun of its day as well as most other artillery' (ACE 2016b,14). This description was taken from the application written by The Tank Museum (The Tank Museum 2016,5). This application (The Tank Museum 2016,5) also discussed how the 'The Tank Museum's Matilda 2 will be the only running Matilda 2 tank in the Northern Hemisphere' (Figure 23), showing its uniqueness and equating this to value. This focus on the historic successes of the tank, and the uniqueness of the project shows that PRISM funding placed emphasis on the historic importance of objects.

In addition to asking about the significance of the object, the application form also asked for information on the proposed conservation work, and how visitors will access the object during and following conservation. The application stated that 'behind the scenes' tours would take place during the project as well as educational activities, social media and website coverage. Afterwards the tank was to return to public display, running on event days. This shows that the priorities for project decision-making for the PRISM scheme lie in the value of the object, the practicalities of the work, and the impact on visitors.



Figure 23. The Matilda II in running condition on an event day. Source: [www7](#).

Another method of engaging visitors in the project was *The Matilda Diaries*, a series of videos broadcast on YouTube following the restoration ([www8](#)). There were 26 videos, including 2 specials, produced between May 2016 and January 2019. The videos have an average of 21,250 views each. This clearly engages a large online





### 3.4.A Historiography of Conservation Ethics: Conserving Objects and Conserving Value

Before considering whether a tank should be displayed in running or static condition, conservation ethics must be explored. Professional and public opinions do not remain static and are subject to change over the short and long terms. Conservation ethics reflect these changes and the relatively recent shift from a focus on objects to a values-led approach in the heritage sector is particularly relevant to this study.

#### 3.4.1. The Concept of Originality

Conservation theory has traditionally focused on valuing notions of originality (ICOMOS 1964,1; Knell 1994,16; Laurenson 2006,3; 2014,2). Although there are varying concepts of originality in heritage, it can broadly be defined as relating to a point of origin (Wain 2011,496) which may focus on the creation process, materials or creator (Reed 2018). As a result, the historicity and authenticity of an object was stated to be of primary importance (ICOM 1984; Sloggett 2014,2; Scott 2015,291) and was found within the material aspects of the object, with objects seen as things to be read (Clavir 2002b xvii). Conservation management decisions consequently centred on minimising change that was deemed to degrade this material originality (Avrami *et al.* 2000,66; Laurenson 2006,3).

If an object is original, it provides a more complete historical record (ICOM 1984). This is a particularly useful concept in archaeological contexts where little accompanying written evidence (Gordon 1993,74) means the form and function must be interpreted from the object itself, aided by scientific analysis (Monnier *et al.* 2018). Original objects may also produce more meaningful and memorable experiences for visitors, as they provide a way of directly engaging with the past (Barthel 1996, 345). The originality of an object is important in acting as evidence, thus forming our understanding of the past.

From this perceived value in originality, conservation decisions focused on preserving material originality, as seen through the established concept of minimal intervention which gained prominence from the 1950s onwards (Hume 2007,16; Muñoz-Viñas 2009,48; BSI 2013,10). Minimal intervention has since been critiqued

through arguments that the term itself is an oxymoron, and that there is no universal definition of 'minimal' (Muñoz-Viñas 2009,49-51). Thus, a more pragmatic approach is now accepted, as seen in The Burra Charter (Australia ICOMOS 2013,1) which states 'do as much as necessary to care for the place and make it useable, but otherwise change it as little as possible so that its cultural significance is retained'. This shows a compromise in preserving originality whilst enabling use to retain value (Earl 2003,67).

Another way of theoretically preserving originality is through aiming for reversible conservation treatments (Brenni 1999,23; Meehan 1999,11; Newey *et al.* 1999,12; Wallis 2015,265). Any treatments that are found to be harmful can be removed (Kennedy 2015,218), and scientific information from the object can be obtained in the future (Smith 1999a,7) as the original state of the object can be re-established. But there are issues with this. Most conservation treatments cannot be fully reversible, and some treatments, such as in the case of cleaning corrosion, are carried out with the aim of being irreversible (Ashley-Smith 1999; Charteris 1999; Oddy 1999; Smith 1999a; Hume 2007). In addition, deterioration continues after conservation treatments have been carried out, and so true reversibility cannot be achieved (Schinzel 1999,43; Smith 1999b,99). Although there is an established concept of reversibility, it is also generally acknowledged that this is not always possible.

Other issues arise around the notion of originality itself. An object may be considered original at different times by different people (Muñoz-Viñas 2011,17; ABTEM 2018,28). Even if a point in the object's history is agreed as the point at which it is original, this may not be the most informative or valuable version of the object (Kline 2001,170) as changes throughout an object's lifetime may have altered or increased its significance. It may be more beneficial to display an object with these changes rather than restoring it to its supposedly original appearance and form. (C. van Schaardenburgh 2018 pers. comm. 17<sup>th</sup> March).

The concept of originality also ignores the fact that objects are constantly degrading (Staniforth 2011,35; Wallis 2015,261), albeit slowly. For example, light causes fading of colours and loss of strength in certain materials such as plastics and textiles (Bullock *et al.* 2011). Fluctuations in relative humidity cause organic objects to shrink and swell, potentially leading to warps and cracks if the material is restrained (MGS 2016). High relative humidity can also cause corrosion of metals, and relative

humidity fluctuations can cause efflorescence on materials such as ceramic (BSI 2012,25). Pests can damage organic objects (Child 2011,81) and pollutants can cause chemical deterioration (BSI 2012,14). Therefore, the aim of a true originality will never be attainable.

The traditional focus on material authenticity gave rise to the dichotomous scales of access and preservation; access was seen to negatively impact the preservation of materiality (Hillhouse 2009; Stubbs-Lee 2009; Price 2013; Das 2019; Williams *et al.* 2019). This view that material preservation is in conflict with access can be found within a variety of conservation literature (Hillhouse 2009,2; Williams *et al.* 2019). For example, fading of pigments in prints as a result of light exposure during public access has been equated to 'loss of value' (Brokerhof et al. (2008)). Preservation is usually considered as the preservation of material originality and integrity (Bülow *et al.* 2018,36), consequently public access to heritage is often posed against the material preservation of objects, buildings and places.

The argument of originality puts material authenticity at the forefront of conservation theory. This has resulted in the theoretical aims of minimal intervention and reversibility when carrying out conservation work. However, it has since been acknowledged that these aims are not always the practical solution. Additionally, the concept of originality does not always align with notions of significance, as a change in an object's life may be of greater significance than its original form; objects are constantly changing so true originality is not attainable. The traditional focus on preservation of material originality placed value on just the tangible aspects of the object, thus resulting in the notion that access to the object would be detrimental to its long-term preservation.

#### 3.4.2. The Change to a Value-Led Approach

More recent conservation ethics state it is the *value* of places, buildings and collections that should be conserved for both present and future generations, rather than materiality (Drury *et al.* 2008,19; Australia ICOMOS 2013,1; BSI 2013,9; MA 2015b,7), moving the focus from originality to concepts of value. Other aspects deemed valuable are consequently included in addition to the material aspects, such as function or sensory outputs (ABTEM 2018,36). It may be decided that these intangible features are more significant than the retention of material originality

therefore it is more appropriate to take a more interventive conservation route other than simply maintaining an object in its current state, such as restoration, reconstruction or adaptation (discussed in 3.1 Conservation Routes).

While the concept of originality often resulted in the idea that access negatively impacts upon preservation, a value-based methodology moves beyond this. When values such as the preservation of heritage skills of those who built and maintained working objects, functionality, purpose, and sensory aspects are considered, it becomes clear that access and preservation are not always on opposing ends of the scale. Access can be seen as an opportunity and benefit rather than a risk for preservation. Without access, the value of objects cannot be realised, and without value, there is little reason to preserve objects. Ascribing value to access as well as preservation shows that the argument of access *versus* preservation is too simplistic.

Although decay of an object may negatively impact its value, condition and value do not always correlate directly (Taylor *et al.* 2008, 8; Ashley-Smith 2011,2). Patina is often given as an example of deterioration with the capacity to enhance value (www1). For example, many watch collectors now prefer vintage watches and watch cases that appear 'honest' and aged, with scratches and fading, rather than in apparently new condition (www1). Additionally, a study found that visitors and staff at Dryburgh Abbey (Figure 25) found the abbey ruins' appearance of 'natural decay' to be valuable through indicating authenticity (Douglas-Jones *et al.* 2016,826,827). The value that individuals place on, and get out of, an object can increase with greater access, even if the material aspects are affected. However, this is not to say that all access is good access; access should be relevant, enjoyable, educational and inspirational (Brokerhof *et al.* 2008,87; MA 2015b). Access strategies with the ability to realise the value of an object should be found through risk assessments and value assessments to benefit users and use resources in the most beneficial way.



Figure 25. Dryburgh Abbey, Scottish Borders. This site has been actively curated as a ruin, with visitors responding positively to its decaying appearance. Source: [www2](#), Douglas-Jones et al. 2016.

An increasing emphasis on value has been seen over the twenty first century (Carol 2009). The Museum Association's Collections 2030 project looks at the purpose, use and management of museum collections and its *Empowering Collections* report (MA 2019,6) calls for museums to consider how they can make their collections empowering, relevant and dynamic. This means using collections to 'bring communities together, promote wellbeing, explore issues of place and identity' by 'working with users and stakeholders' to ensure collections are 'well-managed, understood, rationalised and accessible' (MA 2019,6). The increasing emphasis on users shows a general democratisation of museums as they are asked to demonstrate their public value (Steyn 2006; Dierking 2010; Bell et al. 2018).

### 3.4.3. Conserving Value

Value is often described as the importance of something. This value is not only material, but incorporates intangible aspects of experiencing an object (Brown 2007; O'Brien et al. 2010; Scott 2010). Intangible aspects involve the senses, such as hearing a clock chime, seeing a steam engine move, or feeling the ground rumble beneath your feet as a tank rolls past.

Value may change over time. For example, interest in running tanks appears to have increased in the run-up to the First World War centenary, and so may increase again in the periods before and during the Second World War centenary (Fletcher *et al.* 2011,85). This indicates that changing social trends and views impact upon value. As with the examples of centenaries, it may be possible to predict some of these changes in value. Users and potential users should be directly consulted on what they value to create relevant and impactful displays and exhibitions. Museums should therefore adapt and change their displays and collections over time to achieve their best potential value for users.

The relationship between values found in heritage and preservation can be summed up in Figure 26, which shows how an understanding of heritage and realisation of value can result in objects being cared for. Without access, objects have no value; it is interactions with people that give them value.

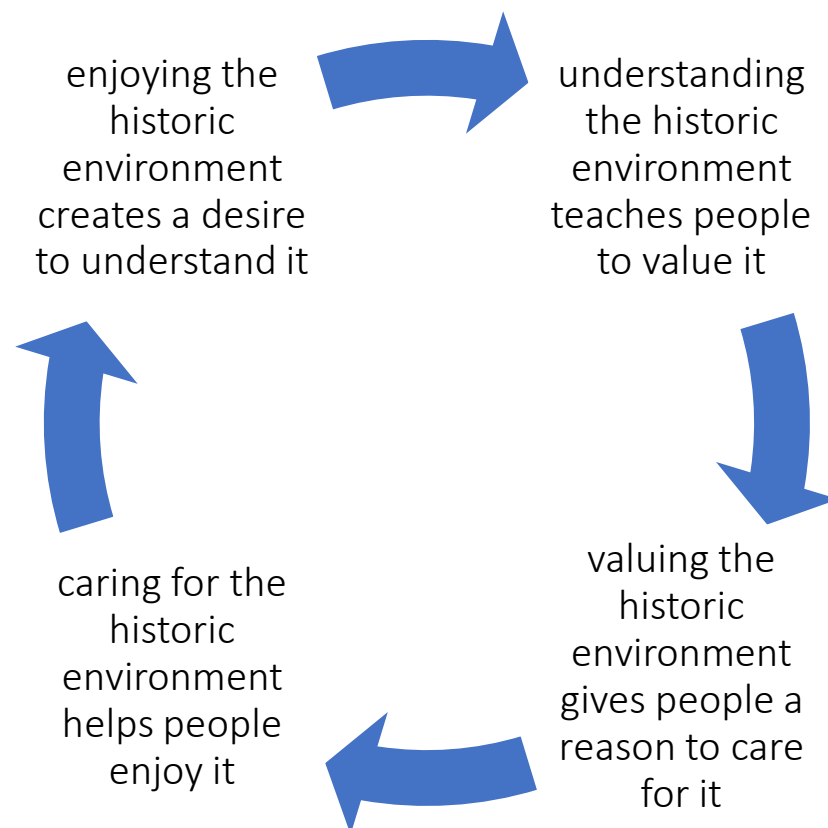


Figure 26. 'Virtuous circle of conservation' by English Heritage. Source: HLF no date,2; English Heritage 2005,4.

Heritage is always adapting to its environment, and survives due to being valued (Taylor *et al.* 2008,10). When decisions are made, they are made within a specific social, cultural and economic context (Peters *et al.* 2008,5). By fully realising the value of objects, they can be cared for and preserved for the future. The shift to value-led decision-making results in conservation being seen as a way of managing change so that value is realised and maintained (ABTEM 2018,80) and places emphasis on the end user, the visitor. Whether a moving object is run or not depends on what is deemed to be its greatest value. This value is decided by the worth the object has to the audience. Audience views and opinions should therefore be sought when assigning value. As value changes over time, decisions based on value ascribed by audiences should be periodically updated.

Therefore, there has been a shift within conservation theory from focusing purely on the retention and preservation of material originality, to an exploration of a greater range of values that an object may embody and produce. This is not to say that originality is no longer important; rather, it is one of the many values now accepted within conservation decision making. As a result, preservation is no longer seen to be in direct opposition to access, as values are formed by people, so access is integral to the realisation of values. This change to a values-based approach gives visitors agency in shaping and defining values. It raises the notion that visitors should be consulted on what they want and find to be beneficial in a museum visit.

### 3.5. A Consideration of Different Ethical Viewpoints for Working Vehicles

Different subsects within heritage have distinct ethics that impact upon methods of conservation, restoration and the condition of historic objects. Examples of this can be seen in the contrast between aviation heritage, where it is often deemed inappropriate to fly aircraft due to the risk of catastrophic loss, and steam heritage, where objects have been preserved through operation and so continue to run (ABTEM 2018,18). The latter will be discussed further, as it has parallels to the restoration, maintenance and operation of AFVs. When arguing for the continued operation of steam engines, it is often stated that this fulfils their purpose. People expect the sounds, smells and movement of steam and burning coal when they visit a heritage railway (APPG 2018,15). This way of thinking is certainly different to the traditional



conservation ethics of preserving the fabric of objects for as long as possible, which often leads to objects being stored or displayed in static condition and controlled environments.

### 3.5.1. Traction Engines

Traction engines were first maintained by farmers who continued to use them for as long as they were more cost effective or reliable than other, newer, options (Trowell 2019,2). The first written account of traction engines being run for entertainment is of a traction engine race in Appleford, Oxfordshire in 1951 (Sawford 1985,7; Samuel 2012,248; Trowell 2019,2). The National Traction Engine Trust (NTET) was established in 1954 (Wilson 2002,16), and several annual rallies commenced in rural locations between the 1950s and 1970s (Trowell 2019,3). The number of rallies has since increased to 1,300 steam rally events in the UK in 2016 (Trowell 2019,1).

Steam rallies provide an opportunity for like-minded individuals to meet up and enthuse over traction engines (Wilson 2002,6; Geoghegan 2013,41; Trowell 2019,2). This, along with running vehicles, was the initial draw of steam rallies. As steam rallies became more popular, public demonstrations of running historic engines and re-enactments became even more important (Wilkes 1974,12,13; Trowell 2019,1,5,11). Today, steam rallies are public events that are advertised as a fun day out with food stalls, music and retail (Trowell 2019,5) with the historic traction engine still being the main attraction (Monger 1988,377). Another important part of the steam fair is the driving of traction engines to the site, hence the working traction engine is still at the centre of steam rallies today.

Steam rallies are dependent on individuals and preservation societies who volunteer to restore, maintain and run steam engines (Linsley 1980; Stratford 2011,5; Trowell 2019). Many of the societies aim to both run and preserve steam traction engines (www2). The ways in which traction engines are kept in private collections have similarities with museum collections, with many being housed in buildings and cared for by those that have a wealth of knowledge of the engine that many museum professionals may not possess (Wilson 2002,18). Although museum ethics are not followed stringently, the actions of individuals to run and care for such vehicles means

that they are still preserved. Although there are criticisms of over-restoration and running of these machines (Sawford 1985,8), the alternative may be their complete loss if they are left to rust in scrapyards and fields. This shows that the view is not simply that of running versus preservation, but instead preservation through running.

The National Traction Engine Trust's *Engine Owner's Codes of Practice* (NTET 2018a) indicate the importance of running within the ethics of traction engines. The codes focus on the operation of vehicles by giving advice on the practicalities of running in front of the public and maintaining the vehicles (NTET 2018a,5, 2018b). The objectives of the *Codes of Practice* include 'to ensure that engines currently in preservation will be maintained to a standard which will both preserve their monetary value and keep them in good mechanical condition for as long as possible' (NTET 2018a,6). This shows a desire to preserve the operating function of the vehicles. It is interesting that monetary value, rather than other values are stated (Brown 2007; Carol 2009; O'Brien *et al.* 2010). This is a distinction from museum ethics which usually focus on a range of values. The objectives also state 'to ensure that preserved engines will continue to operate and give pleasure to their owners and the public without being a source of danger to either' (NTET 2018a,6). This shows a focus on operating vehicles with emphasis on the practical health and safety aspects of running. There is a *Code of Practice* on the laying-up and storage of traction engines (NTET 2018c), but this is written from the view of laying-up the engine for a relatively short amount of time in between operation, rather than permanent static storage. The ethics for traction engines assume that they will be in working condition or in the process of being restored to working condition.

#### 3.5.1.1. Qualitative Study of Steam Engine Organisations

A brief analysis of steam clubs and societies' 'about' sections and aims and objectives indicates factors valued by such organisations (Figure 27). The 'about', aims and objectives of 12 steam societies and clubs were found through their websites or communication with committee members (Appendix A). These texts were often more informal than those of museums, reflecting social and community nature of the groups.

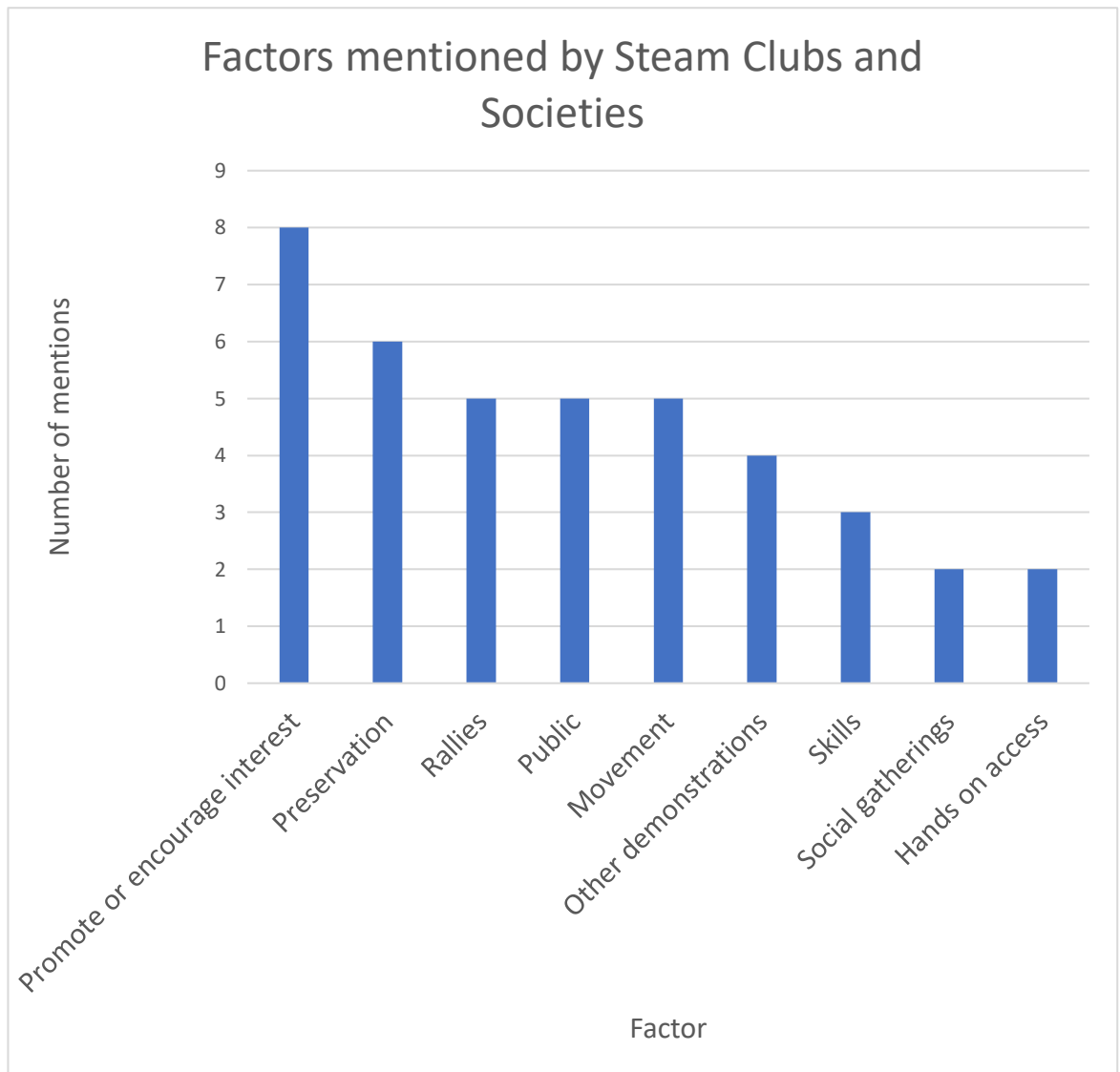


Figure 27. Chart showing factors mentioned by steam clubs and societies in their 'about', aims or objectives

The most frequently mentioned factor is the promotion or encouragement of interest, such as one statement which mentioned 'increasing and maintaining interest in historic steam' (www4). This shows the value placed on the historic significance of the vehicles and an acknowledgment that efforts should be taken to engage with the public and other enthusiasts to continue demonstrating this value. This is corroborated by the five mentions of preservation, which shows how steam clubs and societies preserve vehicles for 'future generations' (www4) through running and restoration. The fact that preservation and promotion of interest are the top two cited factors suggests that, generally, steam engine societies follow similar ethics to those of museums (MA 2015b, 2019).

Movement, the public and rallies are each mentioned five times. These factors are often associated with each other, as rallies are public events that involve moving vehicles. It is interesting to note that movement is mentioned fewer times than preservation; this is not to say that preservation is prioritised over movement, as movement is seen as a way of preservation. It may be because movement is assumed within the context of steam clubs and societies. These factors should therefore not be pitted against each other. Instead, it indicates an increased emphasis on preservation, with supporting statements on the importance of movement for this preservation.

The five mentions of the public included two mentions of education, one mention of entertainment and one mention of demonstration. This echoes the traditional role of museums as an educator, as well as acknowledging steam rallies as a fun day out and reinforcing the significance of rallies and movement.

Out of the five mentions of rallies, three state the rally as being the main aim or focal point of the organisation. The rally is the main event of the year, with regular meetings leading up to it. The main aim for many of the organisations is an annual, public demonstration of running steam engines. There are also four mentions of running and display that are not rallies, such as road runs. These road runs do not have the county fair structure of vehicles being demonstrated a field alongside shops and food vans, as the vehicles are on the road. Yet they are still open and advertised to the public (www5). This again shows the significance of running vehicles and public demonstrations.

The three mentions of skills include two mentions of passing down skills. This involves training such as the steam apprentice activities run by The Bedford Steam Preservation Society (www6). The preservation of skills is seen as an important part of steam organisations' aims and purpose.

Social gatherings are mentioned by two organisations. This includes club nights and meetings. One of these mentions of meetings states that they run from October to April (Leeds and District Traction Engine Club 2018), so provide a social gathering for members in the months that steam rallies are not held. These meetings indicate the importance of the social and community aspect of such interest groups.

Hands-on or experiential access is stated by two organisations. One states 'to facilitate hands-on access of engines to members and others, especially young persons' (Leeds and District Traction Engine Club 2018). This shows an understanding of the importance of engaging with younger generations to enable the preservation of such vehicles.

Thus, the top two mentioned factors of promoting interest and preservation demonstrate the priority placed on encouraging engagement and caring for the vehicles. These values align with museum ethics (MA 2015b, 2019). However, the methods of carrying out these aims differ, with steam engine societies placing more emphasis on running as a form of preservation than museum ethics currently do.

### 3.5.2. Steam Fairgrounds

Like steam traction engines, fairground rides often survived through continual use. To ensure the ongoing popularity of a ride, parts were updated, repainted and replaced over time (Figure 28) (www7). This has resulted in fairground rides with few historic parts that could traditionally be defined as original, yet the rides still have historic value to visitors (www8).



Figure 28. Two photos of Edwards' Super Chariot Racer, previously Edwards & Sons Noah's Ark (top), an example of a fair ground ride that was rebuilt during its lifetime. This ride was originally built in 1934 and rebuilt as the Chariot Racer in 1946 (bottom). Source: Dingles Fairground Heritage Centre, [www7](http://www7).

Although some rides have electric motors, many continue to be powered by steam. Hollycombe Steam in the Country has a collection of steam-powered fairground rides, such as their Golden Gallopers, Steam Swings and Steam Chair-o-Planes ([www9](http://www9)).

Carter's Steam Fair, a travelling fun fair, has rides dating from the 1890s to the 1960s (www10). They market themselves as the largest travelling vintage funfair in the world, using steam-powered rides as a unique selling point. They also restore rides, such as their Jubilee Steam Gallopers, which involved replacing the electric engine with a historic steam engine (www10). By using the rides, they are maintained and preserved for the future, albeit not with their original parts. Steam fairs continue to run to fulfil their original purpose, to be 'alive and working as they were meant to be' (www11).

### 3.5.3. Heritage Railway

Heritage railway preservation initiatives followed after those for traction engines (Trowell 2019,2). After the end of steam on British Rail in 1968, locomotives were scrapped (Grimshaw 1976,83; APPGHR 2013,12) and many heritage railways started to preserve railway lines to continue the operation of public services (APPGHR 2013,12). Preservation groups and small groups of enthusiasts restored the scrap locomotives to running order (APPGHR 2013,12). By the 1980s, heritage railways could not sustain use for public services, but steam engines created a tourist market. In 2019, heritage railways were estimated to be worth around £400 million to the British economy (APPGHR 2019,5), receiving 13 million visitors a year, of whom 9.6 million are train passengers (APPGHR 2019,7). Thus, heritage rail initially started as a means of keeping old lines open and became viable by saving locomotives from scrap yards and playing a part in the tourist economy. The opportunity offered by public demand for heritage rail, locomotives and railway lines enabled their survival, a clear demonstration of preservation through access.

Examining the work of the Heritage Railway Association (HRA) shows that priority is placed on running vehicles. The 2020 Chairman's Special Award went to the restoration project of the rebuilding of No 4942 'Maindy Hall' from scrapyard condition (HRA 2020,4). Several new components were made, such as three new driving wheel sets, two bogie wheel sets and two 'half' cylinder blocks. The frames were extensively modified, while parts were added from other trains, such as the chimney from a 68XX Class. This rebuilding was commented on positively in the HRA newsletter, showing a pride in adding parts and making new parts to produce the vehicle. The finished machine was numbered 2999 and named 'Lady of Legend' (Figure 29) (HRA 2020,4),



the change of name indicating that there is no pretence the finished vehicle is the same as the one that came from the scrapyard. As this project won the Chairman's Special Award, it shows that the process of using parts from other trains and making new parts to form one whole working vehicle is praised within heritage rail. It illustrates the importance placed on the process of building to running order and subsequent running rather than material authenticity.



Figure 29. 2999 Lady of Legend in Steam, 5<sup>th</sup> June 2019. Source: [www12](http://www12).

The 2019 APPGHR report states that steam is the principal attraction in a heritage railway and when diesel locomotives replaced steam on a regular basis, rider numbers dropped to 30% of their previous level (APPGHR 2019,15). This indicates that the sensory aspects associated with running historic trains are integral to the significance of steam engines and make the operation of steam engines essential for the continuation of the sector (Rees *et al.* 2010,93).

#### 3.5.4. Why is there a disparity between ethics?

There are several reasons why there is a disparity between ethics for steam engines and traditional museum collections. The origins of preservation for traction

engines and steam fairs lies within their continued running. Railways were preserved through using steam locomotives as tourist attractions after it was no longer viable to keep the line open for general public use. Running is integral to the preservation of these machines. This is different to the life cycle of most museum objects. Often, objects are used throughout their initial stage of life, but once they enter a museum they are no longer used for this original purpose. Instead, they are often displayed in static condition to preserve their material aspects. As a result, museums often hold static collections that may be separated from their historic context.

Another reason for the difference between conservation ethics and steam preservation ethics is that steam vehicles were saved from the scrapyard by volunteers and preservation societies. These volunteers are often highly knowledgeable about the vehicles they own (Telgmann 1980; White 1981; Wilson 2002). The volunteers who preserve such vehicles simply have to be passionate about them in order to put in the work required (Craggs *et al.* 2013,879; Laurs *et al.* 2019,187). This is often seen in accounts of enthusiasts, who state ‘interest in traction engines and the men who used them developed from a life-long love of the countryside, and the people who live and work in it’ (Wilkes 1974,20) or ‘hearts...are stirred by railway memories’ (Adley 2014,7). Steam engines were preserved by those who cared for them in their spare time, rather than being placed in museums.

Conservation professionals have traditionally taken issue with the enthusiasm aspect of steam heritage with the emotional attachment to preserving and running vehicles often being dismissed in academia and decision-making. The term *enthusiasm* was first used in the seventeenth century to describe religious or prophetic frenzy among ancient Greeks (Hanks 1998,155), and it appears that this definition still holds some weight (Geoghegan 2009). Enthusiasm has been stated as ‘a threat to rationality and professional practice’ in conservation (Craggs *et al.* 2016,2), with rationality seen as integral to decision making (Cass *et al.* 2009,66).

This definition of enthusiasm has resulted in the belittlement of enthusiasts’ views. Studies on community planning have found that planners and policy makers dismiss community responses they perceive to be emotional (Cass *et al.* 2009; Geoghegan 2013). Paid staff may not consciously disregard a volunteers’ knowledge (Craggs *et al.* 2016), but it happens nonetheless, as can be seen in statements such as

‘more enthusiasm than respect for historical accuracy’ (Monger 1988,376) when discussing enthusiast restoration decisions. Although it is certainly true that some engines are restored to look new and so may be over-restored by conservation standards (Sawford 1985,9), statements of enthusiasm equalling lack of respect shows a disdain for enthusiasts. White (1981,55) states ‘decisions were too often influenced by change, whimsey or sentiment’ and ‘so long as railway relic preservation is dominated by the buff, the community at large is likely to view the movement as something of a joke’ (White 1981,60). These statements were written in the 1980s, and there has been a change in recognising the value of enthusiasts’ work since, but there is still some elitism in the sector. Samuel (2012,4) remarks on a separation by academics ‘in quite a tribal sense of who is, and who is not a historian’ which means that the work carried out by enthusiasts is not valued. The fact that enthusiasts carry out restoration and maintenance in their spare time, and are passionate about doing so, has resulted in their views and expertise being dismissed by heritage professionals.

The traditional unwillingness for museums to operate vehicles means that enthusiasts see museums as a place where objects lose their life and meaning. Stratford (2011,5) demonstrates an aversion to museums and their display of items in static condition ‘only future legislation will determine the day that the last fires will be dropped and all engines will be consigned to be lifeless “stuffed and mounted” museum pieces’.

By changing conservation perceptions of enthusiasm as an emotionally charged factor with negative impact, to one that drives people to continue caring for heritage (Craggs *et al.* 2016,2), conservation and enthusiasts may be reconciled. By acknowledging the value of steam enthusiasts in preserving vehicles through operation (Craggs *et al.* 2013,879), wider definitions of conservation can be found which may attract a wider audience. If conservation is seen as a method of managing change to preserve significance, rather than simply preserving the fabric, then the ethics followed by both steam enthusiasts and museum professionals are the same (Rees *et al.* 2010,101). A wider definition of conservation should be sought to acknowledge the work carried out to preserve steam engines.

### 3.6. Discussion of Conservation Ethics

The conservation routes for moving objects such as vehicles often results in one of two distinct categories of either a working or static vehicle. If the decision is made to restore or reconstruct a vehicle to working order, then this shows that greater value is placed on preserving its function and associated factors, such as the preservation of skills and the ability to demonstrate a working vehicle to audiences. If the decision is made to display the vehicle in static condition, this indicates that more value is placed on preserving historic parts in situ in order to display the significance of the vehicle's material aspects.

Traditional professional conservation, which views objects as things to be 'read' as evidence, is often opposed to users' views of objects, which they may see as intertwined with traditions, community and identity (Clavir 2002b,xvii). This resulted in conservation efforts focusing on the material aspects of objects valued by professionals as opposed to the intangible meanings and associations valued by users (Clavir 1994,53; Bülow *et al.* 2018,35). Past conservation decisions have focused on fulfilling professional values which at times have been at odds with what users want from a heritage experience (Clavir 1998,1; Dierking 2010,12). This focus on conservation professionals forming decisions has resulted in an unequal power balance between professionals and the public (Coghlan 2018,796).

Recently, efforts have been made to greater ensure museum objects benefit their users (Bülow *et al.* 2018,35), as can be seen through funding stipulations. Studies have demonstrated the benefit of involving visitors in decision-making to enable both the preservation of objects and creation of valuable heritage experiences (Sully *et al.* 2014; Katrakazis *et al.* 2018,462; Lithgow *et al.* 2018,395). However, there is still a disparity between conservation guidelines and what visitors value in heritage objects (MA 2019,16).

This may be because guidelines, although periodically updated, are static texts, while users constantly form new and different interactions with objects which result in the creation and fortification or diminishment of varying values. These values may depend upon the users themselves, or changing external contexts and circumstances (Taylor 2015,66). Consequently, heritage may hold different meanings for different people (Taylor 2015,74; Bülow *et al.* 2018,36), so there is not one singular voice to

follow when deciding a conservation route. In addition, guidelines are produced to be nationally or internationally applicable. Whilst this means they can be widely applied to a range of heritage contexts, in reality there is no 'one size fits all' approach when conserving values. Each object has a different history and continues to gain or lose values throughout their life within a museum, so embodies individual associations and values.

This discussion of conservation ethics has highlighted the traditional focus on preserving material originality, and the subsequent move to considering a wider range of values. Originality is now one of the many values that should be considered when making conservation decisions. The change from material focused conservation to a value-based methodology incorporates the intangible. One such intangible value is heritage skills, which can be seen throughout The Tank Museum's restoration programmes such as the restoration of the Matilda II tank. This project increased public knowledge of historic AFVs and enabled visitors to engage with the restoration through the series of YouTube videos.

The change to a value-led approach means that access can be seen as an opportunity to better conservation efforts. Thus, access and conservation are mutually beneficial, rather than opposing each other as per traditional conservation ethics. Values change over time, so visitor opinion should be periodically assessed to ensure museum experiences are relevant to their audiences. This ensures that heritage is appreciated, so is cared for and enjoyed by users.

The change to a values-led approach can also act as a step towards reconciling enthusiasts and museum professionals. It frames conservation as a way of managing change to preserve significance and demonstrate value, rather than simply preserving the fabric.

Thus, conservation can now be seen to encompass preservation efforts through running. All four of the machine types below (Table 7) were initially preserved through continued use; some traction engines and heritage railways continued to be used as their popularity fell, while fairground rides were repainted and updated for new audiences. Similarly, the tanks at The Tank Museum were used for training at Bovington. As a result, many, if not most, historic machines within these categories

have undergone changes and repairs throughout their lifetime in order to preserve their function. Steam enthusiasts continue to restore and run vehicles and fairgrounds in order to ensure their preservation. The main reason why these machines are kept, and why, in many cases, they are not lost completely, is to take them to steam rallies, hold open days, drive traction engines around the field, run fairgrounds, run a train along a line and to meet up with likeminded enthusiasts.

Machine Type	Initial Purpose	Current Values
Traction Engines	Agriculture	<ul style="list-style-type: none"> <li>• Sensory</li> <li>• Involved experiences</li> <li>• Nostalgia</li> <li>• Community / Social</li> <li>• Operational / Functional</li> <li>• Historic</li> <li>• Recreational</li> </ul>
Steam Fairgrounds	Pleasure	
Heritage Railway	Transport	
Armoured Fighting Vehicles	Warfare and peacekeeping	

*Table 7. Table showing different machine types, their initial purpose and their current values.*

In some cases, such as steam fairgrounds, these machines carry out the same function and realise the same values as they were originally created for; that of pleasure. In other cases, such as with traction engines, these machines are now recreational in addition to having strong community and social values. Other values, such as nostalgia, have only been associated with these machines after some time. All of the above machines can realise these values through running. Functioning machines encompass the value of involved experiences; of being on a steam fairground ride or train, or of feeling the ground rumble as a traction engine or tank drives past.

Therefore, conservation decisions should focus on managing change to enable the most beneficial values, whether tangible or intangible, to be demonstrated. By widening the definition of conservation to the management of change so that cultural value is not lost, the ethical viewpoints taken by steam enthusiasts can be reconciled with museum ethics. This is particularly pertinent for the conservation management of tanks, where The Tank Museum recognises there is a need to preserve and enhance

the value of such vehicles. A value-led analysis can indicate whether visitors will benefit from a specific vehicle in running condition.

As values change with time, heritage can continue to embody values through reinterpretation (Bülow *et al.* 2018,36). This means that conservation decisions should involve a consultation of visitor opinion to find what users value about heritage and consequently manage heritage in a way that demonstrates these values. After all, museums are public-facing institutions for the benefit of the public (MA 2012,7, 2018, 2019,14). In consulting visitors and forming decisions based on visitor opinion, the traditional professional values rooted in the materiality of the object may give way to a realisation of values that are more beneficial for visitors in creating meaningful, inspiring and engaging heritage experiences.



## 4. Visitor Experiences and the Value of Authentic Experiences

The previous chapter considered the machines themselves and how the values that they embody may affect the ethics and conservation routes that are applicable to them. It is through interactions with people that values of objects are realised so to understand how values can be maximised, the desires of visitors to heritage attractions must be considered.

### 4.1. Visitor Trends

Museums are for the public (MA 2015b), and there are perpetual debates concerning the best way to encourage repeat visits and attract new audiences to museums. One avenue for finding successful methods of engaging audiences is through exploring visitor experience in other contexts. Current high street trends are of great interest; amid large-scale shop closures, shops that are thriving successfully provide the customer with an experience (Swain 2011; Woodall 2013). This indicates a continuing rise in the experience economy, with individuals spending their money on experiences rather than material goods. Applying this to heritage indicates a need for museums and attractions to invest more resources into experiential concepts rather than traditional static display.

#### 4.1.1. The Experience Economy

A change from a services-based economy to an experience-based economy was noted in the late 1990s (Pine *et al.* 1998) with a suggested foundation in the festival culture that was becoming increasingly mainstream at that time (www1). Successful experiences have been found to be entertaining, educational, aesthetic and escapist (Pine *et al.* 1998). Experiences involving all five senses also appear to be more memorable than those that are simply visual (Pine *et al.* 1998,104), for example, in-person retail experiences use scents, music and enable touch to encourage customers to purchase products (Klatzky 2011,43; Meyers-Levy *et al.* 2011,139; Morrin 2011,76). These multi-sensory experiences appear to be ever-increasingly popular (Brochado *et al.* 2019).

It has been argued that the reason behind this continued change from services to experiences is due to social trends. Ikea's head of sustainability, Steve Howard, stated that we reached 'peak stuff' in the West in 2016 (www2) so expenditure is less focused on acquisition of material objects. One reason for increased spending on experiences is their ability to level social standings, as they result in an outcome that is less monetarily comparable than an object (2017, www3). Spending on a holiday is less of an expression of social standing than a material purchase, with its associated brand and price tag. This is because experiences are felt differently by different individuals (Pine *et al.* 1999,12) and are unique, as compared to mass-produced consumables. A report by Airbnb (2016,2) found 'over 80% of millennials seek unique travel experiences', thus showing the value placed on the ability for experiences to be unique, which can act as a social leveller.

Technological advances are another factor driving the experiential market. People can take photos of their holidays, evenings out or festivals, and so can remember the experience whilst still displaying their spending ability on social media (www3). In addition, internet shopping means that people can see a shop's entire catalogue within a matter of minutes (www4). When customers can do this from their own homes, the idea of going to a shop seems less appealing. Therefore, to bring customers back into shops, an experience must be provided.

When looking at recommendations for retail, it appears that there is a move to shopping becoming even more customer-orientated, rather than shops dictating styles and what customers should buy (Danziger 2017). Gimmicky experiences do not provide the same quality of experience as valuable and personalised ones (www1; www4). The same trend has been noted in museums (Lynch 2011). If museums are to follow high street trends to be successful, then they too should carry out studies on the wants and needs of their visitors in order to create valuable experiences.

#### 4.1.2. Psychological Findings

These spending trends follow psychological findings. Several studies from 2000 onwards have found that happiness is furthered to a greater extent by experiences than material possessions (Van Boven *et al.* 2003; Lyubomirsky *et al.* 2005;

Lyubomirsky 2007; Rosenzweig *et al.* 2012). This has resulted in an increased awareness of the benefits of experiential purchases.

The fact that happiness is furthered more through experiences than materials may be due to the tangible nature of material possessions versus the intangible nature of experiences. If an individual buys an item that is deemed poorly made, or useless, then that item is a permanent reminder of that in itself (Wallman 2014). It is a static object that cannot be re-imagined. However, people remember experiences more favourably over time through 'rose-tinted glasses' (Carter *et al.* 2012,1306). This is because the experience is less tangible, so can be re-interpreted in people's memories, often in a positive manner (Van Boven *et al.* 2003,1199; Wallman 2014). In addition, the nature of material possessions and deterioration means that the view of possessions over time will be less favourable. For example, purchasing a car may bring happiness to an individual, but eventually the car may need replacing with a newer, more up-to-date model. In contrast, an experience stays in a person's memory, and tends to be looked at more positively over time (Carter *et al.* 2010,158).

Experiences can change a person's view of themselves to a greater extent than a material possession can (Van Boven *et al.* 2003,1199; Carter *et al.* 2012,1304). Experiences can help an individual to feel as if they are improving themselves, such as being educated when attending a museum or library. Carter and Gilovich's study (2012) found that individuals were more likely to say they would rather give up material possessions than experiences, as the experiences were more central to their notion of self. Individuals are formed from their life experiences, so they are far more integral and valuable to their being than material possessions.

Studies also show that experiential buys are less competitive than material ones and that people are more likely to discuss them, so bringing social benefits (Kumar *et al.* 2014,1930). As discussed above, material purchases are more likely to be comparative than experiential purchases (Carter *et al.* 2010,156,157). An additional social benefit may be that experiences are more likely to be shared with others than a material purchase (Caprariello *et al.* 2013,200). Thus, experiences have been found to have social benefits in psychological research.

#### 4.1.3. Applications for Museums

If museums are to ensure their continued relevance and visitor appreciation, which in turn means that objects will continue to be cared for, then it is suggested that they follow experiential trends. This involves enabling visitors to engage in memorable authentic experiences. Such experiences can directly involve the objects themselves, such as at Imperial War Museums (IWM) Duxford, where visitors can step inside a Lancaster aircraft (www5). Memorable experiences may involve interactivity and active engagement with the heritage objects on display; M Shed in Bristol displayed the statue of Edward Colston that was pulled down in June 2020 during a Black Lives Matter protest, alongside a survey asking visitors their opinions on what should happen to the statue next. In addition to being an engaging experience, this was also a stakeholder opinion gathering exercise, which asked visitors how they wanted heritage to be displayed. Thus, to ensure heritage is preserved, museums should provide visitors with authentic engaging experiences and enable communication from visitors.

#### 4.2. Definition of Authenticity

To understand how to provide authentic experiences, a definition and explanation of authenticity must be found. Authenticity is a widely used term, yet it does not seem to have an unequivocal definition (Reisinger *et al.* 2006b,299; Mkono 2012,480). For example, commodities can be marketed as authentic with little explanation of what this means (www1). Restoration processes are often scrutinised for their impact on authenticity by individuals who disagree with others about what counts as authentic (Emerick 2014,84; Bold *et al.* 2017,4). Additionally, the precise concept of authenticity has changed over time with different paradigms (Crew *et al.* 1991,165; Penrose 2018,2). This has further obscured a singular definition of authenticity.

The following discussion will aim to form an explanation of authenticity by initially focusing on historic paradigms. Materialist views will be considered before looking at the shift to constructivism (Cohen 1988; Scott 2015,291). Existentialist theory will then be discussed. The concept of aura and its associations with notions of authenticity is examined. The study will then consider the importance of authenticity; what it is that makes authentic objects significant?

#### 4.2.1. Authenticity is inherent in the object- materialist authenticity

The Oxford English Dictionary (*The Oxford English Dictionary*. 7th Edition

2012,41) states that authenticity is:

- '1) known to be real and genuine
- 2) based on facts; accurate'

This follows the materialist perspective, which argues that authenticity is inherent in an object. This traditional notion of authenticity as an object-based concept has also been described as an objectivist, modernist or realist viewpoint (Reisinger *et al.* 2006a,66; Su 2018; Farrelly *et al.* 2019,6). Materialist authenticity draws on the idea that authenticity is a measurable aspect (Reisinger *et al.* 2006a,66) based on the 'fabric, form and function' of an object (Jones 2010,182). The origins of the object are therefore of great importance (Spooner 1986,199).

The Nara Document on Authenticity (1994) states:

'Conservation of cultural heritage in all its forms and historical periods is rooted in the values attributed to the heritage. Our ability to understand these values depends, in part, on the degree to which information sources about these values may be understood as credible or truthful. Knowledge and understanding of...sources of information, in relation to original and subsequent characteristics of the cultural heritage, and their meaning, is a requisite basis for assessing all aspects of authenticity.'

This is in line with materialist theories of authenticity in which authenticity is based on the notion of originality, and factual information about a historic object or place contributes to its authenticity. Thus, according to materialism, authenticity is something that can be objectively and absolutely assessed with the right information. This places emphasis on documents associated with the origins and history of an object (Spooner 1986,200). It shows a desire to reach the true, genuine and original (Spooner 1986,199; Chhabra 2010,794). This in turn defines value and significance based on authenticity (Lovell 2019,449); the more authentic, the more valuable.

#### 4.2.2. Who judges Authenticity?

If there is an absolute criterion by which to judge authenticity, then it follows that there must be an absolute authority to declare this authenticity (Crew *et al.* 1991,163; Lovell 2019, 449). In the medieval period this was the Church, who was seen as the authority able to certify whether a relic was real or not (Jones 2010,186). Authenticity is still certified today, for example certificates of authenticity for paintings (Mould 2010,235). A declaration of authenticity by an authority based on expertise, scientific knowledge or documentation can be described as 'cool' authentication (Cohen *et al.* 2012,1298). The materialist perspective argues that, even if a visitor believes they have had an authentic experience, it may not be authentic if judged not to be by the authority (Wang 1999,351). Materialism judges authenticity, and consequently value, on what is considered to be true by those in positions of expertise or power. This is a top-down, one-directional approach to authenticity.

#### 4.2.3. A Criticism of Material Authenticity

One issue with the materialist view of authenticity is the argument that true authenticity can never be found. The historic object or place will never be in its truly original state due to inevitable deterioration (Staniforth 2011,35; Wallis 2015,261). In addition, the individual who declares authenticity will almost always have to deal with areas of uncertainty in the historical record. Despite this, materialism strives for authenticity based on knowledge of the historicity and originality of an object or place. The more historically accurate and original an object, the more authentic it is.

#### 4.2.4. Museums and Material Authenticity

Absolute authenticity has been traditionally upheld by museums. Museums are places of education (Pitt-Rivers 1891,115), and so they are trusted to display true and correct information (Crane 1997,45; Latham 2015,14). This presentation of truth gave museums the authority to both judge and generate authenticity (Mitchell 1991,7; Gorman 2011,157; Penrose 2018,3). In the early 1960s, a visit to a museum focused on passing down information from the museum, which was the 'all-powerful and the uncontested authority' (Falk *et al.* 2000; Lang *et al.* 2006; Wetterlund 2012). Objects in museums were not just authentic objects in themselves, but seen as an authentic

representation of that culture, time or place (Trofanenko 2006,52; Chhabra 2008,431; Lleras 2010,25). Notions of authenticity in museums were assessed by museum staff based on where the object originated from, how it was made, what it was made from and who made it (Brida *et al.* 2014,519; Thyne *et al.* 2016,1481). This is heavily grounded in materialist theory.

#### 4.2.5. The Paradigm Shift to Constructivism

Constructivism built upon theories of materiality and materialism to argue that, although some aspects of authenticity are based in the object's history and origins, it can also be affected by interactions with people. Whereas materialism argued that, regardless of whether a visitor perceived an object to be authentic, it was not truly authentic unless an authority agreed, constructivism states that, to that individual, the experience is authentic (Wang 1999,351). People's experiences with objects shape meaning, and therefore authenticity (Lleras 2010,38). By being able to experience 'the real thing' by engaging with objects, visitors can experience and comprehend authenticity (Latham 2015). Authenticity, therefore, is not just based on the material qualities of an object, but the connections people have with it (Bold *et al.* 2017,4).

In contrast with materialist authenticity, constructivism can be described as 'hot' authentication, as it involves the active creation, reinforcement and preservation of objects, places and events by current people (Cohen *et al.* 2012,1300). In this way, authentication can change over time, depending on public opinion, belief and acts. People can thus negotiate authenticity (Su 2018,920). Constructivism therefore defines authenticity as a dynamic process produced by interactions between people and objects or places (Wang 1999,355; Su 2018,920). Constructivist theories argues that authenticity is not a tangible, but an intangible value (Brida *et al.* 2014, 519). This is a symbolic authenticity rather than material authenticity.

Individuals experience authenticity differently. Authenticity to an individual is based on their individual personality, knowledge and interests (McIntosh *et al.* 1999,608; Penrose 2018,3). Littrell *et al.* (1993,197) carried out a study in which they asked for definitions of the authenticity of souvenirs, and found that the definitions

changed depending on a person's age and tourism styles. These individuals created their own notions of authenticity (Littrell *et al.* 1993,210). Thus, different people may feel that the same objects or places have different authenticity values.

Constructivist theories in tourism studies differentiate authenticity and historic accuracy. If a tourist believes a place is authentic, even if it is not original, then constructivists argue that authenticity is still experienced (Rickly-Boyd 2012,127). This highlights disparities between what contemporary audiences think is authentic based on their previous knowledge and beliefs, and what is historically accurate (Bruner 1994,399). A modern audience may believe a place is authentic, but if someone of that time period were to see it, they may not (Bruner 1994,399). For example, if an object looks old or worn, then it is more likely to be deemed authentic to a modern audience (Crew *et al.* 1991,162). But this would not be authentic to the object's original contemporaries, who would have seen it when it was new. Thus, in constructivism, authenticity and originality are not interchangeable.

This distinction between authenticity and originality does not negatively impact value under a constructivist framework. This is because, in order for authenticity to matter, it must be accessible. Historicity is still of importance under this paradigm, but there is increased emphasis on the needs of modern visitors (Chhabra *et al.* 2003,704). If a visitor cannot physically or conceptually access an object and its meaning, then both authenticity and value are lost. This emphasises the importance of experience, and the need to focus on what benefit visitors get from such an experience.

Authenticity is negotiated by stakeholders (Brida *et al.* 2014,519). This can be groups of people or communities. In this way, things like dance performances can change over time, yet still be deemed authentic as long as the community agrees so (Cohen 1988,383; Daniel 1996, 782). Constructivist authenticity may not strictly show historical accuracy, but it indicates what is important to a specific audience or visitor. In constructivism it is these experiences that matter, and perceived authenticity rather than true historical accuracy.

Constructivism therefore gives individuals agency when negotiating authenticity (Brida *et al.* 2014,533; Penrose 2018,7). It is their interactions and experiences that are important (Brida *et al.* 2014,533). This still requires the presence



of historical places, collections, or a continuation of tradition or historic events, such as emphasised by materialism. Constructivism, however, shifts the emphasis from solely originality to meaningful and authentic experiences.

#### 4.2.6. Museums and Constructivist Authenticity

Forms of presentation in museums also echo the change from materialism to constructivism. From the late 1960s, museum exhibits had an increasing emphasis on interactivity (Barry 1998,104) and, by the early 1990s, were far more consumer-orientated (Dodd 1994; Lang *et al.* 2006). In particular, science museums had a large number of interactive displays (Davidson *et al.* 1991; Barry 1998,104). Visitors were seen as individuals, with individual learning styles (Hooper-Greenhill 1994,67). This indicates a shift in authority (Trofanenko 2006,52), from museums as authoritative figures that determine authenticity, to visitors being able to interact with objects and information to shape definitions of authenticity.

The 1998 Museums Association definition of a museum states ‘museums enable people to explore collections for inspiration, learning and enjoyment. They are institutions that collect, safeguard and make accessible artefacts and specimens, which they hold in trust for society’ (www2.). This associates museums with the materialist view of authenticity by drawing on the theme of learning. In addition, the mention of access shows developments taken by constructivists, and an acknowledgement that museums no longer simply provide one-directional learning. Instead, exhibits focus on visitor interactions with collections.

More recently, there has been a further increase in the wish for interactivity with collections. *Collections for the Future* (Wilkinson 2005) called for museums to enable visitors to ‘engage fully with collections’. This was echoed in many contemporary studies (DCMS 2005; Watl 2006; Morris 2007; ACE 2008; Carol 2009). The visitor became the focal point, and their interaction with collections was highlighted (Glaister 2005; Keene 2008; Lynch 2011). It is now expected that visitors can interact with collections (Thyne *et al.* 2016,1481).

An example of a museum acknowledging and encouraging constructivist views of authenticity is Lacock Abbey, a National Trust property in Wiltshire (www3).

Lacock's 2020 programming theme states 'a sanctuary that allows space for contemplation, authentic connections and a sense of belonging' (A. Wright 2019, pers. comm., 23<sup>rd</sup> October). In this theme, it is the authenticity of the connections that are important, placing emphasis on the visitor and their interactions. This is particularly pertinent at Lacock, as it is a well-known filming location, appearing in Harry Potter, Fantastic Beasts and Pride and Prejudice (www4). Many people visit as a result of the associations with filming, to experience authentic connections with fiction. Although the historicity and authenticity of the property and its collections are important, it is acknowledged that authenticity can apply to the interactions visitors create with non-historically accurate associations.

Similarly, people visit The Tank Museum to see the Sherman and the Tiger 131 tanks used in the film Fury (Figure 30). The Sherman tank is advertised by The Tank Museum as being 'the mechanical star of the 2014 film' (www5) and it is referred to as the Fury tank, showing a recognition that associations with the film form part of the tank's current significance. The tanks are historic Second World War tanks and this historicity, along with other factors, certainly also contributes to their significance. However, as with Lacock Abbey, visitors place value in constructivist notions of experiencing authentic connections with objects from a film.



Figure 30. The Sherman Tank used in the film *Fury*. The Tank Museum has not greatly altered the tank's appearance since the film. Source: author.

#### 4.2.7. Existentialist Theory

The definition of authenticity can be further expanded to define being true to oneself. The definition of authenticity in museums often incorporates this 'essential nature' of humans (Reisinger *et al.* 2006b, 299), as well as the realness of collections. Authenticity can therefore be applied both to the object and to our interactions. 'The real thing' is experienced through, and as a result of, an individual's own aspects, such as memories (Latham 2015). If an object is particularly engaging to an individual as a result of something in their own memories, experiences or identities, then it can have a far greater impact on that person (Latham 2013,4; Vitelli 2013,90; Froggett *et al.* 2014,484). Authentic experiences thus allow people to connect with both the object and their 'real' selves (Handler *et al.* 1988, 243). In addition, authentic experiences can enable exploration and redefinition of one's self (Fawcett *et al.* 2001, 688; Hede *et al.* 2010.690). It is widely accepted that museums shape identity (O'Neill 2006; Capper *et al.* 2016), and this can be seen in existentialist theory. Thus, existentialist theory supports constructivism, but focuses further on the notion of self. It does not place

emphasis on the authenticity of the object, but instead focuses on the effects of an experience with an object on the self (Wang 1999, 359), and human nature (Su 2018, 923).

Museums apply existentialist notions of authenticity to argue for the impact of museum experiences. The Museums Association *Museums Change Lives* (2013) stated that museums 'enrich the lives of individuals, contribute to strong and resilient communities, and help create a fair and just society'. Several similar studies have assessed the impact of museums, and found that they certainly do enable individual development, promote well-being and improve communities (Britainthinks 2013; Dodd *et al.* 2014; Paul Hamlyn Foundation 2016). This ties in with traditional and prevailing ideas of the museum as an educator (ACE 2016a). Thus, museums, through their collections, and people's experiences with those collections, can impact individual authenticity in an existentialist sense.

#### 4.2.8. Aura

Walter Benjamin (2010) coined the phrase 'aura' in 1935. Benjamin's concept of aura involved the changes to physical structure and the history of the object (Benjamin 2010). This explores both the tangible mechanical changes, as well as the intangible historic associations. This highlighted the importance of provenance (Restauri 2010,91). This provenance, or originality, formed the basis of authenticity for Benjamin (Appadurai 1988,45; Beier-de Haan 2010,3). Thus, for Benjamin, aura was formed of intangible components, but these were based on the original qualities of the object. This follows the line of thought posed by materialists.

Constructivism can also be applied to the notion of aura. A study by Hampp *et al.* (2010) used eye trackers to see how long visitors focused on objects when they were labelled as real when compared to being labelled as replicas. They found that the visitors focused on the objects labelled as real for longer than the replicas, but only when these objects were items the visitors recognised and were interested in (Hampp *et al.* 2010,83). Thus, aura was verified, and it was found that the effect of authenticity was influenced by the individual's knowledge and interests (Hampp *et al.* 2010,84). A further study (Hampp *et al.* 2014,358) looking at people's reactions to moon rock

when labelled as real or a replica, found that authenticity is not inherent in an object, but arises from interactions between the visitor and the object, such as what the visitor is told about the object. Thus, the interplay within an individual and an object contributes to an understanding of aura as an active negotiation of authenticity.

A study by Nemeroff et al. (1994) found that people believe objects retain properties of their owners, and actions can be carried out to reduce these properties. 36 adults were asked how they felt about a new jumper, and then again about that jumper if it belonged to their enemy or someone evil. Several responded that they felt uneasy about the jumper if it belonged to someone evil, suggesting that they believe the jumper can take on negativity (Nemeroff *et al.* 1994,178). This aligns with theories of animism, which argue that objects can be imbued with a spirit or life (Ingold 2006, 10). It also shows an acknowledgement of aura. The study found the subjects thought that physically cleaning the jumper would slightly reduce this 'symbolic contagion' (Nemeroff *et al.* 1994,178). Therefore, not only do people impart an intangible energy or aura onto objects, but others can reduce this. This fits with the constructivist view that authenticity is not simply about the object, but people's interactions with it. Individuals can create and influence authenticity through their interactions with material objects.

Aura can also be seen to fit under existentialist theories. When people have a unique experience that shows the authenticity of the object, they are able to understand its aura. Through interacting with the authentic aura of objects, people can understand themselves and their identity better (Jones 2010,189). Thus, connecting with the intangible enables individuals to shape their perceptions of themselves, enable inspiration and enhance wellbeing (MA 2013).

