

**The impact of the organisation of work and employment at
sea on the occupational health, safety and well-being of
seafarers**

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ABSTRACT

This thesis explores the health, safety and well-being experiences of seafarers in relation to the organisation of work and employment at sea. Work at sea entails many features – such as long working hours, scheduling uncertainty and social isolation – which have been shown in other industries to be associated with a deterioration in workers' health, safety and well-being. Moreover, the structure of the seafaring industry has changed beyond recognition in recent decades with the vast majority of today's seafarers employed by third-party agencies on a temporary basis, and in shore-based industries the organisation of employment in this manner has also been associated with poorer occupational health, safety and well-being outcomes.

This study used a mixed-methods approach, including both semi-structured interviews with seafarers onboard four ships and the secondary analysis of three shipping companies' safety data.

Seafarers' health, safety and well-being experiences were related to the structure and organisation of their work and employment and fluctuated in relation to specific time periods within a tour of duty. In particular, the most substantial adverse well-being outcomes were apparent at both an early and late stage of a tour of duty, whilst safety outcomes were seen to significantly improve during the last week of a tour of duty for seafarers onboard offshore vessels.

Further qualitative analysis revealed some strong associations between poor occupational health, safety and well-being experiences and the ways in which employment is organised at sea, and indicated a failure to address such associations in the arrangements in place to manage the health, safety and well-being of seafarers during their periods of employment. In particular, it indicated that there were substantial mismatches between the experiences of seafarers and the requirements of them determined by their shore-side management, and found that the reporting mechanisms that might demonstrate this were inadequate.

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LIST OF ACRONYMS AND ABBREVIATIONS

3/O	Third Officer
AB	Able Seaman
ACTU	Australian Council of Trade Unions
AIS	Automatic Identification System
BIMCO	Baltic and International Maritime Council
BSA	British Sociological Association
BSc	Bachelor of Science
CAQDAS	Computer Assisted Qualitative Data Analysis
CCR	Cargo Control Room
CI	Confidence Interval
CoC	Certificate of Competency
DMA	Danish Maritime Authority
ECDIS	Electronic Chart Display and Information System
FAC	First Aid Case
FLASCI	Flag State Conformance Index
FOC	Flag Of Convenience
HIV	Human Immunodeficiency Virus
HR	Human Resources
HSE	Health and Safety Executive
HSEQ	Health, Safety, Environment and Quality
HSSE	Health, Safety, Security and Environment

ILO	International Labour Organization
IMO	International Maritime Organization
INTERTANKO	International Association of Independent Tanker Owners
ISM	International Safety Management
ISPS	International Ship and Port Facility Security
ITF	International Transport Workers
JDCS	Job Demand Control Support
LTI	Lost Time Incident
LTIF	Lost Time Incident Frequency
LWC	Lost Workday Case
MAIB	Marine Accident Investigation Branch
MAROF	Marine Officer
MARPOL	International Convention for the Prevention of Pollution from Ships
MCA	Maritime and Coastguard Agency
MLC	Maritime Labour Convention
MoU	Memorandum of Understanding
MTC	Medical Treatment Case
NHS	National Health Service
OCIMF	Oil Companies International Marine Forum
OECD	Organisation for Economic Cooperation and Development
OOW	Officer Of the Watch
P&I	Protection and Indemnity

POEA	Philippines Overseas Employment Administration
RWC	Restricted Work Case
SIRC	Seafarers International Research Centre
SIRE	Ship Inspection Report
SOLAS	International Convention for the Safety of Life at Sea
SREC	School Research Ethics Committee
STCW	International Convention on Standards of Training, Certification and Watch keeping for Seafarers
TRC	Total Recordable Cases
TRCF	Total Recordable Case Frequency
UAE	United Arab Emirates
UK	United Kingdom
UNCTAD	United Nations Conference on Trade and Development
USA	United States of America
VLCC	Very Large Crude Carrier

INTRODUCTION

The aim of this study is to explore the health, safety and well-being experiences of seafarers in relation to the organisation of work and employment at sea. Seafaring is a hugely important industry, with more than 90 per cent of global trade carried by sea (IMO 2012). The industry is not new, “from the Phoenicians, through the Egyptians, the Greeks and the Carthaginians, the Chinese, the Vikings, the Omanis, the Spaniards, the Portuguese, the Italians, the British, the French, the Dutch, the Polynesians and Celts, the history of the world is a history of exploration, conquest and trade by sea” (IMO 2012, p.6). Moreover, the industry employs an estimated 1,647,500 seafarers (BIMCO 2015).

Research shows the seafaring industry to be particularly dangerous. Between 2003 and 2012 seafarers onboard British flagged vessels were twenty-one times more likely to suffer a fatal accident at work than all other workers in Great Britain (Roberts et al. 2014). Furthermore, rates of non-fatal injuries in the seafaring industry are of concern. In comparison to shore-based workers, seafarers were found to have a 70% increased risk of personal injury (Hansen et al. 2002).

Seafarers are at increased risk of suicide compared to other occupations and work at sea entails a number of features which are known to adversely impact on well-being outcomes. Seafarers are one of the most physically and socially isolated demographic working groups worldwide (Oldenburg et al. 2010) and working at sea is characterised by long periods of separation from life at home and family members. Environmental stressors have also been identified as features which negatively affect seafarers' well-being. During both their working time and their rest time seafarers are exposed to environmental factors such as vibration, noise and the motion of the ship (Oldenburg et al. 2010).

While some elements of working at sea which are likely to cause adverse health, safety and well-being outcomes have remained immutable – such as harsh weather conditions and social isolation – seafaring has been transformed greatly since the 1970's. In former times shipping companies were predominantly family run and their ships were associated with a specific port. The nationality of the shipping company tended to be reflected in the flag under which their ships sailed. Crews were much larger and were predominantly composed of national workers. These crews tended to remain with one company for the entirety of their seagoing career. Seafarers often joined the vessel in its home port and sailed onboard for a prolonged period of time before 'paying off' the ship on its return to the home port.

In today's seafaring industry the relationship between the flag of a vessel and the location of ship ownership is far less predictable (Sampson 2013). Ship operators have flagged out their vessels to Flags of Convenience¹ and it is no longer commonplace for vessels to be registered locally.

Moreover, whilst historically seafarers have tended to be from the traditional maritime nations such as the United Kingdom, in recent decades ship-owners have sourced crew from emerging economies, with China and the Philippines estimated as the top two labour supplying countries in 2015 (BIMCO 2015). This new supply of labour is predominantly recruited through employment agencies in their home country, rather than directly by the shipping companies onboard whose ships they work (Walters and Bailey 2013). Thus, the national link between the ship owner, flag of the ship and the ship's crew no longer exists.

¹ The International Transport Workers Federation (2012) defines a flag of convenience (FOC) ship as a ship "that flies the flag of a country other than the country of ownership."

Increasingly, today's seafarers tend to be employed on a temporary basis – although among the minority of seafarers from more economically developed countries permanent employment is still conceivable – and are likely to be placed onboard different ships or even onboard ships operated by different shipping companies. As a consequence, seafarers' periods of work may occur on a regular basis (for permanently employed seafarers) or on an ad hoc basis for those seafarers who experience temporary employment. The durations of these prolonged periods of intense labour at sea vary greatly – from one week to nine months or more – and are dependent on numerous factors, such as the seafarer's nationality and which crewing agency recruited the individual. Consequently, it is not uncommon to find two seafarers onboard the same ship, working in the same rank, to have tours of duty of completely different durations.

During tours of duty seafarers work long hours each day they are onboard. For example, in one study the average weekly working hours of participants was between 67 and 70 hours and the majority of participants reported working every day of the week (Jensen et al. 2006). More often than not these working hours are arranged in shift patterns – owing to the fact that the shipping industry is a 24 hour 365 days a year industry and ships navigate and load cargo regardless of the time of the day or the day of the year. Many seafarers work split shifts and it is not unusual for seafarers to work patterns of 4 hours on/8 hours off or 6 hours on/6 hours off. It is thus unsurprising that literature (see for example Smith et al. 2006) suggests fatigue to be prevalent among the seafaring labour force.

In addition, literature pertaining to injuries in the offshore oil and gas installation industry identified relationships between injury severity and the number of consecutive days an individual had been on the offshore installation (Parkes and Swash 1999). Research specific to the seafaring industry similarly indicates a relationship between the frequency of seafarers' injuries and the number of elapsed days onboard (Hansen et al. 2002; Jensen et al. 2004).

With this background in mind, this study seeks to consider the following research question: What are the health, safety and well-being experiences of seafarers in relation to the organisation of work and employment at sea? In addressing this question the thesis focuses on an important aspect of the organisation of work at sea – seafarers’ work patterns – and in particular seafarers’ experiences throughout a tour of duty. The principal aim is to deepen understandings of the impact of the organisation of work and employment at sea on the health, safety and well-being of seafarers and contribute to an area of academic research which is both important and under-studied. In order to address the research question the thesis utilises both qualitative and quantitative research methods – which entail the interviewing of seafarers and the analysis of three shipping companies’ safety records. The thesis discusses the findings of the study, before finally drawing conclusions and reflecting on how some of the issues identified might be addressed.

The thesis is arranged into seven main chapters. Chapters one and two present a review of the literature. Chapter one focusses on literature regarding the nature of the seafaring industry and the seafaring labour market, highlighting the widespread prevalence of precarious employment. It does so as, to properly understand how the organisation of work and employment at sea impacts on the health, safety and well-being of seafarers, it is necessary to look at the ways in which the seafaring industry is structured – which in turn enables a consideration of the extent and nature of control possible among those who work at sea.

The latter half of the chapter considers the appropriate literature regarding the challenges associated with regulating occupational health and safety, and in particular the challenges specific to the seafaring industry. In doing so, it indicates issues – such as the working of seafarers outside the boundaries of national states – which inevitably have some bearing on the protection of those who work at sea. Thus, it helps to set the scene for chapter two, which presents a review of literature regarding occupational risks – specifically the risks faced by those who work at sea.

The first half of chapter two focusses on occupational accidents and injuries, as well as occupational-related illnesses and well-being at work. This chapter seeks to explore the current state of health, safety and well-being at sea, as well as making an important divide between three distinct aspects of occupational health and safety: occupational injuries, occupational ill-health and occupational well-being. In doing so an indication of what is, and is not, known about seafarers' occupational health, safety and well-being outcomes is given.

With the first half of the chapter showing the scale of the problem, the latter half of the chapter focusses on the contribution of the organisation of work and employment to occupational health, safety and well-being. In particular, the second half of the chapter considers literature regarding occupational accidents in relation to temporal factors – such as successive shifts and working hours – and indicates some associations between the frequency of occupational injuries and features of work patterns. In doing so, it explicitly draws out relationships between occupational accidents and the ways in which work and employment are organised in a number of shore-based industries. The chapter also considers literature regarding occupational health and safety in relation to features of seafarers' tours of duty and presents an overview of the factors specific to both the early and late stages of a tour of duty. Drawing on several key studies, it considers patterns of fatigue throughout an entire tour of duty and the adverse impact that prolonged travel and jet lag has on seafarers when they arrive at a vessel. Lastly, it draws on a study by Bailey et al. (2007) and presents an overview of seafarers' perceptions of risk at both the start and end of a tour of duty. Again, in doing so it indicates how features of the organisation of work and employment may be associated with health, safety and well-being outcomes.

Chapter three details the research methods utilised in this study. The chapter considers the key techniques used in other relevant studies and critically assesses the use of mixed methods research. It goes on to provide an outline of the data collection methods implemented in this study. The qualitative component of this study – the semi-structured interviewing of seafarers – is outlined and details regarding the manner in which this aspect of the research was conducted are provided. Finally, the chapter presents an overview of the ethical considerations which were taken into account in the study.

Chapters four, five and six present an analysis of the data collected. Chapter four is the first of two chapters which present the qualitative findings of this study, obtained from the semi-structured interviewing of seafarers. The chapter provides the reader with a flavour of life as a seafarer and considers the complexities of life at sea throughout a usual tour of duty. In doing so chapter four provides an understanding of seafarers' experiences of some of the features of the organisation of employment and work at sea – such as the use of precarious employment and tour of duty duration – and how they impact upon their health, safety and well-being outcomes. The findings in chapter four also help to situate and contextualise the findings presented in chapters five and six.

Chapter five primarily presents the findings from the quantitative component of this study. The findings in this chapter are based on the secondary analysis of three shipping companies' safety and human resources data. The chapter considers and compares the frequency of occupational injuries among seafarers with various work patterns. In considering the relationship between seafarers' injuries and time into tour of duty using shipping company data, chapter five explores what these data can tell us about how work patterns – an important and integral feature of the organisation of work and employment – impact on the safety outcomes of those who work at sea. In later chapters, consideration of these findings in the light of the experiences of the seafarers who participated in the qualitative study allows an exploration of the extent to which these company data capture the extent and relevant contexts of work-related harm associated with working at sea.

Chapter six – the second of the two qualitative findings chapters – highlights findings regarding the experiences of seafarers pertaining to the early and late stages of a tour of duty. The early and late stages of a tour of duty emerged from the interviews as particularly important time periods during which some of the most substantial impacts of features of the organisation of work and employment at sea on seafarers' health, safety and well-being outcomes were most apparent. A significant strength of this study is that the use of seafarers' own definitions – as identified during interviews – of the time periods within a tour of duty which were perceived to be important were used. By focussing on these particular periods of time within a tour of duty, chapter six identifies a number of issues related to features of the organisation of work and employment at sea – such as scheduling uncertainty and location uncertainty – reported by the seafarers in this study. It also indicates gaps in the expectations of seafarers and the contractual obligations of those who employ them.

Chapter seven synthesises the key findings that emerged from the analysis presented in chapters four, five and six. It discusses findings which indicate a mismatch between seafarers' experiences and the requirements determined by shore-side, as well as the inadequacy of mechanisms to record this mismatch.

The final chapter highlights the key findings from this study. In this chapter reflections on the research and possible approaches to addressing the problems identified are given. These include improvements in the recording of injury data by shipping companies – among others.

CHAPTER ONE: THE SEAFARING INDUSTRY

1.0 Introduction

In this chapter, there are two points of departure. First, the nature of the seafaring industry and the organisation of life onboard ships are explored. The literature gives a flavour of how the relationship between ships' owners and those who work onboard ships has changed. In doing so, literature regarding how and where labour is sourced in the seafaring industry and the employment terms and conditions of those who work at sea is considered. In exploring the nature of the seafaring industry, the consequences of flagging out vessels to flags of convenience – and the associated removal of the national link between the ship owner, flag of the ship and the ship's crew – are seen and thus it is acknowledged through such literature that the seafaring industry has transformed beyond recognition. This has, in turn, impacted on the organisation of work and employment at sea, yet little is known about how these changes relate to the occupational health, safety and well-being experiences of the seafaring labour force.

Second, in order to fully understand seafarers' health, safety and well-being, it is critical to recognise the ways in which efforts are made to safeguard seafarers. Much of seafarers' work takes place outside national boundaries and consequently the regulation of what can be considered as a global industry is complicated. As such, in the latter half of the chapter research regarding the complexity of regulating a global industry is considered and recent attempts to ensure the adequate protection of seafarers, such as the Maritime Labour Convention (2006), are explored.

In presenting a broad and comprehensive review of literature relating to how the seafaring industry is structured, how seafarers are employed, and how those who work at sea are safeguarded this chapter provides an understanding of the extent – and also nature – of control possible in the seafaring industry. The chapter therefore raises questions of power both amongst colleagues onboard a vessel, and in the seafaring labour market more generally.

1.1 The nature of the seafaring industry

In 1970, annual world seaborne international trade was estimated as 2.6 billion tons of cargo (UNCTAD 2016). In comparison, in 2015 annual world seaborne international trade was estimated as 10 billion tons of cargo (UNCTAD 2016). Thus, worldwide seaborne trade has increased exponentially during the last four decades and undoubtedly the seafaring industry has transformed greatly in this period. Historically, maritime industries were concentrated in more economically developed countries, such as Norway and the UK. Ships were owned, built, operated and crewed by nationals of the same country, and the ship flew the flag of that country.

Today, the situation is very different. In 2016, the top five owners of the world fleet were Greece, Japan, China, Germany and Singapore (UNCTAD 2016). Between them they owned almost 50% of the world fleet (UNCTAD 2016). Yet, the five largest fleets in terms of flags of registration were Panama, Liberia, Marshall Islands, Hong Kong (China) and Singapore (UNCTAD 2016). These five countries flagged 57% of the world's fleet (UNCTAD 2016). Thus, the link between where ships are owned and where they are flagged no longer exists. This is because ship owners are free to flag their vessels to any flag, a situation which has led to the prolific rise of flags of convenience and in 2016 70.2% of the world's merchant fleet was registered in a country which was different to the country in which the ship was owned (UNCTAD 2016).

Recent studies have revealed that registering a ship under a FOC provides a number of benefits for ship-owners. In terms of cost it is cheaper for ship-owners to register their vessels with these countries as registration fees and other costs such as tonnage tax rates are lower (Lillie 2004). Moreover, Lillie (2004) also revealed that such countries offer relatively weak regulatory frameworks which enable ship-owners to adhere to lower regulatory requirements. It is these regulatory requirements – and the problems of regulating a global industry – which will be presented in the latter half of this chapter. Before this, the employment terms and conditions experienced by today's seafarers and the composition of ships' crews will be explored.

1.1.1 Seafarers' employment

Working onboard ships are an estimated 1,647,500 seafarers (BIMCO 2015). In 2016, China, the Philippines and Indonesia were listed as the top three labour supplying countries (UNCTAD 2016) and table 1 below shows the estimated global seafarer supply of officers and ratings by broad geographical areas.

Area	Officers	Ratings
OECD Countries	23%	14%
Eastern Europe	17%	14%
Africa and Latin America	8%	9%
Far East	39%	55%
Indian Sub-Continent	13%	8%

Table 1 Estimated global seafarer supply by broad geographical area (adapted from BIMCO 2015 [online]).

Whilst ship-owners have long been able to employ foreign labour – British ship owners, for example, utilised foreign seafarers as early as the mid Nineteenth Century (Coles 2002) – in recent decades ship-owners have cast their nets further to source seafarers to staff their fleets. Consequently, there has been an erosion of local seafaring labour and the number of seafarers from traditional maritime nations has reduced substantially. Moreover, UNCTAD (2016) revealed that the labour market for seafarers is increasingly separate from the country of vessel ownership. In one study Sampson (2013) explained that ship-owners enter into agreements with third-party crew agents – who are predominantly located in less economically developed nations – to supply locally sourced labour and thus the recruitment underpinning the global seafarer labour market has changed beyond recognition.

The sourcing of seafarers through local third-party crew agents has impacted upon the organisation of employment within the seafaring industry and the current types of employment prevalent within the industry can best be described as precarious employment. In one study the International Labour Organisation (2001) used data obtained from a survey of 4525 seafarers and revealed that the majority of seafarers were employed on contracts of a single tour of duty. Bloor and Sampson (2009, p.713) went on to explain that “contractual arrangements for outsourced labour vary between ship operators and between ship sectors (ferry, cruise, bulk carriers, container ships, oil tankers, gas carriers, etc.) but typically only senior officers will be employed on permanent contracts if permanent contracts are in place at all: junior officers (frequently) and crew (almost invariably) will be employed on short-term contracts of a year or less, but will remain ‘on the books’ of the crewing agency”.

Research regarding precarious employment in shore-based industries has shown precarious employment methods to be associated with negative occupational health and safety outcomes. In a review of 93 studies which considered the effects that precarious employment has on health and safety outcomes Quinlan et al. (2001) found in 76 studies precarious employment was associated with a deterioration of workers’ health and safety in terms of rates of injuries, risk of disease, exposure to hazards or the knowledge of workers’ occupational health and safety and regulatory responsibilities.

In endeavouring to explain the link between precarious employment and inferior health and safety outcomes Quinlan et al. (2001, p.345) identified three broad sets of risk factors: “economic and reward factors, disorganisation and increased likelihood of regulatory failure.” Economic and reward factors encompassed issues such as “competition for work/underbidding of tenders and task work/payment by results” and disorganisation included risk factors such as “exacerbation of complexity/ambiguity in rules and procedures and hidden changes to work practices and underqualification, inadequate training and inexperience” (Quinlan et al. 2001, p.345). The risk factor termed ‘increased likelihood of regulatory failure’ included the “weakening of conventional surveillance and reporting systems and multi-employer worksites, situations with complex webs of legal responsibility and difficult-to-locate/monitor workplaces/workers for which conventional regulatory regimes are not designed and which require substantially more logistical resources” (Quinlan et al. 2001, p.345).

In another study Lewchuk et al. (2003) considered the impact that precarious employment had on the health and well-being of workers and in doing so conducted a survey of more than 400 workers who were engaged in precarious employment in Canada which examined employment strain – a concept which was developed by Lewchuk et al. (2003) to capture those characteristics which are unique to precarious employment. There are seven components of employment strain: “employment uncertainty (control over access to work), earnings uncertainty (control over future earnings), household precarious-ness (control/demand providing basic needs), scheduling uncertainty (control over work schedule and hours), location uncertainty (control over work location), task uncertainty (control over use of skills and job assignment) and employment uncertainty workload (demand required to manage employment uncertainty)” (Lewchuk et al. 2003, p.29).

In designing the employment strain model Lewchuk et al. (2003) utilised some of the key concepts of Karasek's (1979) Job Demand Control model. The key idea behind the Job Demand Control model is that a worker's control can act as a buffer on the impact of job demands on strain. Thus, high job demands when accompanied by low decision latitude result in job strain. In the simplest sense individuals experience lower levels of well-being when they perceive lower levels of job control. Johnson and Hall (1998) also expanded Karasek's model (1979) by adding a factor which they termed 'support'. The Job Demand Control Support model predicts that low social support combined with high demand and low control results in job strain.

Building on these models the employment strain model of Lewchuk et al. (2003) hypothesised that levels of employment strain may not necessarily correlate with job strain. That is, employment strain captures a dimension of the organisation of work which is independent from a worker's experience with any one workplace (Lewchuk et al. 2003). In a questionnaire study, which explored workers' employment strain Lewchuk et al. (2008) revealed that scheduling uncertainty was associated with negative health outcomes. Lewchuk et al's. (2003) findings pose some interesting questions for the seafaring labour force, the majority of which is employed precariously on contracts of a single tour of duty, on an ad hoc basis.

Despite the negative health, safety and well-being outcomes associated with precarious employment, for some seafarers' permanent employment is simply not an option. For example, in the Philippines the 'Standard Terms and Conditions Governing the Overseas Employment of Filipino Seafarers Onboard Ocean Going Ships states: *"The employment contract between the employer and the seafarer shall commence upon actual departure of the seafarer from the Philippine airport or seaport in the point of hire and with a POEA approved contract. It shall be effective until the seafarer's date of arrival at the point of hire upon termination of his employment pursuant to Section 18 of this Contract. The period of employment shall be for a period mutually agreed upon by the seafarer and the employer but not to exceed 12 months. Any extension of the contract shall be subject to mutual consent of both parties"* (POEA 2013). Consequently, Filipino seafarers are prohibited from engaging in permanent employment.

This is not the case globally, however, as not all seafarers experience precarious employment – some seafarers are permanently employed directly by shipping companies. In a study regarding the employment methods utilised in the seafaring industry Ellis et al. (2012) used questionnaire data and revealed that the type of employment experienced by seafarers was significantly related to the seafarers' nationality. It showed that 75% of all respondents reported that they were employed on temporary contracts, however, when considering the British questionnaire respondents in isolation, 21% were employed on short-term contracts (Ellis et al. 2012). Other factors such as rank and ship type were also found, to a lesser extent, to influence the type of employment experienced by the respondents (Ellis et al. 2012).

Seafarers who are employed on permanent contracts experience fixed periods of time at sea and fixed periods of time at home, on a cyclical basis and recent studies have revealed that the ratio of leave to time at sea is dependent on both rank and nationality.

Those seafarers who are employed on short-term contracts – which are commonly referred to as voyage contracts – are employed onboard a ship for a pre-determined period before returning home and seeking a new voyage contract, a process which occurs on an ad hoc basis. Consequently, the length of time such seafarers spend at home following employment onboard a ship is almost entirely dependent upon the availability of subsequent voyage contracts.

Recent studies have also revealed that the length of time a seafarer is deployed for varies and this was seen to be related to the ship type on which they were sailing, their rank, their nationality and which crewing agency recruited them. In one study Oldenburg et al. (2009) found that the average tour of duty for European seafarers was between three and six months, whereas for non-European seafarers the average was between six and nine months.

Seafarers from less economically developed countries were found to be willing to accept longer tours than their colleagues from more economically developed countries as for many seafarers from poorer nations any job onboard a ship is better than the alternative, which is wide-spread unemployment. Moreover, there are substantial differences between the average salary earned ashore and the salary earned at sea – particularly for those individuals from less economically developed countries. For example, Lillie (2004) reported the average monthly wage for an industrial worker ashore in the Philippines to be \$140. In comparison, the median monthly wage for a Filipino able seaman was found to be \$1025 (Lillie 2004).

Seafarers' willingness to endure unfavourable terms of employment is also a cause for concern with regards to occupational health and safety, as Sampson (2013, p.92) explains: "crew members are not only willing to sacrifice a great deal in pursuit of high dollar salaries, with which there is no comparison for local shore-based jobs, they are also frequently recruited from very impoverished backgrounds where living standards, and consequently expectations, are low."

The ways in which seafarers are employed also impact on the ship types on which they sail and to understand this issue it is necessary to consider seafarers' professional qualifications. First, individuals sailing as deck and engine officers are required to hold a Certificate of Competency and the exact requirements and procedures for obtaining this vary from country to country. The minimum requirements, however, are outlined in the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (1978) – a convention which will be discussed in greater detail in section 1.2.1 – and a Certificate of Competency states the capacity in which the seafarer who has been awarded it can sail.

These Certificates of Competency can be unlimited in terms of the geographical area in which the ship sails or the ship's tonnage – or they may have limitations based on geographical area or gross tonnage. It is imperative to recognise, however, that a Certificate of Competency does not contain any restrictions in terms of ship type. Similarly, ratings must obtain basic certification in areas such as firefighting and first aid and this basic certification is universal across all sectors of the seafaring industry. Thus, seafarers are able to be employed onboard any ship type². Within the industry there are numerous vessel types and an aggregation of ship types – conducted by Equasis (2014 [online]) – gave the following twelve main types: general cargo ships, specialised cargo ships, container ships, ro-ro ships, bulk carriers, oil and chemical tankers, gas tankers, other tankers, passenger ships, offshore vessels, and service ships. A lack of restriction permits seafarers to be employed onboard any of these ship types.

² An exception to this is officers who are involved in cargo operations onboard tankers (oil/chemical and gas) who require additional certification.

Consequently, the seafaring labour force can be considered to offer what Leong (2012) terms functional flexibility – that is seafarers can transfer their services to other sectors of the seafaring industry. This is of benefit to those who control the seafaring labour force as, in the event of a labour shortage in a sector, seafaring labour can be sought from another sector. Thus, shipping companies can choose not to employ seafarers when their labour is not required safe in the knowledge that labour can be sourced in other sectors should a shortage of seafaring labour occur in times of increased demand.

This approach by shipping companies to the seafaring labour force has some salience in relation to labour process theory which argues that the workforce is objectified in terms of its use values (ILPC 2008).

By treating seafarers in a flexible manner, the costs of the employers are reduced, and such flexibility is, arguably, a consequence of shipping companies' lack of commitment to seafarers. Consequently, this flexibility – and instability – is a concern for seafarers in terms of employment uncertainty and these are features of the organisation of employment at sea which are likely to impact on their occupational health, safety and well-being.

1.1.2 Organisation of life onboard

Onboard ships, seafarers are deemed as either officers or ratings and ratings are those seafarers who are employed in roles which require lower levels of professional seafaring qualifications (Glen 2008). Individuals occupying trainee officer positions are commonly referred to as Cadets. In 2016, around 51% of seafaring positions were for officers and the remaining 49% of positions were for ratings (UNCTAD 2016).

Onboard each ship a seafarer occupies a specific position and within the seafaring industry an unusually strong hierarchical structure exists with officers and ratings having separate spaces to socialise and even eat. Figure 1 below illustrates the general rank structure onboard a ship, however, it should be noted that onboard some ships there are slight variances in this structure.

These individuals share the space onboard which can be divided into five general sections: the bridge, the engine room, the accommodation block, the weather decks and the cargo holds. When a seafarer is not on duty they can normally be found in the accommodation block, the area that includes the cabins and mess rooms. Seafarers onboard modern ships tend to have single-person en-suite single cabins. However, there are no spaces onboard a ship that are truly private; even a seafarer's cabin can be entered at any time by the Captain and all cabins are subjected to regular inspections in accordance with the Maritime Labour Convention (2006) – a convention which will be discussed in section 1.2.1. As Sampson (2013, p. 122) states: “for many seafarers the ship is not regarded as a home or a community but is merely an institutional work space where they have to survive until the end of each contract”.

The work undertaken by seafarers varies depending on their position onboard. The Captain, for example, is in overall command of the ship and is required to ensure the safe operation and navigation of the vessel. The primary role of the deck officers (Chief Officers, Second Officers and Third Officers) is to navigate the vessel and ensure the planned voyage is carried out. These individuals spend the majority of their working time on the bridge and generally in each twenty-four hour period they undertake two periods of watchkeeping (Sampson 2013). Deck ratings (Able Seamen and Ordinary Seamen) are supervised by a Bosun and assist the deck officers by maintaining a lookout during the hours of darkness and acting as a helmsman when required. In port the duties of deck officers and ratings include loading and discharging cargo and maintaining a security watch.

The engineering officers (Chief Engineers, Second Engineers, Third Engineers and Fourth Engineers) and the engine ratings (Fitters and Wipers) undertake the routine maintenance and monitoring of equipment in the engine room. Finally, the Chief Cook and Messman are generally found in the galley and take care of many of the domestic requirements, such as cooking and cleaning onboard.

The exact nature of the work undertaken by seafarers also varies between different ship types. For example, whilst in port onboard tankers deck officers operate pumps to discharge cargo whereas onboard passenger vessels deck officers ensure passengers safely disembark.

Irrespective of the work they undertake the work space of seafarers is not only to work in, seafarers must also live in this space – and socialise with those who share this space for prolonged periods of time. Onboard a ship the number of seafarers can vary and the minimum number of seafarers each vessel requires is decided by the vessel's flag state in accordance with safe manning regulations (ILO, 2006). The flag state's responsibility to determine the minimum number of seafarers again indicates why it is in the ship owners' interests to use certain flags. In an article published by the Nautical Institute the author explains that a flag state assesses a manning proposal made by a shipping company and "subjectively makes a decision as to whether the company's proposal can be agreed" (Bowring 2006, p.11). It goes on to explain "if one administration always holds out for higher crew numbers then owners under that flag will find that they are uncompetitive and will consider changing flag. Some companies put more people onboard but others feel that to remain competitive, they are only able to sail with a complement similar to that of their competitors" (Bowring 2006, p.11).

In a study which analysed crewing levels – but did not differentiate between vessels' flag states – Winchester et al. (2006) revealed that the mean number of seafarers onboard tankers varied from 11.7 to 25.0. Findings regarding crew size onboard dry cargo vessels were found to be similar (mean between 10.0 and 25.7 seafarers).

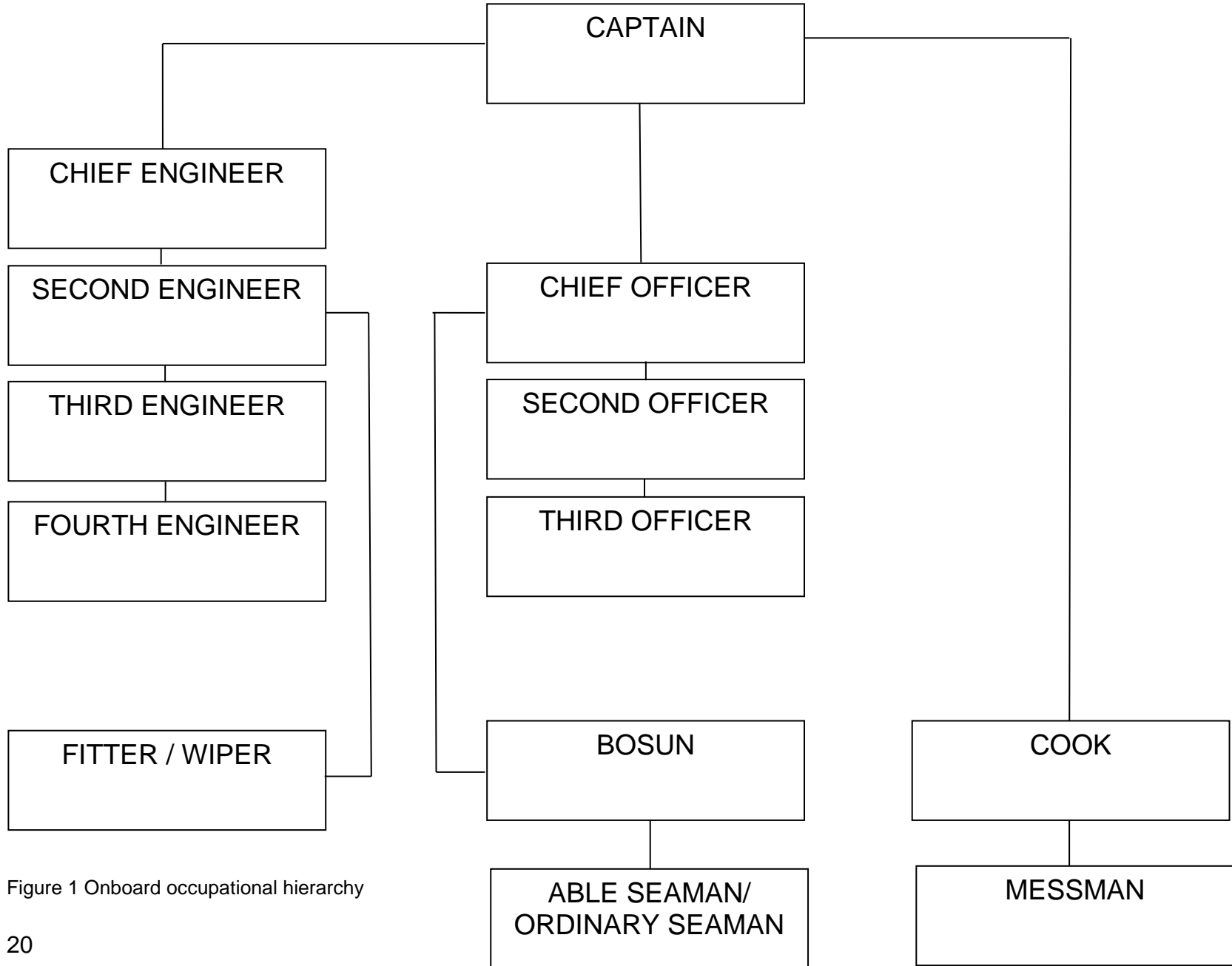


Figure 1 Onboard occupational hierarchy

These individuals may be of any nationality and in a study, Wu and Winchester (2005) revealed that multi-national crewing – whereby onboard one ship seafarers of three or more nationalities work alongside one another – is now widespread. They go on to state that multi-national crewing has undoubtedly been helped by transnational links between ship-owners, manning agencies and national labour markets (as discussed in section 1.1.1 above). Multi-national crewing, however, has implications for language and communication between individuals onboard, as whilst English is the universal language used at sea, for many seafarers it is not their native language. In one study regarding multilingual crews Sampson and Zhao (2003) revealed that seafarers perceived communication between multi-national crews as a substantial potential problem – owing to the fact that miscommunication or poor communication could contribute to both work-related and social problems. Some of the seafarers interviewed as part of the study by Sampson and Zhao (2003) cited experiences whereby misunderstandings arose because individuals were unable to convey how to carry out a particular task or which tools were needed for a job.

Despite concerns for both inadequate communication and cultural barriers amongst multi-national crews, in some studies seafarers have been found to express a preference for working as part of a multi-national crew. Sampson and Zhao (2003) revealed that seafarers perceived the potential for conflict to be reduced when working with other nationalities. This perception was seen to relate to the notion that social distance and in turn tolerance and respect, was greater in teams of mixed nationals. In a questionnaire study regarding seafarers' stressors, however, 39.5% of respondents had a positive attitude towards multicultural crews, 5.5% a negative one and 55.0% were neutral (Oldenburg et al. 2009). Importantly, there were substantial differences in attitudes between European and non-European seafarers, with only 25.2% of non-Europeans perceiving multicultural crews as positive and more than 70% stating they were neutral to such crews (Oldenburg et al. 2009).

Irrespective of the seafarers' nationality – and indeed the nation to which the ship is flagged – the rest hours of all those who work at sea are determined by the Maritime Labour Convention (2006). The Maritime Labour Convention (2006), which will be discussed further in section 1.2.1, requires all seafarers to have a minimum of 10 hours rest per day and all seafarers must have 77 hours rest per week. Importantly, “hours of rest may be divided into no more than two periods, one of which shall be at least six hours in length, and the interval between consecutive periods of rest shall not exceed 14 hours.” (ILO 2006, p.31). It is worth noting that the seafaring industry is unusual in that the minimum number of rest hours is specified, rather than the maximum hours of work. The hours which seafarers work are dependent on the working routine of the ship – which in turn depends on a number of factors such as the ship type, the number of seafarers onboard and the frequency of port visits. Table 2 on the following page is a version of the ILO specimen shipboard working arrangements table, which is required by the Seafarers' Hours of Work and the Manning of Ships Convention (commonly referred to as ILO 180). Whilst the table does not give the exact hours all seafarers work, it does give a flavour of the working routine at sea.

Moreover, a number of studies have revealed the rest hours of seafarers to be under-recorded, with seafarers recording their rest hours to comply with requirements rather than the actual hours of rest they experienced. In one study regarding global governance in the seafaring industry, Bloor (2003) stated that it was widely known that seafarers' hours of work and rest were being routinely falsified. This situation poses a number of important questions with regards to how those who work at sea are safeguarded – an issue which this chapter now turns to.

Position/rank	Scheduled daily work hours at sea			Scheduled daily work hours in port		Total daily rest hours	
	Watchkeeping		Non-watchkeeping duties	Watchkeeping (from - to)	Non-watchkeeping duties (from - to)	At sea	In port
	(from-to)	(from-to)					
Chief Officer	04.00 - 08.00	16.00 - 20.00	08.00 - 10.00		06.00 - 18.00	14	12
Second Officer	00.00 - 04.00	12.00 - 16.00	10.00 - 12.00	00.00-06.00 / 12.00-18.00		14	12
Third Officer	08.00 - 12.00	20.00 - 24.00	13.00 - 15.00	06.00-12.00 / 18.00-24.00		14	12
Bosun			06-12, 13 – 17		06.00 - 18.00	14	12
AB (Watchkeeper)	04.00 - 08.00	16.00 - 20.00	08.00 - 10.00	00.00-06.00 / 12.00-18.00		14	12
AB (Watchkeeper)	00.00 - 04.00	12.00 - 16.00	10.00 - 12.00	06.00-12.00 / 18.00-24.00		14	12
AB (Watchkeeper)	08.00 - 12.00	20.00 - 24.00	13.00 - 15.00	00.00-06.00 / 12.00-18.00		14	12
AB (Day man)			06-12, 13-17	06.00-12.00 / 18.00-24.00		14	12
OS			06-12, 13-17		06.00-12.00 / 13.00-17.00	14	14
Chief Engineer			08-12, 13-17		08-12, 13-17	16	16
Second Engineer			08-12, 13-17		08-12, 13-17	16	16
Third Engineer			08-12, 13-17		08-12, 13-17	16	16
Motorman			08-12, 13-17		08-12, 13-17	16	16
Cook			06-13, 15-18		06.00-13.00 / 15.00-18.00	10	10
Mess man			06-13, 15-18		06.00-13.00 / 15.00-18.00	10	10

Table 2 Shipboard working arrangements (adapted from ILO 1996 [online])

1.2 Safeguarding seafarers

The second half of this chapter explores the various ways in which seafarers are safeguarded. In doing so it provides an outline of the regulatory environment within which the mechanisms to protect seafarers' health, safety and well-being are situated.

The section begins by detailing the key regulatory instruments of global governance which shape the regulation of occupational health and safety in the seafaring industry. These include legislation regarding labour standards, the environment, safety and training. In particular, those instruments which are of the most relevance to the health and safety of seafarers are presented.