Thus, aura is an important part of authenticity, and it is widely accepted that this intangible aspect of an object exists. The original use of the word aura focused on the intangible results of the origins and history of the object, as well as its physical characteristics. The term has since been used to support constructivist theories to show that aura and authenticity are changed and shaped by interactions with people (Nemeroff *et al.* 1994; Hampp *et al.* 2010, 2014). Aura can also impact existential authenticity through changing people's concepts of themselves.

#### 4.2.9. Summary of Theories

Authenticity is a multi-faceted concept. Materialism takes the view that authenticity is based within the originality of objects, and this is the stance traditionally adopted by museums. Constructivism builds on the view that historic objects have authenticity but challenges the view that authoritative figures are the only ones who can determine authenticity. It argues that authenticity is negotiated by both individuals and communities. This shows a shift of focus from original objects to authentic experiences. Existentialism focuses on the authenticity of an individual's experience. Notions of aura tie in to all three theoretical viewpoints, stating that the originality of an object is important, as is its lived history and how it affects individuals. By looking at all three of these theories, as well as the concept of aura, authenticity appears to be formed of the material aspects, the historical associations and significance and people and the interplay of these with people (Scott 2015, 303; Farrelly *et al.* 2019,2). Authenticity is not just the tangible material originality or historicity, nor is it solely the intangible impact on an individual. It is a combination of both. The object must be stated as being of some material significance in order to affect individuals, and it must also be accessible in order for its historicity to be understood. In this way, there is interplay between the intangible and tangible. This results in valuable and impactful experiences.

#### 4.2.10. Is Authenticity Important?

An alternative approach to consider is that of postmodernism. Postmodernism argues for hyperreality, in which the reproduction is of more value than the original (Bruner 1994, 397; Mkono 2012,480). For example, a reproduced scene of life in a certain time period may be of greater educational value than the surviving artefacts. Postmodernists argue that, with the advent of experiences like Disneyworld (Wang 1999,356), tourists are not interested in the authentic (Mkono 2012,480). They argue that visitors value enjoyment over authenticity (Wang 1999, 357).

#### 4.2.11. Current Trends and Recent Findings

Contrary to these views, recent findings have shown that postmodernist theories on authenticity do not hold true (Farrelly *et al.* 2019,6). Mkono (2012,481)

carried out a study of mentions of authenticity in TripAdvisor reviews, and found that it was mentioned often when discussing the value of places. Therefore, people are still interested in the authentic. Study of Generation Y's, or Millennials', attitudes to authenticity found there was certainly a demand for authenticity (Chhabra 2010, 805); in a generation known for wanting experiences, it was experiences that were meaningful and authentic that were rated highest (Chhabra 2010, 807). The section on Visitor Trends discusses this in greater detail. Thus, the postmodernist predictions have been disproven; visitors want authentic experiences. This shows that constructivist theories hold true.

#### 4.3. The Value of Authenticity

Thus, authentic experiences are deemed to be valuable. When researching the literature concerning the value of authenticity, several different reasons were found. Authenticity was deemed valuable through acting as a marker point for the past, denoting age and value, and displaying uniqueness. Authenticity can change people's outlook, sometimes invoking empathy, and at other times producing life-changing experiences.

The most basic value of authenticity is its ability to act as anchor point, or marker, to the past (Barthel 1996, 345). Objects ensure memories are passed on (Barthel 1996, 347). These might be collective, community memories as well as individual (Barthel 1996, 362). Physical objects and places engage people with the past, ensuring memories are passed on. In a heritage setting, the use of written or sensory interpretation can aid this understanding and show how objects and places are associated with historic events. For example, Big Pit National Coal Museum enables visitors to experience a guided tour of a coal mine by an ex-miner (Watson 2007,16)(www1). This enables aspects of the social and industrial history of Wales to be passed on to future generations. Experiencing the pit makes a far greater impression on visitors than simply being told about Wales' mining history in a non-relevant environment (Conlin *et al.* 2010). Authentic objects and places allow memories and histories to be preserved.

Authenticity is often associated with age, which impacts upon value. A study (Bull 2013, 250) found that children equate authenticity with age, and therefore fragility. Age often has connotations of value (Crew *et al.* 1991, 160). For example, Fouseki *et al.* (2013) carried out interviews to ascertain the different values of parts of the multi-layered historical site of 'Lykeion of Aristotle' in Athens. The study asked if 'army barracks on the site should not be preserved because they are not ancient'. A high proportion of non-experts agreed with this statement, suggesting an association between age and value. Thus, the links between authenticity and age are considered to add to the value of authenticity.

The uniqueness of the object, place, or experience creates significance for visitors (Littrell *et al.* 1993,210; Daniel 1996,782; Brida *et al.* 2014,533; Hampp *et al.* 2014, 359). A study by McDonald (2011) found that a high proportion of participants stated uniqueness contributed to a heritage element's importance. This uniqueness can evoke wonder (Greenblatt 1991), and through provoking an emotional response can create a memorable experience. Only the specific object has its exact origins and history, and this counts towards its intangible authenticity and sense of aura.

Authenticity has also been found to encourage curiosity. A study by Bunce (2016) found that visitors who perceived a taxidermy rabbit as real asked more questions than those who saw it as inauthentic. The study found that regardless of whether the object was authentic or inauthentic, the fact that it was perceived as authentic invoked curiosity (Bunce 2016,235). Thus, it is important that visitors know an object is authentic in order to increase curiosity and engagement.

Authentic objects give an individual a sense of proximity to events. Authentic objects can invoke empathy (Penrose 2018, 3), and can enable people to feel closer to past objects, events and people that relate to our identity (Runia 2006, 5), building on existential theories that argue authentic objects can shape an individual's sense of self. The change occurs when the individual perceives an object to be authentic (Penrose 2018,4), and can result in life-changing experiences (Penrose 2018, 3). These experiences have been variously described as numinous, transformational or transcendental (Latham 2007, 247; Soren 2009, 236).



Sensory experiences are particularly effective at altering perceptions of one's self (Barthel 1996, 360). These experiences cannot be adequately or authentically conveyed through visual methods (Barthel 1996, 360); it is the production of sensory outputs that is authentic. They simply do not have the same impact on individuals if they are not conveyed in their authentic sensory methods. Thus, multi-sensory aspects are important when looking at the value of authenticity.

Thus, authenticity has value through acting as a marker for historic events and associations with age and uniqueness. Engaging with authentic objects can promote curiosity. It can also provide long-term value after the experience through providing impactful and sometimes life-changing experiences.

#### 4.4. Authenticity, Nostalgia and War Museums

The increasing visitor wish for authentic experiences gives rise to debates concerning what should be displayed in museums. This is particularly the case for war museums, whose collections have the potential to attract the macabre, labelled dark tourism, which takes agency away from historic individuals and caters to uncritical, sensationalist views of the past. The following paragraphs will explore the ethics behind the display of war-related material in heritage in creating authentic experiences.

##### 4.4.1. Criticisms of the 'authentic experience' model

War museums can create a reproduction of conflict experiences for those who have never been in conflict themselves through creating sensory experiences that are perceived to be authentic by visitors (Cundy 2017b,363). However, there are criticisms that these experiences pander to nostalgia, resulting in visitors gaining an inaccurate understanding of the past.

Nostalgia can be described as the act of selective remembrance or wanting to experience an idealised version of the past (Hirsch 1992), which is often seen to be better than the present in some way (Lowenthal 1985,4; Chhabra *et al.* 2003,705; Bull 2013,244; Levine 2016,87). Positive aspects of the past are inflated and glorified (Levin *et al.* 2007,93), while negative memories are filtered out (Hirsch 1992; Levine 2016,87).

Although nostalgia focuses on the past, it often only selects certain aspects of the past (Arnold-de Simine 2013,54). Nostalgia is often dismissed as inauthentic and uncritical, yet it can also be seen as a way of rebelling against modern culture, society and capitalism (Arnold-de Simine 2013,56-57). This notion of rebellion is eminent in examples such as the current slow living movement (Lyon *et al.* 1999,193; Varley *et al.* 2020,8), which can act as momentum for future change (Arnold-de Simine 2013,56). However, this type of nostalgia is still very selective (Lyon *et al.* 1999,193) and can result in a selective perception of the past.

Nostalgia was first coined by Johannes Hofer (1669-1752) to describe severe homesickness (Anspach 1934; Arnold-de Simine 2013,57; Dodman 2018,16). It was seen as a medical condition and was considered a treatable disease in the seventeenth and eighteenth centuries (Boym 2001.XIV; Arnold-de Simine 2013,57). During the eighteenth century, nostalgia became recognised in terms of the temporal rather than solely spatial (Arnold-de Simine 2013,57). In Britain after the First World War, nostalgia was accepted as a response to trauma that was not a medical condition, and so was acceptably culturally expressed as a way to process trauma and loss (Roper 2011,451; Arnold-de Simine 2013,62). Shell-shocked officers were sent to the countryside, which effectively provided an idealised 'pre-war' atmosphere, contributing to the idea that everything was better before the war (Reid 2011,34). In addition, commemoration meant that over time this grief was transformed into an expression of national glory (Waterton 2011,1; Arnold-de Simine 2013,62). This demonstrates nostalgia as a way of creating a collective memory, national sentiment and glorification through past suffering by selecting narratives that make sense of the trauma and choosing to ignore less fitting narratives (Calder 1992,15; Dames 2010,269; Waterton 2011,1-2). This continued after the Second World War with the mythologization of the 'Blitz spirit' (Calder 1992,14). Nostalgic methods of museum display were widely used throughout the 1960s and 1970s (Cannadine 2004,238; McLean 2016). Living museums have been cited as an example of this, with idealised multi-sensory experiences used to support the idea that the past was somehow better (Goulding 2001,566). This has since been criticised as uninformed and inaccurate (Cannadine 2004,238).

Nostalgia can still be a motivating factor for museum visits (Chhabra 2008,427; Rentschler *et al.* 2009,106). A study by Goulding (2001) surveying visitors to Blists Hill

Living Museum, Ironbridge, found three different types of nostalgia experienced by visitors (Table 8). The study found that the majority of visitors surveyed experienced very low levels of nostalgia, visiting for an educational or social day out, many visiting with children. The second category of visitors showed personal nostalgia. These visitors were predominantly over 70, and many had suffered loss or geographical displacement, and discussed a sense of loss of community in modern society (Goulding 2001,575). They were familiar with many of the objects on display and ascribed selective perceptions of past societies onto objects to find personal meaning. Goulding describes this as 'escapist self-determination' (Goulding 2001,575), with the act of visiting such a museum as a way to gain comfort in happy memories. The third category was described as being vicariously nostalgic, made up of mostly 30- to 50-year-olds, with little personal remembrance of the objects on display. These visitors, while critical in evaluations of authenticity and educated in history, showed nostalgia for past art and architecture and wanted to preserve history. They saw the museum visit as a way to escape the pressures of modern life through imagination and an opportunity for education. Out of the visitors that showed nostalgic tendencies, both sets used it as a form of escapism, with one set reliving happy memories, whilst the other used their imagination to escape everyday pressures. Whilst this study on a living museum may not apply wholly to a war museum, it does show that visitors have varying levels of nostalgic tendencies and motivations, so nostalgia should not be discussed as one uniform characteristic.

	<b>Nostalgic Reaction</b>		
	<b>None</b>	<b>Personal High</b>	<b>Vicarious High</b>
<b>Age</b>	all ages	predominantly 70+	predominantly 30 - 50
<b>Occupation</b>	retired comfortable	retired low income	professional
<b>Education</b>	range of qualifications	minimum	further educated
<b>Role involvement</b>	role happy	role deprivation	role overload
<b>Social contact</b>	desire for interaction	desire for interaction	desired for solitude
<b>Personal remembrance</b>	objective	personal	vicarious
<b>Object familiarity</b>	varied	high	low
<b>Gender</b>	both male and female	both male and female	both male and female
<b>Category</b>	social	existential	aesthetic
<b>Total (sample size of 53)</b>	33	8	12

*Table 8. Table showing the results from Goulding's study. Source: Goulding 2001,588.*

As a result of a visitor wish for nostalgic experiences, nostalgia is used as an argument for preserving history (Chhabra 2008,427). For example, it is often cited when discussing steam railways (Wilkes 1974,11; Grimshaw 1976,83; Garratt 1994; Levine 2016,87; McLean 2016). There is even a 'Museum of Nostalgia' in Upminster (Figure 31) which, interestingly, has a large collection of Second World War items. This demonstrates that some museums actively cater to nostalgia, and wartime objects often fall into the category of nostalgia.



Figure 31. 'Museum of Nostalgia' at Upminster Tithe Barn. Source: [www1](http://www1).

The selectivity of nostalgia can be problematic in that it can result in one singular historic narrative (Levin *et al.* 2007,94). This narrative can reflect the ideologies of the group that produces the nostalgic narrative, resulting in varying and diverse histories being forgotten and ignored (Waterton 2011,4; Arnold-de Simine 2013,34). Nostalgia is often described as a sanitised version of history (Hirsch 1992; Pickering 2010,94; Arnold-de Simine 2013,46). It may also be associated with false memories (Hewison 1987,46; Landsberg 2004,2; Radstone 2007,114), and so may not accurately show historical events and historical lives. Thus, nostalgia can often portray a singular, uniform concept of an inaccurate past.

Nostalgia is often perceived through the notion that the past was somehow better than the present. Yet if one tips the scales in the other way, by showing graphic or brutal imagery and items, there is a concern that this can result in sensationalist 'dark tourism'. This can also be a result of nostalgia which is directed onto suffering and tragedies (Arnold-de Simine 2013,59). This nostalgia is explained as being enjoyable by experiencing history at a distance (Arnold-de Simine 2013,56). Examples include Jack the Ripper tours (Cunningham 2007) which take visitors on a tour of the streets upon which the murders took place, or the displaying of shrunken heads in museums (Rekdal 2013,130). Dark tourism can be profitable, the ethics of sensationalist interpretation is questionable (Sharpley 2005,9; Arnold-de Simine 2013,60). Some dark tourism may help individuals to contemplate mortality (Sharpley *et al.* 2008,589), while sites of remembrance can provide a place for reflection, memory and shared healing, in turn contributing to positive societal change

(Manderson 2008,12; Thomas *et al.* 2019,4). This cannot be done if it is sensationalised. Sharpley (2005,14) defines different shades of dark tourism (Figure 32). War museums may fall within the 'grey tourism demand' section, when tourists with a fascination with death visit a site that does not exploit death, resulting in the museum becoming an unintended dark tourism site (Sharpley 2005,14; Ehrenreich *et al.* 2013,145). Although this is a small proportion of visitors (Lennon *et al.* 2000,23), museums have a responsibility to avoid this sensationalist and one-sided type of dark, or grey, tourism (Winter 2013,33).

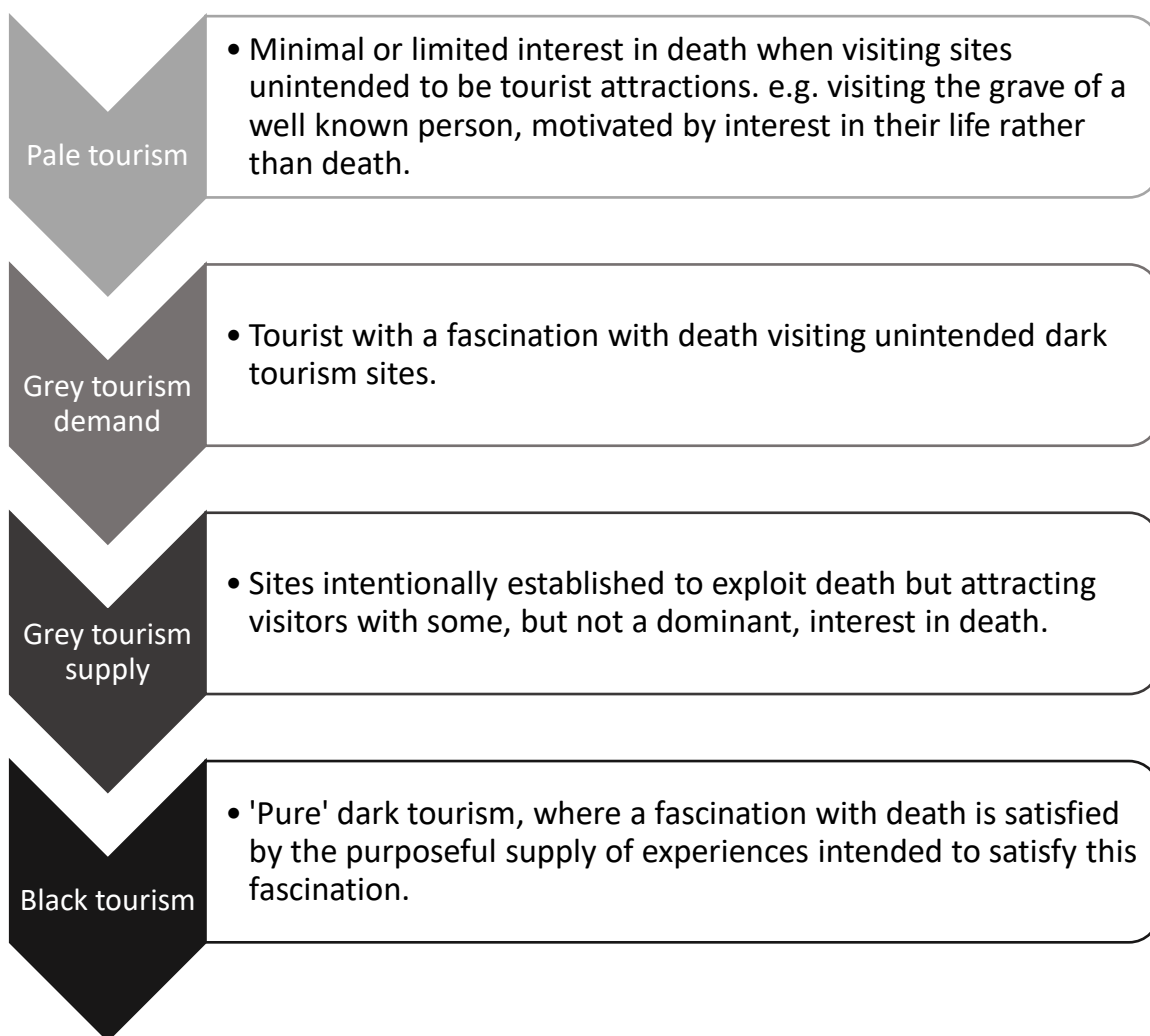


Figure 32. Sharpley's 'shades of darkness' of tourist behaviour. Source: Sharpley 2005,14.

These issues are particularly pertinent in tank museums, where tanks have been found to be the focus of object fetishism (Raths 2013,89). Raths (2013), when writing about The German Tank Museum, states that the Second World War German tanks make up about 25% of the vehicles in the museum, but draw the majority of visitor interest, often through the popular myth that the Wehrmacht was a successful,

technical army (Raths 2013,90). Often a visitor focus on the technicality of such machines is used to ignore or reduce focus on the fact that tanks were made to kill people (Raths 2013,89). These myths surrounding tanks are widespread, and so some visitors come to the museum with preconceived ideas. These ideas are difficult to dismantle, especially since they are often convenient and sensationalist; in-depth discussions of the complexities of differing histories are not as fun to learn about as which one has the best gun, or which is the fastest (Raths 2013,90). The problems of object fetishism and sensationalism must therefore be considered and addressed in museums such as tank museums.

#### 4.4.2. Addressing Nostalgia and Dark Tourism in Museums

If nostalgia and dark tourism create selective histories with undue emphasis on certain aspects without consideration of other histories, then a middle way must be found. This can be achieved by putting the people back into history (Pickering 2010,94; Hacker *et al.* 2013,58). The physical objects of war should be interpreted in how they relate to the people who interacted, and continue to interact with them, over their lifetime. This includes those who made them, used them, collected and displayed them, and the visitors who experience them (Raths 2013,91; Cundy 2017a, 270). By showing the people, rather than a faceless history, empathy can be evoked through the telling of authentic stories (Coplan *et al.* 2011,ix). Different voices can tell different histories (Winter 2013,36), thus moving away from the restrictive notion of one collective memory. The incorporation of social history, economic history and cultural history forms a more engaging view of the past (Raths 2013,91).

Diversity must also be addressed. Women, including farmers, nurses, factory workers and prostitutes, all played a part in war, but their stories are not often displayed in war museums (Deufel 2009; Winter 2013,37). The histories of people from different ethnic minority backgrounds have also traditionally been excluded (Frost 2019,497; Wajid *et al.* 2019). Museum displays that show diverse histories and experiences of a range of people move away from the traditional focus on individual famous figures (Thwaites 1996,73), and by doing so, create more impactful and relevant experiences for a wider audience (MA 2019).

Sensory experiences can also play a part. Through experiencing the sounds, smells and movement of running machines, a greater understanding of past lives and experiences can be understood (Wain 2017,83). This multi-sensory experience is certainly not the same as actually being in warfare, nor should it claim to be (Arnold-de Simine 2013,33; Winter 2013,37) and simulation must not result in selective or wholly imagined histories. Creating authentic individual experiences based on historical accuracy and a diverse range of histories can bring a wide range of people closer to an understanding of the social histories behind each machine (Landsberg 2007,628). Through this, museums can fulfil aims of being inclusive spaces that reach out to new and diverse audiences, and provide and generate accurate information to benefit society (Holden 2006,19; MA 2015b,9; ICOM 2017,7).

Front of House staff are important in ensuring the past is portrayed in appropriate and representative ways. At The Tank Museum, Bovington, many visits are motivated by the opportunity to see objects associated with relatives, which can be very emotional. The Tank Museum staff have been praised for their ability to interact with visitors to create empowering visits (Keene 2005,96). Museums should ensure that visitors can fully access histories, and support visitors in doing so.

#### 4.5. Discussion of Visitor Experiences and the Value of Authenticity

Through an analysis of current visitor trends, it appears that commercial spaces that are surviving on high streets are doing so by providing authentic experiences for customers. Similarly, if museums are to ensure that collections are cared for, they should enable demonstrations of value in authentic experiences for visitors. The Tank Museum currently aims to provide authentic experiences through displaying static vehicles in a way that means visitors can get close to them and through running vehicle displays.

The application of constructivist views appears beneficial when considering authenticity, with consideration of the origins of authenticity in materialism and the notion of aura to show the importance of both the tangible and intangible. The historicity of an object provides a basis on which meaningful experiences can occur.



Museums are currently adopting a constructivist stance, as seen through The Tank Museum's decision to display the Sherman tank used in the film *Fury* as the 'Fury tank'. This indicates a recognition that, although the historic aspects of an object are important, authenticity can be negotiated by visitors with objects that also have associations with fiction. This support of constructivism should continue if museums are to provide effective experiences for visitors and other users. Collections are only one part of a museum; without users, collections are meaningless. Providing impactful experiences means moving away from focusing solely on the material aspects of objects and the putative originality of individual pieces. The overall experience should be viewed holistically. This is not to say that the historicity is not of value; there should simply be a move to greater acknowledgement of the role of visitors in understanding, interpreting and negotiating collections. The intangible nature of objects and the impact this has on visitors should be explored in depth to provide valuable experiences. By enabling visitors to fully engage with collections, collection items acquire a far greater significance. One method of enabling visitors to engage more fully with the experience of a historic tank may be through running vehicle demonstrations.

Museums, particularly those that hold collections associated with warfare or death, must ensure they do not fall under the spectrums of sensationalist nostalgia or dark tourism. This can be achieved by putting the people back into history. By displaying a range of diverse stories and histories, museums can achieve ethical aims of broadening participation, ensuring ongoing relevance to audiences, and providing accurately authentic experiences.

By moving from the notion of authentic objects to authentic experiences, visitors are given agency in the realisation of value. Through this process, visitors value authentic experiences, and therefore have a reason to care for heritage, thus aiding preservation. By working with a range of stakeholders, including users, the purpose of museum collections can be fully realised (Scott 2010,37). Museums are for the public (Wilkinson 2005,10,11), and so the public should be involved in the decision making process. This appears to be an obvious statement, but previous thinking in museums expected museum professionals to make decisions to benefit the public without extensive user consultation (Anderson 2004,135; Munley 2010,22). Users should benefit from collections, and their views should be found. The following section

interrogates how visitors interact with collections in impactful and memorable ways, with the aim of including the findings within the framework for conservation decision-making at The Tank Museum.

## 5. Sensory Experiences

As valuable, authentic experiences are created through interactions with objects, the ways in which visitors engage with objects must be examined. This involves an exploration of the smell, sound, sight and feel of heritage experiences. The following sections will discuss sensory aspects to find the significance of the senses and the sensory value of museum visits in creating authentic experiences. Visuals are usually the primary source of display in museums. Visuality will not be discussed in great detail as there is adequate research and literature on the topic (Hodge *et al.* 1999,58; Waterton *et al.* 2010); a discussion here would not add to knowledge. Touch and taste will not be discussed in any depth as, although visitors are free to touch static tanks on display in The Tank Museum and this does provide greater access and understanding of the static objects, touch and taste are not relevant to running tank displays. Sound and smell will be discussed in greater detail, as these are the two sensory aspects associated with running tank displays; the sound of the tanks moving and the smell of the exhaust fumes are central to attending a display event.

In the following paragraphs, mentions of sensory experiences in the ABTEM guidelines are initially discussed. This is followed by the reasons why there is a focus on the visual rather than the other senses in museums. The impact and value of sound and smell is assessed. Subsequently, a consideration of archaeological phenomenology explores the usefulness of the concept for historic tanks. This is followed by an analysis of eyewitness accounts to discuss the part of sound in playing an integral part of an authentic experience.

### 5.1. The Senses in ABTEM Guidelines

There has been an increased acknowledgement of the importance of the senses other than visual in museum experiences over the last 25 years. This can be demonstrated by analysing the different guidelines for larger and working objects. The 1994 *Standards in the Museum Care of Larger & Working Objects* (MGC 1994) does not mention sound or sensory experiences. The 2009 document, *Larger & Working Objects: A Guide to Standards in Their Preservation and Care* (Ball *et al.* 2009), does not mention the words 'sensory' or 'sense', but does state 'for most visitors, the sights,

sounds and smells of a working steam locomotive make it an intrinsically more interesting and enlightening object than its non-working counterpart' (Ball *et al.* 2009,16). This does acknowledge the importance of sensory aspects in the display of working objects. The most recent set of guidelines (ABTEM 2018) states that when understanding the significance of objects in museums, one should ask 'what is the emotional, sensory and physical impact of the object likely to be?'. Thus, an understanding of the importance of the senses in museum experiences with larger and working vehicles has grown over time.

The value of sensory aspects of large industrial machinery and transport collections is mentioned in the 2018 guidelines, which state 'one of the best ways to gain an understanding of the operation and atmosphere of a historic process is to participate in a live experience. Seeing and hearing objects working may enhance the experience of museum visitors and can aid understanding of past working practices and the lives of those who operated them' (ABTEM 2018,18). Therefore, sound is seen to be an important factor in making the decision to move collection objects in addition to sight. Sound is credited as adding an informative aspect to the experience, as well as improving the overall experience for visitors.

The other mention of senses when discussing the decision to work an object is within a section on replicas. It states 'replication can offer a sensory alternative when the risks associated with the use of a historic object outweigh the potential benefits...this does not detract from the sensory and emotive experience that the casual observer can gain from the operation of the object' (ABTEM 2018,35). The statement argues that working replicas provide the same sensory value as a historic vehicle. This contradicts the well-established notion of aura, which can be described as the impact of the intangible historicity of an object. It also contradicts findings that show working the historic object can be of far greater value to visitors than a replica (Monger 1988,376; Wain 2017,86). These are discussed in greater detail in the Definition of Authenticity section. A visitor survey carried out by The Tank Museum from the 2017 Tankfest event found that 'rarity, uniqueness and quantity' of historic armour 'is what sells this event' (The Tank Museum 2017). The use of a replica can detract from the sensory experience, as aura is part of the sensory aspects of an object in the same way as it is part of the object's material aspects. Replicas are a valid

solution when the historic vehicle can no longer be operated, but it is of greater benefit to visitors if a historic vehicle can be run. Thus, one of the only mentions of senses in the 2018 ABTEM document does not appear to correspond with real-life findings. This highlights a need to look at the importance of the senses in further detail.

One other mention of sound is in the case study for the Tom Tom, a textile machine used to wash and shrink shawls (ABTEM 2018,31). The case study looks at the restoration of the Tom Tom to working condition. It states ‘the machine was named from the sound it makes when beating the cloth in the barrel and is the only working example in Wales’ (ABTEM 2018,31). The fact that the machine’s name is intrinsically linked to its sound is of importance. But this is not stated to be a reason why the machine was restored to working order; instead, knowledge and skills are cited as reasons. While these are valid and valuable reasons, the use of skills and knowledge as reasons rather than sound shows that sound is not seen as such an important reason for running. It does not fully acknowledge the sensory importance of the machine working to fulfil its purpose, of which it was named after.

Although there is an increase in the number of mentions of sensory aspects in the guidance for larger and working objects over the last 25 years, it is only mentioned briefly and does not always seem to follow audience findings. The sensory aspects of replicas are discussed in more detail than the sensory value of ‘the real thing’. This appears to be at odds with the tank displays at The Tank Museum, where the sound and smell of the running vehicles forms an integral part of the visitor experience. There is a need to research the importance of sound and smell in greater detail in order to make informed decisions about the significance and conservation decisions of larger and working objects.

## 5.2. The Senses in Museums

Museums have been perceived as institutions that focus solely on the visual aspects of artworks, archaeology and artefacts. However, there has been a recent move to acknowledging the opportunities of greater sensory access in museum

experiences. The following paragraphs explore the historiography of sound and smell in museums before discussing how sound has been used in museums in recent years.

#### 5.2.1. A Historiography of Senses

Collections were not always so reliant on the sole sense of vision. Seventeenth-century cabinets of curiosities or Wunderkammern contained a range of natural and man-made objects (Evans *et al.* 2006,63). The objects were placed in a seemingly random order, and there were no labels or text (Hamilakis 2014,47). The sensory aspects of the objects were central to the visit, with objects being handled as Figure 33 shows (Woodall 2013; Kannenberg 2017). John Evelyn esq., in his diary, wrote ‘I went...to see the collection of a noble Venetian, Sign. Rugini’ whose collection contained ‘eggs in which ye yealk rattl’d’ (Evelyn 1827,339)<sup>2</sup>. The example of John Evelyn shaking an egg and listening to the rattle of the yolk demonstrates how objects were passed around to observe an understanding of their meaning and value, which involved smell, sound and touch (Woodall 2013; Stevenson 2014,160; Kannenberg 2017). The sound of the objects was not the only sound; these were places where noisy discussion and debates took place between prominent members of society (Alexander 1983; MacGregor 1983,70; Hamilakis 2014) (Figure 34). Thus, seventeenth-century collections were experienced in a sensorially focused manner, with all the senses forming a significant part of such a visit.

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<sup>2</sup> John Evelyn wrote his diary between 1641 and 1705-6



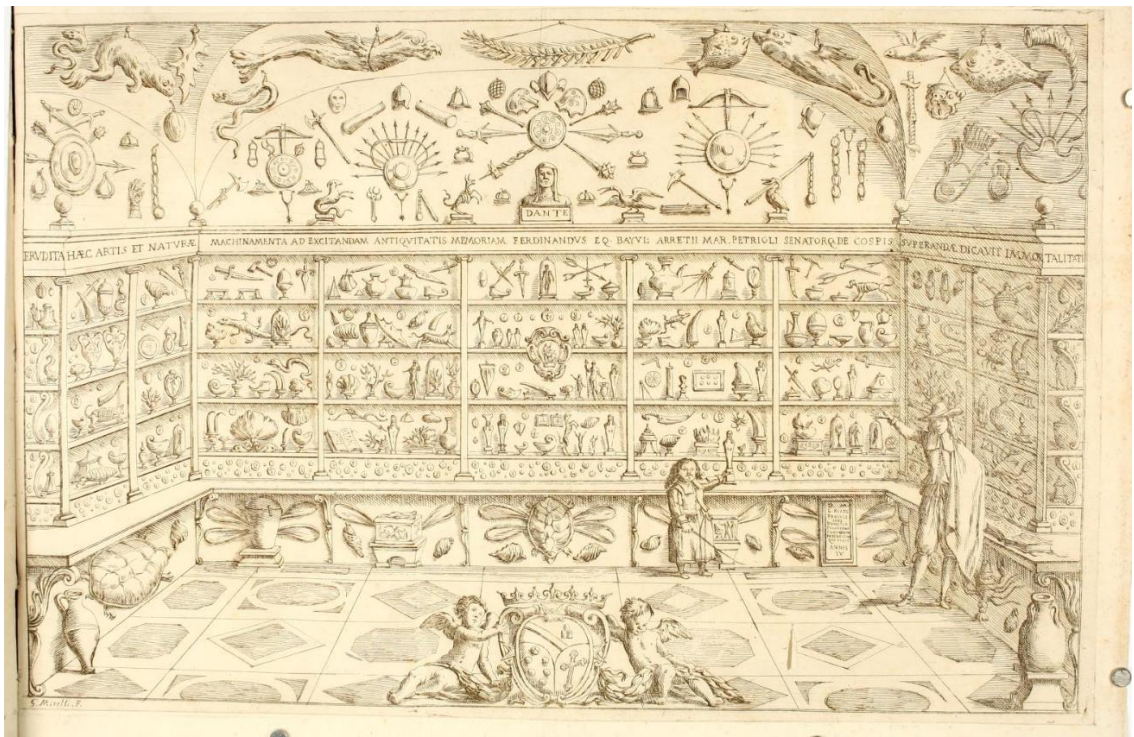


Figure 33. Frontispiece of Museo Cospiano, Bologna, showing how handling formed part of the visit to a Seventeenth-century cabinet of curiosities. Source: Legati et al. 1677.



Figure 34. Museum of Ferrante Imperato from Dell'Historia Naturale. Source: Imperato 1599.

This sensory focus changed in the following centuries. The Enlightenment resulted in museum collections becoming ordered. Museums opened to the public from the mid-1700s with the aim of educating, liberating and civilising society (Hamilakis 2014,48; Roppola 2014,14). Through this organisation and aim of education, museums became seen as a place where the truth was taught, and visitors were guided on a set route with a fixed narrative and visual display (Hamilakis 2014,48). Smell was excluded from museums as it was difficult to explain in words, so was perceived as less certain than visual observation (Hooper-Greenhill 2003,138). Places that held collections were no longer scenes of loud debate (Bubaris 2014; Hamilakis 2014). The sensory experience was replaced in favour of the aim of visual education.

Throughout the Victorian period in Britain, museums continued to work as emblems of cultural power, improving the public through education (Woodson-Boulton 2008,111). The phrase ‘cathedrals of urban modernity’ has been variously used to describe Victorian museums (Lorente 1998; Forgan 2005,573; Bubaris 2014), indicating how museums portrayed themselves as a temple-like institution which commanded respect from visitors (Sandell *et al.* 2012). This view of the ‘sacred’ museum has been contested in recent years, with historians such as Woodson-Boulton (2008,111) arguing that museums were also places of leisure, thus giving more agency to the visitor as an active participant in the Victorian museum (Forgan 2005,582; Selwood 2018,227). Yet it still holds that the Victorian museum was a place of education, enforcing visual learning.

Senses in the Victorian period became to be seen as ordered, with a distinct difference between respectable music and the music of the lower classes (Picker *et al.* 2003). There was a high culture and low culture (Bennett 2013,23), as well as a hierarchy of the senses. The sense of sight was placed above other senses and was perceived as the only proper sense to appreciate art (Classen *et al.* 2006,207, 2017,124). In contrast, smell was seen as uncivilised (Classen *et al.* 2010,3,4). Edward Forbes, a lecturer in natural history at the Royal School of Mines, London (Genoways *et al.* 2016), delivered a lecture in the autumn of 1853, stating ‘one of the greatest advantages of museums was that they stimulated the observing powers, a part of education which had been too long neglected’ (*Morning Chronicle* 1853,5). Thus, there was an emphasis on visual modes of learning and appreciation of museum displays



(Barringer 2006,133; Kannenberg 2017). The period also saw a rise in the use of spectacular taxidermy displays and other dioramas in natural history museums (Yanni 2005,150). This shows a continuation of a sensory hierarchy, with sight deemed to be more truthful than other senses.

This resulted in what is now seen as the traditional visual model of museum exhibit (Proudlove 2001; Angliss 2005; Drobnick 2014,193; Chen *et al.* 2015,183; Kannenberg 2017). In the 1900s this slowly changed towards an increased emphasis on other senses. For example, The Science Museum held a daily gramophone demonstration from 1928 until 1952 (Rich 2019). There were criticisms of visitor disruptions during the demonstrations, indicating the pervading view of a museum as a place of quiet contemplation (Rich 2019). Yet it did prove the benefits of demonstrating sound in museums. In the early 1960s, museums still generally displayed objects and associated information in a solely visual format (Lang *et al.* 2006), and still relied upon the top-down framework of passing down information to visitors that was regarded as indisputably true (Falk *et al.* 2000,9; Lang *et al.* 2006,5).

This model subsequently changed to one with a greater emphasis on interactivity (Barry 1998,104), with an increasing focus on art including sound (Cluett 2014,111). Open-air museums, with their focus on involving the senses and engagement with 'living history', were first proposed in the 18<sup>th</sup> and 19<sup>th</sup> centuries (Hurt 1978; Paardekooper 2013), and the first national open-air museum in the UK was established at St Fagans at its present site in 1946, although smaller open-air museums were already established in the Isle of Man and Scotland, such as the Highland Folk Museum which was founded in 1935 (www1) (Mason 2005,20). Open-air museums began to grow in popularity in the 1990s (Paardekooper 2013,23). The Jorvik Viking Centre, which opened in 1984, is cited as one of the first museums in the UK to provide a multi-sensory experience (Hamilakis 2014,64). It used recorded sound and reproduced smells to create the experience (Jenner 2011,336). From the 1980s onwards, museums became more consumer-orientated (Dodd 1994; Lang *et al.* 2006,6; O'Neill 2019,30). More emphasis was placed on the 'real thing' working, especially within industrial heritage (Barthel 1996,360). There was an increasing amount of discussion around sound and smell design in museums during the 1980s and 1990s (Stocker 1995; Aggleton *et al.* 1999; Reinartz 2014,2,3). The Burra Charter

includes 'the smells and sounds associated with the place and its use' when considering significance (Australia ICOMOS 2013,3). Thus, there has been a move towards acknowledging the value of sensory aspects other than the visual in museum experiences (Wain 2014,52).

As museums have increasingly focused on the need to attract more visitors and demonstrate their impact (Simon 2010,1, 34), the number of sensory museum experiences has risen (Woodall 2013; Bubaris 2014,393; Classen *et al.* 2017,117; Hjortkjær 2019,454; Wang 2020,3061). The use of sensory access for people who are sight-impaired has been advocated (Cole 2008,177,183; Henrich *et al.* 2014,124; Stevenson 2014,159). There has been a move towards discussing the importance of immersive experiences (Cluett 2014,111; Beliveau 2015,30; de Jong 2018; Everett 2019,313). Museums have started incorporating sound in museum visits (Voegelin 2014,120). Sound in museums is typically the addition of music (De Visscher 2014,240; Bijsterveld 2015; Knott 2017) or spoken dialogue, either spoken by actors reading historic or imagined texts, or recorded oral histories (Kaghat *et al.* 2009, 174; Bubaris 2014,393-396; Beliveau 2015,29). The use of sound installations is increasing, for example the 2017 Cavalry 360° art installation at Chesters Roman Fort and Museum used wind turbines to recreate the sound of 500 horses (Figure 35; Mills 2017; [www2](#), [www3](#)). The importance of the vibratory effects of sound in creating immersion has also been highlighted (Bubaris 2014,393). Smell has also been used in museums (Drobnick 2014,190; Stevenson 2014,152; Mills 2020), for example the Atmospheres project in National Trust properties resulted in the use of smells (Boyd *et al.* 2010,3), such as at Lanhydrock, where baby powder scent was used in the Nursery Corridor, and tobacco scent used in the Smoking Room. Studies have attempted to categorise smells through solid phase microextraction, gas chromatography-mass spectrometry, and focus groups (Strlic *et al.* 2009; Bembibre *et al.* 2017), in order to understand and explain them in more effective ways.



*Figure 35. Image of the Cavalry 360° art sound installation at Chesters Roman Fort and Museum in 2017. Source: [www4](http://www4).*

#### 5.2.2. Critiques of Current Sensory Experiences in Museums

However, there are criticisms of the current use of sound and smell in museums, particularly within the context of working objects. One argument is that this addition of sound and smell does not provide truly immersive experiences, with functional objects remaining static and devoid of life (Bijsterveld 2015; Gauvin 2019). Working objects were created to work in some way, and by remaining static, they cannot fulfil their function (Gauvin 2019). Visitors cannot gain a full appreciation of such objects and the stories of people associated with the objects through only static display and the addition of some simulated sensory aspects (Wain 2017,83). There is also the argument that authenticity is not fully demonstrated (Vidal González 2008,801), resulting in less engaging visits. Industrial museums are uniquely positioned to provide a sensory experience in context (Cole 2008,187), involving the smell of burning fuels, the sound of engines, vibration and the sense of scale (Barthel 1996,360; Cole 2008,187; White 2011,24; Wain 2017,83; Rossi Rognoni 2019,409). This can be far more immersive and engaging than the addition of sound or smell to a static museum display (Gordon 1993,83; Caple 2000,140; Pye 2016). Thus, industrial and military museum collections have an advantage in that they produce sensory immersion through the continued use of their objects. This can provide impactful, authentic sensory experiences.

There are also criticisms that sensory experiences, particularly those concerning smell, are often aimed solely at children (Fairhead 2018; Mills 2020), so are often seen as flippant (Jenner 2011,336). This echoes the hierarchy of the senses seen in the Enlightenment and Victorian period, with smell seen as primitive and less academic when compared to sight (Jenner 2011,337). Therefore, there are calls for sensory experiences to be aimed at all ages, rather than just children.

Another criticism of the current use of sound in museums is that there is relatively little research on the impact and effect of sound in museums (Wiens *et al.* 2019,277). Although there is literature on how sound can be designed (Fry 2002,14; Chen *et al.* 2015; Lupton *et al.* 2018,14; www5), it has been argued that sound is still not examined by museum professionals in the same way as visual modes (Angliss 2005). The lack of research on sound in museums has highlighted a need to look at the subject in further detail (Wiens *et al.* 2019,277). The following paragraphs will look at research on the impact of sound in order to find how sound can be used to its greatest benefit within museums.

### 5.3. The Impact of Sensory Experiences

The impact of sensory experiences must be assessed in order for their most effective uses to be realised in museums (Wain 2014). Sound and smell will be examined, as they are the senses that are experienced in a running tank display, but their impacts are not often explored in great depth within museum literature. In order to assess the impact of the sensory aspects of sound and smell, they must first be defined. Sound is the result of our brain registering changes in the surrounding air pressure with sound travelling more slowly than light, which is why lightning is seen before thunder is heard (Arnott *et al.* 2014,88). Sound can be transferred into the ear by the cochlea, or by vibrations in the skull (Arnott *et al.* 2014,88). Smell is the perception of odours or scents. The vocabulary used to define smells is less definite than that of sounds, especially in English where visual modality dominates (Engen 1982a,7; Drobnick 2014,187; Majid 2015,629; Bembibre *et al.* 2017,5). Smell, and to a lesser extent sound, varies for individuals (Engen 1982b,102; Lawless 1997,127; Willander *et al.* 2006,260; Greenberg *et al.* 2013; Bembibre *et al.* 2017,5). Yet there are general effects of sound and smell which will be discussed below.

### 5.3.1. Perception

Sound enables us to perceive and understand the world around us. It gives supporting information to events we can see as well as letting us know about things happening outside our field of vision (Arnott *et al.* 2014,86). Sound is therefore an important interpretative tool (Beliveau 2015,6). Sound can be immersive (Voegelin 2010,xv) and can form an important part of experiences.

Olfaction can work in the same way to enable individuals to understand their surroundings (Ouzman 2001,238). Smells are finite and time-specific, so often tell us what is happening in that moment (Almagor 1990,257; Anon 2008,3; Keller 2014,168). This can be replicated with the use of scents in museums (Aggleton *et al.* 1999; Kell 2010). Smells can also make an individual feel closer in proximity to something than vision (Reinarz 2014,157), so making individuals feel closer and more involved in events.

### 5.3.2. Memories

Sounds can affect memory. Stories and epics were memorised and passed down through generations by being structured into sung rhymes and ballads (Rubin 1998,6,8). It has been suggested that emotional sounds are remembered for longer than neutral sounds (Zeelenberg *et al.* 2006,290). Sounds can bring back intense and emotional memories of certain events, termed bottom-up retrieval (Campen *et al.* 2014,1; Ward 2014,276). Sound is therefore an important factor in creating long lasting, memorable experiences.

Perception of smell is affected by past experiences. A study by Ayabe-Kanamura *et al.* (1998) tested the familiarity and perceived pleasantness of Japanese and German associated scents on Japanese and German individuals, and found that culturally familiar scents were rated as more pleasant; previous experiences of scents resulted in preferences. This shows that memory acts upon the perception of smell.

Smell also triggers memories (Verbeek *et al.* 2013,133; Keller 2014,174). This could be part of a common memory of a whole generation; Bembibre and Strlič give the example of Playdough in triggering nostalgia for those born after 1960 (Bembibre

*et al.* 2017,2). These memories may also be individual. A study by Aggleton and Waskett (1999) looking at the effects of the scents used in Jorvik Viking Centre found that when people who had previously visited the museum smelled the scents used at the museum again, they were able to answer questions about their museum visit more accurately. A study by Willander and Larsson (2006,243) found that memories evoked by smell are vivid and enable the feeling of being brought back in time. This has been corroborated by other studies (Almagor 1990,268; Reinartz 2014,6; Stevenson 2014,156). Thus, smell is known to trigger vivid memories that may affect individuals or whole communities.

Smell can evoke long-term memories (Goddard *et al.* 2005,84; Baines 2008,88; Stevenson 2014,156). A study by Chu and Downes (2000) found that, while memories evoked by word labels corresponded to a range of past memories over time with the highest proportion between the age of 11 to 20 years of age, the highest proportion of memories evoked by smell related to between the ages of six to ten years; smell elicited memories that were from a younger age than word cues. Willander and Larsson (2006) have similarly found that olfactory-evoked memories were older than memories from verbal and visual cues, with memories from smell cues often relating to the first ten years of an individual's life. Thus, memories elicited by smell are often older than those evoked by verbal or written cues.

### 5.3.3. Emotional Impact

Sound can elicit emotional responses. This may be empathy, which is enabled through a greater understanding of an event as discussed above. A study by Gazzola *et al.* (2006) found that sound is linked to empathy through conducting functional magnetic resonance imaging scan (fMRI) experiments. Studies have found how sound perceived to be emotional can affect the brain and perception. Music is well-known to cause an emotional response (Bates 2012,377; Chanda *et al.* 2013,179; Arnott *et al.* 2014,90). A study by Mitterschiffthaler *et al.* (2007) found that happy and sad music activated different parts of the brain, and clearly resulted in different emotions. Music can induce dopamine release (Quarto *et al.* 2017,9). Emotionally charged sounds, such as laughter and screams, have been found to be detected more easily by the brain and the signals maintained for longer compared to neutral signals (Martin *et al.* 2014,530).

This shows that the brain prioritises emotional sounds (Zeelenberg *et al.* 2006). The effect of sound does vary between individuals (Chanda *et al.* 2013,186; Quarto *et al.* 2017,9), but these studies show that in general, sound affects emotions.

Smell has been found to alter motivation and affect mood (Ehrlichman *et al.* 1992,410; Stevenson 2014,155). A study (Herz *et al.* 2004) found that participants spent less time on puzzle tests in the presence of odours with negative connotations due to emotions evoked by the odour. Smells are often manipulated in retail settings to evoke positive emotions (Classen *et al.* 2010,158). Odours can still have an emotional impact when they are not consciously acknowledged by individuals (Keller 2014,169; Stevenson 2014,152). Thus, smell can also affect emotions.

The emotionality of smell is often intrinsically linked with memories (Ehrlichman *et al.* 1992,410). Kennedy (2019) gives the example of *The Mods: Shaping a Generation* exhibit at Leicester's New Walk Museum and Art Gallery, which included a scarf with Youth Dew perfume on it. Joe Nixon, the design agency owner for the project, said 'people broke down in tears remembering how their grandmother used to smell. There's something about a smell that can really take somebody back to a time and a place' (Kennedy 2019). A study by Herz and Cupchik (1995) found that scent-evoked memories were more emotional than memories elicited by verbal cues. These emotions are often personal to the individual through their lived experiences (Classen *et al.* 2010,2). Smells linked to memories can elicit strong emotional responses.

#### 5.3.4. Multimodal Sensory Perception

It is important to state that neither sound nor smell operate in isolation. Remembering a past event involves remembering other perceptual features such as touch and vision (Ward 2014,273). The engagement of more than one sense also increases the ability to remember (Beliveau 2015,12). The more senses engaged, the more effective the learning experiences; the most effective learning experiences are immersive and engage all of the senses (Falk *et al.* 2000,201). Multimodal sensory experiences appear 'clearer' as they are more embedded in real life than, for example, watching a video on a screen without the sound on. One sense has the ability to impact another (Pascual-Leone *et al.* 2001,427). Therefore, multi-sensory experiences

may produce a greater impact than may be found by simply looking at individual senses.

#### 5.4. Atmosphere

The senses can contribute to atmosphere (Kotler 1974,50; Walker 2019,259), which is a sense of the mood or feeling of a place (Pallasmaa 2019,126). This relates to the whole experience (Bjerregaard 2015,75), and the multimodality of senses. When sensory aspects, such as scents and sound recordings, are added to a museum experience, it is important that these are done well in order to appear authentic and not result in sensory overload (Fry 2002,14; Chen *et al.* 2015,183; Everett 2019,313). It can be argued that the most beneficial way to provide an authentic atmosphere and authentic experience is to show the real thing, such as through demonstrations of working historic vehicles and machines (Grimshaw 1976,83). The *Guidelines for the Care of Larger and Working Historic Objects* (ABTEM 2018,20) state that atmosphere is an important aspect of running vehicles. Multisensory experiences are important in creating an effective atmosphere (Harvey *et al.* 1998,620; Stogner 2011,118).

The integration of sensory aspects can provide a sense of immersion (Everett 2019,313). This is increased emotional engagement and direct involvement with the experience (Carù *et al.* 2006,5; Bjerregaard 2015,74; Hjortkjær 2019,458). Immersion can be defined as becoming surrounded by, or part of, an experience (Murray 1997,98; Ermi *et al.* 2005,3,4). This can result in emotional engagement and more empathetic responses by visitors to the histories of objects (Stogner 2011,119; Bjerregaard 2015,74). Several studies use the work carried out by Pine and Gilmore (1999,30), as shown in the diagram below (Figure 36), to explain immersion (Ermi *et al.* 2005,3,4; Grimshaw 2008,120; Grimshaw *et al.* 2008,1). The diagram shows how immersion is achieved through engagement rather than entertainment (Pine *et al.* 1999,30), meaning that immersion is the result of being involved with the experience.



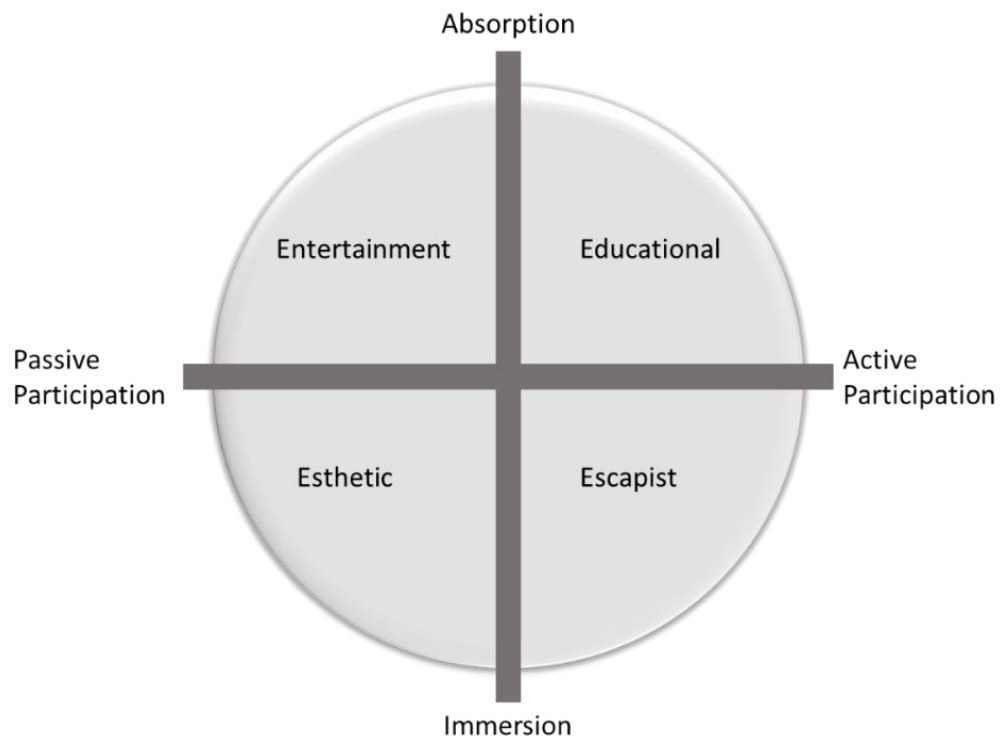


Figure 36. Pine and Gilmore's diagram describing the scales of absorption and immersion, and passive participation and active participation. Source: Pine et al. 1999,30.

Thus, atmosphere also relies on the visitors. Through immersing visitors, visitors become active participants and co-creators of value which contribute to atmosphere (Vargo *et al.* 2008, 2015,8; Uhrich *et al.* 2010; Antón *et al.* 2018,1407; Campos *et al.* 2018,392). The views and experiences of visitors should therefore be found and assessed in order to improve atmosphere and create positively impactful experiences (Babin *et al.* 2000,92).

### 5.5. Phenomenology

When exploring the value of sensory experiences, the theory of phenomenology can provide an insight into sensory values in historical and archaeological contexts. The following paragraphs will explain the purpose of phenomenology, before considering criticisms of the theory. The potential application of phenomenology to industrial and military archaeology and heritage will then be discussed.

### 5.5.1. A definition of phenomenology

Tilley was one of the initial advocates of phenomenology in archaeology, conceptualising archaeological phenomenology as a response to new archaeology which he felt decontextualized the past by treating landscapes as wholly separate to past experiences of people (Tilley 1994,7; Brück 2005,46). Tilley states 'phenomenology involves the understanding and description of things as they are experienced by a subject. It is about the relationship between Being and Being-in-the-world' (Tilley 1994,12). The phenomenological perspective argues that people's experiences are inseparable from their surroundings and interactions with both place and objects.

Before the advent of phenomenology, the archaeology of the 1980s and 90s often saw the material record as text; something to be 'read' with an objective meaning (Hamilakis 2014,51). Phenomenology subsequently argued for more emphasis on bodily experiences. Phenomenology therefore acted as a response to textual metaphors in archaeology (Johnson 2012,271). Brück (2005,65) argues that phenomenology moves archaeological discourse from the previous view of objects being inanimate things that people put meanings onto, to acknowledging that objects and places are capable of shaping experiences. This interplay between objects, landscapes and people is important in demonstrating how active experiences can shape people (Tilley 1996,162, 2016). In addition, it gives agency to spaces and objects (Tilley 1994,9).

Tilley argued for the assumption that 'relationships between peoples and landscapes in prehistory were just as intimate and affective' as the current day, as seen through anthropological studies (Tilley 1994,71; Cummings *et al.* 2004,8). He argues this through the notion that our bodies are not any different to those from the Mesolithic period onwards, and so we use our bodies in the similar ways to perceive the world around us (Tilley 1994,74). Consequently, perceptions of the landscape in the present can provide an understanding of the significance of past people's perceptions (Tilley 1994,74, 1996,162; Jones 1998,8). This provides a greater understanding of experiences in prehistory (for which there are no written texts). Tilley (1994,74) states 'I make no claims to an empathetic understanding of their significance, to some incredible feat of being able to find and recover meaning in

prehistoric minds'. Phenomenology does not state it can be used as a way to understand the exact meanings and purposes of objects and spaces, and it does acknowledge that there is a level of subjectivity (Chadwick 2004,22; Tilley *et al.* 2017,75). Instead, it is used to gain a greater understanding of past experience.

#### 5.5.2. Sensory phenomenology archaeology

Although phenomenology initially focused on the visual aspects of the landscape (Tilley 1994; Cummings *et al.* 2003,256), other senses were subsequently explored through phenomenological frameworks (Tilley *et al.* 2017,217). The sector of phenomenology that has arguably made the most impact is acoustic archaeology (Beranek *et al.* 2012,4), particularly that focusing on prehistoric Britain (Brück 2005,45). Archaeoacoustics have built on the notion of soundscapes, a definition which was introduced in the late 1960s and 1970s (Schafer 1975; Pijanowski *et al.* 2011; de Jong 2018). Sensory phenomenology, like the initial visual-focused phenomenology, takes the notion that modern bodies are similar to those of prehistory, and so the world is perceived and experienced through the same methods of the senses (Cross *et al.* 2002,25; Hamilakis 2002,122; Brück 2005,51; Mills 2014,19; Blake *et al.* 2015,81; Tilley *et al.* 2017,288). This goes one step further than the initial phenomenological arguments that focused on the visual (Hamilakis 2014,8). It builds on the premise that the past was not silent; noises have always been part of human experiences (Watson *et al.* 1999,325; Debertolis *et al.* 2013,2), as indicated by evidence of prehistoric musical instruments (Debertolis *et al.* 2013,2). Archaeoacoustics often focus on the perception of sound in and around prehistoric monuments and earthworks (Watson 2001,308; Cluett 2014,109; Primeau *et al.* 2018,875). This can involve exploring the auditory effects of percussive sounds at different points in and around monuments (1999), or listening to the landscape surrounding monuments (Mills 2014,276). This acknowledgement that sound forms part of the experience of being-in-the world (Cummings *et al.* 2004,8) has resulted in a greater level of sensory understanding of monuments and sites.

Sensory phenomenology has also been applied to historic sites. Suárez, Alonso and Sendra (2016) applied archaeoacoustic theory and methods to understand the perception of sound within the Maior Ecclesia in Cluny, a medieval Romanesque

church that was destroyed in the 18<sup>th</sup> and 19<sup>th</sup> centuries (Landrieu *et al.* 2012). Simulations of the space were created through computerised models (Landrieu *et al.* 2012; Suárez *et al.* 2016,569), and acoustic prediction techniques were applied. The study found that sound produced in the choir of the church was clear, and resonated, amplified and diffused within the rest of the church (Suárez *et al.* 2016,572). This meant that the melody of Gregorian chant would have sounded spiritual and mystical as the words became intelligible in the rest of the church (Suárez *et al.* 2016,571). This demonstrates that archaeoacoustics can be used to provide valuable sensory information in historic heritage as well as prehistoric landscapes.

### 5.5.3. Criticisms of phenomenology

The main criticism of phenomenology is that we cannot know whether the significance ascribed to phenomenological aspects in the present are the same as in the past (Boado *et al.* 2000,189; Hodder *et al.* 2003,119; Brück 2005,51; Blesser *et al.* 2007,69). The similarities between modern experiences and past experiences may not be as axiomatic as Tilley (1994,71) argues. Tilley often approaches sites and monuments as if for the first time, whereas past individuals may have a strong understanding of such sites, which may be associated with certain values and memories (Hamilakis 2014,103). Our notion of self and experience is shaped by past experience (Brück 2005,55); this is particularly the case for smell, where past experiences can result in different emotional associations with certain smells. We cannot specifically know how past individuals experienced sites without accompanying documentary evidence.