It then moves on to consider the role of flag state and port state control. The flag state is the "country of registry of a sea going vessel" (OECD 2003 [online]) and it has the authority to enforce regulations on ships flying their flag. The International Maritime Organisation (2017 [online]) defines port state control as the "inspection of foreign ships in national ports to verify that the condition of the ship and its equipment comply with the requirements of international regulations and that the ship is manned and operated in compliance with these rules." Port state control in particular, plays an important role in the safeguarding of seafarers' health, safety and well-being.

Finally, the section concludes by describing the private regulation of health and safety at sea and the major players currently engaged in this. These players include classification societies, protection and indemnity (P & I) clubs, as well as trade unions. Furthermore, Walters and Bailey (2013, p.123) state that "in shore-based industry, business relations within supply chains are increasingly regarded as potentially useful leverage in improving worker conditions" and thus the roles of supply chain players such as oil majors are considered. Each of these private regulators are important, particularly given the limitations of state regulation in the face of a global industry.

1.2.1 Instruments of global governance in the seafaring industry

At a global level health and safety regulations in the seafaring industry include both International Maritime Organisation (IMO) and International Labour Organisation (ILO) Conventions. The IMO is a United Nations specialised agency and is the principal maritime treaty making body. The ILO is also a United Nations specialised agency but is concerned specifically with labour standards (Walters and Bailey 2013). One key IMO convention concerning seafarers' safety is the International Convention for the Safety of Life at Sea (1974) (SOLAS). The convention is the primary legislation for transportation at sea and in 1994 the IMO added a chapter titled the 'Management for the safe operation of ships' to SOLAS. This chapter is universally known as the ISM Code and the code shifted the focus of managing seafarers' health and safety from maritime administrations to shipping companies. The code requires a safety management system to be implemented by ship operators worldwide and the legislation represents a shift from the previous prescriptive regulatory approach (Bailey 2006). Thus, the ISM Code brought the seafaring industry more in line with shore-based industries which have adopted similar regulatory approaches.

One important requirement of the ISM Code is the recording and investigating of accidents by shipping companies. Literature regarding the reporting of incidents in the seafaring industry, however, suggests the occupational incidents which are reported in the seafaring industry may just be the tip of the iceberg. In one study Psarros et al. (2010) analysed accident data for Norwegian flagged vessels which was obtained from the Norwegian Maritime Directorate and Lloyd's Register Fair Play and suggested that around 30% of incidents experienced were reported.

A number of reasons as to why seafarers may not report incidents have been identified. In his study on the impact of the ISM Code on the management of health and safety, Bhattacharya (2012) revealed that seafarers feared reporting an incident as they felt that doing so would subject them to disciplinary action – be this directly or indirectly – as they would be assumed by managers to be responsible for the incident. Thus, whilst seafarers readily acknowledge the under-reporting of incidents they justified that they did so in order to avoid shore-side managers demanding an explanation from them (Bhattacharya 2012). In addition, some seafarers were seen to not only be concerned about reprisals to themselves individually but also wanted to avoid reporting an incident which might bring a colleague's professional reputation into disrepute, which in turn would lead to them becoming labelled as someone who betrays their colleagues (Bhattacharya 2012). Such worries are likely to be significantly exacerbated by the fact that many seafarers are precariously employed – an issue discussed in section 1.1.1 – and consequently prioritise obtaining future employment over the reporting of an injury.

Whilst SOLAS is perhaps the IMO's best known legislation, other treaties which are directly related to the safety of ships include the International Convention on Load Lines 1996, which primarily concerns the depth a vessel can be loaded to and the International Regulations for Preventing Collisions at Sea (COLREGS) 1973, which can be compared to the Highway Code.

Another important IMO convention is the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) 78. In section 1.1.1 it was seen that STCW outlines the minimum requirements seafarers need to sail in certain positions within a ship's onboard occupational hierarchy. In doing so it aims to ensure that ships are operated in a common manner and maintain standards among the labour force – factors which are known to have implications for occupational health and safety in the industry. The maintaining of seafarers' standards is especially important given that research has consistently shown human behaviour to be a significant cause of incidents at sea. In one study the MCA (2010 [online]) stated that human behaviour was the source of "virtually all" losses at sea. In a study which reviewed literature on the human element of safety in the shipping industry Hetherington et al. (2006) revealed there are a number of human factors which influence safety at sea including: situational awareness, team work, communication and decision making. Hetherington et al. (2006) concluded that there are individual and organisational behaviours which are common to accidents in the seafaring industry. These individual and organisational behaviours may, in turn, be related to how work at sea is organised, and consequently the argument of the role of human error in accident causation supports the main objective of this study which is to explore the impact of the organisation of work and employment at sea on the occupational health, safety and well-being of seafarers.

Given the role of human error in accident causation it is unsurprising that attempts have been made to regulate the human element of the seafaring industry. One such attempt is the labour standards for those who work at sea, which are consolidated under the International Maritime Labour Convention (MLC) 2006. The MLC (2006) falls under the four titles: Minimum requirements for seafarers to work on a ship; Conditions of employment; Accommodation, recreational facilities and food and catering; and Health protection, medical care, and welfare and social security protection.

In section 4 of the MLC (2006) it is stipulated that member states are responsible for the management of health and safety onboard ships that are flagged to their state – however, the use of flag states to enforce regulations in the seafaring industry is not without problems, as will now be seen.

1.2.2 Flag state and port state control

Irrespective of the amount of regulation governing the seafaring industry, such regulation is only of use if it is adequately implemented and enforced. The flag state is supposed to be the principal regulatory body in the seafaring industry through its own system of certification and inspection (Walters and Bailey 2013). Critics, however, have argued that Flags of Convenience lack both the infrastructure and the will to ensure compliance. It was seen in section 1.1 that the flagging of vessels to the newer maritime states (FOC's) is widespread and consequently the use of flag states across the global seafaring industry in implementing and enforcing regulations is generally considered as inadequate. As a result, some states decided to protect their own territorial waters and coastlines and consequently this helped to develop a further key regulatory body: port state control.

Port state control utilises port state inspectors who board ships and conduct inspections to ensure compliance with international conventions such as STCW and SOLAS. There are a range of options available to port state inspectors should they identify any deficiencies, which include prohibiting the vessel from entering their national ports in future or detaining the ship until the necessary rectifications have been made.

Memorandums of Understanding (MOU's) have been formed by states within regional groups and are an internationally agreed approach to the inspection of foreign flagged vessels. The IMO (2017) states there are currently nine regional MOU's: Paris, Tokyo, Abuja, Caribbean, Black Sea, Mediterranean, Indian Ocean, Riyadh and Acuerdo de Vina del Mar (Latin America). The purpose of the MOU's is to ensure "that as many ships as possible are inspected but at the same time prevent ships being delayed by unnecessary inspections." (IMO 2017 [online]). The Paris MOU publishes lists which classify the flag states of vessels in terms of risk. The white list is classified as quality flags, the black list is for flags which are classified as between medium risk and high risk inclusive, whilst the grey list is for flags classified between quality and medium risk (ParisMOU 2017). In 2015, of 73 flag states, 43 were on the white list, 19 were on the grey list and 11 were on the black list (ParisMOU 2017).

The enforcement of international regulations in the seafaring industry through the use of port state control, however, is not without limitations. In a study which involved shadowing port state ship inspectors in Russia, India and the UK, Bloor (2003) revealed substantial inconsistencies in inspection practice between ports and countries, as well as between inspectors. The 2014 annual report published by Paris MOU indicated that port state control has not succeeded in fully eliminating all substandard ships – a point made by Bloor (2003) over a decade earlier. In the 2003 annual report Paris MOU itself stated: “Port State control results for 2002 indicate that efforts need to be enhanced to obtain a substantial reduction in the number of substandard ships visiting the region” (Paris MOU 2003 [online]).

Nevertheless, in a study regarding the effectiveness of port state control inspections in Sweden Cariou et al. (2008) revealed that following an inspection, deficiencies were reduced by 63% at the subsequent inspection. Thus, whilst port state control has not eliminated all substandard ships – as evidenced by the fact that 63 vessels were banned in Paris MOU ports between 2012 and 2014 (ParisMOU 2014) – the finding indicates it has played a role in improving the standards of some vessels. The continued presence of substandard ships, however, indicates limitations in the safeguarding of seafarers and these limitations support the need for a deeper understanding of the factors which negatively impact on seafarers’ health, safety and well-being outcomes.

1.2.3 Private regulation

In this final sub-section literature regarding the private regulation of health and safety in the seafaring industry is considered. Some forms of private regulation predate state regulation – one of which is the regulating of the condition of sea-going vessels through the use of classification societies. Classification societies are closely tied to risk assessment and insurance and they conduct routine surveys to ensure vessels are maintained to a specified standard. By certifying a ship as meeting their standards classification societies enable insurance companies to allocate ships a risk rating, which in turn enables ship owners to obtain insurance for the ship's hull and machinery. If ships are to be insured they must remain in class, and to do so minimum standards must be met. In one study Payer (1998) revealed that classification societies made a substantial contribution to harmonising an adequate standard of structural requirements for vessels. Moreover, Walters and Bailey (2013) explain that the standard setting and certification activities of classification societies play a role in protecting the health and safety of those who work at sea.

Closely aligned with classification societies are Protection and Indemnity Clubs which insure many of the liabilities relevant to the seafaring industry. INTERTANKO (2006) – which is a worldwide association of tanker owners – explain that liabilities generally include: the death and personal injury of seafarers, passengers and third parties; liabilities in respect of persons saved at sea and stowaways; liabilities arising from collisions, groundings, pollution, damage to fixed and floating objects, wreck removal, towage operations; and liability to cargo. P & I Clubs operate on a non-profit basis and between the thirteen P & I Clubs 95% of the global sea-going tonnage liabilities are insured (Seward 2002). Whilst the insurance of liabilities is the primary area of work of P & I Clubs, a further area of work entails co-operation in matters of common interest, for example, representing common interests in discussions at the IMO (Seward 2002). DeSombre (2006) suggests that the standard of ship admission to P & I Clubs is generally acknowledged as being rigorous and thus provides a further form of private independent regulatory control in the seafaring industry.

Commercial hirers of ships are also recognised as a form of independent regulatory control which make a positive contribution to seafarers' health, safety and well-being. In some sectors of the seafaring industry – for example the chemical and oil sectors – ships are inspected by those who commercially hire them. In the oil sector the Oil Companies International Maritime Forum (OCIMF) – a representative organisation for the oil majors – routinely inspects tankers through the Ship Inspection Report Programme (SIRE). OCIMF (2014 [online]) states that “the SIRE programme is a unique tanker risk assessment tool of value to charterers, ship operators, terminal operators and government bodies concerned with ship safety.”

Walters and Bailey (2013 p.124) explain: “to compete for contracts, tanker companies must ensure their ships are maintained and operated at a level dictated by the oil majors, including with respect to arrangements for the management of health and safety onboard.” Oil majors use the SIRE programme to determine whether or not a tanker is maintained and operated to the standard they require. Significantly, if a vessel fails to meet the required standard, it is likely to result in an oil major denying business across the ship owner's entire fleet. SIRE inspections are widely regarded as rigorous and Bhattacharya (2009) states that the benefits SIRE poses in terms of safeguarding the occupational health and safety of seafarers are acknowledged by the seafaring industry as being considerable.

Trade Unions also play a role in safeguarding the occupational health, safety and well-being of seafarers. In a study regarding the collective bargaining of seafarers Lillie (2006) argued that trade unions are a strong force in the seafaring industry. In particular, the International Transport Workers Federation (ITF) has been active in promoting international collective bargaining. Lillie (2004) states that the ITF has been instrumental in bringing about a global inter-union uniform wage rate.

At a shipboard level, however, trade union presence is considered to be weak (Walters and Bailey 2013). This is a concern for the safeguarding of seafarers' health, safety and well-being as shore-based studies, such as Walters' (2006) study on workers' representation in the United Kingdom, have revealed that an important aspect of worker representation regarding occupational health and safety occurs in the workplace. Consequently, whilst private regulation in the seafaring industry plays an important role in the safeguarding of seafarers it is not without limitations. Viewing these limitations of safeguarding alongside those of both the instruments of global governance and flag and port state controls, suggests that there is a need for further research regarding safeguarding inadequacy and its implications for seafarers' health, safety and well-being.

1.3 Summary

The review of literature in this chapter has shown how the seafaring industry has been transformed in the last half century. The transformation of the seafaring industry has a number of implications for this study. First, the link between the flag of the ship, the ship owner and the seafarers working onboard no longer exists. Gone are the days when ship owners permanently employed local seafarers to work onboard ships flagged to their home nation. Instead today's seafarers are precariously employed – a situation which has been seen in shore based industries to relate to adverse occupational health and safety outcomes (see for example Quinlan et al. 2001).

Moreover, the emergence of FOC's has reduced the implementation and enforcement of global legislation by the flag state – as was seen in the latter half of this chapter which outlined the instruments of global governance in the seafaring industry. This is of particular importance for this study as it indicates the inability of flag states to safeguard the seafaring workforce.

Thus, what emerges from the review of literature in this chapter concerns the broader structure of the seafaring industry, the ways in which work at sea is organised and the manner in which seafarers are employed. This chapter therefore presents an understanding of the extent of control which may be experienced by those who work at sea. Such control – and the associated power and ensuring inequalities – are important determinants of the organisation of work and employment which are likely to impact upon the health, safety and well-being outcomes of seafarers.

In the following chapter literature regarding the organisation of work – in particular work patterns – and the impact features of these have on safety and well-being outcomes will be considered.

CHAPTER TWO: SEAFARERS' OCCUPATIONAL HEALTH, SAFETY AND WELL-BEING

2.0 Introduction

This chapter presents literature relating to the occupational health, safety and well-being of those who work at sea. It provides both an understanding of what is currently known regarding the occupational health, safety and well-being outcomes of those who work at sea and highlights some of the areas where such knowledge is fragmented. In doing so this chapter indicates that whilst some of the occupational health, safety and well-being outcomes of seafarers are related to the hazardous nature of the maritime environment – for example poor weather conditions – many of the hazards experienced by seafarers are associated with the ways in which work and employment at sea is organised.

In demonstrating this, the first half of this chapter explores the different aspects of occupational health and safety: occupational safety, occupational health concerns and occupational well-being. Whilst the importance of workplace safety is widely understood – as are occupational health concerns – historically, less consideration has been given to occupational well-being. Yet there are many aspects of life at sea, such as isolation and fatigue, which suggest that the seafaring workforce may be at particular risk of poor well-being outcomes – and many of these aspects are associated with the ways in which employment and work at sea is organised.

The first section considers seafarers' occupational safety. Research has shown seafaring to be dangerous in terms of the likelihood of experiencing a fatality or personal injury: for example, in the previous decade seafarers were nearly twenty-six times more likely to suffer a fatal accident at work than all other workers in Great Britain (Roberts and Marlow 2005). The section then goes on to consider literature regarding seafarers' health concerns. Owing to the nature of their work, seafarers are exposed to health risks – such as exposure to carcinogenic substances – which are rarely encountered by those employed in other occupations. Given such risks, it is perhaps unsurprising that seafarers' rates of illnesses, such as heart disease and respiratory cancers, compare unfavourably with workers in other industries. The first half of this chapter concludes with a consideration of seafarers' well-being and the psychosocial hazards faced by those who work at sea. These hazards include factors, such as stress, which have been seen to be related to the organisation of work and employment in other industries.

The second half of this chapter draws on a body of literature concerning the organisation of work, in particular work patterns and the impact features of these have on safety and well-being outcomes. In doing so it presents international research findings on temporal factors, including working hours and time of the day in relation to safety and well-being outcomes. The chapter moves on to consider injury frequency in relation to time within a tour of duty and concludes by drawing on literature relating to factors which are associated with an early and late stage of a seafarer's tour of duty.

2.1 Occupational injuries, illnesses and well-being

The ILO (2008 [online]) defines occupational health and safety as “the science of the anticipation, recognition, evaluation and control of hazards arising in or from the workplace that could impair the health and well-being of workers, taking into account the possible impact on the surrounding communities and the general environment.” In 2015/16 in Great Britain there were 1.3 million individuals who experienced a work-related injury and 144 people were killed at work (HSE 2017). There are differences between the most hazardous occupations within the UK and when comparing fatality rates for the thirty most dangerous occupations in Great Britain, Roberts (2010) found merchant seafarers to be in the top ten most hazardous occupations in Great Britain.

Moreover, British seafarers were found to have relatively high mortality rates for several cancers – such as cancer of the liver and cancer of the larynx – as well as for cirrhosis and pancreatitis (Office of Populations, Censuses and Survey 1995). Similarly, in a more recent study Danish seafarers were identified as experiencing an increased overall cancer risk, in particular lung cancer, compared to the overall population (Kaerlev et al. 2005). Seafarers were also found to be more likely than the general population to engage in unhealthy behaviours – such as smoking and consuming high levels of alcohol (Parker et al. 1997).

Similarly, the mental health and well-being of seafarers is a cause for concern. Suicide rates among British (Mayhew 1999) and Danish (Brandt et al. 1994) seafarers were found to be high. Poor mental health and well-being among seafarers has been seen to manifest itself in other less dramatic ways – such as the reported high levels of work-related stress (Carotenuto et al. 2012) and fatigue (Smith et al. 2006).

In the following sections these three main aspects of occupational health and safety: occupational injuries, occupational related illnesses and occupational well-being will be considered in turn.

2.1.1 Accidents and injuries in the seafaring industry

In 2002 the IMO ([online]) stated that “shipping is perhaps the most international of all the world’s great industries and one of the most dangerous.” Such a statement is supported by data obtained from the MCA which indicated that the occupational fatality rate for seafarers was twelve times higher than that of the general workforce (Allianz 2012).

A distinction must be drawn, however, between two fundamentally different causes of fatalities in the shipping industry. One cause is maritime casualty, in which a disaster befalls a ship and impacts upon the entire ship – and all the individuals onboard. Maritime casualties may be caused by events such as collisions, fire, capsizing or explosions. These events may result in the loss of seafarers’ lives. In recent years, maritime casualties have included the capsizing and sinking of the cement carrier Cemfjord in 2015, resulting in the loss of eight lives (MAIB 2016).

The other cause is occupational fatality – in which an individual seafarer (or a small number of seafarers) are involved in a specific task and experience a work-related mishap which results in their death. These mishaps may include slips, trips and falls, which were found to account for 43% of injuries reported in a questionnaire study of 6461 seafarers (Jensen et al. 2005).

Data regarding fatalities among the seafaring labour force is historically – and consistently – grim. For example, Roberts and Hansen (2002) revealed that between 1986 and 1995, onboard British flagged vessels, seafarers' relative risk of mortality due to occupational accidents was 23.9 times higher than for all workers in Great Britain. Evidence from other studies suggests that mortality rates may be even worse in other fleets. Occupational mortalities onboard Singapore and Hong Kong fleets, for example, were found (between 1981 and 1995) were found to be significantly higher than on British vessels (Roberts 1998).

Whilst there is a body of literature which has considered mortality rates among seafarers, the numbers of non-fatal injuries have been less studied and the focus has been on cumulative rates as opposed to incidence rates. In a study which explored the availability of seafarers' non-fatal injuries data Hetherington et al. (2006) identified that across the global seafaring industry there is no standardised reporting system and the problems associated with obtaining seafarers' health and safety data will be considered in chapter 3.1.1. Thus, reliance has been placed on individual studies – all of which are incomplete – to develop a composite understanding of seafarers' accidents.

One such study is a large-scale study conducted by Jensen et al. (2004) on rates of seafarers' personal injuries which revealed that crude injury rates varied with demographic factors such as nationality, position onboard and age. The study which utilised retrospective questionnaires obtained from 6461 participants identified the crude rate of seafarers' injuries as 9.1%. The authors concluded that the annual prevalence of seafarers' injuries could be estimated at between 9 and 20% (Jensen et al. 2004). Thus, using a conservative estimate of 15% the authors estimated that 180,000 of 1.2 million seafarers worldwide were injured during one year (Jensen et al. 2004). This is comparable to a study by Tomaszunas et al. (1997) which estimated the yearly prevalence of seafarers' injuries to be 11.5%.

In another study Hansen et al. (2002) similarly studied seafarers' injury rates in relation to demographic factors onboard Danish flagged ships – utilising insurance data and data recorded by the Danish Maritime Authority – and identified relationships between rates of injuries and the seafarer's age, position onboard and their working department onboard. Seafarers who worked as part of the deck department were found to have the highest risk of being injured and the risk of an accident causing a permanent disability was seen to increase steeply with age (Hansen et al. 2002).

In the study Hansen et al. (2002) also identified a relationship between the type of ship and the frequency of seafarers' injuries. They found that seafarers onboard coasters and roll on roll off vessels experienced higher levels of risk than seafarers onboard other types of vessels (Hansen et al. 2002). The study also revealed a relationship between the seafarers' nationality and rates of accidents. In doing so it showed that foreign seafarers had lower accident rates than Danish seafarers (Hansen et al. 2002). The authors concluded that this variance could be a genuine difference and perhaps be due to dissimilarities in behaviour between different nationalities in the same workplace (Hansen et al. 2002). They went on to suggest that an alternative explanation may be that there are higher rates of under-reporting by some nationalities. In chapter 1.2.1 it was seen that research suggests that the under-reporting of injuries by seafarers is widespread and that those who experience precarious employment – a factor which was seen in chapter 1.1.1 to relate to nationality – may be particularly reluctant to report injuries.

From such research, it can be concluded that whilst seafaring is a high risk occupation there is at present an incomplete picture. There is therefore an opportunity to explore seafarers' occupational safety further, in particular in relation to aspects of their employment which are potentially related to their safety outcomes.

2.1.2 Seafarers' health concerns

Moving on, whilst seafaring is undoubtedly a risky occupation in terms of workplace injuries, a less straightforward issue is the impact that working in the seafaring industry has on the health of the labour force.

Seafarers undergo mandatory periodic medical examinations which are designed to screen out incapacity and ill health (Bloor 2000). Consequently, the seafaring labour force exhibits the 'healthy worker effect' whereby unhealthy individuals leave the workforce – or are simply prevented from joining it in the first place. However, owing to the nature of their work, seafarers are exposed to health risks which are rarely encountered by those employed in other occupations. In one study Moen et al. (1995) found that on ships which carried chemical or oil products seafarers may be exposed to carcinogenic substances. It is perhaps unsurprising therefore that among Norwegian seafarers who worked in the engine department mesothelioma related deaths were found to be six times more common than the general population (Eriksen 1999 cited by Bloor et al. 2000).

In addition, cardiovascular disease has been found to be a concern for the seafaring labour force. In fact, among seafarers cardiovascular disease was found to be the single largest cause of death, accounting for 87% of fatalities in seafarers working onboard British merchant ships between 1986 and 1995 (Roberts 2008). These findings echo those which have been identified among Polish (Jaremin et al. 1996) and Danish (Hansen 1996) merchant fleets.

The seafaring labour force has also been found to be subject to relatively high rates of infectious diseases. The worldwide travel which many seafarers are engaged in exposes them to tropical diseases such as Malaria (Roberts and Hansen 2002). Moreover, like other migrant workers – and transport workers – those who work at sea have been found to experience relatively high rates of sexually transmitted diseases. In one study, Hansen et al. (1996) found that seafarers were at an increased risk of HIV, hepatitis A and B, as well as Tuberculosis.

Studies, such as Hansen et al. (1994), have identified that many of the illnesses experienced by seafarers can be attributed to lifestyle choices and Oldenburg et al. (2009) suggested that for some seafarers the feeling of loneliness was compensated for through the use of unhealthy lifestyle choices such as excessive smoking or alcohol consumption. In a study regarding Danish seafarers – which utilised information recorded as part of mandatory health examinations – the number of overweight seafarers was statistically significant when compared to a reference group of individuals ashore (Hoeyer and Hansen 2005). Previously, Hansen et al. (1994) have attributed relatively high levels of obesity among the seafaring work force to the reduction in the manual workload at sea, combined with the fact that food onboard has become more abundant. Thus, in many respects seafarers' health concerns pose a number of questions with regards to lifestyle choices and their work-life balance and point to the need for further investigation in this area.

2.1.3 Well-being in the seafaring industry

In addition to the literature which shows both seafarers' safety and their health to compare unfavourably with other occupations, a body of literature indicates the well-being of seafarers to be of concern. Seafarers are faced with a number of psychosocial hazards, which can be attributed to the nature and organisation of their work. One such hazard is stress. Whilst many of the causes of stress experienced by individuals across all industries – such as large amounts of responsibility and workload pressures – also apply to seafarers, there are additional causes which are experienced by seafarers that are not routinely experienced by workers in other occupations. This is because the pattern of seafarers' work (and life) is regulated, restricted and secluded – and some researchers have equated life at sea as akin to prison. Thus, it is perhaps unsurprising that as part of the Australian Fatigue, Stress and Occupational Health Study, 60% of the seafarers surveyed reported moderate to high stress levels (cited by Bloor et al. 2010).

Moreover, seafaring is characterised by long periods of separation from life at home and family members and seafarers routinely experience social isolation. Multi-cultural differences between seafarers onboard may heighten these feelings of social isolation. In one study Carotenuto et al. (2012) suggested that the isolation experienced by seafarers was a major cause of psychological problems. The authors went on to identify that separation from family members was particularly difficult for seafarers when family members were unwell or a death occurred. Similarly, Jezewska et al. (2006) revealed that seafarers identified being away from home as one of the most significant demotivating factors.

Evidence from studies ashore regarding the effect of the built environment on an individual's well-being (see for example Evans 2003) suggests that poor quality living accommodation onboard ships can also negatively affect seafarers' well-being. In considering this issue Ellis et al. (2012, p.73) conducted a questionnaire study and found that "substantial minorities of seafarers identified their cabins as poorly furnished, dirty and in poor condition." The authors went on to conclude that this issue was likely to have a deleterious impact on the well-being of the seafaring labour force and inhibit their ability to restore a sense of equilibrium following a stressful work shift.

Research has also revealed that environmental stressors negatively affect seafarers' well-being. Oldenburg et al. (2010) identified that during both their working time and their rest time seafarers are exposed to environmental factors such as vibration, noise and the motion of the ship. These environmental factors may cause sleep disturbances among seafarers and it should be remembered that the ship's routine of maintenance and loading or discharging cargo continues for twenty-four hours a day with no regard for how it might affect seafarers who are resting.

In a questionnaire study regarding seafarers' onboard living conditions, 60% of respondents stated that they were disturbed by noise (Ellis et al. 2012). In the same questionnaire 63% said that they were disturbed by vibrations and 41% of respondents answered that they were unable to control the temperature in their cabin (Ellis et al. 2012). These issues impact not only on the amount of sleep possible but also the quality of sleep a seafarer experiences.

These issues are significant as studies have shown fatigue to be a psychological stressor as sleep of sufficient quality and duration is necessary for well-being. In a study of seafarers employed by the Royal Australian Navy, Grech et al. (2003) identified fatigue as a major problem. It revealed that 44% of the participants worked more than 80 hours a week and 62% of the participants stated that they were not getting enough sleep. Similarly, Gander and Le Quesne (2001, cited in Smith 2007) reported that 61% of officers working on inter-island ferries in New Zealand felt that they were regularly affected by fatigue when on duty. Worryingly, “it was also found that 26% of the ferry sample could recall being involved in a fatigue related incident or accident in the last six months” (Smith et al. 2008, p.26).

Apart from exposure to environmental stressors there are several other reasons why fatigue is so widespread in the seafaring industry, such as the working patterns and routines of seafarers – as presented in chapter 1.1.2. Many seafarers work split shifts – a feature which has been seen to impair sleep and shift patterns of 6 hours on duty and 6 hours off duty are not uncommon. In a study regarding seafarers’ fatigue in relation to work shift patterns Project Horizon (2012) – a study which utilised ship simulators – revealed that greater levels of fatigue were found in those working shift patterns of 6 hours on and 6 hours off than those working 4 hours on and 8 hours off. Moreover, in a further study regarding seafarers’ work shift patterns onboard ships Condon et al. (1984) stated that the effectiveness of seafarers could be greatly improved by implementing a system which allowed for a daily single sleep period.

Research has also shown that the frequency of port calls can impact on seafarers' fatigue levels. In a diary study, for seafarers working shorter tours of duty, frequent port calls were associated with greater fatigue (Smith et al. 2006). With methods of improved efficiency, for example containerisation, ships are spending less time in port than they once were and port turn-around times have reduced substantially. For example, in a study regarding the trade, infrastructure and development of Los Angeles, Erie (2004) reported that ship turnaround time in the port of LA had reduced from a week or more in the 1960s to two or three days in the Twenty-first Century. Moreover, in 2016 the average turnaround time for container vessels in the port of Hong Kong was found to be 16 hours (Mardep 2016). Clearly, quicker and more efficient port turnarounds are of financial benefit to ship owners. However, shorter port turnarounds and greater frequency of port calls negatively impact on seafarers who are required – for a number of reasons – to work extra hours when the vessel is not at sea. Whilst in port ships are subjected to inspections from various parties such as port state control and classification societies. Arslan and Er (2007) stated that an increased number of inspections – whilst the vessel was in port – was one cause of seafarers' fatigue. In another study Smith (2007) revealed that increases in International Ship and Port Facility Security (ISPS) requirements – such as maintaining a continuous gangway watch – have also increased seafarers' workloads, thereby contributing to seafarers' levels of fatigue.

Moreover, Carter (2005) stated that seafarers were at risk of experiencing burnout, and senior officers were identified as being particularly at risk. In identifying the risk Carter (2005) revealed that the predisposing factors of burnout include homesickness and loneliness – factors which seafarers are known to experience.

It is difficult however to quantify the effect factors such as poor quality living conditions, social isolation, loneliness and burn-out have on seafarers' well-being. One possible measurement is rates of suicide and one study found that among British seafarers the greatest cause of traumatic occupational fatalities was suicide (Mayhew 1999). Similarly, in a review of data from 1996 to 2009, Iversen (2012) found that 5.9% of all seafarer deaths were the result of suicide.

Thus, from such research it can be concluded that the occupational well-being of seafarers is a concern. Moreover, the literature discussed in sections 2.1.1 and 2.1.2 regarding occupational injuries and occupational related illnesses, indicates that there is a need for substantial improvement in the health and safety of those employed in the seafaring industry – as well as the need for further research. In addition, the structures of employment in the seafaring industry and the organisation of life onboard – as presented in chapter one – suggest that features of the organisation of work at sea have the potential to impact on the health, safety and well-being outcomes of seafarers. Thus, in the following section the limited research regarding occupational safety and well-being in relation to work patterns will be presented.

2.2 Occupational safety and well-being in relation to work patterns

Seafarers' safety and well-being in relation to their work patterns is of interest for a number of reasons. First, there are a number of features which are specific to work patterns in the seafaring industry, such as the fact that seafarers are away from home for a prolonged period of time and work every day whilst they are onboard, that make it an especially interesting topic to study.

In addition, the seafaring industry is a rare example of a 24 hour 365 days a year industry. Ships navigate and load cargo regardless of the time of the day or the day of the year. As Knudsen (2009, p.296) states: "weekly cycles ceased to be fixed points for me and yet daily life had a rhythm as regular as clockwork, marked by recurring events like changing the watch, breaks and meal times."

In this section literature regarding seafarers' safety and well-being in relation to features of their work patterns will be presented. In doing so, occupational risk and temporal factors – such as long working hours and overtime – are presented.

The section goes on to consider literature regarding personal injuries in relation to time periods within seafarers' tours of duty. In particular, two key studies – Hansen et al. (2002) and Jensen et al. (2004) – are reviewed. Literature from the offshore oil industry is also discussed, due in the most part to the scarcity of such literature relating to the seafaring industry.

Finally, literature regarding issues which are pertinent to the beginning and end of a seafarer's tour of duty are considered in section 2.2.3. These issues include the time seafarers spend travelling to a vessel and the uncertainty seafarers face regarding the date on which they will leave the vessel and return home – among others. The section concludes by drawing on Bailey et al.'s. (2007) questionnaire study which explored seafarers' perceptions of risk at both the beginning and end of a tour of duty.

2.2.1 Temporal factors

In chapter 1.1.2, it was seen that seafarers work long hours during a tour of duty. Research has identified long working hours to pose a risk among construction workers (Lowery et al. 1998), healthcare professionals (Gander et al. 2000), miners (Duchon and Smith 1994, cited in Dembe et al. 2005) and fire-fighters (Lusa et al. 2002). Similarly, research from transport industries suggests bus drivers (Meijman 1997) and long distance truck drivers (Mccartt et al. 2000) also experience an increased risk of occupational injuries when they are subjected to long working hours. In a study regarding seafarers' working hours Smith et al. (2006) found that 49% of seafaring respondents from the offshore oil and support industry to be working more than 85 hours a week. In the same study 46% of respondents working in the short sea and coastal industry said they were working more than 85 hours per week (Smith et al. 2006).

The long working hours experienced by seafarers are likely to be exacerbated by the under-reporting of working hours, in order to ensure compliance with rest hour legislation – as described in chapter 1.1.2. In a study regarding the relationship between recorded hours of work and fatigue in seafarers, Allen et al. (2006) revealed that 40% of a sample said they under-reported their working hours.

Long working hours, and similarly overtime schedules have been associated with decrements in performance, which can lead to increased risk of errors (Parkes 2007). In a study which explored the impact of long working hours and overtime on occupational injuries in shore-based occupations in the United States, Dembe et al. (2005, p.595) revealed that “overtime schedules had the greatest relative risk of occupational injury or illness, followed by schedules with extended (≥ 12) hours per day and extended (≥ 60) hours per week.” Overtime data in terms of extra hours worked per day/week for the seafaring industry is not readily available as seafarers are normally paid a fixed monthly salary regardless of the number of hours worked. However, from a study which utilised questionnaires Ellis et al. (2012) identified the average hours seafarers worked in every twenty-four hours to be over ten hours whilst the vessel was in port and nine and a half hours whilst the vessel was at sea. In addition, in the same study 70% of respondents reported working seven days every week whilst onboard (Ellis et al. 2012). Thus, whilst seafarers may not experience overtime working in the traditional sense, the hours they work are far more than the hours worked by individuals in shore-based occupations, whereby in the UK the working time directive prohibits individuals from working more than forty-eight hours a week on average (GOV 2017).

Moving on, shore-based studies have shown a relationship between occupational injuries and time on task, however, few studies regarding seafarers' occupational accidents and time on task exist – and it is debatable if such research is even desirable given that seafarers live and work in the same environment for an extended period, thus in a sense a seafarer is ‘on task’ for the whole period they are onboard.

Research from other industries, however, can shed light on the issue but the extent to which such findings apply to the seafaring industry is substantially limited. In one study Pokorny et al. (1981) investigated the accident risk of bus drivers and identified a peak in the third or fourth hour of the driver's shift. Significantly, this peak was not affected by the exact start time of the driver's shift (Pokorny et al. 1981). Other studies suggest that the risk of experiencing an occupational accident increases during the latter portion of a long work shift (Hanecke et al. 1998; Nachreiner et al. 2000; Dembe et al. 2005). In a study of French lorry drivers Hamelin (1987) reported a substantial increase in relative risk after twelve or more hours. On reviewing Hamelin (1987) and other studies Folkard (2000, p.22) concluded that "it would appear that there is an underlying exponential increase in accident risk over time on duty, but with a transient, 2-4 hours increase in risk superimposed on top of this underlying trend."

Folkard's (2000) statement is particularly interesting as it would appear to refute current fatigue and vigilance decrement theories. Both theories predict an increase in risk over time on task but the research suggests that the risk decreased between the fourth and the eighth hour. It is also noteworthy that the findings suggest that the relative risk for four hour shifts is 20% greater than the relative risk for eight hour shifts (Folkard 1997). Such four-hour shifts are common among seafarers, who generally work a three-watch system of four hours on duty followed by eight hours rest – as was seen in chapter 1.1.2.

Studies have also revealed how the risk of experiencing an occupational accident varies when working successive shifts. Folkard and Lombardi (2006, p.957) pooled results from other published epidemiological studies regarding injury frequencies in relation to four successive night shifts in shore-based industries and found that “on average, risk was about 6% higher on the second night, 17% higher on the third night, and 36% higher on the fourth night.” Nevertheless, such research has generally focused upon four successive night shifts and there is a lack of studies regarding longer spans of consecutive night shifts. It is reasonable to suggest that the reason for this is that longer spans of consecutive shifts without a rest day are unusual among shore-based occupation. Consequently, it is difficult to determine how risk varies over a greater number of consecutive night shifts and for this reason Folkard and Lombardi (2006, p.957) raised the question: “what happens to risk over longer spans of successive night shifts?”

Research also suggests that successive night shifts are not the only type of successive shifts which are associated with patterns of occupational accident risk. On pooling results from other published studies regarding occupational injury frequencies and consecutive morning/day shifts Folkard and Lombardi (2006) found the relative risk to increase over consecutive shifts. Consequently, they concluded that: “there is evidence for an increase in risk over successive workdays, irrespective of the type of shift” (Folkard and Lombardi 2006, p.958). Little is known, however, regarding the relationship between the consecutive shifts that seafarers work during a tour of duty and occupational injury risk – as will be seen in the following section.

2.2.2 Time into tour of duty

Time into tour of duty refers to the time period from the day an individual leaves home and arrives at a workplace – such as a ship or an offshore oil installation – to the day they leave the workplace and return home.. In the offshore oil and gas installation industry a study found that injury severity was not independent of time into tour of duty (Parkes and Swash 1999). The research utilised two injury categories: fatalities and serious injuries, and 3+ day injuries. The normal duration of a tour of duty was found to be two weeks and the relative proportions of each injury category were then considered alongside days into tour of duty. “For tour durations longer than two weeks, the ratios of fatalities and severe injuries to 3+ day injuries increased markedly, relative to tour durations of one and two weeks” (Parkes and Swash 1999, p. iiiii). Additionally, there was a rise in percentages of fatalities and serious injuries as the time on the offshore installation increased beyond two weeks (Parkes and Swash 1999).

Similarly – in a more recent study conducted in the offshore oil and gas industry – Parkes (2007) identified an increase in the frequency of injuries requiring first aid treatment as a two-week tour of duty for offshore petroleum workers progressed. Conversely, serious injuries did not show a similar trend.

Whilst such research is of interest, the two weeks’ tours of duty worked by offshore oil and gas industry workers are substantially shorter than the tours of duty worked – on average – by seafarers. In chapter 1.1.1, for example, it was seen that the average tour of duty for European seafarers was between three and six months – and between six and nine months for non-European seafarers (Oldenburg et al. 2009).

Literature regarding seafarers’ incident frequency in relation to time into tour of duty is sparse, however, in one such study Hansen et al. (2002) utilised insurance data and data obtained from the Danish Maritime Authority and identified time phases of how long a seafarer had been onboard when an accident took place (a factor the authors termed ‘time at risk’).

In table 3 below the adjusted relative risk in relation to days onboard when the accident took place can be seen. The relative risk of experiencing an accident causing permanent disability was lower after the seafarer had been onboard the vessel for 90 days (Hansen et al. 2002). For all periods prior to 90 days, however, the relative risk remained about the same (Hansen et al. 2002). Additionally, for all ship types the risk associated with time aboard was similar. The exceptions to this were oil and chemical tankers “where there was a steady reduction in risk after the first month, ending with an adjusted relative risk after 3 months of 0.22 compared with the first 15 days” (Hansen et al. 2002, p. 89).

	Notified notifiable accidents not causing disability of 5%		Accidents causing permanent disability of >5%	
Time aboard when accident took place (days):	Cases	Adjusted relative risk (95% CI) (p<0.001)	Cases	Adjusted relative risk (95% CI) (p<0.001)
1–15	232	1.00 (reference category)	42	1.00 (reference category)
16–30	176	0.87 (0.71 to 1.05)	22	0.60 (0.36 to 1.01)
31–60	344	1.01 (0.85 to 1.19)	51	0.85 (0.56 to 1.28)
61–90	201	0.86 (0.71 to 1.04)	30	0.75 (0.47 to 1.21)
>90	326	0.62 (0.52 to 0.75)	43	0.51 (0.33 to 0.81)

Table 3 Time aboard when accident took place (adapted from Hansen et al. 2002, p.87)

In another study Jensen et al. (2004) used retrospective questionnaires to compute seafarers' occupational accident rates. The information obtained included: “age, gender, working hours per day and days per week, ship type, flag state, tonnage, main work area, occupational position, duration of the latest tour of duty (dates of signing on and off plus duration in whole months and days) and whether the seafarer had suffered any injuries during this period” (Jensen et al. 2004, p.406). The average tour length of the respondents was found to be 234 days and table 4 below shows the adjusted and unadjusted relative risk for less than, and more than, 117 days onboard.