The reliability of experiments have been questioned, with several citing that it is difficult to consistently replicate and produce the same results (Primeau *et al.* 2018,876). Tilley (2017,75) writes that ‘inevitably, different experiences of the same landscape give rise to varying personal and emotional responses’. Again, this shows that the importance of the phenomenological framework does not lie in its exactness and reliability (Hamilton *et al.* 2006,48), but in its ability to understand and communicate ideas about the senses in the past.

The Western centric notion of the five senses has also been questioned in relation to understanding the significance of the past. The categorisation of the five senses is a Western construct (MacGregor 1999,264; Hamilakis 2014,112), so past societies may not have perceived the senses in the same manner as a modern individual. The research in phenomenology has echoed the Western hierarchy of the senses by first looking at visual aspects, then sound. Smell, taste and touch have not been explored in the same way as sight and sound (Hamilakis 2002,122, 2014,55). This indicates the need to increase emphasis on other senses and sensory frameworks.

In addition, Meskell (1996,9) raises the issue that the body in phenomenology is often assumed to be male, and diverse experiences are not often considered in any depth. This has since been countered (C. Fowler 2002,47; Hodder *et al.* 2003,106) with an aim of incorporating a more diverse idea of the body in phenomenology. Thus, it should be considered that past experiences are subjective and depend upon the individual. Yet, through phenomenology, a general understanding of how the senses played a part in past experiences can be found. Phenomenology is therefore not an exact science but a useful framework for looking at overall impact and aspects of sensory significance.

#### 5.5.4. The application of phenomenology in industrial and military archaeology

From an exploration of the criticisms of phenomenology, it is clear that the theory has drawbacks. The main criticism is that we cannot know how people in prehistoric societies viewed the world and the senses. Although this is a drawback for prehistory, it is not for the period under study in this thesis, as there are several historical documents available which can indicate how people thought and exactly what people sensed. The next logical step, therefore, is to consult historical sources in order to find out what individuals thought and sensed. This will indicate which, if any, senses were of importance when seeing tanks for the first time, and subsequent encounters with tanks in warfare. This reveals the significant aspects of the tanks themselves, and so gives an indication of what should be conserved and demonstrated.

The notion of phenomenology accepts that individual experiences are different. The use of primary sources enables us to find those individual voices documenting their own experiences. Thus, phenomenology can be useful to the study of the value of tanks from the first World War onwards. By finding the historical value of tanks, museum experiences can be authentic, accurate and grounded in sensory history.

## 5.6. Eyewitness Accounts of Tanks

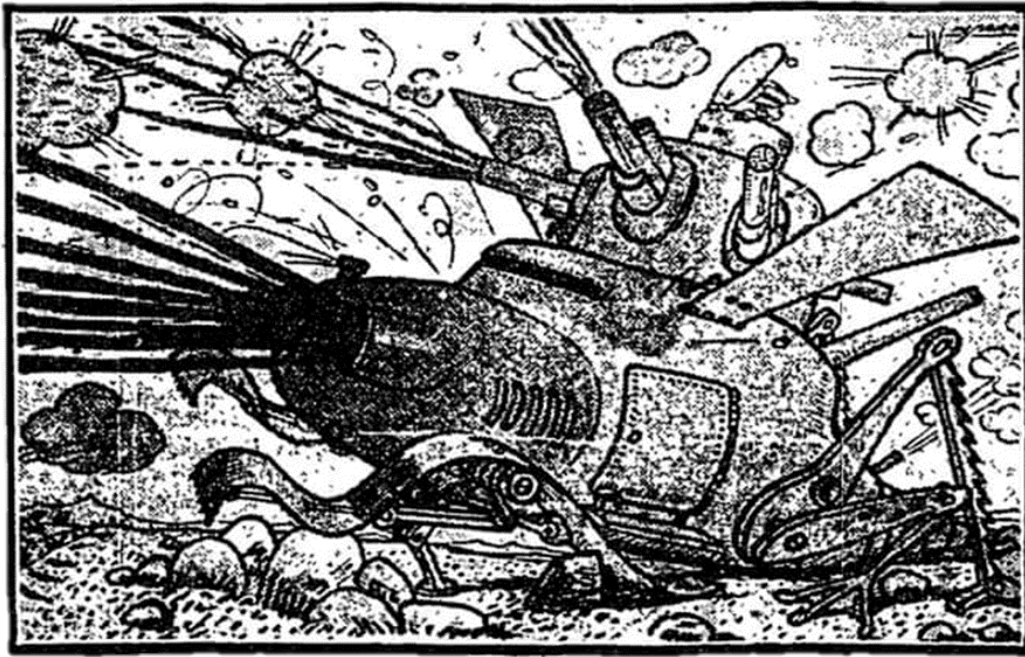
Eyewitness accounts provide valuable information about what effect tanks had on individuals in warfare. This consequently provides information about the purpose and impact of tanks in battle. Many accounts from the First and Second World War mention the sound and motion of tanks having an enormous effect on both battle and the emotions of soldiers. The success of tanks becoming established as a weapon of war can be clearly seen in the First World War. This was due to their ability to manoeuvre, provide protection and armour (Willey 2017, 9). It was also due to the emotive impact of a tank. Hearing and seeing a tank moving, particularly for the first time, invoked terror and awe. The eyewitness accounts consulted place sensory aspects as significant aspects of a moving tank, and therefore part of its function.

### 5.6.1. Movement

The movement of tanks was described in animalistic, living terms. Norman Dillon served as a reconnaissance officer with B Battalion (Bn) Heavy Branch Machine Gun Corps and 2<sup>nd</sup> Bn Tank Corps on the Western Front 1916-1918 (Dillon 1987). In an oral history recording, Dillon (1987) said of the first tank he saw 'a queer object crawled over the mud'. Dillon also says 'this enormous thing on the road in front of me ambled on behind the troops' (Dillon 1987). Lieutenant Tommy Turner, who was in the 60<sup>th</sup> Bn Machine Gun Corps, saw the first tanks in action at the Somme, in the Battle of Flers-Courcelette on the 15<sup>th</sup> September 1916. Turner (1916) wrote that a tank 'has strolled over the trench'. The word 'strolled' indicates the ease with which tanks were able to drive over trenches. These descriptions of tanks indicate that movement gave the tanks a semblance of life.

Several of the personal accounts go further with this anthropomorphism to describe the moving tanks as monsters. David Lloyd George, at the time Minister of Munitions, commented that Mother, a British tank prototype, was an 'ungainly monster plough[ing] through thick entanglements' (Kershaw 2008, 12). Philip Neame (1974), an infantryman who saw one of the first tanks, said 'everybody was staggered to see this extraordinary monster crawling over the ground.' Bert Chaney, an Non Commissioned Officer (NCO) with the signallers, saw the first British tanks in the Battle of Flers-Courcelette (1973,115). Chaney (1973,115) explains 'lumbering slowly towards came three huge mechanical monsters'. Second Lieutenant Frank Mitchell described the first encounter of his British Mark IV tank meeting a German tank in 1918, and described German tanks as 'a round squat-looking monster' (Mitchell 1930,233). Several other accounts used the word 'monster' to refer to tanks (Seddons n.d.; Henriques 1916; Becke 1995; Maxwell 1916; the Observer 1916). The image below (Figure 37) shows a Spanish cartoon, published in the Manchester Guardian on the 9<sup>th</sup> October 1916, imagining the appearance of a tank, and describing it as 'the war monster'. The majority of these accounts refer to the tanks as monsters when they are in motion rather than static. It is movement that makes tanks what they are, rather than static fortifications with firepower. This suggests it is the movement that makes the tanks appear monstrous, indicating the importance of movement in producing lasting impressions of terror and awe.

## A SPANISH IDEA OF THE TANK.



**"The War Monster."**

A Spanish cartoonist's version, from "Esquella de la Torratxa" of Barcelona, of the 'new armoured vehicle' invented by the English and used with brilliant success in the North of France."

*Figure 37. Imagined cartoon of a tank, published in the Manchester Guardian 9<sup>th</sup> October 1916. The first photographs of tanks were not published in the paper until November. Source: [www1](http://www1).*

Tanks were also referred to as monsters when they visited cities and towns around Britain in 1917 and 1918 in a successful attempt to raise money for war bonds (Figure 38). Harry Cartmell, Mayor of Preston at the time, describes his memories of seeing a visiting tank (Cartmell 1919). He writes 'he seemed a great pre-historic monster, and the absence of all visible human control heightened the impression. They have funny ways with them in the Army, and it is one of the funniest that they should have given to a thing so suggestive of life a name which connotes nothing but deadness and impassivity' (Cartmell 1919,145). This shows that the specific movement of a tank appeared to give it life and make it seem monstrous, even when not on the battlefield.





*Figure 38. Image of Egbert the Tank visiting Preston to raise money for War Bonds on the 21st January 1918. Source: [www2, Preston Digital Archive](http://www2.preston.digitalarchive.org).*

The movement of tanks certainly produced terror in the opposing side when in battle. A German soldier stated during the First World War of the British tanks that ‘tank after tank loomed forward. These monsters appeared invincible’ (Cited in Horne, 1923). The account indicates the fear a moving tank induced in its enemies. The fact that they were described as appearing invincible shows just how much this fear impacted morale. Ivor Wynne Roberts, 3<sup>rd</sup> Bn Tank Corps, writes ‘in 1916 the first introduction had great psychological and moral effect on the Germans’ (Roberts, [n.d.], 49). Thomas Hirst Brown of the King’s Liverpool Regiment said ‘I think they frightened the life out of Jerry when he first saw them!’ (Brown, 1987; IWM, 2018). Kershaw (2008,8) cites a Bavarian prisoner of war, when faced with the first tanks, was recorded saying ‘someone shouted “The Devil is coming!” ...and word passed along the line’. The use of the word ‘devil’ and ‘monster’, as well as the description of tanks moving, indicate that tanks induced extreme fear into those in warfare.

British accounts consolidate this sense of terror when witnessing moving tanks for the first time. Sidney Taylor, a soldier who saw the first tanks in battle in the Battle of Flers-Courcelette, said ‘it was a funny sensation to see a dozen tanks coming over shell holes, no stopping. Didn’t matter what they came over, they got over it alright, and it was horrifying... It was a wonderful sensation, really, to see them. But it was

horrifying, you know.’ (Taylor, 1989; IWM, 2018). Similarly, Walter Henry Tucker, a British private who served with the Queen’s Royal West Surrey Regt on the Western Front between 1916-1918 said ‘we were out there when the first tanks came...that was a wonderful sensation...t’was no doubt about it they’d go over terrific ground’ (Tucker n.d.). John Malcolm Laurence Grover (1973), a British officer who served with 2<sup>nd</sup> and 1<sup>st</sup> Bns King’s Shropshire Light Infantry, said ‘everyone was full of hope when they were first introduced’. Basil Henriques, C Company HS MGC in 1916, wrote (n.d.) that the tanks were well received by those in battle, with exclamations of ‘the tanks are wonders...tanks are splendid’. He wrote ‘you can guess one’s blood just boiled with pride and pleasure’. These comments show the positive impact on morale from the first tanks. Andrew Bain, a British officer, came under attack from a German tank later in the war. He recounts ‘we were holding this line. And one day an alarm got up. And we saw this thing trundling through. We were firing, but we had nothing but small arms ammunition. And of course it was no use against tanks... it came lumbering on and lumbering on...it was rather terrifying to see this thing coming and you knew that you couldn’t stop it.’ (Bain, 1974). These accounts show that the manoeuvrability of the first tanks was a great part of their ability to inspire awe and terror.

The specific movement of tanks shaped their warfare. Private Archie Richards stated ‘I’d just get set and ready to fire, and bang, the tank would lurch somewhere, throw me right off’ (Richards, cited in (Van Emden 2006,18). This lurching motion can easily be seen when a tank is running but is difficult to discern when it is static. Private XYZ, of the Royal Tank Corps, describes driving a Second World War tank as ‘swaying, bucking, leaping, bouncing’ (Private XYZ, 1937,41). This again describes a style of movement that is particular to tanks. The movement of a tank is of significance when understanding the function of a tank, and how this impacted warfare. Movement is integral to the function of the tank.

#### 5.6.2. Sound

Noise and movement have been initially separated for the purpose of this discussion, but they are intrinsically linked. Movement resulted in sound, which gave the overall impression of the tank as something terrifying when running.

The sound of the tank was the first thing soldiers perceived of tanks when the tanks were introduced into battle during the First World War. Robbie Burns, a 7<sup>th</sup> Cameron Highlander recounted ‘the gunfire was terrific but then I heard this brrrrr, and I thought, what on earth is that noise? It got louder and louder, so I stood on the firestep and saw something moving...’ (Van Emden 2006,172). Bert Chaney, 7<sup>th</sup> London Territorial Bn, also heard the sound of tanks before he saw them, writing ‘we heard strange throbbing noises’ (Chaney, 1973,115). Thus, the noise of a tank formed the initial impression for those on the battlefield.

Similar to the movement of tanks, the sound was also often described in animalistic terms. Frank Mitchell (1930), Army Ordnance Corps attached 21<sup>st</sup> Infantry Division, wrote ‘three huge, toad-like forms, grunting and snorting, crept out of the wood to a spot some hundred yards to the rear’. Sam Lytle, of the Liverpool Scottish Infantry, described tanks as ‘snorting’ (Kershaw 2008,15). Similarly, John Seddons, 13<sup>th</sup> Bn TC, wrote (n.d) ‘exhaust pipes snort violently if much work is demanded of the engines’. These mentions of grunting and snorting give an image of an aggressive, animalistic vehicle.

Other descriptions of sounds include mentions of roars and growls. During training for the Second World War, Private XYZ recounted ‘the engine shrieking like a demon...on we’d roar, the sound carrying for miles’ (Private XYZ, 1937,40). Norris Perkins of 3<sup>rd</sup> Bn 66<sup>th</sup> Armoured Regiment, cited in Forty (1998,44) when talking about the M2A4 light tank, said ‘tremendous roar of the engine, fantastic roar of the tracks going forward from the rear idlers over to the roaring sprockets’. Second Lieutenant Frank Mitchell (1930,235) also mentions ‘the roar of our engine’. The word ‘roar’ is used in many accounts, suggesting a specific, loud sound. Roars are usually associated with apex predators, thus likening tanks to fear-inspiring animals. Lieutenant Helmut Ritgen, when talking about Panzer Mark I’s, said ‘got the “beast” started again with a loud bang’ (Kershaw 2008,62). Another German soldier, Rudolf Behr, wrote ‘engines growl into life to our right and left, and from further back there is the whining and howling and clattering of the smaller combat vehicles’ (Behr, n.d.). In the majority of personal accounts analysed in this study, the noises of tanks are referred to in animalistic ways. This results in tanks being portrayed as living creatures that incite fear and awe.

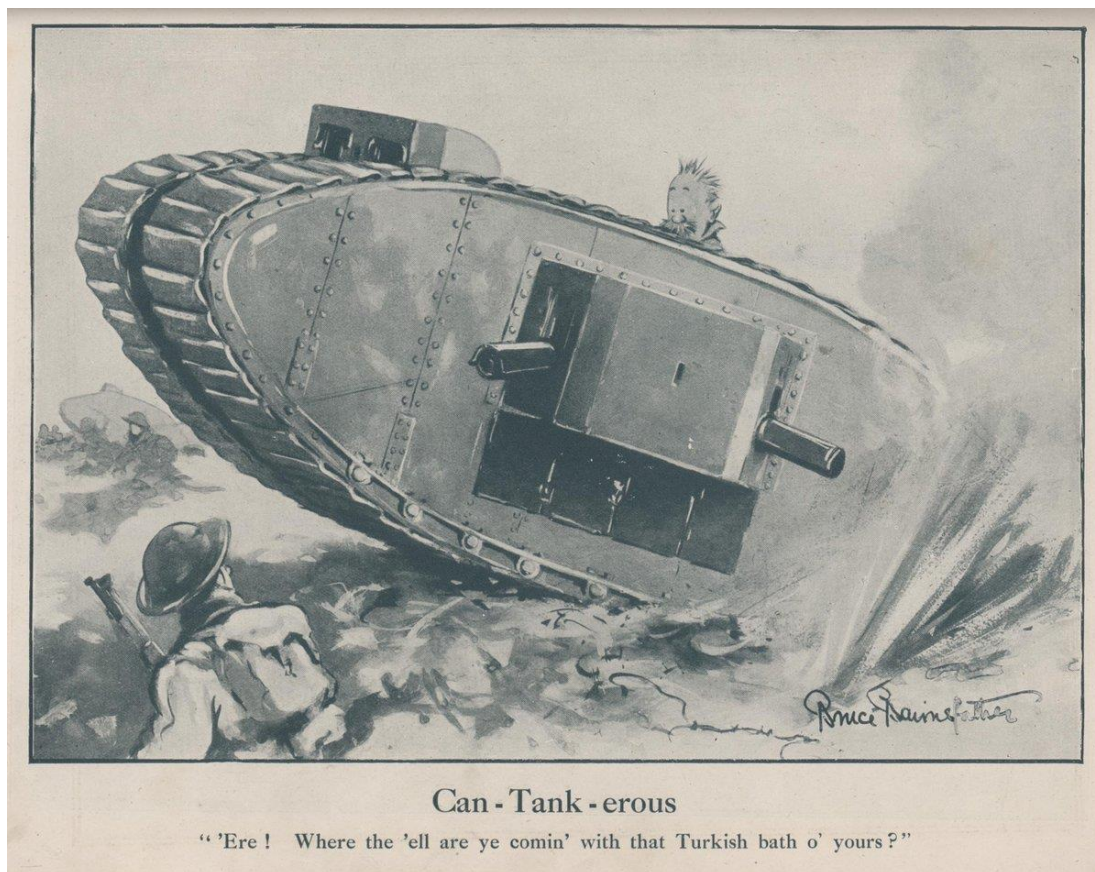


Figure 39. Bruce Bairnsfather cartoon 'Can-Tank-erous'. Source: *The Bystander*, 11th April 1917, pp. 78-79.

As Figure 39 shows a Bruce Bairnsfather cartoon (1917). Bruce Bairnsfather drew weekly cartoons for *The Bystander*, and these cartoons were hugely popular during the First World War (Holt *et al.* 2014,9). In the cartoon the movement of the tank is clearly seen, and the sound is implied with the pun 'Can-Tank-erous'. This shows just how much of an aggressive impact a tank makes, and sound formed an integral part of this. Ernie Hayward, a British NCO, stated that he first found out about tanks from Bruce Bairnsfather cartoons (Hayward 1977). This type of cartoon, showing the movement and sound of a tank, was therefore the first impression of a tank for many before they actually saw the tank. This shows that even images of tanks incorporated sensory aspects, and so it contributes to a large portion of their significance in warfare.

Accounts discuss how the sound of tanks impacted warfare. For example, Alfred Brisco, H Bn Tank Corps, (n.d.) wrote that in the Battle of Cambrai, 'the driver had to keep the tank engine only turning over gently- like the drone of a hive of bees. There had to be no noise whatsoever otherwise we would be heard by the enemy'. Major A Becke similarly writes about the importance of ensuring the tanks were as

quiet as possible (Becke 1995), as does Brigadier P.C. S. Hobart (Hobart 1935). These accounts convey how sound impacted upon movement in warfare.

Accounts also discuss the noise when inside a tank. Geoffrey Robert Kirk, a British trooper who served with 141 Regt Royal Armoured Corps 1943-1945, said 'if you want to be noisy and uncomfortable, then travel in a tank' (Kirk n.d.). Private A Reiffer, a gunner in a tank, said 'we were going up to the approaches to Flers and there was a terrific amount of noise in the tank made up by the engine, the tracks, and the tumbling about of the barrels of oil and the various things that were in the tank. A terrific noise was going on' (Reiffer, 1963; IWM, 2018). Norman Dillion (1987) stated there was 'a frightful racket that went on inside' a tank in action. Hayward (1977), a British NCO who served as a tank gunner similarly recounted the noise inside the tank, and the method of tapping the bonnet of the engine to signal due to the noise. Ivor Wynne Roberts (n.d.,59) from the 3<sup>rd</sup> Bn Tank Corps also wrote about how the driver gave manual signals since it was too loud to speak inside a tank. M. J. Tiffen, Gunner R Owen Arscott and Brigadier P. C. S. Hobart similarly wrote about the need to signal as 'the din inside was terrific' (Arscott, n.d; Hobart 1935; Tiffen n.d.). William Cleworth (n.d.,12), an American soldier in the Tank Corps, wrote about the Mark IV 'inside the tank...the noise was deafening'. The noise of a tank shaped how men acted within a tank, and consequently how battles were acted out. The noise of a tank is therefore an intrinsic part of its function and form.

Sound is clearly an integral part of a running tank. It formed the initial perception of a tank for many soldiers, and led to tanks being seen as animalistic, living things that induced terror and awe. It also shaped the way soldiers acted within and with a tank, and thus how warfare was enacted.

### 5.6.3. Temperature

The heat inside the tank was also often mentioned. Jason Addy (1983), a British private who served as a gunner with B Bn Tank Corps in the Battle of Cambrai, said 'temperatures often reached 120 degrees and many a time we had to stand by with pyrenes ready for a fire'. Gunner R Owen Arscott (n.d.) wrote 'a driver could burn his hands on the hot steering wheel and, in the case of the Mark V tank, it even caused

ammunition to explode...there was little to hold on to except a red hot exhaust pipe when the machine lurched into a shellhole and out again'. Private George Brown (n.d.) similarly wrote 'the heat from the exhaust pipe which was now red hot'. These were clearly difficult conditions, as a report to Bn Headquarters by Officer Commanding B Company stated (1918) 'the heat and noise were a great inconvenience. Two cases occurred of drivers fainting after the action'. Thus, the temperature inside the tank also affected the experience of warfare.

#### 5.6.4. Smell

The smell of early tanks is discussed in written memoirs, reports and oral histories. Jason Addy (1983), gunner with B Bn Tank Corps in Battle of Cambrai, said 'conditions within the tank were appalling, not only for the noise, but also for the smell of engine, exhaust fumes, cordite'. Frank Mitchell writes 'we were half-stifled by the fumes of petrol and cordite' (Mitchell 1930). Norman Dillon, when discussing the guns firing, said 'it was rather unpleasant, fumes blowing back' (Dillon 1987). Gunner R Owen Arscott (n.d.) wrote 'ventilation was, at the best of times, very poor, being little more than a radiator fan sucking in air but even this failed to remove carbon monoxide fumes and, in the case of tanks armed with Lewis guns, it drew in acrid, choking cordite fumes, mixing with the nauseous smell of oil and petrol, across the faces of the gunners'. This shows how the smell of tanks and explosives formed lasting memories of tank warfare.

#### 5.6.5. Summary of Eyewitness Accounts of Tanks

Eyewitness accounts of the first tanks inform the reader of the initial reaction to tanks in the First World War. They also give information about what aspects formed an important part of the perception of a tank from the First World War onwards. From the above analysis of eyewitness accounts, it appears that movement, sound, temperature and smell made an impression on those who worked in or alongside tanks in warfare.

### 5.7. Discussion of Sensory Experiences

The move to value-led conservation means that material originality is now one of many factors to consider in heritage decision making processes. Intangible heritage and values, such as the senses, must also be considered. Guidelines and examples within museums indicate that interest in sensory experiences has grown over time. Enabling the use of other senses such as smell and sound in museum exhibits can engage visitors in more ways than simply visual (2014,169), and so can enable visitors to value the museum experience, which in turn leads to greater care of collections. Smells and sounds have been found to help people establish themselves within their surroundings, so can be used to make museum experiences more grounded, relevant and 'real'. This will enable the visitor to have a more active role within the experience (Keller 2014,174). Sensory access also has the ability to elicit emotional responses and create long-lasting memories. Thus, sensory museum experiences have the opportunity to create long-lasting impact on visitors which can enhance the educational value of a museum visit, immersion with the experience and, through increased engagement, can result in more people becoming interested in caring for heritage and ensure that heritage is not forgotten.

There are criticisms of the current sensory offers in heritage, including the notion that sensory experiences are often additions rather than a product of the heritage itself. This can be reconciled through the use of working historic objects, such as running tank displays at The Tank Museum. Through using real, historic, objects which have an aura, the public can engage in meaningful and authentic experiences.

Through using the theory of phenomenology, it can be argued that demonstrating historic vehicles in motion can provide visitors with a greater understanding of past experiences. The main criticism of phenomenology centres around the notion that the modern individual cannot fully understand how people in the past perceived the spaces and objects around them. But this is not an issue for studying the history of tanks, as there are primary sources detailing exactly what and how people perceived and felt about tanks. By consulting these sources and assessing material evidence with the textual, significant aspects can be found, thus identifying what was important about a tank at the time of its use. This importance can then be demonstrated to current audiences. Phenomenological theory can be applied to past

experiences of moving tanks to find the sensory values of running. This reinforces the notion that sensory experiences form how we perceive the world around us, and similarly how past people perceived their surroundings. Therefore, sensory aspects appear to be significant in the creation of authentic experiences.

Eyewitness accounts of the first tanks inform the reader of the initial reaction to tanks in the First World War. They also give information about what aspects formed an important part of the perception of a tank from the First World War onwards. By analysing what aspects are mentioned, the most significant aspects of a tank can be found; what makes a tank a tank, and what contributes towards its purpose and effect. The original purpose and function of a tank should be considered so that they can be presented accurately and accessibly in museums. A tank is an Armoured Fighting Vehicle, the name itself neatly summing up a tank's purpose:

- Armour- for preventing enemy weapons
- Fighting- a way of attacking the enemy with firepower
- Vehicle- able to move across the battlefield

Tanks were originally invented by the British as a way of breaking the static battlefield on the Western Front. The aspects of armour, firepower, and movement of a tank have remained an important part of warfare since. Movement is clearly an important part of the function of a tank; otherwise, it would be a fort. Several accounts refer to how the movement and sound of tanks impacted the function and operation of both the tank and general warfare. Movement and sound also impacted upon the fear or morale boost, depending which side the individual was on. In addition, temperature and smell within a tank were discussed, indicating their significance and effects in tank warfare. Thus, the operation and function of a tank is intrinsically linked to sensory experiences. If The Tank Museum is to achieve the aim of creating authentic experiences, then sensory aspects should certainly be considered.

The above sections have discussed conservation viewpoints, both traditional and current, and visitor expectations from a museum visit. Both sections have argued for the use of value-based conservation decision making to determine the conservation route of each individual tank. This can be carried out through a significance assessment, as detailed below.



## 6. A Review of Frameworks for Reassessing Authenticity

### 6.1. Significance Assessments

In order to determine which values of a tank should be preserved, the significance of the tank must be assessed. This will determine whether, in each individual case, there is more value for visitors and conservation through running, or through being displayed in static condition. The following paragraphs will discuss definitions of significance before assessing past and current guidelines to explore how significance is assessed. Current processes of significance will be researched with the aim of creating a significance assessment for vehicles at The Tank Museum.

#### 6.1.1. Significance and Value

The process and outputs of assessing significance have become increasingly important over recent years as conservation has moved from focusing on protecting the materiality of objects to the management of values (Reed 2018,3; Duval *et al.* 2019,1280). There has also been a greater focus on the public due to the decrease in public spending which has necessitated the demonstration of value for funding (Benington *et al.* 2010,12). By showing the value of collections, support can be gained, resulting in improved collections care and visitor experiences (Bell *et al.* 2018,9). The need to demonstrate value is ever more important in a society that functions on an 'audit culture' (Bell *et al.* 2018,9), requiring value to be defined and quantified. Thus, assessing significance is a method of showing the worth and value of collections.

Significance can be described as 'the values and meanings that items and collections have for people and communities' (Russell *et al.* 2009,1). Significance refers to the multiple values that a collection item or place can have (Avrami *et al.* 2000). Notions of significance therefore correspond with values.

Value can be defined as 'the different qualities, characteristics, meanings, perceptions, or associations ascribed to the things we wish to conserve' (Avrami *et al.* 2019,11). Value is not inherent in an object, but instead placed on objects by people (Lipe (1984,2) so, the relationships between objects and people create value (Ashley-Smith 2011,81; Buckley 2019,50). Objects are not preserved for solely their materials, but for the associated values (Robb *et al.* 2013,529). As a result, different stakeholders

and cultures may have different views on what is valuable (Mason 2002,9; Apaydin 2018,492; Avrami *et al.* 2019,9). In addition, values will change over time (Russell *et al.* 2009,vii; Ashley-Smith 2011,81), are subjective and can be defined in a number of different ways (Baxter *et al.* 2018,10), with different people and groups placing value on certain aspects over others at different times.

The creation of the significance assessment as a heritage management tool allows collections to be assessed against a standardised set of guidelines so their value can be found (BSI 2009,5; Russell *et al.* 2009,3). They facilitate an evidence-based demonstration of collections value for both internal and external stakeholders (Bell *et al.* 2018,8), and have been proven to be an effective persuasion tool for funding and resource opportunities (Collections Trust 2009,4; Russell *et al.* 2009,2). Significance assessments identify values (Avrami *et al.* 2000,8), which can then be used to assess individual collections, groups of objects or entire collections (Russell *et al.* 2009,22), defining the value aspects that have the most actual or potential meaning (Mason 2002,7; Clark 2007,1). The decision is then made to conserve and display the object in a way that best demonstrates these value aspects (Mitchell 2004,2) which can mean that other values are not displayed (Avrami *et al.* 2019,9-10). Significance assessments can be used to prioritise items within a collection, and collections within an organisation or community (Russell *et al.* 2009,vii). This may be prioritisation of display, whether static or functional, or prioritisation of collections care work (Atkinson 2010). Significance assessments can also highlight collections and items that have engagement or display potential, thus increasing visitor engagement with collections (Russell *et al.* 2009,2). Significance assessments are used to create statements of significance, which detail why an item is important (Russell *et al.* 2009,2,11), and consequently why certain conservation routes should be decided upon (Drury *et al.* 2008,21).

#### 6.1.2. Standards and Guidelines

Through analysing the significance and value factors found in guidelines and standards, one can find established ways of measuring value. A literature review was carried out to explore value aspects. A total of 19 standards and guidelines that define specific value aspects were analysed. In total, 82 different value aspects were

mentioned within the 19 standards and guidelines (Appendix B). The following chart gives the results of value aspects that were mentioned more than once in the text (Figure 40), so indicating established value themes. The most mentioned values will be discussed below to explore the values perceived to be of greatest worth in guidelines and standards.

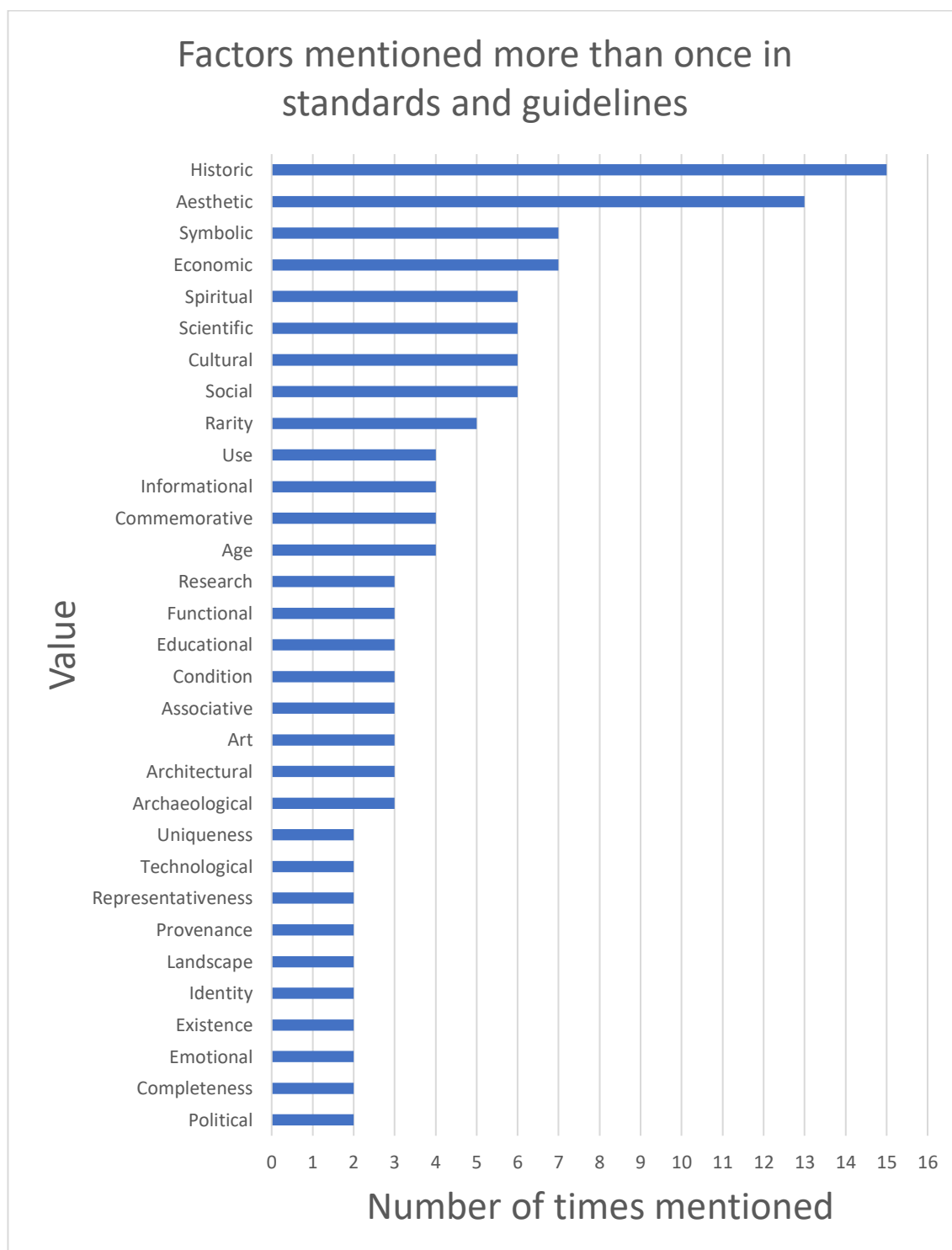


Figure 40. Chart showing value factors mentioned more than once in general standards and guidelines under study. Source Appendix B.

The value factor mentioned the greatest number of times within standards and guidelines is historic. Items may be deemed to be of historic importance if they are associated with a well-known person, group, place or event, or contribute to an understanding of a certain part of history (Keene 2005,162; Russell *et al.* 2009,39). Historic value may also include how the object entered the collection (Baars 2010,238). All objects in museums represent some part of history, so it would follow that this is a regularly mentioned value factor when assessing why an object should be cared for in a museum.

The second most often mentioned value factor is aesthetic. This includes the look and form of the object, involving how well it is perceived to have been designed and made (Russell *et al.* 2009,39). This aspect focuses on a judgement of the perceived beauty of an object (Robb *et al.* 2013,533) and consideration of how the object reflects a particular aesthetic movement. It is associated with the historic value of the object, thus demonstrating that even though values are given individual categories in theory, in practice they correlate with, incorporate and interdepend upon other values (Mason 2002,9).

Aspects mentioned a large number of times appear to correlate well with those in the Venice Charter and the Burra Charter, with some exceptions. Both charters presents the idea of using significance to form conservation decisions (Mitchell 2004,2). The Venice Charter, when mentioning value, states 'aesthetic and historic value' (ICOMOS 1964,3) while the most recent version of the Burra Charter states 'cultural significance means aesthetic, historic, scientific, social or spiritual value for past, present or future generations' (Australia ICOMOS 2013,2). This specification of certain values as markers of significance has been widely adopted within heritage (Poulios 2010,172; Buckley 2019,51; Mackay 2019,111), as shown by the results of the literature analysis. All of the values mentioned in both charters sit within the top eight mentioned values within the literature analysis.

As the Venice Charter and Burra Charter framework have been widely adopted, aesthetic values have often been valued over other value aspects (Buckley 2019,51). This can be seen in the large number of guidelines and standards that mention aesthetic value. Whilst again indicating the influence of both charters in heritage

management, this also demonstrates the Western preference for sight over other senses.

However, relatively few guidelines and standards mention the social value of collections compared to those that mentioned historic or aesthetic value. This indicates that social value may be less appreciated within guidelines. The number of mentions of social value may also reflect the process of the significance assessment in being decided by museum professionals, who may be more focused on the material and actual aspects of the object rather than the potential for objects to enable meaningful experiences. This again links to the traditional notion of valuing the materiality authenticity over experiential authenticity and focusing on preservation rather than the museum visit. Even though the earliest version of the Burra Charter (Australia ICOMOS 1979) includes social value as a value aspect, the low number of mentions of social value within the standards and guidelines in relation to historic and aesthetic value demonstrates the traditional emphasis placed on historicity and aesthetics, as shown in the lack of mention of social value in the earlier Venice Charter (ICOMOS 1964,3).

The variety of values mentioned encompass both actual and potential values in collections. Historic and aesthetic values are often described as being embedded in the object, whereas values such as use and educational indicate the potential benefit collections can have on users (Avrami *et al.* 2019,11). Thus, values can be actual, potential, or both.

The 82 different value aspects found within 19 standards and guidelines indicate that, although factors such as historical and aesthetic are generally recognised significance factors, there are many different ways of categorising value (Avrami *et al.* 2019,11). The prevalence of the characteristics mentioned in the Venice Charter (ICOMOS 1964) and Burra Charter (Australia ICOMOS 2013) shows a general adoption of these values, but the overall number of different value aspects demonstrates that there is not one single typology for measuring value.

The following chart (Figure 41) shows the results of a further literature review focusing on standards and guidelines for larger and working collections. Eight

standards and guidelines for larger and working collections were consulted (Appendix C), and again the value themes were listed and counted.

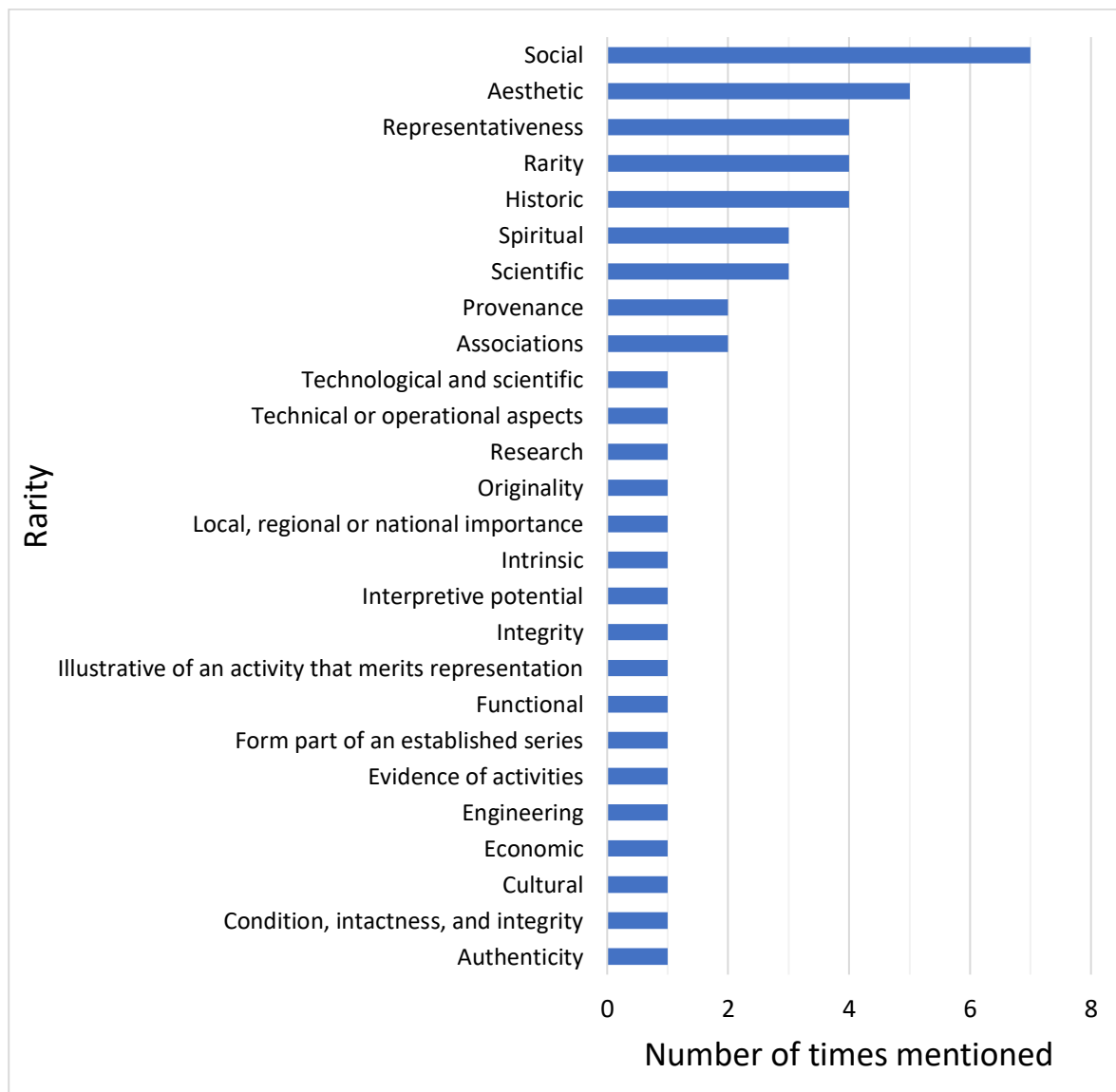


Figure 41. Factors mentioned in standards and guidelines for larger and working collections.

Many of the guidelines for larger and working objects echo the Burra Charter in mentioning aesthetic, historic, scientific, social or spiritual value (Australia ICOMOS 2013,2). This again shows the influence of the Burra Charter on value frameworks, and its widespread application in heritage. However, the results differ from those of the general guidelines through increased mentions of social value. This may be because of the nature of the collections; industrial and working collections show the social history in an easily accessible manner. The number of social value mentions also shows a greater emphasis on potential value for collections. This puts focus on visitors as active agents that create value through their experiences and interactions with objects.

Representativeness and rarity are also mentioned relatively more times than other values when compared to the general guidelines. This suggests an emphasis on larger and working objects being perceived as significant if they are one of a kind, or one of the last remaining examples. The focus on representativeness demonstrates the ability of larger and working collections to encapsulate histories, and thus their potential to be used to teach wider histories. For example, by visiting an industrial archaeological site, one can learn how the moving objects worked and how objects have developed over time, as well as gaining an understanding of social conditions and social history, cultural history, wider economic conditions and political history through effective interpretation and display. This is not to say that other collections cannot do this, but larger and working collections have a strength in their ability to represent history, which is indicated in the literature on values.

The results of this literature review indicate there is relatively little emphasis on the sensory aspects of larger and working objects. Like the general guidelines, aesthetic values are mentioned far more times than values that consider technical or operational aspects, functional value or evidence of activity. This demonstrates the western focus on visual modality over other sensory aspects.

Thus, from an analysis of guidelines and standards concerning larger and working vehicles, it appears that there is an emphasis placed on the social value of such collections. This contrasts with the literature review on general collections guidance, which found fewer mentions of social value. Representativeness and rarity also form a greater proportion of the values mentioned in the guidelines for larger and working vehicles. These differences demonstrate that different types of collections appear to hold different values. Yet, similar to the general guidelines, there is little emphasis on sensory value other than that of visual.

#### 6.1.3. Table of Surveys and Interviews to Find Value Aspects

Many of the standards and guidelines mentioned above use existing literature to decide which value themes to include in significance assessments. This can be clearly seen in the number of guidelines that base their significance assessment upon the Burra Charter. Other guidance and research on significance assessments has

sought to explore what a specific group of people find to be valuable when considering heritage. Three such studies have been summarised in the table below (Table 9).

Source	Collection Type Studied	Methods	Values Stated
(Robb <i>et al.</i> 2013)	Geological collections	Survey of academic and heritage professionals using the Russell Collection at the Natural History Museum (London)	<ul style="list-style-type: none"> <li>• Personal/inspirational</li> <li>• Uniqueness</li> <li>• Originality/historic</li> <li>• Educational/future</li> <li>• Aesthetic/commercial</li> <li>• Information</li> </ul>
(Dillon <i>et al.</i> 2013)	Documents	Survey of visitors to The National Archives (UK), the Library of Congress (USA), Capitol Visitor Centre (USA), The National Archives (UK) Museum, Bodsworth Hall, Kenwood House and Eltham Palace. Visitors were given around 60 statements and ask to rate their agreement or disagreement with each statement.	<ul style="list-style-type: none"> <li>• Future value</li> <li>• Materials and sensory experience</li> <li>• Public value and evidence</li> <li>• Personal meaning and identity</li> <li>• Understanding the present</li> <li>• Discovery and engagement</li> <li>• Content and learning</li> <li>• Connection to the past</li> </ul>
(Duval <i>et al.</i> 2019)	San (Bushman) rock art	Conducted interviews with people living in, working in and visiting the Maloti-Drakensberg Park World Heritage Site and Buffer Zone	<ul style="list-style-type: none"> <li>• Pleasure</li> <li>• Belonging</li> <li>• Social cohesion</li> <li>• Health</li> <li>• Enrichment</li> <li>• Care and responsibility</li> </ul>

Table 9. Table showing summarised results from studies that consulted specific groups on significance values. Source: Dillon *et al.* 2013; Robb *et al.* 2013; Duval *et al.* 2019.



The first study in the above table, carried out by Robb, Dillon and Rumsey (2013), aimed to find academic and heritage perceptions of values within geological collections. The study applied an attitude questionnaire (Robb *et al.* 2013,529). For the study, stakeholders were defined as ‘anyone who has worked with, personally owned or cared for geological collections in museums, universities, other heritage institutions or geological companies’ (Robb *et al.* 2013,530). The value aspects given by professionals in the study reflects the values mentioned in guidelines and standards, which demonstrates the successful application of these standards. It shows the enduring notion that values in museums should follow the frameworks stated in such standards.

However, there are criticisms of this work. Although the study (2013) effectively used questionnaires to find perceptions of value, the definition of stakeholders as experts within the field diminished the role of the public as users of heritage. Collections are for the public, so it is logical that the public should be included as stakeholders and consulted on what they value.

Further studies have consulted public opinion on the value of collections. One such study is that carried out by Dillon, Lindsay, Taylor, Fouseki, Bell and Strlič (2013). The study involved a VALUE questionnaire; visitors at a range of heritage sites were given around 60 statements and asked to rate their agreement or disagreement with each statement in relation to historic documents. The results of this questionnaire are significantly different to previous standards and guidelines, and different from the 2013 study by Robb, Dillon and Rumsey. Results of the VALUE questionnaire include materials and sensory experience, public value and evidence, personal meaning and identity and understanding the present (Table 9). The majority of the values found through the questionnaire focus on the potential of historic objects for engagement with the public for learning, discovery and enjoyment, rather than on the material aspects of objects. This indicates a disparity between what aspects the public value, and what professionals deem valuable.

While the VALUE questionnaire is a useful source for value aspects, the methodology of the survey does not allow for full public articulation of values. The 60 questions were based on a Likert Scale, and so resulting value categories were determined by the questions. The question design was carried out by heritage

professionals who are aware of the traditional value categories used in museums, archives and historic houses. This means that values widely outside of those anticipated may not have been collected (Mason 2002,17). Although the questionnaire clearly shows that public values are different from values ascribed by heritage professionals, the authority for the study still remained on the side of the heritage professionals (Poullos 2010,173; Sharma 2019,186). Conservation decisions often implicitly prioritise professional preferences over those of the public (Fredheim *et al.* 2016,469). This results in traditional notions of value remaining uncontested (Sharma 2019,186). Conservation values that are not highlighted may subsequently be delegitimised (Fredheim *et al.* 2016,469), even though they may, in practice, have great potential benefits for users.

A study by Duval, Smith, Hørslé, Bovet, Khumalo, and Bhengu (2019) aimed to readdress this balance. The study interviewed people living, working in and visiting the Maloti-Drakensberg Park World Heritage Site. The methodology included ensuring that the team carrying out the interviewing and analysis was diverse (Duval *et al.* 2019,1284). The interview transcripts were analysed separately by each member of the team before consolidating their different list of themes (Duval *et al.* 2019,1284). This ensured that different cultural interests were not excluded. The study found six main value themes of: pleasure, belonging, social cohesion, health, enrichment and care and responsibility. These themes are markedly different from the values stated in the Burra Charter (Australia ICOMOS 2013,2). The values found in the 2019 study show how heritage sites impact people, rather than how objects and places are valuable in themselves. It also places emphasis on the use of sites and objects as playing a meaningful part in current society and communities (Mydland *et al.* 2012,584). This moves the discussion from being object-focussed to people-focussed.

If collections truly are for everyone (Wilkinson 2005,4), then studies such as that by Duval *et al.* (2019) must be carried out to find what exactly people value about collections. From this, conservation efforts can focus on displaying and preserving aspects of user value. This can result in meaningful, educational, engaging, and enjoyable experiences. Public value must therefore be considered (Alford 2010,144; Benington *et al.* 2010,2). By focusing on public value, benefits for communities can be realised as well as operational aims of the museum (Dierking 2010,9). Public value

takes emphasis off the needs of the institution and places it onto community wants and needs (Dierking 2010,12).

#### 6.1.4. Significance Assessments and the Visitor

There appears to be a disparity between value aspects stated by guidelines and those experienced by visitors (Turnpenny 2004,303). Although social aspects are mentioned within the general standards and guidelines, they are not mentioned as many times as historic or aesthetic value (Figure 40). Social factors are mentioned more within the guidelines on larger and working objects. However, the categories within these guidelines do not explore the variety and depth of social benefits of heritage, as seen within the studies that consult user opinion. In addition, the use of a 'social' category often results in social aspects being marginalised and seen to be less important than other significance factors (Fredheim *et al.* 2016,474). This indicates a need to look at the social value aspects in more detail, and to integrate them into significance assessments.

This involves considering the whole museum experience, including sensory and phenomenological aspects. Sensory aspects were mentioned once in the 17 general standards and guidelines, and were not directly mentioned within the larger and working guidelines studied in this literature review. Yet, anecdotally, when visitors talk about the importance of working collections, they often mention the smell, sound and feel of the movement (Wain 2004,2). This anecdotal evidence needs to be assessed in more detail, and the disparity between what visitors value and what museums state as values must be addressed.

Values found from user consultation differ from values traditionally used in guidelines as they indicate exactly what a certain group values about the heritage and how it impacts them. Studies into visitor-defined values show what gives the historical material meaning to users. If museums are for the public, then their views must be consulted when creating significance assessments that impact heritage management decisions and, ultimately, museum experiences (Turnpenny 2004,303). Studies into user value themes reframe heritage as a social process, rather than solely a physical object (Mydland *et al.* 2012,583).

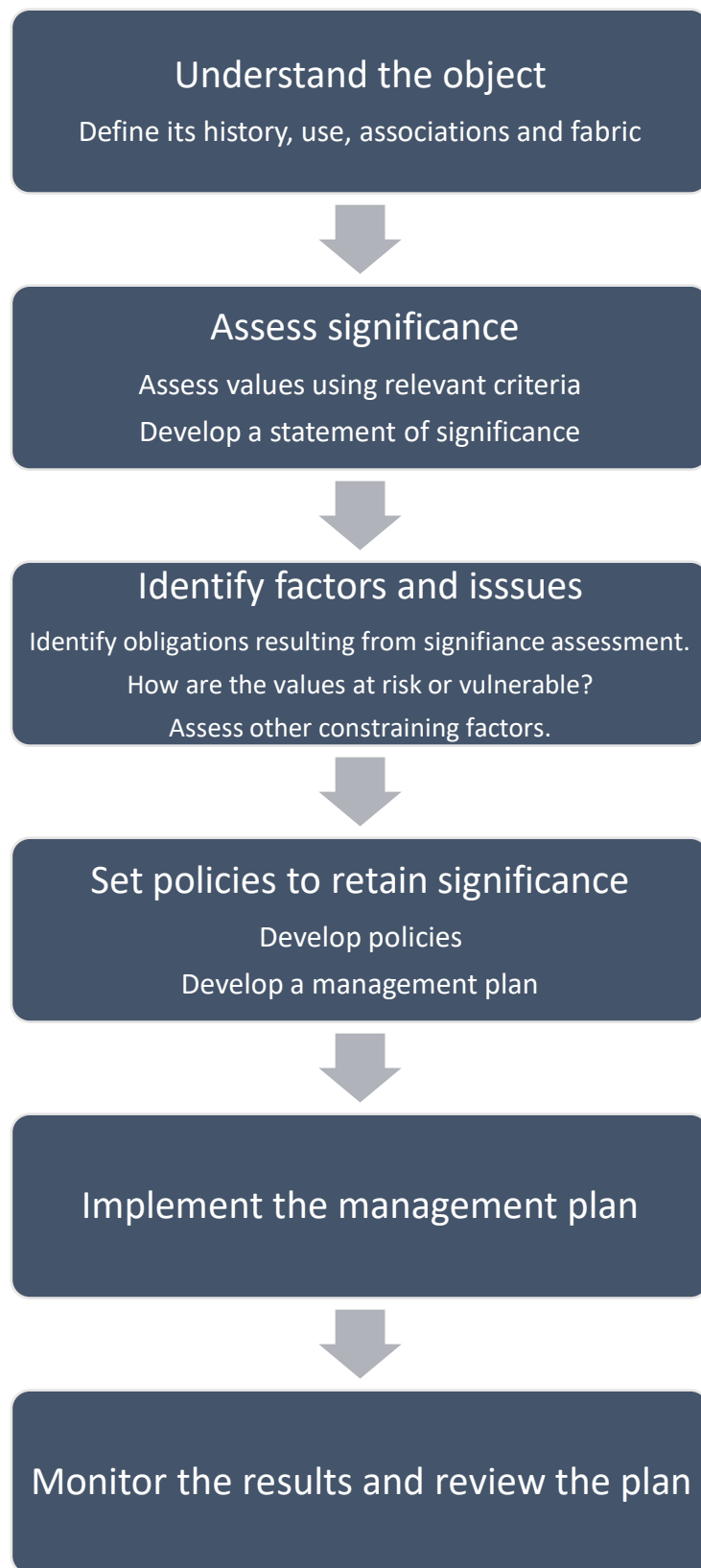
Values must be found from user consultation in order to create meaningful experiences. This may result in distinct value typologies for different institutions and places. Value assessments should be periodically updated, as values change over time (Landorf 2009,508).

#### 6.1.5. The Significance Assessment Process

Significance Assessments are often carried out with the use of a template and scoring system (ABTEM 2018,15). The template will include the values agreed upon for assessing the collection. The use of a template allows for identification and prioritisation of items.

#### 6.1.6. The Overall Process

Once the value themes have been identified, the process of assessing the significance of objects or collections must be carried out. In recent years several tools and decision-making frameworks have been developed for significance assessments (Bell *et al.* 2018,8). Most follow a variation of the framework shown below (Figure 42). Initially, research should be carried out to understand the objects and collection. Then, a significance assessment is implemented. This involves marking items against a standardised significance framework. From the significance assessment, the management plan should be developed to conserve the aspects of each object that are deemed to be most valuable (ABTEM 2018,16). The results of the updated management plan should be monitored, and any undesirable changes reviewed. Stakeholders should be involved throughout the process (Clark 2014,68).



*Figure 42. The Significance Assessment Process. Adapted from* Mason 2002; Drury et al. 2008; Russell et al. 2009; Dunn et al. 2012; Australia ICOMOS 2013; Clark 2014.

### 6.1.7. Other Considerations

When deciding the conservation route for an object, especially when deciding whether to restore or maintain an object in working order, or to display it in static condition, other aspects must be taken into consideration. This includes:

- Health and safety
  - Unsafe parts may need to be replaced or removed
- The resources involved
  - This includes resources such as time, cost, skills and equipment
  - This depends on the current condition of the object, as an object in poor condition may require more resources
- How the object fits within the museum's Collections Development Policy

Sources: (Wain 2004; FIVA 2017; ABTEM 2018)

All of the above aspects must be considered regardless of whether an object is to be displayed in working or static condition. The outcomes will be different depending on the conservation route. For example, it will take more time and money to restore a tank to running order, but static display also requires resources such as display space, environmental monitoring and other preventive conservation processes.

## 6.2. Case Study: Dingles Fairground Heritage Centre

The following study will look at conservation decisions made from significance assessments at Dingles Fairground Heritage Centre, an accredited museum dedicated to preserving fairground collections in West Devon (Knott 2016). The curatorial manager, Nick Sturgess, has carried out significance assessments to decide the display route for rides in the collection. The significance of two rides and subsequent conservation routes will be discussed below. These decisions have followed the significance assessment process set out in Figure 42.

### 6.2.1. About Dingles Fairground Heritage Centre

Dingles Fairground Heritage Centre contains the collection of the Fairground Heritage Trust which was established in 1986. The trust aims to preserve 'a representative national collection of historic fairground rides with related items and memorabilia' (FHT 2016,2). The trust's objectives are 'to promote the study of the fairground in its every aspect, including its institutions, its social history, the history of

British Showmen, the development of fairground amusements, mechanical rides, transport and popular entertainments and the various art forms related to the public' (FHT 2016,2). The museum's statement of purpose is 'to establish *Dingles Fairground Heritage Centre* as a remarkable and fascinating place to visit – offering fun, enjoyment and learning to a broad range of audiences' (FHT 2016,2).

One of the main attractions for visitors to Dingles Fairground Heritage Centre is the opportunity to experience working rides (FHT 2016,2,4). Nick Sturgess, the curatorial manager, states that some of the fairground rides can only be fully understood if the ride is experienced (N Sturgess 2018 pers. comm., 5<sup>th</sup> September). However, in some cases, the material aspects of the ride are deemed too significant to be restored to working order.

#### 6.2.2. Shaw's Moonrocket

##### 6.2.2.1. History, Use, Associations and Fabric

Shaw's Moonrocket was delivered, new, to John Shaw of Lancashire in 1939, and was debuted at the Seaforth Easter Fair 1939 (www1;www2). It originally featured a rocket on the front of the ride, which is no longer present (www1). In the 1950s the original fixed rockets (Figure 43) were replaced with swing-out rockets (Figure 44) (www1;www3). These new rockets swung as the ride went faster due to G-force. The original decoration on the front was replaced at a similar time (www1). The current paintwork on the ride dates to 1967 when it was again redecorated. The rocket cars were repainted in the 1970s. This ride was the only Moonrocket travelling in Britain by the 1970s, and was sold for restoration in 1982. It was restored extensively after being sold again in 1992 (www1;www4). The restoration in the 1990s changed several parts of the ride (www4), such as the wooden boards forming the platform (N Sturgess 2018 pers. comm., 5<sup>th</sup> September). In addition, the current seats are no longer original (N Sturgess 2018 pers. comm., 5<sup>th</sup> September). The ride was acquired by Dingles Fairground Heritage Centre in 2017 with National Heritage Memorial funding (www1).



Figure 43. Shaw's Moonrocket with its original fixed rockets. Source: [www1](#).



Figure 44. Shaw's Moonrocket in current working condition. Source: author.

#### 6.2.2.2. Significance

Shaw's Moonrocket is the only complete, running Moonrocket in existence ([www1](#);[www2](#)). It is therefore unique in its operation. It is the only known ride to have retained such 1960s artwork ([www1](#);[www4](#)). Like most fairground rides, changes were made throughout its life to retain relevance and popularity, and so the ride does not



retain much material authenticity. Although the artwork on the rocket cars may undergo some slight wear-and-tear, the 1960s artwork appears to be fairly resistant to wear and tear (N Sturgess 2018 pers. comm., 5<sup>th</sup> September). The significance of the ride is therefore in its unique working condition, rather than in its material authenticity.

#### 6.2.2.3. Conservation Route

The Moonrocket ride's significance lies within it retaining functionality. It is a unique ride; visitors are not able to experience riding a Moonrocket anywhere else. The fabric of the ride is not materially authentic, but through continued use, the ride retains its ability to provide authentic experiences. It is therefore important to keep the ride in working condition, and accessible to the public to ride.

#### 6.2.3. Edward's Gallopers

##### 6.2.3.1. History, Use, Associations and Fabric

The first record of Edward's Gallopers dates from 1916 (Sturgess 2017,5), although it has been speculated that it was built before the 1900s (www5). The gallopers were used until 1933 (Sturgess 2017,6). They were then put into storage until 1986, when they were acquired by the Fairground Heritage Trust, who commissioned interventive conservation work in 1987. This included the restoration of the organ façade, removal of varnish, replacement of two snare drums and preservation of original rolled paper pipes in the organ (Sturgess 2017,7). The ride was moved to Dingles Steam Village, now Dingles Fairground Heritage Centre, and is currently in storage (Sturgess 2017,7). It retains its historic wooden horses (Figure 45) and cockerels made by notable wooden figure manufacturers (Ward 1989) (www5).

##### 6.2.3.2. Significance

Edward's Gallopers is the only known example of a gallopers ride in 1930s condition (Sturgess 2017,9), as most others have been extensively altered to respond to the changing requirements of fairground audiences. It retains its historic wooden horses (Figure 45) and cockerels (www5). Various figures were carved by significant manufacturers of fairground pieces, such as Arthur Anderson of Bristol, Lines Bros of London, Orton & Spooner of Burton-on-Trent and Savages of Kings Lynn (www5)

(Ward 1989). Thus, the ride in its current condition retains its historical significance, and has potential for research and educational significance (Sturges 2017).



Figure 45. The carved horses of Edward's Gallopers. Source: [www5](http://www5).

#### 6.2.3.3. Conservation Route

Restoring the ride to working order, and keeping it in working order, would result in large-scale replacement of parts, and wear of historic surface finishes (Sturges 2017,9). Edward's Gallopers is highly significant since it has not changed, apart from some interventive conservation, since the 1930s. It is thought to be the only known example of a galloper ride in 1930s condition (Sturges 2017,9). In addition, enabling visitors to ride Edward's gallopers would not provide a greatly different experience to riding another set of gallopers that are less authentic, of which there are far more in existence, especially since restoring Edward's Gallopers to working order would result in reduction of current originality. Any unique experience would come from the fact that the ride has been relatively unchanged since the 1930s, and restoration to working order would negate this. Thus, it has been decided to keep the ride in static condition.

#### 6.2.4. Case Study Summary

As the case studies show, each ride should be considered on a case-by-case basis. Ethical considerations must be weighed up against each other before concluding

whether a ride should run or not. The case studies show how historical aspects of materials and authentic experiences can weight against each other in order to produce informed conservation management routes. Through these case studies, the significance assessment process can be seen and applied to other collections such as vehicles at The Tank Museum. The object must be understood before assessing significance, which can then be used to inform conservation routes. If the functionality of a tank is deemed to be of greater importance than its materiality, then the decision can be made to restore it to running order.

The use of significance assessments such as those used at Dingles Fairground Heritage Centre provide a robust methodology for determining if an object should be displayed in running or static condition. We now have a suggested framework for deciding, in an ethical manner, when it is acceptable for certain objects to run. However, it is not expected that these objects will run forever. The following section discusses the point at which the object should return to static condition at the end of its running life in a heritage setting, and considers factors that may affect this decision.

### 6.3. Object Lifetimes

Once it has been decided by the Tank Museum that a tank is to be restored to working condition, this decision should be periodically revisited as objects have a finite working life. Defining the point at which an object stops running is important when forming decisions around the risks and values of vehicles. The decision incorporates the previous decision-making on restoration and maintenance based on values and considerations of public and museum professional opinions. The following discussion explains the concept of lifetimes with reference to museum objects, before looking at traditional views on objects lasting forever, the subsequent change to acknowledging that objects have a finite lifetime, and a specification of when end-of-life should be decided for an object.

#### 6.3.1. Lifetimes

Before discussing the length of an object's life, the concept of lifetimes must be clarified. When talking about an object being alive, many workers in conservation

argue that 'objects do not 'live' or 'die' but 'gain and lose different kinds of value' (Taylor *et al.* 2008). Whether an object is seen as living or dead is down to people ascribing values to the object (Ashley-Smith 2011,10). Yet this is not to say the term 'living' should be discarded. Describing an object as alive is useful as it shows that it has value to an individual, group or society and acknowledges the emotional impact an object can have and the interplay between an object and a person. This can often be seen with vehicles being described as alive. In a purely realistic sense, objects do not possess the functions amounting to a living thing such as reproduction, adaptation, growth, energy processing or homeostasis (Flowler *et al.* 2013). Yet they can still be described as having a life through value. Over the past couple of decades there have been calls to bring collections to life (Wilkinson 2005; Appelbaum 2012) through realising their potential value for users (Avrami *et al.* 2000). Objects have different stages in their life. These can be marked as creation, original use and subsequent use, then some have a life in a museum (Pearce 1992,17; Marty *et al.* 2012,87). End of life is often regarded as the point at which the object 'ceases to have a recognisable form or meaning' (May *et al.* 2006, 187). Although the idea of an object lifetime should not be taken literally, it is useful when looking at the changing values of an object.

### 6.3.2. Traditional views on object lifetimes

It is a traditionally held view that, once an object enters a museum, it will last for ever (Bradley 2005,55). Applebaum (1987,72) stated 'the fundamental reason we do our work is to insure that the pieces we treat will last for ever'. This view can also be seen within guidelines for larger and working objects. There have been four sets of guidelines published concerning the care of larger and working objects, each a development of the previous publication (MGC 1994; Ball 1997; Ball *et al.* 2009; ABTEM 2018). The first of the four such guidelines mentions 'important objects which the museum seeks to preserve in perpetuity' (MGC 1994,20). This shows the traditional notion that objects can last forever.

This view is still held in more recent standards. For example, the 2018 British Standard EN 16893 states 'cultural heritage collections are intended to be preserved indefinitely' (BSI 2018). This does not explicitly argue that objects do not degrade, and it may be referring to the idea that the collection as a whole, with individual

acquisitions and disposals, should be preserved indefinitely. But it still indicates a pervading concept of collections being preserved in perpetuity.

### 6.3.3. Acknowledging finite lifetimes

The idea that objects can last forever once they enter a museum has more recently been acknowledged as being impractical (Scott 2015,299). Objects degrade from the moment they are made and have a finite lifetime (Bradley 2005,59). Appelbaum has updated her stance, stating ‘the fact that conservators feel responsible for preserving objects forever is noble, but, practically speaking, unrealistic’ (Appelbaum 2012,271). Conservation should aim to manage change rather than stop it completely.

This move to acknowledging that it is not realistic to expect objects to last forever is clear within the documentation for larger and working objects. Ball (1997), in the second of the four guidelines, states ‘most materials have a limited life but this can be extended’, suggesting a conceptual change to objects having a definitive lifespan. It acknowledges the aim to extend an object’s life, rather than preserve it forever. This is copied in the 2009 update (Ball *et al.* 2009, 6). The 2018 text states, when describing the term preservation, that ‘preservation encompasses all activities designed to...slow down deterioration’(ABTEM 2018, 24). This again puts the emphasis on reducing, rather than stopping, deterioration. The ABTEM document states ‘preventive measures can be applied to extend the lifespan of certain materials but ultimately their long-term preservation is in conflict with standard maintenance plan and operation’ (ABTEM 2018, 39). Through acknowledging that working objects have a finite lifetime, greater emphasis is placed on the value people can gain from the objects during their working life, rather than seeking to preserve in perpetuity.

### 6.3.4. How long should an object last for?

It has been acknowledged that objects have finite lifetimes. However, there is no consensus on how long an object should last for in a form that still has value. The Museums Association’s *Code of Ethics for Museums* states ‘museums and those who work in and with them should maintain and develop collections for current and future

generations' (MA 2015b,7, 2015a). Several other conservation ethics documents state the same, from Ruskin in 1849 to the present day (Ruskin 1849; Avrami *et al.* 2000; Newey 2000; Simmons 2006; Drury *et al.* 2008; BSI 2013; Kerr 2013; ICOM 2017; Slocombe 2017; ACE 2018a). The idea that collections should be accessible by both current and future generations is the integral factor of many codes of ethics.

Although these documents all make the statement that collections should be for both current and future users, the meaning of 'the future' is often not fully explained (Das 2019,3). This gives rise to subjectivity and ambiguity, as different people have different ideas on what the future means (Das 1987,204).

One document that has gone a step further to specify what the future means is *The Burra Charter*, which states 'places of cultural significance must be conserved for present and future generations in accordance with the principle of inter-generational equity' (Australia ICOMOS 2013,1). Intergenerational equity is used in sectors such as legal studies, climate change and policy development (Colquhoun 2010,3; Thomson *et al.* 2018,379). Intergenerational equity states that each generation is equal with no generation having priority over another, and so have equitable rights to economic, social and environmental systems (Weiss 1992,23; Throsby 2002,109; Roemer *et al.* 2007,xvi; Attfield 2010,102; Thomson *et al.* 2018,381). The use of the word equity rather than equality indicates that resources do not have to be spread and consumed equally over generations, but instead each generation has a fair amount of access in relation to their needs and consumption (Thomson *et al.* 2018,381). The notion comes from the idea that the current generation only has the available resources and habitats due to past generations, and so future generations also have rights to these (Weiss 1992,20). Intergenerational equity is therefore a form of sustainability (Throsby 2002,102; Drury *et al.* 2008,46; Gray 2010,49). The adoption of intergenerational equity by conservation ethics indicates that future users have as much right to access historic objects and places as the current generation.

A study by Lindsay (2005) looked at perceptions of intergenerational equity. It asked 217 museum professionals in the V&A Museum and Natural History Museum in London and the Canadian Museum of Nature in Ottawa about object lifespans (Lindsay 2005,55). As Figure 46 shows, most of the responses stated that present and future

users' needs should be considered equally. This study shows that the concept of intergenerational equity is generally accepted within the museum sector.

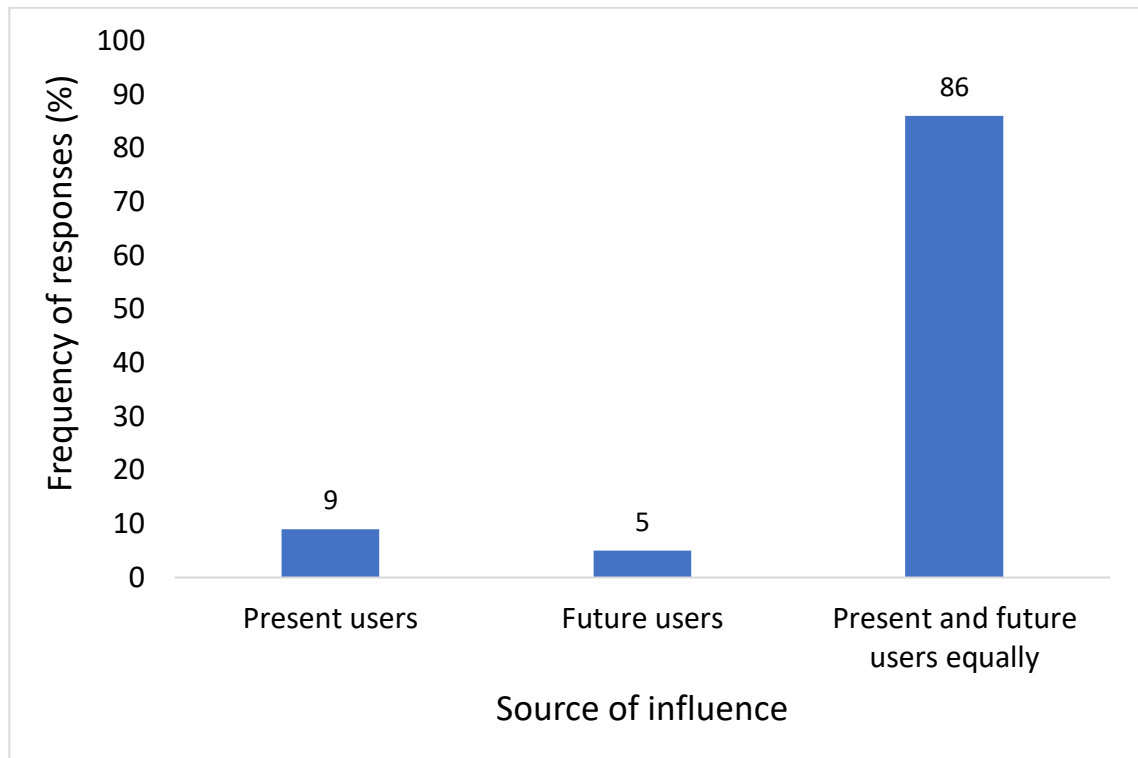


Figure 46. Chart of results from Lindsay's 2005 study of museum professionals in which museum professionals were asked whether present, future or present and future users should be considered in decisions on object use and treatment. Source: Lindsay 2005,57.

The argument of intergenerational equity is often used to state the need for preservation of objects for future users (Throsby 2002,102; Taylor *et al.* 2013). However, if the concept of intergenerational equity is switched from being that of future users having the same rights as current users, to current users having the same rights as future users, it becomes clearer that current users should also be able to access objects in a way that is of most benefit to them by realising the potential value of the object. The notion of intergenerational equity puts emphasis on the needs of current users as well as future users, and conservation decisions must be made around current users along with safeguarding of heritage for the future (www1;www2).

There are some limitations to intergenerational equity. Although the concept of intergenerational equity is useful for considering the importance of future users against current users, it is prone to subjectivity, as different people have different ideas on what can be defined as a single generation (Thomson *et al.* 2018,379). Generational groups are often used when defining a generation, and these do not always fit into discrete or equal year ranges. In addition, heritage decisions can be

affected by cycles that are either longer or shorter than a single generation, and so longer or shorter time frames may need to be used (Taylor *et al.* 2013,6). Although intergenerational equity is useful for overarching statements about the need of future and present users, it is difficult to define exactly how long an object should last in a form that demonstrates its values.

#### 6.3.5. Towards a more specific definition

Several conservation guidelines mention that decisions should be made based on the expected collection lifetime (MGC 1994,24; BSI 2012,iv,v,vi,3,7; Dillon *et al.* 2013,35; Ankersmit *et al.* 2016,78; Saunders 2020,286). This lifetime may be based on the stability of the object, the resources needed to preserve it and its intended use (BSI 2012,vi).

Studies have attempted to find the accepted definite lifetime of an object. Lindsay (2005) surveyed museum professionals in collections care at the V&A Museum, the Natural History Museum, London and the Canadian Museum of Nature, Ottawa, with an aim of defining the term 'expected collection lifetime' (Lindsay 2005,55). The results of this study concerning intergenerational equity have already been discussed. The study also asked 'when you consider 'the future' in the question of present and future use, what period of time does that future represent? Please give your answer in NUMBER of years.' (Lindsay 2005,54).

When looking at the results of this study (Figure 47), it is important to note that not all data was included in the graph. 4% of respondents replied with infinity, and these responses were excluded. 14% of responses gave a range of years rather than one number, and these were also excluded. 16% of responses stated 'at least x' or 'more than x', and the value of x was used in the graph. This does not give wholly accurate data, as the 'more than x' answers were stated as 'x' when the actual value given was a range starting from x+1. In addition, the graph is not incremental, so trends cannot be quickly found. Yet the data provides a basis for finding the accepted lifetime of an object.



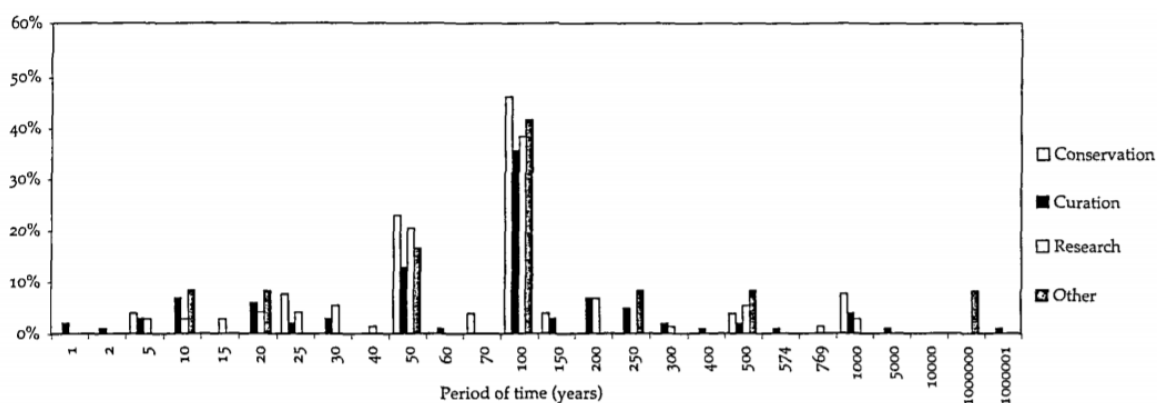


Figure 47. Graph showing responses of museum professionals to the question 'when you consider 'the future' in the question of present and future use, what period of time does that future represent? . Source: Lindsay 2005,59.

The results show 100 years was most frequently cited number (Lindsay 2005,57) (Figure 47). This may be because of previous risk assessment guidance (Waller 2003) that used 100 years as a time frame. Respondents to this survey commented on the value of spanning more than one generation and measuring what can be achieved in one generation (Lindsay 2005,58). This shows a use of a generation as an indicator of time in decision making, and a move towards defining the length of a generation in specific years. This study reinforced the idea that the future means different things to different people, but that most state 100 years as being an acceptable lifetime for use of an object.

Richardson and Saunders (2007) carried out a study to determine the acceptable length of time for just noticeable differences on two paintings, Lady Cockburn and her Three Eldest Sons by Joshua Reynolds, and Girl with a Fan by W.C.T. Dobson. Museum professionals were shown versions of the paintings that were digitally faded. The results of acceptable time length were different for the two paintings, showing that the individual aspects of an object must be considered when exploring the definition of end of life. A similar study by Brokerhof et al. (2008) found that acceptable timeframes for percentage fades were not linear, so the Richardson and Saunders study cannot be definitively used to find the accepted length of life for an object as it asked questions about percentage fade rather than the point of end of life. However, this study is still important to show the need to make decisions on a case-by-case basis.

Other studies have focused on the point at which objects lose their value. Dillon et al. (2013) conducted a questionnaire asking the public questions about their

view on the lifetimes of books within reading rooms, exhibits and historic houses. When asked to define the end of life for a book, the majority of respondents stated that this was when a book could no longer be read (Figure 48). The usability and purpose of the object is deemed to be most important when assessing end of life. The highest number of respondents who said a book's end of life is when it cannot be displayed were those from historic houses. Readability was mentioned the greatest number of times in reading rooms and exhibits, whereas handling was mentioned most in reading rooms, and display mentioned most in historic houses. This indicates the definition of end of life is linked to the book's current function (Dillon *et al.* 2013,41; Strlič *et al.* 2013,85, 2015). For visitors and users of collections, end of life is not a uniform term, and depends upon the object's purpose. The study also found that, in general, respondents wanted older documents to last for a longer amount of time due to the quality of their materials and their historical significance (Dillon *et al.* 2013,44). This indicates that the physical fabric of the object, as well as its historical value, plays a part in deciding the acceptable lifetime of an object. Measuring the values that an object holds, and defining the point of end-of-life as when these values can no longer be realised, appears to be a more useful concept than stating all objects should last for a certain number of years.

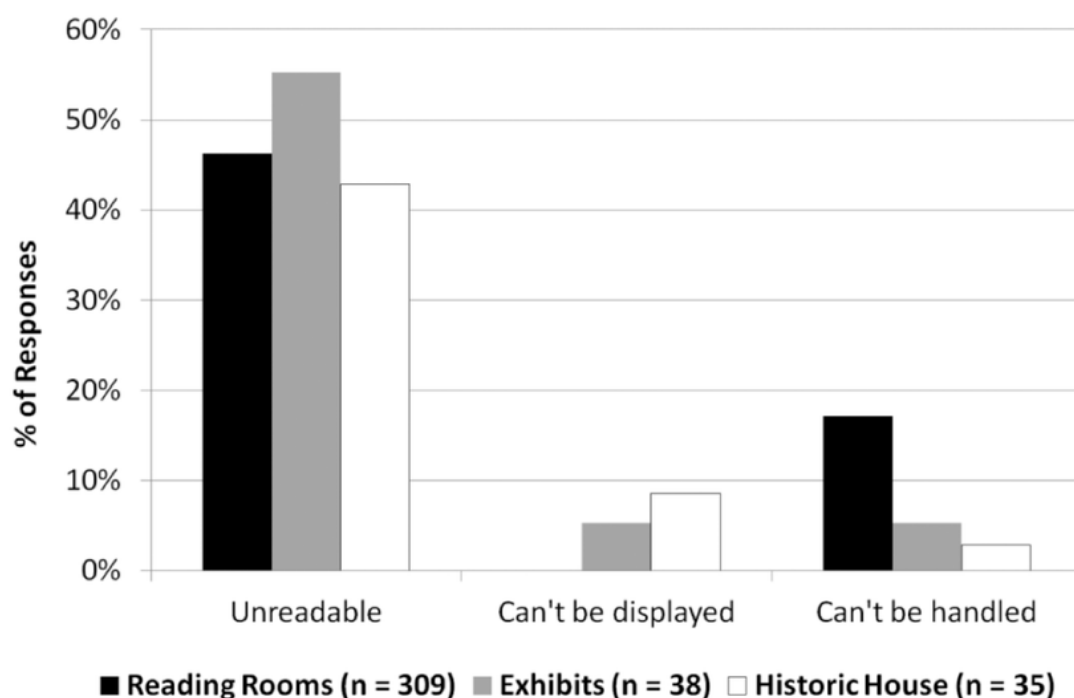


Figure 48. Bar chart showing at what point the respondents thought the end of life of a book was defined. Source: Dillon *et al.* 2013,41.

#### 6.3.6. Previous decision making at The Tank Museum

By looking at the point at which previous decisions were made to stop running vehicles at The Tank Museum, historic statements of the point at which an object reaches its end of working life can be found. The decision to stop running a tank does not mean that the tank is deaccessioned and disposed of, as it usually becomes part of the static collection. But, like the books in the Dillon *et al.* study (2013), it can no longer be used for its original function. The decision to stop running a tank is the point of the end of its working life, rather than its whole life.

The Mark IV and Mark V at The Tank Museum were previously used for running vehicle displays, but the Mark IV was last driven in the 1980s, and the Mark V in the 2000s (Fletcher *et al.* 2013,153). This decision was made due to the rarity of the vehicles. Condition was also an important factor; stress cracks started appearing in the armour plate of the Mark V (Fletcher *et al.* 2013,154). This damage to a part of the tank other than the running mechanism was a significant factor in the decision to stop running, as if this was replaced, then it was feared that the tank would no longer be seen as original by visitors whilst displayed in static condition. This decision was based on a focus on material originality to the exterior of the vehicle, which would result in changes to what the visitor sees. In addition, a track plate broke when the tank was running (Fletcher *et al.* 2013,154). The Tank Museum does state that this decision may change in the future if new, less intrusive, technologies are available, or if audiences no longer want to see static vehicles (Fletcher *et al.* 2013,154). Damage and rarity of the tank resulted in a decision to end its working life, but this decision also depended on the wants of visitors and the technology available at the time. The decision to stop running a vehicle is made on a case-by-case basis (Fletcher *et al.* 2013,154), and this decision may be changed over time.

#### 6.3.7. Object Lifetimes Summary

Overall, the notion of intergenerational equity and the previous studies on the subject of object lifetimes demonstrate a need for objects to be enjoyed by current and future generations, and a general acceptance that objects have a finite lifetime. It is stated that ‘the precise point in the future where the operation of an object may have to cease to prevent loss of a high percentage of its fabric may be impossible to

predict accurately' (ABTEM 2018,23). This is certainly true; although general guidelines may benefit from working around a number of 100 years for an object's life, in practice each object and its associated values should be considered individually. This can be seen within the Dillon et al. (2013) study, which shows that the ability for an object to perform its intended function is most often cited by visitors when discussing the end of life. If the object can no longer be used, and therefore be of value to the public, it has reached its end of life.

#### 6.4. Discussion of Review of Frameworks for Reassessing Authenticity

Significance assessments are widely used in heritage to identify and prioritise the value of collections. These assessments often measure value based on value aspects found within the Burra Charter. This has been found through a literature review on general standards and guidelines, which often cite historic, aesthetic and symbolic value. A literature review on larger and working standards and guidelines found that social value was mentioned a high number of times, and that aesthetic, representativeness, rarity and historic value were also frequently stated as important value aspects to consider. The disparity between the number of mentions of social value from general guidelines and larger and working guidelines suggests that value types can be specific to collection type, suggesting the need to tailor values to the collection. Studies on visitor opinion have found different values than those in the standards and guidelines, with greater emphasis on the impact of places and objects on people rather than materiality and historical accuracy. This disparity shows that visitor-based values should be found when considering heritage values, as it is interactions with visitors that give heritage meaning. This, when coupled with the suggestion that values should be tailored to the collection type, indicates a need to explore visitor-based views on the significance of working tanks. This will enable meaningful values for visitors to be realised within the museum. Once these values are found, the general significance assessment process can be followed, with a consideration of aspects such as health and safety, the impact of wear, resources, and how the conservation route fits within the Collections Development Policy.

The case studies of the Shaw's Moonrocket and Edward's Gallopers at Dingles Fairground Heritage Centre show the importance of understanding and prioritising the

demonstration and preservation of either the unique historic material or the intangible experiences in a museum object. Through carrying out a similar significance assessment, The Tank Museum will be able to assess different aspects of each vehicle to decide whether to display the vehicle in static condition or run the vehicle.

Existing studies regarding object lifetimes indicate an expectation that objects are to be enjoyed by both current and future generations and an acceptance that objects have a finite lifetime. This finite lifetime ends when an object no longer has value in its form or function. The function of an object impacts upon its lifetime, and its value during this lifetime; values are not static and the values placed on certain aspects by individuals are changeable over time (Taylor *et al.* 2008,9). Conservation should therefore aim to preserve and realise values, rather than preserving solely the fabric of objects (Avrami *et al.* 2000). If a collection is not used, its value is not realised; it is useless (Simmons 2006,111). Lifetimes must be considered in terms of value. This is not simply the loss of value as the object degrades, but the realisation of changing values during the object's finite life. These values can be found through carrying out significance assessments.

## 7. Literature Review Discussion

The literature review initially covered traditional and conservation ethics in order to situate the debate around working historic objects within context. A range of conservation routes have been discussed which will result in a vehicle in either static or working condition:

1. Do nothing
2. Preventive measures
3. Interventive preservation or consolidation
4. Restoration
5. Reconstruction
6. Adaptation

The established arguments for and against running were discussed. These are as follows:

Theme	Against Running Objects	For Running Objects
Originality and degradation	<p>Wear and tear and replacement of parts will result in the loss of historic integrity.</p> <p>Removal of historic integrity has occurred in the past when machines have been restored to a false original.</p>	<p>Vehicles were often modified throughout their working life, so not all parts will be original. Parts that wear the most often during running are likely to have already been replaced.</p> <p>Machines and vehicles were made to move; this was their original purpose and reason for being.</p> <p>Objects are constantly degrading and will never be in true original condition.</p> <p>Keeping a vehicle in running order can prevent deterioration, for example by spreading lubricants and moving stress points.</p>
Evidence	<p>The historic material can be a source of evidence:</p> <ul style="list-style-type: none"><li>• Historic objects can add to the historical record or provide evidence where there is little historic record.</li></ul>	<p>Diagrams, drawings and accompanying texts are often available for machines produced in the last few hundred years, so there is less stress on the object itself as the sole source of evidence, as may</p>

	<ul style="list-style-type: none"> <li>• Historic objects can show technological or aesthetic changes.</li> <li>• Materials and construction can provide scientific evidence.</li> </ul> <p>Running results in the loss of this evidence.</p>	<p>be the case with other museum objects.</p> <p>Original parts, when replaced, are stored so are still available for analysis.</p> <p>Documentary evidence is researched when an object is restored to working condition, so knowledge about the vehicle may increase.</p>
Historicity	<p>The fabric of the object may have particular historic significance such as being a complete example, type specimen or associated historic events.</p> <p>If an object that is not functional is restored to running order, then the part of its history that resulted in it no longer functioning is ignored.</p> <p>An object may not have run during its working lifetime. To run it in a museum would ignore its history.</p>	<p>Experiencing a moving object can enable its history and purpose to be greater understood.</p> <p>Machines were made and used by people, so running objects can enable people to understand the social history behind the object.</p>
Practicalities	<p>Restoration and reconstruction require resources, as does subsequent maintenance.</p> <p>Health and safety risks must be considered, as it may not be safe for a machine to be functional.</p>	<p>It should be noted that static display also requires resources (although often not as much as a functional object).</p>
Sensory experiences	<p>Static vehicles can provide sensory experiences through touch, visual and accompanying interpretation.</p>	<p>Sound, smells and vibration enable visitors to have a greater emotional response and involved understanding.</p>
Intangible heritage	<p>The fabric of the object may have intangible historic significance, which cannot be truly realised without the material remaining in situ.</p>	<p>Maintaining vehicles in working order conserves the intangible heritage of skills and expertise.</p>

Table 10. A summary of the arguments for and against running historic objects.

Table 10 mentions tangible heritage, such as materials, and intangible heritage, such as skills, expertise, associated historic events and sensory experiences. These intangible values can be realised through the adoption of a constructivist stance, which argues that authenticity is affected by the interactions between objects and people. Thus, authenticity is dynamic and active, relying on visitor engagement with the object and its meaning. Studies on object lifetimes indicate that an object is perceived to be at end-of-life when it can no longer demonstrate its function or value to people. We must focus on realising these values throughout the object's life.

By looking at heritage through a constructivist lens, it becomes clear that intangible values are important to those that heritage is aimed to benefit, the public. By valuing intangible aspects, measures are taken to ensure that they are preserved. For example, the skills needed to restore and maintain a vehicle are a heritage factor that requires preservation in their own right, and this can be done through running heritage vehicles. In many cases, such as traction engines and heritage railways, vehicles were only preserved due to their continued use, so the skills needed to maintain these vehicles are as much a part of their history and preservation as the material objects themselves.

Similarly, sensory aspects such as the sounds and smells of running vehicles are intangible heritage that should be safeguarded. Demonstrating sensory aspects of a historic object can engage visitors through acting as a marker to the past, enabling visitors to feel close to the past through understanding how something would have moved, felt, sounded or smelled to people in the past through the experience of a present audience. Thus, sensory aspects of experiences are important both in the past in the formation of historical events and memories, and in the present in enabling a greater understanding of past events. The movement of a tank was, and still is, an integral part of its function. With this movement comes sound and smell, which would have impacted upon fear or morale, offering the visitor a greater understanding of conditions for soldiers. This results in authentic experiences that create long lasting memories. Without running vehicles, these intangible sensory heritage values are at risk of being lost.

Conservation can be defined as managing change to enable the most beneficial values, whether tangible or intangible, to be demonstrated. To prioritise



demonstration of the most important values of each vehicle, the significance that a vehicle has to its users must be found. This is detailed in the following study sections. Then, frameworks can be produced to make decisions that ensure this value is realised. This process must be periodically assessed, as values change over time, to ensure that the method of display is still relevant and engaging to audiences.

## 8. Introduction to Studies

Visitors, and consequently visitor perception, are integral to a museum's purpose and function, therefore, visitor views must be consulted when forming ethical decisions about the current and future use of collections. A study of non-user views is outside the scope of this thesis, as it was decided that an in-depth study of current visitor views would be preferable over a more brief study of both users and non-users.

Visitor perceptions are constantly changing, and so should be regularly researched to ensure the museum successfully enables meaningful experiences. This is particularly complex to achieve for The Tank Museum, as its collection is associated with dynamic functions that generate a plethora of sensory experiences, many of which can only be experienced by operating the exhibits. This potentially creates a tension with conservation goals focused on longevity. To develop, inform and rationalise the conservation process, it is essential to factor in the experiences and preferences of the end user in the form of public opinion. These can then be correlated with the views of experts and heritage sector professionals to reach an evidence-based approach to conservation and display. The following studies explore visitor opinion at The Tank Museum, with the first study being taken at an event day and the second being an online questionnaire to survey visitors who attended The Tank Museum on non-event days.

### 8.1. Museum Visitors

A 2018 visitor study by The Tank Museum (2018a) mapped UK visitor origins (Figure 49). The study found that the visit 'sponsor' or individual who motivated the visit is usually male, although 40% of museum visitors are female (The Tank Museum 2018a), with the visit initiated by factors that include subject interest in military history, family history or British history. Often, visits related to holiday, living nearby, or a specifically organised trip to visit The Tank Museum (see section 2.2.2 The Tank Museum Today).

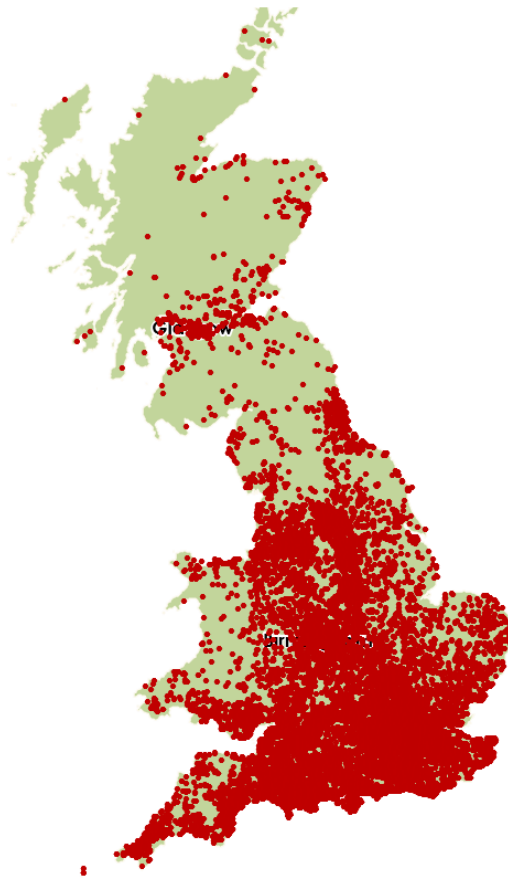


Figure 49. Map showing UK distribution of Tank Museum visitors. Source: The Tank Museum 2018a.

## 8.2. Event Days

Event days at The Tank Museum involve running vehicle displays. The main event each year is Tankfest, a three-day event that takes place at The Tank Museum at the end of June. It is presented by World of Tanks, a Wargaming game ([www1](#);[www2](#)). It is described as ‘the world's biggest and best live display of historic armour, living history, and much more at the Home of the Tank’ ([www1](#)).

Tank Museum visitor surveys for Tankfest explore the demography of visitors, visitor motivation for attending and visitor views on the event days (The Tank Museum 2017, 2018c, 2019). Table 11 shows that similar proportions of each age range visit year on year, with the proportion of males to females remaining similar (Table 12).

	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
<b>Seniors</b>	9%	10%	11%	11%
<b>Adults 35+</b>	44%	42%	43%	46%
<b>Adults 18-34</b>	28%	32%	30%	29%
<b>Children</b>	19%	15%	16%	14%

*Table 11. Table showing the age demographics of 2016, 2017 and 2018 Tankfest Visitor Survey participants Source: The Tank Museum 2017, 2018c, 2019.*

	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
<b>Female</b>	28%	21%	20%	21%	20%
<b>Male</b>	72%	79%	80%	79%	80%

*Table 12. Table showing the gender demographic of 2015, 2016, 2017 and 2018 Tankfest Visitor Survey Participants. Source: The Tank Museum 2017, 2018c, 2019.*

Tankfest attracts visitors internationally. The 2017 Tankfest visitor survey (2017) recorded 14% of respondents were visiting from overseas, within this figure 23% were from the USA, 24.13% from Scandinavian countries and 13% from the Netherlands. In the 2018 Tankfest visitor survey this rose to 15% of all respondents visiting from overseas, increasing to 18% in 2019, evidencing Tankfest's international importance.

The reports (The Tank Museum 2017, 2018c, 2019) also found the main reasons why people attended Tankfest, in order of most citations, to be:

- Seeing, learning about and experiencing tanks and military history.
- Bonding and socialising with friends and family members.
- Seeing the museum and its collections and exhibitions.
- The connection to playing World of Tanks, meeting YouTubers and seeing visiting armour.
- Loyalty and having visited Tankfest in previous year (2018/2019 only).

These reasons indicate a strong preference for experiential aspects of the visit and that there is a sociable element to these experiences, be that family and friends or the wider military enthusiast community. It also demonstrates a link between the online presence of The Tank Museum and the physical museum building and its collection and staff. The desire to attend Tankfest in multiple years shows the appeal of repeating the experience, perhaps seeing different guest armour or simply to enjoy the sensory aspects again. This correlates well with the shift to an experience economy.

As well as The Tank Museum visitor surveys discussed above, students at UCL produced a report on the Tiger 131 tank (Chen *et al.* 2018). Tiger Days are a one-day event that occurs twice a year, focussing on the running of the Tiger 131 tank (www3). This raises issues of reliance on one single tank running and the report aimed to find solutions to this, such as reducing deterioration of the Tiger 131, and restoring the Tiger II to working condition (Chen *et al.* 2018,103). It also surveyed visitor opinion at a Tiger Day on 28<sup>th</sup> April 2018. Although the study focused on a Tiger Day and the Tiger 131 Tank, rather than Tankfest where far more tanks are running over several days, the survey is useful in showing visitor views on running tanks.

It asked 75 people five questions (Chen *et al.* 2018,143) including to what extent survey participants agreed with the statement ‘to prolong the operating life of [*sic*] tank, I prefer to witness the moving exhibits operated by a modern engine and transmission’ (Chen *et al.* 2018,200). Figure 50 shows 49% of respondents either agreed or strongly agreed and only 14% of respondents disagreed or strongly disagreed. Even when accounting for the neutral responses, there was a clear preference to see the tank operational, irrespective of engine authenticity.

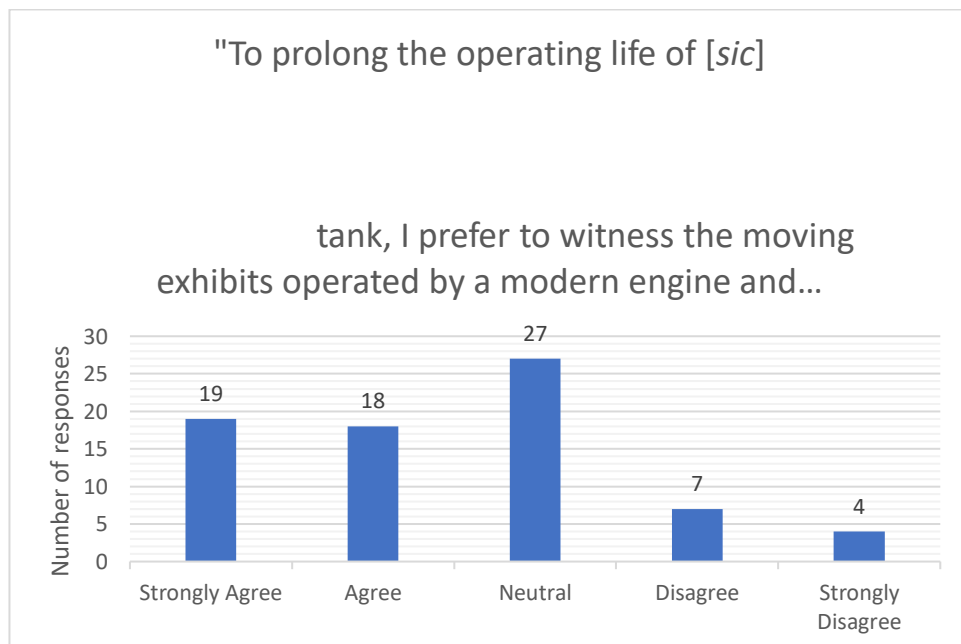


Figure 50. Graph showing results from Tiger Project survey concerning the engine and transmission. Source: Chen *et al.* 2018.

The questionnaire also asked to what extent the survey participants agreed with the statement ‘I place high value in the originality of tanks and prefer minimal changes’ (Chen *et al.* 2018,200). From the 73 answers (Figure 51), 64% were in

agreement and only 10% in disagreement, indicating an overall appreciation of the value of originality and preference towards minimal changes. Initially, this may appear to contradict the data in Figure 50. However, it can be argued that the answers reflect an expectation for tanks to remain original with minimal changes for as long as possible, but to accept change to maintain their original functions including the replacement of moving parts within the vehicle over time to increase the length of its working lifetime.

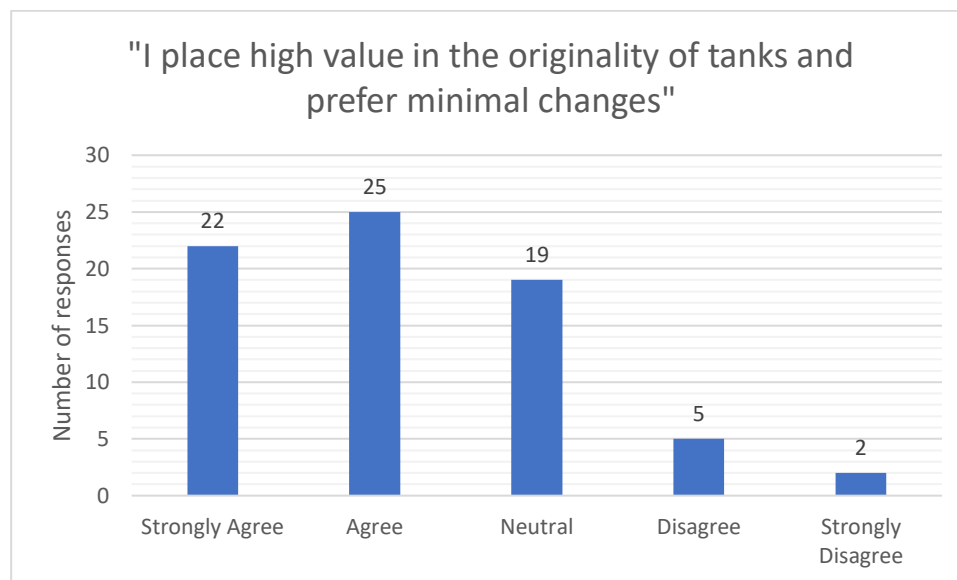


Figure 51. Graph showing results from Tiger Project survey concerning originality. Source: Chen et al. 2018.

Visitor opinions concerning the Tiger 131 generally follow accepted ethical guidelines around minimal intervention and preservation of originality. However, viewed together these answers illustrate the conservation tension that exists for moving exhibits, reflecting a 'have your cake and eat it' approach that is unachievable. Reformatting the questions to require an answer choosing one option or the other would shed more light on choice between function and originality.

### 8.3. Building on past studies

These previous studies provide some initial data for The Tank Museum to underpin their decision-making when assigning conservation routes for individual tanks in the collection. However, the limitations of these past studies and the data they generated means that significant gaps in understanding of visitor opinion remain.

As with all surveys, the nature of the questions and the demography of the respondents can influence outputs. Previous visitor studies carried out by The Tank Museum have found motivational reasons for attending Tankfest, but do not give information about what visitors gained from the experience. The questions did not focus on the objects themselves or how visitors believe these vehicles could be demonstrated in a way that creates the best visitor experience. Further study is needed to find what visitors value in static and running tanks. The most mentioned reason for visiting Tankfest in 2017, 2018 and 2019 visitor surveys was to see and experience tanks and military history. Due to the nature of the survey, the questions did not ask in detail what it was about this experience that was valuable.

Since the study by students at UCL in 2018 focused on the Tiger 131 tank, a more comprehensive study must be carried out before offering guidance on how to determine the conservation route for each of the 350 vehicles in the museum. The study also only used Likert scales, which means there is an absence of visitor comments. This use of closed questions meant that new visitor opinions and values could not be found, hence the following studies aimed to determine values using open ended questions in addition to Likert scales.

The visitor studies carried out by The Tank Museum and the 2018 UCL study asked visitor opinion of visitors to event days. The main attraction to event days like Tiger Day and Tankfest is running vehicle displays. As a result, people who attend event days are likely to want to see running tanks and are likely to answer questions in favour of keeping historic vehicles in running condition.

The aim of the thesis is to create a data set and toolkit for decision-making at The Tank Museum, reassessing the notions of authenticity and value concerning static and running vehicles. This can be adopted for use by other museums and heritage sites with working collections, including industrial, military and vehicle museums as well as museums with collection items that had an original purpose in working. It is not possible to do this based on the data collected in the past studies reported here therefore two visitor surveys were carried out to address the shortcomings of the existing data by determining what visitors to The Tank Museum value in their experiences of tanks at the museum on event and non-event days.

#### 8.4. Visitor Studies Methodology

The same questionnaire was used for both visitor survey studies, asking the same questions in the same way for each respondent to produce a structured and uniform data set (de Vaus 2004,1103). As the survey was self-administered, clear written instructions and a summary of the survey purpose were included at the top of the page to ensure validity of answers (Lavrakas 2004,902).

The questions were guided by the literature review (Meadows 2004,890) and were pilot tested before the study was carried out (Lavrakas 2004,903). Feedback was also sought from the research steering group committee. This ensured the questions were wholly relevant and would produce valid answers. The research design was cross-sectional (Bryman 2003,11; Jann *et al.* 2016,111), collected on one day of Tankfest 2019 for the first study, and between the 5<sup>th</sup> June 2020 and 24<sup>th</sup> June 2020 for the visitors to non-events study. This enables descriptive statements to be made about a defined group people at the time (Jann *et al.* 2016,111). The survey aimed to collect a relatively large sample size in order to increase reliability (F. Fowler 2002,36; de Leeuw *et al.* 2008,99).

The layout and language used in a questionnaire can impact the results (Fowler 2004,1135; Lavrakas 2004,902; Engel 2015,15). The instructions and questions were fitted onto one page for the Tankfest study and appeared succinctly on the online study so it was clear the questionnaire would not take long to fill out (Appendix D; Appendix E). This was done with the aim of improving the attractiveness of the questionnaire, thus helping to decrease the number of non-respondents (Lavrakas 2004,902; Smyth 2016,220). As a result, free-text comments were not permitted for every question and demographic information was not collected. It was decided that the need to have a smaller number of questions to ensure a higher number of responses outweighed the need for comments for every question.

As demographic information was not captured by the survey, the demographics of the survey respondents cannot be analysed. However, available literature shows that both military and transport museums receive, on average, more male than female visitors (Clark, 2013,280), although this is slowly changing (Raths, 2012,3) . This suggests that the surveys may have captured more responses from men than women.



The quantitative questions were close-ended, so provided the respondents with a set of mutually exclusive answers (Lavrakas 2004,903). Likert scales were used for each of the three quantitative questions (Bourque *et al.* 1992,71; Blaikie 2003,42), and the same scale was used each time for ease of use. Likert scales provide a ranked set of answers such as 'strongly disagree' to 'strongly agree'. Respondents choose one of the answers on the scale that best matches their opinion. A 'neither agree nor disagree' category was included to allow respondents to use a neutral midpoint (Lavrakas 2004,903). This is due to the nature of the questions asked; the questions contained broad statements that not every respondent may agree or disagree with. The scale was thus balanced with a true midpoint (Lavrakas 2004,903). Likert scales usually consist of five points (Lavrakas 2008,428). Fewer scale points may result in less information being displayed, whilst more scale points may obscure the distinct value of each scale point (Krosnick *et al.* 1997,144; Smyth 2016,223). Thus, it was decided that the questionnaire should use a five point Likert scale. A bipolar scale was used (Krosnick *et al.* 1997,143), from 'strongly agree' to 'strongly disagree' (Appendix D, Appendix E). Each point on the scale was labelled, as studies show this makes the distinctions between each point more clear for respondents, and so increases the reliability and validity of results (Krosnick *et al.* 1997,150; Menold *et al.* 2013,22,31,35; Smyth 2016,223).

The two qualitative questions were open-ended and had a box which allowed the respondent to answer in their own words. This open-end method of questioning provides more varied and detailed answers than would be elicited from a closed-end question (Lavrakas 2004,903). It can also provide responses not mentioned in the existing literature. This is particularly the case when looking at visitor views. However, open-end questions result in answers that need more steps and time to analyse (Lavrakas 2004,903). The questions used, the response type and data outputs are given in Table 13.

No.	Text	Response type	Data output
1	Sound and movement add greatly to the understanding and enjoyment of tanks.	Likert scale	Quantitative
2	Are there any other features of a running tank that are important?	Free text comments	Qualitative
3	Running tanks need repairs and replacement parts. It is better for a tank to be running with new parts, than remain original and immobile.	Likert scale	Quantitative
4	Tanks of significant historic importance should be kept static, so their parts can be preserved for longer.	Likert scale	Quantitative
5	When do you think the decision should be made to stop running a tank?	Free text comments	Qualitative

Table 13. Visitor survey questions used in the Tankfest 2019 and non-event day 2020 studies.

Analysis of the question response used thematic analysis, which involved finding themes from the results and counting the number of times each theme was mentioned using an Excel spreadsheet. Other methods of qualitative analysis were considered, such as grounded theory which may have also been suitable (Miles *et al.* 1994,5; Sandelowski 2004,893). However, it was decided that grounded theory was not to be used, as it follows a set methodology and so may not allow for changes (Charmaz 2006,3; Bryant *et al.* 2007,2; Eriksson *et al.* 2008,160; Byrne 2017). Thematic analysis has many similarities to grounded theory, as well as any hermeneutic analysis (Attride-Stirling 2001,387). But thematic analysis methodology can be more flexible (Braun *et al.* 2006,83). Thematic analysis is a type of content analysis that involves categorising, cataloguing and identifying patterns in themes (Taylor *et al.* 1984,171; Aronson 1994,2; Benaquisto 2008,85; Chenail 2008,72; Byrne 2017).

The analysis used inductive thematic analysis rather than deductive; the data analysis was approached without a predetermined list of categories (O'Neil Green

2008,71). Instead, themes were found from the answers during the analysis stage by coding the content of the comments into groups. Initially the comments were read, and a list of themes were created. The comments were then re-read and the author counted the number of times each theme was mentioned. As deductive analysis draws categories from previous studies or a literature review, it may not recognise themes that have been neglected in previous research (Braun *et al.* 2006,87; O'Neil Green 2008,71). It is acknowledged that inductive analysis takes place with some knowledge of previous studies, but it does not explicitly use the categories from previous studies or literature (Braun *et al.* 2006,87). Thus, inductive analysis ensures all mentioned themes are included, and so allows for realisation of new themes (Boyatzis 1998,30). This is particularly important in visitor studies, in which visitor viewpoints are constantly changing, and so previous literature may not include up-to-date views. The data has been stored electronically, and both the data and the thematic analysis can be made available upon request.

Several responses for the qualitative questions gave more than one factor as an answer. Each part of the answer was counted equally as an individual response. If one participant gave two different factors in their answer, these were counted equally as two individual responses, and each were thematically grouped accordingly. For example, one respondent, when asked 'are there any other features of a running tank that are important?' answered 'the aroma/smell and weaponry'. Smell was counted as one theme, and weaponry as another.

## 9. Study of Visitors at a Tankfest Event

The main aim of this visitor study was to find visitor opinions on running vehicles at The Tank Museum concerning:

- The sensory aspects of running tanks
- Important features of a running tank
- If it is better for a tank to be running with new parts than remain original and immobile
- If tanks of significant historic importance should be kept static to retain original parts in their context for longer
- At what point a historic tank should stop running

### 9.1. About the Event

In 2019 Tankfest took place from the 28<sup>th</sup> to the 30<sup>th</sup> June (www1). The three days consisted of one preview day on Friday, where there were a limited number of running tank displays, talks, Wargaming activities, living history encampments, the opportunity to handle collection items in the archive and library, M548 vehicle rides, trade stalls and entry to the museum building and Vehicle Conservation Centre (www2; www3; www4; www5). The other two days, Saturday and Sunday, were the main event days. As well as the activities provided on the Friday, there were more running vehicle displays throughout the day, a parachute display, music and meet and greets (www6). Guest vehicles included a WWII Panther Tank whose restoration was funded by World of Tanks (www7), a Valentine DD, a StuG III, a Centurion, a Cheetah PRTL, a Sherman Firefly, Two Russian T-34s and a Type 95 Ha-Go (www8).

The Friday preview day was attended by 4,500 visitors, whilst 9,000 tickets were sold on Saturday and 9,000 on Sunday. The tickets for both Saturday and Sunday were sold out before the event (C. van Schaardenburgh 2019, pers. comm. 5 Aug). Thus, Tankfest is a popular event that draws in a large number of visitors. A total of 84 questionnaires were completed by visitors. While this offers opportunity for clear preferences to be demonstrated when comparing numbers of responses in a category, statistical comparisons may become less meaningful where very small numbers of responses are received in a specific category. The response rate was low compared to the total number of visitors because the surveys were handed out and collected in person by the author. This limited the number of surveys that were filled out.

## 9.2. Methodology

The questionnaire was carried out on Saturday 29<sup>th</sup> June 2019 at the Tankfest event and was given to the respondents in paper form. The author approached visitors, explained that the survey was for university research assisting with The Tank Museum's conservation management decisions, and handed out a paper form. Visitors were randomly selected. Every visitor who agreed to fill out the survey received a form, rather than just one person per group. This ensured that a range of visitor responses were sought. The author stayed with the respondent whilst they were filling out the survey so that the completed survey could be returned in person. The survey responses were then inputted into an Excel spreadsheet before analysis was carried out.

## 9.3. Results and Discussion Question 1: Sound and movement add greatly to the understanding and enjoyment of tanks.

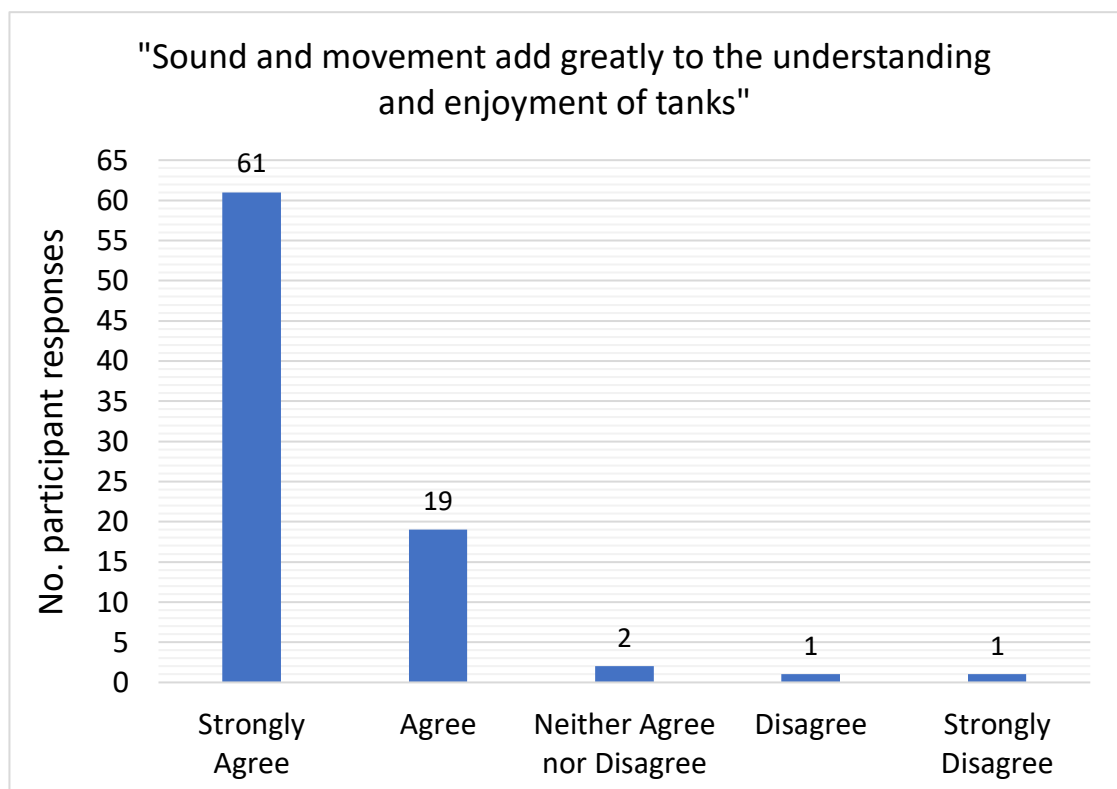


Figure 52. Bar chart showing results of the question 'sound and movement add greatly to the understanding and enjoyment of tanks'

The first question of the survey was presented as a statement, with respondents answering on a Likert scale, rather than as a free form answer. Figure 52 shows a clear overall majority supporting the statement that sound and movement add greatly to the understanding and enjoyment of tanks. Out of the 84 responses,

96% either 'strongly agree' or 'agree' with only 2% in the 'disagree' or 'strongly disagree' category. It can therefore be concluded that sound and movement add greatly to the understanding and enjoyment of tanks.

The value of the sound, and other sensory aspects, of running tanks is not something that has been covered in depth in the existing guidelines concerning conservation decision routes of working objects (ABTEM 2018). There are only two references to sensory impact in the most recent guidelines (ABTEM 2018,14,35). This seems at odds with the data collected in this survey; if a clear majority of visitors to an event with running vehicles agree or strongly agree that sound and movement add greatly to the understanding and enjoyment of tanks (Question 1), then this suggests that consideration of sensory aspects is something that should take precedence when dealing with decision-making routes. The results of this study certainly suggest that sensory aspects should form part of the decision-making framework.

#### 9.4. Results and Discussion Question 2: Are there any other features of a running tank that are important?

Figure 53 records the results to the second question, which asked participants if there were aspects other than sound and movement that are important to a running tank. The answers for Question 2 included other aspects of the moving tanks seen that day, as well as suggestions to improve the experience of moving tanks in future displays. The responses were read and thematically grouped, then further grouped into seven main categories (Figure 53). The groups within the seven main categories were identified using inductive thematic analysis to create main themes which are not pre-determined (Table 14 - Table 20).

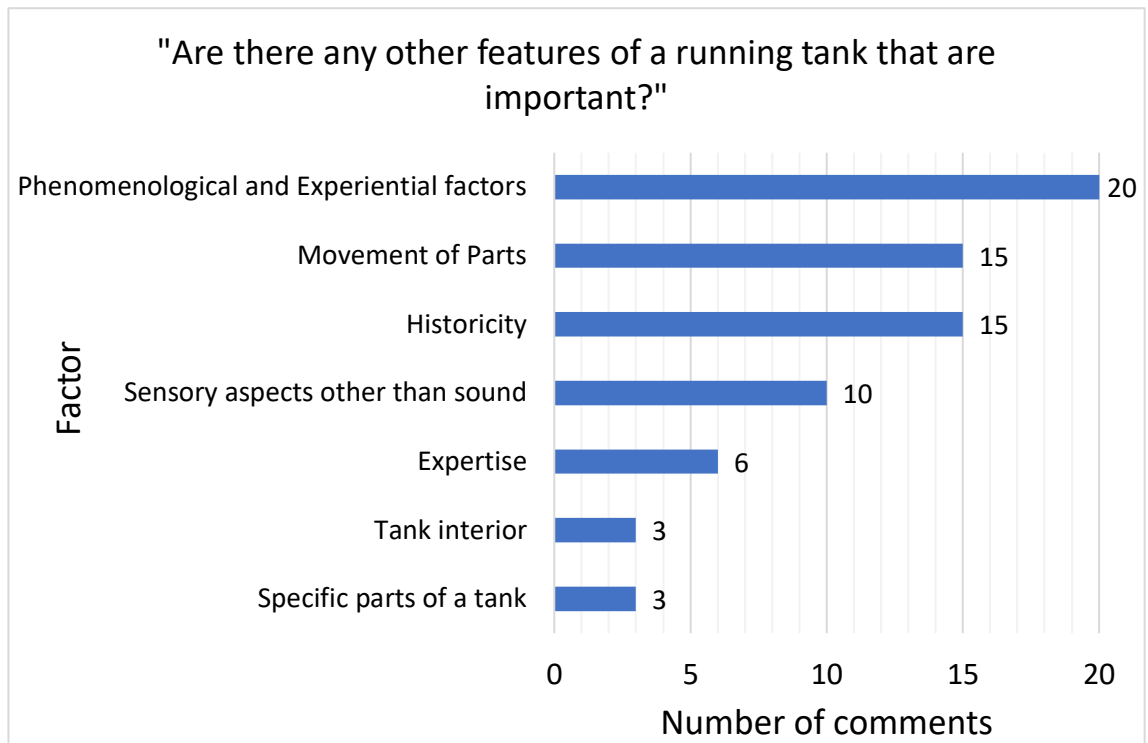


Figure 53. Bar chart showing results of the question 'are there any other features of a running tank that are important?'