Variable	Total no. of hours work (x 1000)	Observations/ Seafarers	Injury cases	Unadjusted			Adjusted		
				IRR	95% CI	P values (two-tailed)	IRR	95% CI	P values (two-tailed)
1-116 days	593	819	66	1			1		
117+ days	6929	2610	183	0.23	0.180.32	<0.001	0.27	0.19-0.39	<0.001

Table 4 Injury in seafarers during latest tour of duty (Jensen et al. 2004, p. 551).

Jensen et al. (2004) revealed 8.06 injury cases per 100 seafarers for those who had been onboard for less than 117 days. For those seafarers who had been onboard for 117 days or more 7.01 injury cases per 100 seafarers was reported. Furthermore, the injury case rate was reported to be 111.30 and 26.41 per million hours of work for those who had been onboard for less than 117 days and those who had been onboard for 117 days or more respectively. To summarise, those who had been onboard for less than 117 days showed significantly greater accident rates than those who had been onboard for more than 117 days. Such research again suggests a relationship between time into tour of duty and occupational accidents in the seafaring industry.

Nevertheless, despite being significant pieces of literature neither Hansen et al. (2002) or Jensen et al. (2004) provided details regarding when within an entire tour of duty an injury occurred. Both studies utilise time lapsed prior to an injury occurring rather than where and when within a tour of duty the injury occurred. Thus, these two studies do not explore the frequency of seafarers' injuries in relation to the end of the seafarers' tours of duty. In fact, Jensen et al. (2004, p. 405) stated: "self-report of the duration of the latest tour of duty is useful for seafarers from merchant ships with short-term employments, but not for ferries and other, non-specified types of ship with other or permanent employment." No further justification for this statement is provided, however, so it is not possible to ascertain the basis of it.

This appears to be a substantial gap in the literature as whilst it is important to consider occupational accidents in relation to the number of consecutive the days the seafarer had been onboard prior to sustaining an injury, there are factors at both the beginning and end of a seafarer’s tour of duty that may impact on the likelihood of experiencing an occupational injury – as is considered below.

2.2.3 The beginning and end of a seafarer’s tour of duty

The beginning of a seafarer’s tour of duty is the time when a seafarer transitions from their life at home to their life onboard and some seafarers are asked to undertake this transition earlier than expected and return to a vessel earlier than anticipated, thus cutting their time at home on leave short. In a survey of 1600 seafarers (950 Chinese and 650 international) respondents were asked whether the “employer had ever asked them to return early from home leave to join a ship?” (BIMCO 2015, p.30). As can be seen in figure 2 below, over half of both international and Chinese respondents usually, regularly, or sometimes were asked to cut short their home leave periods.

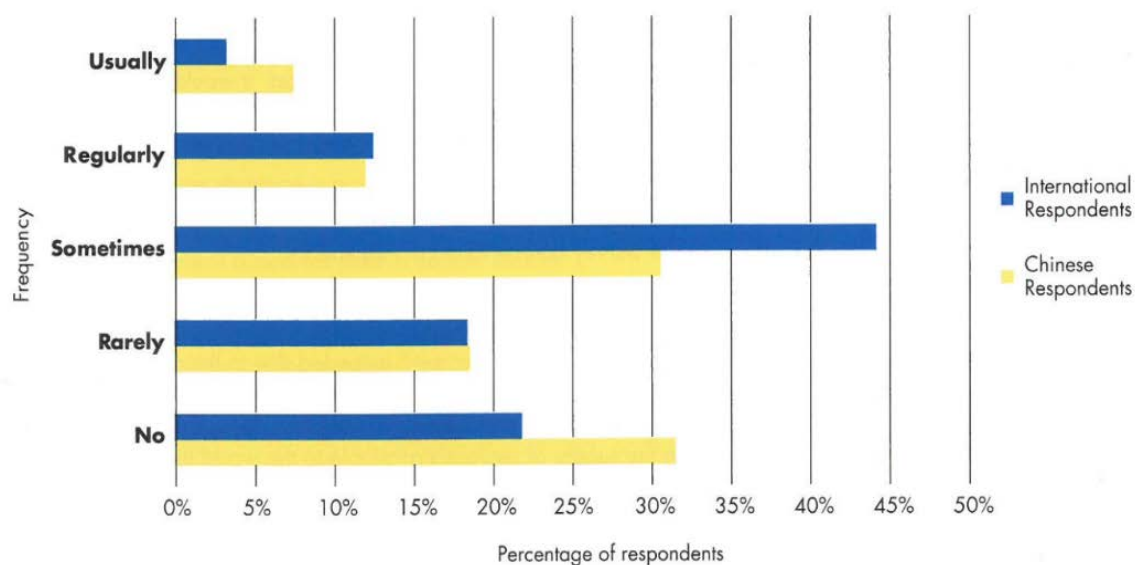


Figure 2 Frequency seafarers reported being asked to cut short home leave periods (BIMCO 2015, p. 30)

Irrespective of whether they joined the vessel earlier than anticipated or not one factor pertinent to the beginning of a tour of duty is the time spent by seafarers travelling to vessels. In one study, Wadsworth et al. (2008) utilised questionnaires and daily diaries to study seafarers' fatigue levels and reported that 66% of respondents stated that they had no opportunity to sleep between travelling to the ship and commencing their first shift. Of this group 47% had travelled more than 6 hours and 19% for 12 or more hours (Wadsworth et al. 2008). Moreover, it is not just the journey time which is a concern but also the changing of time zones. Moving between time zones may result in seafarers experiencing jet lag which has been identified by accident investigators as a factor predisposing a sleep-deprived state (Phillips 2000).

Nautilus – the trade union for British and Dutch seafarers – is campaigning for “seafarers to be given adequate rest periods before starting duties after flying out to join ships overseas” (Nautilus 2017 [online]). Whilst some shipping companies provide seafarers with hotel accommodation near to the ship for the night immediately prior to joining the vessel this is not a requirement and many shipping companies do not and seafarers simply travel directly from the airport to the vessel. Thus, with some seafarers starting their tour of duty tired, it seems this period is a worry in terms of both seafarers' safety and well-being.

Moreover, the organisation of employment in the seafaring industry – as discussed in chapter 1.1.1 – results in many seafarers joining vessels which they have not previously sailed onboard. Consequently, at the beginning of a tour of duty these individuals lack specific workplace familiarity. In a shore-based study Underhill (2007) found that agency workers were particularly vulnerable to injury early in their placement, when the effects of unfamiliarity were most apparent. Thus, it is unsurprising that in their study Hansen et al. (2002, p.90) found “seafarers, who return to the same ship, have an overall lower risk of having an accident during the second or following employment period on the same ship. This study cannot explain this result, but it is likely that familiarity with the ship improves occupational safety.”

In an attempt to overcome a lack of workplace specific familiarity, new joining seafarers are required – by the MLC, STCW and ISM Code – to undergo familiarisation training. Section 6.3 of the ISM Code states: “The company should establish procedures to ensure that new personnel and personnel transferred to new assignments related to safety and protection of the environment are given proper familiarisation with their duties. Instructions which are essential to be provided prior to sailing should be identified, documented and given”.

STCW (78), Part A, Chapter I, Section A-I/14 also states:

“2. The company shall provide written instructions to the master of each ship to which the Convention applies, setting forth the policies and the procedures to be followed to ensure that all seafarers who are newly employed on board the ship are given a reasonable opportunity to become familiar with the shipboard equipment, operating procedures and other arrangements needed for the proper performance of their duties, before being assigned to those duties. Such policies and procedures shall include:

.1 allocation of a reasonable period of time during which each newly employed seafarer will have an opportunity to become acquainted with:

.1.1 the specific equipment the seafarer will be using or operating, and

.1.2 ship specific watchkeeping, safety, environmental protection and emergency procedures and arrangements the seafarer needs to know to perform the assigned duties properly; and

.2 designation of a knowledgeable crew member who will be responsible for ensuring that an opportunity is provided to each newly employed seafarer to receive essential information in a language the seafarer understands.”

Arguably, the guidance provided by STCW and the ISM Code regarding the familiarisation training of new joining seafarers is vague and subjective.

In order to ensure the transference of safety critical information, officers also receive a handover – generally from the individual they are relieving. Research, however, indicates that this handover may be of a short duration. In a questionnaire study of 200 seafaring officers Vidan et al. (2015) revealed that 31% of respondents reported a handover of less than 2 hours, 14% reported a handover of between 2 and 4 hours, 13% reported a handover of between 4 and 6 hours and 42% reported a handover of more than 6 hours.

The short duration of seafarers' handovers is particularly concerning given the flexibility of the seafaring labour force and the prevalence of precarious employment (as discussed in chapter 1.1) which results in seafarers sailing onboard unfamiliar ships and even unfamiliar types of ships. Moreover, research from other industries has revealed some of the consequences of safety critical information being lost during crew changeovers. The Cullen report (1993), for example, recognised crew handover and failures in communication between the outgoing and incoming crews to be key issues in the Piper Alpha disaster, in which the North Sea oil and gas platform exploded resulting in the loss of 167 lives.

There are also some factors which are particularly pertinent to the end of a seafarer's tour of duty. In section 2.1.3 above, fatigue was seen to be a concern in the seafaring industry and in a questionnaire study regarding accommodation onboard cargo ships Ellis et al. (2012) revealed that 70% of respondents reported working seven days every week during a tour of duty. Furthermore, in a study which explored work-related fatigue Winwood et al. (2005) revealed that recovery from work-related fatigue mostly occurred between shifts. This is a concern for seafarers who not only rest and work in the same environment but also are onboard working consecutive shifts for prolonged periods of time. Consequently, seafarers are likely to accrue sleep debt and a study which explored seafarers' patterns of fatigue for an entire tour of duty found that fatigue on waking increased between the beginning and the end of a tour of duty (Wadsworth et al. 2006).

Moreover, towards the end of a tour of duty, seafarers are likely to eagerly anticipate leaving the ship and returning home, and for many seafarers this period is a time of high spirits and happiness. This feeling of approaching the end of the time onboard is commonly referred to as the 'channels' by British seafarers (Sampson 2013) – which is a historical reference to when British seafarers joined and left a vessel at a port in the UK and knew they were approaching the end of their tour of duty when they saw the English Channel on their return to the UK. Just like in these “olden times” however, the exact date on which a seafarer will leave the vessel and return home is still unknown for many seafarers and today there are many reasons why seafarers remain onboard after the anticipated end of their tour of duty. Some seafarers remain onboard willingly, having requested an extension to their tour of duty. Such requests are likely due to the precarious employment faced by the seafaring labour force – as discussed in chapter 1.1.1. For many seafarers, widespread unemployment in their home countries and the relatively high wages earned whilst onboard make it preferable to remain onboard for as long as possible. After all, once they leave the vessel many seafarers will simply not know when they will next secure paid work.

However, many seafarers remain onboard unwillingly, and these circumstances can best be termed as mandatory tour extensions and shipping companies can impose these extensions owing to the terms of seafarers' contracts. Many contracts – be they permanent or single voyage contracts – incorporate a clause which is commonly referred to by seafarers as a 'plus or minus clause'. This clause permits the shipping company to either reduce or extend the contracted voyage period, for example a seafarer with a contracted tour of duty of three months would likely have a plus or minus clause of one month. This would enable the shipping company to repatriate the seafarer once they had been onboard for two months (one month shorter than the seafarers anticipated voyage length) or keep the seafarer onboard for four months (one month longer than the seafarers anticipated voyage length).

There are numerous reasons as to why shipping companies might utilise the plus or minus clause – although it is predominantly the plus clause that is utilised and seafarers remain onboard for longer than they anticipated. In some countries crew members may be unable to leave the vessel due to visa requirements – such is the situation for British seafarers in China. Additionally, the vessel may be sailing a long ocean passage and the next port call may be several weeks' sail away. Shipping companies are in some cases reluctant for seafarers to leave the vessel in expensive countries and try to minimise repatriation costs by waiting for the vessel to dock at cheaper countries. Repatriation costs can be further reduced by only permitting seafarers to be repatriated in small groups and some seafarers may be required to wait until such a group can be formed.

In the BIMCO (2015) survey discussed at the beginning of section 2.2.3 respondents were also asked whether their employer had ever asked them to extend their contractual voyage period, and the responses can be seen in figure 3 below. Less than 20% of both international and Chinese respondents reported that they had never been asked to extend their tour of duty. It is important to note, however, that it is not clear in the survey if this extension refers to staying onboard past the date they anticipated leaving the vessel or beyond their contracted period (as explained above).

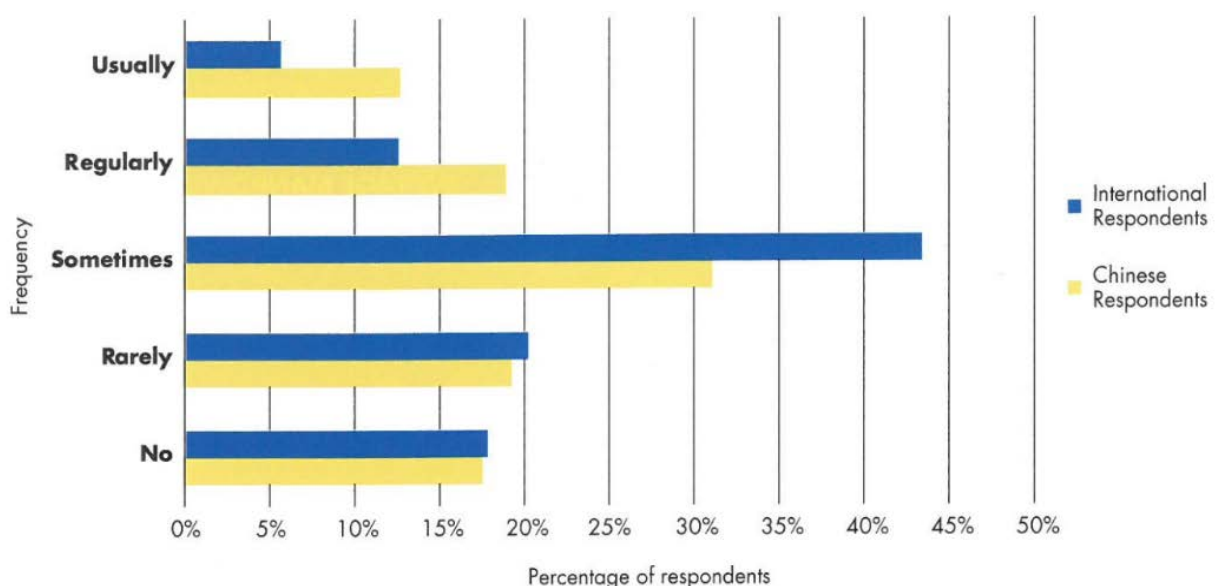


Figure 3 Frequency seafarers reported being asked to extend contractual voyage periods (BIMCO 2015, p.30)

Anecdotal evidence suggests that seafarers perceive that their colleagues are more at risk of experiencing an occupational accident if the colleague is approaching – or has past – their expected time onboard. For example, one Master (cited in Knudsen 2009 p.300) said: “If I have an able seaman whose wife is about to divorce; if he has just recovered from a flu, or maybe he has been aboard one month longer than he should, then you can feel he is tired; and it may be more dangerous than if he was well.” BIMCO (2015, p.30) also recommends that “management practices should protect seafarers as far as possible from changes to their time at sea and leave ashore”.

There is no heuristic available however to translate, for example, a seafarer staying an extra month more than expected onboard into an occupational safety consequence. Intuitively though it would seem such a time would pose an increased risk and research regarding this issue is required. Similarly, it is not possible to quantify the impact mandatory tour extensions have on a seafarer’s well-being. In fact, it is not possible to quantify the effect many of the features presented here have on seafarers’ well-being.

It is possible however to quantify how seafarers perceive risk at different periods of time into tour and in one study Bailey et al. (2007) utilised questionnaires to explore seafarers’ perceptions of risk and two thousand three hundred and seventy-two seafarers from fifty countries responded. A question asked in the questionnaire was: “In your opinion, how great is the risk to a seafarer’s health and safety due to these factors?” (Bailey et al. 2007) One of the fifteen factors given was “having just joined the ship” (Bailey et al. 2007, p.60). On the five-point response scale, two was defined as low risk, three as medium risk and four as high risk. Having just joined the ship was given a perceived risk overall mean of 3.0 and table 5 below shows the perception of the risk for “having just joined the ship” categorised by onboard hierarchy, onboard department, ship type and nationality.

Onboard hierarchy	Managers	3.18
	Senior	3.21
	Junior	3.01
	Rating	2.90
Onboard department	Engineering	3.00
	Deck	3.10
	Shore-side	3.20
	Catering	2.80
Ship type	Tankers	2.95
	Bulk carriers	3.23
	Dry cargo (non bulk)	3.00
	Passenger	2.86
	Working vessels	3.21
Nationality	India	3.06
	Philippines	2.90
	United Kingdom	3.18
	China	3.40
	Netherlands	2.59

Table 5 Perception of risk ordered for “having just joined the ship” categorised by onboard hierarchy, onboard department, ship type and nationality (adapted from Bailey et al. 2007, pp.62, 63, 65, 69)

Interestingly, the relationship between the perceived risk for having just joined the ship and the number of years’ experience in the company that the seafarer had was unclear.

The factor ‘approaching the end of the time onboard’ was given a perceived risk overall mean of 2.9 and this perception of risk can be seen categorised by onboard hierarchy, onboard departments, ship type and nationality in table 6 below. For the factor ‘approaching the end of the time onboard’, nationality, rank and department were predictors for perceived risk.

Onboard hierarchy	Managers	2.91	Ship type	Tankers	2.91
	Senior	3.02		Bulk carriers	2.96
	Junior	2.84		Dry cargo (non bulk)	2.78
	Rating	2.72		Passenger	2.79
Onboard department	Engineering	2.70		Working vessels	2.80
	Deck	3.00	Nationality	India	3.12
	Shore-side	2.90		Philippines	2.67
	Catering	2.80		United Kingdom	2.96
		China		3.14	
				Netherlands	2.46

Table 6 Perception of risk for approaching the end of time onboard categorised by onboard hierarchy, onboard department, ship type and nationality (adapted from Bailey et al. 2007, pp. 62, 63, 65, 69)

The research by Bailey et al. (2007) suggests that seafarers perceive the factors which increase risk at the beginning of a tour of duty and those at the end of a tour of duty to afford similar levels of risk. Thus, it can be seen that not only does literature identify a relationship between seafarers' days lapsed onboard and incidences of occupational injuries (Hansen et al. 2002 and Jensen et al. 2004) but also that seafarers perceive a relationship between specific time periods with a tour of duty and risk (Bailey et al. 2007).

2.3 Summary

The review of literature in this chapter demonstrates that there are numerous aspects associated with the organisation of work that impact on the health, safety and well-being outcomes of workers. The relationship between seafarers' occupational health, safety and well-being and the organisation of work at sea is especially interesting as there are features of seafarers' work patterns – such as the requirement to work every day for an extended period – which are unusual in comparison to shore-based occupations.

Moreover, there are a number of factors, such as seafarers' lack of familiarity with a vessel, which make it reasonable to suppose the beginning of a tour of duty may be particularly risky – in terms of operational and personal safety, as well as well-being. Equally, factors such as cumulative fatigue would suggest the end of a tour of duty to be risky. Therefore what emerges strongly from the review of the literature are the start and end of a tour of duty as areas of particular interest. Moreover, what is apparent in this chapter is how some factors relating to the organisation of work and employment at sea – such as a seafarers' lack of workplace specific familiarity and long working hours – have the potential to impact on the health, safety and well-being outcomes of those who work at sea. Such factors also indicate that there are aspects of the organisation of work and employment at sea – such as delays in repatriation – which are concerned with job control and the issue of power, both onboard vessels and in the seafaring labour market in general. Yet research in the seafaring industry has so far failed to adequately explore these associations and the impact they have. There is therefore a clear opportunity to further investigate how the organisation of work and employment at sea impacts on the health, safety and well-being experiences of seafarers. Such an exploration is the aim of this study and in order to achieve this aim this study utilises mixed methods research, the components of which are the analysis of shipping companies' safety data and the semi-structured interviewing of seafarers. In the following chapter these methods will be considered in detail.

CHAPTER THREE: METHODS

3.0 Introduction

The purpose of this thesis is to address the question ‘what are the health, safety and well-being experiences of seafarers in relation to the organisation of work and employment at sea?’ It was seen in the previous chapter that seafaring is a relatively dangerous occupation and the review of the literature identified numerous features regarding the organisation of work and employment at sea that could be expected to impact upon seafarers’ health, safety and well-being. These features included seafarers travelling for a prolonged period to join a vessel and having no opportunity to sleep between travelling and commencing their first shift (see Wadsworth et al. 2008). And the uncertainty seafarers faced regarding the date on which they would leave a vessel and return home. It also showed that seafarers themselves perceived risk differently at various time periods within a tour of duty (see Bailey et al. 2007).

In the previous chapter, it was also seen that in the offshore oil and gas installation industry injury severity was found to be significantly related to an aspect of the organisation of work: time into tour (see Parkes and Swash 1999). The review of the literature also revealed that studies had identified a statistically significant relationship regarding the number of consecutive days a seafarer had been onboard when an injury occurred (see Hansen et al. 2002 and Jensen et al. 2004). Moreover, it was highlighted that successive shifts and long working hours – features which are prevalent in the seafaring industry – adversely impact on the occupational safety of workers in shore-based industries. Thus, the findings from academic research would support the supposition that there are features of the organisation of work and employment at sea which relate to seafarers’ health, safety and well-being outcomes.

In order to explore these features of the organisation of work and employment at sea, and consider the research questions posed an appropriate methodological approach was required and in this chapter it is this methodological approach which will be discussed. The chapter provides an account of how the research was conducted and justifications for the methods of inquiry I employed.

This chapter consists of four main sections, the first of which considers how this study was designed. In doing so it explains how I obtained the seafarers' injury data which makes up the quantitative component of this study. It goes on to consider mixed methods research and my rationale for utilising both quantitative and qualitative research methods.

The use of a pilot study is considered in section two and the lessons learned from the pilot study discussed. The third section presents an explanation of how the interviewing of seafarers was conducted and in this section an overview of the data analysis is also given. In the final section of this chapter the issues of risk and ethics in research are explored. In doing so it considers my position as a practitioner researcher and the implications of my position.

3.1 Designing the study

Previous studies which have explored seafarers' health, safety and well-being have utilised several different research methods. These methods have included questionnaires (see for example Bailey et al. 2012), accident data obtained from maritime administrations (see for example Ellis et al. 2009) and interviews (see for example Sampson et al. 2016).

In this study a mixed methods approach was implemented and the ways in which the qualitative and quantitative methods of this study were integrated will be discussed in section 3.3.2. The qualitative research component of this study comprises the semi-structured interviewing of 37 seafarers, of various ranks, onboard four vessels and this method of generating data is discussed in detail in section 3.3 of this chapter.

The quantitative research component of this study comprises shipping companies' incident data combined with human resources data. These data were obtained from three multi-national shipping companies and contain 650 incidents. These incidents are all injuries – of all severities – which were reported to the three shipping companies over several years (the exact time periods are detailed in chapter five). The manner in which the safety data were obtained is important as different sources are subject to varying criteria for inclusion, for instance, some sources only record incidents which result in lost working time. Thus, in section 3.1.1 the substantial difficulties associated with obtaining such data and the possible sources from which such data could be obtained are discussed.

3.1.1 Obtaining seafarers injury data

In the review of the literature in chapter two it was seen that literature regarding injuries in the seafaring industry is sparse and incomplete, perhaps due to the difficulties in collecting such data, which are a consequence of the complex global nature of the industry. The main sources for collecting data which could be used to explore the relationship between features of the organisation of work and employment at sea and incidences of occupational injuries are: P and I clubs, national maritime administrations, confidential reporting schemes and shipping companies. There are, however, substantial problems associated with each of these data sources.

For example, P and I club datasets only record data relating to incidents which are sufficiently large to justify recording (Ellis 2007). Thus, such datasets would provide no information regarding injuries which required first aid or basic medical treatment but did not result in any lost work time. Furthermore, there is no standard format between different P and I club datasets so such data are difficult to accurately collate. In addition, due to the sensitive nature of the data recorded by P and I clubs' the data are not publicly available.

Similarly, Philips and Dalty (2006) suggest that national maritime administrations tend to focus on accidents which involve a fatality. Thus, again such datasets would not provide information regarding incidents which resulted in non-fatal injuries. Moreover, whilst maritime administrations are required by SOLAS and MARPOL to record information regarding accidents occurring onboard ships whilst in their water and onboard all vessels flagged to their nation – regardless of their geographical location when the incident occurred, these data are rarely publicly available and in some maritime administrations poorly recorded (Ellis 2007).

Confidential voluntary reporting schemes tend to include information regarding incidents of all severities. However, such schemes – an example of which is the UK based ‘Confidential Hazardous Incident Reporting Programme’ – have very limited coverage and thus are not particularly appropriate for obtaining statistical data regarding maritime occupational accidents (Ellis 2007).

Finally, the ISM Code requires all shipping companies to record accident data for their fleet (Oltedal and McArthur 2010). Generally, accident data from companies is viewed favourably as a data source due to its high level of detail but as these data are sensitive in nature, they are not publicly available. Importantly, such datasets may include specific injury details and contextual factors.

Thus, a significant strength of this study is that the incident data were obtained from shipping companies. Moreover, whilst data regarding deployment dates for the injured seafarers were not contained in the shipping companies’ injury data sets these data were obtained from the shipping companies’ human resources departments. Consequently, it was possible to combine injury data with human resources data which contained information regarding important features – such as the date the seafarer joined the vessel and the date the seafarer expected to leave the vessel. The ability to analyse a combination of shipping company accident data and human resources data enabled an exploration of seafarers’ safety in relation to an important aspect of the organisation of work at sea – seafarers work patterns – and the resulting analyses are presented in chapter five.

Gaining access to these data was relatively complex – as will be revealed below – and the difficulties I experienced in obtaining access likely go some way to explaining the dearth of academic research in the seafaring industry revealed in various places throughout the literature review presented in chapters one and two.

In total I was able to gain access to three shipping companies' data sets. One data set was obtained from Company A, a multinational company which owns and operates oil, chemical and gas tankers. The second data set was provided by Company B, a multinational shipping company which owns and operates a variety of offshore vessels. These vessels primarily provide support services to the offshore oil and gas extraction industry. The third data set was obtained from a large container shipping company – Company C.

Initially, contact was made with Company A via an email sent to the Human Resources department. The introductory email was forwarded internally to the crewing department and a reply was received stating the company would be willing to provide the requested data. The data were sent as Microsoft Excel spreadsheets via email from a Health Safety Environment and Quality (HSEQ) Superintendent, a shore-based individual who was employed by the shipping company to oversee and monitor the seafaring labour force onboard the company's vessels in all matters relating to health, safety and the environment. Table 7 below shows the variables which were obtained from Company A.

Vessel name	Root cause
Event date	Type of contact
Event description	Part of body injured
Type of incident	Nature of injury
Medical leave duration	Crew position
Immediate cause (unsafe condition)	Activity when injured
Immediate cause (unsafe acts)	Location
Underlying cause (job factors)	Age range
Underlying cause (human factors)	Nationality
Control actions area improvement	Company seniority

Table 7 Variables sent by Company A

The name of the ship, the event date, the date the seafarer signed on the ship and the date the seafarer expected to leave the ship were then provided by the crewing department of Company A via email and as such it was possible to match the HSEQ and crewing data by utilising the ship's name and the incident date.

The HSEQ department from Company B provided the relevant dates and the incident details all in the same Microsoft Excel spreadsheet and again the spreadsheets were sent via email. The variables contained in the spreadsheets can be seen in table 8 below.

Event date	Area of operation
IP signed on	Nature of injury
Severity (incident type)	Cause of injury
Activity	Rank
Part of body injured	

Table 8 Variables sent by Company B

It was then possible to calculate the expected sign-off date for the seafarer as all seafarers were employed by Company B on five week contracts.

Data from Company C were all obtained from a HSEQ superintendent, and the company required a research participant disclaimer to be completed – and this disclaimer can be seen in appendix i. However, only the injury severity and the date the seafarer joined the vessel, the date of the incident and the date the seafarer left the vessel were obtained from Company C. As the date the seafarer was expected to leave the vessel was not obtained it was not possible to conduct some of the desired analyses for incidents obtained from Company A, as will be explained in chapter 5.2.

I remained in contact with the shipping companies and received monthly updates – which pertained to injuries which had occurred in the period since I had received the initial data set. I then included these latest injuries in my data set and I continued in this vein until December 2014.

The three shipping companies who provided the data were European based multi-national shipping companies which operated ships worldwide. Walters and Bailey (2013, p.1) state: “European fleets are probably among those delivering best practice in terms of the protection of workers” and thus it is likely that the quantitative data explored in this study is from the better end of the seafaring industry. Moreover, the fact that these three companies granted me access to their safety records suggests they are relatively transparent – again indicating that they operate at the better end of the industry.

A further indicator of the shipping companies’ standards can be seen in the flags under which their vessels sail, with shipping companies with particularly poor standards typically utilising flags from the Paris MoU’s black list (as seen in chapter two). Vessels from the three companies sail under several flags from both the Paris MoU’s white and grey lists (Paris MoU 2017). This again suggests the shipping companies and the vessels they own and operate are at the better end of the industry. The fact that the three companies operate vessels sailing under a range of different flags, however, is important as research (see for example Psaraftis et al. 1998) suggests a relationship between vessels’ flags and accident frequencies.

Moreover, it is also important that the three companies’ vessels operate worldwide as previous research (see for example Hansen et al. 2007) has tended to focus on single geographic locations. Furthermore, the vessels include tankers (product tankers, VLCCs, chemical tankers and gas carriers), offshore support vessels (anchor handling tug supply vessels, platform supply vessels, field and subsea support vessels) and container vessels. This range of vessel types is particularly noteworthy as previous research (Philips and Daltry 2006; Lu and Tsai 2008) has tended to focus solely on a specific vessel type. The combination of studying a range of vessel types, which operate worldwide and sail under a range of flags, thus increases confidence in the robustness of the data set.

3.1.2 Mixed methods research

In addition to the seafarers' injury data this study also utilised a qualitative research method – the semi-structured interviewing of seafarers – and thus this study can be considered as mixed methods research. Bryman (2008, p.1) defines mixed method research as “the application of two or more sources of data or research methods to the investigation of a research question.” The primary purpose of using a mixed method research design in this study was to provide a deeper and broader understanding of how features of the organisation of work and employment at sea impacted on seafarers' health, safety and well-being than either qualitative or quantitative approaches alone would have enabled. Bringing the findings from the qualitative and quantitative components together was also instructive as the findings from the interviews helped to guide the analysis of the data obtained from the shipping companies – an issue which will be considered in more detail in chapter five. The interviews were also used to explore possible reasons as to why the relationships identified in the shipping companies' data exist. To further understand this, it is necessary to consider each step on the research process I undertook.

First, preliminary data sets were obtained from three shipping companies in the manner detailed in section 3.1.1 above. There are, however, several weaknesses that can be associated with this approach. In using data collected by others I was not familiar with the data and required a period of familiarisation. I was fortunate, however, that I had access to those who had collected the data and these individuals assisted me to familiarise myself and importantly they were able to answer any queries I had.

Moreover, since the data were provided by shipping companies' Superintendents I was dependent on the data that they were willing to supply to me and as discussed above I was unable to obtain one key variable from one of the Superintendents, despite knowing that the data was held by the shipping company. I also had no control regarding the quality of the data, and this issue, and other specific limitations of the datasets used in the analyses will be discussed in greater detail in chapter five.

Nevertheless, the secondary analysis of the shipping companies' safety data served a number of purposes. It provided an essential illustration of the risks to their personal safety experienced by seafarers at different periods of time within tours of duty, findings which strengthen the arguments regarding seafarers' safety in relation to work patterns. It also highlighted the variables recorded – and perhaps more importantly the variables not recorded – by the shipping companies following an incident.

Second, a pilot study in which five seafarers were interviewed was conducted and the pilot study and the lessons learnt from it will be considered in greater depth in section 3.2.

Third, interviews were conducted with thirty-seven seafarers onboard four vessels and this research process will be discussed in section 3.3. By utilising this qualitative research method, it was possible to explore the health, safety and well-being perceptions and experiences of seafarers in relation to the organisation of work and employment at sea. In particular, semi-structured interviews were utilised. The term semi-structured refers to “a context in which the interviewer has a series of questions that are in the general form of an interview schedule but is able to vary the sequence of questions.... the interviewer usually has some latitude to ask further questions in response to what are seen as significant replies” (Bryman 2008, p.196). Thus, whilst such an approach provided a degree of structure for comparability, it also allowed respondents to answer on their own terms. Importantly, as a practitioner turned researcher, the conducting of semi-structured interviews enabled me to challenge my own opinions and thoughts which I inevitably took into the interviews with me. Thus, the semi-structured nature of the interviews enabled the seafarers to express how they viewed and perceived the organisation of work and employment at sea and allowed me to gain an insight into their views.

Finally, an analysis of both the shipping companies' safety records and the interview data was conducted. In their work, which explores ways in which qualitative and quantitative methods can be successfully integrated, Steckler et al. (1992) suggest that qualitative methods can be utilised to assist in the development of quantitative measures and qualitative methods can help to explain quantitative findings. It was these approaches to integrating the qualitative and quantitative findings that I took in this study. The findings from the interviews with seafarers guided the analysis of the injury data. In particular, seafarers' definitions of the start and end of a tour of duty, which were revealed during the interviews, were used to quantify the time periods used in the analysis of the shipping companies' data – an issue which will be considered in more depth in chapter five. The strength of this approach was that it enabled me to get closer to the lived experiences of seafarers than would have been possible had I simply analysed the injury data in accordance with my own ideas and biases. This was particularly important given my position as an insider researcher and the potential for bias associated with this, issues which will be considered in greater detail in section 3.4.1.

The qualitative findings were used to shed light on some possible explanations for the quantitative findings which emerged. For example, findings from the interviews regarding the under-reporting and delayed reporting of incidents by seafarers – which will be seen in chapter five – revealed some of the possible reasons for the patterns which emerged in the analysis of the shipping companies' data sets. In utilising both qualitative and quantitative research methods I was able to overcome some of the limitations of using a single research method design.

3.2 Pilot study

Prior to conducting the qualitative component of this study I conducted a pilot study of the qualitative research method. Whilst pilots of qualitative research are less common than pilots of quantitative research, they are not unheard of. This is because there are a number of advantages of conducting pilots for qualitative research.

In this section the reasons why a pilot study was utilised and how the pilot study informed and helped to direct the main study will be presented. The advantages of conducting a pilot study are considered and the manner in which the pilot study was conducted discussed. The lessons learnt by conducting a pilot study are also reflected upon and finally in the latter part of this section possible themes for future consideration are outlined.

3.2.1 Conducting a pilot study

In total five pilot study interviews were conducted at a British university which trains seafarers in maritime studies. The interviews were conducted over two consecutive days in September 2014 in a room provided by the university.

In order to ensure compliance with ethical requirements all the participants were contacted via email one week prior to the interviews taking place and all the participants signed a consent form giving their consent to take part in the study and for the interview to be recorded³. Whilst this method of finding participants was convenient it was in no way a representative sample. The method, however, was deemed suitable for this pilot study, due in the main to the pilot study's primary aim of testing and refining the interview schedule.

Owing to the limitations in the sampling strategy all the participants were employed in the deck department and furthermore all respondents had obtained at least an Officer of the Watch (unlimited) licence. Thus, all the participants were educated and trained seafarers who had demonstrated the capacity to obtain a British Certificate of Competency. In terms of hierarchy the lowest interviewed was a recently qualified officer who had completed twelve months as a deck cadet and was soon to join a vessel as a junior deck officer. Further up the hierarchy were experienced deck officers and two of those interviewed had recently obtained Chief Officer licences and were anticipating joining vessels as Chief Officers in the near future. The length of tours worked by participants varied from twenty-eight days to five months.

³ Further information regarding obtaining ethical approval and ethical considerations can be seen in section 3.4.2

All the participants in the pilot study were male, however, this is understandable given the fact that female seafarers are estimated to make up just 2% of the global seafaring labour force (IMO 2015). There were no apparent issues in the pilot study regarding my gender and the only comments made relating to my position as a researcher appeared to be based on the fact the participants were aware of my previous employment onboard deep-sea tankers. For example, one Deck Officer stated:

“On tankers you’re always doing tank inspections, going down the pump room, you’re always doing something that is related to the cargo, aren’t you? Whereas offshore you’ve got lots of different cargoes and when you do tank inspections and stuff it’s more of a deck focus part of the industry whereas tankers are very much about the tank isn’t it?” (Deck Officer A).

All the participants were European with four being British nationals and one being a Lithuanian national and only one participant did not speak English as their native language. This individual however was proficient in speaking English.

Whilst these limitations in the sampling of the pilot study participants are undesirable they are not insurmountable given that the pilot study’s main aim was to refine the interview schedule, an aim which was met and which is further discussed in the following section.

3.2.2 Lessons learnt from the pilot study

Refining a research instrument, such as an interview schedule, is perhaps the greatest advantage of conducting a pilot study and some researchers – such as Bryman (2008) – have conducted pilots explicitly to develop and refine research instruments. Others (see for example Turner 2010) have framed questions utilising experiences gained during pilots. Moreover, Bryman (2008) suggested that a pilot study provides the opportunity to become familiar with an audio recorder, a piece of equipment that I was not previously familiar with.

My main motivation for conducting a pilot was that I wanted an opportunity to test and refine my interview schedule prior to going onboard a vessel – which as will be seen in section 3.3 was the method I utilised for accessing seafarers. The testing of the interview schedule was warranted owing to the substantial complexities in gaining access to ships on which to conduct research. Such complexity is due to both logistical and procedural issues. For instance, ships' schedules may vary at short-notice and consequently ships may not call at planned ports, or the arrival at the planned port may occur on an earlier, or later, date than anticipated. Moreover, ISPS requirements are stringent and as such it is no longer the case that individuals can simply enter a port area and approach a ship – regardless of their intentions.

By testing my interview schedule I was able to ascertain if the schedule was suitable for answering the research questions of the study, prior to undertaking the complex task of arranging access to ships on which I could conduct my research. I was also able to test how my questions were phrased and this was of importance as the interviews were conducted in English, which is my native language. I was aware, however, that many of the seafarers I would interview onboard vessels would not be native English speakers. An example of this issue was experienced during the pilot study when it became apparent that the phrase “time into tour” was not understood by even those seafarers for whom English is a first language, and this lack of understanding was attributed to my accent. Consequently, the previously planned uses of the phrase were altered.

Testing my interview schedule also involved trying to identify ways in which I could improve the elicitation of responses. The pilot study enabled me to recognise parts of the interview which did not flow and where I found it difficult to encourage a comprehensive narrative from the participant. An example of this relates to interview questions regarding the participant's experience of being injured whilst at sea, which proved to be particularly problematic. During the first interview the participant's immediate response was that they had never experienced an injury. When the same response was given in a later interview conducted, I did not immediately move on to the next question as can be seen by the quote below this brief period of silence allowed the respondent to recall an incident and alter their response.

“I’ve not really injured myself {pause}. Actually, no that’s not true I cut my arse, I fell over. This was the end of the trip we were moving stuff on deck and I was supervising the guys and then I was concentrating on what they were doing.”
(Deck Officer D).

Whilst I could potentially notice these points during the interview, the issue became much clearer and easier to consider upon transcribing each interview and reflecting on it.

Another important issue – which became apparent in the early stages of the pilot study – was that I could explore the quantitative data I had obtained in a different manner. The logical approach to considering seafarers’ occupational injuries in relation to time was to consider them chronologically. However, comments made by Officers A and B – as can be seen below – suggested a difference in working patterns and work intensity towards the end of a tour of duty. Thus, the findings from the pilot study indicated the importance of considering the quantitative data in a manner which worked chronologically backwards from the end of the tour of duty rather than chronologically forwards from the beginning.

“Your last sort of few days on board you don’t do anything, any risk anything you just don’t do anything because out of sods law you’re bound to hurt yourself so anything that’s slightly risky for the last week or so onboard don’t do it. You get someone else to do it or you just leave it” (Deck Officer B).

“[During the last week I do] less work really because you want time to do your handover notes don’t you and stuff like that” (Deck Officer A).