Overall, the results from question two support the notion that significance lies within the historicity and authenticity of the tanks. Considering the question 'are there any other features of a running tank that are important?', the most frequently mentioned response was that of phenomenological and experiential factors. From this it is concluded that, other than sound and movement identified in question 1, visitors believe the experience is of greatest significance when assessing the impact of running tanks. It is the experience of seeing and sensing a running tank that lends weight to the argument that historic tanks should be in working order. This experience is formed of sensory factors, the understanding of speed, power and movement in the running vehicle displays, and the atmosphere of the event.

As well as the traditional ethical considerations, the impact on the visitor needs to be examined in greater detail. The emphasis on experience is supported by previous visitor surveys undertaken by the Tankfest, as well as recent findings on the rise of the experiential economy. Visitors increasingly want real and authentic experiences. A total of 15 visitor mentions of moving parts in the survey comments suggest that visitors want to see tanks perform their original functions within reason, as this conveys their original purpose, and consequently their significance. This again backs up the visitor wish for real experiences. A further 15 mentions of historicity add to this

argument supporting authenticity, whilst the 10 comments on sensory aspects again show the value of experience. Three comments concerning the tank interior indicate a visitor wish for greater access, again showing how visitor value is placed in the experience. Three mentions of the specific parts of a tank emphasises the other themes of movement of parts and historicity. Expertise is a factor that adds to the experience and understanding of the function of tanks and was mentioned six times. Thus, the responses to this question show the value of the authentic experience of running tanks. Results are reported in more detail below.

### Phenomenological and Experiential Factors

The most mentioned theme was that of phenomenological and experiential factors. This includes comments on the movement of tanks, setting and atmosphere of the event, the displays, mock battles, and the importance of running tanks in giving an impression of their size, speed and power (Table 14).

Comment theme	Number of comments
The fact it is running	4
Setting and atmosphere	3
The displays themselves	2
Mock battles	2
Impression of size	2
Understanding of speed	2
Appreciation of how they move across the landscape	1
Understanding of the power of the machines	1
Dust	1
Smoke	1
Engaging for new audiences	1
<b>Total</b>	<b>20</b>

*Table 14. Table showing sub-categories of phenomenological and experiential factors mentioned by respondents in the 2019 Tankfest survey.*

The fact that the tanks are running was the most mentioned sub-category in this theme, indicating the primary importance of running tanks. It gives weight to the value of seeing and experiencing running tanks; this is what visitors have come to



Tankfest for. This rationale for attending Tankfest is reiterated in the 2017, 2018 and 2019 Tankfest visitor surveys carried out by The Tank Museum; when asked why people visit Tankfest, the most given answer was to experience historic tanks moving (The Tank Museum 2017, 2018c, 2019). This corroborates the data found in this study. Thus, the most important aspect of this essential income generating event for The Tank Museum, which is a Trust relying on income to maintain its collection and fund its activities, appears to be that visitors can see and experience running tanks.



*Figure 54. A running tank at Tankfest. Source: www1.*

Setting and atmosphere was the second most mentioned sub-category. This includes comments on the atmosphere of the event day, and how this atmosphere contributes to the experience of running tanks. The number of people at Tankfest, along with sensory aspects such as sounds, sights and smells, contribute to this atmosphere which visitors enjoy so much. One of the comments mentioned ‘theatre’, associating the running vehicle displays with dramatic performances. Another participant commented on ‘the enjoyment of the crowd.’ This again links to experience, as visitors can experience this atmosphere and be part of it. This raises the importance of engagement and interactivity of visitors to museums, which appears to be particularly successful at event days such as these. One of the next most mentioned factors is the displays themselves, which was mentioned twice. This links to setting and atmosphere, reiterating the importance of movement and seeing and experiencing running tanks in the arena.

Mock battles were also identified twice, with a suggestion that visitors want to see more mock battles in the running vehicle displays. The rationale is clear; such battles would show the tank's purpose to a greater extent, thus enabling viewers to further understand a tank's original use. One of the comments mentioned that other shows have mock battles, and that they would make for good viewing. Mock battles would therefore impress upon the visitors the reality of history and elucidate the significance of tanks in warfare. This is a factor for future consideration, but as it was only mentioned twice, there does not appear to be a great demand for it. It does, however, indicate the visitor want for historic tanks to continue performing their original actions to display their purpose.



*Figure 55. A mock battle at Tankfest. Source: [www2](#).*

Two survey participants commented on the importance of running tanks in giving visitors an impression and understanding of their size. Experiencing a tank moving next to you or seeing it on the other side of the arena makes a strong impression of their great scale. Showing a group of tanks running also allows for comparison of size between the tanks. It enables people to understand how the tank situates itself in the landscape.



*Figure 56. Experiencing a moving tank can give a greater understanding of scale. Source: [www2](#).*

Two participants mentioned that running tanks give an impression of the speed of the machines. When faced with a static tank, one can be told how fast it could go, but it is difficult to form a perception of this unless one understands how tanks move and what it looks like to see a tank move. This is also where sound offers an important input, the experience of seeing a tank in action provides this understanding. A sense of awe is invoked when seeing such a large vehicle moving at an unexpected high speed, which is particularly the case with modern tanks. On the other hand, witnessing the slow speed of earlier tanks results in an appreciation of how they were used in a contrasting way in battle. For example, Britain's WWI heavy tanks were used to support infantry, so were driven alongside foot soldiers when going towards battlefields (Fletcher 2012, 3; Haskew 2014, 29; Willey 2017, 22). At Flers-Courcelette, the first battle in which tanks were used, it was planned that the tanks would reach the German trenches a few minutes before the infantry to protect the men (Fletcher 1994b, 3-4). Speed was therefore an integral consideration in such battles and indicates how warfare and tactics have changed in line with technological change, when modern main battle tanks are seen in action at the same Tankfest. This significance can only be truly conveyed when a tank is running, consequently providing clear demonstrations of changes in warfare, which is enhanced by mock infantry engagements with the tanks to offer an all arms approach. Perhaps one aspect is absent: the destruction of tanks? They are not invulnerable and would suffer high losses in any battle and this should be conveyed to audiences.

One participant wrote that tanks running in displays give an appreciation of how tanks move across the landscape. By seeing a tank moving, one can see how they

manoeuvre across terrain, mount hills and plough through mud. It gives the viewer a greater sense of how they moved on the battlefield, and how this movement can shape the nature of battle. The phenomenological aspects of situating tanks within the landscape further realises their purpose and gives a more accurate sense of context for those watching.

It was also stated by one person that tanks in action give an idea of the power of machines. By seeing a tank running, one can comprehend just how much power is needed to move such a large machine. This again shows how tanks can be used to produce reactions of shock and awe as reported throughout their history. Through this, visitors can understand their use as propaganda and symbols of power. Seeing tanks running, and the power behind them, therefore gives an understanding of how tanks are both physically and psychologically powerful weapons of war. The overall emotive aspect of such machines is conveyed in many ways during Tankfest events.

Interestingly, one participant mentioned dust as an important aspect of running tanks other than sound and movement. Tracked vehicles interact with the ground surface and kick up loose surfaces, as seen in Figure 57, likely in Italy in WW2. The weather was hot and dry on the day the surveys were carried out, so the display arena was dusty, which obviously impressed this visitor. On wet days, the tanks kick up mud and clods of earth instead, which similarly shows movement and the impact the tank has on the landscape. The kicking up of dust can show speed and power and can also give an idea of what conditions may be like for soldiers alongside, and thus the social history behind such vehicles. This cascades down to visitors reading subject related books, whether novels or historic publications, and being able to relate to eyewitness comments.



*Figure 57. Photograph of a Sherman tank and the cloud of dust thrown up by its tracks, 1944. Source: [www1](#).*

The same participant also mentioned smoke. Smokescreens can be deployed by some tanks such as the M1 Abrams (Green *et al.* 2005,105; Hofrichter 2007,10), Centurion (Ware *et al.* 2012,65; Dunstan 2017,19), Chieftain (Dunstan 2003,5) and Challenger (Taylor 2018,26). Demonstrations are given in the vehicle displays to show how smoke can be used in battle. During the display, a smokescreen is produced when the tank is driving close to the viewing area, covering the viewers with smoke. This involves the audience to a greater extent and so produces a far more interactive experience. It demonstrates just how effective smokescreens are at concealment (US DA 1988, 32) and provides an engaging insight into how tanks work in battlefield scenarios.

One survey answer stated that running tanks is engaging for new audiences. If a visitor has never seen a moving tank it is difficult to describe exactly how one moves



and for them to understand this. It is far more immediate to see a tank in action and so understand exactly how a tank moves in a sensory manner. In addition, the awe-inspiring experience of seeing a tank in action can draw in new audiences. This factor shows the importance of running tanks for increasing access and appealing to a wider range of visitors.

Thus, survey participants deemed phenomenological and experiential aspects to be the most important aspect of running tanks other than sound and movement. This includes the atmosphere of the event, how the tank situates itself into the landscape, its size, speed and power and engagement with new audiences. Suggestions for mock battles indicates the importance of running tanks being used to demonstrate their initial purpose.

#### Movement of Parts

Movement of parts was the second most mentioned theme (Table 15). This involved participants mentioning specific aspects of the tank moving. Thirteen of the 15 responses focused on the gun and turret, indicating a visitor-led emphasis on firepower and the value of demonstrating the original purpose of a tank in running vehicle displays.

Comment theme	Number of comments
Gun fire	7
Turret Rotation	5
Transmission/engine	2
Gun movement	1
<b>Total</b>	<b>15</b>

*Table 15. Table showing sub-categories of movement of parts mentioned by respondents in the 2019 Tankfest survey.*

Seven participants commented on gun fire. This is the most mentioned single comment from the survey, accounting for 10% of all comments. It was stated as a recommendation for future displays, with one participant stating ‘firing the tanks would help better increase enjoyment’ and another writing ‘would like to see dummy rounds fired when possible.’ This relates to the function of a tank. A tank is an Armoured Fighting Vehicle (AFV), the name itself succinctly summing up a tank’s

purpose of having armour to prevent enemy weapons, fighting ability to attack the enemy with firepower, and being a vehicle that can move across the battlefield. Armour can be seen when vehicle is static, but it can be argued that it has a greater importance which is realised when running. The vehicle aspect of a tank can clearly be seen when it is running in a display. The Tank Museum currently does not fire its tanks, but this survey data shows an audience wish for tanks to further demonstrate their original purpose of being fighting vehicles and using firepower. Thus, presenting a tank's original use accurately in a museum would involve both running it and demonstrating its firepower.

Gun fire also involves aspects of sound and movement. Experiencing it is a sensory experience, in this instance combined with movement of the gun itself and the vehicle carrying it. This relates to the first question in the 2019 Tankfest survey, which found 96% of participants either strongly agreed or agreed that sound and movement add greatly to the understanding and enjoyment of tanks. Some museums do fire guns. For example, at Fort Nelson commemoration of Armistice Day in 2018 involved the firing of the 18 pounder gun. Fort Nelson also has live gun firing on other event days ([www2](#)). Thus, other museums have shown the ability to fire historic guns. However, health and safety must be considered and it may not be practical for guns to fire blanks in Tank Museum events. If this is the case, more research should be carried out as to how to provide a comparable experience that elicits a similar viewer response and understanding of how tanks use firepower. For example, the Military Technical Museum of Lesany has a tank recreation exhibit, which has light and sound effects ([www3](#)). This provides some sensory access and understanding of a tank firing.

The ability to rotate a tank's turret was mentioned by five survey participants. During the vehicle displays, turrets are sometimes moved so the gun points at the audience. As well as simply demonstrating moving parts, this can invoke the shock and awe inspired by a tank. It conveys the psychological power of a tank, and so gives the audience a greater emotional understanding of warfare. One comment suggested that more turret movement would improve future displays. Turret movement is part of the function which realises the purpose of a tank and is evidently appreciated by an audience. Movement of the transmission and engine was mentioned by two participants. This indicates an understanding of the practicalities required for a tank to

move. It infers the importance of maintenance and the need for replacement parts if a tank is to continue running for a considerable period of time. Gun movement was mentioned by one person. This again links to gun fire and turret movement. It similarly shows how the function of a tank can be greater realised when the firepower aspect is played out.

The second highest mentioned factor of running tanks other than sound and movement concern specific moving parts of tanks. Most of these answers focused on the movement of either the gun or the turret, when combined with the desire to see the gun firing, these factors relate to the intended functions of a tank and their *raison d'être* as an Armoured Fighting Vehicle that intimidates if you are an enemy or inspires if you are a friend. There is also an appreciation that the engine and transmission inside the tank need to fulfil their function and, while they are invisible to the audience, their function can be sensed by sound and smell.

#### Historicity

Historicity, like the Movement of Parts theme, was also mentioned by 15 participants (Table 16). This includes factors such as ensuring the tanks are historically accurate and authentic. It also involves notions of tanks displaying their own histories, and through doing so, conveying a wider history of warfare.

Comment theme	Number of comments
Historical accuracy	3
Authenticity	3
The story behind the tank	3
The fact they are historical	2
Living history is better than any book	1
Showing a tank's intended use	1
Shows history	1
Relevance	1
<b>Total</b>	<b>15</b>

*Table 16. Table showing sub-categories of historicity mentioned by respondents in the 2019 Tankfest survey.*



Historical accuracy, authenticity and the story behind the tank were each mentioned three times. Mentions of accuracy reveal a visitor expectation for museums to correctly show history in an objective manner, identifying museums as places of learning to display history, which is reflected in the visitor comments surrounding the importance of historical accuracy. As with historical accuracy, mentions of authenticity show the importance of historic tanks moving rather than replicas. Value is thus given by visitors to the intangible historicity of the tanks, which involves an authentic experience as well as just authentic objects.

Two of the three comments concerning accuracy discuss the importance of historically accurate camouflage, and one comment categorised under authenticity stated 'the original exterior should remain the same'. Restoration projects at The Tank Museum have found that some tanks in museum collections have been painted with historically inaccurate colours in the past, such as the Tiger 131 (Fletcher *et al.* 2011,81). Through the processs of restoration, the correct paint schemes have been researched, and the Tiger 131 is now painted in its original colours. Restoration projects can therefore improve the historic accuracy of vehicles.

The story behind the tank was illustrated by various comments including a desire to see 'battle damage showing how they were knocked out'. This shows a value placed on the histories of the individual tanks themselves, and thus gives significance to the fact they are historic tanks. Running tanks can display their own histories of production, combat and post-combat life, as well as the social histories of those who served in and with them. This factor also raises the importance of the commentary when the tanks run in the displays, which uses the tanks to give information on the history of the tank and how this fits in with the history of more general warfare. This gives further information about the histories of tanks and the histories of warfare to provide an educational and informational platform.

Two people wrote that an important attribute of running tanks is the fact the tanks are historic. This is similar to authenticity in that the importance of the running tanks comes from the tanks having a history and being real rather than replicas. This again highlights the importance of demonstrating intangible historicity through the running of historic vehicles. One participant commented 'living history is better than any book'. The mention of 'living history' shows how running tanks bring history out of

the past to engage audiences. It suggests running tank displays make the tanks relevant and of value to current visitors. The statement ‘better than any book’ suggests that running tank displays are not a one-way dissemination of information, like that of a book. Instead, they are engaging, as they can react to, and involve, audiences. This also alludes to sensory aspects and the importance of experience in such an involving display. In summary here, the moving tank delivers the experience as a reality, whereas the book or the static tank relies on imagination and perception offered by images and words. This is supported by one participant stating that running tanks show history and another that it shows the ‘use it would have really served’. By showing a tank running, this value is conveyed, adding to its perceived significance as a museum object.

Collectively, the responses identify the importance of historicity and the aspects within it that matter to audiences, which can be fulfilled by the moving tank.

#### Sensory Aspects other than Sound

The fourth most mentioned theme was that of sensory aspects other than sound (Table 17). This included ground vibrations, smells and bangs. Sensory aspects were mentioned 10 times.

Comment theme	Number of comments
Vibrations under your feet	5
Smell	4
Bangs	1
<b>Total</b>	<b>10</b>

*Table 17. Table showing sub-categories of sensory aspects other than sound mentioned by respondents in the 2019 Tankfest survey.*

The most mentioned category under this theme is vibrations underfoot, which was mentioned five times. A moving tank causes the ground to move, which, coupled with sound, produces an immensely effective sensory experience. This gives a greater understanding of how it feels to be close to a moving tank, and an idea of how tanks in action impact the landscape. It demonstrates just how loud and powerful tanks are. It is factor that involves the audience to a greater extent, thus causing an emotive response.

The second most mentioned aspect under the theme is smell. Four respondents mentioned smell. This again is a factor that can involve the audience to a greater extent. Staff at the Tank Museum say that they cannot get the smell of the Tiger 131 exhaust out of their nose all day when it is running (C. Cooper 2018, pers. comm. 15 Sep), demonstrating how certain tanks have particular smells from combustion, and that these have an impact on those running them and watching them run. This shows the importance of petrol and diesel combustion in contributing to the overall experience. This smell is likely to be similar to the original smell from the engines as they run off the same fuels. It also indicates that smell must be considered when looking at how sensory experiences contribute to the overall experience.

Bangs were mentioned by one person. This could be counted as sound but can also involve vibration, feeling and sight. Bangs and explosions can contribute to a greater appreciation of the role tanks played in creating shock and awe, as shown in Figure 58. They can also be used to recreate combat scenarios, and so show the audience aspects of warfare. The respondent wrote 'more bangs', so provided a suggestion to have more explosions in future displays.



*Figure 58. The 'Fury Tank' at Tankfest, with explosions in the background. Source: [www4](http://www4).*

In conclusion, feeling the ground vibrate or rumble and smelling the tanks is all part of the sensory experience, which generates a more complete experience of a tank and its function for the audience. They make the experience more engaging and interactive, and so can enable people to understand more fully the role of tanks. One

suggestion for more bangs and explosions shows a wish for more battle recreations, and a greater use of potential sensory aspects. This shows aspects other than sound and movement are important when looking at the impact of running tanks.

### Expertise

The category of expertise includes six comments and is the fifth most mentioned theme (Table 18). This category focuses on commentary, crew skills, the chance to speak to maintenance teams and the value of vehicle knowledge.

Comment theme	Number of comments
Commentary	2
Crew skills	2
Chance to speak to the maintenance teams	1
Vehicle knowledge	1
<b>Total</b>	<b>6</b>

*Table 18. Table showing sub-categories of expertise mentioned by respondents in the 2019 Tankfest survey.*

Commentary was mentioned twice. Commentary is certainly an important part of the experience, as it provides information about the tanks whilst the tank displays are taking place. The commentary covers the history of the tank, social histories, general military history, and technological advances. This enhances the meaning of the running tanks by providing context and therefore value for the audience. The commentary and the running tanks build on each other to give a greater overall picture of tanks and their histories for the audience members. Thus, providing information can enhance the experience through learning to generate a greater understanding of the significance of each tank.

Crew skills were mentioned twice and opportunity to speak to maintenance teams once. Crew members clearly need adequate skills to operate the tanks. If crew members know the capabilities of a tank, they can give a better display when it is running. This is a practical aspect of running tanks that takes training and the passing down of skills into account. Visitors can speak to crews at Tankfest before and after tank displays. This gives them the opportunity to ask specific questions that are answered by those who are knowledgeable and work with tanks. This knowledge is not

just theoretical; having a working knowledge of a vehicle is an important part of running vehicles, and visitors enjoy learning about this. This can provide meaningful interactions, where visitors can find out about the details they are interested in and so personalise their experience.

#### Tank Interior

Tank interior was mentioned three times (Table 19).

Comment theme	Number of comments
Riding or sitting inside the tank	2
Seeing the tank interior	1
<b>Total</b>	<b>3</b>

*Table 19. Table showing sub-categories of the theme Tank Interior mentioned by respondents in the 2019 Tankfest survey.*

Two comments mentioned riding or sitting inside the tank, and one comment mentioned the ability to see inside a tank. Visitors do not have the chance to ride inside or look inside a running tank at Tankfest, with the exception of the eBay auction to ride inside the Tiger 131 at Tankfest 2016. At Tankfest visitors can ride in an M548, but this is a tracked cargo carrier rather than a tank. These comments are therefore suggestions for future Tankfest events, rather than comments on current experiences. They show a visitor wish for closer, more accessible and personal experiences.

#### Specific Parts of a Tank

The seventh most mentioned theme contains discussions of specific aspects of a tank (Table 20).

Comment theme	Number of comments
Weaponry	2
Camouflage	1
<b>Total</b>	<b>3</b>

*Table 20. Table showing sub-categories of specific parts of a tank mentioned by respondents in the 2019 Tankfest survey.*

This includes weaponry, which was mentioned twice, and camouflage which had one comment in addition to the comments on historically accurate camouflage

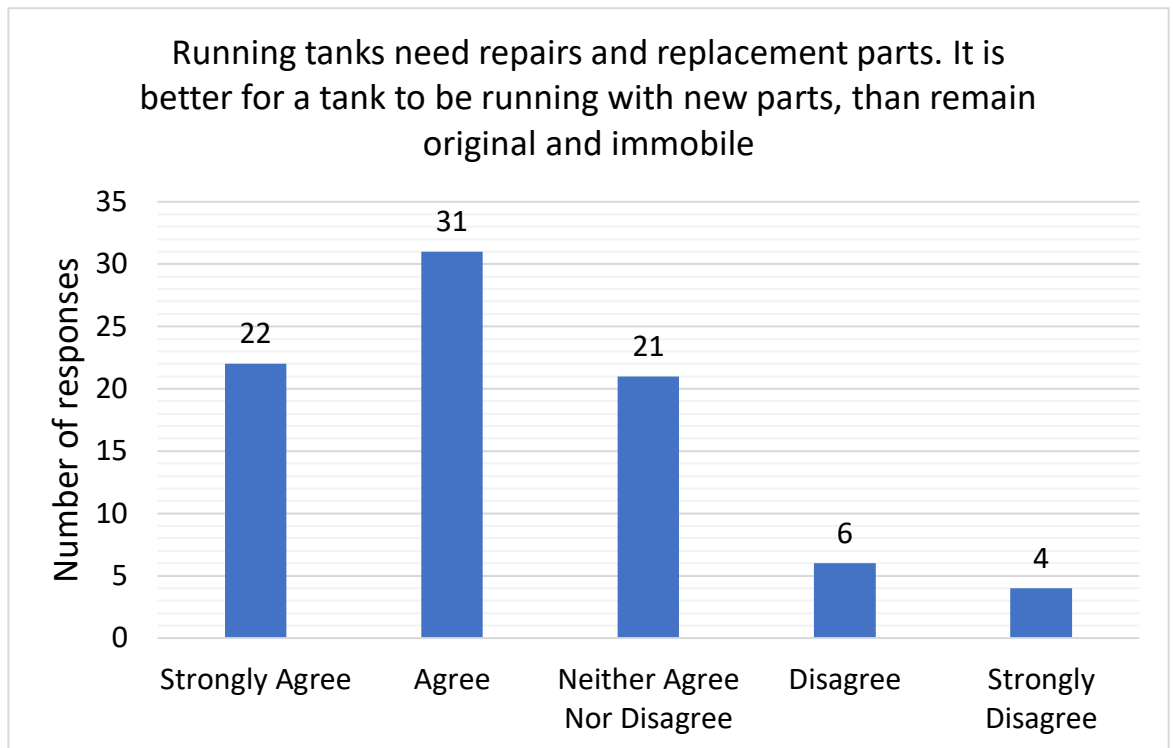
that are discussed above. This theme is distinct from the theme titled 'movement of parts', as this theme contains comments on parts without mentions of movement or running. It is interesting to note that weaponry is mentioned in itself, as well as being mentioned 11 times within the category 'movement of parts'. These two comments on weaponry without any mention of movement again shows that visitors deem the weaponry to be an important part of a tank. This links again to the function of a tank as an AFV and highlights the importance of the tanks fulfilling their function in order for their meaning and value to be fully realised.

The one mention of camouflage reiterates the point of ensuring the external appearance of tanks is accurate. Camouflage can clearly be seen when a tank is static, but certain camouflage patterns can be more comprehensible when a tank is moving, showing the effectiveness of the design in concealment. Tank camouflage on a running tank can therefore show aspects of the tank's history, and through this, general histories of warfare.

This theme reinforces the more frequently mentioned themes of movement of parts and historicity. Although it does not explicitly mention movement, it does add emphasis to the importance of weaponry on a historic tank, as well as using camouflage to display history.

#### **9.5. Results and Discussion Question 3: 'Running tanks need repairs and replacement parts. It is better for a tank to be running with new parts, than remain original and immobile.'**

The statement that 'Running tanks need repairs and replacement parts' was put at the start of this question, so participants acknowledged the fact that this is true when considering their opinions on the second part of the statement. It posed the two avenues of decision making which would produce outputs on the dichotomous scales of running and static (Figure 59).



*Figure 59. Bar chart showing responses to the statement 'it is better for a tank to be running with new parts, than remain original and immobile'*

The majority of survey participants either agreed or strongly agreed with the statement, reflecting a general agreement that it is better for a tank to be running with new parts than remain in original and immobile condition.

One respondent wrote under the tick boxes that the decision should be made on a 'case by case basis'. As the survey layout did not allow for comments, the number of participants who thought this cannot be found. However, the fact that 25% of participants neither agreed nor disagreed shows that these participants felt the question could not be answered definitively by either agreeing or disagreeing. This suggests a visitor expectation for each decision to be made on an individual basis, and that a blanket statement cannot be made for all the tanks in the collection. There was not unanimous agreement as 12% of participants disagreed with the statement, thus a range of views should be considered when deciding whether to replace tank parts to keep the tank running.

#### 9.6. Results and Discussion Question 4: 'Tanks of significant historic importance should be kept static, so their parts can be preserved for longer'

The fourth question again posed a statement and was answered using a Likert scale (Figure 60). The question aimed to find visitor perceptions of historic significance, whether they believe this should impact on decision making, and, if so, how they think this should impact the conservation decision.

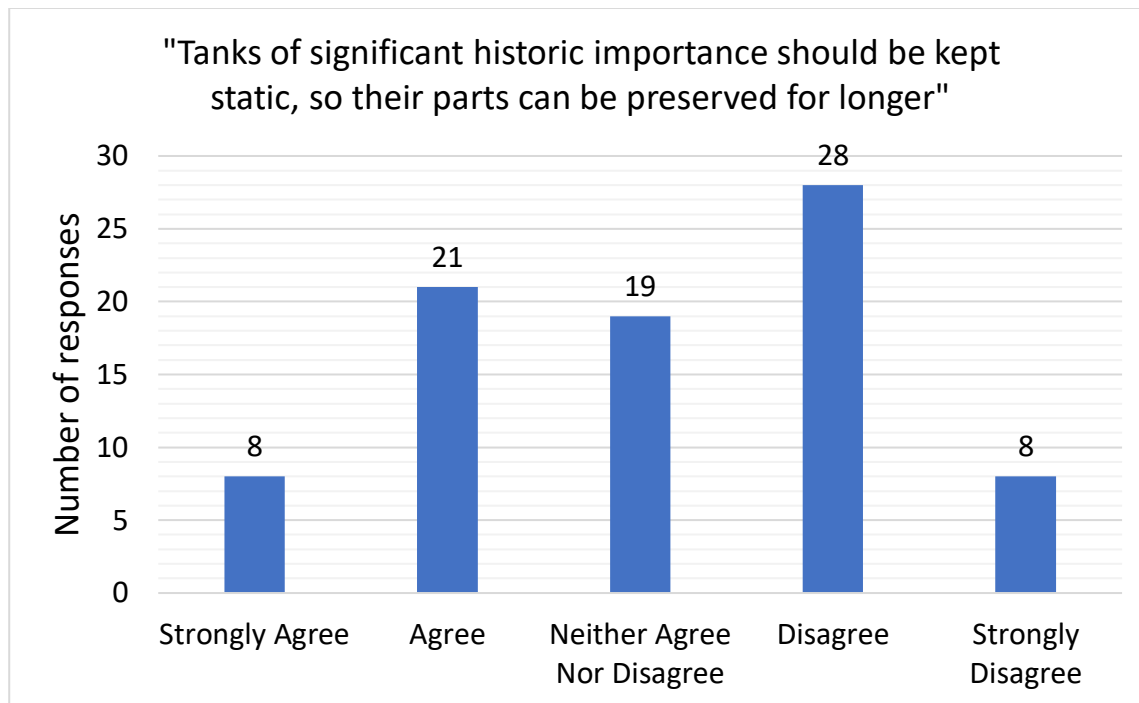


Figure 60. Bar chart showing responses to the statement 'Tanks of significant historic importance should be kept static, so their parts can be preserved for longer'

The highest portion (43%) of respondents to the statement 'tanks of significant historic importance should be kept static, so their parts can be preserved for longer' either disagreed or strongly disagreed with the statement. It is to be expected that people attending this event want to see historic running tanks, as it is an event at a museum which focuses on running vehicles. This can be seen in the results.

However, a relatively large portion of survey participants, 35%, believe that tanks of significant historic importance should be kept static to preserve parts. This question was structured differently to the questions before, so some survey participants may have ticked agree or strongly agree following the structure of the previous questions, where strongly agree or agree meant they were expressing the opinion that they wanted tanks to be running. This may account for some of the apparently conflicting results when compared to the answers from previous questions.



However, it does not discount the results of this question. The fact that 35% of respondents either agreed or strongly agreed does show that visitors want to keep historically significant tanks in static condition.

There was also indecision, as 23% of survey participants neither agreed nor disagreed. Again, this is almost a quarter of respondents, showing that participants are not willing to make overall judgements on all the tanks at The Tank Museum. This echoes results from previous questions suggesting that each tank should be looked at on a case-by-case basis.

Although, overall, more visitors expressed a wish for tanks of historic significance to remain running than be in static condition, the relatively high number of responses wanting the opposite must be considered. It may be that there is a visitor expectation that static display means objects do not degrade, and so are preserved for far longer. Previous studies have indicated discrepancies between public and professional understandings of preservation (Wilkinson 2005; Lynch 2011; Dillon *et al.* 2013). Thus, it is to be expected that a high number of visitors would want significantly historic collections to be preserved for as long as possible. These visitors may have the perception that decay does not occur significantly within static display conditions.

It would be interesting to see if the divided opinion in this question would change if a specific tank was posed in the question; this is an avenue for further study. More participants disagreed than agreed overall but the number of responses which neither agreed nor disagreed again suggests the importance of looking at decision making for historic vehicles on a case-by-case basis.

#### **9.7. Results and Discussion Question 5: When do you think the decision should be made to stop running a tank?**

Question 5 asked about the point at which a tank should stop running. This looked at decision-making factors and sought to understand visitor perception on the end-of-life of collection items. The aim of the question was to find aspects that visitors deem to be important when considering the end of working life of tanks. It was deliberately open to allow for a range of different factors (Figure 61).

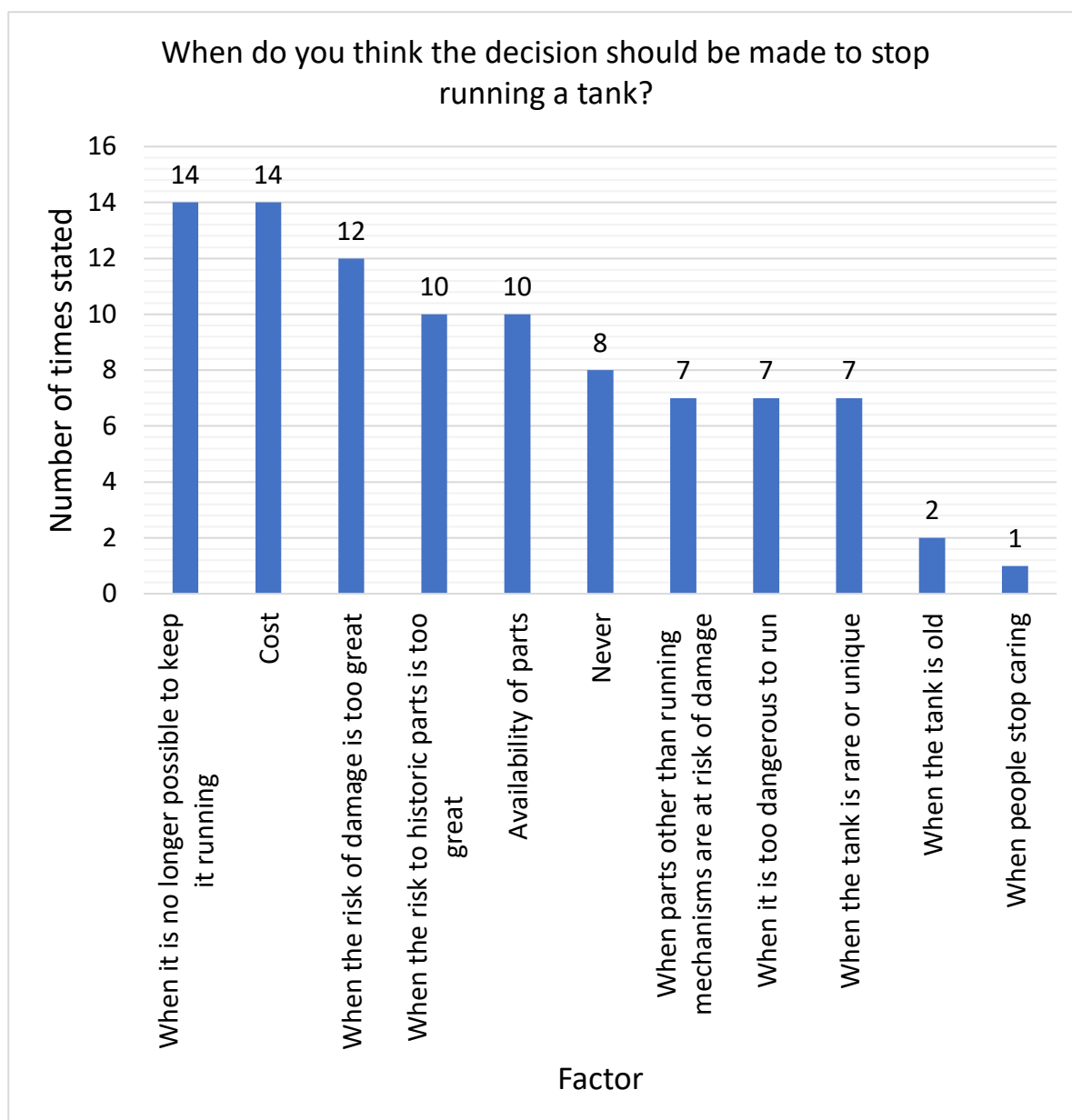


Figure 61. Bar chart showing results to the question 'When do you think the decision should be made to stop running a tank?'

The results show a consideration of practical aspects, such ability to repair or maintain, cost, availability of resources and health and safety (Figure 61). They also show a consideration of risk of damage to the overall vehicle, as well as some focus on the historicity of parts and the uniqueness of the tank itself. It is also interesting to note that eight respondents stated tanks should never cease running.

The top two most frequently mentioned factors involve practical aspects of resources and cost. These categories make up 30% of the total survey responses, so form a large portion of the comments. This emphasises survey participants' emphasis on the expectation that tanks should continue to run unless resources and cost are

limiting factors. Most of the categories can be grouped into focusing on either practical aspects, or historical aspects of running tanks. If the following factors are considered as practical aspects, then 45 comments focused on practicalities:

- When it is no longer possible to keep it running
- When the cost is too high
- When availability of parts is limited
- When it is too dangerous to run

If the following aspects are seen to view the tanks as primarily historic vehicles, rather than running vehicles, 38 comments focused notions of authenticity and damage to historicity:

- When the risk of damage is too great
- When the risk to historic parts is too great
- When parts other than the running mechanisms are at risk of damage
- When the tank is rare or unique
- When the tank is old

Considerations of historicity are therefore secondary to the discussion of practical aspects, although this is certainly not to discount them altogether, as they still form 41% of visitor comments.

It should also be noted that health and safety should be put above all other considerations. This includes health and safety of workshop staff and those who drive the vehicles, as well as visitors during displays.

Three categories, which contain 27 responses in total, comment on parts specifically, including risk to historic parts, availability of parts, and risk of damage to parts other than the running mechanisms. There is predictably a distinction between historic and replacement parts. The comments also show a perceived difference between the lifetimes of external and internal parts.

38 responses consider resources through writing about the possibility of keeping a tank running, cost, and availability of parts. This indicates visitor emphasis on considering the allocation of museum resources when making the decision to keep running a tank or not. It shows the importance of confirming there are adequate resources and carrying out plans to ensure resources are available in the future.

The survey responses show the need to make each decision on a case-by-case basis. The three comments discussing the point at which a tank should stop running as when around 50% of parts are replacements, can be seen to provide an overall statement of the point to cease working, but this still requires each tank to be individually considered. Factors such as resources, ability to run, risk of damage, availability of parts, rarity, age and relevancy all require individual judgements. Thus, although the survey provides information about the types of factors that concern visitors, they cannot be used by themselves; the context of each tank is required in the decision-making process.

All of the answers require documentation to produce a specific outcome. Significance assessments or statements should be produced for each running vehicle, and periodically updated to accurately reflect their condition and rarity. Conservation plans provide a documented decision for the future running or display of the tank (Historic Scotland 2000), and take risk assessment of damage into account, as well as cost, availability of parts, health and safety concerns, and future repair and maintenance. Treatment records must be kept in order to reach informed decisions about the running of the tank based on any repairs. Operating manuals ensure the tank is operated effectively. Operating logs provide documented evidence of running which can be used to organise maintenance plans.

A distinct category is 'never'. This indicates that 9% of survey participants expect a tank to continue running, regardless of the amount of replacement parts. Although this certainly doesn't represent a large amount of survey participants, it should still be taken into consideration when making the decision whether to keep a tank in running order.

#### When it is no longer possible to keep it running

15% of survey participants believe it is only when it is impossible to keep tanks running that they should cease to run. This places function and movement as the primary action to fulfil the purpose and significance of running tanks. When looking at the ability for tanks to remain in running order, resources must be considered in the guise of staff, workshop space and parts. This means tanks should be prioritised through significance assessments, so that only certain tanks are run in order to allocate

resources effectively and the decision should be periodically reconsidered, taking the extant resource into account.

Nine comments that state the obvious truth that 'tanks should no longer be run if repair cannot be carried out', likely relates to the availability of resource. One participant wrote 'when repairs cannot be made easily', which takes practicalities such as costs, resources and time into account. Irreparable wear was also mentioned, showing that the condition of the tank itself must be considered. The one comment stating 'only as a last resort' showed the desire to keep tanks working for as long as possible. Two responses stated tanks should no longer be run when maintenance is no longer possible. This is a clear cut-off point for tanks to cease running, and again takes resources into account, as well as likely future damage due to lack of maintenance.

Thinking behind these answers may also take damage into account. Although not specifically stated, running, repair, and maintenance may no longer feasibly keep a tank running for a long enough time to offset the money, time and other resources needed to repair the tank. Allocation of resource on one project may be at the cost of neglecting other parts of a collection, impacting on the maintenance and repair of other tanks due to the limited nature of resources.

### Cost

Cost also comprised 15% of the total number of comments and demonstrated visitor interest in the practicalities of both running and static vehicles. The responses supported the belief that tanks should continue to run unless practicalities such as cost render doing so impossible. This may imply that the authenticity, historicity or originality of parts is of less importance to these survey participants than the fact the whole vehicle is in running order. These answers disregard notions of keeping historically significant parts in the vehicle, as they expect parts to be replaced unless the cost of replacement parts is too high or the cost of carrying out maintenance is excessive. Most answers concerning cost simply said that the decision should be made to stop running a tank when the cost is too much. One response stated 'when the repair costs are going to ruin the museum' which suggests the respondent expects tanks to continue to run unless it will negatively impact upon the museum and is no longer affordable or financially viable for the museum.

One participant wrote ‘when it becomes too costly to run the tank as it can still be kept at the museum’. This shows an understanding that The Tank Museum does have a large static collection, and that tanks that are no longer able to be run should still be kept and displayed in static condition so they can still be accessed by visitors. The decision to stop running a tank does not equal a decision to stop displaying the tank altogether. However, it must be noted that there are still costs involved with the static display of collection items and it is interesting that static display is seen as a fallback position.

Since cost is a limiting factor that may change over time, if it is deemed the deciding factor in running a tank or keeping it static, the decision may be made at one point to display the tank in static condition but to reverse this later if finance and/or resource becomes available. Issues such as wear of static loads must be considered in this scenario. The tank parts may undergo more damage by being used periodically, and then stopped, than by being run often. Hydraulic fluids and load on suspensions are problems for static tanks. Thus, cost should be planned from the outset when making the decision to restore a tank to running order or to display it in static condition.

In simple terms, cost is a factor that can be easily defined; running is either affordable or not. Tanks should therefore be prioritised so money can be allocated efficiently. However, funding can be sought for restoring a tank, and so other factors such as significance, risk of damage, and ongoing maintenance must also be considered.

#### **When the risk of damage is too great**

Risk of damage forms 13% of the comments. Of these, eight responses stated that the decision to stop running a tank must be made before damage becomes too great. This consideration of the notion of risk takes risk assessments into account. One comment mentioned risk explicitly, whilst the other seven discuss stopping a tank before damage is too great. Some of these answers attempt to predict future faults, such as ‘when if a critical fault will ultimately stop it’, ‘when it could damage the tank beyond repair’ or ‘before it breaks down’. The point at which this damage may happen cannot be fully predicted, but an informed decision can be made using risk assessments, documentation on the running of the vehicle, and the knowledge of

crews and maintenance teams, demonstrating the need for skilled maintenance professionals and documentation when making such decisions.

Five comments state that tanks should stop running when the tank has received damage. This includes comments such as when the 'toll on the vehicle is too much', 'when falling apart', 'when it's on its last legs' and 'when it is getting too much damage'. This offers an indication to stop running a tank when damage has already occurred. Comments such as 'when it's on its last legs' can be seen to take risk of catastrophic failure into account, so although these five comments do discuss damage that has already occurred, they have been grouped under risk of damage. Since the risk of damage is often quantified further when there is evidence that damage has occurred, visible damage must therefore be documented and taken into account when forming risk assessments, significance statements, conservation plans and maintenance plans (ABTEM 2018,45).

The responses are vague and do not give a specific point at which damage is deemed to be too much. Instead, words are used such as 'significantly damaged', 'before it breaks down' and 'when it could damage the tank beyond repair.' These phrases display a level of ambiguity, showing there is not one easily identifiable point at which a tank should stop running due to damage. It indicates a level of subjectivity involved in the decision-making process, and that each individual decision should be made on a case-by-case basis. It is interesting to note that significance is mentioned, showing that value-based judgements are of use in the decision-making process. A significance assessment would certainly be valuable when looking at decisions surrounding ending the running life of a tank.

#### **When the risk to historic parts is too great**

The risk to historic parts comprised 11% of the comments. Several comments focused on the point at which a tank is deemed to have too many replacement parts to be truly historic. Four attempted to quantify the point at which the decision should be made to stop running a tank by looking at the percentage of replacement parts. One comment stated 'when a significant portion of parts are no longer original'. Three comments specified this portion as around the 50% mark, with one comment advocating stopping the tank operating when it was assessed that more than 50% of parts would be replacements in the future, while another comment said stop when

there are currently 50% replacement parts. The third comment stated 'when the parts required to keep it running comprise of more of the tank than originals', which can be quantified as just over 50%. All these comments focus on the notion of 50%, or half, being repairs. These few comments could potentially point to prevailing opinion for producing a decision-making framework based on a preponderance of historic parts, but the underpinning rationale behind 50% is unevidenced and the definition of 'a part' is undefined. What is 50% of parts? Is it 50% numerically? Which parts? Are all parts historically significant? Engines in tanks were changed regularly. Size of parts may matter; an engine block is significantly larger than an alternator. Some parts may need regular renewal if they are in use, as they wear quickly. There may also be a broader conceptual discussion to consider as to whether something like an engine in its entirety is a part.

The word original was mentioned three times, including a comment focused on the engine, stating 'when the original engine, if original, begins to show faults'. The use of original adds an intangible aspect, or an aura, which can result in an emotional response (Benjamin 2010,15) and a feeling of visitors having a greater connection to the past through viewing something that is original. Originality can therefore increase access and engagement with museum objects. The original tank could be the tank's original form when it came out of the assembly line, or its state when it was originally used, and sent into battle. The point at which a tank is considered original can therefore be contested. To quantify the point at which damage to the original parts occurs, the point of originality should be agreed, and originality of parts found. These parts should be stated in the significance assessment and conservation plan (ABTEM 2018,45), and any risk of damage to these parts assessed. It might be feasible to remove certain original running parts if they are at risk of damage to be preserved at the museum and put back into the tank when the decision is made to keep it in static condition. However, in general, if running the tank results in risk of damage to original parts, only 3% of survey participants believe the tank should cease working.

The broader issue of originality is embodied in the use of the words historicity, authenticity and character in relation to this question. One response stated 'if there's so many new parts involved that it ruins the historical bit of the tank' and the other 'the historic piece is lost'. These both focus on historic parts. There are broader issues



here and potential conflicts of opinion, as previous questions identified that visitors seem to consider the movement of a tank as 'history' in action, so preservation of originality may prevent an aspect of history being seen; an aspect that is given high priority by respondents. One comment stated 'when a repair would make the tank lose its authenticity', but does authenticity relate to movement as well? Another comment seems to identify this conflict. It mentioned character, which can be defined as 'the particular combination of qualities...that makes them different from others' (www1), making the tank individual, and involving both tangible and intangible aspects to tie into notions of historicity. However, the comment went on to say 'ruin the visualisation of the history', which suggests that this character is portrayed through what visitors can see, so involves the external parts of the tank and its movement. Authenticity, originality and historicity should all be considered and balanced when making the decision to continue running a tank or not.

#### Availability of parts

Availability of parts was mentioned by ten survey participants, identifying factors that included stopping running when the parts are no longer available, rare or are difficult to source. On balance, more of the participants who mentioned availability of parts said the point at which a tank should cease running is when parts are no longer available, as opposed to when parts are rare but still available. The comments concerning the availability of parts do not discuss the option of making new parts. It is not clear whether these responses focussed on historic parts, or whether new old stock is acceptable, and if they would agree that a tank should remain running if new parts can be made. This is a limitation of the survey about the notion of availability of parts that must be taken into account when deciding whether to stop running a tank.

Two participants stated that tanks should no longer be used when new external parts are needed. This shows a distinction between the internal and external. The internal parts include the running mechanisms and parts inside the tank. The external parts are replaced less often, so are more likely to be original and authentic. External parts, such as the armour, may also show battle damage, and so display the tank's history. In addition, visitors cannot see internal parts when the tank is moving around the arena. This raises the argument that, since the visitors do not see the interior, these parts could be replaced with new old stock or new parts for the tank to run more

efficiently and continue running for longer. Replacing interior parts would provide a better experience of a running tank that shows historic exterior parts that the audience can see. Although these comments only make up 2% of the factors mentioned by survey participants overall, they indicate a perceived differentiation between the external and internal parts.

The majority of comments on availability of parts focus on the point at which a tank should stop running as when parts are no longer available. Fewer comments stated that this point should be when parts are rare. The comments did not focus on the ability to make new parts. Two of the comments discussed the difference between the significance of retaining external parts as opposed to internal parts, and that replacing internal parts is seen as more acceptable than external replacements.

#### **Never**

Eight comments stated tanks should never stop running. This is a very-clear cut category. It shows that 9% of the visitors surveyed think tanks should continue to run, regardless of the number of repairs or replacement parts. These comments indicate a portion of the survey participants, and therefore visitors to The Tank Museum, think the running of a tank gives it its significance, and this is more important than consideration of historicity of parts. This is not to say that historicity is to be ignored completely; the historicity and aura of the tank may still be of importance to these participants. But by continuing to run the tanks regardless, the historicity of the tank as a whole is shown, rather than the historicity of its parts preserved. This therefore considers the experience of overall tank fulfilling its intended purpose instead of focusing on original parts.

#### **When parts other than the running mechanisms are at risk of damage**

Seven people mentioned parts other than the running mechanism. This includes five comments concerning the external parts of the tank. Three of these consider the risk of external damage and suggest stopping the tank before this damage occurs, whilst two state that the tank should stop running when new external parts are needed. Thus, a slightly higher number of people suggest that the risk should be found rather than simply stopping the tank when damage is already done. This can be found through risk assessments and conservation plans.

One comment specifically said ‘if it threatens the rest of the tank besides the running gear.’ This shows an acceptance of the need to repair and replace the running parts of a tank, as these are the parts that wear through use. It also suggests that the significance of running parts is in their operation, whilst the significance of non-running parts may be in their historicity. Thus, parts that will need to be replaced through use can be replaced, and parts that are more robust during running, such as the exterior, should not. The point at which a tank should stop running, according to this survey respondent as well as the other six comments, should be when the external parts are damaged or at risk of damage.

Overall, visitors expect different lifetime lengths for external parts and internal parts. It appears to be more acceptable to replace running parts as these are the parts that wear, and so are more likely to have already been replaced in the tank’s lifetime. Any damage on the exterior may show the tank’s history. The exterior is what visitors can see, so conveys the history of the vehicle, whereas it is more important for internal parts to work, so it is accepted by some survey participants that these can be replaced.

#### **When it is too dangerous to run**

Seven survey responses identified that tanks should no longer be run when it becomes unsafe or dangerous. How this response relates to the more heritage-based aspects of tanks is unclear but as a practical aspect that involves the safety of those working with the tanks as well as visitors, it is clearly an aspect that The Tank Museum already considers. In practice, it vetoes all other considerations of historicity, authenticity and risk of damage to the tank and must be part of the decision framework when deciding whether to stop running a tank.

#### **When the tank is rare or unique**

Seven responses mentioning the uniqueness or rarity of the tank can be put on a rough sliding scale of rarity. One response simply stated ‘number available’ as a defining point, three responses stated low numbers remain of a specific tank, one cited ‘really rare’ and two responses stated when it is the only one left or is unique. Overall, these answers indicate the need to preserve at least one type of the tank in static condition, which shows that the decision to run or stop running a tank needs to be periodically updated based on which other tanks are still preserved. This could be done

through updating the significance assessment of each tank on a relatively regular basis, and through research of other preserved tanks.

#### When the tank is old

Two people stated that tanks should cease running when they are too old. These vague comments did not state at which age a tank should stop running or whether age is associated with fragility, value, relevance and rarity. Tanks that are old may be perceived to be more fragile, and thus at greater risk of damage. Older tanks may also require more frequent maintenance and repair, impacting on their historicity as well as the resources of The Tank Museum. They may be seen to have greater historic and material value. In addition, the age of the tank may draw associations with uniqueness, and as discussed above, there appears to be an expectation that at least one type of each tank should remain in static condition. It may therefore be deemed more acceptable that replicas are made of older tanks.

Previous decision making by The Tank Museum may contribute towards visitor acceptance that tanks of a certain age should not run. The Tank Museum did not run any First World War tanks at Tankfest 2019 (www2). The First World War Mark IV tank at The Tank Museum was last run in the 1980s, and is now displayed in the museum in static condition (Fletcher *et al.* 2013,153). This decision was made due to the fact that, as of 2013, there were only seven examples of the Mark IV. In addition, the tank developed cracks in the armour plate and a track plate broke whilst running the tank at the museum (Fletcher *et al.* 2013,153). This decision focused on rarity and risk of damage, but also has associations with age. The Tank Museum's 1918 Mark V was last run in the 2000s and is now also in static condition. This confirms the idea that tanks should stop running when they reach a certain age.

#### When people stop caring

One person stated that tanks should not run 'when people stop caring'. This links to notions of museums in general. The Museums Association definition of a museum is:

'Museums enable people to explore collections for inspiration, learning and enjoyment. They are institutions that collect, safeguard and make accessible artefacts and specimens, which they hold in trust for society' (www3)

ICOM's current definition of a museum is:

'[Museums] hold artefacts and specimens in trust for society, safeguard diverse memories for future generations and guarantee equal rights and equal access to heritage for all people.' (www4).

Access for visitors is clearly at the forefront of a museum's purpose and therefore meaning, and so if people no longer wish an object to be displayed, then museums are no longer fulfilling their purpose. ICOM's definition places emphasis on future generations, which is an aspect expressed by the visitor survey comment. If people no longer care for an object being displayed in a particular way, museums do not enable collections to be inspiring, educational and enjoyable. There is onus on the museum to ensure collections are still relevant, accessible and interesting, so that visitors continue to care about them. Thus, although only one person commented about this aspect of museums, it raises important considerations about the overall purpose of a museum. By running tanks during an event day, it can be argued that visitors will continue to care about these tanks, thus aiding efforts to preserve them.

#### **9.8. Implications for decision-making at The Tank Museum**

Unsurprisingly, the study of visitors to The Tank Museum during Tankfest demonstrated a strong visitor preference for the prioritisation of running tanks. Visitor enjoyment was shown to be heavily focused on engagement with tangible and intangible aspects of the vehicles, including the sounds, smells, movement and demonstration of driver/operator skills and the knowledge of the commentators to place the tanks in the context of their operational history. This is seen to enhance visitor engagement with the tanks and the impact of the educational experience.

Visitors accept that the case for running historic tanks is intimately connected to concepts of significance and that there can be no one-size-fits-all approach. There is a clear understanding that each tank should be considered individually when decisions are being made to run or display in static condition and that this decision should account for the significance of each tank and the practicalities of restoring it to running order. The significance of some tanks, for example those that are particularly rare or unique, is acknowledged to preclude their running.

The evidence from this survey supports decisions by The Tank Museum to repair and replace parts to ensure historic tanks continue to run. Despite the desire to see working tanks, there is an acknowledged limit to the running of any tank and visitors accept that end of running life decisions will be made for a range of reasons including the pragmatic (cost, safety, unavailability of parts) and ethical (changes in significance, concerns around originality e.g., preponderance of replacements parts).

Surveying visitors to an event day focused on running vehicles captures the views of an audience with a predicted bias towards maintaining tanks in working condition. Are these views shared with visitors to The Tank Museum on non-event days? The second study explores this.

## 10. Study of The Tank Museum Visitors to Non-Event Days

### 10.1. Introduction

A second, online version of the questionnaire was carried out to find opinions of running tanks from visitors who have visited on non-event days. Through carrying out this survey, and subsequently comparing the results with the 2019 Tankfest survey, the reliability of the 2019 Tankfest survey can be explored in addition to finding a wider range of visitor opinions.

### 10.2. Methodology

It was initially intended that the questionnaire would be carried out in person on a non-event day at The Tank Museum. However, due to the Covid-19 pandemic, it was decided that the survey should be carried out online. The use of online surveys can target a greater portion of users than any one day at The Tank Museum, so can provide an opportunity for greater access to information on visitor opinion (Benington *et al.* 2010,14). The questionnaire was carried out using Microsoft Forms as it allows for a large number of results to be collected and data to be easily downloaded onto an Excel spreadsheet. Analysis was also carried out on the Excel spreadsheet.

The same questions asked in the 2019 Tankfest study were asked in this questionnaire to allow for comparisons (Appendix E). An additional question was added to the online survey to ensure the appropriate section of the audience was targeted; those who have visited The Tank Museum on non-event days. This question stated 'have you visited The Tank Museum on a non-event day in the past two years?'. This ensured people who have visited on non-event days are selected, and that they have recent memories of visiting. It may also allow for comparison of the significant aspects recalled from memory in this survey, compared to the factors deemed valuable on the day of the event as found through the 2019 Tankfest survey. Although this is marked as question 1 on the online survey, it will be stated as a screening question in this discussion. This means that references to question 1 on the online survey, the first question eliciting visitor opinion, will be the same question as question 1 from the 2019 Tankfest survey to allow for easier comparison of results.

A link to the survey was sent to The Tank Museum email subscribers as part of a Tank Times monthly newsletter email on the 5<sup>th</sup> June 2020. The survey was online between the 5<sup>th</sup> June 2020 and 24<sup>th</sup> June 2020. In this time, a total of 939 responses were collected, 484 of which answered yes to the question 'have you visited The Tank Museum in the last 2 years', so were able to answer the rest of the questions. Therefore, the number of responses under analysis is 484. This offers a very viable dataset for percentage analysis.

### 10.3. Results and Discussion Question 1: Sound and movement add greatly to the understanding and enjoyment of tanks

As with the 2019 Tankfest survey, the first question was presented as a statement. Respondents answered on a Likert scale (Figure 62).

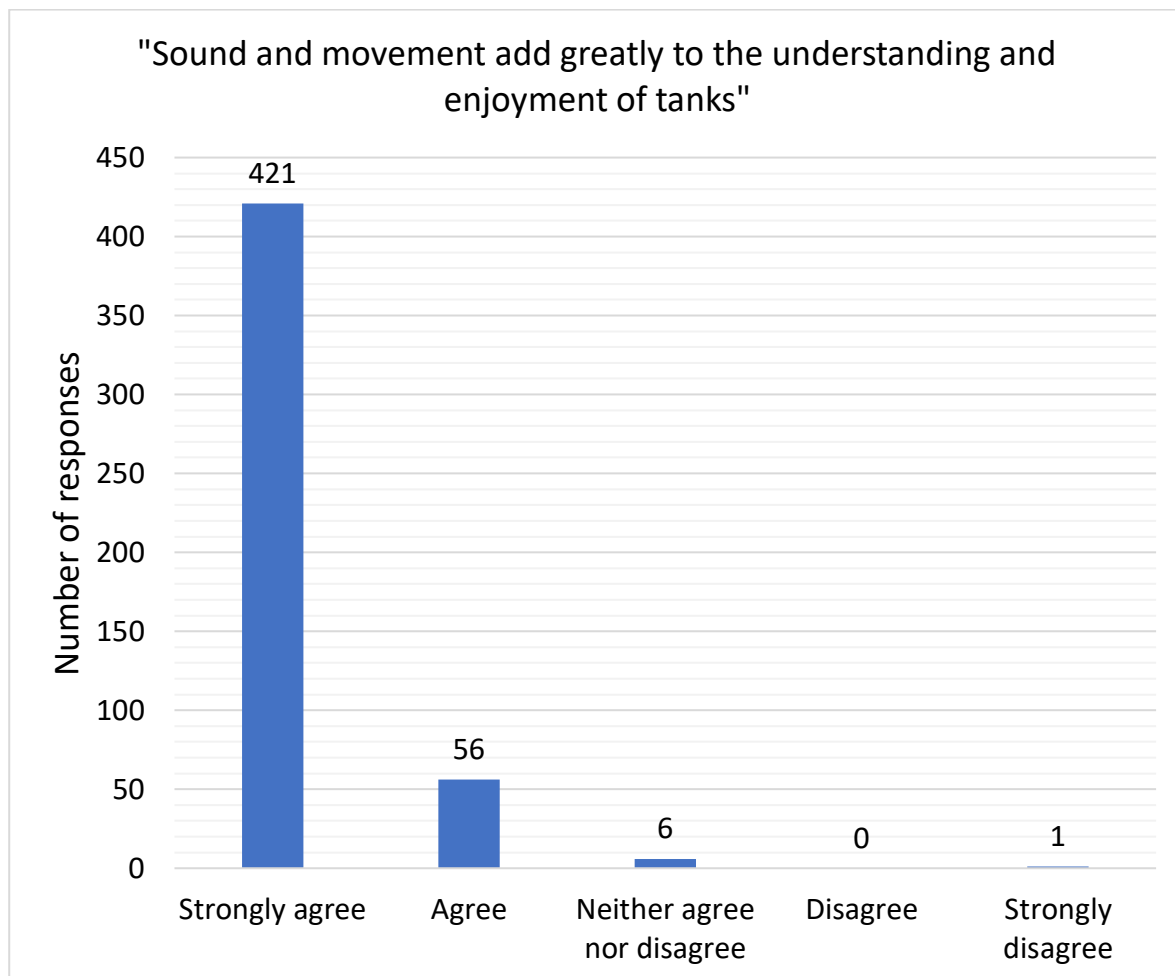


Figure 62. Bar chart showing results of the question 'sound and movement add greatly to the understanding and enjoyment of tanks'



Overall, the majority of respondents strongly agreed with the statement 'sound and movement add greatly to the understanding and enjoyment of tanks'. A total of 98.6% of responses either strongly agreed or agreed with the statement. 1.2% of respondents neither agreed nor disagreed with the statement, while 0.2% strongly disagreed. This shows that, whilst one person answered that sound and movement does not add greatly to the understanding and enjoyment of tanks, an overwhelming majority of responses agreed with the statement. It can be concluded that visitor opinion of non-event days is that sound and movement add greatly to the understanding and enjoyment of tanks.