Consequently, I learnt several useful and valuable lessons by conducting a pilot study.

3.3 Interviewing seafarers

After refining my interview schedule – in the ways suggested from the pilot study – I commenced interviewing seafarers. In order to interview seafarers, however, I first needed to access them and researchers have utilised a number of approaches to access seafarers, such as through a shore-based maritime training centre (see for example Sampson et al. 2016). Such an approach, however, would have restricted both the rank and the nationality of the seafarers interviewed. This is because, in general, seafarers utilise maritime training centres in their home country and it is predominantly officers and cadets who attend such centres. The implication being that if I accessed UK maritime training centres my sample would have been heavily skewed towards British nationals and officers (and trainee officers), thus preventing the inclusion of the perceptions and experiences of ratings and seafarers from other nations in my study.

Utilising a seafaring centre within a port was also considered, particularly as such an approach had proved successful for other researchers (see for example Sampson et al. 2016). I was able to obtain consent from a number of seafaring centres within the UK to conduct interviews, however, upon visiting one of the centres for a preliminary visit prior to conducting my study – it emerged that only a very small number of seafarers attended the seafaring centres in the UK, with seafaring centres in other parts of the world proving more popular.

Consequently, I opted to conduct interviews onboard ships. Bhattacharya (2009) and Sampson (2013) conducted interviews with seafarers' onboard ships, and adopting such an approach also enabled me to access the range of seafarers onboard. Like these researchers, it further meant I was able to conduct the interviews in an environment with which the seafarers were familiar – and with which they were comfortable. Sailing onboard the vessels during a voyage would have permitted more time in which to conduct the interviews but owing to my personal circumstances this was not possible. Therefore, I spent time onboard the vessels when they were in port. Whilst this approach meant the time I could become acquainted with the seafarers was limited, my previous experience of working at sea helped in building rapport with them quickly and effectively. This issue is discussed further in section 3.4.1.

It is important to acknowledge that interviewing a number of seafarers sailing onboard the same ship is different to interviewing individual seafarers each sailing onboard different ships. Thus, there was a weakness of my approach in that seafarers were most likely to talk about their most recent experiences and seafarers onboard the same vessel were likely to have similar recent experiences. To overcome this weakness, I asked seafarers to reflect on their broader experiences, including their experiences onboard other ships.

In this section I will first discuss in greater detail the interviews I conducted with seafarers before moving on to explain the manner in which I analysed qualitative data I had collected.

3.3.1 Conducting interviews onboard ships

In total four ships were visited in four different UK ports. Each of the ships were visited for the duration of their stay in port, which in each instance was approximately two days. The consent to visit each of the ships was obtained from the Captain, who I contacted via email. In order to email the Captains directly a ships' agent – a local shore-based individual who is employed to assist a ship whilst the ship is in port – who knew which ships would be arriving in the port, was able to facilitate contact between myself and the Captains. The use of a gatekeeper was important as it is widely acknowledged by researchers that seafarers are difficult to access.

Bhattacharya (2009, p.95) for example, described the difficulties he had in gaining access to seafarers and stated that “getting access to conduct research onboard ships is considerably more complex than shore-based industries because of a series of procedural and logistical problems involved.” The facilitating approach of the agent helped me to navigate the procedural and logistical problems – such as ensuring I had security clearance to access the port – and owing to the approach I utilised I did not experience refusals from any of the Captains contacted.

In my initial email I provided the Captain with information about myself, my intentions whilst onboard and the scope of my research. On one of the vessels it became apparent that this information had been shared by the Captain with others onboard when the Chief Engineer informed me that he had checked my credentials online prior to my visit.

As well as not experiencing any refusals from the Captains I contacted on two occasions the Captains expressed pleasure that they themselves had been contacted by a researcher to obtain permission to visit rather than the shipping company providing consent on behalf of the Captain and simply assigning a researcher to the vessel. One seafarer even stated that he was willing to participate as the request had not come from the shipping company and therefore he was confident that I was “not a company mole”. It should be noted, however, that this approach resulted in the issue that my consent to visit was assigned to the one ship only and if an issue were to arise regarding the vessel’s schedule it was not possible to attend another of the shipping company’s vessels instead. Therefore – and also owing to the ship’s tight schedules and the fact that the schedules were frequently altered – it was imperative that I was ready to travel to the ship at short notice and able to arrive at the ship immediately after it berthed, as any delay would result in a reduction in the already short period available to interview the seafarers. With these issues in mind I was able to keep up-to-date with the ship’s schedule by both maintaining contact with the agent and tracking the vessel’s Automatic Identification System (AIS) online.

Upon arrival, I initially met with the vessel’s Captain and provided information as required. Onboard ships 3 and 4 the Captain assisted in introducing me to other seafarers onboard and on ships 1 and 2 the Captain instructed a junior officer to assist me.

In total thirty-seven interviews were conducted and the average duration of each interview was approximately fifty-three minutes. The number of seafarers interviewed varied from ship to ship and on each of the ships a full spectrum of views was included with senior officers, junior officers and ratings interviewed. Table 9 below provides a summary of the interviews conducted along with the number of officers and ratings onboard each ship. Further details regarding the interviewed seafarer's position onboard, nationality and age can be seen in appendix ii. It is noteworthy that on each of the ships there were seafarers of three or more nationalities and were therefore multi-national crewed vessels.

	Officers interviewed	Ratings interviewed	Total seafarers interviewed	Officers onboard	Ratings onboard	Total seafarers onboard
Ship 1	3	7	10	Unknown	Unknown	23
Ship 2	10	2	12	12	9	21
Ship 3	5	2	7	6	4	10
Ship 4	6	2	8	6	4	10
Total	24	13	37			

Table 9 Summary of interviews conducted

3.3.2 Analysis of interview data

All the interviews were recorded using a digital tape recorder. Whilst onboard I also wrote brief field notes regarding my observations and after conducting each ship visit I transcribed each interview and typed up my field notes. I used the CAQDAS programme NVivo to assist in the analysis and began by importing the transcriptions and field notes into the programme.

I commenced the analysis by reading through all the transcripts and made a small number of notes regarding what struck me as particularly interesting. I then re-read the transcripts and started assigning codes which identified a topic that emerged from the interview transcripts. In some instances, the topics were captured in a few words, whilst in others they were narrated in far greater detail and ran into several pages of text.

Once I had fully completed this process I reviewed the codes in relation to the transcripts. In instances where I had used different words to describe the same phenomenon I changed these to the same phrase, thus making a consistent code. I began to look for connections between the codes and flagged up such examples. For example, I identified if particular ideas were from seafarers who were employed in a specific manner or if they were common among seafarers of a particular rank.

I then grouped the codes together into categories based on features they had in common. This process was conducted for a number of reasons. First, it served to make the data more manageable. It also enabled the data to be organised in a way that it could be used to address the research question posed in this study. The categories discussed here give rise to the themes which are presented in the subsequent findings chapters.

3.4 Further considerations

In this final section, some of the main considerations I needed to be aware of both whilst collecting my data – and throughout the course of my study more generally – are presented. In brief these considerations include my position as a researcher, ethical principles in social research and risks in research.

Acknowledging my own position as a researcher is important as: "a researcher's background and position will affect what they choose to investigate, the angle of investigation, the methods judged most adequate for this purpose, the findings considered most appropriate, and the framing and communication of conclusions" (Malterud, 2001, p. 483-484). Thus, my position as a researcher likely shaped this study – and it is important to understand how, and perhaps more importantly the steps I took to avoid potential bias.

The ethical principles in social research are also important, and these principles tend to revolve around harm to participants, lack of informed consent, deception and invasion of privacy. The steps I took to ensure the research I conducted was ethical are detailed in section 3.4.2. Such steps included providing interview participants with written and verbal information regarding the study and asking them to sign a consent form so as to ensure I had informed consent to conduct each of the interviews.

In section 3.4.2, the steps I took to reduce the risk to both myself – and the potential risks posed to the seafarers who participated in my study – are detailed. Bloor et al. (2010, p.45) state that: “qualitative research frequently involves extended personal contact with research participants in a range of research settings that cannot (and arguably should not) be closely controlled by the researcher, so some residuum of researcher risk is inevitable.” Such risks I faced included working as a lone researcher in an inherently dangerous environment. Importantly, I was also mindful of the fact that my research may pose a risk to the participants, particularly as I was asking them to discuss topics which were of a sensitive nature – such as their experiences of personal injuries.

3.4.1 Position as a researcher

In considering my position as a researcher, perhaps a good way to start is by acknowledging my own occupational history. The origins of my connection with the seafaring industry began when I embarked on a cadetship. After successfully completing training as a Deck Cadet – during which time I worked onboard container vessels, a product tanker, an offshore support vessel and a passenger ferry – I was awarded an Officer of the Watch Certificate of Competency. I went on to sail as a Third Officer onboard product tankers. Thus, throughout this study I was a practitioner researcher and there were several advantages because of my position.

In section 3.3.1 it was seen that I conducted interviews with seafarers’ onboard ships whilst the ships were in port. My experience as a seafarer enabled me to quickly build a rapport with the seafarers I interviewed. This was critical, given the relatively short period I spent onboard. It also gave me the capacity to understand the technical terms used during the interviews without needing to interrupt the flow of the conversation to ask, for example, what was meant by the term ECDIS (the electronic chart display and information system used to navigate ships). My ability to build a strong rapport – owing to my insider status – meant that I was successful in getting seafarers to talk expansively about their broader experiences. This was especially important given that I wanted to prevent seafarers from focussing solely on their most recent experiences – an issue discussed in section 3.3.

My knowledge of the working routine onboard also enabled me to use my time onboard efficiently. For instance, I was aware of the times when watchkeepers would change watches and when individuals would likely be found in the communal areas onboard.

Importantly, my experience as a seafarer appeared to encourage those who were reluctant to participate in my study. Through my occupational history I could express empathy and indicate that I too had been 'one of them'.

It is important to acknowledge that there are problems associated with insider research. I ensured I was explicitly familiar with these problems and throughout my study I was aware of the potential for making assumptions based on my own prior knowledge. I was also aware of the issue that I may overlook – or simply not see – important information. My awareness of my potential bias on both data collection and analysis ensured I regularly reflected on these issues to ensure that my study retained its integrity and quality.

3.4.2 Ethics and risk in research

Throughout my study I maintained awareness of risks to myself – as well as the potential risks to the individuals who participated in my study – and in order to reduce the risks of conducting research and try to ensure my safety as a lone researcher I implemented a number of measures. First, I wore the appropriate personal protective equipment as designated by the port and the ship whilst conducting the fieldwork. At all times I complied with the instructions given to me by port workers and members of the ship's crew.

Prior to travelling to any of the fieldwork locations I left details of my itinerary with my designated person and upon completion of each field visit I contacted my designated person and confirmed that all was well. In addition to this the ship's agent and port security were kept informed of my whereabouts and I updated them once I had concluded my field visit.

Throughout the fieldwork I was also mindful of the fact that my research may pose a risk to the participants. I was therefore conscious of the fact that my participants may have had professional and personal welfare interests to protect.

All the methods used to conduct this research were carried out in compliance with both the requirements of Cardiff University's School of Social Science Research Ethics Committee and the Statement of Ethical Practice of the British Sociological Association (BSA 1992).

Prior to conducting the interviews I submitted an application to the SREC and obtained ethical approval. The ethical approval documentation can be seen in appendix iii. As part of my application for ethical approval I also submitted my interview guide, which outlined the areas which I intended to cover during the interviews. This interview guide can be viewed in appendix iv.

Before I conducted the interviews all the participants were informed that they could terminate the interview at any time and I provided each of the participants with an information sheet – which can be seen in appendix v.

I also asked each of the participants to read and sign a consent form and a copy of this form can be seen in appendix vi. The consent form is clear in stating that the participant is taking part voluntarily and that they have the right to withdraw their consent for the use of any data generated at any time. Additionally, the consent form explains that any information will remain anonymous and confidential.

The irony of asking seafarers to talk about their perceptions and experience of the organisation of work and employment at sea in relation to their health, safety and well-being, whilst the vessel was in port, a period which is known to be especially busy was not lost on me. I was acutely aware that taking part in my study could potentially result in seafarers' violations of rest hours regulations. Consequently, I stipulated to all individuals that I would not conduct any interviews if in doing so rest hour violations would occur.

To ensure all data remain private and confidential I have followed data protection rules and all participants' names were removed and replaced with anonymous identifier codes. To assist in analysing the data I retained the rank of the participant and the anonymous identity of the ship on which they were interviewed (ships 1, 2, 3, 4). Christians (2005) suggested that insiders in organisations may be able to recognise pseudonyms and other details, such as locations. Therefore, with this issue in mind, in some instances in this study it has been necessary to be somewhat vague about specific details.

All data have – at all times – been stored securely and separately and electronic data have been stored on a password protected computer. Additionally, all data will continue to be stored securely for five years following the completion of the study, thereby complying with the requirements set by Cardiff University.

3.5 Summary

This chapter has presented an explanation of the research methods utilised in this study, which were chosen to ensure that the research questions posed in this study were extensively addressed. In doing so it has shown why I utilised shipping companies' safety data to explore seafarers' safety in relation to features of work patterns – an important aspect of the way in which work is organised. It has also discussed the advantages of conducting semi-structured interviews with seafarers to gain an insight into their perceptions and views regarding the impact of features of the organisation of work and employment at sea on their health, safety and well-being. In this chapter, I have detailed the manner in which I have utilised mixed methods research to address the research question:

What are the health, safety and well-being experiences of seafarers in relation to the organisation of work and employment at sea?

The chapter has also explained the reasons why I conducted a pilot study and the lessons I learnt from the pilot study – such as the need to allow for pauses to give respondents time to comprehensively answer my questions. It also presented the ethical considerations taken into account during this study, and discussed my own position as a researcher. In doing so I acknowledged my position as an insider researcher and how my awareness of this was important in ensuring my data collection and the analysis of the data was conducted with integrity.

In addressing the research question the findings from the shipping companies' safety data and the ways in which the qualitative data guided the analyses can be seen in chapter five. Before this, however, the findings from the semi-structured interviews with seafarers which paint a picture of a seafarer's tour of duty are presented in chapter four.

CHAPTER FOUR: SEAFARERS EXPERIENCES OF A USUAL TOUR OF DUTY

4.0 Introduction

This chapter – the first of three findings chapters – seeks to give a flavour of life as a seafarer and, in particular, to provide an understanding of the organisation of work and employment at sea. It therefore presents seafarers' experiences relating to how the work they undertake is organised and the manner in which they are employed. In presenting these findings the chapter is arranged into a number of themes, each of which were identified through discussions during the course of the interviews with the seafarers who took part in this study about their own personal experiences of life at sea. Thus the accounts in both this chapter and chapter six specifically draw upon the interview transcripts and field notes from the four ships visited.

In the first half of this chapter, themes relating to seafarers' employment are explored. In chapter one it was seen that precarious employment is prevalent within the seafaring industry and the vast majority – but not all – seafarers are employed on single voyage contracts. Precarious employment methods have been seen in other industries to be associated with negative health, safety and well-being outcomes and thus these are of particular importance when considering the impact that the organisation of work and employment at sea has on the health, safety and well-being of seafarers. This chapter, therefore, makes comparisons between the experiences and perceptions of those individuals who were permanently employed and those who were precariously employed.

In the latter half of this chapter, the seafarers' experiences of the routine of life onboard are presented. In doing so it considers the working routine onboard and how a relatively small number of seafarers operate a ship twenty-four hours a day, seven days a week. It also considers seafarers' rest hours and goes on to present findings regarding fatigue and seafarers' perceptions of risk in relation to fatigue. Such issues may be present throughout a seafarer's entire tour of duty, from the first day they arrive on the vessel to the day they leave the ship and return home.

In exploring the issues which may be present throughout a seafarer's tour of duty, the descriptions presented in this chapter help to situate and contextualise the findings presented in chapter six – which relate to particular time periods within a tour of duty. Moreover, to understand how the organisation of work and employment at sea impacts on the health, safety and well-being of seafarers it is necessary to look beyond the specific time periods identified by both literature and the seafarers in this study and consider how seafarers experience a usual tour of duty.

4.1 Seafarers' employment

Research in shore-based industries has revealed a number of relationships between occupational health, safety and well-being and the organisation of employment. For example, Quinlan et al. (2001) found precarious employment to be associated with a deterioration of workers' health and safety in terms of personal injury rates and risk of disease. Literature regarding well-being outcomes and the organisation of employment also highlights precarious employment as a concern (see for example Lewchuk et al.'s discussion on employment strain 2003).

Many of the features related to the organisation of work and employment which have been shown to be associated with poor occupational health, safety and well-being outcomes in shore-based industries are prevalent in the seafaring industry and consequently similar adverse outcomes might be expected for seafarers.

4.1.1 Stable employment

Literature (see for example Ellis et al. 2012) has shown substantial variations in the organisation of employment experienced by seafarers and such differences may be dependent upon a number of factors. Research (see for example Bloor and Sampson 2009) also indicates that, depending on the manner in which they are employed, the periods of time when an individual is at sea can be regular for some and ad hoc for others.

In chapter 1.1.1 it was seen that, generally, seafarers from more economically developed countries experience stable employment conditions, regardless of their rank, which results in fixed periods of time at sea followed by fixed periods of time at home. During their time both at sea and at home these seafarers received a monthly salary. The findings from this study corroborate this and one rating who was from a developed nation explained the manner in which he was employed:

“I have a permanent contract for the last, well I sign a permanent contract in 2007 so 7 years’ permanent contract I work 5/5, 5 weeks on 5 weeks off” Chief Cook ship 1.

Those seafarers who were permanently employed were not subjected to the same earning uncertainty as their precariously employed colleagues. This had a number of important implications for their health, safety and well-being – something which will become apparent as this chapter progresses.

The scheduling of some seafarers who were permanently employed was organised in a manner in which two seafarers were employed in the same role on a consecutive rotational basis. Thus, when one individual was onboard, the other was at home – and vice versa. Throughout the interviews, seafarers used the term ‘back-to-back’ to describe returning to the same vessel for each tour of duty and rotating this position with another individual, resulting in the position onboard being consistently filled by the same two seafarers.

It was apparent, however, that it was predominantly only the senior officers from economically developed countries who experienced this schedule, whilst senior officers from less economically developed countries were not routinely scheduled in this manner. For example, onboard one of the ships discussed here, the Captain and Chief Engineer who were both European were employed on back-to-back schedules whilst the other two senior officers, the Chief Officer and Second Engineer, who were from developing nations, were employed using single voyage contracts.

The seafarers who experienced back-to-back scheduling reported arranging their relief schedule between themselves – rather than the shipping company arranging the dates on which they joined and left the vessel. As one Second Engineer explained:

“I could just email [seafarer’s name] and say can you join now and he would just say yes or no and then that’s how we do it. We arrange our reliefs and then I just go and see the captain and say [seafarer’s name] is coming this port” Second Engineer, ship 2.

In many respects the organising of employment in this manner relieves the shipping company of many of the issues related to arranging for a seafarer to join a vessel. For example, as will be presented in chapter 6.1.1 it emerged that in some circumstances shipping companies provided seafarers with very little notice prior to joining a vessel and consequently they were sometimes unable to leave home and join the vessel on such short notice.

The convenience of allowing the seafarers to make their own arrangement has resulted in these seafarers enjoying a far greater degree of control than their colleagues not utilising such a scheduling arrangement, as one Second Engineer explained:

“Yeah we just do it as we want, I just, I could do it a week early.... you have to, well the seniors have to average 75 day trips, so you can’t do 3 weeks on all the time, you could maybe do it once but then, well I’m sure they’d let it go once without an issue but you can’t just do 3 weeks on 3 weeks off all the time”
Second Engineer ship 2.

A seafarer’s ability to arrange their own relief schedule is of significance when considering issues regarding both the start and end of a tour of duty – as will be seen throughout chapter six. In chapter 6.1.1 it will be seen that the experience of a seafarer who knows the date they will be joining a vessel a number of weeks in advance is substantially different to the experience of a seafarer who receives instructions to join a vessel at short notice. A seafarer’s ability to arrange their own relief schedule also has important implications for mandatory tour extensions – as will be seen in chapter 6.2.2.

The greater flexibility afforded by a back-to-back schedule relies to an extent upon the willingness of both seafarers to settle upon an agreement between themselves – if no agreement can be reached the shipping company dictates the relief pattern. However, in such circumstances it is not unusual for one seafarer to seek a move to another vessel.

Lewchuk et al. (2003) argue that scheduling uncertainty – that is an individual's control over when they work – is an important component of employment strain, which in turn relates to job strain. Since traditional measures of job control – such as those suggested in the classic study by Karasek (1979) – argue that workers experience higher levels of well-being when they perceive higher levels of job control it could be reasoned that seafarers who experience higher levels of autonomy regarding when they work may experience higher levels of well-being.

In the light of such arguments it is unsurprising that the accounts of seafarers revealed that employment on a back-to-back schedule – which allows the seafarer a relatively high degree of control regarding when they join and leave a ship – was highly favoured and something which many strived for. For example, onboard ship 2 terms set by the charterer required all officers to be of a certain nationality⁴ and a shortage of junior officers of this nationality employed by the shipping company had resulted in many of the officers (of this nationality) working a back-to-back schedule. As the Fourth Engineer explained:

“3 months on 3 months off at the moment, yeah just the way it's worked out on this ship, it's quite good yeah, my contracts not 3 months on 3 months off but just on this ship you know with being English [British] crewed it's like easier to just get 2 people doing back to back” Fourth Engineer, ship 2.

Undoubtedly, the Fourth Engineer was pleased by his back-to-back status, something which under normal circumstances he would not have experienced until he reached the rank of Second Engineer.

Seafarers who experienced back-to-back scheduling reported remaining in contact with their reliever whilst they were at home via email or social media and consequently were aware of the vessel's upcoming schedule. Furthermore, by remaining in contact the seafarers were able to apprise one another of any potential problems which were likely to impact upon their pre-determined relief schedule. One Chief Engineer explained:

⁴ The nationality restrictions set by the charterer were related to issues of national security

“This time for example I got in touch [via email] with my oppo [opposite] and his father in law had died so he obviously can’t come so I’m staying the extra 10 days” Chief Engineer, ship 2.

Again, the consequence is that these individuals retain a degree of control and such control has positive implications for seafarers’ well-being outcomes.

4.1.2 Flexible employment

In comparison, other seafarers, and particularly those from less economically developed countries (such as the Philippines), experienced far less control and substantially more employment uncertainty. They were precariously employed and more often than not, employed through third-party crewing agencies. Thus, corroborating Ellis et al’s. (2012) study in which it was revealed that the type of employment experienced by seafarers was significantly related to the seafarers’ nationality.

The crewing agencies employed the seafarers on voyage contracts⁵ and as such only paid the seafarers a wage whilst they were at sea. Upon returning home these seafarers are likely to obtain a further voyage contract from the manning agency for further employment. However, this is not guaranteed. One AB explained how he had secured subsequent employment with a manning agency but as part of this employment they had transferred him multiple times between not only different shipping companies but also different ship types:

“My first vessel is LPG it was a Norwegian company and then after that I think 3 times contract in the LPG that was 9 months [contracts] and after that I transfer but this is the same manning in Manila but different owner it was in Italy but same LPG and then I have 3 times contract there as 9 months and then I try to work in oil chemical tanker it was in Norwegian flag but the owner is Swedish and then I don’t know I have been many times there I don’t remember how long I was working there and then after that the manning in Manila they planned to transfer here. It was almost 7 years here in this company as an AB” AB ship 3.

⁵ It should be noted that whilst individuals employed directly by shipping companies normally hold permanent contracts, a small number of shipping companies do utilise voyage contracts. This is particularly the case in the cruise sector.

The above quote illustrates how an AB had worked for four different shipping companies via the same crewing agency. When a crewing agency provides repeat employment for a seafarer within a shipping company, the seafarer is likely to join different vessels for each subsequent tour of duty. As one AB explained:

“This is first time on this vessel I was, my first vessel in this company was ship A and then after that only one contract in ship A and then transfer in ship B so I was then three times in ship B and then after that ship C. Ship C I been there 3 times also and then after Ship C I was in Ship D one time and then after ship D, ship E and then now here [ship F]” AB ship 3.

Nevertheless, sailing onboard different vessels operated by the same shipping company for subsequent tours of duty is not a scenario which is unique to seafarers precariously employed. Some seafarers who were employed on permanent contracts by a shipping company were also seen to work onboard different ships for each subsequent tour of duty. This situation has negative implications for seafarers’ safety as research from other industries highlights an increased risk when workers are unfamiliar with a specific workplace. Breslin and Smith (2006) for example, found that workplace specific inexperience contributed to occupational injury risk, irrespective of the age of the worker, in various shore-based industries. Moreover, in research specific to the seafaring industry Hansen et al. (2002) revealed that seafarers who returned to the same ship for subsequent tours of duty had a decreased risk of experiencing an injury.

Irrespective of the adverse safety outcomes associated with deploying seafarers to unfamiliar vessels, the findings indicate that seafarers are considered as flexible employees who can be employed across a range of work situations. In theory this situation permits seafarers to exert some job control as they can transfer their labour across the various sectors of the seafaring industry. It was explained in chapter 1.1.1 that this flexibility is underpinned by STCW which provides seafarers with a universal qualification which is applicable for any vessel type. In light of this functional flexibility – a term utilised by Leong (2012) – it is unsurprising that when asked about his employment history one British AB, who at the time was employed onboard an offshore vessel replied:

“[I’ve worked onboard] Royal Fleet Auxiliary, several different ship types. I worked on a submarine tender or repair ship which used to repair nuclear subs and Royal Navy ships. I’ve worked on the tankers which refuel at sea other ships, I’ve worked on stores carrying ships which obviously is self-explanatory. I worked for [shipping company name] so marine cable laying round the UK and across the world. I’ve worked on ferries, roll on roll off ferries out of Dover. What else have I done? Within [shipping company name] as well route clearing ships which before the cable gets laid they go out and drag grapnels behind the ship and clear the cable route before a big ship comes in and actually lays the cables for real. I’ve worked on survey vessels, I worked for a company that worked alongside the government testing new build ships, new design and new build ships carrying stuff on there that they wanted to test out for the forces” AB ship 1.

This response was not untypical and many of the seafarers interviewed had worked onboard vessels across different sectors of the seafaring industry.

Seafarers’ perceptions of changes to the type of vessel on which they were employed varied and for some seafarers the changes were perceived in a negative manner. During the interviews, it was indicated that moving between sectors of the seafaring industry was a consequence of the economic realities that some seafarers – particularly those from less economically developed countries – faced. Thus, some seafarers moved – or were moved by crewing agencies – from sector to sector irrespective of their personal preferences. One of the components of Lewchuk et al.’s (2003) employment strain model (as presented in chapter 1.1.1) is location uncertainty – a component which considers a worker’s control over their work location. Viewed in light of Lewchuk et al. (2003) argument seafarers’ lack of control over the vessels to which they were deployed is a concern for well-being outcomes.

Moreover, a lack of ship type experience was perceived to have negative implications for not only the unfamiliar seafarer – but also for the other seafarers onboard and the operational safety of the vessel, as the following example indicates. Onboard one of the ships discussed here an AB with many years of experience in the offshore sector of the seafaring industry was sailing onboard a tanker. The seafarer's lack of familiarity with tankers had resulted in an unofficial routine in which the AB did more of the work which is similar across vessel types, such as lookout duties and less work that is tanker specific such as tank cleaning, as one AB explained:

“We’ve just done a lot of tank cleaning on here before going to dry dock and line washing and educting and that some of it had to be done during night time like m1e and [seafarers name] burst it between the 2 of us, we went sixes and me and [seafarers name] agreed, I had a bit more experience especially when it comes to draining the lines and that because at the time we had one new lad not too clued up on that and the last thing you want to be doing is trying to get him to do something so what we were doing during the daytime was just working like normal two of us together and when it got dark he [new seafarer] went to the bridge and I just stayed on, done what needed to be done” AB 2, ship 2.

This example illustrates how the flexibility of the seafaring industry works in practice. If experienced crew members are unable – or unwilling – to alter their own work routine to accommodate inexperienced seafarers, there is the potential for an increase in risk.

In light of the above example, it is perhaps unsurprising that the accounts of seafarers suggested having seafarers onboard who were familiar with the vessel was greatly favourable. In particular, seafarers with vessel specific familiarity were deemed to be less of a risk than those who were unfamiliar. As one Captain explained:

“Well this ship as you're aware has a regular crew so it works pretty well I would say because people come back to the same ship.... from that point of view this ship has an advantage over other ships which is reflected in the fact that we haven't had a lost time accident in over 10 years. That's not an accident if you like that that's happened it's because of experienced people”
Captain, ship 2.

The Captain went on to state:

“We've just got a new third mate joining so you could say that now is a heightened risk because he's new to the company and new to the ship so that's a heightened risk purely because he's new so we just have to then make sure he knows what he's doing, we can't just say tell him to get on and do stuff unsupervised, we supervise until we know he isn't a complete incompetent if you see what I mean, so yes I would say yes because he's a new guy he's an increased risk which we have to be aware of” Captain, ship 2.

As highlighted in the comment made by one of the Captains, seafarers moving between different ships for subsequent tours of duty also has implications for colleague familiarity – an issue which will be presented in chapter 6.1.2.

4.1.3 Tour of duty duration

Irrespective of their familiarity with a vessel, the seafarers interviewed experienced vastly different tour of duty durations – ranging from five weeks to six months – and there were a number of factors found to impact upon tour duration. The dependency of tour duration on the seafarers' employment type, rank and qualifications was evident on all the vessels discussed here and the disparity onboard a single vessel ranged from tours of six weeks to six months – with senior officers experiencing the shortest tours of duty and ratings the longest.

The differences in tour of duty durations experienced by seafarers were particularly apparent onboard vessels which were sailing busy trading schedules. The accounts of seafarers suggested that vessels which were trading hectic schedules were undesirable and consequently the seafarers perceived that shipping companies experienced difficulty in recruiting and retaining senior officers to sail onboard such hectic vessels. Therefore, senior officers onboard busy vessels wielded more power in terms of the tour of duty durations they worked in comparison to their colleagues onboard quieter, more desirable ships.

Onboard one of the ships discussed here – which was undertaking a busy trading schedule – the senior officers were contracted to work tours of duty which were two months long, the same as their colleagues on other vessels. However, regardless of their contracted terms these individuals were working six week tours. When asked whether the shipping company had expressed any issues regarding these unofficial shorter tours of duty, one Chief Engineer replied:

“[The shipping company can] take it or leave it really. Otherwise they’d have to find 2 new Chief Engineers and 2 new Masters and they will never find it” Chief Engineer, ship 4.

Thus, it is apparent that the experience of senior officers onboard busy ships was one of greater power and flexibility in terms of tour duration than both colleagues of the same rank sailing onboard other less hectic vessels and also individuals of lower ranks sailing onboard the same vessel. In part this greater flexibility was possible as the senior officers were sailing a back-to-back schedule and all of the senior officers assigned to the vessel were happy to schedule six week tours of duty. Junior officers and ratings sailing onboard hectic vessels had no such power as they were not employed on a back-to-back schedule and they were only likely to be sailing onboard the vessel with a particularly busy trading route for a single tour of duty. Additionally, junior officers and ratings perceived that the shipping company could easily replace them with another seafarer willing to accept the conditions.

Differences in the duration of tours of duty between seafarers of different nationalities who held the same qualifications and were employed in the same role were also evident. As a Swedish Second Officer working six week tours explained:

“There’s a Polish [Second Officer] and a Croatian [Second Officer]. The Croatian he has I think 3 months and the Polish I don’t remember but they have a much longer contract than we have” Second Officer, ship 4.

The findings regarding differences in tour duration relating to nationality corroborate Oldenburg et al. (2009) in which substantial differences between the average tour durations for different nationality seafarers were revealed.

It is notable that the Swedish Second Officer, despite working and living alongside the other Second Officers for a period of weeks, was unsure of their tour of duty duration. The Second Officer went on to state:

“They [the two other Second Officers] try to get shorter [tours] but money rules so that’s a bit difficult for them” Second Officer, ship 4.

The two Eastern European Second Officers however, were aware of the Swedish Second Officer’s considerably shorter tour of duty and had asked the shipping company to reduce their own tours in line with the Swedish Second Officer’s – a request which had been denied. The Swedish Second Officer expressed his opinion that this refusal was down to the increase in costs caused by seafarers working shorter tours.

The vast differences in tour of duty durations appeared to be a taboo topic with those seafarers sailing shorter tours careful not to mention the topic in front of colleagues who were sailing longer tours. Moreover, the topic was addressed in a guarded manner during the interviews, however, one Third Engineer – who worked far longer tours than his colleagues onboard – stated:

“What is annoying is Danish guys serving on this vessel have short [tour] due to vessel operating short voyage even if the person is of the same rank as me, like 6 weeks on 6 weeks off, max is 10 weeks on 10 weeks off. So, look in a humane way something wrong with me being an Indian. Does it mean I should suffer and work? I have 5 months and 2.5 months at home.....Yes irrespective of [their] contract, yes it says otherwise but due to vessels operation they have come to some mutual agreement with manning” Third Engineer.

The quote indicates that the Third Engineer's Danish colleagues had been able to negotiate unofficial shorter tour of duty durations with the shipping company – something which the Third Engineer had been unable to arrange. Thus, the disparities in tour of duty duration between seafarers of different nationalities again highlights the very significant differences in the levels of power and control held by seafarers.

To avoid any potential conflict conversations between seafarers regarding an individual's tour of duty tended to focus around how long they had left onboard the ship as opposed to the overall length of the contract. This approach enabled all seafarers to express that they were leaving the ship in a certain period of time – something which was looked forward to – rather than drawing attention to their very different terms of employment.

Nevertheless, the length of time seafarers thought was remaining to them onboard was not necessarily what would occur in practice. This was because, as explained in chapter 2.2.3, many seafarers' contracts contain a clause which permits the shipping company to send the seafarer home prior to the end of their tour – or more often – impose a mandatory tour extension. Mandatory tour extensions are a cause for concern for a number of reasons, as will be seen in chapter 6.2.2.

4.2 The life of a seafarer

Working away from home for prolonged periods of time makes the life of a seafarer somewhat unusual, and Thomas and Bailey (2009) describe the life of a seafarer as fragmented. The reason for this is that seafarers experience two distinct phases that may perhaps be viewed as two distinct lives: one when they are at sea and the other when they are at home. There is no blurring of the boundaries between the two, seafarers do not usually do paid work when they are at home but during their time at sea seafarers are always in the workplace. Apart from short periods of leave ashore in port, once at sea, seafarers do not leave their workplace for prolonged periods of time. Consequently, employment as a seafarer is not like most other work.

Working at sea has several features which indicate that psychosocial issues may be a particular concern and Carter (2005, p.61) argues that “there is a range of constraints at sea which may influence the ability of people to adopt coping skills to reduce or remedy pressures.” Since many jobs onboard ships are safety critical any decrements in performance – whether they are due to psychological or other reasons – may risk the safety of those who work at sea (Carter 2005).

4.2.1 Multi-national crews

Since seafarers must live as well as work onboard a ship, they must also live (and work) alongside their colleagues – which is an aspect of life that is not normally experienced by employees in shore based industries. The number of seafarers who must live and work together onboard a ship varies. However, of the vessels discussed here, one of which is an offshore pipe layer and three are tankers, there were between ten and twenty-three seafarers onboard⁶ – as presented in chapter 3.3.1. In terms of crew size these vessels are representative of the industry as a whole in which the average crew size was found to be fifteen (Bergantino and Marlow 1998).

Working alongside one another on each ship were seafarers of different nationalities, who had different first languages and were of different religions and cultures. On the four ships discussed here English was the working language onboard. However, onboard two of the ships there were no native English speakers, a situation which is not unusual⁷.

⁶ Onboard ship 1 there were a number of project workers. These are employees who are not involved with any aspect of the vessel but are onboard to carry out the tasks which the vessel has been contracted for, such as the laying of pipes. In this study project workers are not considered to be seafarers.

⁷ A summary of the nationalities and first languages of the seafarers on each of the ships visited can be found in appendix vi.

Each of the ships had three or more nationalities of seafarers onboard and would therefore be considered as multi-national crewed vessels. In chapter 1.1.2 it was seen that some writers have suggested that seafarers prefer to work onboard multi-national crewed ships (Sampson and Zhao 2003). Reasons for such a preference tend to be based around the idea that greater respect is afforded to individuals of different nationalities and as such it is easier to maintain non-conflictual relationships onboard (Sampson and Zhao 2003). Other scholars, however, such as Oldenburg et al. (2009) suggest that some seafarers – particularly non-Europeans – do not view working as part of a multi-cultural crew in a positive light.

Onboard one of the ships discussed here, which was predominantly British crewed, seafarers of other nationalities who were onboard were the subject of suspicion, in particular with regards to the theft of foodstuffs from the crew mess – corroborating Oldenburg et al.'s (2009) suggestion that not all seafarers prefer multi-national crewed ships.

Moreover, multi-national crews also have an implication for social isolation. Sampson and Zhao (2003) revealed that onboard multi-national crewed vessels, some seafarers may communicate in their native language, leaving those who do not understand this language isolated. This is a cause for concern as social isolation has been seen to adversely impact on the well-being of seafarers (Sampson and Thomas 2002).

A further implication of multi-national crewing is the potential for divisions among the crew onboard a ship. During the fieldwork divisions were evident between different nationalities of seafarers which in some cases blurred the occupational hierarchy onboard. For example, onboard one of the ships discussed here the table for the senior officers at meal times seated the Swedish Second Officer alongside the Swedish Captain, Chief Engineer and Chief Officer. According to the rank hierarchy the Filipino Second Engineer should have sat in the place of the Second Officer but instead the Second Engineer, a senior officer sat on the junior officers' table (the onboard occupational hierarchy can be seen in figure 1 in chapter one).

Whilst this peculiarity was likely to be the result of the Swedish Second Officer sharing a native language and cultural norms with the Swedish Captain, Chief Engineer and Chief Officer, differences between the terms of employment for the Second Officer, who was permanently employed and the Filipino Second Engineer, who was employed on a voyage contract may also have played a role.

A similar finding emerged during Sampson's (2013) fieldwork during which onboard a ship with Swedish and Filipino officers and Filipino ratings, the Filipino officers were excluded from the communal officer spaces. In her study Sampson (2013, p.112) argued that the Filipino officers were "denied their proper occupational status as normally recognised and operationalised onboard". Such a situation also serves to isolate these Filipino officers (in both this study and Sampson 2013) – since they were isolated from the Filipino ratings due to their officer status and also isolated from their fellow officers because of their nationality. As presented above social isolation has been seen to adversely impact on seafarers' well-being outcomes.

4.2.2 Temporal synchrony

The lack of temporal synchrony onboard vessels may also serve to isolate seafarers as a lack of temporal synchrony was seen to result in unstable work teams – an issue which will be considered further in chapter 6.1.2. Onboard each of the ships discussed here were seafarers who had recently joined, individuals who had been onboard for a number of months and were approaching the end of their tour of duty and seafarers somewhere in between. Moreover, seafarers were engaged in varying tour of duty durations and consequently between the seafarers onboard there was a lack of temporal synchrony – with seafarers joining and leaving the vessel on a regular basis.

Onboard tankers a lack of temporal synchrony is a SIRE⁸ requirement for officers. SIRE requirements stipulate that the Captain and Chief Officer must not both leave the ship within two weeks of each other. The same requirement exists for the Chief Engineer and Second Engineer. In the review of the literature in chapter 2.2.3 it was seen that numerous industrial disasters have been attributed – at least in part – to the loss of safety critical information following the changeover of workers. For example, the Cullen (1993) report concluded that this issue played a role in the Piper Alpha disaster. As such this two-week period – stipulated by SIRE – is to ensure that senior officers have an adequate overlap to minimise the risk of losing safety critical information during a crew changeover. However, the two-week overlap experienced by some seafarers was perceived by some as unnecessary, as one Second Engineer explained:

“[Second Engineer’s name] doesn’t regard that [SIRE requirement] as a rule so he just leaves and then we get a message saying ‘why have the Second [Engineer] and Chief [Engineer] left together again it’s not allowed’” Second Engineer, ship 2.

As a consequence of all of the senior engineers being employed on a back-to-back schedule these seafarers were able to determine their own relief schedule and whilst the shipping company expressed concern regarding the lack of overlap, the account of the Second Engineer suggested it was a common occurrence. If the shipping company had organised the relief of the Second Engineer and Chief Engineer a two-week overlap would have been scheduled, which would have resulted in one of the individuals remaining onboard for two weeks longer than they had wanted to.

When a seafarer’s date to leave the vessel was not affected, the accounts of seafarers suggested there was an appreciation that a lack of temporal synchrony between individuals onboard could improve safety. As one Bosun explained:

“You’ve got people around you who should say ‘stop you’re doing it wrong’ cos not everyone changes the same crew change so you’re always staggered on the crew change especially the AB’s” Bosun, ship 1.

⁸ The SIRE programme, as presented in chapter 1.2.3 is a “unique tanker risk assessment tool of value to charterers, ship operators, terminal operators and government bodies concerned with ship safety” (OCIMF 2015 [online])

Thus, there was a tacit understanding that those seafarers who had recently joined may not be as familiar with procedures and therefore required guidance from colleagues who were not newly joined.

As a result of a lack of temporal synchrony individual seafarers conceived private calendars which identified significant events possessing meaning to the individual – such as the date on which they anticipated leaving the vessel and returning home. From the findings, it emerged that life at sea was not influenced by traditional shore-based temporal markers and the accounts of seafarers suggested that alternative temporal markers were utilised in marking the passing of time which related to their own individual private calendars. As one Deck Cadet explained:

“I start counting down, I work on ports I might say I’ve got 3 ports to go, 2 ports to go, 1 port to go” Deck Cadet 3, ship 2.

Exploring how seafarers conceived private calendars highlighted the salient reality that for many, life onboard was simply something to be endured before they could go home. Moreover, understanding how seafarers counted down to their expected leave date is of particular interest when considering issues regarding specific time periods within a work pattern, as will be seen in greater detail in chapter six.

A further aspect of temporal synchrony which emerged from the interviews relates to the hours in the day. Due to the twenty-four-hour nature of work at sea many seafarers worked split shifts which included a day shift and a night shift each day. This resulted in a situation with some seafarers resting whilst others were working – but seafarers who were resting were occasionally summoned to work at short notice. Throughout a tour of duty the seafarers remained in the workplace and as such were considered as available to work even during scheduled rest periods if required. The findings revealed the lack of temporal synchrony between different shifts resulted in resting seafarers – who were summoned to work – placing reliance on their on-duty colleagues to ensure operational and safety standards were maintained. One Bosun explained:

“You should have the same safety standard nights as you do days, the only difference is as I’ve said for me is being woken up in the middle of the night but yeah I’ve got [night] AB’s who I should be able to trust, if I’m doing something wrong they should be able to say that’s wrong” Bosun, ship 1.

The comment made by the Bosun implies that those seafarers who were summoned to work during their rest period were unlikely to be as safety conscious as those individuals who were scheduled to be working at that time. This perception indicates a link between the organisation of work at sea – in particular hours of work – and their occupational safety.

4.3 The routine of life onboard

Lamvik (2002) suggested that time at sea is both linear and circular. Linear as a ship is on the move and seafarers are oriented to the near future and circular due to the rhythm of the daily routine onboard.

From the findings it emerged that in some respects, the routine of life onboard was as regular as clockwork, with recurring events such as the changing of the watch and meal times occurring at the same time each day. Seafarers in general carried out repetitive tasks on a daily basis, seven days a week and as such the shore based notion of weekly cycles ceased to become fixed points. As one First Officer explained:

“The routine you know like the well every day’s the same, every day you are eating on the same time, every day you are starting the day from the same things” First Officer, ship 1.

In other respects, some aspects the routine of life onboard were found to be irregular. For example, one of the ships discussed here did not berth on arrival at a port, instead the vessel drifted⁹ and once the terminal was ready to berth the vessel the Captain was provided with one hour’s notice to prepare the vessel. During this hour the preparing of the vessel for arrival was prioritised above all else – and the seafarers onboard worked regardless of if they were scheduled to work or not. Thus, the working routine of the seafarers was interrupted by the requirements of the terminal.

⁹ Drifting refers to a vessel which is underway but not making way – that is they are afloat (not at anchor) but not using any means of propulsion

4.3.1 Working routine

In chapter one, table 2 gives an example of shipboard working arrangements and the working hours of each seafarer onboard. Of the ships discussed here, the seafarers on the three tankers worked similar hours to those shown in table 2 whilst those individuals onboard the offshore vessel worked one twelve-hour shift in every twenty-four-hour period.

As indicated in table 2, the engineers onboard the three tankers worked 0800 till 1700. Between the hours of 1700 and 0800 the engine room became an unattended machinery space (UMS). This is a relatively recent development as previously technology did not enable machinery spaces to be sufficiently monitored whilst unattended. Following advances in technology, during the hours in which the machinery space was unattended one engineering officer was on-call and was responsible for responding to any alarms. This duty engineer position rotated between the engineering officers onboard on a nightly basis and for the three vessels with a Chief Engineer, Second Engineer and Third Engineer this meant that as well as their usual day work each engineering officer was also on-call one night in every three.

Whilst members of the engineering department onboard work additional hours on a rotational basis, members of the deck department reported working additional hours when the vessel was in port and this is also illustrated in table 2. The table, however, does not consider that alongside periods of fixed routine duties – be they at sea or when in port – there were also periods of time when the seafarers had to work additional hours. For example, when participating in emergency drills which were, generally, conducted in the early afternoon. Thus, those who would normally be resting during this time – such as the 0400-0800 watchkeepers – were awake and participating in emergency drills.

Moreover, the scheduling of emergency drills may not take into account the vessel's trading schedule – particularly if the vessel is undertaking a hectic trading pattern. On one of the ships discussed here an emergency drill was held despite the berthing of the vessel late the previous night, a procedure which had required all deck personnel as well as the Chief Engineer and one other engineering officer, many of whom had interrupted their periods of rest for the vessel's arrival.

These examples of emergency drills and a vessel's arrival in port also illustrate how the hours worked by seafarers involved periods of monotonous individual activities which were punctuated by high intensity collaborative activities. For example, onboard one of the ships discussed here the Second Officer reported spending many weeks whilst the vessel was at sea watchkeeping, a monotonous individual activity. However, upon arrival at a port the Second Officer assisted in the mooring of the vessel – an activity which was high intensity and involved the collaboration of other seafarers.

During some activities, such as arrival at port there is no scope for individual seafarers to control their own working routine. Likewise, a strict watchkeeping schedule is adhered to and meal times occur at the same time daily, regardless of the vessel's trading pattern. Despite the rigidity of the routine of life onboard a paradox occurs in that some seafarers are able to control and adjust their own working routine. To understand this, it is necessary to appreciate that whilst watchkeeping officers adhere to a strict routine, they are generally able to control their own working hours and the temporal ordering of tasks outside of their watchkeeping responsibilities.

For example, a Third Officer might watchkeep between the hours of 0800 and 1200 and then again between 2000 and 0000. In addition to watchkeeping they are likely to be allocated additional duties. These additional duties must be conducted outside of watchkeeping periods, and consequently whilst at sea table 2 specifies that bridge watchkeepers undertake two hours of non-watchkeeping duties. In describing his routine one Third Officer explained:

"I was on the 8-12 watch then and if you've got safety stuff to do, you know 2 hours during the day after lunch and of course they can call you for mooring as well..... Sometimes when we were like at anchor and it was really hot cos we were stuck off UAE, so after dinner in the evening I'd go and make a round on deck or whatever instead of after lunch" Third Officer, ship 2.

Thus, whilst table 2 in chapter one indicates that a Third Officer undertakes non-watchkeeping duties between 1300 and 1500 this may not necessarily be accurate. Some days a Third Officer may not work these two hours and other days they may work these two hours earlier or later.

The degree of control over their working routine experienced by the seafarers was seen to vary depending upon the rank of the seafarer. The ratings interviewed reported that their working routine was controlled by the senior officers and generally, tasks were set each day by those seafarers sailing in management positions. Tasks were set according to the operational needs of the vessel and the prevailing weather conditions. Consequently, it emerged that the delegating of tasks took little – if any – consideration of the ratings' individual preferences.

In comparison those seafarers sailing in management positions reported being able – albeit to a limited extent – to plan their own work day and thus the experiences of these individuals were different, as one Chief Cook¹⁰ explained:

“Sometimes you have harder day but the next day you can compensate it a little bit do different kind of work but my job you know I do different things every day I have some routine jobs but I can plan for myself” Chief Cook, ship 1.

Moreover, senior officers were – in some respects – able to control both their own working routine and the working routine of others onboard, as one Chief Engineer explained:

“Saturday afternoons and Sunday afternoons we are usually cheating the working time. We say that we work but actually we are relaxing” Chief Engineer, ship 4.

Similarly, one Captain explained:

“If I want to go ashore for example I can plan my administration work and maybe to do it the next day” Captain, ship 4.

¹⁰ Whilst the position of Chief Cook would not be considered a management position onboard a vessel, the Chief Cook would be the senior member of the catering department and as such would schedule the work of themselves as well as any other cooks who may be onboard and the mess man.

From these comments it is apparent that senior officers were able to utilise the power they hold in regards to controlling their own working routine to exert their own preferences on how and when they worked. Moreover, senior officers were able to control the working routines of more junior seafarers onboard. Such a scenario was possible due to a lack of direct oversight from management ashore. Similarly, Sampson (2013, p.88) suggested that onboard a ship actions can be carried out which do not attract the attention of shore-side and a ship's Captain "can chose to do a great deal to impact upon the workload of individuals and of the crew as a whole."

A lack of direct oversight from shore-side meant that consistency was not maintained onboard and the working routines of some seafarers changed when a new senior officer joined the vessel. For example, when asked about his working routine, one Deck Cadet responded:

"It depends on the chief mate or whatever so with the last Chief Mate we worked all day Saturday and got a half day or usually a full day off on a Sunday but obviously, this Chief Officer is new and I think its half day Saturday full day Sunday but it might be work, but usually I get at least one day [off]" Deck Cadet 2, ship 2.

Whilst such a change may be unsettling this account was not untypical. However, some senior officers such as the Chief Engineer onboard ship 2 endeavoured to utilise his power in controlling the working routine of others to offer these individuals flexibility in line with their preferences. He explained:

"[A] 7 o'clock start in the morning is quite early but the lads want to do that in order to finish at 4 if possible so I've had people start at 8 and finish at 5 I'm flexible either way, whatever they want to do" Chief Engineer, ship 2.

Not all senior officers were reported to be considerate and the power held by senior officers to control the working routine of others was not always a positive feature – particularly when others had to carry out additional work as a result of abuses of this power. One Third Officer explained:

“When I was with [company name] I was doing sixes¹¹ all the time cos we had this lazy Chief Officer” Third Officer, ship 2.

The comment by the Third Officer indicates that instead of the usual working routine of 4 hours on/8 hours off the Chief Officer had instructed him to work 6 hours on/6 hours off – thereby working the hours the Chief Officer should have been working. Clearly the Chief Officer would not be popular onboard – due to what would be perceived by many as an abuse of their power. However, other than asking the Captain to address the issue, there would be little the junior officers could officially do in such a situation unless additional duties resulted in the breaking of rest hour legislation. Moreover, whilst an example of this did not emerge during this study, the situation with the Chief Officer begs the question of what the seafarers could have done if it was the Captain – rather than the Chief Officer – who was abusing his power. In her ethnographic work Sampson (2013) revealed an example of a Captain who was described as a bully, who overtly and unpleasantly exercised his power to the detriment of the other seafarers onboard.

It is perhaps therefore unsurprising that findings regarding seafarers’ experiences of job control were seen to strongly relate to perceived well-being outcomes. That is those seafarers who perceived they could control aspects of their working routine onboard reported improved well-being outcomes. This finding again relates to Karasek (1979) and the job demand control model – as considered in section 4.1.1.

Importantly, seafarers live as well as work onboard a ship and arguably job control takes on a far greater significance than for workers in shore-based occupations, since the power held by senior officers does not just refer to seafarers’ autonomy in terms of carrying out work related tasks but also when they rest – as will now be seen.

¹¹ Working a schedule of 6 hours on/ 6 hours off

4.3.2 Rest hours and fatigue

In chapter 1.1.2 it was seen that unlike in most industries, the seafaring industry legislates for the minimum number of hours a seafarer must rest rather than the maximum number of hours they may work. Onboard a ship the Captain holds the responsibility of ensuring rest hour legislation is upheld in accordance with the MLC (2006) and one Captain stated:

“This last couple of week I’ve been fatigued because we’ve been in dry-dock and we had lots of, especially [towards] the end, lots of time pressure to get the ship out so I had to, but I do have the authority if you like from the company to stop and not sail if there’s enough people tired I can stop the ship, which I did once. I refused to sail from the dry-dock on the last night because the engineers were knackered” Captain, ship 2.

The Captain went on to explain:

“I just told them [shipping company] I wasn’t sailing. They [engineers] were going to be finished around 10 at night so I said I won’t sail until 8 o’clock the next morning, the company fully backed me on that so I do have that authority and they do back me up, but I would have done it anyway” Captain, ship 2.

The quote indicates that in practice – as well as on paper – the exercise of power by a Captain in relation to rest hours is significant and similarly, another Captain explained how:

“There are also cases that we have postponed departures and so on and arrivals, of course we had to keep our rest hours and [terminal operator] for example know about it so they accept that we can wait until we are rested if we have had for example tank cleaning on a short trip” Captain, ship 4.

From these comments it is apparent that when necessary a Captain can postpone events so as to ensure the crew onboard are rested and importantly, such a decision is supported by the shipping company and terminal operators. Such support is likely to increase a Captain's willingness to make the decision to postpone a vessel's arrival or departure. It could be argued that these findings represent the better end of the seafaring industry and such support may not be extended to all Captains across all vessels. In her ethnographic work, Sampson (2013) suggested that Captains were subjected to pressure from shore-side to maintain a tight schedule and only very rarely did Captains resist this pressure.

It is noteworthy that the examples presented above indicate that the Captains postponed certain events due to their colleagues onboard being overly tired – rather than the Captains themselves being fatigued. Nevertheless, the postponement of a vessel is not a regular occurrence and the experiences of seafarers suggest that the current rest hour legislation may not be sufficient to cope with the workload, with one Captain describing how:

“You have situations that you are tired, you have to work, you must work but you really really want to go to bed but the job has to be done” Captain, ship 4.

Likewise, a Deck Cadet explained:

“The rest hour legislation means you can do sixes [work six hours on/six hours off] for 3 months straight and I think after 2 even 3 weeks of that I think your performance is going to start dropping significantly, I’m not sure it protects maybe enough” Deck Cadet 2, ship 2.

The experiences of seafarers suggest that the current rest hour legislation does not necessarily provide a sufficient amount of rest and for many seafarers a working schedule of six hours on/six hours off was considered particularly arduous. One Third Officer matter-of-factly stated:

“Sixes is a killer, everybody knows that” Third Officer, ship 2.

This is akin to Smith et al.'s (2006) observations of increased negative health and safety outcomes when a two-man watch system was in force – a system which utilises a working schedule of six hours on/six hours off. Moreover, in an exploration of seafarers' health and safety regulations Bloor (2003) argued that there was a regulation deficit and in particular rest hours' regulations were insufficient – something which was apparent in the analysis of the data in this study.

Worryingly, the accounts of seafarers also suggested that non-compliance with rest hour regulations was commonplace and widespread. One Second Officer explained:

“This time I think I have red¹² twice in 3 weeks” Second Officer, ship 4.

In many instances, however, this non-compliance was simply not recorded by individual seafarers and the following account was not untypical:

“When we are playing, gambling with the rest hours to make sure we don't get red for a stupid half an hour somewhere. I'll have a look, maybe I took 2 hours' lunch instead of 1 hour, little bit forgery, not big forgery, just small” Chief Engineer, ship 4.

Moreover, during the interviews a seafarer described an event in which he had recorded a non-compliance with rest hour legislation and the records were altered by the senior officers onboard in a manner which resulted in the non-compliance not being recorded. The seafarer explained the incident as follows:

“Everybody was breaking hours of work then and later on you know you go and look at your hours of work and you're still in compliance somehow even though you filled it in yourself and you were in noncompliance. The Chief had been tampering with it so I asked you know what's going on and he says oh he was told to do it because what happened was like the ship, the port and the tugs is all owned by the same company so it's kind of like a cover-up” Third Officer, ship 2.

¹² 'Red' is a commonly used term to describe breaking rest hour legislation as a widely-used computer based rest hour recording programme uses the colour red to highlight any episodes of non-compliance.

The comments made by the Third Officer – and the Chief Engineer above – suggest that seafarers were able (and willing) to alter and falsify records that are legally required. Consequently, the falsifying of records enabled seafarers to appear as rule abiding, when this was not the case. The appearance of rule abiding was considered as important as in doing so the seafarers avoided inciting unwanted attention from shore-side. Many of the seafarers appeared to be fearful of drawing attention to themselves as they considered such attention might inhibit them from securing future employment. It is noteworthy that in the above example, whilst the Third Officer was willing to record non-compliances, the Chief Officer – reportedly in conjunction with the shipping company – falsified records so as to avoid unwanted attention from external agencies such as Port State Control. This situation poses a number of questions regarding how seafarers are safeguarded and how they are able to not comply with the regulations that are in place to protect them.

In some circumstances, however, the oversight from external agencies meant that it was not possible to inaccurately record hours of rest and one Chief Engineer explained it thus:

“There’s times when you cannot cheat with the rest hours, we do that we cheat, we try to avoid the red we try to trick a little bit but if it’s not possible it’s not possible and then they become red” Chief Engineer, ship 4.

The Chief Engineer went on to say:

“Somethings you cannot move [rest hours] too much because arrival and departure is always noted the times officially in the logbooks and everything so them I cannot move and also when we’re taking bunkering I cannot move that because those are official times logged there. That’s the first thing they [inspectors] check, how many engineers were awake” Chief Engineer, ship 4.

Here the Chief Engineer suggests that in some circumstance the oversight of some external agencies – such as Port State Control and SIRE inspectors – resulted in seafarers accurately recording rest hour non-compliances. It is concerning, however, that the Chief Engineer did so only as he could not ‘cheat’. Clearly, the Chief Engineer – an individual who holds a very senior position onboard – perceived it as acceptable to falsify rest hour records in situations he considered himself unlikely to be caught. Thus seafarers weighed up the likelihood of being caught falsifying records by external agencies and when they perceived the likelihood to be low the avoidance of drawing shore-side’s attention was chosen as a greater concern than being ‘caught’ by the external agencies. These findings suggest that the safeguarding of seafarers by external agencies is somewhat limited – and this is a concern for their health, safety and well-being.

Given these findings it is unsurprising that the inaccurate recording of rest hours is well-known by external agencies and the MAIB stated: “The records of hours of rest onboard many vessels, which almost invariably show compliance with regulations, are not completely accurate” (MAIB 2004, p.13). The present findings confirm this view and the accounts of seafarers suggested that the under-recording of working hours is widespread. This is a concern as literature (see for example Smith et al. 2006) demonstrates a clear link between under-recording of working hours and increased levels of fatigue among seafarers.

During the interviews it emerged that the fatigue experienced by the seafarers was particularly apparent at both an early and late stage of a tour of duty and findings regarding this will be presented in chapter six. However, the accounts also suggested that the experience of fatigue was dependent upon factors affecting all seafarers onboard such as weather conditions and the vessel’s schedule. As one Chief Engineer explained:

“Winter time is much more fatiguing because its bad weather all the time. Last night was a little bit rolling again and you cannot sleep, it’s impossible and then you try to catch up when you come in port for a few hours. You become tired during the winter season” Chief Engineer, ship 4.

Clearly, the weather conditions and the vessel's schedule can cause fatigue irrespective of an individual seafarer's time within a tour of duty. As a field note records:

"Everyone onboard seems to have found the recent dry-docking particularly tiring. Those who have recently joined seem to view it as tiring as those who have been here for months" (Devereux field note 2014).

Regardless of the perceived cause of increased fatigue, such fatigue was negatively associated with safe working practices and the following example provides a strong illustration:

"I know during this trip [when working excessive hours] I was not doing things I would normally do, when it was at its worst for a start we didn't have time to do it but as things were picking up again I was just cutting corners, so an example is the other day I'd finished pumping sludge and normally I would shut the valves regardless as it's good practice but I was like 'ah I'll probably have to pump that later on' so I just left the valves open which normally I would never do that sort of thing. Obviously not major short cuts but things that are actually alright but bad seamanship should we say, so yeah leaving valves open when they should be closed, not watching things that should be watched, or not recording things that should be recorded but when I'm doing it I'm not thinking 'oh I'm tired so I'm going to leave that', I'm just thinking 'right can't be arsed with that' and walk away." Second Engineer, ship 2.

This comment was not unusual – throughout the fieldwork it was apparent that the seafarers perceived fatigue as a risk to operational safety. The accounts of seafarers also suggest that fatigue was widely perceived to negatively impact upon personal safety and the following account was not untypical:

"Being tired, it's a big problem people getting injured. You get more slack when you're tired so it increases your chance of getting hurt." Fourth Engineer, ship 2.

Similarly, one Captain stated:

"If you're tired risk definitely increases" Captain, ship 2.

Thus, seafarers associated fatigue with increased negative safety outcomes and this perception is of importance when considering seafarers' experiences regarding risk throughout a tour of duty and findings regarding this issue will be presented in chapter six. Moreover, research (see for example Smith et al. 2006) has also shown fatigue to be a concern for seafarers' well-being – as well as linked to ill health among the seafaring population.

4.4 Summary

The findings presented in this chapter shed light on how a usual tour of duty was experienced by seafarers. It was seen that the organisation of employment and work within the seafaring industry varied substantially and many, though not all, seafarers experience precarious employment. Findings regarding the prevalence of widespread precarious employment corroborate the literature (see for example Bloor and Sampson 2009) presented in chapter one.

Importantly in this chapter it was revealed that the use of precarious employment methods were perceived to impact on the safety and well-being outcomes of the seafarers in this study. Again such findings corroborate studies (see for example Quinlan et al. 2001) in which precarious employment has been seen in other industries to be associated with adverse occupational health, safety and well-being outcomes.

The chapter started by revealing that those seafarers who experienced permanent employment were able to exert some control over their deployment scheduling, whilst those who were precariously employed were more often obliged to accept the deployment scheduling of the shipping companies. Control over deployment scheduling was seen to particularly impact upon seafarers' well-being outcomes.

Similarly, there were a number of other findings which also relate to the presence (or otherwise) of power and control among seafarers in different work and employment situations. For example, some seafarers had the ability – albeit to a limited extent – to control their own working routine. This was particularly the case for senior officers who were able to exert their own preference on how and when they worked. Such control had perceived positive implications for their personal safety and the operational safety of the vessel. Various studies (see for example Karasek 1979) have also emphasised how high levels of job control in positions with high levels of demand improve outcomes in terms of employee well-being.

As a consequence of the inequity among the labour force, some seafarers were found to be more vulnerable than others. Those who were precariously employed at the lower end of the onboard occupational hierarchy were revealed to be especially vulnerable. As a result, they were reluctant to do anything which may impede their ability to secure future employment, and they experienced limited onboard job control. Job control is also likely to affect how seafarers are able to mitigate for the additional challenges which may be present – in particular at an early and late stage of a tour of duty – and it is these findings regarding the beginning and end of a tour of duty which will be presented in chapter six. Before this findings from the analysis of seafarers' injury data – which was obtained from three multi-national shipping companies – are presented.

CHAPTER FIVE: SHIPPING COMPANIES' INCIDENT DATA

5.0 Introduction

In the previous chapter interviews were used to gain an insight into seafarers' health, safety and well-being experiences in relation to the organisation of work and employment throughout a usual tour of duty. It was seen that the terms of employment varied between seafarers, as did specific workplace familiarity. This qualitative research shed light on seafarers' experiences and perceptions of power and control. The experiences of seafarers – when considered in light of occupational safety literature from shore-based industries – further suggest that those who work at sea may be more vulnerable to adverse safety outcomes at certain time periods within a tour of duty. For example, many seafarers lacked workplace specific familiarity. In a shore-based study, Underhill (2007) found that agency workers were particularly vulnerable to injury early in their placement, when the effects of unfamiliarity were most apparent. This is particularly important given the fact that – as revealed in the review of literature in chapter one – seafarers not only frequently move between vessels for subsequent tours of duty, but may also move between sectors of the seafaring industry, a situation which was experienced by many of the seafarers in this study. Thus seafarers may be more vulnerable to occupational injuries at an early stage of time into tour of duty.

The situation is something of a paradox, however, considering that – as seen in chapter two – in the offshore petroleum industry Parker (2007) identified an increase in the frequency of injuries requiring first aid treatment as a two-week tour of duty progressed. In a similar vein, in a review of studies Folkard and Lombardi (2006) found relative risk of injury to increase over successive workdays. Such literature would suggest that seafarers may also be particularly vulnerable to occupational injuries at a late stage of time into tour of duty.

Steered by such literature and, importantly, by the experiences of seafarers' which emerged during the interviews regarding their perceived potential vulnerabilities at both the beginning and end of a tour of duty, this chapter explores seafarers' occupational injury frequencies in relation to time within a tour of duty. Therefore, in this chapter the following two sub-questions will be considered:

1. Can a significant relationship be identified between incidences of seafarers' occupational injuries and time within a tour of duty?
2. What are the variables that relate to incidences of seafarers' occupational injuries and time within a tour of duty?

5.1 Shipping companies' injuries data sets

The lost time incident frequency (LTIF) rate was obtained for each of the three shipping companies. This rate refers to the number of lost time injuries¹³ occurring onboard all vessels operated by the company per one million exposure hours. Between the years 2010 and 2013, on average seafarers sailing onboard tankers were most at risk of experiencing a LTI (0.87) (Figure 4). The average LTIF for seafarers onboard container ships was similar (0.86), whilst those seafarers onboard offshore vessels were the least likely to experience a LTI (0.59).

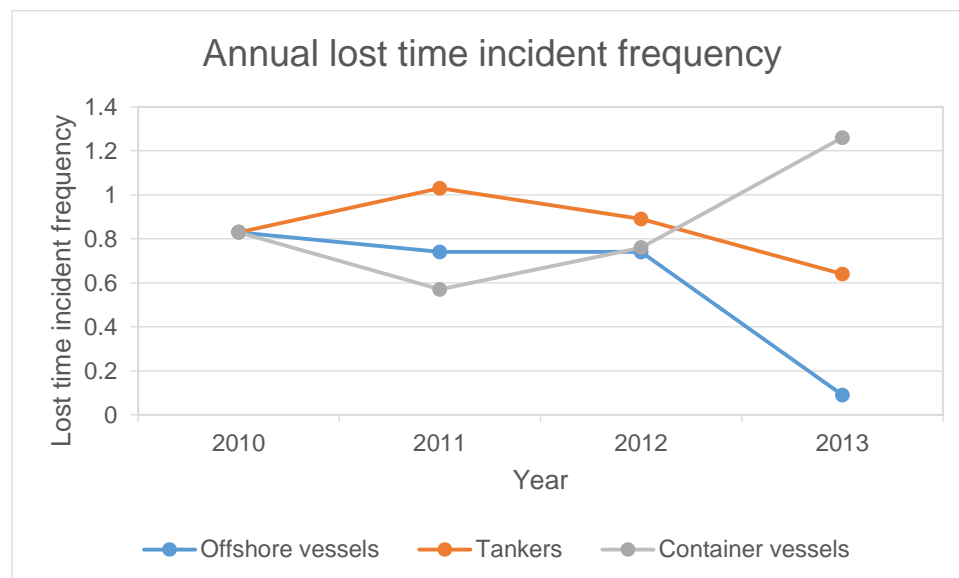


Figure 4 Annual lost time incident frequency

¹³ Lost Time Injuries are the sum of fatalities and Lost Workday Cases

Figure 5 below presents the total recordable case frequency (TRCF) rate for tankers, offshore vessels and container vessels. The TRCF rate is the total number of recordable cases (lost time incidents (LTI) + medical treatment cases (MTC) + restricted work cases (RWC))¹⁴ per one million exposure hours. The average TRCF rate for 2010 until 2013 for each of the three companies has been calculated and similar to findings regarding the LTIF rate, seafarers onboard offshore vessels were the least likely to experience a recordable injury (1.81). The average TRCF rates for seafarers' onboard container ships and tankers were 2.54 and 2.25 respectively. Over the period 2010-2013 the three shipping companies' incident data show a downward trend with incident rates decreasing year on year – with a couple of exceptions – as shown in figures 4 and 5.

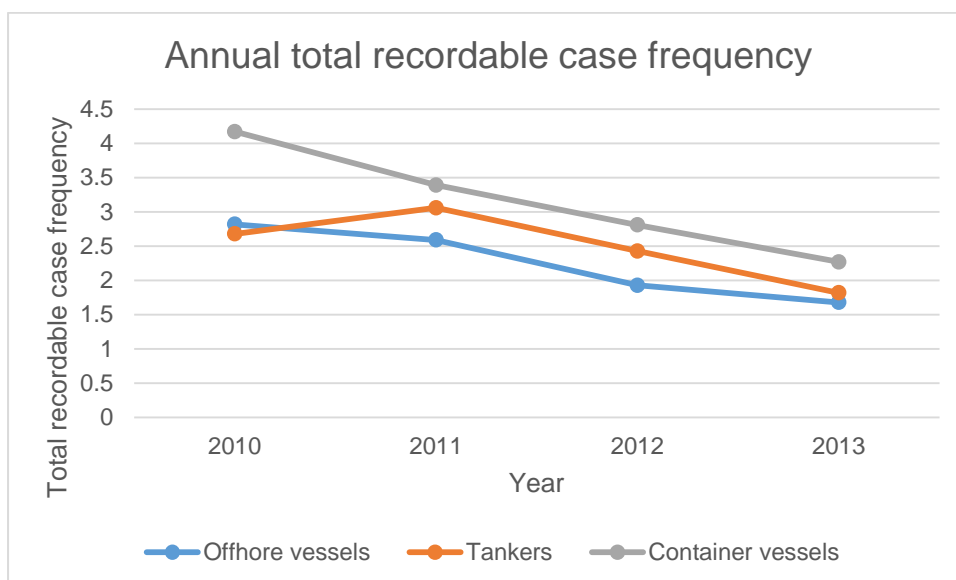


Figure 5 Annual total recordable case frequency

¹⁴ Details regarding injury classifications can be seen in appendix viii.

LTIF and TRCF rates are not always publicly available. However, as a comparison in 2011 INTERTANKO found the average LTIF to be 1.39 and the average TRCF to be 3.23 for vessels within the INTERTANKO pool. Therefore, in terms of their average safety records over the years stated all three shipping companies whose injury data are analysed here performed better than the INTERTANKO average¹⁵. This would suggest that the three shipping companies are from the better end of the shipping industry.

5.1.1 Merging data from different shipping companies

In each of the three data sets injuries incurred by seafarers sailing onboard vessels operated by the shipping companies were recorded. However, as stated in chapter three the three sets of data did not record identical information. For example, Company A provided the date on which the seafarer was expected to leave the vessel, whilst Company C gave the actual date the seafarer left the vessel¹⁶. A summary of the data obtained from each source can be seen in table 10 below.

Shipping company	Vessel type	Date joined	Expected leave date	Actual leave date	Other independent variables ¹⁷	Injury type
A	Tanker	✓	✓	✓	✓	✓
C	Container	✓	✗	✓	✗	✓
B	Offshore	✓	✓	✗	✓	✓

Table 10 Data received from each shipping company

The time period covered by the three data sets also differed. The data provided by Company A covered all incidents from 2012 until 2013 inclusive. The data obtained from Company B covered incidents which occurred between January 2010 and September 2013 inclusive. Company C provided data regarding all incidents which occurred in 2012. To aid clarity the companies A, B and C will be referred to by the type of vessels they operate which are tankers, offshore vessels and container vessels respectively.

¹⁵ The TRCF rate for container vessels in both 2010 and 2011 however was worse than the INTERTANKO average

¹⁶ In some instances it was therefore not possible to know if the seafarer left the vessel as a result of the injury or if they had left the vessel as it was the scheduled end of their tour

¹⁷ See 5.1.2 for information regarding the independent variables

A total of 650 incidents from the three shipping companies were analysed. Of these 133 (20.5%) occurred to seafarers onboard tankers, 404 (62.2%) were experienced by seafarers onboard offshore vessels and 113 (17.4%) occurred onboard container vessels. Injuries onboard tankers, offshore vessels and container vessels differed in the total number of injuries recorded. However, this is consistent with the different time periods involved and differences in hours of exposure.

5.1.2 Independent variables and injury classifications

Upon commencing an analysis of the independent variables it became apparent that some contained data which were either too ambiguous or missing to such an extent that they were not usable. Thus, these variables were removed. In the offshore dataset these variables were 'activity when injured' and 'cause of the injury' – both of which were too sparsely populated to allow for any analysis. In the tanker data set the variables removed were 'medical leave duration', 'nationality', 'LTI total monetary value' and 'company seniority' as these variables were not sufficiently populated. The variables 'immediate cause', 'root cause', 'type of contact', 'activity when injured', and 'control actions area improvement' were also removed from the tanker data set as the data was too ambiguous. For example, 'control actions area improvement' was predominantly filled with the response 'not applicable'.

To ensure consistency between the datasets recoding of the independent variables was conducted and the following variables were used in the analysis: 'part of the body injured', 'type of injury', 'rank of the injured seafarer', 'shipboard location where the injury occurred' and the 'working department of the injured seafarer'.

The recoding of variables 'part of the body injured' and 'type of injury' was done broadly in line with the coding of UK HSE data (Parkes and Swash 2000) and these categories can be seen in table 11 below.

Part of the body injured	Type of injury
Arm	Break/fracture
Leg	Sprain/strain
Torso	Lacerations/open wounds
Head	Burns (scald/chemical)
Other	Bruise
	Other

Table 11 Recoding of 'part of the body injured' and 'type of injury' variables

The independent variables 'rank of the injured seafarer', 'location', and 'the working department of the injured seafarer' were recoded in to the categories seen in table 12 below and such recoding was based on my own professional seafaring knowledge.

Rank of the injured seafarer	Shipboard location where the injury occurred	Working department of the injured seafarer
Officer	Hull	Deck
Rating	Engine room	Engine
Other	Superstructure	Other
	Other	

Table 12 Recoding of 'rank of the injured seafarer' and 'shipboard location where the injury occurred' variables

Additional details regarding the recoding of the independent variables shown in tables 11 and 12 can be found in appendix vii.

The severity of the injuries was classified by the HSEQ Superintendents employed by each of the shipping companies, using OCIMF 'Marine injury reporting guidelines'. OCIMF (1997, p.3) state the intention of the guidelines is to "provide a consistent method among tanker operators for collecting, classification and reporting, and communicating data on all injuries occurring onboard." Each injury was classified as one of the following:

- Fatality
- Lost Workday Case (LWC)
- Restricted Work Case (RWC)
- Medical Treatment Case (MTC)
- First Aid Case (FAC)

Further details regarding these injury classifications can be seen in appendix viii.

As seen in chapter 4, there are other factors such as the manner in which a seafarer is employed and the hours of rest seafarers experience which are important but these were not recorded in the three shipping companies' injury datasets. Consequently, the analysis was conducted using only the variables – as described in this section – which were recorded by the shipping companies.

First, an analysis of the frequencies of the independent variables was conducted and the results from this can be seen in appendix ix.

Following this an analysis was carried out for the distributions across injury severity – for recordable case injuries – between vessel types differed significantly as can be seen in table 13 below (χ^2 34.357, d.f. 4, $p < .0005$).

Vessel type	Injury severity				
	Fatality	LWC	RWC	MTC	Total
Tankers	0 (0.0%)	22 (34.9%)	25 (39.7%)	16 (25.4%)	63 (100.0%)
Offshore	2 (2.1%)	24 (25.5%)	56 (59.6%)	12 (12.8%)	94 (100.0%)
Containers	2 (1.8%)	61 (54.0%)	24 (21.2%)	26 (23.0%)	113 (100.0%)
Total	4 (1.5%)	107 (39.6%)	105 (38.9%)	54 (20.0%)	270 (100.0%)
χ^2 34.357, d.f. 4, $p < .0005$					

Table 13 Injury severity across vessel types

The data regarding injury severity are shown graphically for each company in figure 6. There were no fatalities onboard tankers. However, there were two fatalities on both offshore vessels and container vessels in the time periods studied. It can be seen that the majority of injuries onboard container vessels fell into the lost time injury category, whereas the majority of those onboard offshore vessels fell into the restricted work accident category. The injuries onboard tankers are more evenly distributed across injury categories (excluding fatalities), with relatively large proportions falling in the lost time incident and restricted work accident categories. The reason for this marked variation in the three distributions is unclear. It was shown in the review of the literature in chapter 1.1.2 that the types of tasks carried out by seafarers onboard different types of ships can be somewhat different, however, it is not clear how such differences may impact upon injury severity.

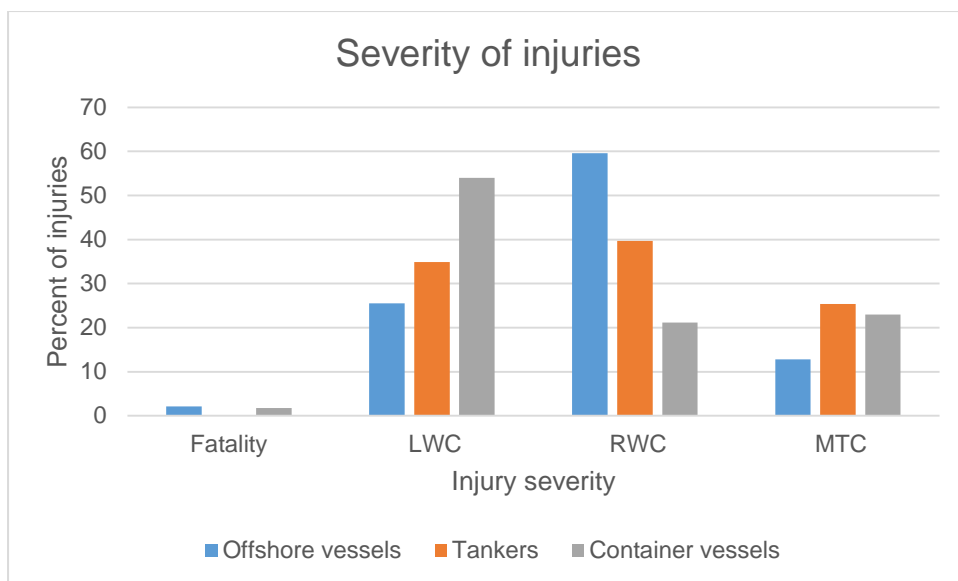


Figure 6 Severity of injuries

In addition to the incidents shown in table 13 and figure 6 a total of 380 first aid cases were analysed. These incidents account for 58.5% of the injuries recorded and data regarding them were obtained from tankers and offshore vessels.

5.1.3 Defining time aspects of a tour of duty

The duration of a tour of duty for all seafarers onboard offshore vessels was 35 days. For those seafarers onboard tankers the expected tour durations varied from 45 days to 339 days. Of those seafarers sailing on a tanker who reported an incident, 18.0% had a tour duration of three months or less, 43.6% had a tour duration of more than three months but equal to or less than six months, 36.1% had a tour duration of more than six months but equal to or less than nine months and 2.3% had a tour duration of more than nine months. As data regarding the date the seafarers expected to leave the vessel were not provided by the container vessel company it is not possible to know the exact expected tour durations of these seafarers. However, it is known that such seafarers are generally employed on tours of between three and six months.

All three data sets included the number of elapsed days at the time the incident occurred and the days into tour variable was collapsed into three categories which corresponded to the three different phases – start of a tour, middle of a tour and end of a tour – as suggested by seafarers during the qualitative component of this study.

For example, one Deck Cadet stated:

“The first week I don’t know my way around....” Deck Cadet 3, ship 2.

Similarly, a Fourth Engineer explained:

“For me the first week I’m always really tired....” Fourth Engineer, ship 2.

Thus during this analysis the start of a tour of duty was defined as the first seven days a seafarer was onboard, with the day they arrived onboard the vessel considered to be day one.

The quantifying of the end of a tour of duty was conducted in the same manner, with seafarers suggesting a time frame. For example, one Second Engineer said:

“I’d say a week before I go home.....” Second Engineer, ship 2.

Similarly, one Chief Engineer suggested:

“My last week of my trip is a quieter time for me....” Chief Engineer, ship 2.

Ratings also made the same suggestion of a time frame regarding the end of a tour:

“The last week it’s not tired but you have worked for, you can see you’ve stayed and worked 12 hours for 7 days a week, in the last week you see forward to go home” Storekeeper, ship 1.