#### 10.4. Results and Discussion Question 2: Are there any other features of a running tank that are important?

The second question asked participants if aspects other than sound and movement are important for a running tank. This question was optional, so not every respondent commented. Comments that did not mention any features other than sound or movement were discounted from the analysis. This resulted in a total of 339 responses. Each feature mentioned in the comments were counted as one factor with 560 factors being counted from the 339 responses. The comments were grouped into categories, then further grouped into seven main themes (Figure 63). Under the logic of inductive thematic analysis, sub-categories should be used to create main themes which are not pre-determined. In practice, although the comments covered a wider range of initial themes than those mentioned in the 2019 Tankfest survey, only one new main theme differed from those of the 2019 Tankfest study; that of considerations for future generations.

One impression of respondent comments that stands out is the depth of emotion they convey regarding what operational tanks are expected to deliver and the range these emotions cover. In themselves, these emotions are testimony for what is absent when tanks are static, while they also evidence the human need to convert perception of what tanks are like when moving into a reality. The outcome of experiencing the reality will confirm or modify these perceptions and, as a result, create new emotive feelings that may include awe, excitement and disappointment, according to how perception transfers to reality. When considered as a linkage, this

identifies what is absent when tanks are static. Do visitors viewing static vehicles leave feeling loss because they cannot experience the tank moving? If so, this seems to run contrary to the function of museums for the public. The evidence to support these suggestions is reported in this chapter.

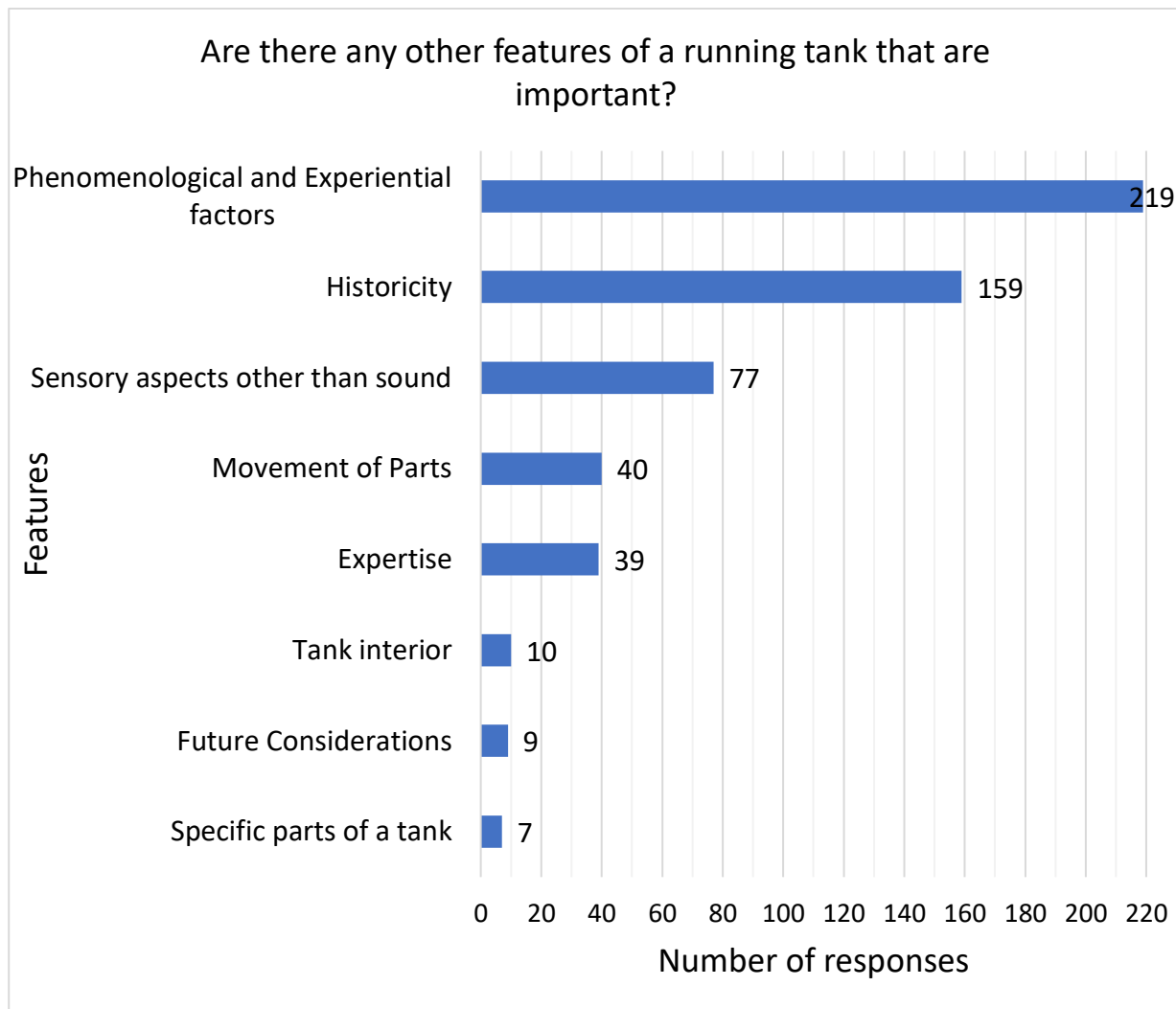


Figure 63. Bar chart showing results of the question 'Are there any other features of a running tank that are important?'

### Phenomenological and Experiential Factors

Phenomenological and Experiential factors were mentioned 219 times (Table 21) which forms 39% of the total number of comments. This was the most mentioned theme, indicating the importance of the phenomenology and experience of running tanks. The paragraphs below discuss the sub-categories within this theme in more detail.

<b>Comment theme</b>	<b>No. comments</b>
Understanding of the power of the machines	44
Appreciation of how they move across the landscape	42
Impression of size	21
Understanding of speed	12
Brings the machines to life	11
Engaging for new audiences	10
Appearance	9
Dust, dirt or mud	8
Provides a complete experience	8
Excitement	8
Proximity	6
Interesting experience	6
Smoke	4
Understanding of physical impact	4
Memorable	4
Realistic	4
Appreciation of the design	2
Learning more than can be learnt through text	2
Seeing the tank in detail	2
The fact it's running	2
Setting and atmosphere	1
A view of the complete display	1
Understanding of tactical potential	1
Understanding how tanks target	1
How the vehicles accelerate	1
How the vehicles brake	1
Brings back memories of own experiences	1
Range of vehicles	1
Fun	1
Unique experience	1
<b>Total</b>	<b>219</b>

*Table 21. Table showing sub-categories of phenomenological and experiential factors mentioned by respondents in the 2020 online survey.*

## Understanding of the power of the machines

The greatest number of comments under the phenomenological and experiential theme constituted of comments discussing how running tanks contribute to an understanding of the power of the machines. These 44 comments referred to the physical and psychological power of tanks. The majority of these comments discussed the importance of gaining an understanding of the psychological or physical power of tanks in order to comprehend their impact in warfare.

One comment clearly referred to the physical power of tanks. The respondent suggested that they would like 'a main battle tank crushing a car demonstration'. This suggestion would show the physical capabilities of the tank. Comments such as this indicate a desire to see the physical might of a tank demonstrated in Tanks in Action displays.

Several comments referred to the psychological impact of moving tanks. Eight comments mentioned that moving tanks convey fear, menace, and a person's comparative defencelessness. One such comment stated 'running tanks demonstrate one of their major assets- their power and your vulnerability in front of them'. Comments such as this convey how running tanks can enable audiences to gain a greater understanding of a tank's ability to project power. This is one of the fundamental purposes of a tank and aligns with reports of tanks in contemporary literature (see section 5.6 ).

Five comments mentioned shock and awe. The phrase originates in the 1996 publication *Shock and Awe* (Ullman *et al.* 1996). Shock and Awe 'was about affecting, influencing and controlling will and perception' (Ullman 2010,80). Shock was used in warfare to quickly overwhelm, whilst awe created long-lasting impressions of an army's abilities (Ullman 2010,81). Thus, shock and awe is a psychological strategy in warfare. One comment stated 'to convey the idea of shock action and decisiveness inherent in Armor operations a running, operational vehicle is imperative'. Comments discussing shock and awe indicate how such strategies can be clearly demonstrated and understood through running tanks.

Out of the comments discussing power, 37 stated how the power of a tank impacts an individual's understanding of tanks or warfare. One wrote 'the sound and

awesome power of these vehicles conveys more about the impact and dominance on the battlefield than the static specimens could every convey'. Another wrote 'only a true sense of the power and capabilities can be felt during 'running', whilst one comment stated 'you can get a feel of the power...of the tank, unlike if it were static, it then becomes an object'. The discussion of static tanks as objects compared to running tanks as conveyors of power portrays how tanks can gain value through running. These comments show the importance of tank displays in demonstrating the impact of tanks upon people and their understanding of a tank's power and capabilities.

Through understanding the power of the machines, four comments specifically stated that this resulted in a greater understanding of the reactions of infantry soldiers who came against tanks. One wrote 'fortunately you can only imagine the feelings of the men who have had to face them'. Another respondent wrote 'it's only through seeing tanks running that the onlooker can start to appreciate a small fraction of what it must be like to see one on a battlefield regardless of whether it's 'friendly', or part of the enemy forces'. None of these responses write that experiencing moving tanks gives a full understanding of warfare, and it certainly cannot be claimed that running tank experiences give an experience of war. This is not the intended purpose of tank displays, nor would one want it to be. Yet, by running tanks, some sense of the impact of a tank can be experienced and understood. Through this, a greater understanding of the social history of tank warfare can be found.

When using thematic analysis, it must be considered that themes are not always mentioned individually; some link to others, and are used to argue and explain others. Within the 44 mentions of how running vehicles show the power of machines, 11 mentioned sound, 4 mentioned sight, 4 mentioned the ground shaking or vibrating, and 3 mentioned smell. This shows how power is demonstrated through sensory aspects, therefore factors should not be considered solely in isolation.

#### **Appreciation of how they move across the landscape**

There were 42 mentions of how running tanks enable an appreciation of how tanks move across the landscape. This includes the phenomenological aspects of how a tank is situated within the landscape, and how people experience tanks moving in the landscape. Thirty-three comments mentioned that running tanks enable visitors to see how a tank moved. These mentions include a comment stating 'the surprise that these

enormous, heavy pieces of equipment can actually be quite fast and manoeuvrable [sic]. Static displays give quite the opposite'. The comment suggests that static displays hinder an understanding of tank movement and do not enable visitors to appreciate how tanks move. Another comment notes how seeing a tank moving across the landscape 'gives a better understanding of tanks. Also, you get an idea of what it might be like on the battlefield'. This again indicates the importance respondents placed on how moving tanks show physical aspects of warfare. One comment stated 'to see them outside shows what they would look like in there [sic] natural environment [sic], and what they look like from a distance'. The mention of distance is significant, as the tanks cannot be seen within The Tank Museum from a distance due to space limitations. Seeing a tank from a distance may provide a greater understanding of experiencing a tank in warfare. Moving tanks give viewers a greater understanding of how tank warfare plays out, and how manoeuvrable tanks are, which may appear to be at odds with impressions of a static display. By providing a more phenomenologically-grounded experience, running displays enable visitors to appreciate the purpose of a tank.

#### Impression of size

A total of 20 comments mentioned the size or scale of tanks. Six of these also mentioned the impression of power, as discussed above. This indicates that the size has associations with conveying impression of power in moving displays. Other comments associate the impression of size to the tank's impact, such as one which states 'to fully appreciate the sheer size and presence that such vehicles can bring onto a battlefield'. This shows how running tanks can enable visitors to understand battlefield conditions. Running displays are therefore valuable educational tools. One comment stated 'gives idea of scale, impact etc - very emotive experience' which demonstrates the link between size, which is more comprehensible when the tank is moving in the landscape, and the emotive impact of a moving tank. Mentions of scale and size reiterate the importance of experiencing a running tank within the landscape and how this impacts upon the emotions and understanding of viewers.

#### Understanding of speed

Thirteen comments mentioned how running tanks enable viewers to gain a greater understanding of speed. The term 'understanding of speed' refers to rate of

travel, rather than solely how fast a tank can travel. In total, 12 comments mentioned speed, and 2 mentioned slowness. For example, one comment stated 'The whole experience of seeing tanks is the noise and the speed, or lack of'. Another stated 'to show how slow but powerful they are'. All the comments describe how seeing a tank moving impacts upon an understanding of the tank. One example of this is a comment stating 'the historical context of the vehicle and how it moved and appears when moving can be better understood when the vehicle is in motion. It is one thing to be told a certain tank had a certain speed, but seeing it at that speed can help the viewer visualise the reality'. This conveys how the speed of a tank cannot be fully understood through static exhibits. It also shows that the history of a vehicle can be conveyed through movement.

### **Brings the machines to life**

A total of 11 comments mentioned how running brings the machines to life. As discussed in the Object Lifetimes section of the literature review, some conservation literature states that objects do not live or die (Taylor *et al.* 2008), but gain and lose different types of value. This suggests that focus should move from the idea of a living object to a purely values-based discussion. However, the number of people who have commented on the idea of bringing tanks to life through running indicates that the use of life and death discourse when discussing heritage objects is adopted by the public, so is a useful way of describing and communicating values, particularly intangible values.

Several of the comments reveal interesting aspects of the discussion around living and dead objects. One comment stated 'a running tank brings it to life. not just a thing. comes alive. living history is something to treasure and hold. the day we just let things die (static only) we lose everything'. This comment goes on to say that this is 'not fair on generations to come'. By running tanks, it ensures they and their associated histories are not 'dead' and forgotten. Another comment states 'like steam engines - just not the same if dead and cold'. This associates the idea of a hot or working engine with giving the object life. Another comment states 'tanks (and aeroplanes for that matter) are dead things sitting in museums like dinosaur bones in the natural history. Running tanks are alive and appear as they did in their day. Running tanks give the most accurate representation of how they appeared when

used'. By likening static tanks to dinosaur bones, it is clear that the respondent feels aspects of the tank's purpose and working history are lost in static display. This comment also discusses how running tanks shows a more 'accurate representation' of the tank, so shows the tank's history, purpose, and impact as it was designed to be shown. Running a tank is its original purpose, so by continuing to run tanks, this original purpose can continue to be fulfilled. Thus, the comments discussing how running tanks brings the objects to life use analogies such as steam engines and dinosaur bones to indicate the value in the intangible aspects of running display that elevates the tank above being 'just an object'. Together these respondents offer a powerful range of emotive comments that aptly demonstrate why tanks should be operational.

### Engaging for new audiences

Ten comments discussed how running tank displays are engaging for new audiences. Out of these comments, six mentioned young people, two mentioned both adults and children, and one comment mentioned non-enthusiasts. Comments focused on how running displays can help new audiences to understand the role of tanks, such as 'took the kids to an event a few years ago and they said it was only when they saw them running that they understood their effect in wartime'. Running tanks enable new audiences to understand certain aspects of history that are not adequately conveyed through static exhibits. Another comment stated 'try explaining to a child how a tracked vehicle turns & you've got a task on your hands; let him/her see how it happens and it's a memory for life'. In addition to being engaging at the time of viewing the display, this comment describes how tank displays can provide long-lasting memories. The effect of engaging new audiences has been stated within the comments as drawing 'the interest of children into engineering'. This shows how tank displays can change lives through engaging curiosity to enable the creation of new interests. This is in accordance with the Museum Association's vision that museums enhance wellbeing, create better places, and inspire people (MA 2013). Another comment states 'it provides inspiration for the younger generation which then inspire them into the preservation of our national history, as well as providing learning and reference for works on history'. By inspiring new audiences, people are also inspired to preserve history. This is reflected in English Heritage's 'virtuous circle of conservation', which states that by enabling people to enjoy heritage, people will greater value that



heritage and give them a reason to care for it (English Heritage 2005,4; section 2.1.3) Thus, these comments reflect on the importance of running tank displays in engaging new audiences, therefore inspiring learning and the future care of heritage collections.

#### Appearance

The visual impact of movement was mentioned nine times. Two of these comments mentioned condition, with one stating 'it needs to look good'. This indicates a wish to see tanks in good working condition. One comment stated 'the aesthetic beauty of the early tanks [sic] to the modern are a joy to behold, they emanate power and even the silhouette of one is a beauty on its [sic] own'. It could be argued that this demonstrates object fetishism, and leans towards dark tourism which should not be promoted. This comment illustrates the ethical considerations required when deciding whether to run vehicles. Other comments discuss the visual impact of tanks in motion when commenting on the value of moving tanks. This suggests that the visual experience is important in running displays.

#### Dust, dirt or mud

There were eight mentions of dust, dirt or mud. One comment stated 'how it affects the tank, how the tracks operate in differing conditions'. This highlights the importance of seeing tanks in different weather conditions, which can provide visitors with a greater understanding of how tanks operated in different battles. This gives an insight into the history of individual events, as well as conditions for soldiers.

#### Provides a complete experience

Eight comments discussed the whole experience of running tank displays. This included four comments that specifically mentioned the importance of multiple senses in creating the complete experience. For example, one response stated 'multiple sensory input provides more interaction and more memorable visits plus they engage more'. The mention of interaction and engagement is significant, as it shows how visitors feel involved with running displays due to multi-sensory aspects. As the comment states, the stimulation of several senses results in a more memorable experience, as discussed in the Multimodal Sensory Perception section (5.3.4). Another stated 'it provides a complete experience, visual, audible - something even the best static displays cannot do'. This indicates the value of running displays in providing

multi-sensory experiences. Therefore, the whole experience, including sensory aspects, should be considered when forming conservation decisions.

#### Excitement

Excitement was also mentioned eight times. This again contributes to engagement, with one comment stating 'seeing a machine in action increases interest, excitement and engagement rather than solely observing static museum pieces'. Another comment stated that running displays 'makes it far more exciting for visitors and should attract more'. The emotional aspects of running tanks in creating excitement contributes to the engagement with the overall experience.

#### Proximity

Six comments discussed the importance of proximity to the running tank displays. This also contributes to the sense of engagement and interaction with tanks and associated history. One respondent wrote 'you can never get that intimate feeling with a static, immobile object'. This indicates that it is not merely the fact that tanks are close to viewers, which can be experienced in static museum exhibits, but that the tanks are moving.

#### Interesting experience

There were six comments that discussed how running tank displays are an interesting experience. One comment stated 'if working vehicles were not present at events, especially, then there would be less interest in the public and enthusiasts to attend them, with reduced income resulting from them'. This highlights the importance of running vehicle displays in creating engagement and subsequent income, which can be used by the museum to care for the collection. Economic reasons must also be considered when deciding conservation routes.

#### Smoke

Four respondents commented on smoke as part of the experience. This included mentions of smoke produced by tanks for concealment. One respondent wrote 'smoke elements allow a greater understanding of how they would have appeared in combat. Understanding issues specific to certain tanks operation'. Thus, smoke shows tactical aspects of certain tanks in motion, and gives viewers an insight into tank operation in warfare.

### Understanding of physical impact

Four comments stated that running tanks gives viewers a better understanding of the physical impact of tanks. This included one comment on how it is 'hard to imagine the physical... impact with purely static exhibits', suggesting moving tanks enable viewers to understand their physical impact in warfare, which can be educational in showing aspects of history.

### Memorable

As the survey was online between the 5<sup>th</sup> June 2020 and 24<sup>th</sup> June 2020, and The Tank Museum had been closed from the 20<sup>th</sup> March 2020 due to the Covid-19, respondents commented with factors they remembered from previous running displays and experiences at The Tank Museum, other museums and online. This means that all the factors recounted are memories. But this category looked at those who specifically stated that the experience in itself is memorable. Four comments mentioned that the experience is memorable. One comment stated 'the smell of the hot oil and fuel is a huge part of the full tank experience, you remember it forever'. This reiterates the importance of sensory factors in the creation of memorable experiences.

### Realistic experience

Four comments mentioned the importance of perceiving the experience as realistic. One comment stated 'it's got to be in a realistic setting to feel good' while another stated 'make the experience as realistic as possible'. This demonstrates the value of authentic experiences in increasing enjoyability and engagement.

### Appreciation of the design

Two comments valued running tank displays in enabling greater appreciation of the design of tanks. One stated 'nearly everyone is familiar with motorcars, and seeing armoured vehicles actually move helps to appreciate the design, engineering and building process for the vehicles'. This shows the draw of seeing vehicles that are not usually seen in everyday life. This unique experience should therefore be considered when deciding whether to run tanks or display them in static condition.

### Learning more than can be learnt through text

Two respondents specifically stated that running tanks can be more educational than textual information. One wrote 'it helps to immerse yourself in the history and the story of the tank, seeing them move is a lot better than just having

static displays with an info board. you can read about a tank on the internet or in a book, it's another thing entirely to see and hear one moving in person'. This shows the value of running tanks as educational tools, providing a learning experience that informs viewers of the history of tanks in a way that cannot be achieved with static vehicle displays.

#### Seeing the tank in detail

Two comments mentioned the importance of seeing the tank in detail. One of these comments was a wish for further visual access to appreciate the details of tanks. This sub-category links to the sub-category of proximity, which discussed how people feel engaged with history through running vehicles. By viewing the tanks up close, more details can be seen.

#### The fact it's running

Two comments mentioned the fact that tanks are running as a value aspect. One stated 'the fact that it runs and therefore is not just a hulk is what's important'. This shows the value placed on preserving the purpose and function of the tank. It reiterates the notion that running a tank enables it to gain value that cannot be demonstrated through static display.

#### Setting and atmosphere

One respondent mentioned the importance of setting in creating an impactful experience. This factor is associated with comments on the whole experience, placing value on the overall experience. This includes the sensory experience and atmosphere of an event day.

#### A view of the complete display

One comment mentioned having 'a clear view of the complete display'. This shows a wish to be able to fully engage with the whole running display. The Tank Museum have previously received suggestions to improve arena viewing (The Tank Museum 2017). This factor should be considered when organising running displays.

#### Understanding of tactical potential

One comment stated that running displays enable an appreciation of tactical potential. This gives insights into how war plays out. It shows that the movement and associated sensory aspects of tanks impact upon warfare and tactics, and so by showing tanks moving, visitors can understand this impact.

#### Understanding how tanks target

One comment specifically mentioned the importance of running tanks in enabling an understanding of how tanks target. This again can provide a greater understanding of the role and impact of tanks in warfare.

#### How the vehicles accelerate

Another comment mentioned the importance of learning how tanks accelerate. They stated 'acceleration demonstrated on flat or uphill'. This links to the comments that state running vehicles give an appreciation of how they move across the landscape. Acceleration can enable audiences to understand how tanks respond to different terrains and conditions.

#### How the vehicles brake

One comment stated the value of understanding how the vehicles brake. This again links to the comments under the appreciation of how tanks move across the landscape sub-category. This comment mentioned how 'some harsh braking tips some tanks considerably... all gives better impression of how the vehicle would operate in wartime'. Thus, this furthers the argument that running tanks give audiences an understanding of historic warfare.

#### Brings back memories of own experiences

One comment mentioned that watching running tanks 'brought back memories for my husband, of his army days'. This reiterates the importance in running tank displays in impacting upon memories; as well as creating memories, they can bring memories to the fore. This is significant in ensuring stories and histories are remembered.

#### Range of vehicles

One comment stated 'range of vehicles each day'. By showing a range of vehicles, a range of interests can be met and a variety of audiences catered for.

#### Fun

One comment stated 'also there [sic] fun!'. This comment is similar to comments under the theme of excitement, showing that running tank displays are enjoyable.

## Unique experience

One comment stated ‘unlikely to ever see a tank running outside of the museum’. This demonstrates the unique experience that running displays at The Tank Museum provide, which in turn adds value to the experience and draws in visitors.

## Conclusion

Phenomenological and experiential factors form the greatest proportion of responses. This includes 44 comments concerning the psychological and physical power of tanks, which can be portrayed in an impactful manner through running. 42 comments focus on the importance of running tanks in demonstrating how tanks interact with and move across the landscape. Other comments focus on how running tanks enable an understanding of other sensory and functional purposes, which can incite engagement and interest. Through these aspects, running tanks can create memorable, educational and inspiring experiences.

## Historicity

Historicity was the second most mentioned theme, with a total of 156 comments (Figure 63). This is 28% of the overall responses. The sub-categories within this theme (Table 22) are discussed below.

Comment Theme	Number of Comments
Understanding of human experiences	31
Shows history	22
Understanding the impact of tanks in war	21
Showing a tank's intended use	15
Comparison of different tanks	15
Authenticity	13
Understanding of engineering	11
Brings history to life	9
Shows advances in technology	7
Remembrance	6
The story behind the tank	4
Period costume	2

Historical accuracy	2
Relevance	1
<b>Total</b>	<b>159</b>

Table 22. Table showing sub-categories of historicity mentioned by respondents in the 2020 online survey.

### Understanding of human experiences

31 of the comments within the theme of historicity fit within the sub-category 'understanding of human experiences'. As this was the highest sub-category within historicity, it shows the relative importance of running tanks in showing the human side of war. Emphasising the stories of the people who made tanks and fought alongside and in tanks ensures their stories are not lost (Figure 64). It is also valuable in ensuring history is not sensationalised or at risk of dark tourism or inaccurate nostalgia (Pickering 2010,94; Hacker *et al.* 2013,58). The display of different stories ensures history is not homogenised into one uniform national history, and so enables for diversity (Winter 2013,36,37). By showing the stories of people, running tank displays can increase diversity and therefore engagement through being relevant and accessible to a wider audience.



Figure 64. Churchill tanks of 3rd Bn Scots Guards, 6th Guards Tank Brigade, with infantry of the 15th (Scottish) Division aboard, Normandy, July/August 1944. Source: [www1](http://www1).

Of these 31 comments discussing how running tanks enable an understanding of human experiences, 12 comments discussed the crew conditions inside a tank. Several

of the comments show empathy, such as one which states 'it also gave you a feel for how the poor crew must of [sic] felt while using them'. This discussion shows that, by seeing running tanks, viewers can gain an appreciation of crew conditions. Through creating authentic experiences, visitors can empathise with soldiers and further their understanding of the human side of warfare.

Another 12 comments stated that running tanks give a greater understanding of what it would be like to face a tank. As tank displays at The Tank Museum take the form of spectators watching running tanks within an arena, it enables viewers to see a tank when they themselves are not in an armoured vehicle. One comment states 'it's only through seeing tanks running that the onlooker can start to appreciate a small fraction of what it must be like to see one on a battle field regardless of whether it's 'friendly', or part of the enemy forces'. Again, gaining an understanding of the human experience is not the same as experiencing warfare, or what people who fought alongside tanks experienced. Instead, it enables visitors to understand conditions to a greater extent, and to gains some insight into the human aspects of tank warfare.

Ten comments discussed the general conditions of tank warfare, such as morale. Empathy is also mentioned within these comments, with one stating 'you appreciate the full effect of heavy armour and what it can do to morale when they are run'. This in turn enables a greater understanding of more general histories.

Therefore, moving tanks contribute to an understanding of the impact of tanks in war upon people. This includes an understanding of crew conditions and infantry conditions.

#### Shows history

A total of 22 comments mentioned how running tanks show history. 17 of these stated that running tanks inform viewers of context. This suggests running tanks do not merely show a vehicle in action, but can display individual stories of people and the tank, as well as more general histories. This reinforces the value of running machines in educating and preserving memories.

Three comments stated that running tanks maintain or preserve history. One comment stated that if tanks are not restored, then they are not cared for. This shows a link between restoration and preservation, as by failing to restore tanks 'we start



losing history'. The two other comments stated that running preserves and maintains history. This indicates a disparity between some visitor views and traditional conservation ethics, which argues that preservation is best done by keeping objects in static condition with minimal intervention. These comments indicate value placed on preserving history through continued running.

#### Understanding the impact of tanks in war

The value of running tanks in understanding the general impact of tanks in war was mentioned 21 times. This does not count specific impacts which are mentioned elsewhere under historicity, as this would mean that the comment would be counted twice within the general category of historicity. Nine of these comments focused on the importance of running tanks in understanding a tank's role in battle. Through this, running tanks enable a greater understanding of history.

One comment mentioned that, through experiencing running tanks, the capabilities of tanks are understood. This impacts upon perceptions of tank warfare. Another comment stated 'to understand the complexity of the logistics of armies and the limitations of the capabilities, myths if you like, of the tank'. This shows the importance of running tanks in ensuring myths are not passed off as facts, and tank warfare is not over-sensationalised with the risk of spreading inaccuracies. It enables history to be portrayed in an accurate and engaging manner.

#### Showing a tank's intended use

A total of 15 comments stated that running tanks demonstrate their purpose or intended use. This included 5 mentions of the value of the sensory aspects of tanks in fulfilling purpose. One such comment stated 'I believe there is huge historical value in seeing, hearing and feeling things as close as possible to the way they actually were'. Comments such as this indicate the importance in sensory experience and experiential authenticity. Five comments stated that tanks should not be inanimate objects. One comment stated 'they are built to run. If they don't, you may as well have a model / static display that isn't a "real" tank', whilst another stated 'tanks are on tracks .. designed to be moving .. otherwise it's artillery' and another 'it's what they are for, they are not just museum static displays'. These comments show the value placed on the ability of tanks to fulfil their original purpose of movement. They show that if a tank cannot move, then it is no longer seen as a tank. The meaning, purpose and

function of a tank can only be fulfilled when it is running. This is a critical point to note; that a museum exhibit has effectively lost its meaning is potentially a sign that the museum is not fulfilling its role in society. However, a counter argument is that there is a duty to preserve the past for the future. The obvious retort is what for, if the sensory experiences that relate to the function of an object can never be experienced, hence the object cannot be understood, despite the fact that the function is eminently deliverable? Later interrogation of cost and resource in this thesis indicates how this can be prevented, despite being desirable.

Four of the 15 comments stated that, by enabling a tank to run and fulfil its function, it enables visitors to understand tanks in more detail. This includes an understanding of people who served in wars, the real purpose of a tank, engineering history, sensory impacts and an understanding of the tank itself. Thus, ensuring tanks fulfil their original purpose in running can result in visitors gaining a greater understanding of historic aspects.

#### Comparison of different tanks

There were 15 comments concerning the importance of being able to compare different tanks. These comments included four comments on comparing tanks from different nations, and two comments on comparing tanks from different time periods. These comments indicate the value of tanks in being able to show international history, and the ability to compare tanks for improved insight into historic events. Another comment discussed the value in being able to compare different engine smells, again showing the importance of the senses in gaining a greater comprehension of historic tanks. By running several different tanks, comparisons and differences can be found across nations and time periods.

#### Authenticity

Authenticity is an interesting and emotive topic and was mentioned 13 times. Six of the comments discussed the authenticity of the tank's external appearance, including comments on the tank's colour and paint. One comment considered the authenticity of the whole tank. Some comments focused on individual aspects of the tank, with one discussing the authenticity of equipment, and another mentioning engine authenticity. The six comments on the tank exterior, when judged against the three comments concerning interior aspects and the whole tank, shows relative value

is placed on the exterior over the interior. This means it may be deemed more acceptable to make some changes to interior running mechanisms than it may be to change the exterior. This reinforces the concept of conveying a tank as a functional item, where emotional and visual impact override authenticity. Perhaps considering the concept that a visitor can be informed that the static tank they are viewing is wholly original internally, which is hidden from their view, versus the spectacle of a tank moving raises the question which provides the most emotive experience and leaves the greatest impact going forward. People want experiences they can pass onto other people.

There were five mentions of originality. Four of these stated that the tank should be as original as possible. This suggests there is some acceptable leeway for restoration or changes to ensure running continues, but that changes should be sympathetic and unnecessary changes avoided. The other comment stated 'original or near original engine'. This again indicates the respondent accepts some freedom in making changes, but the impact on originality should be carefully considered. The five comments that mentioned originality suggest that, while any changes should be necessary, some changes to originality are acceptable for the vehicle to be maintained in running condition.

#### Understanding of engineering

A total of 11 comments stated that running tanks help an understanding of engineering. This is an understanding of past engineering on historic vehicles, for both the visitors and those who restore and maintain vehicles. One comment stated 'static exhibits don't require the same knowledge about the engineering'. This may refer to the knowledge required by those who maintain and drive the vehicle. This was certainly seen in the case of the Tiger 131, which required research into its engineering before restoration to running order could take place (Fletcher *et al.* 2011,78). Crews and engineers also required extra training for the project (Fletcher *et al.* 2011,78). By researching and implementing this knowledge, it can then be passed onto visitors who consequently learn more about the tank than they would if it had been left in static condition. By restoring and maintaining tanks, information about the manufacture and engineering of the vehicles can be researched and displayed to visitors.

### Brings history to life

Nine comments stated that running historic vehicles brings history to life. This, like the 'brings the machines to life' sub-category of the phenomenological and experiential theme, contains comments where static tanks are compared to objects. For example, one comment states 'think of animal museum exhibits compare to a zoo'. Comments such as this indicate how static tanks are viewed as objects, and running tanks seen as working machines with a greater 'living' value.

### Shows advances in technology

Seven comments stated that running tanks show advances in technology. For example, one comment stated 'advances in technology can be visibly shown, stabilised barrels and suspension for example'. These advances can be described in text displays with static vehicles, but their impact on warfare can be understood to a far greater extent if they are moving.

### Remembrance

There were six comments that mentioned remembrance or commemoration. The survey took place in the month following the 75 year commemoration of VE Day on the 8<sup>th</sup> May. It cannot be determined if this had any impact on survey results, but it is important to consider that values change over time and are impacted by external events. Out of these six responses, five stated the importance of commemorating past events and people. Three mentioned the value of learning from history, with one stating "'Lest we forget". The importance of running these great war machines is simple. We as a species still fight wars and kill each other. If we forget the past we run the risk of failing the future generations who may make more positive decisions about war, so showing these machines in an active display is very important, in my humble opinion'. This shows the importance of running vehicles to remember past wars, which can impact upon future events and public opinions that influences those future events.

### The story behind the tank

Four responses stated that running tanks show the individual story behind each tank. This includes mentions of military service, the impact of functioning aspects of the tank on those who would have used it, and the overall history of an individual tank. Thus, moving tanks demonstrate their own histories, as well as more general histories as mentioned above.

### Period costume

Period costume was mentioned twice. This included one suggestion for tank crews to wear period clothing 'to give extra authenticity'. The comment reinforces the importance of ensuring the whole experience gives a greater understanding about historicity. However, only two people commented on this, so it does not appear to be widely wished for by the survey respondents.

### Historical accuracy

Historical accuracy was mentioned twice. This shows some visitor wish for history to be shown in a way that is deemed as true and objective as possible.

### Relevance

Relevance was mentioned once. This comment stated 'it's too easy to keep historic AFVs in a static condition so that eventually in generations to come their relevance to changing 20th Century warfare would be severely diminished'. This demonstrates a view that, by running tanks, their relevance is maintained, and so history is preserved.

### Conclusion

Historicity was mentioned 156 times, indicating the value placed in running historic vehicles, and the impact of aura. By running historic vehicles, comments show that the experience gives visitors a greater understanding of human experiences, the impact and purpose of tanks and the history behind the tanks. This ensures tanks continue to be relevant to changing audiences.

### Sensory Aspects other Than Sound

Sensory aspects other than sound were mentioned 77 times, forming 14% of the overall comments, with 5 sub-categories identified (Table 23). This includes comments on smell, vibration, temperature and bangs.

Comment Theme	Number of Comments
Smell	45
Vibrations under your feet	25
Temperature	3
Bangs and pyrotechnics	3

General sensory	1
<b>Total</b>	<b>77</b>

*Table 23. Table showing sub-categories of sensory aspects other than sound mentioned by respondents in the 2020 online survey.*

## Smell

Smell was stated 45 times as an important feature of running tanks. This is the greatest number of comments within any sub-category. The relatively high number of respondents that discussed smell indicates the importance of smell in running vehicle experiences. One comment stated ‘the smell of the hot oil and fuel is a huge part of the full tank experience, you remember it forever’. This shows the importance of smell as part of the experience, and how the smell of running vehicles makes an experience memorable. It has been established that sensory factors can impact memory, and this appears to support the view stated in comments such as this.

Other comments focused on the ability to distinguish between smells. For example, one wrote ‘many of the engines just smell different compared to modern engines’ while another stated ‘smell of running engines e.g., differences between running diesel engines vs running petrol engines’. These comments show that the smell of a running vehicle can add to an understanding of the vehicle and enable comparisons between the vehicles.

## Vibrations under your feet

There were a total of 25 mentions of the ground vibrating during running tank displays. One comment put ‘the viewer doesn’t know what it feels like when the ground shakes as it passes unless they experience it for themselves’. This shows the importance of running tank displays in providing experiences that cannot be done through static exhibits.

Many comments on vibration focused on the impact the ground vibrations can have. One stated ‘the ground trembling underneath your feet to give you an understanding of the fear tanks can represent’. This clearly shows that sensory aspects can have a strong emotive impact upon audiences. It also enables the audiences to gain a greater understanding of tank warfare, and the psychological effect of tanks.

Another comment stated 'the vibration through the ground makes the engineering aspects more enlightening'. This comment demonstrates the value of running tanks in giving visitors a greater understanding of how tanks function.

#### Temperature

Temperature was mentioned three times. One stated 'heat gives a better sense on [sic] just what it was like to serve in a tank in battle'. The temperature from the exhaust can give some sense of soldier conditions, therefore illuminating the past and for visitors.

#### Bangs and pyrotechnics

Bangs were also mentioned three times. One stated 'pyrotechnics always seem to add an extra dimension to any tank display'. Pyrotechnics can help improve the enjoyability and perceived 'realness' of running displays. By mimicking firepower, they can provide the audience with a greater understanding of warfare.

#### General sensory

One comment mentioned the multi-sensory experience without specifically stating senses. This comment stated 'multiple sensory input provides more interaction and more memorable visits plus they engage more'. This shows the value of multi-sensory experiences. While other comments mentioned a variety of senses, they were categorised under the specific senses stated. This reiterates the importance of multi-sensory experiences in creating engaging, impactful and memorable experiences.

#### Conclusion

Therefore, sensory factors were found to be an important feature of running tanks. This includes smell, vibrations underfoot, temperature, bangs and the impact of several senses together. Through analysing the comments, it was found that sensory factors can create memorable experiences, evoke emotion and educate audiences.

#### Movement of parts

There were 40 comments mentioning the importance of moving parts in running tanks (Figure 63). These comprised 7% of the total number of comments and were sub-divided to include the comments turret movement, fire power, movement of tracks, barrel movement, running gear, and functioning equipment (Table 24) which are discussed below.

Comment Theme	Number of Comments
Turret Movement	12
Fire power	13
Movement of tracks	6
Barrel movement	5
Running gear	2
Demonstrates equipment functioning	2
<b>Total</b>	<b>40</b>

*Table 24. Table showing sub-categories of movement of parts mentioned by respondents in the 2020 online survey.*

### Turret Movement

Turret movement was mentioned 12 times. This involved a comment stating that turret movement was important ‘to show what a vehicle would look like whilst operating on the battlefield’. During running displays at The Tank Museum, the turret is often rotated so the audience can understand some of the fear that tanks can portray in a menacing way. Turret movement can impact conceptions of how battles play out.

### Fire power

There were 13 mentions of firepower. These include mentions of firing blank rounds. One comment stated this would ‘make the experience as realistic as possible’. Another wrote ‘if gunfire were possible, that should also be carried out, to give a proper feeling of what the vehicle is for, and how it operates’. These comments show the importance placed on gun fire, and in turn the value placed in the ability of tanks performing their original purpose.

### Movement of tracks

Six responses mentioned movement of tracks. One comment wrote ‘until you see how the tracks work you don’t really understand a tank’. This again shows how seeing tanks in motion can provide a far greater understanding of how tanks work and their purpose.

### Barrel movement

Barrel movement was mentioned five times. This reiterates the discussion within the sub-categories of turret movement and firepower, that ‘all elements of a tank’s operation should be demonstrable’ for visitors to understand how a tank would



have appeared and functioned in battle. Another comment discussed the value in comparisons of these movements between different tanks in order to gain a greater understanding of warfare.

#### Running gear

Running gear was mentioned twice. This is a practical aspect; running gear must run if the tank is to move.

#### Demonstrates equipment functioning

There were two comments concerning the value of how running tanks demonstrate functioning equipment. These did not specify equipment, instead focusing on the importance of experiencing functioning equipment to gain a greater understanding of tanks and their wider historical impact.

#### Conclusion

In conclusion, 30 of the 40 comments on movement of parts focused on movement of the gun, turret and firepower. This high number of comments indicates the importance placed on firepower by respondents and the ability to show the purpose of a tank through motion. The other comments acknowledge practical aspects required to run a tank and further the argument that a running tank can demonstrate valuable aspects.

#### Expertise

Expertise was mentioned 39 times (Figure 63) representing 7% of the total number of comments. These comments focused on maintenance, skills and information for visitors (Table 25).

Comment Theme	Number of Comments
Maintenance of tanks	14
Commentary	11
Crew skills	5
Maintenance of skills	3
Crewmen	3
Supporting information	1
Reliability	1

Safety	1
<b>Total</b>	<b>39</b>

Table 25. Table showing sub-categories of expertise mentioned by respondents in the 2020 online survey.

### Maintenance of tanks

There were 14 comments discussing the importance of tank maintenance. This has been placed under the theme of expertise as maintenance requires the expertise of skilled professionals. Out of these 14 comments, eight stated the importance of running as a way of maintaining and preserving vehicles. This includes a comment stating ‘engines and vehicle[s] do not do well if kept static as water and rust can build. Movement is need[ed] in some systems to keep the oil moving and so keeping the system well looked after and free of rust, or seizure of parts’. It is certainly true that vehicles should be run in order to prevent deterioration of rubber seals, and decay due to antifreeze, oils and lubricants not being moved around systems. In this way, movement can actively help the preservation of tanks. The expertise needed to move such vehicles is required in order to maintain tanks. Another two comments stated the importance of well-maintained tanks to ensure they continue to run.

### Commentary

Commentary was mentioned 11 times. Seeing tanks moving in an arena is a powerful sensory experience, as shown by the comments in categories above. The addition of commentary enables these sensory experiences to be placed within historical contexts so the audience can gain a greater appreciation and understanding of the experiences. One comment that ‘they are mobile history lessons when you combine them with a commentary’ demonstrates their educational importance during tank displays. Through commentary, visitors can comprehend both the value of the tanks and an understanding of historical contexts.

### Crew skills

There were five mentions of crew skills. This includes mentions of the challenges of operating vehicles, being able to see the skill of drivers and seeing tanks being prepared to run. These all require crew skills, thus highlighting the importance of skilled personnel. It is also a practical consideration; without a trained crew, tanks cannot run.

### Maintenance of skills

Maintenance of skills was mentioned three times. This is a relatively low number compared to the amount of discussion on skills maintenance in conservation literature, suggesting that it is not seen as such an issue within the public sphere as it is from the perspective of heritage professionals. The comments that do mention maintenance of skills all state the importance of preserving skills through continued use. This shows an understanding that some of these skills are tacit knowledge, and so must be actively continued and passed down in order to prevent their loss.

### Crewmen

There were three comments regarding crewmen. This is a separate sub-category to crew skills as these comments did not specifically mention skills. Instead, they comment on 'the presence of the crew'. By having people crewing the tank, audiences can gain a greater understanding of how people interact in tanks. This in turn enables a greater understanding of the human experience, as discussed in greater detail above. Crewmen give a sense of perspective and add to the living history of a running tank display. They are integral to the display, and as a result show that tanks are not simply machines, but their purpose and values are formed by people.

### Supporting information

Supporting information was mentioned once. This comment stated 'supporting information that explains why the tank has been chosen to run and how the work of the museum balances the approach to running tanks with its approach to long-term preservation'. This comment indicates a wish to make the conservation decision process transparent to the public. This could be done through further public consultation on individual decisions to restore a tank to running order or to stop running a tank, as well as online and in-museum information about the process behind making decisions on the running of tanks. Making this information accessible will engage visitors in the process, and enable them to understand both the contextual information of the tank, and more about conservation at The Tank Museum. This, according to English Heritage's 'virtuous cycle of conservation', will in turn generate more value placed on collections by visitors, and thus result in greater emphasis on the care of such collections.

## Reliability and safety

Reliability was mentioned once, with the respondent writing 'Reliability [sic] is more important than sticking religiously to using original parts which might be rare, expensive, fragile and unreliable'. This shows a wish to replace unreliable or fragile parts with new parts in order to run the tank. It indicates value is placed on the running of the tank rather than the individual parts remaining in situ. Safety was mentioned once as a statement.

## Conclusion

The 39 mentions of expertise show a visitor value placed in the maintenance of tanks through running, the need for skilled members of staff to run tanks and for these skills to be passed on, and an acceptance that parts may need to be changed to ensure the tanks are reliable. These comments also focus on the importance of giving visitors information, both through commentary during running tank displays, and through being transparent to the public about conservation decisions.

## Tank Interior

The tank interior was mentioned 10 times, forming 2% of the overall responses but building the broad range of experiential factors. This included mentions of riding or sitting inside the tank, and seeing the tank interior.

## Riding or sitting inside the tank

The six mentions of riding or sitting inside a tank indicate wish for greater access to running tanks. Four comments discussed wanting to ride inside a moving tank. The other two comments focused on the different experience of being inside a tank compared to viewing from the outside. One stated 'to be inside a tank or APC as a soldier with no view of the outside world, just sitting in the gloom with 6 other soldiers as you are thrown around going across country and surrounded by a wall of sound is quite an experience. You are completely unaware of your surroundings or how far you have travelled'. This shows how experiencing a running tank from the inside is a very different sensory experience from outside. These experiences should also be considered when assessing the value of tanks, although they will not be accessible to large audiences. Yet they do add to the value and significance of a moving tank and reinforce the notion of visitors wanting authentic experiences.

### Seeing the tank interior

There were only four mentions of seeing the tank interior (Figure 63; Table 26).

Comment Theme	Number of Comments
Riding or sitting inside the tank	6
Seeing the tank interior	4
<b>Total</b>	<b>10</b>

*Table 26. Table showing sub-categories of the theme 'Tank Interior' mentioned by respondents in the 2020 online survey.*

One respondent wrote 'find ways to get people into more tanks, even static ones', indicating a visitor wish for museum experiences that have greater access to collections. It gives this suggestion for both static and running tanks. This comment also stated 'don't cut extra holes in the tanks for handle more people', so shows a wish to experience the tank in a realistic manner. This reinforces the notion of visitor wishes for authentic experiences.

### Conclusion

In conclusion, mentions of the tank interior indicate a visitor wish for greater accessibility. They also show how visitor value is placed on authentic experiences.

### Future Considerations

Future considerations were mentioned nine times. These comments make up 2% of the overall comments. There were no sub-categories within this category. Six of these comments specifically mentioned future generations, showing the value placed on preserving running tanks for the future. The other three comments discussed general preservation and maintenance of preservation and maintenance of running tanks. These nine comments show a visitor expectation that future audiences should also be able to see running tanks. Conservation decisions should therefore take this into account.

### Specific parts of a tank

There were seven mentions of specific parts of a tank (Figure 63; Table 27). This is a separate category to movement of parts, as the seven comments did not state movement, simply stating the importance of certain parts. This included two mentions of weaponry and two mentions of the turret. This reiterates the value placed on parts

that fulfil the purpose of a tank, particularly those involved in firepower. The exhaust was mentioned once, as was the sighting system, and camouflage. These are all factors that make up a running tank, and so indicate the importance of ensuring running vehicles effectively convey their original purpose to audiences to create authentic experiences.

Comment Theme	Number of Comments
Weaponry	2
Turret	2
Exhaust	1
Sighting system	1
Camouflage	1
<b>Total</b>	<b>7</b>

*Table 27. Table showing sub-categories of the theme 'specific parts of a tank' mentioned by respondents in the 2020 online survey.*

#### 10.5. Results and Discussion Question 3: 'Running tanks need repairs and replacement parts. It is better for a tank to be running with new parts, than remain original and immobile.'

This question received 484 answers as, unlike the questions with comments, it was not optional to answer (Figure 65). The question initially stated the need for running tanks to have repairs replacement parts as a result of running. The statement gave two routes for decision making which would produce outputs of either running or static tanks. As Figure 65 shows, the majority of responses (84%) agreed that it is better for a tank to be running with new parts than remain original and immobile, leaving a minority of only 3.7% disagreeing.

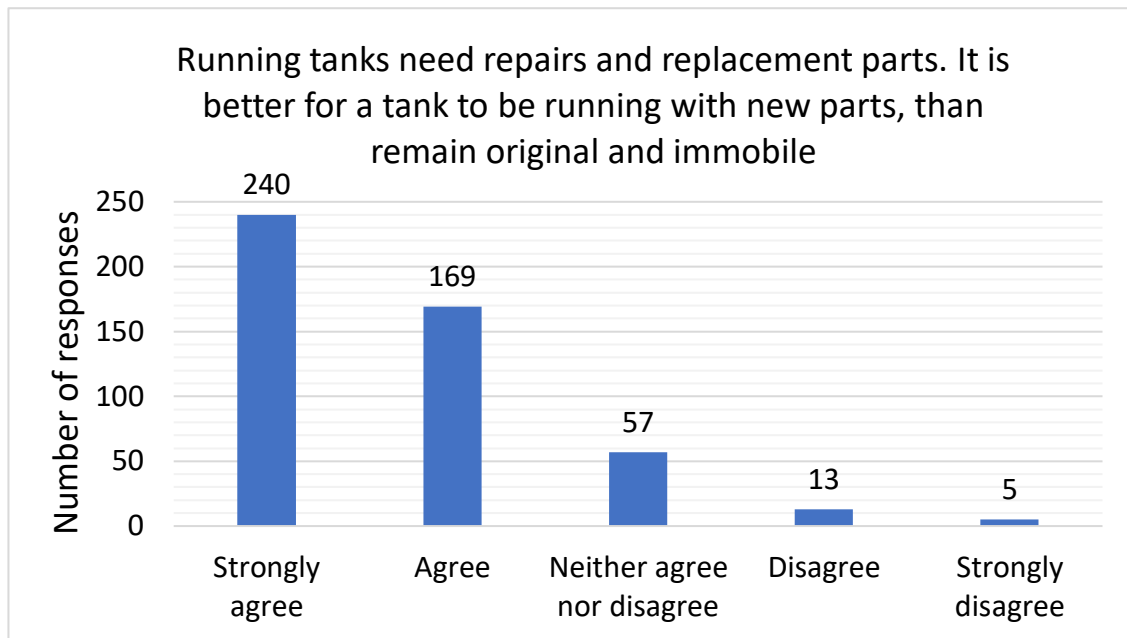


Figure 65. Bar chart showing responses to the statement 'it is better for a tank to be running with new parts, than remain original and immobile'

#### 10.6. Results and Discussion Question 4: 'Tanks of significant historic importance should be kept static, so their parts can be preserved for longer'

Question 4 was answered using a Likert scale (Figure 66). This question might be seen as a provocative or emotive question, as it asked for visitor perceptions of the importance of historic significance in forming decisions on the display of historic tanks. This may explain why the results for this question are less unanimous than those seen in questions 1 and 3; who wants to be seen to effectively say historic importance does not matter? The largest percentage of participants in one category, 26.7%, answered neither agree nor disagree, indicating that participants did not want to make an overall decision based on a general statement (Figure 66). This reiterates the importance of looking at each decision on case-by-case basis and shows that, overall, slightly more participants agree that tanks of significant historic importance should be kept static in order to preserve their parts. Whether the same respondents would agree to never see such tanks in motion would be an interesting question to pose.

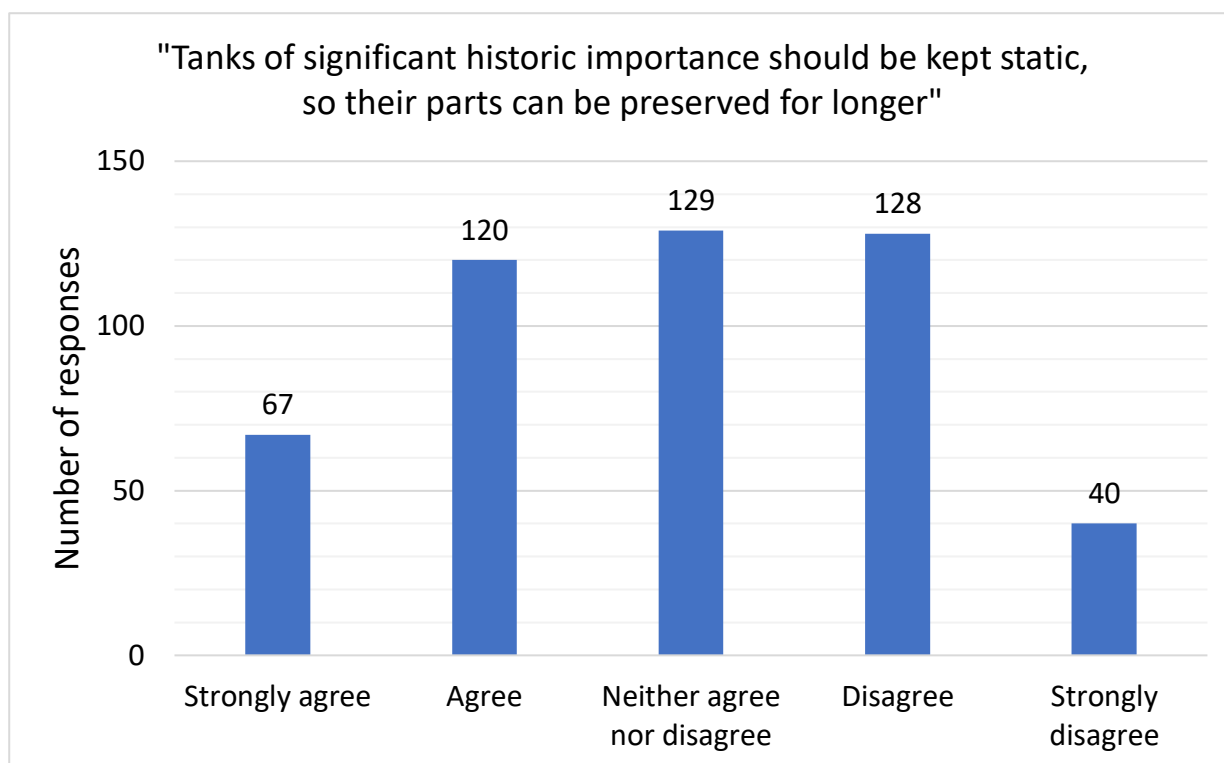


Figure 66. Bar chart showing responses to the statement 'Tanks of significant historic importance should be kept static, so their parts can be preserved for longer'

#### 10.7. Results and Discussion Question 5: When do you think the decision should be made to stop running a tank?

Question 5 was an end-of-life question for running a tank (Figure 64). The range of answers considered practical aspects and significance. As one comment summarised, 'I suppose this decision is going to be determined by how much of a purist someone is'. When creating management decisions for heritage, it should be stated that decisions may not be universally supported by all visitors. However, by looking at the factors most often stated by visitors, generally acceptable guidelines can be found.



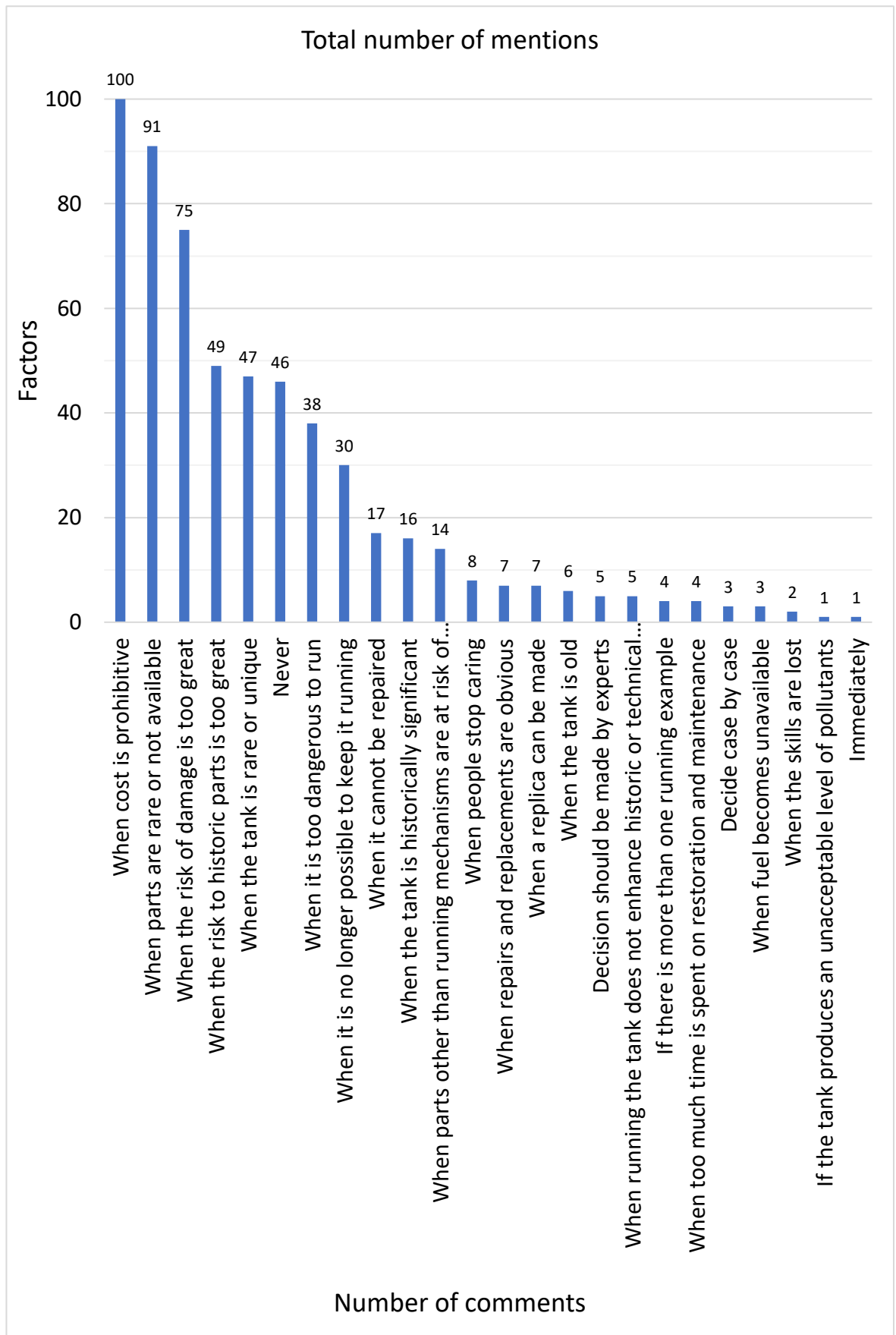


Figure 67. Bar chart showing results to the question 'When do you think the decision should be made to stop running a tank?'