Thus, the analysis regarding the end of a tour of duty was defined as the last seven days a seafarer was expecting to be onboard, with the day they were expecting to leave the vessel considered to be day seven. Throughout the analyses the first and last days onboard were included as full days. It is important to note that the date the seafarer expected to leave has been utilised rather than the actual date they left the vessel. This is because findings from the interviews conducted with seafarers suggest that their perceptions were related to the expectation of leaving the vessel. For example – as will be seen in chapter six – seafarers talked about their experiences regarding a change in their mindset as they approached the end of their expected time onboard. This can be illustrated with an example – which will be seen in the next chapter – in which one Captain stated:

“When they [ratings] start to get in the end of 6 months, then they are already home some of them in the head. I mean when they are in the end of the contract” Captain, ship 4.

From this quote – and also the comment made by the Storekeeper above – it is apparent that seafarers perceived that they experienced a change in their mindset when they approached the end of their tour of duty, whether the ratings in the example remained onboard for another month does not alter this fact.

For this reason, injuries which occurred during a tour extension have been included in the ‘end of tour’ category throughout this chapter. The category ‘middle of tour’ refers to incidents which did not occur either at the start or end of a tour, as defined above.

5.2 Question 1: Can a significant relationship be identified between incidences of seafarers’ occupational injuries and time within a tour of duty?

To answer this question firstly the rates of incidences at the start, middle and end of a tour were compared for each of the three shipping companies. It can be seen in table 14 below that the distribution of incidences was greater during the start of a tour of duty for offshore vessels compared to tankers and container vessels. However, this finding does not imply that the start of a tour was more dangerous onboard offshore vessels as the shorter tours worked by seafarers onboard offshore vessels means that for such seafarers the time period classified as the middle of the tour was much shorter than for their tanker and container vessel colleagues. For example, onboard the offshore vessels considered in this chapter the middle of the tour was three weeks, whereas the middle of the tour for seafarers onboard the tankers and container vessels discussed here was anywhere between seven weeks and more than nine months. The same explanation also applies to incidences at the end of a tour.

Additionally, the shorter tours and correspondingly shorter leave periods experienced by the offshore seafarers studied resulted in these seafarers working a larger number of individual tours on an annual basis and thus they experienced a greater number of starts and ends of tours per year than their tanker and container vessel colleagues. As previously stated data regarding when a seafarer expected to leave the vessel were not obtained from container vessels and therefore an analysis of end of tour incidents was not possible for these incidents.

	Tankers	Offshore vessels	Container vessels
Start of tour	3 (2.3%)	82 (20.9%)	3 (2.9%)
Middle of tour	120 (90.2%)	240 (61.2%)	102 (97.1%)
End of tour	10 (7.5%)	70 (17.9%)	
Total	133	392	105

Table 14 Injuries in relation to time into tour onboard tankers, offshore vessels and container vessel

A chi-square test (X^2 14.061, d.f 4, $p < .001$) showed that injuries were not equally distributed and incidents were less likely during the end of a tour than during the rest of a tour of duty onboard offshore vessels. This suggests that there were less incidents at the end of a tour than would be expected by chance. In chapter two it was revealed that in one study injury risk decreased after the seafarer had been onboard for 117 days (Jensen et al. 2004). The findings from the offshore seafarers here, however, show that whilst the end of a tour was the safest the risk did not decrease linearly as time into tour progressed, as will be seen below. The methods employed by Jensen et al. (2004) – as discussed in chapter 3.1.1 – did not identify changes in risk during different periods of time within an entire tour of duty and as such are not comparable to findings from this study.

In addition to the incidents shown in table 14 above, 30 incidents occurred after the date on which the seafarer expected to leave the vessel. Nearly 7% of injuries recorded onboard offshore vessels and 3% of injuries recorded onboard tankers occurred during tour extensions. As the seafarer's expected leave date was not obtained for incidents onboard container vessels it is not possible to know the frequency of tour extension injuries onboard these vessels. Moreover, there were a number of significant challenges that meant very little could be concluded regarding the frequency of tour extension incidents. As the overall frequency of seafarers working tour extensions was unknown it was not possible to consider how this incident rate related to tour extensions overall. Also – as will be seen in chapter six – seafarers and shipping companies considered tour extensions as different time periods and as such even if the shipping companies provided details regarding the frequency of tour extensions these data would not correspond to the seafarers' perceptions of tour extensions.

As the tour durations of the seafarers onboard tankers and container vessels varied it was not possible to conduct a chi-square test for each week of a tour of duty for these two data sets. A way of overcoming this inherent limitation was to test the number of incidents as a function of weeks into tour for the first four weeks a seafarer was onboard. Unlike in the analysis of incidences across the categories start, middle and end of tour, incidents which occurred during tour extensions were not included in the analysis of the weekly distribution of incidences.

A chi-square test (χ^2 7.800, d.f. 3, $p < .05$) showed that onboard tankers the distribution of incidences across the first four weeks into tour differed significantly. In particular, the fourth week of a tour was more risky than the first three weeks of a tour. Conversely, the distribution of incidences across the first four weeks of a tour did not differ significantly for offshore vessels or container vessels (offshore vessels: χ^2 4.226, d.f. 3, p .238, container vessels: χ^2 6.238, d.f. 3, p .101). The distribution of incidences across the first four weeks of a tour can be seen for each of the data sets in figure 7 below.

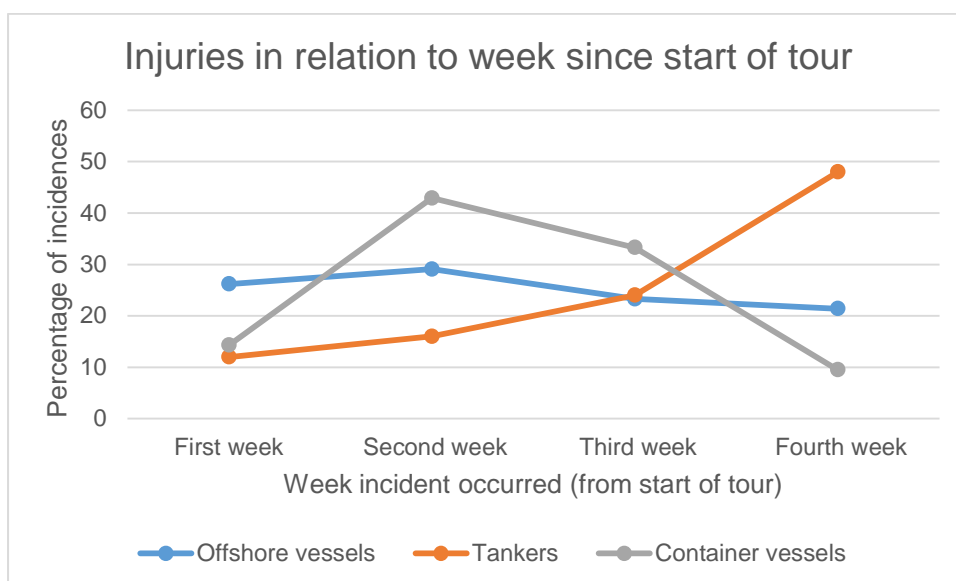


Figure 7 Injuries in relation to week since start of tour onboard tankers, offshore vessels and container vessels

Onboard tankers there were more incidents during the fourth week of a tour of duty – in comparison to the first three weeks – than would be expected by chance.

Furthermore, figure 7 shows the frequency of incidences increased linearly as the first four weeks within a tour progressed.

Comparatively, within the first four weeks onboard container vessels the distribution of incidents was likely due to chance.

The lack of significance for incidences within the first four weeks of a tour for offshore vessels is of particular interest, given that onboard these vessels tours were five weeks in length and when analysed as an entire tour, significance was identified (as will be seen below in figure 9).

Figure 8 below shows the number of incidents as a function of weeks into tour for the last four weeks of a seafarer's tour for the tankers' and offshore vessels' data sets. As previously explained the data set obtained from the container vessels did not record the date the seafarer expected to leave the vessel and as such it was not possible to include this data set in the analysis of incidences at the end of a tour. For both tankers and offshore vessels the distribution of incidences across the last four weeks of a tour differed significantly (tankers: χ^2 8.250, d.f. 3, $p < .05$, offshore: χ^2 14.839, d.f. 3, $p < .005$). In particular, onboard tankers the penultimate week of a seafarer's tour was riskier than the two preceding weeks and the last week. Onboard offshore vessels the distribution of incidences across the last four weeks showed a linear decline as the last four weeks progressed. As such, the last week of a seafarer's tour was the safest compared to the preceding three weeks.

The findings shown in figure 8 again show that a significant relationship could be identified between incidences of seafarers' injuries and time into tour. The reasons for a spike in incidents in the second last week of a tour onboard tankers are unclear and the literature identified in chapters one and two provide little in the way of an explanation.

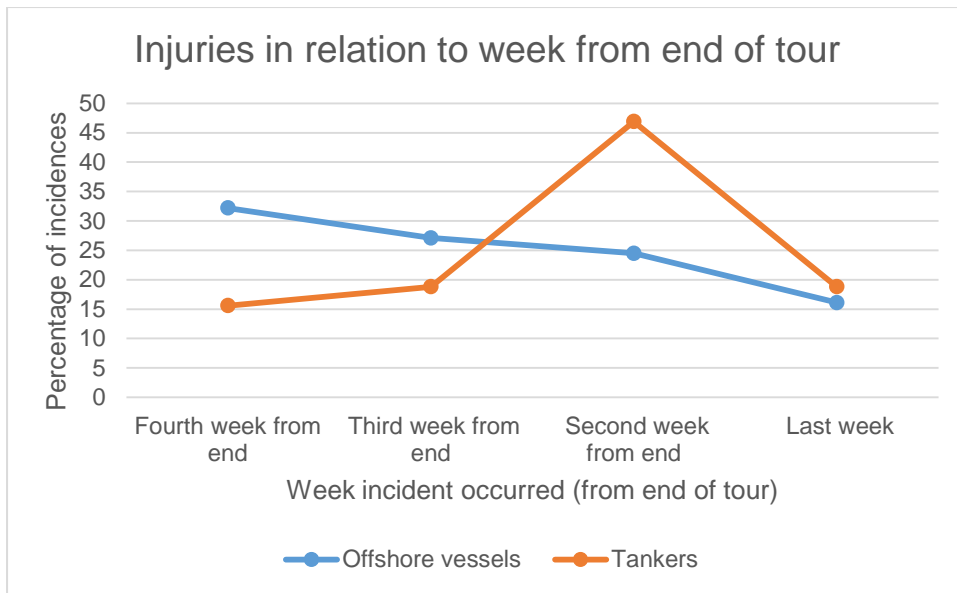


Figure 8 Injuries in relation to week from end of tour onboard tankers and offshore vessels

As previously stated – unlike seafarers onboard tankers and container vessels – offshore seafarers all expected to work the same tour length and as such it was possible to analyse the distribution of incidences across an entire tour for offshore seafarers.

Figure 9 below plots the number of all incidents combined as a function of weeks into tour for an entire tour for the offshore vessels' data set. The distribution of incidences on a weekly basis across an entire tour differed significantly (χ^2 11.486, d.f. 4, $p < .05$). In particular, the frequency of incidences was greatest in the second week onboard and the last week at sea was the safest.

When considering the findings regarding incidents onboard offshore vessels shown in figure 7 – no significance within the first four weeks of a tour – and figure 8 – significance within the last four weeks of a tour – it is apparent that a significant relationship between incidences of seafarers' injuries and time into tour was identified only in the last week of a tour. This suggests that when considering seafarers' occupational safety it is important to consider the entire tour. Literature identified in chapter two – such as Hansen et al. (2002) and Jensen et al. (2004) – explored incidents in relation to the progression of time since the start of a deployment and this approach would not have enabled the findings regarding offshore vessels shown here to be identified.

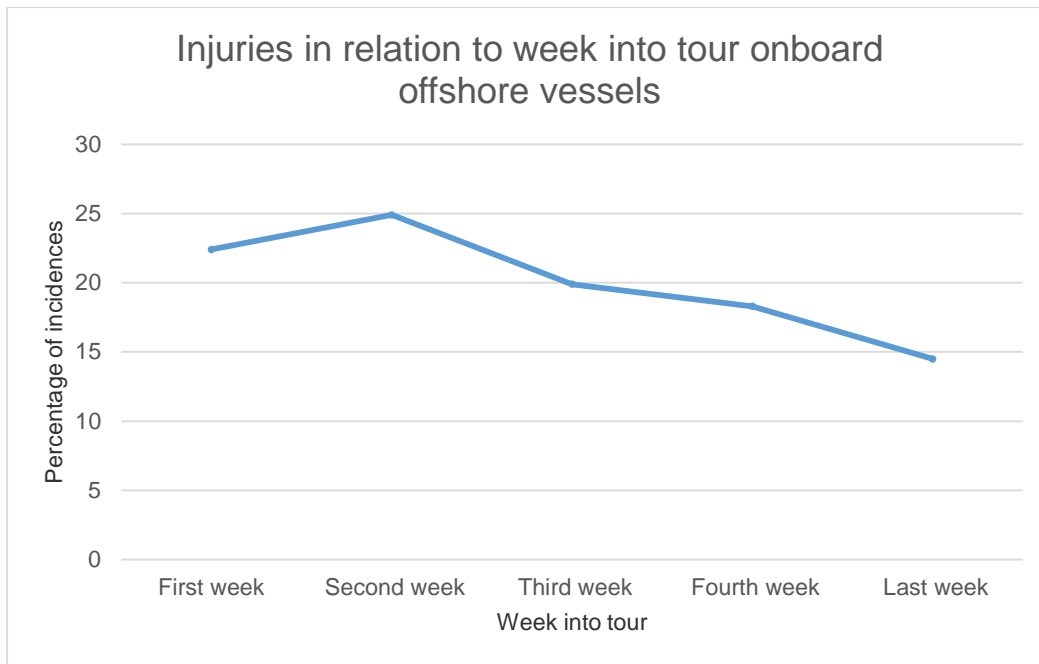


Figure 9 Injuries in relation to week into tour onboard offshore vessels

In answer to the question ‘Can a significant relationship be identified between incidences of seafarers’ occupational injuries and time within a tour of duty?’, yes such a relationship could be identified onboard offshore vessels and tankers. No such relationship was apparent for container vessels. However, the limitations regarding the lack of data identifying the date the seafarer was expected to leave the vessel have resulted in an incomplete analysis of these data.

The frequency of incidences of seafarers’ injuries in relation to time within a tour of duty and how this relationship related to injury severity onboard offshore vessels was also explored. In figure 10 below the number of incidences categorised by injury severity are shown as a function of weeks into tour for an entire tour for the offshore vessels’ data set.

It was not possible to statistically test injury severity across an entire tour as the necessary categories did not provide sufficiently high frequencies. However, it was possible to analyse the distribution of recordable cases (fatalities, lost workday cases, restricted work cases and medical treatment cases) across an entire tour for offshore seafarers. The distribution of incidences classified as recordable cases onboard offshore vessels across an entire tour differed significantly (χ^2 13.186, d.f. 4, $p < .05$). The likelihood of experiencing a recordable case injury was the lowest in the last week of a tour, compared with the other four weeks of a tour and this distribution can be seen in figure 11.

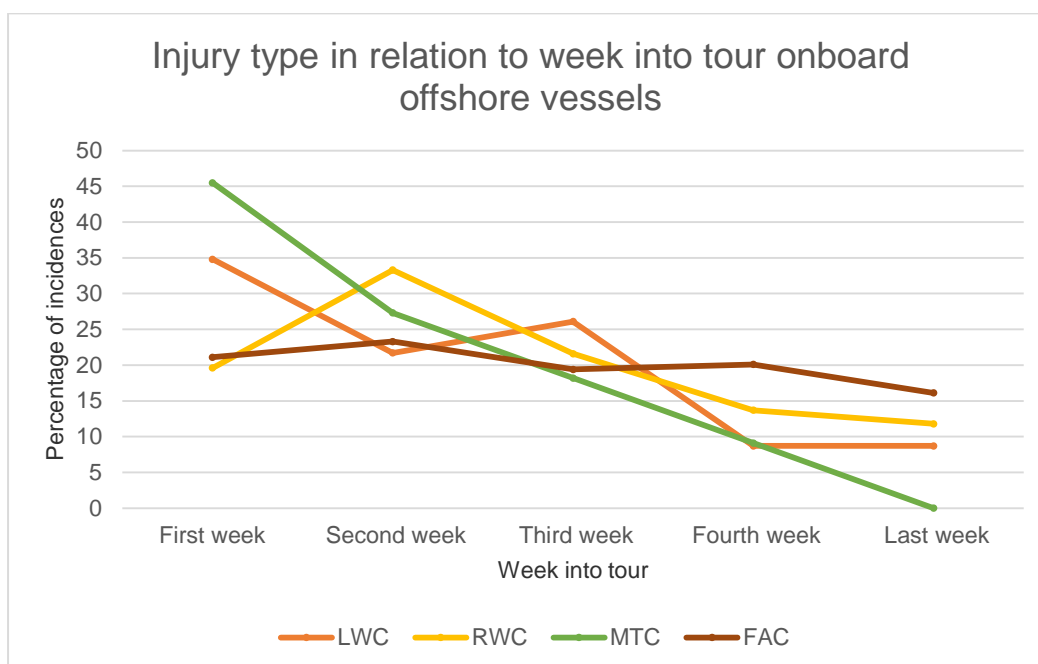


Figure 10 Injury severity in relation to week into tour onboard offshore vessels

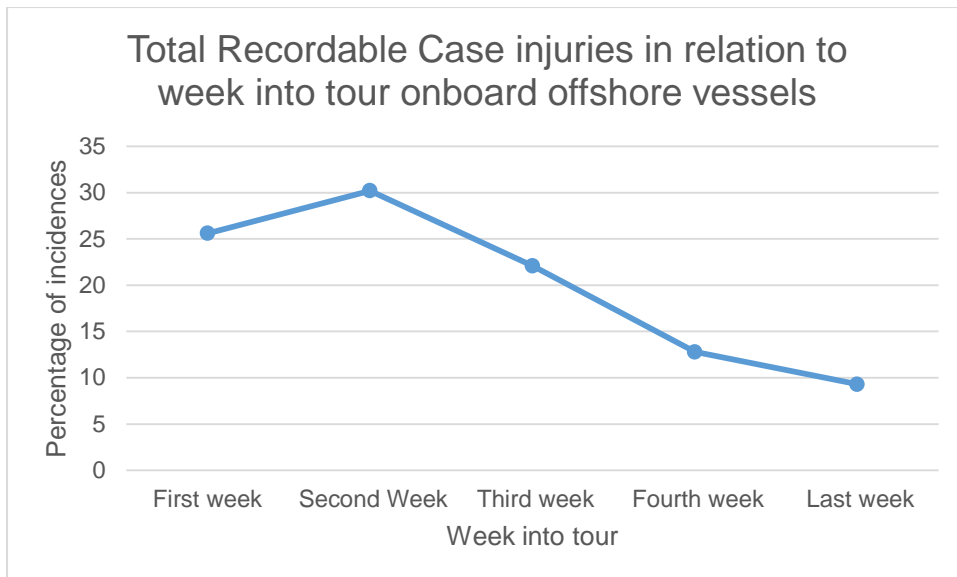


Figure 11 More severe incidents in relation to week into tour onboard offshore vessels

The chi-square test result suggests that there were less total recordable case injuries during the last week of a tour – onboard offshore vessels – than would be expected by chance. This finding shows that with the less severe first aid case injuries removed, a significant relationship between incidences of seafarers' injuries and time into tour was still evident. This suggests that the occurrence of less severe first aid case injuries does not mask the identified relationship between occupational injuries and time into tour. As it was not possible to conduct analyses of the more severe injuries by type, it is unfortunate that little else can be concluded regarding injury severity and its relationship with seafarers' incidents and time into tour.

The significant chi-square test result indicates that the relationship between incidences of seafarers' occupational injuries and time within a tour of duty warrants further analysis. For example, it would be useful to identify the incident characteristics – such as where onboard the incident occurred and the rank of the seafarer who sustained the injury – which may be related to a seafarer experiencing an injury at a particular period of time within a tour of duty.

5.3 Question 2: What are the variables that relate to incidences of seafarers' occupational injuries and time within a tour of duty?

To answer this question a number of binary logistic regressions were conducted. Binary logistic regression was identified as an appropriate method as all the independent variables were nominal variables, with no hierarchy and a number of predetermined categories. As the variables were not linear and were groups of absolute variables there were limited statistical analyses available.

In total, four binary logistic regressions were conducted and these were:

1. Start of a tour vs. all later incidents (middle and end of a tour)
2. End of a tour vs. all earlier incidents (start and middle of a tour)
3. Start of a tour vs. middle of a tour (end of tour incidents not included)
4. End of a tour vs. middle of a tour (start of tour incidents not included)

This method ensured that separate incidents at the start and end of a tour were compared with any other time within a tour (1 and 2) and separate incidents at the start and end of a tour were compared with the middle of a tour (3 and 4).

The following variables were identified for use in the binary logistic regression models:

1. Rank of the seafarer
2. Type of injury sustained
3. Shipboard location where the injury occurred
4. Part of the body injured
5. Working department of the injured seafarer

As was seen in section 5.1.2, the variables were recoded and where necessary they were merged to form new variables. Further details of this can be found in appendix vii.

Following checks for missing data, Pearson chi-square tests were used to test the relationship between the criterion variable (i.e. time into tour when the incident occurred) and the independent variables. As per convention the significance level was set at $p = <.05$ (see for example Field 2009). It was not possible to identify a significant relationship between any of the five independent variables separately and the dependent variables (time into tour).

Finally, before the binary logistic regressions were conducted the independent variables were tested for multi-collinearity. No multi-collinearity was identified between the five independent variables.

Each of the four models were run for incidents onboard tankers and offshore vessels combined and there were no significant variables identified for rest of tour (start and middle of tour) vs. end of tour (R^2 .023 (Cox and Snell), .041 (Nagelkerke). Model χ^2 4.934, d.f. 8, p .765) and the omnibus test of model coefficients suggested the model had a very poor fit.

There were, however, significant variables in the other three binary logistic regression models. As can be seen in table 15 below the odds of a seafarer working in the engine department reporting an injury at the start of a tour (compared to all later incidents) were 66% less than a seafarer classified as 'other working department'. Similarly, the odds of a seafarer working in the deck department reporting an injury at the start of a tour were 75% less than an 'other department' seafarer.

	Odds ratio	95% CI
Department		
Other Department (n= 159)	1*	
Engine Department (n= 111)	0.34*	(0.12-0.92)
Deck Department (n= 142)	0.25**	(0.11-0.59)

Note R^2 .066 (Cox and Snell), .115 (Nagelkerke). Model χ^2 13.158, d.f. 8, p .107. * p < .05, ** p < .005.
Table 15 Start of tour vs. all later incidents logistic regression (tankers and offshore vessels)

Table 16 below shows that the odds of both engine department and deck department seafarers were less (71% and 79% respectively) than other department seafarers to report an injury at the start of a tour (compared to the middle of a tour).

	Odds ratio	95% CI
Department		
Other Department (n= 134)	1 **	
Engine Department (n= 95)	0.29*	(0.10-0.83)
Deck Department (n= 126)	0.21**	(0.09-0.51)

Note R² .086 (Cox and Snell), .143 (Nagelkerke). Model χ^2 10.151, d.f. 8, p .255. * p < .05, ** p < .005.
Table 16 Start of tour vs. middle of tour logistic regression (tankers and offshore vessels)

The odds of a deck department seafarer reporting an incident at the end of a tour (compared to the middle of a tour) were 60% less than a seafarer classified as other working department, as can be seen in table 17 below.

	Odds ratio	95% CI
Department		
Other Department (n= 128)	1	
Deck Department (n= 130)	0.40*	(0.18-0.88)

Note R² .040 (Cox and Snell), .067 (Nagelkerke). Model χ^2 9.026, d.f. 8, p .340. * p < .05.
Table 17 End of tour vs. middle of tour logistic regression (tankers and offshore vessels)

The four binary logistic regression models – as outlined above – were then conducted for only incidents which occurred onboard offshore vessels and the results were similar. There were no significant variables for rest of tour (start and middle of tour) vs. last week of tour (R² .037 (Cox and Snell), .061 (Nagelkerke). Model χ^2 8.840, d.f. 8, p .356). Unlike for tanker and offshore vessels combined, there were no significant variables for middle of tour vs. end of tour (start of tour not included) (R² .056 (Cox and Snell), .085 (Nagelkerke). Model χ^2 11.501, d.f. 8, p .175), for injuries which occurred only onboard offshore vessels.

Table 18 below shows that the odds of a deck department seafarer reporting an injury at the start of a tour (compared to all later incidents) were 61% less than an 'other working department' seafarer.

	Odds ratio	95% CI
Department		
Other Department (n= 138)	1	
Deck Department (n= 76)	0.39*	(0.16-0.96)

Note R² .065 (Cox and Snell), .115 (Nagelkerke). Model χ^2 7.048, d.f. 8, p .531. * p < .05.

Table 18 Start of tour vs. all later incidents logistic regression (offshore vessels)

Similarly, the odds of a seafarer working in the deck department reporting an injury at the start of a tour (compared to the middle of the tour) were 66% less than an 'other department' seafarer, as can be seen in table 19 below.

	Odds ratio	95% CI
Department		
Other Department (n= 115)	1	
Deck Department (n= 62)	0.34*	(0.13-0.87)

Note R² .084 (Cox and Snell), .124 (Nagelkerke). Model χ^2 8.822, d.f. 8, p .358. * p < .05.

Table 19 Start of tour vs. middle of tour logistic regression (offshore vessels)

It has therefore been established that some aspects of the seafarer's working department were significant predictors for injuries at particular periods of time within a tour of duty in the tankers and offshore vessels' data sets. For tankers and offshore vessel incidents combined the seafarer's working department was a significant predictor for the start of tour vs. all later incidents, start of tour vs. middle of tour and end of tour vs. middle of tour.

When offshore vessel incidents were tested on their own a seafarer's working department was a significant predictor for just the start of tour vs. all later incidents and start of tour vs. middle of tour for incidents onboard offshore vessels. The reasons for this difference regarding the end of tour vs middle of tour having a significant predictor variable for tanker and offshore vessels incidents combined and not for offshore vessel incidents tested on their own, however, are not immediately clear.

Therefore, to answer the question: 'What are the variables that relate to incidences of seafarers' occupational injuries and time within a tour of duty?' only the seafarer's working department was identified as a factor which related to time within a tour of duty and incidences of occupational injuries.

These findings – or more precisely lack of significant findings – from the binary logistic regression models are important as whilst previously in this chapter a significant relationship between seafarers' occupational injuries and time within a tour of duty was identified the data collected by shipping companies provides very little in the way of any explanation regarding this relationship.

What emerged from the analyses, however, was the scale and breadth of the variables which had not been recorded by the shipping companies following an injury. For example, nothing about the manner in which the injured seafarer was employed was known, nor was the seafarer's familiarity with the vessel – or indeed familiarity of working at sea – known. These extensive deficiencies in the information recorded by the shipping companies are a significant limitation regarding the use of shipping companies' safety data to explore seafarers' safety experiences in relation to the organisation of work and employment at sea.

5.4 Limitations

There are also several other limitations regarding the quantitative component of this study. It became apparent during the analyses that one limitation of the data obtained was the low number of cases in some of the categories – such as fatalities and lost workday cases – and without sufficient numbers of cases it was not possible to conduct all the desired analyses.

In addition, Company C were unwilling to provide the date the seafarer expected to leave the vessel and for this reason only a partial analysis of incidents experienced onboard container vessels was conducted. Data regarding independent variables were also not obtained from Company C and as such it was not possible to conduct any further analysis regarding the circumstances of incidents which occurred onboard container vessels.

There are also a number of reasons to be somewhat sceptical of the accuracy of any findings obtained from shipping companies' incident records. First, it is widely acknowledged that the under reporting of incidents in the seafaring industry is common place and there are many reasons for this. It was seen in the review of the literature in chapter one that many seafarers experience precarious employment and as such these individuals may be averse to reporting an incident which they perceive will negatively impact upon their career. However, even for seafarers who are lucky enough to experience permanent employment, the perception of being blamed for an incident may result in it not being reported. As one Second Officer explained:

"If I was going to get bollocked for it mainly, well back when I was cadet, I wouldn't care as much now obviously. Actually, there was another time on [ships name] I was coming down a ladder and I swung on the thing and I slipped off and landed on top of my foot and I didn't report it and my foot swelled up quite badly but I didn't report it because [captains name] was the old man and it was an Indian Second Mate so he'd make a big thing about it, write a report, I couldn't really be bothered with that so I never told anyone"
Second Officer, ship 2.

In some circumstances, when an incident occurs onboard a ship the injured individual is alone. Such a lack of witnesses means that seafarers may be able to hide the occurrence of the event. One Captain openly stated that other seafarers onboard were able to hide non-serious injuries and that he himself would be reluctant to report an injury, primarily due to the paperwork required in such a situation. He explained:

“If I don’t report it I think it’s not so serious. Let’s say that I go on a ladder here and I miss the steps and I fall down and I hit my arm but I feel that ah it’s just nothing. To report something it’s a lot of paperwork all the time, I don’t want to have so much paperwork so any minor of myself if not so necessary. If anybody else I have to report it, if they come to me I report but there can be the situation also that they keep it for themselves” Captain, ship 4.

The comment suggests that if an incident was reported to the Captain then the Captain would be obliged to report the event to the shipping company. In practice, however, this was not always the case and a Captain may avoid reporting an incident to the shipping company if the seafarer to whom the injury occurred was willing to not involve the shipping company and the injury was not serious enough to require shore-side medical assistance. The following dialogue is from an interview with a Second Officer who had stated that he had previously reported an injury to the Captain:

Me - *“Did the office find out about it [the injury]?”*

Second Officer, ship 2 - *“Nah it wasn’t really serious enough”*

Many of the seafarers interviewed suggested that they would not report non-serious injuries, particularly if they did not require medical assistance. As one Third Officer explained:

“[If it] requires medical assistance or you need to see a doctor then yeah I would report it, something minor that doesn’t require medical assistance of any kind then no I wouldn’t” Third Officer, ship 2.

For some seafarers the remoteness of the ship when an incident occurred meant that little could be done with regards to diagnosing and treating the injury without diverting the ship. Such a diversion would be hugely costly to the shipping company and would likely be an inconvenience for other seafarers onboard. As one Second Officer explained:

“I thought it [my foot] was broken actually but if it was broken we were sailing past Bermuda at the time and I don’t know what the old man would’ve done. He’d have had to phone radio medical, Danish ship so he’d have phoned radio medical and they might have said I should be got off and then that would divert the ship off course and I wouldn’t be very popular so that’s part of the reason I didn’t tell” Second Officer, ship 2.

Whilst such findings regarding the under-reporting of incidents in the seafaring industry are interesting they add little to the current body of literature regarding this well-known issue. However, findings regarding the impact of time within a tour of duty on incident reporting are particularly salient to this study. For some seafarers the reporting of an incident at an early stage of a tour of duty would be avoided where possible, as one Deck Cadet explained:

“If it was a serious one I’d do it anytime but if it was one that needed a bit of attention but could wait I probably won’t do it as soon as I join a brand-new ship I’d be like try not pester them just get used to the ship then when you get to know people I’d tell them, yeah I’d tell people, I probably would tell people at any point in the trip but less keen, depends how serious and whether I need their attention. I wouldn’t do it at the start so much, I’d be shy, not knowing how people might respond to it, they might say piss off you girl or something like that so yeah most likely at the start of the trip” Deck Cadet 3, ship 2.

The Deck Cadet suggested that his desire to avoid drawing attention to himself and the worry of being perceived as a hindrance by his new and unfamiliar colleagues would result in him being averse to reporting an injury.

Conversely some seafarers suggested they would be less likely to report an incident at a late stage of their tour and one reason for this was to avoid completing the additional paperwork such an incident would entail. A Second Officer stated:

“Like at the end of the trip, especially when you’re going home you don’t want to write a report, the last thing you want to do is write a report” Second Officer, ship 1.

The Second Officer went on to explain:

“Maybe people wouldn’t report it at their last day because they can’t really be bothered, you just want to go home” Second Officer, ship 1.

If an individual would shortly be leaving the vessel they may be willing to wait until they got home to seek any treatment for an injury they may need. As one Fourth Engineer explained:

“If I was going to get off in a few days then I’d probably be less likely to report it you know, if I broke my finger and I was going to get off in a day I’d probably just go home to my doctors” Fourth Engineer, ship 2.

Such a scenario is potentially more likely to apply to seafarers from more economically developed countries who have access to high-quality healthcare in their home country. In contrast the fact that health care is funded by the shipping company for any injuries or illnesses a seafarer experiences whilst onboard may make the opposite true for seafarers from less economically developed countries.

The qualitative findings regarding the reporting of incidents among seafarers suggest that caution should be exercised when considering findings regarding shipping companies’ injury data – in particular the patterns of reported injuries in relation to time within a tour of duty. The accounts of some seafarers suggest that there may be a greater likelihood of under reporting incidents at particular periods within a tour of duty and as such any significant differences regarding injury frequency in relation to time within a tour of duty may be the result of reporting differences.

5.5 Summary

The findings presented in this chapter provide a novel exploration of the frequency of seafarers’ occupational injuries in relation to time into tour. However, it is unlikely to present a completely accurate picture of seafarers’ injuries owing to the likelihood of substantial under-reporting of injuries. This has been identified in a number of studies (see for example Bhattacharya 2009) and the findings which emerged during the interviews in this study further corroborate this by indicating that the injuries that seafarers reported to shipping companies were simply the tip of the ice-berg. Consequently, the true scale of occupational injuries experienced at sea is unknown.

Moreover, the findings presented in this chapter indicate that, when an injury was reported, the shipping companies were not recording variables which could shed-light on why seafarers might be more vulnerable to occupational injuries at certain time periods within a tour of duty. The findings presented in chapter four suggested that there are a number of factors which are important in this regard, including, for example job insecurity, workplace familiarity and fatigue. However, information regarding factors such as these are not present in the shipping companies' injury records. This is a particular concern as research from other industries has identified associations between such factors and occupational injury frequency – for example Underhill (2007) found agency workers' workplace familiarity to be related to injury frequency. Similarly, literature from the seafaring industry (see for example Hansen et al. 2002) has identified associations between seafarers deployment to a familiar vessel for subsequent tours of duty and injury frequency. Bodies such as the MCA (2003) have also identified associations between working hours, fatigue and injury frequency. Yet despite such evidence, the shipping companies did not record variables, such as workplace familiarity and rest hours, which relate to the organisation of work and employment at sea.

The consequence of shipping companies not recording such variables is that little is known regarding some of the factors that might be related to accident causation. This is a cause for concern in terms of seafarers' occupational safety as any actions shipping companies may take to improve the safety outcomes of their workforce are not based on a full and complete story. It is also somewhat ironic that many of the variables relating to the organisation of work and employment which have been seen in other industries to be associated with injury frequency (see for example Quinlan 1999) – such as whether or not an individual is precariously employed – are actually controlled by the shipping companies themselves. This, of course, suggests that companies do have these data available, but currently do not relate them to the information they collect about injuries at sea.

Finally, none of the shipping companies collected data that provide any indication of seafarers' well-being, let alone how it may fluctuate with time into tour of duty.

Taken together, these findings suggest that the shipping companies' data are unlikely to adequately describe the extent of seafarers' occupational harm, or the relevant aspects of the contexts in which it occurs – which, of course, has significant implications for their ability to mitigate it.

In the following chapter we return to a qualitative analysis to further explore the relationship between the organisation of work and employment and seafarers' experiences of health, safety and well-being.

CHAPTER SIX: THE EARLY AND LATE STAGES OF A TOUR OF DUTY

6.0 Introduction

This chapter – the third and final findings chapter – seeks to shed light on the experiences of seafarers at both an early and late stage of a tour of duty. It does so as during the interviews it emerged that there were a number of features pertinent to the organisation of work and employment at sea that were important for health, safety and well-being experiences which occurred at the beginning and end of a tour of duty. Similarly, in the review of literature in chapters one and two it was seen that a number of factors – such as unfamiliarity and cumulative fatigue – were prevalent at either the beginning or end of a seafarer's tour of duty, and these factors had been found to be associated with adverse health, safety and wellbeing outcomes in other industries (see for example Underhill 2007).

As with chapter four, this chapter draws upon the interview transcripts and field notes from the ships visited and once again the themes presented in this chapter are those which were brought to light by the seafarers in this study talking about their own personal experiences of life at sea.

Unlike in chapter five however, in this chapter the beginning and end of a tour of duty are not quantified – they are notions which have been developed to make sense of the experiences and perceptions of seafarers. The terms were utilised in order to provide an insight into how the beginning and end of a tour of duty were understood by seafarers and in many instances the seafarers themselves quantified these time periods (as was seen in chapter 5.1.3).

This chapter progresses chronologically and begins by considering those factors which are pertinent to an early stage of a tour of duty. In the review of literature presented in chapter two it was seen that many seafarers were asked by their employer to return early from home leave to join a ship (BIMCO 2015). Moreover, Wadsworth et al. (2008) revealed that seafarers often had no opportunity to sleep between traveling to a ship and commencing their first work shift. Both of these issues – returning to a vessel early and not sleeping following prolonged travel to a worksite – are likely to result in fatigue, an issue which is known to adversely impact on occupational safety and wellbeing outcomes (see for example Carotenuto et al. 2012 and MCA 2013). Thus, with this literature in mind this chapter begins by describing how seafarers experience events immediately prior to arriving at a ship and how these experiences differ depending on the manner in which the individual is employed. The findings regarding seafarers' experiences upon joining a vessel and how they adjust as newcomers are also presented.

In the latter half of this chapter the experiences and perceptions of seafarers in regards to a late stage of a tour of duty are presented. The literature – in chapter 2.2.3 – revealed that some seafarers are asked to extend their contractual voyage period (BIMCO 2015) and many seafarers are unsure of the date on which they will leave the vessel and return home. Steered by such literature the text considers seafarers' experiences at the end of a tour of duty and the how the issue that the date a seafarer leaves the ship is not fixed impacts on their health, safety and well-being.

In presenting the findings from this research relating to the beginning and end of a seafarer's tour of duty this chapter sheds a light on issues relating to job control and the variations in power experienced by seafarers in different work and employment situations, and the impact that such power had on mitigating some of the adverse features of the organisation of work and employment at sea.

6.1 The start of a tour of duty

At the start of a tour of duty seafarers must transition from life at home to life at sea. The contrast between the time wealth experienced by seafarers at home and the long hours worked at sea is vast and life onboard involves a strict routine of watch patterns, set meal times and limited rest periods.

Yet from the moment a seafarer joins a vessel they are at work and Sampson (2013, p. 88) states: “It is difficult to overstate the impact of work, and work schedules, on the lives of seafarers’ onboard cargo vessels. The work of the ship is prioritised above all else. If something needs doing onboard a way is found to get it done. There are no holidays, no concessions to sea sickness or minor ailments, little concession to weather conditions and no account at all of the time of day or night when a ship enters port.” Consequently, the start of a tour of duty is an important period, however, prior to this it is necessary to consider how seafarers spend their time immediately preceding the start of a tour of duty.

6.1.1 Time preceding the start of a tour of duty

In exploring seafarers’ experiences immediately prior to joining a vessel it was seen that many of the seafarers in this study did not arrive onboard the vessel in a physical or mental condition conducive to work.

Chapter 4.1.1 revealed that some seafarers were able to plan their own deployment schedule – in conjunction with another seafarer of the same rank – and consequently these seafarers often knew many months in advance the approximate date on which they would leave home and join a vessel. Other seafarers, however, reported receiving deployment scheduling information from a crewing agency.

During the analysis it was revealed that joining information was often sent via email and the information included the name of the ship the seafarer was joining and an electronic flight ticket from the seafarer’s home airport to the nearest airport to the ship.

The examples in chapter 4.1.2 indicate that many seafarers had no control regarding which vessel they were assigned to and consequently they perceived low levels of control over where they worked – something which in shore based industries research has been linked to adverse well-being outcomes (Lewchuk et al. 2003).

The seafarers reported that in some circumstances the joining instructions were passed from the shipping company to themselves at very late notice. For example, an AB told of how:

“They [crewing department of shipping company] tried 12 hours once and I said no way.” AB 2, ship 2.