As with the 2019 Tankfest study, most of the categories can be grouped into either focusing on practical aspects or historical aspects. If the following categories are considered to be practical aspects, then 284 comments stated that practicalities should be the limiting factor:

- When it is no longer possible to keep it running
- When cost is prohibitive
- When parts are rare or not available
- When it is too dangerous to run
- When it cannot be repaired
- If the tank produces an unacceptable level of pollutants
- When fuel becomes unavailable
- When too much time is spent on restoration and maintenance

If the following categories are grouped under a focus on damage to historicity and material authenticity, then 221 comments stated that these should be limiting factors:

- When the risk of damage is too great
- When the risk to historic parts is too great
- When parts other than running mechanisms are at risk of damage
- When the tank is rare or unique
- When the tank is old
- When the tank is historically significant
- When repairs and replacements are obvious
- When a replica can be made

Considerations of practical aspects therefore form 49% of visitor comments, while considerations of damage to historicity and material authenticity form 38% of visitor comments. This suggests a greater visitor emphasis on practical aspects as limiting factors in the continued running of tanks, although it still indicates a visitor wish to consider material and historic factors.

Some of the factors mentioned in the discussion are interlinked. Significance of the particular tank may impact upon how much wear-and-tear, and subsequent replacement of parts, is deemed acceptable. For example, a tank that has already had many replacements during its working life may be more acceptable to keep running than a tank that is in a more original or historic condition. Thus, the decision to stop running may also depend on where the significance lies with each tank; if a tank has more significance in its experiential running potential, running may be deemed more

acceptable than a tank that has more significance in its materiality. This reiterates the need to consider each management decision on a case-by-case basis.

As with the 2019 Tankfest study, health and safety should be considered above all other factors. If continued running of a tank puts anyone at risk, then running should cease.

The factors mentioned when deciding whether to stop running a tank require documentation. Significance assessments and statements for each vehicle will find the most valued aspects of each vehicle, which can then be periodically weighed against other factors to form decisions. Conservation plans should be formed and followed as they provide evidence for decision-making and consider a risk assessment of running. Treatment records state any repairs, which can help when forming decisions about risk of damage and risk to historicity. Operating logs provide evidence of running, which aids in the formation of maintenance plans. This documentation ensures that decisions are made based on specific evidence and are tailored to each tank and circumstance. The responses supporting this summary are reported in more detail below.

#### When cost is prohibitive

100 comments stated that tanks should stop running when cost is prohibitive. This is the highest mentioned category, forming 17.3% of the total number of comments, with 22 mentions of the cost of parts, 16 mentions of running costs, 13 mentions of repair costs, and 5 comments stating maintenance costs. This shows a visitor awareness of the need to balance resources against benefits discussed in questions one and two.

This theme includes 19 pragmatic comments stating that a cost-benefit analysis should be carried out to find the balance between cost of running and benefits to visitors, such as impact, the tank as a statement, significance in running, and monetary benefits from running. The pragmatic approach was reinforced with six comments discussing the idea of defining the point of end-of-running life as when the cost of running negatively impacts the rest of the museum. This involves impacting costs of other projects and other conservation and visitor engagement activities. Although these should be in separate funds, these six comments show that visitors do not

expect other parts of the museum to receive less funding in order to continue the running of tanks.

#### When parts are rare or not available

The availability of parts was mentioned 91 times, forming 15.7% of responses. This is the second highest mentioned category, so shows a general acceptance that parts should be replaced in order to continue running. As a result, these responses place value on the tank running over the value of historic parts remaining in situ in a static tank.

Out of the 91 responses, 70 responses commented generally on the availability of parts, whilst 43 responses stated that tanks should stop running when parts can no longer be manufactured. Some responses mentioned both the ability to get parts and the ability to manufacture parts, so were counted within both groups but were not counted as more than one comment in the totals for this theme. The 43 responses show an acceptance that new parts should be manufactured in order for a tank to continue running, and that running should only be stopped when this is no longer possible. For example, one comment stated 'it is entirely possible to have one off or small numbers of unique parts made, although at a cost. If funds are available, then such things should be done'. This reinforces the desire to experience tanks in action despite the impact on originality. It might be considered as originality versus authenticity in that a static tank might not be considered an authentic tank by some respondents.

One comment stated the importance of considering the longevity of different parts, writing 'When it's no longer possible or practice to make parts. The parts that break are likely mechanical - engine parts, tracks etc while the majority of the body of vehicle can probably be preserved indefinitely'. As this comment shows, mechanical or engine parts are more likely to require replacement compared to the body during the tank's running lifetime. It appears to be acceptable to repair mechanical and engine parts, while the body of the vehicle will not likely need restoration. Replacing mechanical parts with like-for-like replacements will result in a vehicle that will continue to run in the same way as it historically did, and will appear the same too. This will ensure that the vehicle remains authentic in terms of experiential

authenticity, enabling visitors to understand the sensory aspects of a vehicle and learn about the historical context behind the tank.

#### When the risk of damage is too great

In total, 75 responses commented that tanks should stop running when the risk of damage is too great. This is a factor that should be considered on a case-by-case basis, and the outcome decided based on an exploration of how the tank is run, what parts are at risk and the condition of the tank.

21 of these comments stated that tanks should not continue to run if there is risk of irreparable damage. One comment stated this, going on to write 'an example would be the Mk V which was run in the past but became too brittle with age to do so'. It was decided to stop running the Mark V as cracks appeared in the armour plate (Fletcher *et al.* 2013,154). This shows an acceptance that a tank should stop running if the armour is at risk of damage as repairs to this would affect the outward appearance and consequent perceived authenticity of the tank. There were also concerns that repairing the armour plate in one section would lead to stresses at other points, which would result in subsequent damage. This indicates that previous decision-making by The Tank Museum determining the point of end-of-life of a tank is accepted by survey respondents.

Thirteen comments focused on the notion of catastrophic damage. For example, one comment stated 'if to continue running the tank would render it so badly damaged as to be no longer of display quality'. These comments acknowledge tanks that can no longer be run should be displayed in static condition. They also reiterate the decision made for the Mark V, which was made when external parts were failing, thus risking its authentic appearance. These comments mark the point of end-of-life at the point at which a tank cannot be displayed in static condition. If there is a risk of damage to the exterior appearance of a tank, it should stop running.

Risk of damage includes an assessment of the tank's condition. Nine comments focused on condition when assessing risk. These comments included mentions of fragility and weakness of the tank. In order to assess condition against risk, records must be kept of running and condition in order to find any deterioration and its causes.

By keeping written records, the tank can be periodically assessed to decide whether it should continue to run or be displayed in static condition.

Five comments stated the decision should be made when there is risk of significant damage. This is not specific, so reiterates the point of deciding on a case-by-case basis. It also indicates an acceptance of replacing small parts, but the replacement of larger sections may be deemed unacceptable.

Six comments specified risk of damage to the structure. This included mentions of damage to visible parts and the main structure. This again emphasises the importance of maintaining the historic visible parts such as armour plates. These are the parts that are less likely to receive damaging wear and tear through running, particularly when compared to the running mechanisms. These comments appear to support the notion that running parts can be replaced, but running should stop when there is risk of damage to the structure, particularly the external structure.

Four comments specified risk of damage as risk of damage to systems. This included mentions of damage to the suspension and running gear. Although this shows some wish to retain historic running mechanisms within the tank, there were fewer responses that mentioned running mechanisms than the exterior, as shown in the paragraph above. This indicates the relative importance of stopping running when exterior parts are at risk of damage rather than interior running mechanisms, which appear to be deemed more acceptable to replace.

#### **When the risk to historic parts is too great**

49 responses stated that a tank should cease running when the risk to historic parts is too great. This forms 8.5% of the total number of responses for question five. This category is distinct from the above category as the comments specifically mentioned aspects associated with historicity, rather than general damage. The range of comments reported below indicates a strong adherence to the ethic of the tank being compromised in a historical sense when it has lost many original parts.

Out of the 49 responses, 10 comments stated that running should stop when a significant proportion of parts are not or will not be original. These comments involve an acceptance that parts should be replaced to continue running but argue that the point at which running should stop is when too many parts are not original. What

constitutes as a significant proportion is not specified, and it could be argued that this should be considered on a case-by-case basis. The term original must also be specified in order to implement this way of marking end-of-life. An additional comment stated 'depends on the original tank...how much was there originally and how much has to be removed to keep it going'. This raises the issue of accounting what parts of the tank were deemed original at the time of entry into the museum; if a tank has had a long working life, then many parts may have been replaced before it becomes a museum collection item. For a case such as this, it may be seen as more acceptable to continue replacing parts when compared to a tank that has not had many parts replaced during its active service. The history of each object should be considered. The ten comments stating significant proportion of parts highlights the need to consider each object on a case-by-case basis and define what constitutes as significant.

Five comments specified the point at which a tank should stop based on the proportion of original parts. Two of these comments stated that the decision should be made before 50% of the tank is formed of replacement parts and there is a risk of requiring further replacements, while three comments stated that the point should be when above 50% of parts are replacements, with one of these comments specifying 60% and above. These comments show a wish to stop running tanks if they are made up of as many or more replacements as original parts.

Other comments focus on specific parts instead of percentages of the whole vehicle. Six comments stated that end of running life should occur if large parts such as the engine were changed. This includes a comment that states 'when the original engine cannot be reconditioned anymore'. The use of the word reconditioning implies that it is acceptable to fix the engine until core components such as the engine block, head or chassis fail. However, after this point, running should cease. Another comment gave an example, writing 'a tiger running with a replacement modern day engine would not be right, better left static, however replacing smaller engine or other parts such as track links in my opinion would be acceptable'. This again indicates that interventive work is acceptable up to a point and depends upon the individual circumstance. Another comment stated 'when continuing to run a tank would require significant modifications to the internal superstructure to fit modern equivalent parts such as engines, transmissions etc'. This comment shows a want for a tank to run in

the same way as it did historically. These six comments suggest that tanks should be maintained to continue running, but running should stop when large engine or structural sections fail.

Three comments stated that tanks should stop running if they cannot be run on original parts. These comments are similar to the six comments that accept reconditioning to original parts, but differ in that they do not accept the replacement of parts in order to continue running. These form exactly half the number of comments than the comments in the above paragraph, indicating that although some respondents do not accept replacement parts, a higher proportion of responses agree that some parts can be replaced to continue running.

Five comments stated that running should stop when the historic appearance is at risk. These comments focus on the risk to the exterior of the vehicle. In a running tank display, the audience only sees the exterior, so this is what forms the experience. These comments place value on the exterior of the tank, which infers that interior changes and replacements are acceptable to keep the tank in running condition.

Visual is not the only sense to be considered. Three comments stated that running should stop if repairs affect the historic sound of the vehicles, two stated if the movement changes, one stated if the behaviour changes, another comment stated if the experience changes, and another stated if the parts are losing life. This shows that the survey respondents include sensory and experiential aspects when considering the historic value of vehicles. Therefore, intangible authenticity should be examined when discussing the point at which to stop running a vehicle.

Three respondents commented on the notion of the Ship of Theseus or Trigger's Broom. These comments highlight the importance of the intangible associations of original pieces. Even if the tank performs the same function and appears the same, these comments show that the tank is not perceived to be the same as the original. This places importance on intangible aura of historic objects.

Six respondents wrote that running should cease when it risks the historic significance or value of the vehicle. Another five comments stated that tanks should stop running when historic integrity is risked. These comments encompass the whole vehicle. In order to define historic integrity, a significance assessment must be carried



out. Conservation efforts should then focus on preserving or enhancing factors found to be significant.

One comment mentioned risk of damage to accurate representation. This involves assessing the significance of the tank to find valuable aspects, and then form a conservation plan to ensure these aspects are retained or enhanced. When running risks these aspects, or a majority of the significance aspects, the decision may be taken to stop maintaining the tank in working condition.

#### **When the tank is rare or unique**

A total of 47 responses stated that the decision to stop running a tank should be made when the tank is rare or unique. This forms 8.1% of all responses to question five. Out of the 47 responses, 25 stated that a tank should cease running if it is unique, or the only one left. In this case, the comments discussed the possibility of displaying the tank in static condition within the museum. 24 respondents wrote that a tank should stop running if it is rare. Some comments stated uniqueness and rarity, which have been counted under both categories. Two comments stated that, when considering a specific type of tank, there should be one in static condition and one in running condition. These comments on rarity and uniqueness indicate the importance of looking outside the collection as well as within, to explore other tanks of the same type within national and international contexts.

One comment stated that ‘rolling out rare tanks on specific days is an important feature of the tank museum’. Certainly, the rarity of a tank can be an argument for its continued running, as it may be the only one of its type running, and so the only chance the public has to experience that specific tank in action. This can be seen within the case study of Shaw’s Moonrocket at Dingles Fairground Heritage Centre (see Significance Assessments). The significance of rarity must be taken into account and weighed up against the risk of running. If running does not risk damage to the exterior, then it appears acceptable to continue running, as the tank will still appear the same in static display. Any historic parts that are replaced can be stored by the museum.

The above discussion shows how concepts of rarity and uniqueness can be used to both argue for continued running and static display. These arguments must be

considered together; if the tank is a rare running example, then it may be more beneficial to keep it running. However, if it is the only example left, then static display may be deemed to be more acceptable by audiences.

#### Never

46 responses to question five argue that tanks should never stop running, forming 7.9% of responses. Comments include acknowledging that tanks in the museum are unlikely to be wholly original, with replacements occurring during their service. This means that it is acceptable to replace parts with new parts in order to continue running the tank but does not address the concept of defining when originality begins.

Some comments consider the replacement of parts, with one stating 'I think that a tank should be kept running as long as practical. If pattern parts can be used so as to preserve the original parts, then that should be considered'. Another respondent writes 'never. So long as the broken part is kept for reference'. These comments suggest that historic parts should be retained and preserved in static condition, and new parts made in order for the tank to continue running. In this way, the tank may not be made of the exactly the same pieces as it was when in service, but it still provides the same experience, and parts are preserved.

Another comment states 'Never. Supports every person involved in creating and using that tank'. This reiterates the importance of maintaining and preserving skills. These skills are an intangible part of the heritage associated with the tank, and by continuing to maintain and repair the tank, these skills can be continued. This indicates value placed on preservation of skills over preservation of materials.

The 46 responses of 'never' indicate that 7.9% of the comments believe that the running of tanks is more important than retaining their original, or historic, parts in situ. The intangible benefits of experiencing a tank in action is more valuable than the tank's fabric remaining exactly as it was in when it first entered the museum in terms of materials. These comments show experiential authenticity is perceived to be more significant than material authenticity.

#### When it is too dangerous to run

38 responses, or 6.6% of responses, stated that tanks should stop running when it is too dangerous. These comments included 18 statements concerning the safety of the crew, 7 concerning the safety of spectators, and 4 concerning the safety of the tank. In practice, this factor will be considered above all other factors. The number of responses that mention safety indicate a visitor wish for tanks to continue running until they cannot safely run. For example, one comment states 'only when it becomes unsafe to do so, these vehicles must be allowed to run for as long as possible so that the younger generation can actually physically see how exciting and terrifying they are'. Another comment states 'it may be advisable to reduce or temporarily halt operation in order to allow for the fabrication of replacement parts (to original specifications if possible) if a component has been identified to be at risk of failure during an inspection'. These comments suggest an acceptance to repair and replace parts to continue running, with running only stopping when there are health and safety concerns.

#### When it is no longer possible to keep it running

30 responses stated that tanks should no longer run when it is simply no longer possible to keep them running. This makes up 5.2% of responses. Seven of these comments specifically stated that running should stop when all avenues have been exhausted. For example, one respondent wrote 'only as a last resort ... however, reverse engineering means that obsolete components can be remanufactured'. This shows a visitor view that parts should be replaced to continue running, so other factors are limiting. A similar comment states 'only when it's impossible to run it anymore. Anything that needs replaced should obviously be replaced with an authentic part wherever possible, where this is not possible then a modern piece should be sourced and the original part restored or preserved for historical accuracy'. This places value on new old stock over manufacturing new parts, although it states that new parts are acceptable. These comments indicate a wish to continue running a tank for as long as practically possible, regardless of repairs and replacements.

One response discussed the conservation route that should be taken, writing 'when there's ABSOLUTELY no hope of maintaining it's [sic] operational status. Then, it should be very carefully cleaned up and cosmetically restored (using whatever

methods and materials are needed including 3D printing of track shoes, as an example) and placed on display along with videos of it when it was running. Even dinosaurs on display in the finest museums have added “ersatz” bones. If the smell of hot grease and engine exhaust can be replicated; all the better’. This comprehensive response shows an acceptance that parts may fail to the point that they can no longer be displayed, and that it is acceptable to create new parts for display. It also suggests that the tank should still be able to be experienced running in a way that is as realistic as possible through sensory aspects such as sight, video and smell. Thus, this response places great value on the experience of running over retaining original materials, and considers the option of including sensory aspects in static display. This reiterates the importance of sensory access in museums.

#### When it cannot be repaired

The theme of inability to repair was mentioned 17 times, forming 2.9% of the total number of responses. This again shows an acceptance to repair and replace parts, instead placing the decision to stop running on ability to repair. This considers available skills and resources, including staff, time, workshop space, funds and, to an extent, availability of parts. Therefore, these 17 comments focus on the practical aspects of running rather than the traditional heritage values placed on materiality of objects.

#### When the tank is historically significant

In contrast, 16 comments stated that a tank should stop running when it is historically significant. This factor does take historicity and material authenticity into account. This category is distinct from the rarity or uniqueness category, as although rarity does feed into significance, other factors can influence significance. This category involves the use of a significance assessment to find which valuable tanks should be kept in static condition. One comment stated ‘unless it is historically significant then I am not worried about a running tank being 100% original’, indicating that more material value may be placed on certain historically significant tanks, and so it may be perceived to have more value in static display than working condition. This again reiterates the importance of considering each vehicle on a case-by-case basis.

#### When parts other than running mechanisms are at risk of damage

Fourteen respondents wrote that tanks should stop running when parts other than running mechanisms are at risk of damage. One comment stated 'given the structural build of a tank, whilst mechanical parts might wear and have to be replaced with modern pieces, the main bulk will remain in originality and carry the integrity of the original vehicle's character and history'. This comment shows an acknowledgement that the tank armour will last for a far longer time than the mechanical parts. It accepts that mechanical parts should be repaired to continue running. By taking this route, the tank appears the same visually, and can continue running to provide valuable experiences.

#### When people stop caring

Eight comments stated that tanks should stop running when there is little or no interest in them. Although these only form 1.4% of the total number of comments, it raises the important notion that collections must be relevant for audiences. If collections are not relevant, then they do not provide satisfactory engagement and interest. If people are interested in experiencing that tank in action, then they give value to the running of the tank. This value may change over time, and so visitor opinion should be periodically found when considering the point of end of running life for tanks, as well as other general display decisions.

#### When repairs and replacements are obvious

Seven respondents stated that the decision should be made when repairs and replacements are obvious. This forms 1.2% of the total number of responses. These responses indicate a wish for the tanks to appear historic, and the importance of perceived authenticity as part of the tanks in action experience. One comment wrote 'a museum tank has 2 lifes [sic] in my opinion: first is directly after service, it can still run, and should still be run... Second life is being static: showing what it used to look like (somewhere in the range between factory-new and battle-experienced but still looking like ready for the next battle). The second life (only static) is the 'natural end' of the museum tank, and you would want it to look like the real deal. If by running it too much /many times during its first museum life that it can no longer perform that second life well, then you have gone too far'. This comment re-emphasises the assumption that a tank should be displayed in static condition when it can no longer be

run. If running risks the authentic appearance of the tank, then operation should cease.

#### When a replica can be made

Another seven comments wrote that a tank should stop running when a replica can be made. These comments, forming 1.2% of the overall responses, suggest that historic tanks should stop running as soon as possible, and that the use of a replica is a satisfactory alternative. For example, one respondent wrote 'Make replicas and keep the original. That said it seems such a pity But they need preserving'. This shows a wish to run historic tanks, but weighs this up against static preservation and finds that preservation of parts is more important. These comments form a relatively small percentage of the overall comments, so are in the minority. Yet they do show some visitor wish for replicas.

#### When the tank is old

Six comments stated that a tank should stop running when it is old. Two of these comments mentioned both age and rarity, and two stated both age and condition, indicating that concepts of age are closely associated with rarity and condition. This shows that age cannot be considered in isolation, but is impacted, and impacts upon, other factors.

The comments concerning age should not be interpreted as a wish to create a policy that tanks over a certain age should not run. One response discusses the importance of considering age, and also states 'but I would stress again the need to decide on an individual basis rather than a blanket policy - say - 'anything over 40 years of age should not run'. All decisions to stop running a vehicle should be decided on a case-by-case basis.

#### Decision should be made by experts

Five respondents wrote that the decision should be made by experts. These comments stated mechanics and curators as experts. These form 0.9% of the total number of responses, the other 99.1% of responses deciding on a point at which tanks should stop running. This category shows an acknowledgement that experts should be the ones to make the final decision. Yet the relatively small number of responses within this section compared to other themes shows that visitors are willing to provide

their views on the decision-making process, and so it is beneficial to initially consult users.

#### When running the tank does not enhance historic or technical understanding

Another five responses stated that a tank should stop running if it no longer enhances historical or technical understanding. This goes back to the purpose of running tanks as creating experiences that enable for greater understanding of the tank and its past. When this value is no longer realised, the purpose of running tanks is lost. One comment detailed 'your best display when I was there last was the industrial manufacturing room with the split Centurion...you don't need a mover for that. However if you want to discuss the difference between France in 40, and the Golan Heights in Yom Kippur, a mover is important'. This comment shows the importance of ensuring there are agreed aims and purposes behind each running tank, which should be periodically reviewed to assess ongoing value.

#### If there is more than one running example

Four comments stated that a tank should stop running if there is more than one running example. This forms 0.7% of the overall comments. This indicates that one vehicle of each type is sufficient to form an engaging, inspiring and educational experience for an audience. In practice, it may be beneficial to have two of a certain type of tank in running condition to reduce wear-and-tear on one tank, and also to mitigate the risk of loss of income on event days focused on one specific tank, such as the Tiger 131, if that one tank were to stop running. However, these comments show that one of a type of tank is enough for an individual event day. Unless the tank is particularly valuable for attracting visitors, keeping only one tank of a type should be considered.

#### When too much time is spent on restoration and maintenance

Another four respondents wrote that the decision to stop operation should be made when too much time is spent on restoration and maintenance. This includes one comment stating 'When the cost, in time and money, outweighs the benefits of keeping it operational', another stating 'when the time spent on it is out of proportion to what is spent on other similar vehicles', and another writing 'when there are more breakdowns and maintenance than running time'. These comments all consider the cost-benefit analysis of running, with benefits detailed as operational benefit, benefit

to other objects in the museum, and the benefit of running time versus time spent maintaining the vehicle. These comments show the importance of assessing the resources put into one vehicle compared to a variety of factors. They also indicate a need to periodically reassess conservation route decisions.

#### Decide case by case

Although every decision should be made on a case-by-case basis, three comments specifically mentioned this. This reiterates the importance of considering each tank as an individual case, and deciding conservation routes accordingly.

#### When fuel becomes unavailable

Three comments stated that tanks will stop running when fuel becomes unavailable. This is similar to the 'when it is no longer possible to keep it running' category, but is a distinct category as it specifically mentions fuel. Tanks run on fossil fuels, which will eventually run out, and so will be a limiting factor. These views suggest that tanks should continue to run and be repaired until fuel can no longer be used.

#### When the skills are lost

Two comments stated that loss of skills will result in tanks ceasing to run. This is a preventable factor; by ensuring that skills are maintained and passed on, tanks can continue to run. This factor, although only mentioned by two people, highlights the importance of preserving knowledge associated with the maintenance and running of tanks.

#### If the tank produces an unacceptable level of pollutants

One respondent wrote that tanks should not run if they produce an unacceptable level of pollutants. The acceptable level may change over time, so this must be reassessed. This comment shows a consideration of long-term environmental factors in the running of tanks.

#### Immediately

The one respondent who wrote 'immediately' strongly disagreed with questions 1 and 2. Although this response for question 5 should be considered, it forms 1 of 579 comments. Overall, 0.2% of responses believe that tanks should not run.



#### 10.8. Implications for decision-making at The Tank Museum

The study of visitors to The Tank Museum on non-event days reinforces the findings of the Tankfest 2019 survey in evidencing a strong preference for the opportunity to experience running tanks. This shows that even visitors who visit the static displays feel that their understanding and enjoyment of tanks would be enhanced by the experience of witnessing them working at first hand. The arguments for running tanks echo those found in the Tankfest 2019 survey with a clear focus on the ability of running tanks to demonstrate their intangible values that are lost when on static display. The full educational and experiential potential of a tank is not realised without the sounds, smells and visuals of the tank moving through the landscape of the parade ring.

Perhaps due to having more time to complete the online survey than the in-person Tankfest survey, there were some additional reflections by respondents that were not mentioned at the event day. These centred around human aspects, from an enhanced understanding of the life of the soldier working alongside, or within, the tank to an empathetic sense of the impact of tanks on civilians in wartime. Respondents also reflected on the end of working lifetime implications on future generations of visitors to The Tank Museum.

For The Tank Museum, these results offer a firm steer that their decision-making in determining conservation routes for the vehicles in their collection should consider the options to restore to running condition in order to service visitor needs. When applying prevailing theories within the conservation literature and discourse to decision-making, The Tank Museum should reflect on ways in which visitor views may not follow trends in thinking within the sector. Although it may be an unfashionable perspective amongst museum professionals, it has been proven here that visitors to The Tank Museum view working objects that are relegated to static display to be dead and lifeless exhibits whose values are diminished.

## 11. Comparison and Further Discussion of Studies

Although some brief discussion of similarities between the Tankfest 2019 and the 2020 online studies has been offered, a thorough comparison is required examining their results side by side (Figures 65-69). Potential correlations will identify agreement and disagreements between the participants views provided on an event day and reliance on memories of past visits to the museum on a non-event day in the last two years.

### 11.1. Methodology

As the 2019 Tankfest study received 84 responses, and the online survey received 484 responses, viewing data as percentages from each study allows for comparison. These were expressed in three significant figures or one decimal place to accurately present smaller percentages and compared using bar charts.

On average, respondents to the online survey gave a greater number of factors for the two open questions (2 and 5). For Question 2, each respondent gave on average 1.65 factors for the online survey, and 1.33 for the 2019 Tankfest survey. For Question 5, each respondent gave on average 1.37 factors for the online survey, and 1.23 factors for the 2019 Tankfest survey. This may be due to the circumstances around taking the survey; respondents at Tankfest filled in the survey on an event day, so may have been less willing to spend a long time on the survey when compared to those completing the online survey during lockdown. This should be considered when comparing the results from each survey.

### 11.2. Question 1

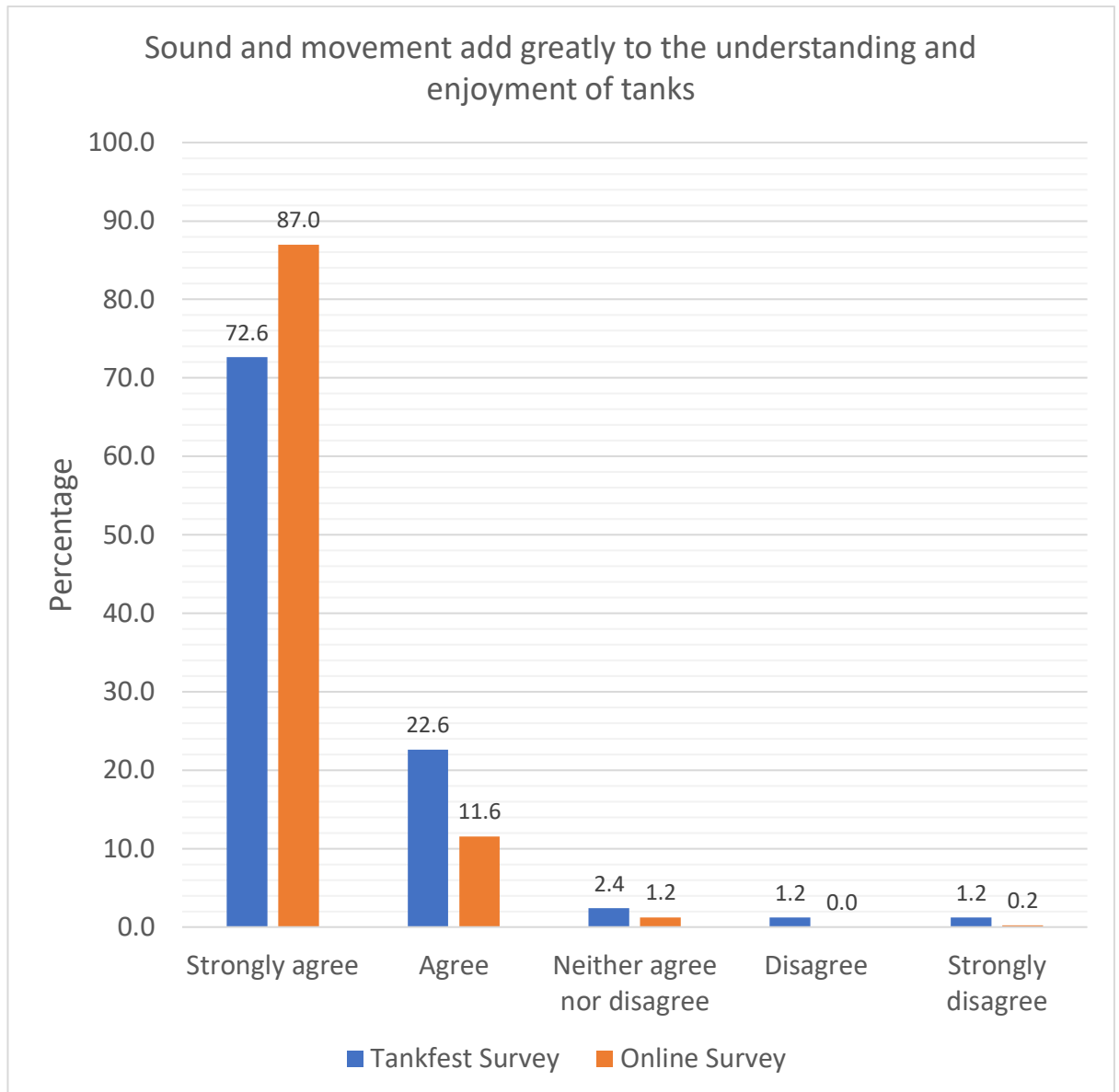


Figure 68. Bar chart showing comparisons of question 1, 'Sound and movement add greatly to the understanding and enjoyment of tanks'

As Figure 68 shows, the responses to Question 1 from the Tankfest and the online surveys follow the same trend, showing most respondents strongly agree with the statement 'sound and movement add greatly to the understanding and enjoyment of tanks'.

### 11.3. Question 2

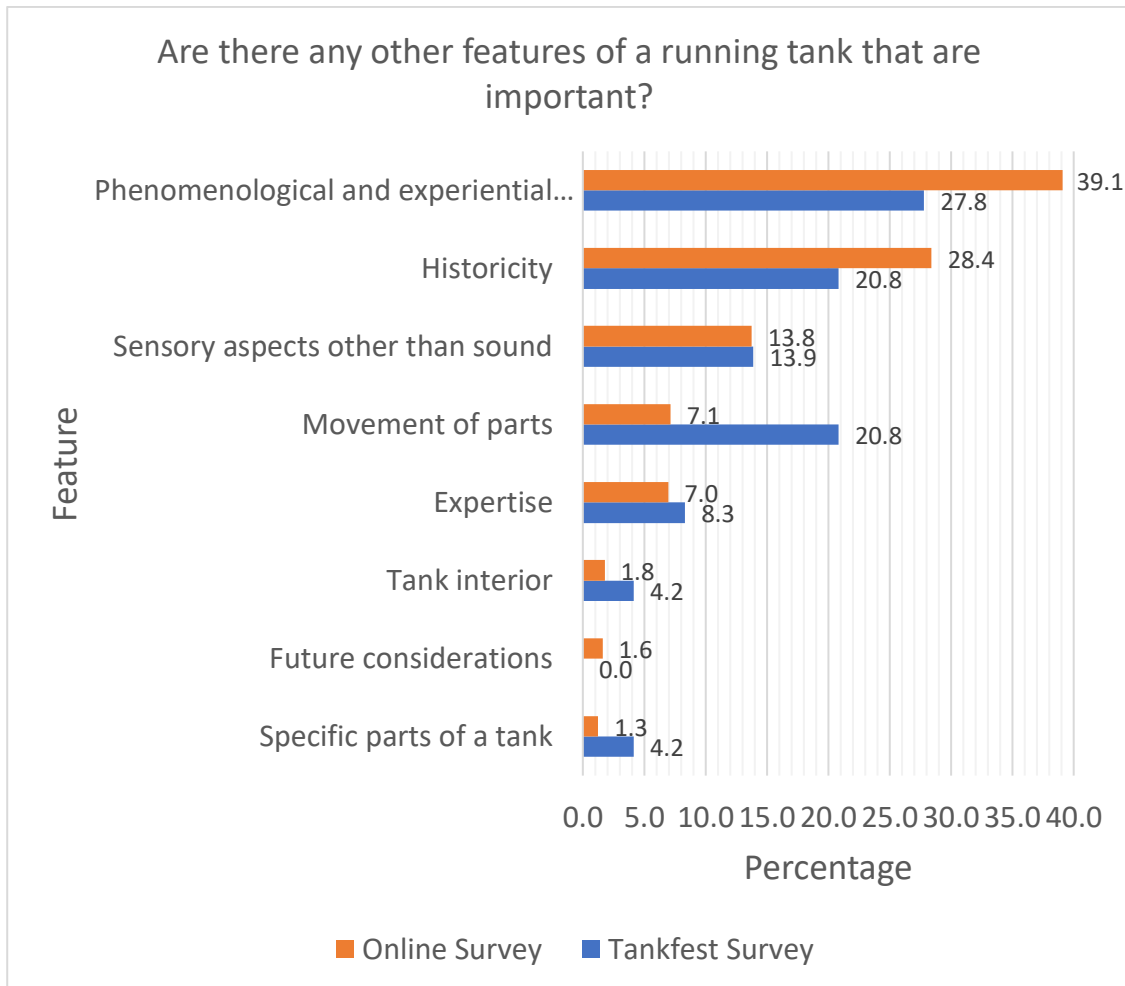


Figure 69. Bar chart showing comparisons of question 2, 'Are there any other features of a running tank that are important?'

A comparison between the two studies for Question 2 includes one additional category for Future Considerations, which was found through analysis of the online study compared to the Tankfest study (Figure 69). The category Future Considerations for the Tankfest Study therefore shows as 0% as there are zero responses.

From a general viewpoint, the most mentioned factors by participants of both studies are similar, being under the theme of phenomenological and experiential factors. This shows the relative importance of this factor and reinforcing it as the primarily important feature of a running tank other than understanding and enjoyment identified in Question 1.

Historicity also rates highly on both studies, being the second most mentioned category in the online study and tying with movement of parts for second in the Tankfest study. This highlights the value of running historic vehicles, placing value on

the fact that the vehicles are historic. Sensory aspects provide a similar proportion of results for both studies. The fact that smell, ground vibrations and bangs were mentioned in both studies reiterates the importance of these sensory aspects, despite the on-line survey participants being unable to experience these feelings in a real time sense. Additionally, mentions of temperature and multi-sensory experiences occur in the online survey.

Although the category of sensory aspects is similarly weighted in both studies, it forms the third most mentioned category for the online study, and the fourth most mentioned category for the Tankfest study. Participants for the Tankfest study place more importance on movement of parts than the online study, possibly because it is more immediate in real time as opposed to the emotional effects of the visit forming long-term memories, as shown by the high proportion of experiential and phenomenological comments in the online study. Both studies deemed the category of expertise as equally important but there were fewer comments on the tank interior in the online survey than the Tankfest survey. This may be due to some tank interiors being accessible on non-event days therefore satisfying the desire to see inside the tanks.

A small 1.6% percent of participants from the online survey mentioned future considerations, which was absent in the Tankfest survey, which may be due to the immediacy of the event compared to the online survey. Similarly, the lower proportion of mentions of tank parts in the online study (1.3% compared to 4.2%) may again relate to the fact that the Tankfest study was conducted on an event day, whilst the online survey asked for memories of visits for the museum. This supports the notion that impact of phenomenological and experiential aspects are remembered for longer after the event than the movement of specific parts of a tank, although it could also relate to the Tankfest study being on an event day, with fewer responses than respondents to the survey online who had more time to think about the answers.

In conclusion, both studies show the same general trends overall, with phenomenological and experiential factors rating highly. The differences found between the studies may be due to the differing methodologies, or due to the idea that experiential factors are more memorable than other factors such as the movement of parts.

#### 11.4. Question 3

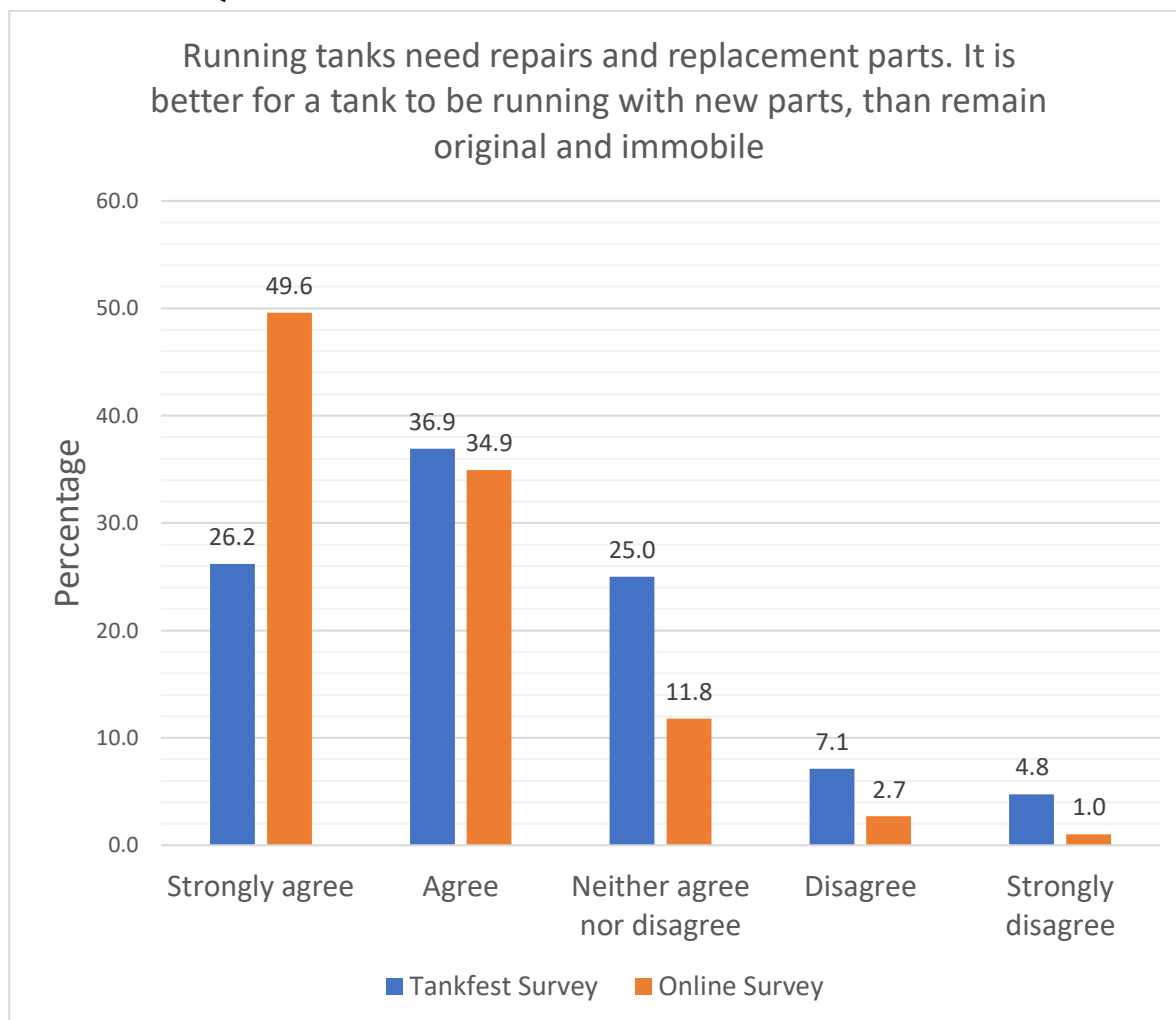


Figure 70. Bar chart showing comparisons of question 3 'Running tanks need repairs and replacement parts. It is better for a tank to be running with new parts, than remain original and immobile'

This question asked for participant opinion surrounding the replacement of parts and repair of vehicles with consideration of the historic integrity of the vehicle. In both studies a higher proportion of respondents either strongly agree or agree with the statement than disagree or strongly disagree (Figure 70). This shows a general agreement with the statement that it is better for a tank to be running with new parts than remain original and immobile. However, a higher percentage of participants in the online survey strongly agreed with the statement than participants in the Tankfest study; 49.6% as opposed to 26.2%, which could indicate that having viewed static tanks, has generated a desire to see them operational; almost a feeling of 'something missing' when visiting a static collection.

#### 11.5. Question 4

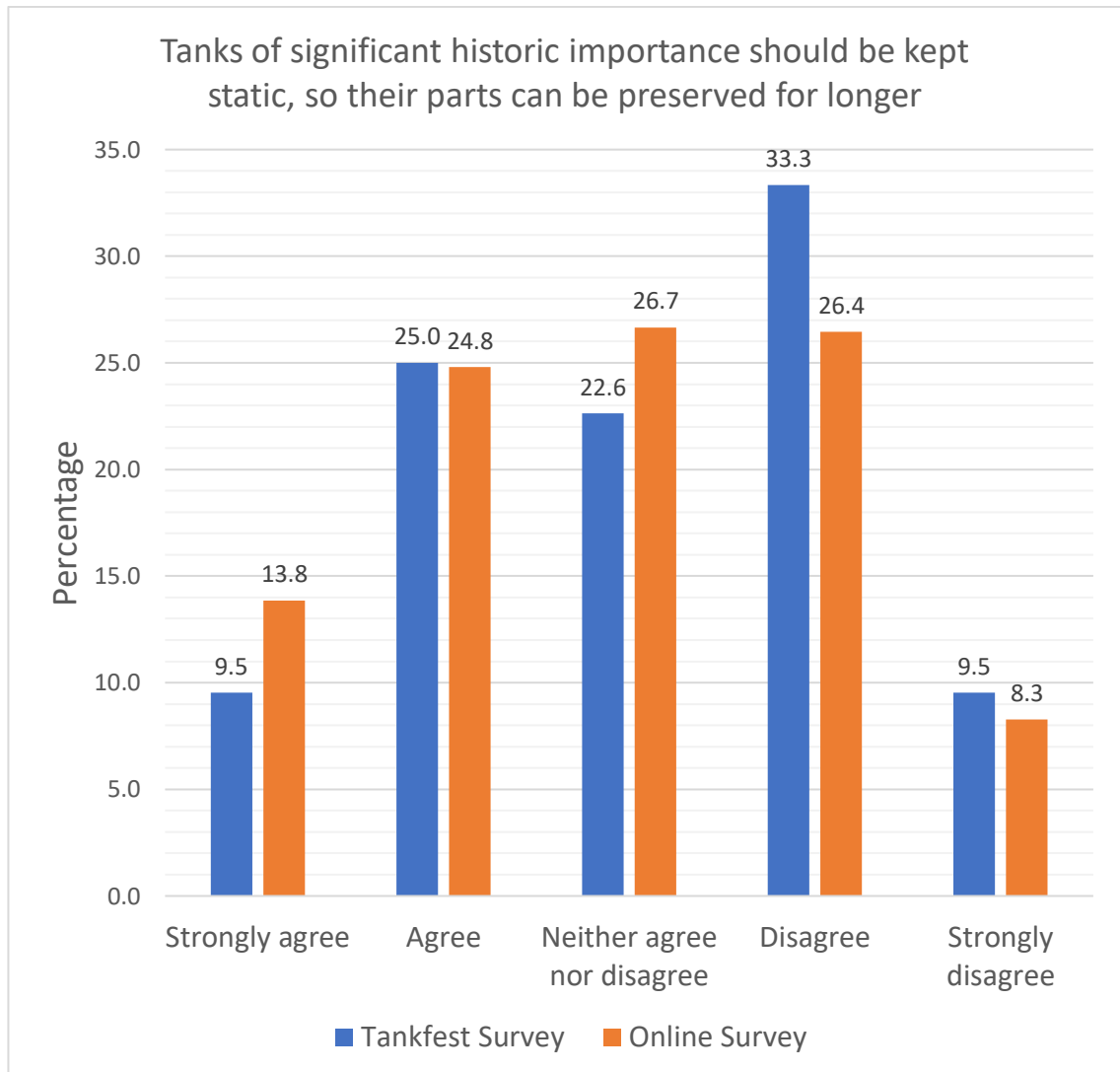


Figure 71. Bar chart showing comparisons of question 4 'Tanks of significant historic importance should be kept static, so their parts can be preserved for longer'

Overall, the results of both studies follow a similar trend (Figure 71), with many responses clustered around the centre of the Likert scale. This lack of consensus for agreement or disagreement emphasised the need to create a specific conservation plan for each tank, based on circumstance and significance, before deciding whether to run vehicles or keep them static on a case-by-case basis.

## 11.6. Question 5

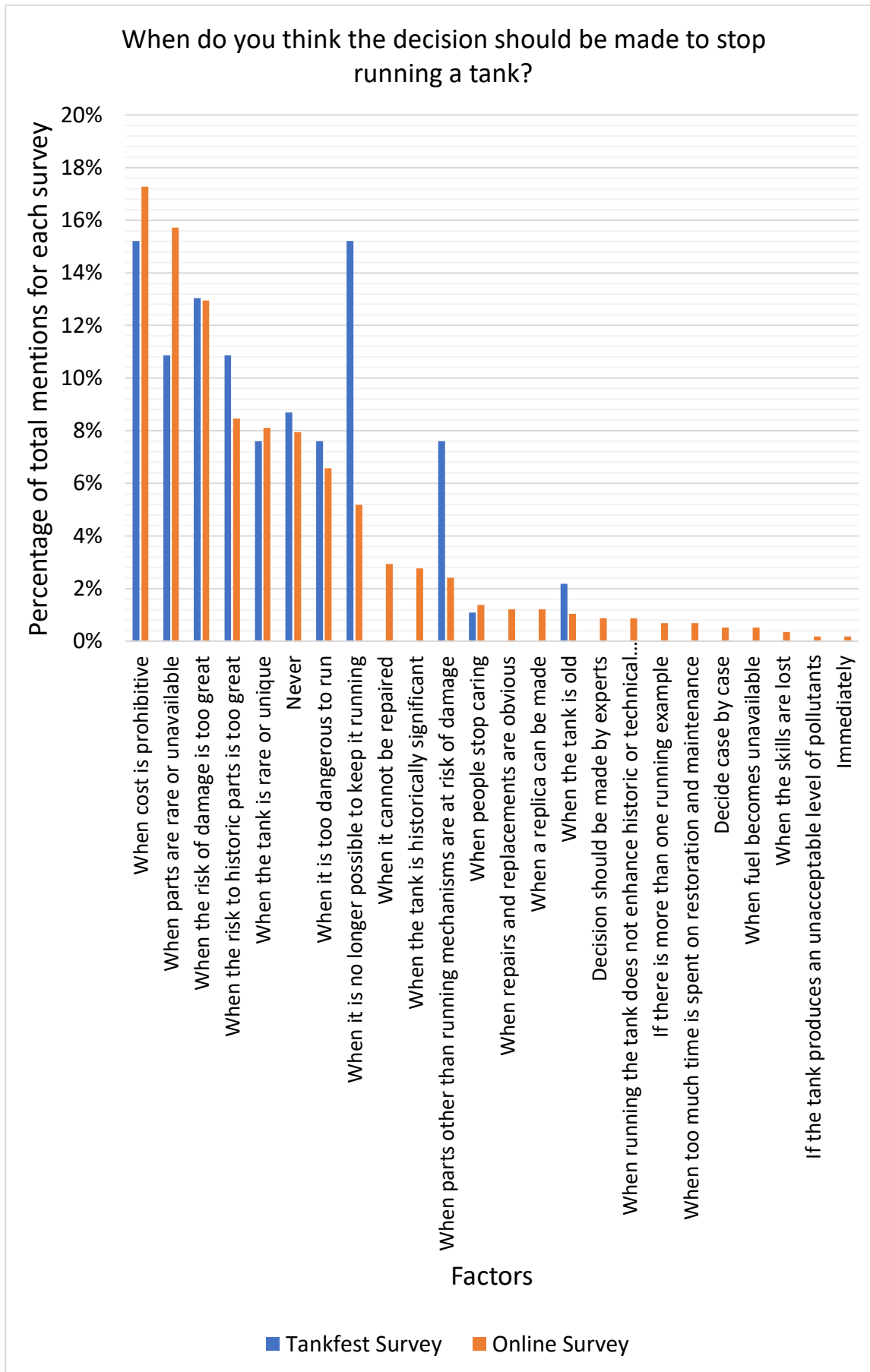


Figure 72. Bar chart showing comparisons of question 5 'When do you think the decision should be made to stop running a tank?'



Figure 72 shows the results for question five from both surveys. The results from the online survey extend over a greater number of factors, since application of inductive thematic analysis formed categories from the results, rather than fitting results into pre-existing themes. All the categories mentioned in the Tankfest survey were also mentioned in the online survey, showing the importance of these categories for visitors on both event and non-event days. These categories are set out below and provide clear guide for factors to address when consulting visitor opinion on the end of a vehicle's working life.

- When cost is prohibitive
- When parts are rare or unavailable
- When the risk of damage is too great
- When the risk to historic parts is too great
- When the tank is rare or unique
- Never
- When it is too dangerous to run
- When it is no longer possible to keep it running
- When it cannot be repaired
- When the tank is historically significant
- When parts other than running mechanisms are at risk of damage
- When people stop caring
- When repairs and replacements are obvious
- When a replica can be made
- When the tank is old

The most mentioned category from the online survey is when cost is prohibitive, whilst the two most mentioned categories from the Tankfest survey are cost and when it is no longer possible to keep it running. By placing practicalities of resources above other factors there is indication that a high proportion of respondents believe that tanks should continue to run, regardless of repairs and replacements, until there are limiting practical factors. This links to evidencing there is greater visitor value placed on the running of tanks than retaining historic parts in situ which may result in a static vehicle.

The second most mentioned category for the online survey is the availability of parts. This forms a higher percentage of responses than for the Tankfest survey; 15.7% as opposed to 10.9%. This is certainly a limiting factor; if parts cannot be found or made, then the tank cannot run. In both studies risk of damage is the third most

mentioned category, which links to condition in practical terms and so must be periodically re-assessed to ensure the correct conservation route is taken.

While the risk to historic parts is the fourth most mentioned factor within the online survey (8.5%) and the fifth most mentioned factor in the Tankfest survey (10.9%), there is little real difference. Risk to historic parts is a key factor to consider, the studies show that a greater proportion of visitor opinion believe practical aspects such as cost, availability of parts and risk of damage are more important considerations. There is a potential contradiction here, as movement wears and risks parts but mobility is tantamount in the view of the visitor. This again raises the issue of emotive and sensory value set against what is preferred ethically. There is also the issue of defining risk of damage; since it appears risk to historic parts is overridden by risk of damage but damage to what? Replaced parts or just the tank overall? This is an example of where nuance and further depth is required in gathering opinion.

The preservation and sensory experience tension again arises in relation to rarity or uniqueness, which have a similar percentage of the totals in both studies. A rare running tank may provide an experience that cannot be gained elsewhere, but as the results show, visitors believe that a rare or running tank should cease operation to preserve it, especially if it is the last of its type.

Health and safety issues were mentioned a similar number of times in both studies. As discussed in the individual studies, predictably this was seen to take priority when deciding whether to continue running a tank.

There were a higher percentage of mentions of when parts other than running mechanisms are at risk of damage in the Tankfest study than the online study. Once again, this may be because the study was taken at an event day, so visitors were able to see moving tanks, and may therefore feel that the appearance of tanks is important, and any changes that detract from this are to be avoided.

The category of age was also mentioned in a greater proportion of results in the Tankfest study than the online study. This may be due to the age of the moving tanks being announced at event days. Responses to the online study that mentioned age discussed that a certain age should not be stated as the point at which to cease running a tank, and instead other factors should be considered. This could be because

The Tank Museum did not run any First World War tanks at Tankfest 2019 (www1), so previous decision making at The Tank Museum may impact visitor perception on conservation decisions. The theme of when people stop caring was mentioned a similar percentage in both studies; possibly reflecting the importance of ensuring running displays are relevant and interesting.

From the two studies, it appears that, according to visitor opinion, tanks should run until they cannot due to resources such as cost, availability of parts, ability to keep running. This is an interesting outcome. Does it indicate that one may as well run a tank until the engine or moving parts are no longer either viable in health and safety terms or replaceable, rather than have sensory value locked into a static tank that is capable of being operated but policy deems it should not be? Should historicity in the form of risk to historic parts, rarity or uniqueness of the tank and historic significance, override it being experienced as it was meant to be in its lifetime? Feeding the outcome of these surveys into designing a decision-making framework can help guide and contextualise the process that decides whether a tank should be run or static.

## 12. Frameworks for Decision Making

The Tank Museum collections department does not currently have frameworks for making the decision to run a vehicle or to display it in static condition. This means that there may be vehicles in the collection that are not presented in the way that best encompasses their most important values. Additionally, some of the vehicles in the Running Fleet are currently showing signs of wear and damage due to years of running, raising the question of when running should cease (van Schaardenburgh 2021). It is hoped that in the development of frameworks that can be used to undertake management decisions, The Tank Museum will be in a stronger position to realise these values and enable authentic experiences for visitors.

The following frameworks have used information from the literature review and studies presented in this thesis to create decision-making aides for The Tank Museum. The frameworks take the form of a Conservation Route Supporting Document, which accompanies an Excel file and a blank document for the Tank Museum to fill in. The next framework is an End of Working Life Guidance. This is a compilation of factors mentioned by visitors when discussing the point at which a tank should stop running, and so provides a starting point for making the decision to stop running a vehicle. This is followed by an Overview of Visitor Views document, which presents the main themes and factors from the two studies. These frameworks are written with the intention of being used as standalone documents for use by The Tank Museum.

### 12.1. Conservation Route Supporting Document

#### 12.1.1. Overview

This document contains the information needed to fill out the Conservation Route Document and Conservation Route Form (Appendix F; Appendix G). The aim of the Conservation Route document is to aid with conservation route decisions that will result in either a static or running vehicle. This will be done through the completion of:

- A heritage summary
  - A summary of the history, fabric and associations of the object.
- A brief significance assessment
  - An assessment of the collection value.
- A condition assessment

- Assessing the condition of the object and considering any required conservation measures.
- A conservation route assessment
  - Assessing the value of an object in running condition, and then the value of an object in static condition.

There is an accompanying Excel file which will produce a conservation route suggestion based on the above information.

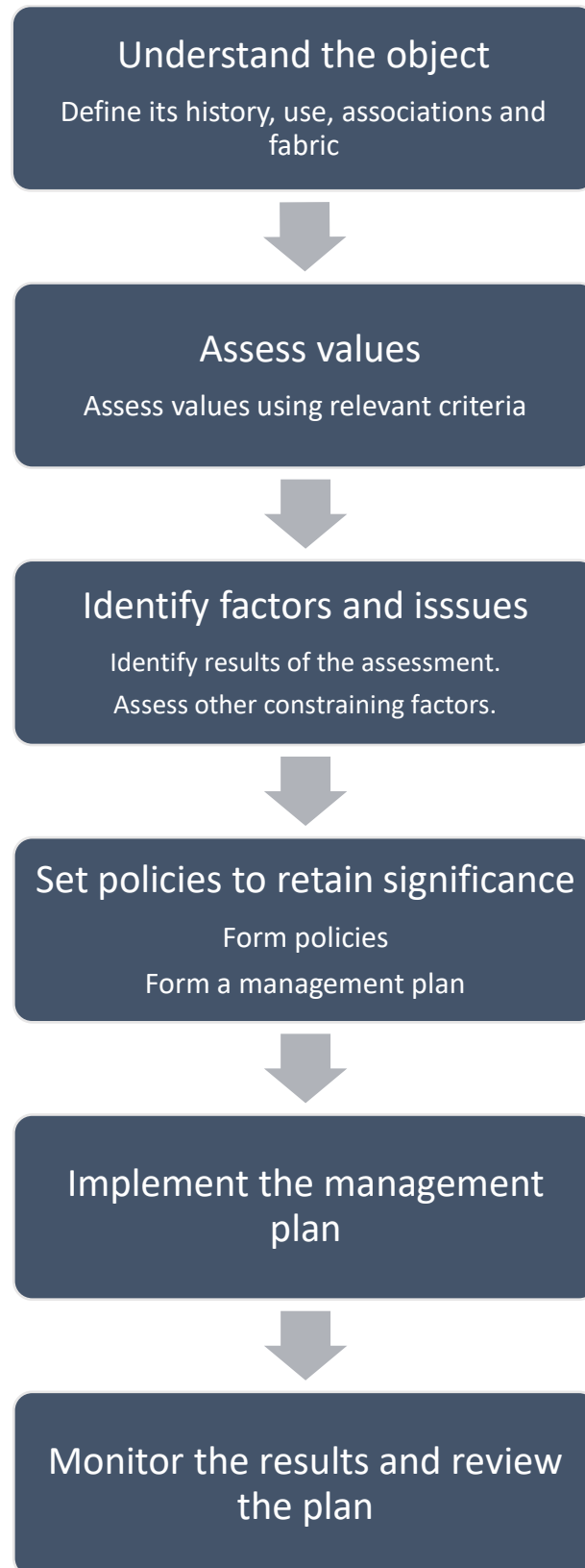
The assessment is produced with the view that each object should be assessed individually, rather than a whole collection or part of a collection. It is intended that a Conservation Route Document should be filled out for each object (Appendix F).

If two or more objects receive the same conservation output but resources are limited, then it may be beneficial to carry out a Pairwise Comparison assessing the objects against each other based on the conservation route assessment.

The assessment is laid out with the object assumed to be in current static condition.

The following flowchart shows the review process (Figure 73). The Conservation Route Document assists with the first three parts of the process outlined: understanding the object, assessing values and identifying factors and issues. The final step, monitoring the results and reviewing the plan, is discussed in section 12.2.

### 12.1.2. An Overview of the Review Process



*Figure 73. The Significance Assessment Process. Adapted from* Mason 2002; Drury et al. 2008; Russell et al. 2009; Dunn et al. 2012; Australia ICOMOS 2013; Clark 2014

### 12.1.3. Introduction

#### **Participants:**

Include a list of who participated in the process.