As an individual who was permanently employed the AB felt able to refuse as he was confident that the shipping company would arrange for him to join the vessel at a later date. The AB suggested that he was particularly aggrieved by the short notice as the vessel was sailing a regular itinerary and consequently he felt that the shipping company would have been aware of the vessel's movements far in excess of twelve hours.

The short notice provided by the shipping company was in some cases perceived as a cost saving method. When asked about receiving flight details the day before flying one Second Officer responded:

"[the shipping company] have to catch the, try to catch the vessel being alongside so then that's not to spend money for the hotel and so on. It's yeah, it's normal money saving, then waiting for the ships prospects for the berthing prospects then they can arrange flights" Second Officer, ship 3.

The implication of such short notice is that shipping companies consider seafarers as available for work irrespective of the length of time notice is given prior to being expected to work. Bergmans and Gardiner (2007) suggest that being available for work is both a disposition and a capacity and the varying domestic situations experienced by seafarers result in some seafarers being more available than others. For example, a seafarer who provides childcare is likely to be less available than a seafarer who does not provide childcare.

Moreover, the notion of being available for work for seafarers is different to an individual in a shore-based occupation – since unlike shore-based workers, seafarers are leaving home and in effect putting their lives on hold for a prolonged period.

In addition to receiving little notice prior to joining a vessel some of the seafarers reported arriving at the ship in an indirect manner. For example, the majority of the seafarers from the Philippines stated that they had visited a crewing agency office immediately prior to joining. This visit to a crewing agency office enabled the seafarers to complete paperwork and other contractual requirements prior to joining a ship.

It also emerged that some seafarers arrived at a vessel after attending STCW or company specific training courses, as a field note records:

The Third Mate joined yesterday evening but left home a week ago to attend a [company name] training course (Devereux field note 2014).

Worryingly some seafarers also reported experiencing a much shorter duration at home than they had initially expected – as the following account from one of the Third Officers interviewed indicates:

“I heard originally I was supposed to be joining December 1st and then they said ‘oh we want you to join earlier’. I mean I’ve only been home for 1 month after sailing for 7 months” Third Officer, ship 2.

For those seafarers who were permanently employed their leave duration was dependent on the duration of the tour of duty worked preceding the leave period – although as will be seen in section 6.2.2 the findings indicated that mandatory tour extensions meant that such leave was not guaranteed. Other seafarers employed on a more ad hoc basis – such as those utilising single voyage contracts – had little certainty in terms of leave duration. When asked about how long he would have at home, one Wiper responded:

“Probably [a] maximum of two months” Wiper, ship 4.

It was seen that for such seafarers – particularly those from less economically developed countries – further employment was prioritised over lengthy leave periods.

Moreover, during the analysis it emerged that in some instances, seafarers were transferred directly from one ship to another. There are numerous reasons why this may happen, for example, if onboard a product tanker a chemical cargo is scheduled for carriage and a Deck Officer holds an oil endorsement but not a chemical endorsement. The seafarers indicated a transfer from one ship to another was not a welcome scenario as they must leave a vessel and work-team they had become familiar with and begin the process of adjustment and transition all over again.

Onboard one of the ships discussed here a Deck Cadet – who was onboard at the time of the fieldwork – had left the vessel a week or so previously as the vessel was scheduled to undertake a dry-docking period and a number of shore-based individuals from the shipping company were required to be onboard during the dry-docking. As the vessel did not have enough cabins to accommodate the Deck cadet and these individuals, the Deck Cadet returned home for a short period of time. The situation was explained in this manner:

“He signed on about 2 months before me but he wanted to do the dry-dock, he stayed on for that, he’s been on a long time but then he got sent home just before the dry-dock because all the cabins were full but he then managed to get back for dry-dock because someone went home with injury and now he’s still here until he gets sent home” Deck Cadet 2, ship 2.

Unusually the Deck Cadet had re-joined the vessel and consequently he was sailing two tours of duty with a leave period of just a few days between the tours. The Cadet reported that he was willing to endure the situation in order to ensure he achieved the minimum amount of sea time required to take his officer exams. Moreover, the Cadet indicated that he has prioritised returning to the familiar vessel over a longer leave period.

Thus, from the findings it was apparent that there were numerous reasons why some seafarers arrived at a vessel in an indirect manner. That a seafarer may have had other obligatory employment requirements immediately prior to joining a vessel, however, was not always obvious to other seafarers already onboard.

A further factor which was not always apparent to the seafarers already onboard was the time that a new-joining seafarer had spent travelling to the vessel. Many seafarers travelled vast distances to join a vessel and even when the flight to join a vessel was relatively short, the travel either side of the flight was sometimes extensive and resulted in many hours spent travelling, as a Chief Engineer explained:

“We usually take the [Swedish term] flight in the morning, 6 o’clock in the morning from the airport [Stockholm], you arrive at the ship, if you go to Pembroke you arrive at the ship 3 o’clock in the afternoon and then you have your reliever standing there and he want to go also” Chief Engineer, ship 4.

The seafarers perceived the shipping company to make little – if any – effort to arrange convenient and time efficient journeys. In describing his experiences regarding joining a ship one Deck Cadet said:

“It took 2 hours to get there [home airport] and then flew to Barcelona and then to Malaga. Flying time I think it took like an hour and a half to Barcelona then I had to wait I think it was about 8, 10 hours in the airport, it was a ridiculous length of time in the airport, I was just like ahhh and then from there to Malaga and then from Malaga put up in a hotel, that was about [it]. Well think I left it was about midday the flight, to Barcelona, like the first flight I got on and then I arrived in Malaga in the airport about 3 in the morning and just waited. It was a long day, I think got picked up from there [hotel] about 10 or 11 to join the ship”
Deck Cadet 1, ship 2.

Despite the excessive time spent travelling, the distance between the UK and Spain is unlikely to have resulted in the Deck Cadet experiencing jet lag. However, for a Filipino AB joining a vessel in the UK, jet lag was an issue. As he put it:

“You are adjusting your time because in the Philippines it’s different, for example for this time in the Philippines it’s time for sleep” AB, ship 3.

Thus, the responses from seafarers indicated that their experiences immediately prior to joining a vessel meant they were unlikely to arrive at a vessel feeling fresh and rested and this issue is of significance when considering risk and seafarers’ perceptions of risk at an early stage of a tour of duty. These findings also have implications for seafarers’ well-being outcomes as many of the issues considered here – such as jet lag and excessive time spent travelling to a vessel – are likely to result in fatigue, which in turn adversely impacts on an individual’s well-being.

6.1.2 Newcomer adjustment

Regardless of their use of time immediately prior to joining a vessel and whether they arrive at the ship in a direct or indirect manner all seafarers joining a vessel for the first time (as well as individuals who have not sailed onboard the vessel in the previous six months) are required to undertake familiarisation training. In accordance with the ISM Code, the MLC and STCW – as seen in the review of the literature in chapter 2.2.3 – familiarisation training is to be completed prior to any work duties being assigned. During the interviews it emerged, however, that this was rarely the case. As one Third Officer – an individual new to the shipping company as well as the vessel – explained:

“I haven’t even done any bridge equipment familiarisation yet. I mean cos tomorrow morning I’m going to get a pilotage on the way out, you know I might have to set up the bridge and of course I can’t do the AIS or any of that shit yet because I haven’t even been shown it, different radar systems, different ECDIS systems.” Third Officer, ship 2.

It was seen in chapter 4.1.1 that the familiarity of a seafarer with both the vessel and their colleagues was dependent upon the manner in which the seafarer was employed. For some seafarers joining an unfamiliar ship with unfamiliar people was perceived as being particularly difficult.

A Deck Cadet – who was at an early stage of his career at sea – identified the beginning of a tour of duty as a time of unhappiness and discontent. He explained how:

“The first week I don’t know my way around, I don’t know the people, I’m jet lagged, I’m tired, I hate it, I want to go home, I want to cry, it’s just the worst experience ever” Deck Cadet 3, ship 2.

From these comments it is apparent that new joining seafarers who were unfamiliar with the vessel and their colleagues experienced considerable stress and apprehension – which was further exacerbated by inadequate familiarisation training. Consequently, these findings imply that there was a heightened risk to seafarers' well-being when they first arrived onboard an unfamiliar vessel. This resonates with literature (see for example Axtell et al. 2002) which indicates that changes to work practices can negatively impact upon an individual's well-being. A seafarer arriving at an unfamiliar vessel with unfamiliar colleagues can be considered as an extreme example of changes to working practices and it is unsurprising that many of the seafarers interviewed perceived the beginning of a tour of duty as a period which was related to adverse well-being outcomes.

The accounts of seafarers also indicated that unfamiliarity with a ship was one reason for a perceived increase in risk in terms of personal safety at the start of a tour of duty and the following example provides a strong illustration:

"I think you're at more risk when you've just joined and you don't know things like even though I've done other ships before, coming here was a big shock I mean everything is completely different, starting on a completely new ship and I think that's the same even going between the same class of ships, so 2 ships that are exactly the same and you'll go to another ship and things will be done completely differently, things will be in different places." Deck Cadet 2, ship 2.

This association between an increase in risk and unfamiliarity has been identified by others (see for example Underhill 2007) in relation to occupational health and safety.

An unfamiliar new-joiner may also be unsettling for the seafarers already onboard. For example, many senior officers suggested that working with junior officers who were already familiar with the vessel minimised disruption to the routine onboard, as a Chief Officer explained:

"All officers more or less, 80% of them maybe is fixed back-to-back so that also mean a lot so I don't have a new guy even if it's a new third officer I cannot let him or her be alone in CCR [Cargo Control Room]... so that means a lot also, all stations have back-to-back" Chief Officer, ship 4.

A Storekeeper elaborated on the situation, describing how:

“This ship have a lot of changing [crew] the last year, lot of changing people every time. I believe that’s not a good thing [for the] company, much better to keep people who will stay for a long long time so you can work as a team. You know them, you don’t need to start from scratch again” Storekeeper, ship 1.

The accounts of seafarers who had returned to the same vessel for subsequent tours over a period of many years, suggested that for these individuals the start of a tour of duty resulted in little – if any – anxiety or worry. Among such seafarers the following account was not untypical:

“Once I unpack and that takes around an hour and once I’ve done the handover, after 8 years you just click back in. If it was joining a new ship different answer” Captain, ship 2.

The ability to simply ‘click back in’ and easily settle in and adjust to the routine of life onboard resulted in substantial differences in perceptions of risk – both in terms of safety and well-being – at the start of a tour of duty depending on the seafarer’s familiarity with the vessel. It emerged that those seafarers with vast amounts of sea-going experience onboard a familiar ship found it much easier in comparison to those who were unfamiliar, as one Captain explained:

“I’ve been home and I come onboard the first day it feels like I have been here so it is not so much difference no, not for me. For other people they are new onboard, they’ve not been on the ship before of course the beginning if you’re new on a ship in the beginning it takes time to adopt everything that you need to for safety” Captain, ship 4.

Moreover, all seafarers, regardless of their familiarity, needed to adjust to the routine of life onboard which – as it was seen in chapter 4.1.2 – included shift work and night work. One Bosun explained:

“It’s just about getting back into a routine, getting your body clock used to it.”
Bosun, ship 1.

While a First Officer elaborated on the situation, describing how:

“[The] first two days are quite tough, later on you change your body, the body just adjusts for this time, change watches and times of work.” First Officer, ship 1.

This combination of adjusting to the routine of life onboard and tiredness from travelling to the vessel resulted in increased levels of perceived fatigue at an early stage of a tour of duty and the following account was not untypical:

“For me the first week I’m always really tired and like I always ache and stuff and then after that I’m alright” Fourth Engineer, ship 2.

This is akin to Wadsworth et al.’s (2006) observations in which seafarers were found to become increasingly fatigued over their first week onboard before reaching a ceiling and remaining at this level of fatigue for the remainder of the tour of duty.

Moreover, whilst some of the seafarers stated that their working routine remained consistent throughout their tour of duty, others reported that their routine altered monthly. The altering of seafarers’ working routine is a concern as in a study of offshore oil installation workers Parkes (2007) revealed that individuals were at an increased risk of personal injury when switching shift patterns during a tour of duty. Despite this increase in risk, altering their shift patterns during a tour of duty was preferred by offshore oil installation workers (Parkes 2007). Similarly, throughout the interviews it became apparent that there were several reasons why some seafarers preferred to change their working routine during a tour of duty and many of these were dependent upon the individual seafarer’s personal preferences as well as the vessel’s trading pattern.

Although some individuals altered their working routine at various points throughout a tour of duty, the adjustment at the start of a tour of duty was considered by the seafarers to be the most substantial. When joining a ship the seafarers transitioned from an extended period at home to a demanding physical and psychosocial environment. This led a Second Engineer to describe being onboard a ship as a situation requiring more mental and physical strength. As he put it:

“At the beginning of your trip the first few days you’re just wandering around scratching your head. I was saying to [seafarer’s name] actually when he joined he was trying to undo a bolt and he was just messing around with it and I was like just give it here and he was yeah sorry and he was saying he forgets you need ship’s strength. It means that when you go home you go a bit soft and you forget how hard things have to be beasted whereas so in the first few days I’d say you’re a bit soft and then you get into it” Second Engineer, ship 2.

The transition into life onboard required the seafarers to subscribe to the rules and regulations of the vessel – regardless of how they carry out similar tasks whilst at home. The following example provides a strong illustration:

“The start of the trip ... its getting yourself into work mode whereas you might do something at home – I’ll give you a prime example, going up a ladder to put lights up at Christmas, whereas at home you’ll just get the ladder out, get the lights up and get down again – when you get back onboard here, you’ve got to start thinking about safety harnesses, are the ladders in date, about this, about that, you’ve got to switch back into your safety mode as such” Bosun, ship 1.

The notion that seafarers’ transition from home mode to work mode is important – particularly as seafarers perceived that the switch was not instant and a period of time to readjust is required. The Bosun again explained:

“You’re just getting back into it, you’ve had 5 weeks off of possibly doing nothing, playing golf, getting drunk and then you’re back to no alcohol, no free time as such and that’s it so you’re well, I would liken it to prison but it’s not, you’ve gone from being able to do anything you want to this is what you’ve got to do so yeah probably say 3 or 4 days to a week to sort of get into it” Bosun, ship 1.

Perhaps due to the accepted notion that the switch from home mode to work mode was not instant, it was notable that some of the seafarers interviewed reported utilising unofficial working routines in order to ease the burden on new joining seafarers. For example, when asked about procedures regarding new joining members of the engine department, a Chief Engineer explained:

“If you have bad luck when you join the ship you can be on duty but unofficially we do this that this one who’s joining he’s never on duty so let’s say the Second [Engineer] will take his first night yeah, or let’s say on this night I was not on duty because it was the duty of the Second Engineer but we had a crew change and they just arrived in the evening so I said, well this has become normal practice, take a rest, I will take the duty until 0800” Chief Engineer, ship 3.

Thus, it emerged that instead of the official procedure regarding on call engineering officers – as detailed in chapter 4.1.2 – which required individuals to take turns to be on call during periods when the engine room was unattended an unofficial system, which was considered normal practice, was in place.

New joining seafarers from other work departments faced similar issues and during an interview a Chief Officer commented that:

“The Captain used to plan that quite good so sometimes if I join the ship direct then I can sleep to the morning or something so he will arrange that, so far he have handled it really good, if I have been awake from early morning because of the flight and I arrive in the evening then more or less he would have started up everything and I can rest and start in the morning” Chief Officer, ship 4.

The importance of such unofficial procedures is made even more evident when remembering that the transition to life onboard must occur alongside carrying out work duties in a safety critical environment. As a Chief Engineer put it:

“[It’s] full ahead from day one” Chief Engineer, ship 4.

Undoubtedly, some of these work duties which must be carried out regardless of when an individual joined the ship carry immense responsibility and – particularly for senior officers – not being ready for such responsibility was simply not an option.

From these comments it is apparent that for the participants the need to transition and adjust to life onboard is a process which requires the understanding and cooperation of those seafarers already onboard. If such cooperation is not forthcoming the safety and well-being of seafarers is likely to be negatively affected.

6.2 The end of a tour of duty

When considering the health, safety and well-being experiences of seafarers in relation to the organisation of work at sea the end of tour of duty is a particularly important period of time as, just like the start of a tour, the end of a tour is also a period in which seafarers' change, transition and adjust. During the interviews it was apparent that throughout a tour of duty the seafarers were thinking of home and the family and friends awaiting their return. Towards the end of a tour of duty many seafarers eagerly anticipated the day they would leave the vessel and return home to the life they had, in effect, left 'on hold'.

6.2.1 Time preceding the end of a tour of duty

Just like the time preceding the start of a tour of duty it is also important to consider seafarers use of time immediately preceding the end of a tour of duty. Whilst seafarers must work every day they are at sea – regardless of how close they are to the end of their tour of duty – the accounts of some seafarers suggested that there was a change in the nature of the work undertaken at a late stage of a deployment. As one Chief Engineer explained:

“Towards the end I’m doing more paperwork, trying to catch up with stuff rather than physical stuff in the engine room. I’m down in the engine room walking around looking at things, towards the end I ease off a wee bit as far as the physical works concerned....my last week of my trip is a quieter time for me but it’s still work but its different work for me” Chief Engineer, ship 2.

The increase in paperwork and decrease in manual work experienced by seafarers towards the end of a tour of duty was particularly apparent among officers. Whilst this may be the result of officers' autonomy in terms of controlling work routines what emerges on careful consideration of the data is that officers likely felt obliged to catch up on paperwork prior to leaving the vessel. Consequently, this change in working practices may simply be the result of different requirements for officers, for example, compiling handover documents at the end of a tour.¹⁸

¹⁸ Unlike officers, ratings are generally not responsible for any paperwork or records and do not write handover notes.

During the interviews it was suggested this change in working practices may also be due to the fact that the initial energy and enthusiasm to solve problems and make improvements wanes as time onboard progresses. One Chief Officer explained:

“[When I] come onboard I have a lot of energy I have been at home for long time you know then you start up different kind of maintenance work, solve problems. In the end you put everything on paper” Chief Officer, ship 4.

Moreover, seafarers reported that the intensity of work differed towards the end of a tour of duty. For some seafarers, this difference was a reduction in work undertaken – in comparison to other periods of time within a tour of duty, as one First Officer explained:

“I did everything ahead, looking ahead to be prepared to not leave too much work on my last days, to get proper rest before home” First Officer, ship 1.

Conversely for others the time preceding the end of a tour of duty was a period in which they worked harder than usual, as the following account illustrates:

“[I] try to clear off everything I’ve postponed for the last 6 weeks. More and more work at the end, last week is horrible, then you read your handover notes from the previous guy and oh shit I didn’t do that, oh that I forgot, oh shit, oh my god yeah and then you have to settle your account, clear out what you have started and so on so there’s always more to do at the end. The closer you get to signing off, the more you have to do, the more you have to wrap up and so on” Chief Engineer, ship 4.

Similarly, another seafarer explained that:

“[The] last few days I’m normally busy trying to tie every job up if you know what I mean, last 2 weeks I’m trying to make everything, I’m writing my handover notes and making sure all the jobs are finished so if anything the last 2 weeks I do more work to make sure everything’s finished” Fourth Engineer, ship 2.

As previously stated, whilst officers reported a change in working practices towards the end of a deployment and ratings did not, the same findings emerged with regards to work intensity. For example, when asked about his own working practices and work intensity in relation to temporal factors, one rating responded:

“For me it doesn’t matter if it’s the first, second or third week cos the same job. We know what we have to do” AB 2, ship 1.

The accounts of officers, however, suggested that they perceived a difference in the work intensity of ratings as they were approaching the end of their tours of duty. One Chief Engineer explained:

“You see in the way they [the ratings] work, it’s more slowly and more slowly, you can see that. They get more and more tired. You can see if you go down in the crew day room 8 o’clock in the evening is usually empty because they’re all gone to sleep. The longer they’ve been onboard the more time they spend in their cabin” Chief Engineer, ship 4.

Similarly, a Chief Officer stated:

“They don’t violate the rest hour or something but it’s a big difference from when they come onboard of course” Chief Officer, ship 4.

The Chief Engineer perceived the ratings’ work intensity to decrease as they approached the end of their tour of duty as a result of cumulative fatigue and there is a tacit understanding of the same in the comment made by the Chief Officer. The Chief Officer went on to explain how he perceived this cumulative fatigue related to risk in terms of both personal safety and well-being:

“The longer you stay onboard of course the risk will increase, you will get tireder and tireder. Normally work 60 hours a week, mixed night a day time it’s a lot, sometimes 70 hours a week and then you work day and night time that’s quite much in my opinion if you work day and night mixed you should not work more than 60 hours a week and in this busy trading area I think 4 or 5 weeks then it’s going down. The last week you are a little bit tired you get rested and you don’t violate your rest hours but it’s about to keep the ambition up and everything” Chief Officer, ship 4.

The idea that prolonged working routines can cause an increase in risk with regards to occupational safety has been identified by others in relation to consecutive shift patterns for night-shift workers (see for example Folkard 2000).

Among the seafarers a perceived increase in risk in terms of safety towards the end of a deployment was not untypical:

“Probably the when you look for the statistic probably the likelihood will increase close to the end of the contract” First Officer, ship 1.

Moreover, the accounts of some seafarers suggested that this perception of an increase in risk to both well-being and safety was – as well as the result of cumulative fatigue – also a consequence of individuals experiencing the ‘channels’¹⁹. As one Captain explained:

“You have to be careful when they [ratings] start to get in the end of 6 months, then they are already home some of them in the head. I mean when they are in the end of the contract they are maybe not so concentrated anymore because they are their mind they’re thinking about home all the time, planning everything so when crew are in the last part of the contract supervisors have to be little bit aware of that situation” Captain, ship 4.

Similarly, another Captain suggested that he was able to notice when seafarers were experiencing this mind-set as they neared the end of their tours of duty:

“You can tell when people have the channels but I don’t consider it hugely necessary to be supervising them more because I don’t think that it makes a huge amount of difference again in their attitude to safety. I’m sure it has some effect but not enough to worry me” Captain, ship 2.

Seafarers’ experiences regarding the end of a tour of duty also included uncertainty and frustration due to not knowing the date when they would leave the ship. One Chief Engineer illustrated the effect this uncertainty has on individuals:

¹⁹ The ‘channels’ – as explained in chapter 2.2.3 is a phrase used among British seafarers to describe the time period at the end of a tour. The name refers to the fact that historically British seafarers left the ship when the vessel returned to the UK and as such sailing in the Dover channel signalled the impending end of a tour.

“They will go to the captain ‘any news on my reliever?’ ‘ah no not yet’. Then they’ll start thinking about that, sometimes they, I can see they’re standing on deck watch, they’ve been onboard for 5 months, he’s just standing on the manifold and staring at something, dreaming of his home in Manila or something” Chief Engineer, ship 4.

Likewise, when asked about when he would be going home one Deck Cadet responded:

“Another month I think, fingers crossed mid-December I’m signing off” Deck Cadet 2, ship 2.

The Deck Cadet went on to explain how he had estimated when he would be leaving the ship:

“We’re meant to be, I think Gibraltar for bunkers is meant to be about the 14th 16th December and that’s when they’re going to be doing a big crew change so I’m just going to say that they don’t need me on so I’m just going to go with that one so that’s not too bad” Deck Cadet 2, ship 2.

As an individual who was not required onboard as part of safe manning regulations the Deck Cadet felt he had a good chance of leaving the ship during a pre-planned crew change. Whilst some seafarers considered such uncertainty as ‘part of the job’ it raises an interesting issue with regards to seafarers’ perceptions of job control and the impact this has on their well-being. It could be argued that uncertainty regarding when they will leave the vessel is an example of a substantial lack of job control and viewed in light of Karasek’s (1979) findings it is unsurprising that such uncertainty was not perceived by all as ‘part of the job’ and for many seafarers it adversely impacted on their well-being.

The uncertainty was further compounded by the issue that, like the notice seafarers received when joining a vessel as outlined in section 6.1.1, information regarding a seafarer leaving a vessel was often given at short notice. During one interview it emerged that the Chief Cook was expecting to go home imminently and when asked if he would be leaving in the next port he responded:

“No information, maybe yes, maybe no, maybe I’m coming home from Pembroke [tomorrow], change from Pembroke but I don’t know” Chief Cook, ship 3.

Irrespective of when they received details regarding departing a vessel, a change in circumstances could result in a seafarer remaining onboard – regardless of the seafarer’s plans and expectations and during the interviews one First Officer remembered the last-minute postponement of his departure from a vessel:

“I got the situation on the helideck with my bag on the back and my reliever haven’t been in there, in the chopper so I had to come back and spent 5 days longer on the vessel, to wait for my reliever and I couldn’t focus on the job, what I’m doing you know. I was thinking only about to go to home, I don’t care about the job, I didn’t care about my watch. Okay only my body been on the watch but I say I didn’t think clearly, of course you are trying to do it safely but this is quite dangerous” First Officer, ship 1.

It is easy to see why in these circumstances the First Officer had lost interest in his work. Having worked every day for a prolonged period he had packed his suitcase and then had to watch a helicopter depart that he had fully expected to be on. Another seafarer put it succinctly when – during an informal conversation at dinner – he referred to a similar experience as the ‘postponement of Christmas’.

From such comments it is apparent that the uncertainty regarding leaving a vessel caused considerable amounts of frustration and dissatisfaction amongst seafarers and the unsettling effect of such uncertainty adversely affected their well-being. Worryingly, such uncertainty and the postponing of leaving a vessel was seen to be commonplace and the following section presents findings regarding the experiences of seafarers who remained onboard for longer than expected.

6.2.2 Tour of duty extensions

First, it is important to note that not all tour extensions were viewed negatively. For some seafarers, particularly those from less economically developed countries who were employed on an ad hoc basis – as explained in chapter 4.1.2 – the opportunity to remain onboard a vessel was welcomed. Whilst they may not have relished staying onboard for longer than originally anticipated, for such seafarers the prospect of the additional salary earned by working a tour extension is too good to turn down. As one Chief Engineer explained:

“Some people don’t want to go home, they come when they have 4 months left of the contract they come and they say ‘extension’. They want to extend 1 to 2 months or something” Chief Engineer, ship 4.

Clearly, these requested tour extensions are very different to mandatory tour extensions and in this section tour extensions will be considered to be events in which seafarers were mandatorily required to remain onboard longer than they had expected and there are a number of reasons why such circumstances may arise.

As outlined in chapter 2.2.3, if a vessel is deep sea it may be several weeks before a port is reached where a seafarer can disembark. In some circumstances the port might not be suitable for a seafarer to travel home from. This might be because the port is in an area which lacks infrastructure or it may be in a country which is deemed unsafe. In some countries the debarkation of seafarers is not permitted and in others a seafarer may require a visa which they may be unable to obtain. The accounts of the seafarers suggested that in situations such as these – whereby the circumstances were beyond the control of the shipping company – remaining onboard a vessel for longer than expected was ‘part of the job’. As one Third Officer explained:

“Most of the time you’re over but you can’t blame it on the company because you know like this Ukraine Russia [war in Crimea peninsula] thing that was beyond their control and there’s other things like to do with the trading route of the ship you know if you’ve got a 3 week voyage out somewhere obviously if you’ve only got 1 week left you’re going to be 2 weeks late, you’re not going to be relieved on time” Third Officer, ship 2.

However, the experiences of seafarers suggested that mandatory tour extensions were often used by shipping companies as a cost saving measure. Seafarers conveyed a strong message that – particularly in circumstances which could have been controlled by the shipping company – mandatory tour extensions were a great source of frustration and annoyance and something which negatively affected their well-being. One AB stated:

“I think getting relieved on time is very very important, I think it’s probably the top thing. That’s what really cheeses people off when they’re not being relieved on time and you’re in the vicinity, say in the Med or round Europe you know where they’ve got the time and the chance to do it, it’s still really really poor” AB 2, ship 2.

In some instances, seafarers worked mandatory tour extensions simply because the shipping company had not provided a relief on time. As one Chief Engineer explained:

“The Manila office where the Filipino crew are not the fastest processors in the world so sometimes it take time for them to process the new crew members from out there, then they’re delayed and they have to stay 2 weeks more or 1 week more and so on” Chief Engineer, ship 4.

In a study of the global seafaring labour market Leong (2012) suggested that shipping companies extended seafarers tours of duty to overcome labour shortages.

Moreover, mandatory tour extensions also serve to reduce costs for those who employ seafarers. On one of the ships discussed here, the shipping company had recently implemented a policy which limited the number of crew changes which occurred each month. This policy resulted in joining and leaving the vessel in groups rather than individually and thereby costs – such as agents’ fees – were reduced. Consequently, the leaving of a seafarer who was scheduled to leave the vessel was postponed until a number of others onboard were also scheduled to leave the vessel – thereby resulting in a group debarkation being undertaken. This policy was seen to be particularly unpopular and one Chief Engineer explained how – in practice – he paid little attention to the policy.

“We have a policy from [company name] that we’re only allowed to make 2 crew changes per month but they are coming to [realise] that it doesn’t work. Yeah they’re trying to relax it, officially they say we don’t relax anything but unofficially okay they try to relax a little bit as long as they are so cost focused that’s the only thing they’re bothered about” Chief Engineer, ship 4.

Thus, the nuances in the responses from the seafarers indicate that they perceived those who controlled their labour to view them as a commodity. The shipping company was viewed as being interested only in operating the vessel as cheaply as possible with little – if any – regard for the well-being of the seafarers. A First Officer put it succinctly when he stated:

“They [the shipping company] don’t care they need only the head to cover the position, that’s all it not depends if I’m here and I work for almost one and a half years in here or someone new will come and cover the position, they don’t care” First Officer, ship 1.

Whilst to the seafarer this expected date to leave the vessel became a fixed focal point – to the shipping company it was merely a guideline. During the analysis of the quantitative data it emerged that mandatory tour extensions were considered differently by the three shipping companies. For example, the tanker company – whose injury dataset was analysed in chapter five – considered a seafarer to be ‘over tour’ only once the expected end of tour date was exceeded by more than one month. Similarly, the offshore vessels injury dataset – again, which was analysed in chapter five – was as follows:

- *“[Over tour] payment would be triggered once a relief had been delayed by more than 4 days over the normal tour rotation which is: -*
North Sea 35 days
- *Counting of days will commence from the hour/date signed on vessel’s agreement.*
- *Once 4 days are exceeded the person’s leave rate will be increased to 1.5 days per day backdated to the original relief date.*
- *This payment would not be triggered if the delay in the relief is due to any of the following circumstances:*

1. *Prior previous personal arrangements*
2. *Periods outside vessel's normal operations i.e. transit voyages and refit periods.*

- *Assuming the delay is not excessive i.e. more than 14 days the staff member will be expected to re-join on their normal crew change day.”*

This policy provides several details which are important to highlight. First – in the eyes of the shipping company – a seafarer is not considered to be over-tour unless they have been delayed by more than four days, a time period which is greater than ten percent of their expected tour of duty duration.

Second, periods of time not considered to be part of normal vessel operations are not recognised as over-tour. Consequently, seafarers who must remain onboard, for example when the vessel sails from one oil field to another, may not go home on the date they expected yet in the shipping company's eyes they are not over-tour.

Finally – and perhaps most worryingly – only delays in excess of two weeks will alter the date on which the seafarer is required to re-join the vessel. For example, if a seafarer with a thirty-five-day tour of duty remained onboard for forty-eight days, instead of thirty-five days leave they would receive only twenty-two days. This scenario would result in a two weeks' reduction in the time the seafarer spent at home resting and recovering from the intense period of work they had undertaken – as well as substantially decreasing the time they were able to spend with their family and friends.

Throughout this chapter – and chapter four – findings regarding the adverse impact a lack of job control has on the well-being of seafarers have been presented and mandatory tour extensions are yet another example of seafarers' lack of job control which was seen to negatively affect well-being outcomes. For example, as one Second Engineer stated:

“I think some of the boys do get a bit shanghaied, the crew all the time they are doing longer trips. If you can get any of them to speak to you you'll find out, but they're all miserable as fuck because of it” Second Engineer, ship 2.

The impact of mandatory tour extensions on a seafarer's morale has been identified by others and in her book George (2013, p.6) stated: "The grump is Igor, second officer, deck, and misery is his default setting because he had been meant to go home weeks earlier so exudes his frustration in his face".

From the accounts of seafarers it was also apparent that the impact upon a seafarer's morale adversely affected the individual whose responsibility it was to inform the seafarer that they must remain onboard for longer than they expected. As one Admin Officer explained:

"The people expecting to go home after a few days but then there's no back-to-back or they cannot go home then they're going to get mad. Of course they get furious 'I got holidays booked' and blah blah blah, but what can we do?" Admin Officer, ship 1.

Whilst this study has not included the experiences of the families and friends awaiting the seafarer's arrival home, the accounts of seafarers suggested that such individuals were also negatively affected in instances when a seafarer was required to remain onboard. One Third Officer remembered that:

"There was another guy on there, Second Mate, his wife was going to give birth or whatever, I mean he was saying 'I want to go home, my wife's about to give birth' and what not and he missed the birth and he was pissed off about that" Third Officer, ship 2.

The negative impact upon a seafarer's family in such circumstances was perceived to place further burden on the seafarer, as one Storekeeper explained:

"My kids are grown up, my wife is home and she has no problem to be alone she said she like to be alone sometimes so that's not a problem but I can see the young people here they are crazy if they have to stay 2 days extra because wives start and they have small kids and they're expecting them home" Storekeeper, ship 1.

The mandatory tour extensions experienced by seafarers were also perceived to adversely impact upon safety. As one Chief Engineer stated:

“I would say if you felt that your time was dragging, say for example, well the crew for example they have a 3-month trip and then sometimes they can't get a relief for another month, then that's a bit much you know that's a quarter of your trip again. If they were asking me after my 10 weeks to do an extra month I wouldn't be happy about it, I can see the point of them kind of pulling back on the throttle a little where work and stuff like that is concerned maybe for them there might be a bit of carelessness comes in, or apathy if you like about having to do some extra time that they didn't plan on doing you know I would say that there's a possibility there [of increased risk]” Chief Engineer, ship 2.

A perceived increase in risk to safety during mandatory tour extensions has been identified by others. A Captain cited in Knudsen (2009, p.300) stated: “If I have an able seaman whose wife is about to divorce; if he has just recovered from a flu, or maybe he has been aboard one month longer than he should, then you can feel he is tired; and it may be more dangerous than if he was well”.

Similarly, one Second Officer remembered an incident which occurred whilst she was undertaking a mandatory tour extension. She explained:

“Instead of printing out information regarding river Tyne, I have printed out information regarding river Tees. I have noticed that the VHF channels which we were supposed to use on approach and which I listed on the passage plan did not coincide with the VHF channels given in Volume 6. I assumed I have got the channels wrong in the first instance and corrected them. I did not realise that at that point I was using pages regarding river Tees. A few days after the Captain took the printed pages from the ALRS publication and used them to get the phone number to book the pilots. He called the port authorities but they advised him that the berth he is trying to get to does not exist on the river Tees and that also his agent never been in touch with Port Authorities. The Captain then realised then that the information given on the printed pages were for River Tees. At the time when I made the mistake I must have spent onboard more than 5 weeks. I was feeling tired and ready to go home. I was finding it difficult to concentrate and the fact that I was unsure of when exactly I will be signing off was making me very anxious” Second Officer, ship 1.

From these comments it is apparent that mandatory tour extensions were perceived to negatively impact on occupational safety outcomes as well as seafarers' well-being. It is important to note, however, that there is no heuristic available to translate, for example a seafarer staying an extra month more than expected onboard, into an occupational safety consequence.

The perceived increase in risk in terms of both safety and well-being appeared to be a consequence of the seafarer remaining onboard for longer than expected – rather than because the duration of the tour of duty was greater. As one First Officer explained:

“When you came and you know you need to do 6 weeks it’s you know you prepare yourself looking for the calendar that okay end of the month you will be at home yeah but other things you are coming and middle of the month you will be at home and then someone is telling you you need to stay longer. Then you are not thinking about the job you are thinking only to finish your trip and not that the job needs to be done. Of course you are doing everything but the way of the thinking has changed rapidly” First Officer, ship 1.

It also emerged that remaining onboard for longer than expected resulted in the individual being unable to pace their work effort. The effect of work effort pacing has been identified by others (see for example Duchon et al. 1997) in relation to moderation of work efforts across extended work shifts. Duchon et al. (1997) suggested that individuals are able to offset the impact of additional fatigue resulting from extended work shifts by pacing their work effort across the expected shift length. Such work effort pacing is not possible for seafarers who do not know how long their tour of duty, and therefore their work effort, will last.

Finally, when considering these findings regarding mandatory tour extensions it should be noted that during the interviews it emerged that many seafarers considered talking about their experiences regarding mandatory tour extensions as speaking negatively of the shipping company. Consequently, among ratings there was much reluctance in saying that they had remained onboard for longer than they expected and when an inquiry was made as to why the officers onboard one of the ships visited had not always gone home on time but the ratings said they had, the Chief Engineer replied:

“I never heard about a rating coming home on time. When you interview them they will say yes of course, they will be shit scared” Chief Engineer, ship 4.

This finding likely relates to the issue that the ratings were precariously employed (as seen in chapter 4.1.1) and consequently were reluctant to express any opinions which they perceived might jeopardise their ability to secure future employment. It is also worth remembering that these findings represent the better end of the seafaring industry and it is possible that the prevalence of mandatory tour extensions is even greater among other shipping companies.

6.3 Summary

The findings presented in this chapter indicate how both the early and late stages of a tour of duty were experienced by seafarers. In doing so this chapter identifies a number of factors – such as mandatory tour extensions – as being related to job control and variations in power held by seafarers in different work and employment situations, as well as variations in the balance of power held by seafarers and the companies employing them. Importantly, those with more power were seen to be able to mitigate some of the adverse features of the organisation of work and employment at sea.

At the beginning of a tour of duty seafarers commenced working immediately upon joining the vessel, regardless of the time they spent travelling to the vessel and irrespective of whether they were experiencing jet lag. Findings regarding rest upon joining a vessel corroborate those of Wadsworth et al. (2008) in which 66% of questionnaire respondents reported that they did not have the opportunity to sleep between travelling to a ship and beginning work onboard. Viewed in light of findings which indicate that many seafarers were unfamiliar with the vessel, their colleagues, or even both, the start of a tour of duty is a particular concern in terms of health, safety and well-being outcomes. Unsurprisingly, the seafarers themselves perceived an increase in risk – particularly in terms of personal safety – at the start of a deployment. The study, however, found that as they were unable to delay commencing work when joining a vessel some of the seafarers who experienced more power had devised various informal and unofficial procedures to try and alleviate the problems experienced as a result of these employment and work organisational practices of the companies employing them.

When exploring the end stages of a tour of duty the findings in this chapter also indicated that some seafarers – particularly officers – altered their working practices at a late stage of a tour of duty. In particular, changes from manual work to paperwork, as well as differences in work intensity were reported and such findings indicate that some seafarers experienced a degree of job control. Given that paperwork is inherently safer than manual work, this finding may also help to explain why the analysis of the shipping companies' injury data in chapter five revealed that among seafarers onboard offshore vessels the last week of a five-week tour was the safest.

Some seafarers, however, especially those lower in the onboard hierarchy, experienced less control and had little – if any – scope to alter their working practices. Thus the overarching findings indicate that the degree to which seafarers perceived they could control where, when and how they worked varied substantially with both employment arrangements and rank. These variations impacted on seafarers' well-being outcomes and those seafarers who experienced more power and job control – such as those senior officers who were permanently employed – experienced greater levels of well-being.

In the following discussion chapter the findings identified in this and the previous two chapters will be developed further.

CHAPTER SEVEN: DISCUSSION

7.0 Introduction

This chapter discusses key findings of the research that were presented in previous chapters and examines their contribution to addressing the research questions posed in the study. It therefore presents a sociological understanding of particular aspects of the effects of the organisation and relations of work and employment experienced by seafarers and shows how they impact upon the health, safety and well-being of individuals working at sea. To achieve this, the chapter is arranged into five main themes.

The first section of this chapter discusses the exploitation of the seafaring labour force. One of the ways in which the seafarers in this study were exploited was through the use of precarious employment methods and such methods are intrinsic to the ways in which employment at sea is organised. The organising of employment in this way served to increase seafarers' vulnerability – for example, with seafarers joining vessels irrespective of the rest and restoration period they had experienced beforehand, which previous chapters argued had implications for their health, safety and well-being.