#### **Consulted groups and individuals:**

Include a list of who was consulted in the process. This may include focus groups, steering groups, committees etc.

#### **Other relevant documents:**

Include a list of other relevant documents and management tools e.g., business plans, activity plans, maintenance plans, risk assessments, operating logs, access policies.

#### **Gaps in information and limitations:**

Include a record of any gaps in the information and limitations.

#### **Next review date:**

Write the proposed review date. Assessments should be periodically updated to ensure the conservation outcomes remain relevant and valuable to audiences.

### 12.1.4. Understand the Object: Heritage Summary

The aim of the heritage summary is to provide written documentation and consideration of aspects of the object's history. By carrying out a heritage summary, valuable factors that are individual to each tank are explored. Any gaps in the knowledge of the object's history can also be identified.

The heritage summary can include:

- A description of heritage
- The history of the object
  - Working life (before entry into the museum)
  - Acquisition
  - Use
  - Associations
  - Fabric
    - Include any known changes to the fabric
- The object in relation to the wider context
  - How many are preserved?

- Highlight anywhere that this object can provide a unique experience for visitors
- Describe how the heritage is managed

A concluding paragraph can be used to emphasise the important factors of an object's history, which may include use, associations or fabric. This will aid with the following significance assessment.

#### 12.1.5. Assess Values

The Assessment Matrix (Table 28, 288), can be used to assess significance, condition, the value of the object in running condition and the value of the object in static condition. The matrix has been designed so that each column is to be graded separately, although parts of the significance assessment may impact upon the value in running and value in static. These four grades for each object will, when inputted into the Excel file, produce a suggested conservation route.

An alphabetical system has been used rather than a numerical numbering system. In previous assessments this has been found to be beneficial in highlighting certain objects and providing trends rather than producing an automatic ranking system (Dunn *et al.* 2012; Lomas 2014).

#### **Brief Significance Assessment:**

This is an abbreviated version of a general significance assessment that accounts for the object's overall significance. As this assessment is tailored to provide a consideration of the decision to run a tank or display it in static condition, it is not a full significance assessment. A further significance assessment may be required to determine the object's learning potential and research potential.

One of the following categories should be chosen for each object (this is repeated in the Assessment Matrix, page 288):



- A. Of international importance and integral to the collections development policy. Object is known to be unique or rare. Object is a very valuable engagement piece.
- B. Of national importance and an important part of the collections development policy. Object is known to be rare. Object is a valuable engagement piece.
- C. Of community importance, either locally or an interest group. Integral to the museum's themes and the site's purposes. Only one, or one of the best, examples in the region or community group.
- D. Of clear site-specific importance, integral to the museum's themes and the site's purposes. Important to the contribution of a story or discipline. Only one, or one of the best, examples in the organisation.
- E. Not deemed to have historical interest, or inadequate knowledge available to form significance assessment. Outside the collections development policy.

It may be beneficial to provide a short explanation of why a specific category was chosen. This will aid with future decision-making.

**Statement of Significance:**

This will summarise the valuable aspects of the object and will define how and why the object is significant.

**Condition Assessment:**

A condition assessment will evaluate the physical condition of an object, so can be used to highlight any preventive or conservation work required. It will also assist with determining the conservation route for the object.

One of the following categories should be chosen for each object (this is repeated in the Assessment Matrix):

- A. Stable material, good condition, structurally sound, no evidence of damage or deterioration, no conservation issues and complete.
- B. Stable material, structurally sound and largely complete, minor cleaning or improvement in preventive measures required.
- C. Stable material but needs monitoring, some restoration or repair conservation desirable. May be incomplete or damaged.
- D. Unstable material, incomplete or showing signs of deterioration or damage, specialist conservation required.
- E. Very unstable material, damaged or decayed beyond repair, may pose a risk to other objects or health and safety risk.

Again, it may be beneficial to provide a short explanation of why a specific category was chosen. This may include specific parts that are stable or unstable, or specific measures that may need to be taken.

### **Conservation Route Assessment:**

This assessment will seek to find if more value will be realised through static or working display. The Conservation Route Assessment is formed of two parts: the Value in Running Display Assessment, and the Value in Static Display Assessment. These two assessments should be considered individually.

### **Value in Running Display Assessment:**

One of the following categories should be chosen for each object (this is repeated in the Assessment Matrix). Start reading the categories from category A. If all the criteria are not met within the category, move onto one category down, and continue doing so until the category matches the object. This assessment may require consideration of the significance assessment (page 281).

- A. Running would result in a unique working example that can enable all of the following:
- Show the vehicle's original purpose through movement.
  - Enable a greater visitor understanding of phenomenological or experiential aspects of the past, resulting in an authentic experience.
  - Enable a greater visitor understanding of the vehicle's history and associated wider histories.
  - Enable the display of sensory aspects such as sound, smell, movement and vibrations underfoot that cannot be experienced elsewhere.
  - Preserve specific heritage skills that would otherwise be at risk of being lost.
- B. Running would result in a rare working example that can enable four or more of the following:
- Show the vehicle's original purpose through movement.
  - Enable a greater visitor understanding of phenomenological or experiential aspects of the past, resulting in an authentic experience.
  - Enable a greater visitor understanding of the vehicle's history and associated wider histories.
  - Enable the display of sensory aspects such as sound, smell, movement and vibrations underfoot that cannot be experienced elsewhere.
  - Preserve specific heritage skills that would otherwise be at risk of being lost.

- C. Running would result in a working example, of which there may be several, that can enable two or three of the following:
- Show the vehicle's original purpose through movement.
  - Enable a greater visitor understanding of phenomenological or experiential aspects of the past, resulting in an authentic experience.
  - Enable a greater visitor understanding of the vehicle's history and associated wider histories.
  - Enable the display of sensory aspects such as sound, smell, movement and vibrations underfoot that cannot be experienced elsewhere.
  - Preserve specific heritage skills that would otherwise be at risk of being lost.
- D. Running would result in a working example, of which there may be many, that can enable two of the following:
- Show the vehicle's original purpose through movement.
  - Enable a greater visitor understanding of phenomenological or experiential aspects of the past, resulting in an authentic experience.
  - Enable a greater visitor understanding of the vehicle's history and associated wider histories.
  - Enable the display of sensory aspects such as sound, smell, movement and vibrations underfoot that cannot be experienced elsewhere.
  - Preserve specific heritage skills that would otherwise be at risk of being lost.
- E. Running would realise one, or none, of the benefits mentioned in the above categories.

Write a short explanation of the category chosen here, detailing what values will be displayed through running and the rarity of the vehicle in running order.

### **Value in Static Display Assessment**

One of the following categories should be chosen for each object (this is repeated in the Assessment Matrix (Table 28)). Start reading the categories from category A. If all of the conditions are not met within the category, move onto one category down, and continue doing so until the category matches the object. This assessment may require consideration of the significance assessment (page 281).

- A. If the following criteria are met:
- The vehicle is unique.
  - The vehicle is of great significance in static condition (refer to significance assessment). Running would result in an unacceptable negative impact upon the value of the fabric and vehicle as a whole.
    - This might include significance placed in the period of history that resulted in the vehicle no longer running.
    - It might also include vehicles which were never used, so running would not accurately represent their working life.
  - Retains all or most of its historic fabric, and the vehicle's significance results from this. Any damage is integral to the overall significance of the vehicle.
- B. If the following criteria are met:
- The vehicle is a rare example.
  - The vehicle retains significant historic fabric, or any damage is integral to the overall significance of the vehicle. Running would result in a negative impact upon the value of the fabric.
    - This might include significance placed in the period of history that resulted in the vehicle no longer running.
- C. If the following criteria are met:
- There are several preserved examples of the vehicle type within and out of the museum's collection.
  - The vehicle has some significant historic fabric which is important to the contribution of a history or discipline, or any damage adds to the story of the overall vehicle.
- D. If the following criteria are met:
- There are many preserved examples of the vehicle type within and out of the museum's collection.
  - The vehicle has some significant historic fabric for communities or interest groups, or any damage adds to the story of the overall vehicle.
- E. If the following criteria are met:
- There are many preserved examples of the vehicle type.
  - The vehicle retains little fabric of historic importance.

Write a short explanation of the category chosen here, including the rarity of the vehicle and a summary of the value of its materiality.

#### 12.1.6. Suggested Conservation Route Outcome

The **Brief Significance Assessment, Condition Assessment** and **Conservation Route Assessment** will feed into the Suggested Conservation Route Outcome when inputted into the Excel document. This, overall, will result in one of the following conservation outcome suggestions within the Excel document:

1. Do nothing
  - This will result in vehicle in static condition
2. Preventive measures
  - This will result in a vehicle static condition
3. Interventive preservation or consolidation
  - This will result in a vehicle in static condition
4. Restoration
  - This will result in a vehicle in working order
5. Reconstruction
  - This will result in a vehicle in working order
6. Adaptation or consider disposal
  - This category indicates that significance may be greater through adaptation, or a new use decided e.g., a vehicle with low significance can be used by the museum as an object other than an exhibit piece, or a vehicle with moderate or great significance can be used to assist with the interpretation of other exhibit objects such as through the displaying parts of the object. An example of this is the Cut-in-half Centurion Mark 3. Otherwise, disposal may be considered.

The production of a replica may be considered for numbers 1 to 3. This will result in the original vehicle remaining in static condition, while similar experiential aspects are realised through a replica. This may be particularly beneficial for a vehicle that rates A or B in the 'value in running display' category, but static display is suggested.

The suggested route outcome has been formed with the assumption that the vehicle under assessment is currently in static condition. When carrying out an assessment for a vehicle in working condition, the above outcomes are not applicable, so assume that the tank is in current static condition.

#### 12.1.7. Identify Factors and Issues

Whether these conservation outcomes are realised will depend upon a consideration of the following:

- Health and safety
  - Unsafe parts may need to be replaced or removed.
- Resources (current and future)
  - The condition of an object may impact upon resources required to follow the conservation outcome, which may include factors such as cost, the available knowledge and skills, availability of parts, availability of workshop staff or workshop space.
  - This depends on the current condition of the object, as an object in poor condition may require more resources to follow the suggested conservation route.

- Frequency of operation
  - This may affect the justification of the cost of restoration.
  - It may also impact upon expected working lifetime of the vehicle.
- Size of working fleet
  - The current number of vehicles in the working fleet may impact upon the decision, as if there are enough vehicles in the working fleet to provide valuable running vehicle displays, the decision may not be made to restore or reconstruct a vehicle to working order.
  - This factor also requires consideration of resources such as cost, storage facilities and workshop staff availability, which may prove to be limiting factors.
- Ownership of the vehicle

An additional short risk assessment may be beneficial to support the above points.

These factors may mean that the suggested conservation route is impractical, unsafe or simply not as beneficial as may first appear, and may change the decided conservation route.

#### 12.1.8. Conservation Outcome

State the decided conservation outcome, based on the Suggested Conservation Route Outcome and additional factors and issues.

If it is decided that the item is to be displayed in static condition, state if any preventive or remedial conservation is required. If it is decided that the item is to be displayed in running condition, state the next steps for this to be realised. It may be the case that an item would be more valuable in running condition, but resources do not allow for this to happen at the current time. If this is the case, state why.

#### 12.1.9. Conclusions

Make any conclusions on the conservation outcomes and outline next steps. An action plan may follow this document.

Sources consulted in development of this document: (Dunn *et al.* 2012; CyMAL 2013; Lomas 2014; ABTEM 2018; Reed 2018; Sturges 2018) (www1)

### 12.1.10. Assessment Matrix

	Significance	Condition	Value in running display	Value in static display
<b>A</b>	Of international importance and integral to the collections development policy. Object is known to be unique or rare. Object is a very valuable engagement piece.	Stable material, good condition, structurally sound, no evidence of damage or deterioration, no conservation issues and complete.	Running would result in a unique working example that can enable all of the following: <ul style="list-style-type: none"> <li>• Show the vehicle's original purpose through movement.</li> <li>• Enable a greater visitor understanding of phenomenological or experiential aspects of the past, resulting in an authentic experience.</li> <li>• Enable a greater visitor understanding of the vehicle's history and associated wider histories.</li> <li>• Enable the display of sensory aspects such as sound, smell, movement and vibrations underfoot that cannot be experienced elsewhere.</li> <li>• Preserve specific heritage skills that would otherwise be at risk of being lost.</li> </ul>	<ul style="list-style-type: none"> <li>• The vehicle is unique.</li> <li>• The vehicle is of great significance in static condition (refer to significance assessment). Running would result in an unacceptable negative impact upon the value of the fabric and vehicle as a whole. This might include significance placed in the period of history that resulted in the vehicle no longer running. It might also include vehicles which were never used, so running would not accurately represent their working life.</li> <li>• Retains all or most of its historic fabric, and the vehicle's significance results from this. Any damage is integral to the overall significance of the vehicle.</li> </ul>
<b>B</b>	Of national importance and an important part of the collections development policy. Object is known to be rare. Object is a valuable engagement piece.	Stable material, structurally sound and largely complete, minor cleaning or improvement in preventive measures required.	Running would result in a rare working example that can enable four or more of the following: <ul style="list-style-type: none"> <li>• Show the vehicle's original purpose through movement.</li> <li>• Enable a greater visitor understanding of phenomenological or experiential aspects of the past, resulting in an authentic experience.</li> <li>• Enable a greater visitor understanding of the vehicle's history and associated wider histories.</li> <li>• Enable the display of sensory aspects such as sound, smell, movement and vibrations underfoot that cannot be experienced elsewhere.</li> </ul>	<ul style="list-style-type: none"> <li>• The vehicle is a rare example.</li> <li>• The vehicle retains significant historic fabric, or any damage is integral to the overall significance of the vehicle. Running would result in a negative impact upon the value of the fabric. This might include significance placed in the period of history that resulted in the vehicle no longer running.</li> </ul>

			<ul style="list-style-type: none"> <li>• Preserve specific heritage skills that would otherwise be at risk of being lost.</li> </ul>	
<b>C</b>	Of community importance, either locally or an interest group. Integral to the museum's themes and the site's purposes. Only one, or one of the best, examples in the region or community group.	Stable material but needs monitoring, some restoration or repair conservation desirable. May be incomplete or damaged.	<p>Running would result in a working example, of which there may be several, that can enable two or three of the following:</p> <ul style="list-style-type: none"> <li>• Show the vehicle's original purpose through movement.</li> <li>• Enable a greater visitor understanding of phenomenological or experiential aspects of the past, resulting in an authentic experience.</li> <li>• Enable a greater visitor understanding of the vehicle's history and associated wider histories.</li> <li>• Enable the display of sensory aspects such as sound, smell, movement and vibrations underfoot that cannot be experienced elsewhere.</li> <li>• Preserve specific heritage skills that would otherwise be at risk of being lost.</li> </ul>	<ul style="list-style-type: none"> <li>• There are several preserved examples of the vehicle type within and out of the museum's collection.</li> <li>• The vehicle has some significant historic fabric which is important to the contribution of a history or discipline, or any damage adds to the story of the overall vehicle.</li> </ul>
<b>D</b>	Of clear site-specific importance, integral to the museum's themes and the site's purposes. Important to the contribution of a story or discipline. Only one, or one of the best, examples in the organisation.	Unstable material, incomplete or showing signs of deterioration or damage, specialist conservation required.	<p>Running would result in a working example, of which there may be many, that can enable two of the following:</p> <ul style="list-style-type: none"> <li>• Show the vehicle's original purpose through movement.</li> <li>• Enable a greater visitor understanding of phenomenological or experiential aspects of the past, resulting in an authentic experience.</li> <li>• Enable a greater visitor understanding of the vehicle's history and associated wider histories.</li> <li>• Enable the display of sensory aspects such as sound, smell, movement and vibrations underfoot that cannot be experienced elsewhere.</li> </ul>	<ul style="list-style-type: none"> <li>• There are many preserved examples of the vehicle type within and out of the museum's collection.</li> <li>• The vehicle has some significant historic fabric for communities or interest groups, or any damage adds to the story of the overall vehicle.</li> </ul>



			<ul style="list-style-type: none"> <li>• Preserve specific heritage skills that would otherwise be at risk of being lost.</li> </ul>	
<b>E</b>	Not deemed to have historical interest, or inadequate knowledge available to form significance assessment. Outside the collections development policy.	Very unstable material, damaged or decayed beyond repair, may pose a risk to other objects or health and safety risk.	Running would realise one, or none, of the benefits mentioned in the above categories.	<ul style="list-style-type: none"> <li>• There are many preserved examples of the vehicle type.</li> <li>• The vehicle retains little fabric of historic importance.</li> </ul>

*Table 28. The Assessment Matrix for assessing significance, condition, value of the object in running condition and value of the object in static condition*

## 12.2. End of Working Life Guidance

The flowchart below (Figure 74) shows an abbreviated version of the factors given by visitors when surveyed about the end of working life for vehicles. The following page gives more detail on each factor.

As the flowchart is formed of factors stated by visitors, it may not be comprehensive. Other factors that may impact the point at which a vehicle stops working may arise and must also be considered. Each object and its context should be considered on an individual basis. In addition, the decision should be periodically reassessed as circumstances will change over time.

If the decision is made to consider ending the working life of a vehicle, then this decision may not be permanent. A change in visitor views, or new technology that permits restoration to be carried out, means that it may be valuable to work a vehicle in the future that has previously been designated to be in static display. However, it should also be noted that working vehicles regularly will reduce the degradation of certain parts, for reasons such as the spreading of lubricants. It is not best practice to temporarily halt running on several occasions, as this may result in further replacements and repairs.

## End of Working Life Flowchart

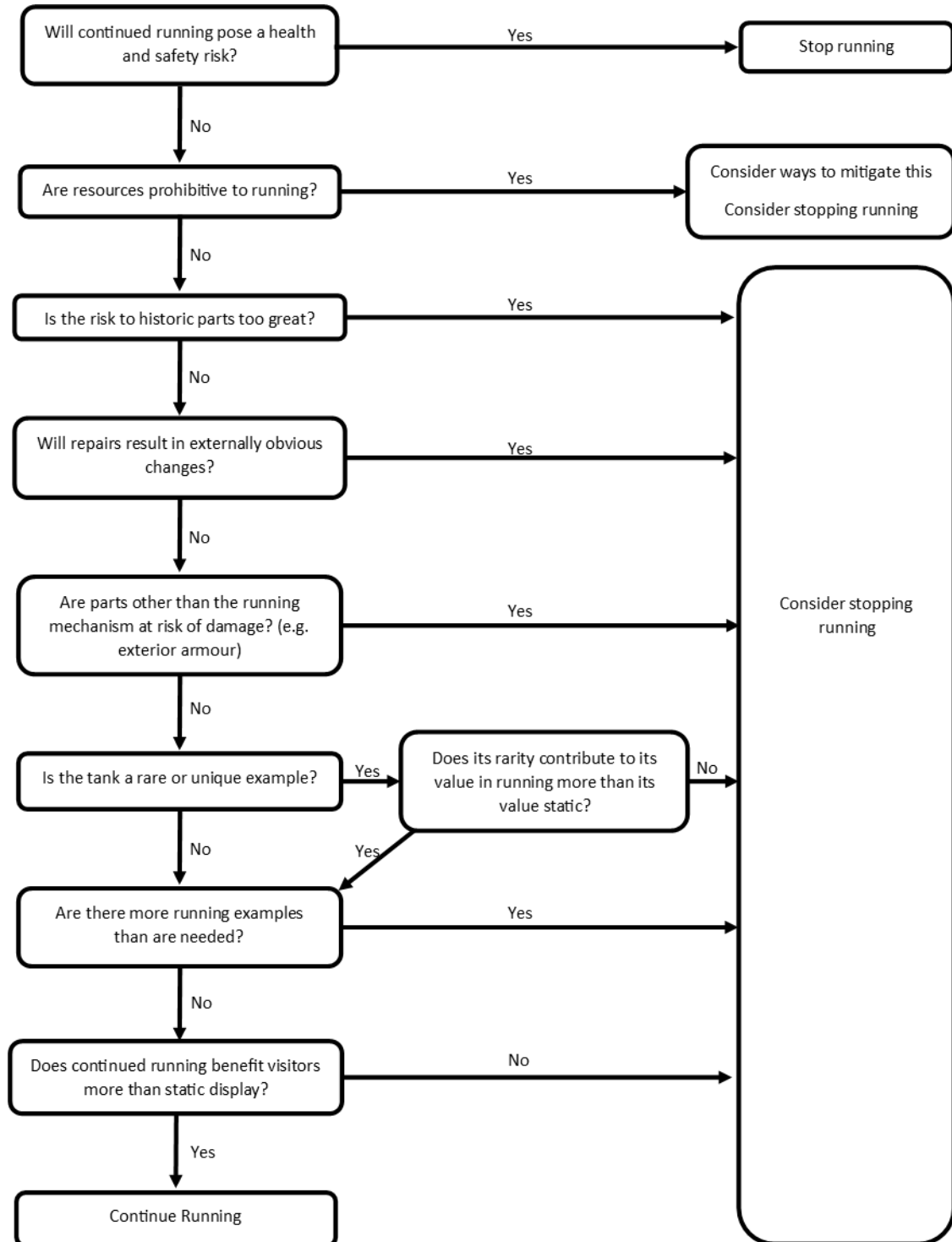


Figure 74. Flowchart showing considerations when deciding the point at which to stop running a tank, based on visitor comments.

### 12.2.1. Factors

**Will continued running pose a health and safety risk?**

This factor should be considered above all other factors. If there is any health and safety risk in running the vehicle, then running should stop until the risk is mitigated. A supporting risk assessment may be required for answering whether continued running would pose a health and safety risk.

**Are resources prohibitive to running?**

Resources can include cost, time, workshop staff, available skills, workshop space, the availability of new old stock, or the ability to manufacture new parts. Another resource mentioned by visitors was non-renewable fuel. There may be avenues to increase resources, for example fundraising to raise money, or further training opportunities for staff to increase the available skills within the team. If there are no avenues to increase resources, then a consideration of stopping running may be beneficial. This may be temporary, until resources are found, or on a long-term basis.

This question requires a consideration of any resources that may be disproportionate to the benefit of running, for example if the time taken for maintenance and repair is greater than the benefit gained from experiencing the tank in running order. The resource issue is broad ranging and diverse to calculate. For example, the post-use washing and cleaning of a tank is crucial for removal of trapped and adhering dirt that can set up electrolytic cells and harbour electrolytes. This also links to storage conditions and the prevailing humidity in between operating the tank. Scenarios such as this may require specific cost-benefit analyses, and decision-making may be aided by focus groups and further surveys of visitor opinion. These individual circumstances should be assessed on a case-by-case basis.

**Is the risk to historic parts too great?**

The point at which risk is deemed 'too great' may depend on a variety of factors, including the significance of the object, plans for future running and the object's condition. It should be assessed based on individual circumstances and the individual object. This factor requires a consideration of the operating log, maintenance plan, significance assessment, condition assessment and conservation route assessment.

**Will repairs result in externally obvious changes?**

This factor assumes that repairs will be required, so if repairs are not required, answer 'no'. If repairs are required, the outcomes of any interventive work that may alter the external appearance should be considered to define the acceptable level of change. If this change is deemed unacceptable, then it may be more beneficial for visitors to display the vehicle in static condition.

**Are parts other than the running mechanism at risk of damage?**

This factor is similar to the above factor in considering external parts. Parts other than the running mechanism may be expected to degrade or wear at a slower rate than running mechanisms. Degradation to armour will be negligible but hinged and sliding parts or low gauge steel storage bins will be at greater risk. Although it is a limiting factor, it is less likely to occur than the need to repair the running mechanism. This decision may be quantified through a risk assessment.

**Is the tank a rare or unique example? If so, does its rarity contribute to its value in running more than its value as a static vehicle?**

This requires measuring the rarity and value of the experience of running against the rarity and value of the tank as a static object. This can be found through the Conservation Route documents.

**Are there more running examples than are needed?**

If there are more running examples than are needed, then resources may be better used elsewhere. In addition, the experience provided by running more examples than are needed will not be of great value to visitors. This factor requires a consideration of the size of the working fleet and may incorporate a consideration of other running tanks in other museums.

**Does continued running benefit visitors more than static display?**

This requires a consideration of the significance assessment, condition assessment and conservation route assessment. If this has been previously carried out for the vehicle, it may be beneficial to review the assessments, as values and circumstances will change over time.

#### 12.2.1.1. Summary

The flowchart (Figure 74) aims to provide a set of questions to be considered when deciding whether to stop a vehicle running and display it in static condition. These factors are based upon visitor perceptions of the point at which a vehicle should stop running, so show what visitors value and think about this decision-making process. From this, the decision to stop working a tank can be made.

### 12.3. Application of Frameworks

The Conservation Route Supporting Document and Conservation Route Form was given to the Collections Department at The Tank Museum and shown to the Steering Group Committee for trials on real scenarios.

It was found that the initial Conservation Route Form did not fully work when considering multiple vehicles of the same type in the collection. The Conservation Route Form was subsequently amended to include the column 'is there more than one of this vehicle in the collection?' (Appendix G). This ensured that, if the suggested decision was to run the vehicle, then only one of each vehicle type would be run and the others displayed in static condition. Both The Tank Museum and the Steering Group gave feedback that the frameworks enabled decisions to be made from a uniform set of criteria based in both visitor views and conservation ethics. Such frameworks have not previously been widely used within larger and working heritage, and they hoped that it is a method that will be adopted in the future.

The end of Working Life Guidance was found to be a useful document when considering the point at which a vehicle should stop running. By linking it back to the Conservation Route Form, value assessments can be periodically produced for the vehicle to reassess its greatest potential use in either static or running display.

In order to establish the applicability and usefulness of these frameworks beyond The Tank Museum, the Conservation Route Form was applied to two vehicles at Haynes Motor Museum, a 1903 Darracq Type L and a 1990 Mazda MX5. The following explains how the Conservation Route Form was used to suggest heritage management decisions for each vehicle.

## 1903 Darracq Type L

### 1. Heritage Summary

The Darracq Type L 8HP was one of four models offered by Darracq in 1903. Able to accommodate four people, the Type L Darracq has an engine cast in one piece, wooden frame and a new innovation, a variable accelerator. The 8hp followed conventional design with a vertical single cylinder engine featuring an atmospheric inlet valve and mechanical exhaust valve. This vehicle has the popular 4/5 seater rear entrance tonneau body configuration, the rear door allowing comfortable access to the rear. This meant that Edwardian ladies did not need to clamber over the rear wings.

This car (Figure 75) was first registered on 5<sup>th</sup> October 1904 to Gordon Scott of Marine Parade, Brighton. Discovered in a scrapyard in West Bromwich in 1943, the vehicle was bought for £15 by the late Philip Southall, who restored the vehicle and ran it for the subsequent 53 years until it was acquired by the museum in 1996. In January 1948 the Veteran Car Club of Great Britain (VCCGB) confirmed the date of the car as 1903.

Shortly after entering the Haynes Motor Museum collection, the vehicle was stripped and rebuilt. It was chosen for display as it is an excellent example of an early internal combustion engine car. Although an early vehicle, it has features that are recognisable in modern vehicles, such as an offset steering wheel and forward-facing seats. In addition to being intrinsically historically significant, it is a valuable example for showing visitors how vehicles have changed in the last 118 years, and how certain aspects have stayed the same.

In 2013, the vehicle was again restored to celebrate the 100<sup>th</sup> episode of the television programme *Wheeler Dealers* and successfully completed the 2013 London to Brighton Veteran Car Run. The Darracq also took part in the London to Brighton Veteran run in 1996, 1999, 2013, 2014, 2015 and 2017 whilst under the ownership of the museum. Notes on the history of the vehicle suggest it had been previously entered into several London to Brighton runs before being owned by the museum.

### 1.1. Conclusion

The 1903 Darracq is an early example of a motor vehicle, which enables visitors to understand advances in vehicle design throughout the last century. The vehicle has been restored at least three times at stages throughout its life.



Figure 75: The 1903 Darracq Type L on display in Haynes Motor Museum. Source: author.

### 2. Significance Assessment

**Significance Assessment Rating: C**

**Supporting information:** The vehicle is one of the best examples of its type in the local region. It can be displayed to tell the history of early motor vehicles. It is integral to the museum's themes and mission of enabling "audiences to experience and explore the motor car's development and the evolution of automotive design, engineering and technology" (Haynes Motor Museum 2020).

**Statement of Significance:** The vehicle is significant due to being an early example, which enables audiences to understand changes in motor vehicle design.

### 3. Condition Assessment

**Condition Assessment Rating: C**

**Supporting information:** The Darracq is in stable condition, but is leaking oil and so requires interventive work. The vehicle has been given a condition rating of C.



#### 4. Conservation Route Assessment

##### 4.1. Value in Running Display

##### **Value in Running Display Rating: C**

**Supporting information:** A search of the 2021 London to Brighton Veteran Car Run entry list ([www1](#)) found five other entries for Darracqs with a 1 cylinder, 8hp engine and a rear-entrance tonneau. These vehicles date from between 1901 and 1904. In addition, one entry was a 2-cylinder 12hp 1904 Darracq owned by the Louwman Museum in the Netherlands ([www2](#)). There are several other running vehicles of the same type, and although they are in private collections, there is one similar vehicle in a museum. Running would show the vehicle's original purpose through movement through a display of sensory aspects. In 1953, Darracq's 12hp 2-cylinder 2-seater was christened *Genevieve* and starred in the film of that name, which told the light-hearted story of rivalry on the London-Brighton veteran car run that in turn shone a spotlight on the joys of owning a veteran vehicle. This resulted in many people becoming interested in historic vehicle ownership and restoration. This story can be understood more fully by audiences when the vehicle is running. The Value in Running display has been given a rating of C.

##### 4.2. Value in Static Display

##### **Value in Static Display Rating: C**

**Supporting information:** Although this is the only Darracq within the museum collection, there are several preserved examples of the vehicle type out of the museum's collection. The vehicle has some significant historic fabric but has been restored many times. Although it can be argued that the restoration carried out in the 1940s forms part of the vehicle history and so is significant, the vehicle was also restored twice after entering the museum collection, so in its current state contains many parts that have little historic importance to the story of the vehicle before it entered the collection. The vehicle is valuable in displaying the early history of motor vehicles, but there are other vehicles in the collection that can be used to demonstrate the same wider themes.

##### 4.3. Conservation Route Suggestion:

**Conservation Route suggestion (taken from the Excel document):** Running

## 5. Other Considerations

**Health and safety:** This vehicle can be run safely and has done so for previous London to Brighton Veteran Car Runs. A full risk assessment will be carried out if the decision is taken to run the vehicle in the future.

**Resources (current and future):** Operation of the vehicle will require resources, which must be considered. The workshop on site currently carries out the maintenance of any running vehicles.

**Frequency of operation:** The vehicle is currently run once a year, or once every two years. More frequent running may reduce the need for complete overhauls every time the vehicle is run, as lubricants are spread and stress points moved.

**Implication on current working fleet:** There is not currently a running fleet at the Museum.

**Ownership of the vehicle:** The vehicle is owned by the museum.

## 6. Conservation Outcome

It is suggested that this vehicle should be displayed in running condition.

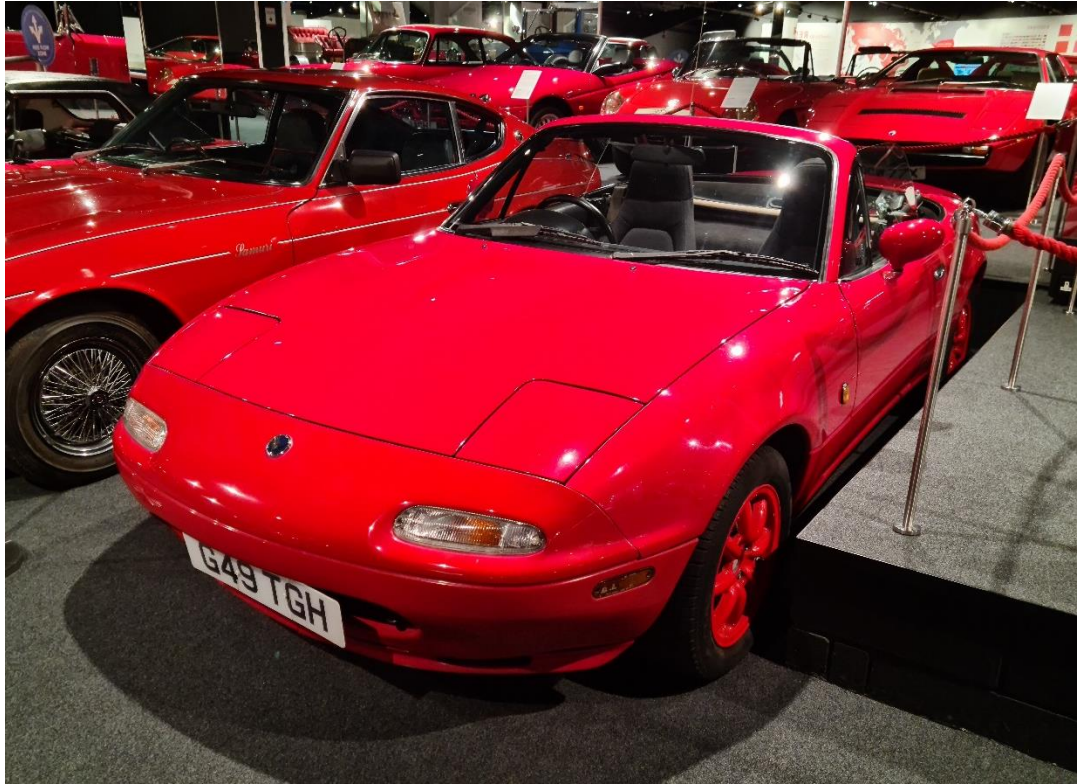
### 1990 Mazda MX5

#### 1. Heritage Summary

Not much is known about the history of this specific example, although it can be used to display the wider history of the Mazda MX5. Widely known as the world's best-selling sports car, the first generation Mazda MX-5 was launched at the Chicago Motor Show in 1989 (Ingram 2013) and quickly gained praise from both the press and the public. The Mk1 was produced until 1997, within which time a total of 433,963 cars were sold. The car was designed to be an affordable lightweight sports car (Ingram 2013). It was influenced by the British sports cars of the 1960s, but with an increased focus on reliability and safety (Ingram 2013). The popularity of Mazda MX5 revived the sports car market after the previous decade's focus on hot hatches.

#### 1.1. Conclusion

The 1990 Mazda MX5 displays both the history of sports cars and of the Japanese car market.



*Figure 76. The Mazda MX5 on display in Haynes Motor Museum. Source: author.*

## 2. Significance Assessment

### **Significance Assessment Rating: D**

**Supporting information:** Although the vehicle can be used to explain various histories, this specific vehicle is not a particularly significant example. It is the only Mazda MX5 in the museum and is of site-specific importance in displaying the aforementioned histories.

### **Statement of Significance:**

The Mazda MX5 is of site-specific importance as it can be used to show the histories of sports cars and the Japanese car market. This particular example and its known history is not of great significance.

## 3. Condition Assessment

### **Condition Assessment Rating: B**

**Supporting information:** The vehicle is in stable and structurally sound condition. It requires some minor cleaning of the interior trim.

#### 4. Conservation Route Assessment

##### 4.1. Value in Running Display

**Value in Running Display Rating: E**

**Supporting information:** The Mk1 MX5 can be widely seen on today's roads around the country, owned by private owners as both a modern classic and a run-around. Running the vehicle would not result in an experience that gives audiences a greater understanding of the phenomenological aspects of the vehicle, or of its history. Any experience it would provide can be easily seen elsewhere on the roads and at car meets.

##### 4.2. Value in Static Display

**Value in Static Display Rating: D**

**Supporting information:** There are many preserved examples of the vehicle type out of the museum's collection. The vehicle retains original and historic components, so its fabric provides some significance.

##### 4.3. Conservation Route Suggestion:

**Conservation Route suggestion (taken from the Excel document):** Static

#### 5. Other Considerations

**Health and safety:** The vehicle is in good condition. Risk assessments for static display will be followed.

**Resources (current and future):** The museum anticipates it will have future resources to continue to display the vehicle in static condition.

**Frequency of operation:** Not to be operated.

**Implication on current working fleet:** There is not currently a running fleet at the museum.

**Ownership of the vehicle:** The vehicle is owned by the museum.

#### 6. Conservation Outcome

It is suggested that this vehicle should be displayed in static condition.

#### 12.4. Future of the Frameworks

The frameworks form decision-making tools and data sets for conservation decision routes at The Tank Museum that will result in either running or static vehicles. The Conservation Route assessment provides a matrix for deciding between a range of conservation outcomes based on the individual condition and values of a vehicle, while the End of Working Life Guidance poses a set of questions for considering whether to continue running a vehicle or display it in static condition. The Overview of Visitor Surveys provides a data set to ensure that decisions are tailored to benefit visitors to The Tank Museum. It is intended that these frameworks are to be processed individually but together create a decision-making toolkit for running and static tanks.

These frameworks will be adopted for further testing at The Tank Museum. Their application to the many hundreds of vehicles in the collections will support the decision-making processes whose outcomes direct the future life of individual tanks at the museum. With their grounding in conservation and psychology theory and thorough underpinning with decisions of visitors to The Tank Museum, it is hoped that the frameworks will facilitate decision that encompass the views of the many stakeholders with an interest in AFV heritage.

The broader applicability of the frameworks to other working vehicle collections has been demonstrated. In disseminating the results of this study, it is hoped to generate interest from other museums to test the value of these frameworks for their decision-making and to inspire periodic review of visitor opinions.

## 13. Conclusions

### 13.1. Visitor Values and Decision-Making

This research began with a question from The Tank Museum: “Should we be running historic tanks?”. With a collection of around 350 tanks and other AFVs, decisions about which vehicles should run and for how long are complex and involve multiple stakeholders. The Tank Museum had no evidence-based framework for incorporating visitor opinions with expert understanding of tank significance, restoration potential and conservation.

The literature review presented here evidences a changing landscape of thinking about heritage object values and lifetimes set against notions of access, acceptable damage and material originality versus authenticity. The role of the public in defining the values ascribed to heritage is in the ascendancy and preservation of objects is recognised as a preservation of the values within them. These values are fluid and, although they relate closely to the purpose and history of an object, they are a product of the individual and wider society. No two individuals will ascribe exactly the same values to an object and values are subject to change over time and with prevailing thinking.

Tanks and AFVs are working vehicles which serve a practical purpose during their working lifetimes before entry into heritage collections. In this way, they parallel steam heritage and other vehicle and transport collections. They embody military history and their development was driven by world events and mirrored wider technological advancements, therefore their educational potential is vast and the method of displaying them should activate that potential.

Surveying over 500 visitors to The Tank Museum produced a robust assessment of public opinion on the value of running versus static display routes for heritage tanks. There was an overwhelming desire for tanks to be maintained in running condition to provide immersive sensory experiences for visitors. If the public defines the values in an object, the value of tanks is in running. Concepts of material authenticity and originality are rejected in favour of authentic experiences of tanks in action with all the associated sounds, smells, vibrations and movements. This is not merely for

enjoyment; the experience of tanks in motion produces a rich understanding of these machines, their operation and their effect.

Beyond the machine itself, this enhanced comprehension is shown to generate a respect for the human skill in building, operating and maintaining these vehicles and an empathy for the soldier or civilian facing them in conflict situations. Running tanks brings eyewitness accounts of tanks and their human impact to life for the visitor. This humanisation of history through running vehicles is clear in the visitor studies and is of great importance for countering grey and dark tourism and the glorifying of war.

Despite the desire to prioritise the running of tanks, the public understands that this is not a one-size-fits-all approach and there are limits to the ability to do this. Caveats to running include when a tank is too significant (e.g. the only surviving example), when restoration and running costs are too high, when parts are no longer available and when health and safety concerns are too great. The visitor survey has produced a comprehensive list of reasons that the public accept as factors precluding the restoration of a vehicle to running order or necessitating the retirement of a working vehicle.

Importantly, and contrary to some theories within heritage thinking, when faced with the dichotomy of a running or a static vehicle, visitors view tanks on static display as lifeless and dead. Ideas that objects move into a different life stage when displayed in a museum are not supported by the opinions found in these studies. Static display is a position of last resort which fails to convey the values that the public ascribe to the vehicles.

The Tank Museum should perhaps not be asking whether they should run vehicles, but rather “When should we *not* be running a historic tank?”. The visitor studies constitute a clear mandate to run tanks within the collection to exhibit the full spectrum of their values and reach their educational potential. Importantly, the preservation of running tanks goes hand in hand with the preservation of heritage skills in construction, maintenance and operation of the vehicles which is a key strategic priority of The Tank Museum. The data gathered here justifies decisions by funding bodies to finance the restoration of tanks to running order and supports future applications for funding to increase the size of the running fleet.

The ultimate decision on whether to run a tank is acknowledged by visitors to lie with the experts at The Tank Museum. The frameworks devised here support the decision-making process and incorporate the public opinions found in the study. This enables The Tank Museum to make those expert decisions with the understanding that visitor opinions are included in the process and this assists them in meeting another strategic priority of enhancing heritage value in the collection. Although at an early stage in testing, the frameworks are already facilitating conservation route and end of working life decisions at the museum and can be adapted to meet changing needs and values, ensuring their relevance into the future.

### 13.2. Limitations and Further Work

This work focuses on the value that users or visitors can gain from collections. A limitation of this approach is that non-users were not consulted. Future research could therefore consider the opinions of non-users, encouraging a wider audience to engage with the collections. By exploring what non-users value, the museum can 'do more to uncover the stories...broaden participation, and ensure their long-term relevance' (MA 2019).

The literature review and studies found broad visitor opinions on the decision to run a tank or display it in static condition. Further research may be needed to consult visitor opinion on the nuance of specific conservation decision routes for individual tanks, as each decision requires a consideration of the individual object, context and associated values. Although respondents acknowledged that the 'expert opinion' was the ultimate backstop in decision-making, echoing notions of 'cool' authenticity in materialist views, a more constructivist view predominates in visitor opinion at this time. There is a clear focus on the benefits of immersive experiences and phenomenological and sensory values. As values change over time, it is suggested that surveys of visitor opinion should be carried out periodically to refresh thinking and identify changes in the values that visitors place on running or static tanks.

The thesis has produced a data set and toolkit for decision-making at The Tank Museum that reassesses the concepts of authenticity and value for static and running vehicles. The relevance of this work and its findings is not limited to The Tank Museum.



Two examples evidence the application of the frameworks to decision-making at Haynes Motor Museum and the next step is to approach other museums with working collections to examine the relevance of the frameworks in those contexts. The concept of a framework which embeds the opinions of stakeholders and experts in conservation decisions is likely to have wide applicability and can be tailored to the end users at different institutions.

The relationship with The Tank Museum will continue in development of publications based on this research and further testing and refinement of the frameworks. The strong links of The Tank Museum with other institutions housing large AFV collections across Europe and the world offers the opportunity to trial the use of the frameworks internationally.

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The use of significance assessments such as those used at Dingles Fairground Heritage Centre provide a robust methodology for determining if an object should be displayed in running or static condition. We now have a suggested framework for deciding, in an ethical manner, when it is acceptable for certain objects to run. However, it is not expected that these objects will run forever. The following section discusses the point at which the object should return to static condition at the end of its running life in a heritage setting, and considers factors that may affect this decision.

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## Appendices

### Appendix A

List of Steam Organisations Consulted for Study under Previous Reasoning Behind  
Restoration to Running Order

Organisation	Reference
Bedford Steam Preservation Society	The Bedford Steam Engine Preservation Society. Available at: <a href="https://bseps.org.uk/">https://bseps.org.uk/</a> [accessed 26.05.2020]
Burnham Steam & Historic Machinery Club	Burnham Steam & Historic Machinery Club, About the Club. Available at: <a href="https://sites.google.com/site/burhamclub/home">https://sites.google.com/site/burhamclub/home</a> [accessed 26.05.2020]
Chiltern Traction Engine Club	Chiltern Traction Engine Club. Available at: <a href="https://www.chilterntractionengineclub.co.uk/">https://www.chilterntractionengineclub.co.uk/</a> [accessed 30.04.2020]
East Anglian Traction Engine Society	About the East Anglian Traction Engine Society. Available at: <a href="https://eates.org/about/">https://eates.org/about/</a> [accessed 26.05.2020] ; (EATES 2016)
Great Yorkshire Traction Engine Club	L Greenwood 2020, pers. comm., 2 May
Hertfordshire Steam Engine Preservation Society	Hertfordshire Steam Engine Preservation Society. Available at: <a href="http://www.hertssteam.co.uk">www.hertssteam.co.uk</a> [accessed 26.05.2020]
Lancashire Traction Engine Club	Lancashire Traction Engine Club. Available at: <a href="https://www.lancashiretec.co.uk/">https://www.lancashiretec.co.uk/</a> [accessed 26.05.2020]
North Staffs and Cheshire Traction Engine Club	R Warren 2020, pers. comm., 3 May
Steam Plough Club	What we do, Steam Plough Club. Available at: <a href="http://www.steamploughclub.org.uk/">http://www.steamploughclub.org.uk/</a> [accessed 26.05.2020]
The Leeds & District Traction Engine Club	(Leeds and District Traction Engine Club 2018); Rimmington A 2020, pers. comm., 9th May
The West of England Steam Engine Society	History of Society- West of England Steam Engine Society. Available at: <a href="https://www.weses.co.uk/index.php/west-of-england-steam-engine-society/">https://www.weses.co.uk/index.php/west-of-england-steam-engine-society/</a> [accessed 26.05.2020]
Road Roller Association	The Association: Road Rollers Association. Available at: <a href="https://www.roadrollers.org/association">https://www.roadrollers.org/association</a> [accessed 26.05.2020]

## Appendix B

Table of Values Stated in Guidelines and Standards for Heritage Management

Source	Values Stated
(Australia ICOMOS 2013) <b><i>The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance.</i></b>	<ul style="list-style-type: none"> <li>• Aesthetic</li> <li>• Historic</li> <li>• Scientific</li> <li>• Social</li> <li>• Spiritual</li> </ul>
(Russell <i>et al.</i> 2009) <b><i>Significance 2.0: a guide to assessing the significance of collections</i></b>	<ul style="list-style-type: none"> <li>• Historic</li> <li>• Artistic or aesthetic</li> <li>• Scientific or research</li> <li>• Social or spiritual</li> <li>• Provenance</li> <li>• Rarity or representativeness</li> <li>• Condition or completeness</li> <li>• Interpretive capacity</li> </ul>
(Appelbaum 2012) <b><i>Conservation Treatment Methodology</i></b>	<ul style="list-style-type: none"> <li>• Art</li> <li>• Aesthetic</li> <li>• Historical</li> <li>• Use</li> <li>• Research</li> <li>• Educational</li> <li>• Age</li> <li>• Newness</li> <li>• Sentimental</li> <li>• Monetary</li> <li>• Associative</li> <li>• Commemorative</li> <li>• Rarity</li> </ul>
(Ashley-Smith 2011) <b><i>Risk Assessment for Object Conservation</i></b>	<ul style="list-style-type: none"> <li>• Economic</li> <li>• Informational</li> <li>• Cultural</li> <li>• Emotional</li> <li>• Existence</li> </ul> <p>Values that may contribute to one of the above concepts of value:</p> <ul style="list-style-type: none"> <li>○ Age</li> <li>○ Rarity</li> <li>○ Material</li> <li>○ Quality</li> <li>○ History</li> <li>○ Identity</li> <li>○ Information</li> <li>○ Context</li> <li>○ Potential</li> <li>○ Condition</li> </ul>

(Drury <i>et al.</i> 2008) <b><i>Conservation Principles, Policies and Guidance, English Heritage</i></b>	<ul style="list-style-type: none"> <li>• Evidential</li> <li>• Historical</li> <li>• Aesthetic</li> <li>• Communal</li> </ul>
(Carter <i>et al.</i> 2002) <b><i>Defining Heritage Values and Significance for Improved Resource Management: An application to Australian tourism.</i></b>	<p>Intrinsic values:</p> <ul style="list-style-type: none"> <li>• Resource richness and diversity</li> <li>• Rarity</li> <li>• Representativeness</li> <li>• Genetic considerations</li> <li>• Indispensability</li> <li>• Naturalness or integrity</li> </ul> <p>Extrinsic values:</p> <ul style="list-style-type: none"> <li>• Cultural traditions</li> <li>• Appeal</li> <li>• Aesthetic qualities</li> <li>• Scientific interest</li> <li>• Existing level of protection</li> <li>• Threats</li> <li>• Sustainability</li> <li>• Location</li> <li>• Fragility</li> </ul>
(ICOMOS 1964) <b><i>International Charter for the Conservation and Restoration of Monuments and Sites (The Venice Charter 1964)</i></b>	<ul style="list-style-type: none"> <li>• Historic</li> <li>• Aesthetic</li> </ul>
(ICOMOS NZ 2010) <b><i>ICOMOS New Zealand Charter for the Conservation of Places of Cultural Heritage Value</i></b>	<ul style="list-style-type: none"> <li>• Aesthetic</li> <li>• Archaeological</li> <li>• Architectural</li> <li>• Commemorative</li> <li>• Functional</li> <li>• Historical</li> <li>• Landscape</li> <li>• Monumental</li> <li>• Scientific</li> <li>• Social</li> <li>• Spiritual</li> <li>• Symbolic</li> <li>• Technological</li> <li>• Traditional</li> <li>• Other tangible or intangible values associated with human activity</li> </ul>
(Mason 2002) Assessing Values in Conservation Planning: Methodological Issues and	<p>Sociocultural values:</p> <ul style="list-style-type: none"> <li>• Historical</li> <li>• Cultural/symbolic</li> <li>• Social</li> </ul>

Choices. In: de la Torre, M. ed. <b><i>Assessing the Values of Cultural Heritage: Research Report.</i></b>	<ul style="list-style-type: none"> <li>• Spiritual/ religious</li> <li>• Aesthetic</li> </ul> <p>Economic value</p> <ul style="list-style-type: none"> <li>• Use (market) values</li> <li>• Non use (non market) value</li> <li>• Existence</li> <li>• Option</li> <li>• Bequest</li> </ul>
(Feilden 2003) <b><i>Conservation of Historic Buildings</i></b>	<ul style="list-style-type: none"> <li>• Emotional <ul style="list-style-type: none"> <li>○ Wonder</li> <li>○ Identity</li> <li>○ Continuity</li> <li>○ Respect and veneration</li> <li>○ Symbolic and spiritual</li> </ul> </li> <li>• Cultural <ul style="list-style-type: none"> <li>○ Documentary</li> <li>○ Historic</li> <li>○ Archaeological and age</li> <li>○ Aesthetic and architectural values</li> <li>○ Townscape</li> <li>○ Landscape and ecological</li> <li>○ Technological and scientific</li> </ul> </li> <li>• Use <ul style="list-style-type: none"> <li>○ Functional</li> <li>○ Economic (including tourism)</li> <li>○ Social (also including identity and continuity)</li> <li>○ Educational</li> <li>○ Political</li> </ul> </li> </ul>
(Keene 2005) <b><i>Fragments of the world : uses of museum collections</i></b>	<ul style="list-style-type: none"> <li>• Economic</li> <li>• Cultural <ul style="list-style-type: none"> <li>○ Aesthetic</li> <li>○ Spiritual</li> <li>○ Symbolic</li> <li>○ Historical</li> <li>○ Authenticity</li> </ul> </li> <li>• Scientific</li> <li>• Personal Narrative</li> <li>• Impersonal narrative</li> </ul>
(Robles 2010) A Methodological Approach Towards Conservation. <b><i>Conservation and Management of Archaeological Sites</i></b>	<ul style="list-style-type: none"> <li>• Typological</li> <li>• Structural</li> <li>• Constructional</li> <li>• Functional</li> <li>• Aesthetic</li> <li>• Architectural</li> <li>• Historical</li> <li>• Symbolic</li> </ul>
(Stubbs <i>et al.</i> 2009)	<ul style="list-style-type: none"> <li>• Associative values</li> </ul>

<b><i>Time honored : a global view of architectural conservation : parameters, theory, &amp; evolution of an ethos.</i></b>	<ul style="list-style-type: none"> <li>○ Historic</li> <li>○ Commemorative</li> <li>● Curiosity</li> <li>● Aesthetic</li> <li>● Universal</li> <li>● Exemplary</li> <li>● Intangible</li> <li>● Use</li> </ul>
(le Corbusier 1933) <b><i>Charter of Athens</i></b>	<ul style="list-style-type: none"> <li>● Economic</li> <li>● Social</li> <li>● Political</li> </ul>
(Riegl 1982) (1903) <b><i>The modern cult of monuments: its character and its origin</i></b>	<ul style="list-style-type: none"> <li>● Historical</li> <li>● Art</li> <li>● Commemorative</li> <li>● Age</li> </ul>
(Lipe 1984) Value and meaning in cultural resources. In: Cleere, H. ed. <b><i>Approaches to the archaeological heritage.</i></b>	<ul style="list-style-type: none"> <li>● Economic</li> <li>● Aesthetic</li> <li>● Associative/symbolic</li> <li>● Informational</li> </ul>
(Dunn et al. 2012) <b><i>The UCL Collections Review Toolkit</i></b>	<ul style="list-style-type: none"> <li>● Teaching</li> <li>● Research</li> <li>● Public engagement</li> <li>● Historical and intellectual development</li> <li>● Uniqueness</li> <li>● Ownership</li> </ul>
(Lertcharnrit 2010) Heritage Value and Meaning in Contemporary Thailand. In: Smith, G. S. et al. eds. <b><i>Heritage Values in Contemporary Society</i></b>	<ul style="list-style-type: none"> <li>● Informational</li> <li>● Educational</li> <li>● Symbolic</li> <li>● Economic</li> <li>● Entertaining/Recreational</li> </ul>
(Reed 2018) <b><i>Reviewing Significance 3.0: a framework for assessing museum, archive and library collections' significance, management and use</i></b>	<ul style="list-style-type: none"> <li>● Provenance/acquisition</li> <li>● Rarity/uniqueness</li> <li>● Sensory/visual quality/ emotional impact</li> <li>● Condition/completeness</li> <li>● Historical/cultural meaning</li> <li>● Exploitability</li> </ul>

## Appendix C

Table of Values Stated in Guidelines and Standards for Larger and Working Objects

Source	Values Stated
(ABTEM 2018) <b><i>Guidelines for the Care of Larger and Working Historic Objects</i></b>	<ul style="list-style-type: none"> <li>• Provenance</li> <li>• Associations</li> <li>• Representativeness</li> <li>• Rarity</li> <li>• Originality</li> <li>• Integrity</li> <li>• Authenticity</li> </ul>
(FIVA 2017) <b><i>Charter of Turin.</i></b>	<ul style="list-style-type: none"> <li>• Engineering</li> <li>• Aesthetic</li> <li>• Functional</li> <li>• Social</li> <li>• Historical</li> </ul>
(NSW Heritage Office 2001) <b><i>Safe in the Shed: Caring for Historic Farm Machinery.</i></b>	<ul style="list-style-type: none"> <li>• Historic</li> <li>• Aesthetic</li> <li>• Scientific or research</li> <li>• Social or spiritual</li> <li>• Provenance</li> <li>• Representativeness</li> <li>• Rarity</li> <li>• Condition, intactness, and integrity</li> <li>• Interpretive potential</li> </ul>
(Leskard 2007) <b><i>Policy and Procedures for Selecting and Operating Historic Objects from the Collections of the National Museum of Science &amp; Industry.</i></b>	<ul style="list-style-type: none"> <li>• Cultural</li> <li>• Aesthetic</li> <li>• Historic</li> <li>• Scientific</li> <li>• Social</li> <li>• Spiritual</li> </ul>
(Barr 2006) <b><i>The Conservation of 'Working Objects': Development of a Conservation Management Tool.</i></b>	<ul style="list-style-type: none"> <li>• Aesthetic</li> <li>• Historic</li> <li>• Scientific</li> <li>• Social</li> <li>• Spiritual</li> </ul>
(TICCIH 2003) <b><i>The Nizhny Tagil Charter for the Industrial Heritage.</i></b>	<ul style="list-style-type: none"> <li>• Evidence of activities</li> <li>• Social</li> <li>• Intrinsic</li> <li>• Technological and scientific</li> <li>• Aesthetic</li> <li>• Rarity</li> </ul>
(Clark 2007) Big Stuff - Big Difference - Understanding the Archaeology, Significance and Impact	<ul style="list-style-type: none"> <li>• Economic</li> <li>• Social</li> </ul>

of Industrial Heritage Projects. In: <b><i>Big Stuff.</i></b>	
(Gibbon 2003) <b><i>Railway Carriage Significance, A Methodical Approach to Assessing the Significance of 'Preserved' Railway Carriages and Other Artefacts with a View to Advising Potential Funding Bodies.</i></b>	<ul style="list-style-type: none"> <li>• Uniqueness or rarity</li> <li>• Representativeness</li> <li>• Illustrative of an activity that merits representation</li> <li>• Technical or operational aspects</li> <li>• Social impact</li> <li>• Form part of an established series</li> <li>• Represent important stage in development</li> <li>• Associations with significant event or person</li> <li>• Local, regional or national importance</li> </ul>



## Appendix D

### 2019 Tankfest Survey

**The following questions will be used as part of a PhD project looking at the importance of static and running tanks in The Tank Museum. The data will be used to help management decisions at The Tank Museum. We'd love to hear your opinion.**

1. Sound and movement add greatly to the understanding and enjoyment of tanks.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. Are there any other features of a running tank that are important?

3. Running tanks need repairs and replacement parts. It is better for a tank to be running with new parts, than remain original and immobile.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. Tanks of significant historic importance should be kept static, so their parts can be preserved for longer.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. When do you think the decision should be made to stop running a tank?

**Thank you!**

## Appendix E

### Online Survey



## PhD Heritage Management of Tanks Survey

The following questions will be used as part of a PhD project with Cardiff University looking at the importance of static and running tanks in The Tank Museum. The data will be used to help management decisions at The Tank Museum. We'd love to hear your opinion.

\* Required

1. Have you visited The Tank Museum on a non-event day in the past two years? \*

☐ Yes

☐ No

Submit

2. Sound and movement add greatly to the understanding and enjoyment of tanks. \*

☐ Strongly agree

☐ Agree


☐ Neither agree nor disagree

☐ Disagree

☐ Strongly disagree

3. Are there any other features of a running tank that are important?

Enter your answer

4. Running tanks need repairs and replacement parts. It is better for a tank to be running with new parts, than remain original and immobile. \* 

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

5. Tanks of significant historic importance should be kept static, so their parts can be preserved for longer. \*

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

6. When do you think the decision should be made to stop running a tank?

Enter your answer

Submit

Conservation Route Assessment

The Tank Museum

Object:	
Accession/Catalogue Number:	
Author(s):	
Date:	
Version:	

Significance	Condition	Running Rating	Static Rating	Suggested Decision	Suggested Action

Conservation Route: \_\_\_\_\_

## 7. Introduction

Participants:

Consulted groups and individuals:

Other relevant documents:

Gaps in information and limitations:

Next review date:

## 8. Heritage Summary

8.1. Conclusion

## 9. Significance Assessment

Significance Assessment Rating: (A-E)

Supporting information:

Statement of Significance:

## 10. Condition Assessment

Condition Assessment Rating: (A-E)

Supporting information:

## 11. Conservation Route Assessment

### 11.1. Value in Running Display

Value in Running Display Rating: (A-E)

Supporting information:

### 11.2. Value in Static Display

Value in Static Display Rating: (A-E)

Supporting information:

### 11.3. Conservation Route Suggestion:

Conservation Route suggestion (taken from the Excel document):

## 12. Other Considerations

Health and safety

Resources (current and future)

Frequency of operation

Implication on current working fleet

Ownership of the vehicle

13. Conservation Outcome

14. Conclusion

## Appendix G

Conservation Route Assessment Form (Excel)

[illegible]