In the second section the heterogeneity of the seafaring labour force is discussed. In chapter five it was seen that – in terms of the recording of occupational injuries – the three shipping companies treated seafarers as a homogenous labour force. It was apparent from the analysis in chapters four and six however, that some seafarers had more power to protect themselves from some of the adverse features of the organisation of work at sea than others, and that this had very significant implications for their occupational health, safety and wellbeing.

Relatedly, the third section considers seafarers' control over deployment scheduling. In doing so it identifies a further aspect of the organisation of work and employment at sea which was revealed to result in substantial variations in power – and ensuing inequalities – among the seafaring labour force.

The theme of job control continues in the fourth section, where issues regarding seafarers' job control whilst at sea are discussed. Job control was revealed to be an important aspect of the organisation of work at sea, not least because seafarers live as well as work in the workplace and consequently can be called upon at any time to under-take work. Levels of job control were found to vary considerably among with seafarers' work and employment situations, and substantial inequalities were apparent among the seafaring labour force. Such inequalities are important when exploring the impact that the organisation of work and employment at sea has on the health, safety and well-being of seafarers, as those who were afforded greater levels of power were found to be able to mitigate some of the adverse features of the organisation of work and employment at sea.

In the final section the flexibility of the seafaring labour force is discussed. During the analysis it was apparent that the organisation of employment at sea resulted in a flexible labour force with some seafarers being deployed on unfamiliar ships and even on unfamiliar types of ships. Again, the organising of the seafaring labour force in this way was seen to impact on the health, safety and well-being of those who work at sea.

In discussing the health, safety and well-being consequences of features of the organisation of work and employment at sea, this chapter also shows how they are manifestations of underlying issues of labour market power in a deregulated global industry. Such deregulation – combined with the relatively limited influence of trade unions – has substantially weakened the position of labour in the seafaring industry. Exploring seafarers' health, safety and well-being in relation to the organisation of work and employment at sea, this chapter helps to provide a better understanding of the lived consequences of these features of employment in a global industry.

7.1 Exploitation of the seafaring labour force

There were a number of underlying issues regarding the organisation of work and employment at sea which appear to relate to the exploitation of the seafaring labour force, which emerged in the qualitative findings. For example, throughout the analysis issues surrounding the use of precarious employment practices and the associated vulnerability of seafarers who were precariously employed were identified. Research (see for example Quinlan 1999) has shown that such employment practices have implications for workers' health, safety and well-being. Thus, precarious employment and the vulnerability of seafarers are the themes that begin the discussion in this section. The section goes on to consider fatigue as a consequence of the exploitation of labour in the seafaring industry.

7.1.1 Precarious employment

The employment of many seafarers falls within the definition of precarious employment, as presented in the review of the literature in chapter one, and categorised by: "the limited duration of the contract (fixed-term, short-term, temporary, seasonal, day-labour and casual labour) and the nature of the employment relationship (triangular and disguised employment relationships, bogus self-employment, subcontracting and agency contracts) (ILO 2011[online])." These working arrangements are often characterised by four working conditions: "low wage, poor protection from termination of employment, lack of access to social protection and benefits usually associated with full-time standard employment and lack of or limited access of workers to exercise their rights at work" (ILO 2011 [online]).

The findings from this study showed the majority of the seafarers were employed on single voyage contracts and, in recent years, research has consistently shown seafarers to be predominantly precariously employed in this way (see for example Kahveci and Nichols 2006).

The prevalence of precarious employment has been shown – by studies in a number of shore-based industries – to adversely impact on the health, safety and well-being of workers. Quinlan (1999) suggested that precarious employment exacerbates disorganisation in the workplace and as a consequence workers are subjected to market forces that are unfiltered and occupational health and safety issues are subordinated to these. He showed through a review of previous studies that changes in the employment structure from permanent employment to various forms of precarious employment resulted in individuals experiencing uncertainty regarding their future employment. Thus, in such conditions whereby individuals prioritise ways to secure future employment, their working conditions are likely to deteriorate.

Precarious employment adversely impacted on the health, safety and well-being of seafarers in this study in a number of ways. First, shipping companies operate with very little involvement or commitment towards any particular group of seafarers – as from a regulatory perspective a shipping company simply needs to ensure the correct number of seafarers with the correct certification is onboard. Therefore, as Walters and Bailey (2013, p.92) state: “the need to ensure the supply of the required number of certificated individuals can conveniently be outsourced to a third party.” This has taken place on an enormous scale in the seafaring industry, especially since the flagging out of vessels. Its effects on the social relations of work at sea are extensive and really have no comparable parallels in land-based industry — but, as far as can be judged from the (almost entirely land-based) literature on precarious work, the precarity of employment for seafarers that results from this mimics many of the negative effects discussed in the land-based literature. For example, chapter 4.1.2 showed seafarers were routinely deployed by manning agencies to different shipping companies and different types of vessels. Implications of the resulting specific workplace unfamiliarity in relation to health, safety and well-being will be discussed in section 7.5.1 of this chapter. It also emerged that those seafarers who were precariously employed experienced earnings uncertainty and, as will become clear as this chapter progresses, for many seafarers earnings uncertainty resulted in less than ideal employment being accepted.

Moreover, in their land-based study, Lewchuk et al. (2003) considered earnings uncertainty, such as that experienced by the seafarers in this study, as one component of employment strain. The employment strain model – as presented in chapter one – suggests that workers engaged in precarious employment face risks that are a product of the insecurity of their employment (Lewchuk et al. 2003). Thus, employment strain captures a dimension of an individual's work experience that is independent from their experience with any one workplace.

Furthermore, literature regarding shore-based workers who are precariously employed and are engaged in work at multiple workplaces (see for example Fitzpatrick and Neis 2015) has revealed that these workers experience a number of work-related health, safety and well-being issues which are associated with working in transient and multiple workplaces. This has salience in relation to seafarers who – as will be discussed further in section 7.5.1 – tend to be deployed to different vessels for subsequent tours of duty, and thus experience multiple workplaces.

7.1.2 Seafarers vulnerability

One particularly interesting way in which precarious employment – and the ensuing earnings uncertainty – was seen in this study to adversely impact on seafarers was that seafarers joined vessels irrespective of the rest and restoration period they had experienced beforehand. One seafarer interviewed had spent at least ten months, out of the preceding twelve months, at sea. This study likely accessed the better end of the seafaring industry and consequently it is perhaps unsurprising that this scenario is by no means exclusive to the seafarers interviewed in this study. Walters and Bailey (2013, p. 95) stated: “it is also well recognised within the industry, that due to pressure from crewing agencies, after completing a nine-month contract, it is not uncommon for seafarers to return to work after just a month of leave, thus contributing to fatigue.” This pressure from crewing agencies is especially prevalent in new labour supply countries and in such countries where seafarers are acutely aware of the ease with which they can be blacklisted by manning agencies and denied future employment (Sampson 2013). It is particularly concerning that seafarers are not protected from these pressures.

To understand why this is so, it is necessary to consider the regulating capacity – and perhaps more significantly, the regulating appetite – of the seafaring industry. Prior to the 1980's domestic seafaring labour markets were, in part, protected by national regulations. However, the widespread use of open registries in the 1980's and onwards, deregulated these national seafaring labour markets, and this global deregulation resulted in ship owners acquiring considerable influence – influence that had previously been kerbed by national regulations.

Such deregulation was the consequence of the widespread uptake of ship owners registering their tonnage to open registers. These open registers enabled ship owners to recruit from a global labour pool and as such internationally recruited seafarers from low-cost developing countries were recruited on single voyage contracts, with reduced wages and poor employment terms and conditions. The exploitation of labour in this manner is perhaps unsurprising given that the industry is particularly vulnerable to wide fluctuations in freight rates and with many of the operating costs fixed, a cost efficiency logic has been to seek ways in which to reduce labour costs.

Moreover, a consequence of open registers – and the resulting lack of overlap between the ship registry, the nationalities of the owners and the seafarers working onboard – has been the weakening of the influence of trade unions. In the context of the physical separation brought about by open registers, national trade unions are inadequately equipped to defend their members' interests (Kahveci and Nichols 2006). Thus, as Bhattacharya and Tang (2013, p.64) state: "the local trade unions, which in theory could support the 'local' seafarers through collective bargaining with the ship-owners within the national jurisdiction, find it difficult to have a similar level of influence in an international setting." Consequently, even if seafarers are members of national trade unions it is clear that these unions do not have the resources and capital to counter ship owners, least of all those trade unions from less economically developed countries. Thus the influence these local trade unions hold is inadequate in protecting seafarers from the pressures of ship operators and manning agencies. The implication of this is that the mechanisms to give seafarers a voice are inadequate.

Whilst some national governments – see for example the USA's Merchant Marine Act (Jones 1921) – have sought to maintain protection of the domestic seafaring labour market, such national protectionist regulation is no longer commonplace and the number of seafarers who benefit from it is much reduced. Thus, without this regulation and the strong influence of trade unions, ship owners and operators have a free hand in the exploitation of labour.

The impact national regulations can have on the protection of labour, in relation to the organisation of work, can be seen in other industries such as the UK offshore energy industry – whereby workers are protected from excessively long deployments and from returning to a workplace when they have not experienced a suitable restoration period by national regulations. These regulations require the durations of deployments and leave periods for workers on offshore UK North Sea installations to be recorded and a system flags up when a worker appears likely to exceed – in a given time period – the maximum permitted days offshore (Parkes 2010). If such protection – like that seen in the UK offshore industry – was in place the power of shipping companies and manning agencies to deploy seafarers who have not experienced an adequate rest and restoration period would be significantly curtailed.

However, given the dearth of such regulations to protect labour in the seafaring industry and the weak influence of trade unions, it is unsurprising that the seafarers in this study were not protected from excessively long deployments or returning to a ship when they had not experienced a suitable restoration period. This problem is exacerbated by the fact that there is currently no way of measuring its extent given that the shipping companies who provided the injury data did not record details such as the duration of the seafarer's leave period prior to joining the vessel. The worrying dearth in the information regarding features related to the organisation of work and employment at sea recorded by the shipping companies will be discussed as this chapter progresses.

7.1.3 Fatigue as a consequence of exploitation

One of the consequences of a lack of protection was that seafarers frequently experienced fatigue and this fatigue was attributed to a number of features, some of which related to the organisation of work, such as insufficient rest hours – which, arguably, shipping companies could mitigate for – and others which related to the work environment, such as poor weather conditions – which were beyond the control of the shipping companies. It is unsurprising that fatigue which could be attributed to the work environment impacted on all individuals concurrently, however, it also emerged that fatigue which could be attributed to the organisation of work predominantly impacted on colleagues synchronously. For example, whilst the vessel was in port, many of the seafarers onboard increased their hours of work and were disturbed during their rest periods to carry out tasks such as mooring the vessel. Thus, during these time periods seafarers perceived that levels of fatigue were increased for most – if not all – individuals onboard.

Cumulative fatigue, however, was perceived to effect individuals independently and was considered to be a particular risk as the length of time the seafarer was onboard for progressed. The idea that prolonged working routines can cause an increase in risk with regards to occupational safety has been identified by others in relation to consecutive shift patterns for night-shift workers (see for example Folkard 2000).

The adverse effects of fatigue on health, safety and well-being are well known. For example, Carotenuto et al. (2012) stated that sleep of sufficient quality and duration is necessary for well-being. Moreover, the effect of fatigue on personal safety and operational safety is worrying – the MCA (2013) estimated that fatigue was a contributory factor in approximately one third of incidents at sea. The analysis seen in chapter 4.3.2 showed that the seafarers perceived fatigue – irrespective of the cause – to adversely impact on their health, safety and well-being.

Thus it is particularly concerning that the findings presented in chapter 6.2.2 showed that seafarers who were employed on single voyage contracts requested for their deployment to be extended – even when they were already scheduled to be onboard for a prolonged period of time. With their future employment uncertain some of the seafarers endeavoured to prolong their current temporary employment and the potential to earn a salary for an additional period of time was prioritised over leaving the vessel at the end of a scheduled deployment. Requests for tour extensions were made to the shipping company (via the Captain) and the shipping company approved the requests unless the Captain asked for the requests to be denied. Onboard ship 4 the Chief Engineer stated that such requests for tour extensions were routine and they were – without exception – denied by the Captain due to concerns for the seafarers' health, safety and well-being. Thus, whilst the ratings onboard ship 4 prioritised employment it was left to the Captain onboard to protect these individuals from excessively long deployments – even at what is likely to be the better end of the industry.

7.2 Heterogeneous labour force

This issue suggests that there is another party who – given the absence of protectionist regulations (and arguably strong trade union influences) – has the power to protect seafarers from adverse features of work patterns, such as excessively long deployments. This party – the vessel's Captain – holds significant amounts of power, which in this study, was seen to be used to protect the seafarers onboard. For example, as well as refusing requested tour extensions, Captains in this study reported taking measures such as refusing to sail from dry-dock or anchoring the vessel when they deemed the crew onboard to be particularly fatigued.

This power, however, was held solely by the vessel's Captain and the substantial variations in the power and control among those onboard was one of the most apparent themes, and it is a discussion on the heterogeneity of the seafaring labour force that begins this section. This section then discusses the unequal employment terms and conditions afforded to different seafarers and in doing so considers the implications of such inequality.

7.2.1 Inequality among seafarers

To understand the power held by the Captain it is first necessary to consider that the seafaring industry is unusual in that there is a physical separation between the shore-based management and the shipboard workplace. Although the Captain is supervised by shore-based management, the Captain has the authority and responsibility to make decisions with respect to safety. Whilst in theory ships are bound by the laws of the states in which they are registered, such regulation is often of little consequence as the enforcement of some flag states is negligible. Moreover, even when safety standards are rigorously enforced the interference into the organisation of life onboard by flag states and shipping companies is minimal. Thus, the power held by ships' Captains can be attributed to a number of features such as: the geographical location of vessels, a vacuum in regulations onboard and the hierarchical traditions of seafaring.

Consequently, the control of the organisation of life onboard – and thus many features of the organisation of work – was largely left to the Captain, and there were numerous ways in which this was evident in this study. For example, the Captains onboard all of the vessels organised – in conjunction with shore-side personnel – when each seafarer would leave the vessel, an issue which will be discussed in greater detail in section 7.3.1. Sampson (2013) suggested that Captains could choose to do a great deal to control the organisation of life onboard, from encouraging social activities to altering the vessels course during poor weather so as to reduce motion and thus enable individuals to sleep.

In this study Captains – and other senior officers – reported holding power in a different capacity in relation to work patterns: they were predominantly permanently employed. Additionally, the small group of junior officers and ratings interviewed who came from Western Europe were also employed on permanent contracts and herein lies perhaps the most significant source of the diversity and inequality which emerged from the analysis. Seafarers from more economically developed countries were found to be far more likely to be engaged in permanent employment than those from less economically developed countries and this situation is by no means exclusive to the seafarers interviewed in this study. It was outlined in the review of the literature in chapter two that seafarers from more economically developed countries were significantly more likely to be able to access secure employment (Sampson 2013).

The analysis of the shipping companies' health and safety data presented in chapter five, however, contains no information regarding the employment terms and conditions of the injured seafarers. Such an omission is important as without such data it was not possible to compare incidents sustained by seafarers who were precariously employed with incidents sustained by seafarers who experienced permanent employment. The omission, however, was not surprising given that in shore-based studies injury data often fail to record key variables such as the manner in which the individual was employed (see for example Quinlan 1999).

It is also of interest to know whether seafarers willingly choose to engage in precarious employment or if they simply have no option due to the lack of secure employment available. Literature (see for example Connelly and Gallagher 2004) argues that workers who voluntarily chose precarious employment contracts had less adverse perceptions and experiences than those who performed contingent work because they were unable to obtain permanent employment. This issue is of pertinence to the seafaring industry as seafarers from the Philippines, which is one of the largest sources of seafarers in the global labour market, are unable to secure permanent employment due to the terms of the POEA which – as explained in chapter one – prohibits Philippine nationals from obtaining permanent international employment.

Moreover, in many less economically developed countries the market rate of seafaring wages is much higher than the wages of alternative shore-side employment. For example, Lillie (2004) reported the average monthly wage for an industrial worker ashore in the Philippines to be \$140. In comparison, the median monthly wage for a Filipino able seaman was found to be \$1025 (Lillie 2004).

Thus, for many seafarers despite suffering from a lack of protection due to non-standard employment, employment at sea is preferable to the alternatives which are substantially lower wages ashore or unemployment. Ship operators utilise a range of nationalities when crewing their vessels and thus those seafarers from poorer countries who had little choice but to accept precarious employment were seen to be working alongside seafarers from richer nations who enjoyed permanent employment.

In determining the nationalities of seafarers employed onboard their vessels, Lane (2002) suggests that the racial preferences of ship owners have little to do with the patterns of multi-national crewing. Rather, the preferences are deliberate decisions made on other grounds and often the decisions vary for different sections of the ships' crew. For example, ship owners have tended to employ Europeans as senior officers for a number of reasons. First, newer and cheaper labour supply countries, such as the Philippines, have been unable to implement the high quality educational and training regimes needed to produce an acceptable calibre of skilled and experienced senior officers (Lane 2002). Also, ship owners – who are predominantly from the richer traditional maritime nations in Europe – have tended to favour European senior officers as they share similar cultural characteristics and thus are perceived to be better able to establish effective ship-shore communication (Lane 2002). Thus, to some ship owners the employing of senior officers from more economically developed countries has been deemed cost effective due to their particular skills and experience.

By picking and choosing different sections of crews from different nations, ship owners are able to optimise the balance of skills and cost (Lane 2002), and the most significant consequence of this approach has been – as seen in this study – the assembling of multi-national crews. This approach by ship operators also serves to inhibit the dominance of the labour market by a small number of nations (Kahveci and Nichols 2006). Moreover, the use of seafarers of different nationalities also prevents a common trade union identity for seafarers, who are multi-national and drawn from a global labour market (Walters and Bailey 2013). Without a common trade union identity seafarers' national trade unions have little bargaining strength and do not have the reach to affect open register shipping, as discussed previously in section 7.1.2.

7.2.2 Unequal terms and conditions

Variations in the precarity of employment were not the only inequality in employment terms and conditions evident in this study, and a further important example, is the vast differences in the durations of tours of duty between seafarers of different nationalities. For example, onboard ship 3 deployment lengths ranged from six weeks to six months. Moreover, onboard ship 4 whilst the Swedish Second Officer worked two month tours his colleague, a Second Officer from Eastern Europe worked six month tours. The seafarers from less economically developed countries, who experienced limited control over access to future employment, were willing to accept longer tour lengths and had limited scope for negotiating tour length. These findings corroborate Drewry (2009) in which a comparison of deployment and leave rates of junior officers sailing onboard tankers found Burmese officers were onboard for between six and nine months with between five and ten days leave per month worked onboard and British officers were onboard for between three and four months with between twenty and thirty days leave for each month worked onboard.

The seafarers in this study who were from more economically developed countries also experienced considerably longer leave periods than their colleagues from less economically developed countries, again corroborating Drewry's (2009) findings. Thus, whilst seafaring labour is able to compete on a wage basis, the organisation of work also serves as a competing factor with those who hold the least power working considerably longer tours of duty with far shorter leave periods, thereby reducing the costs of crew changes for ship operators. As such, it is the ship owners – who are seeking to reduce costs wherever possible – who benefit from this competition and it is the seafarers who bear the consequences.

These findings are a concern for occupational health, safety and well-being for a number of reasons. Long tours of duty are a worry due to fatigue and performance decrement, issues which are associated with extended work periods and long working hours. Moreover, a lack of harmonised terms and conditions between employees has been seen in other industries to adversely impact upon well-being outcomes (see for example Kabeer's 1996 discussion on gender pay inequality and well-being). Among the seafarers interviewed the vastly different terms and conditions – particularly tour of duty duration – were a source of great frustration and stress for those individuals who wanted to work shorter tours (which their colleagues onboard were working) but were not permitted to do so.

The vastly different tour of duty durations sailed by different seafarers also suggests that the manner in which the analysis of injuries in relation to days onboard was conducted by Hansen et al. (2002) and Jensen et al. (2004) does not paint an accurate picture. This is because – as discussed in chapter 2.3.1 – neither study considered the deployment lengths of individual seafarers. Hansen et al. (2002) identified time phases of how long a seafarer had been onboard when an accident took place and Jensen et al. (2004) utilised the average tour length from respondents.

In the analyses of the shipping companies' data – seen in chapter five – all of the seafarers employed onboard the offshore vessels were scheduled to be onboard for five weeks and thus the issues present in the two studies discussed above (Hansen et al. 2002 and Jensen et al. 2004) were not applicable. However, the analyses of the injuries sustained onboard tankers and container ships (as seen in chapter five) were limited by the fact that the injured seafarers were sailing very different tour of duty durations. Thus, the analysis of these two data sets focussed on specific time periods within a deployment as opposed to using average deployment durations, since such averages would not take into account the unequal tour of duty durations which were evident.

Moreover, the inequality which emerged from the analysis suggests that, despite being treated as so in terms of incident investigation, the seafaring labour force is not homogeneous. The three shipping companies' safety records present the injured seafarers as a universal workforce whilst this study clearly indicates that the seafaring labour force is heterogeneous, with different seafarers experiencing vastly different employment terms and conditions, even when employed onboard vessels operated by the same shipping company. This suggests that in the recording (and investigating) of seafarers' injuries the shipping companies are quite simply glossing over features of their workforce which may help to explain aspects of occupational health, safety and well-being outcomes – despite the fact that it is the shipping companies themselves who have chosen how to control these employment features of their workforce.

Taken together the findings from this first section suggest that there is both an absence of mechanisms to protect seafarers in relation to features of the organisation of their employment and their work patterns, and an absence of mechanisms to give seafarers a voice. Regulations – like those evident in the offshore installation industry – which protect labour from issues such as insufficient leave periods quite simply do not exist in the seafaring industry. Instead, it has been left to ships' Captains, and other senior officers, to safeguard their colleagues from many of the adverse impacts which can be attributed to the organisation of work and employment at sea.

Moreover, with little in the way of collective bargaining power – combined with their physical separation and the Flags of Convenience regimes – those who work at sea are left without a voice (an issue which will become more apparent as this discussion progresses). Thus, these findings reflect an industry whereby the workers are made vulnerable by the organisation of their employment, the inadequacy of the regulatory mechanisms in protecting them and their collective weakness in relation to those who control their labour. And the consequences of this vulnerability are seen in the lived experiences of seafarers.

7.3 Deployment scheduling control

Moving on, there were numerous issues relating to job control which emerged in the qualitative findings. For example, throughout the analysis issues surrounding deployment scheduling uncertainty were identified and some seafarers had little control over when they were deployed. In a land based study Lewchuck et al. (2008) revealed that the well-being experiences of individuals were improved when they perceived they were able to control aspects – such as work scheduling – of their employment. Thus, deployment scheduling uncertainty is the theme that begins the discussion in this section. It then moves on to discuss the other end of the spectrum – cases of deployment scheduling certainty.

7.3.1 Deployment scheduling uncertainty

The deployment scheduling of many of the seafarers was uncertain and one significant consequence of this was seafarers received little notice regarding the date on which they would join the vessel. Thus, seafarers left home for prolonged periods of time with little notice and this scenario has no similar comparisons with other occupations. Workers on offshore oil and gas installations generally experience fixed rotations with pre-determined deployment dates (Parkes 2007) and military personnel tend to receive substantial pre-deployment notification (Fitzsimons and Krause-Parello 2009).

A further problem also arose when replacement seafarers were unable to meet the shipping companies' requirement to join a vessel at short notice. The consequence of this scenario was that the seafarer who did not join the vessel was unable to relieve the seafarer already onboard who had been scheduled to return home. Unless an alternative seafarer who could join the vessel at short notice could be found, the seafarer who was already in post had to remain onboard for longer than they had anticipated, regardless of how long they had already been onboard.

There were also many other reasons – as presented in chapter 2.2.3 – as to why mandatory tour extensions occurred. However, in the analysis presented in chapter 6.2.2 it was seen that the seafarers who remained onboard after the date on which they had anticipated going home experienced considerable stress and frustration.

Nevertheless, as reported in chapter 6.2.2 there was a considerable gap between the contracted obligations of the shipping company and the seafarer's expectations regarding leaving the vessel on a specific date. Whilst to the seafarer the expected leave date became a fixed focal point, to the shipping company it was merely a guideline – owing to the plus or minus clause in the contract, as presented in chapter 2.2.3. It is noteworthy that very little is known regarding the frequency of injuries which occurred in the time periods which the seafarers considered to be over-tour as it is not known how many seafarers who considered themselves to be over-tour did not experience an injury in comparison to the number of seafarers who considered themselves to be over-tour who did experience an injury. However, in the analysis nearly 7% of injuries recorded onboard offshore vessels and 3% of injuries recorded onboard tankers occurred during the time period considered to be over-tour²⁰.

²⁰ Data were not available regarding over-tour injuries sustained onboard container vessels (as explained in chapter six).

Previous research into seafarers' injuries has utilised the number of elapsed days into tour at the time the incident occurred (see for example Hansen et al. 2002 and Jensen et al. 2004) and as such very little is known regarding the implications of mandatory tour extensions on seafarers' safety. Similarly, literature regarding the effect of mandatory tour lengths on the well-being of seafarers is sparse, however in a review of literature regarding the impact of deployment length on the health and well-being of military personnel, Buckman et al. (2010, p.69) concluded "a mismatch between actual and expected deployment lengths can increase the likelihood that military personnel and employees of other organisations that deploy to war zones will suffer from mental health problems."

The use of mandatory tour extensions was perhaps the most obvious power imbalance between shipping companies and seafarers which emerged – quite literally shipping companies were able to control seafarers to the extent that they retained seafarers onboard beyond the completion of a pre-determined period of employment. The labour process perspective on the ordering of work (as presented in chapter one) argues that managerial action is motivated by employers desire to control and stabilise labour, which is considered to be the unruly factor of production (ILPC 2008). As the unruly factor of production, seafarers gave their services in a time period which was controlled by the shipping companies – and this control extended to time periods in which seafarers had not agreed to give their services but the control of the shipping companies, and the nature of the workplace, meant they had no realistic option but to comply. This control – and the associated uncertainty – had a number of detrimental effects on seafarers.

First, seafarers were unable to pace their work effort throughout a tour of duty since the duration of the deployment was often uncertain. Research has shown that uncertainty regarding the duration of a work period to be a cause for concern. In a land-based study Duchon et al. (1997) found that individuals were able to offset the impact of additional fatigue which resulted from extended work shifts by pacing their work effort across the expected shift length.

As discussed in section 7.1.3, fatigue is known to adversely impact on the well-being of individuals (see for example Smith et al. 2006) and furthermore, the classic studies such as those of Robert Karasek (1979) have shown that individuals experience lower levels of well-being when they perceive lower levels of job control. Thus it is unsurprising that many of the seafarers reported responses such as frustration, distress and dissatisfaction, which are recognised risk factors for psychosocial harm, resulting from scheduling uncertainty.

Moreover, owing to the nature of seafaring – in that seafarers live as well as work at sea – the experiencing of such psychosocial issues are likely to be significant contributors to both health and performance and the constraints at sea may influence the ability of seafarers to adopt coping skills which reduce the impact on their well-being (Carter 2005). It is also worrying that, as Carter (2005, p.61) argues “almost all jobs at sea are to a greater or lesser extent safety-critical and so decrements in performance from whatever cause, including psychological ones, may put other seafarers, passengers or the vessel at risk.”

7.3.2 Cases of deployment scheduling certainty

Nevertheless, not all of the seafarers experienced scheduling uncertainty. Some were permanently assigned a vessel which they returned to for subsequent deployments. These seafarers experienced far lower levels of uncertainty and exhibited greater degrees of control regarding their deployment schedule. Such control was possible due to the fact that they were replaced at the end of their deployment by the same individual each time and thus together they were (generally) able to make scheduling arrangements between themselves.

These seafarers knew the date on which they would be joining the vessel in advance, and the date on which they anticipated leaving the vessel was adhered to, with such individuals rarely (if ever) experiencing mandatory tour extensions in the same way as their colleagues. Consequently, these seafarers did not experience the frustration and annoyance associated with deployment scheduling uncertainty, that their colleagues experienced. It is therefore hardly surprising that seafarers expressed preference for control over their work pattern in this manner, especially given that it was not only their work schedule they were controlling but also when they would be away from the life they had effectively left on hold when they joined the ship.

Such seafarers – who were predominantly officers from richer countries – formed a sector of the ships' crew that provided continuity and stability. No doubt many ship owners prefer such stability and continuity in terms of the seafarers working onboard their vessels, however as Lane (2002, p. 98) states: "they have become so accustomed to shopping for crews that they are reluctant to make any substantial long-term investment in labour from any one source." By permitting these seafarers a free hand to arrange their own upcoming deployment patterns they were, in many respects, making a long term investment. And the seafarers who experienced this situation recognised the investment made in them and understood their experiences were at the best end of the industry – ultimately the situation was recognised by the seafarers as being outside of the norm. Consequently, they perceived their future employment to be particularly secure. The implication was that these individuals were undoubtedly among those who reported a more favourable work-life balance and a happier work experience. This itself may have contributed to support for some of the negative impacts on well-being such as fatigue and stress – as discussed in section 7.2.1 – and therefore aided working more safely.

7.4 Job control whilst onboard

Scheduling uncertainty also extended to the seafarers' work schedule once they were onboard the vessel. Since seafarers live as well as work in the workplace, the implications of such control are likely to take on even greater significance. In considering job control this section discusses variations in the extent to which seafarers were able to alter their working practices in response to their domestic needs.

7.4.1 Work scheduling onboard

Depending upon their position onboard and the ship's activities some of the seafarers were able to, unofficially, control the hours they worked. Officers, particularly senior officers experienced – albeit limited – autonomy in determining their work schedule and the temporal ordering of tasks. Kossek et al. (2006) argue that the use of flexibility in working hours can increase well-being. Moreover, as discussed in section 7.3.1 research (see for example Karasek 1979) has revealed a link between job control and well-being, with perceived lower levels of job control being associated with poorer well-being outcomes.

Whilst a table of shipboard working arrangements is required in accordance with ILO 180 (as seen in chapter 1.1.2), the seafarers deviated from these pre-determined working arrangements and consequently, the Captains – and the senior officers who assisted them – exercised control over determining how and when things were done. Thus, whilst on paper there were pre-determined working hours, in practice the senior officers were able to operate in accordance with their own preferences.

Those seafarers who were able to control their own working routine indicated that the autonomy to implement working hours in a manner they themselves deemed fit had positive implications for their health, safety and well-being. For example, some seafarers were able to delay tasks they perceived as arduous or difficult when they were feeling particularly tired and instead carry out tasks they considered to be easier. Given that fatigue is a well-known contributor to accidents in the seafaring industry (see for example MCA 2013) an individual's ability to postpone certain tasks when they are tired is likely to have a positive impact on their own health and safety, as well as on the safety of other seafarers onboard and the operational safety of the vessel.

Similarly, some seafarers were also able to postpone tasks to enable them to leave the ship and go ashore whilst the vessel was in port. This is important as literature (see for example Bauer 2007) has shown that shore leave is an important factor in improving the well-being experiences of seafarers.

Thus, by and large these findings suggest that the experiences of the seafarers in this study did not always match the requirements determined by shore-side. And this mismatch was perceived by the minority of seafarers who experienced autonomy in determining their own work schedule onboard to positively impact on their well-being – as well as their safety.

7.4.2 Work scheduling controlled by others

Seafarers lower in the onboard hierarchy, however, had little autonomy and control regarding their work schedule and the temporal ordering of tasks and they worked the hours dictated to them by the senior officers onboard. A lack of autonomy was seen to have a number of negative effects. For example, some seafarers – in particular ratings – conducted arduous tasks when they were fatigued. Some seafarers were also not able to adjust their working hours to enable them to go ashore and thus were unable to take shore leave.

Significantly, the power held by senior officers did not just refer to seafarers' autonomy in terms of carrying out work related tasks, but also when they rested, when they ate and even if they were allowed to leave the ship when it was in port. The implication of this was a seafarer's ability – or inability – to make decisions as part of their work extended to many other aspects of their life onboard. Such control has been noted by others. For example, in discussing the power and authority held by some seafarers over other seafarers Sampson (2013, p.79) stated: "onboard the Captain is still king and controls not only the work aboard the vessel but the living arrangements, and to a great extent, the out of work activities of all the crew."

Moreover, life at sea is highly institutionalised and the workforce are under the constant surveillance of their superiors – generally the senior officers onboard. As previously discussed, whilst remote from the land the jurisdiction of entities such as the flag state and ship owner are irrelevant to the seafarers onboard and instead it is the onboard occupational hierarchy which influences the organisation of life at sea. The hierarchy among seafarers is unusually strong and Sampson and Thomas (2002) noted that the hierarchy among seafarers was so important that it was common practice for individuals to refer to themselves and others by rank, rather than by name.

As a consequence of shore-side's lack of effective monitoring of the organisation of life onboard, tradition combined with an unusually strong hierarchy has resulted in hierarchies of power and control in which the onboard lives of those lowest in the hierarchy are organised subject to the whims of those above. During the analysis it emerged that unofficial amendments to working hours were not always implemented in a manner that assisted individuals onboard equally and some senior officers abused their power by imposing additional working hours and tasks onto their subordinates so as to lessen their own burden. For example, as presented in chapter 4.3.1 a Third Officer described how, on a previous vessel, a Chief Officer had imposed additional working hours on the Third Officer, so as to decrease his own working hours. This resonates with literature regarding relational power in the workplace (see for example Hodson et al. 2006) which suggests that whilst power for some provides a protection, it increases the vulnerability of those with less power.

Importantly, the examples of abuses of power which emerged during the analysis, such as that of the Third Officer covering the watch of the Chief Officer, indicate that such abuses were tacitly accepted. In a study of the National Guard in the US, Zellars et al. (2002) found that those who had witnessed or experienced abuses of power, which were tacitly accepted, went on to mimic these abuses. Consequently, the mimicking of such abuses of power is likely the result of the socialisation of accepted behaviour in the workplace. Given that seafarers move between work teams (as discussed in section 7.3.2 below) it is likely that an abuse of power can be mimicked on an exponential level and consequently becomes accepted behaviour.

The lack of desire from shore-side to interfere in the organisation of life onboard also enables such abuses to go unchecked. Since other parties – such as HR managers and trade unions – are physically separated from seafarers, the ability of these entities to protect seafarers is severely limited. However, even with available avenues to report abuses of power seafarers have been seen as reluctant to report such incidents (see for example Dutt 2015). Such reluctance may be owing to the acceptance of some of the behaviours as normal. In the same vein that abuses of power may be committed as a consequence of the socialisation of accepted behaviour at sea, those who are subjected to such abuses may normalise these occurrences through socialisation.

It is also likely – at least in part – that the reluctance to report abuses of power is due to the fear of reprisals. One reprisal feared by seafarers is blacklisting. Dutt (2015) found that seafarers did not report instances of ill-treatment as they took blacklisting very seriously and felt such an occurrence would have negative consequences for their ability to secure further employment and also would inhibit their career advancement.

Furthermore, it is general practice that a seafarer receives a written appraisal report, completed by a senior officer onboard, at the end of each deployment. For those seafarers who are precariously employed a positive appraisal report may help to secure further employment, whereas a negative report would likely have the opposite effect and thus inhibit the seafarer in securing further work. Thus seafarers are likely to be reluctant to report abuses of power committed by the individuals who are responsible for writing their appraisals. These concerns echo those presented in land-based literature (see for example Fevre et al. 2012).

It is also worth remembering that – as discussed in section 7.1 – senior officers were (predominantly) permanently employed, whilst those seafarers lower in the onboard hierarchy tended to be precariously employed. It is likely that seafarers lower in the hierarchy (who are precariously employed) perceive their supervisors onboard (who are permanently employed) as considerably more valuable to the shipping company than they are. In shore-based studies (see for example Hearn and Parkin 2001) differences in job security have been seen to result in an environment prone to abuses of power. Einarsen et al. (2003) also argued that the presence of structurally weak targets, such as low-status employees, in the workplace increased the likelihood that abuses of authority would occur. As a shipboard hierarchy results in seafarers being slotted into predetermined superior and inferior positions this issue is likely to be applicable to the seafaring industry. Thus whilst autonomy was a positive aspect for some seafarers, the impact that this autonomy had on other individuals onboard was not necessarily a positive aspect for those without autonomy.

7.4.3 Working practices in relation to personal calendars

It is of particular importance to this study that the analysis presented in chapter 6.2.1 showed that those seafarers who were able to exert some control over their own working routine reported changes in their routine and working practices at a late stage of a deployment. Whilst for some seafarers the time approaching the end of a tour of duty was particularly busy, due to their endeavours to complete all of their tasks before leaving the vessel, for others it was a time when work efforts decreased and less work than usual was undertaken. A decrease in work towards the end of a deployment is unsurprising given that seafarers perceived cumulative fatigue to increase as time onboard progressed. In a study of seafarers' fatigue Wadsworth et al. (2006) found fatigue on waking to have increased between the beginning and end of a tour. Furthermore, in a land-based study Winwood et al. (2005) stated that recovery from work-related fatigue mostly occurred between shifts. Thus as seafarers work and live in the same environment they are likely to accrue sleep debt. This is particularly likely given that the experiences of the seafarers suggested that the rest hour legislation does not provide a sufficient amount of rest and that non-compliance with rest hour legislation was commonplace and widespread. These experiences are unsurprising given that seafarers are permitted to work ninety-eight hours a week, almost double the forty-eight hours suggested by the European Working Time Directive (ITF 2017).

From the analysis it also emerged that seafarers perceived that they experienced 'the channels' – a time period in which concentration levels decreased – as they approached the end of their deployment. It is possible that the perceived change in concentration levels can be attributed to cumulative fatigue. The concept of the 'channels' has no real comparable parallels with land-based employment – but as far as can be judged from the literature regarding concentration and occupational injuries (see for example Swaen et al. 2003) it would be reasonable to conclude that injury risk may increase during the time in which a seafarer is experiencing the 'channels'. Viewed in light of cumulative fatigue and the channels it is not surprising that seafarers perceived the very end of a deployment to be a particularly risky period of time.

The analysis in chapter 5.2 showed that for injuries sustained onboard tankers the penultimate week of a seafarer's tour was riskier than the two preceding weeks and the last week of a tour. A possible explanation for this spike in incidents in the penultimate week is that seafarers' concentration decreased as they approached the end of their anticipated time onboard. The decrease in injuries during the last week may simply be a consequence of seafarers altering the type of work they undertake during their last few days onboard. For example, some of the seafarers reported doing more paperwork and less manual tasks at a late stage of their deployment, and the decrease in injuries may be the result of inherently safer tasks (such as paperwork) being conducted. This idea may also explain why the analysis identified that incidents were less likely during the last week of a tour than during the rest of a tour onboard offshore vessels. Nevertheless, as has been discussed, the power to control and alter their own individual work patterns did not extend to all seafarers. As a consequence of little, if any, interference from shore-side management in the organisation of life onboard, senior officers were free to control the work patterns onboard but this control was not extended to those lower in the onboard hierarchy.

In controlling their work patterns in this manner the seafarers did not attract the attention of shore-side. Throughout the findings it is apparent that the senior officers – and the Captain in particular – could choose to do a great deal which impacted on the organisation of life onboard but remained 'invisible' to shore-side. Only rarely, for example when delaying the vessels sailing from dry-dock, were shore-side interested in the decisions the Captain had taken. Thus it was only when the actions of the Captain – in relation to the organisation of life onboard – had commercial implications that these actions became 'visible' to shore-side.

Consequently, shore-side were seen to be more interfering when there were financial ramifications – such as an increase in berth fees if the vessel did not sail – and less interfering when the implications impacted solely on the labour force. This would suggest that the relationship between shore-side and the seafarers was based predominantly on profit, with little interference with regards to life onboard as long as additional costs were not being incurred. Such a situation was recognised by one Chief Engineer who, as presented in chapter 6.2.2, suggested that the shipping company turned a blind eye to the seafarers amending company policies, as long as such amendments did not involve an increase in cost.

Throughout this section numerous examples of how shore-side have given autonomy to the Captain – and other senior officers onboard – have been presented. This is a consequence of the management techniques utilised by shore-side. In shifting the responsibility from shore-side to the Captain of the ship, the Captain – in conjunction with the other senior officers onboard – exercise control over the rest of the crew. This autonomy was seen to have positive implications for those who were fortunate enough to experience it, but importantly there were negative ramifications for those individuals who did not experience such autonomy and were subjected to the unchecked control of others.

Thus, by and large the findings suggest that the experiences of the seafarers did not match the requirements determined by shore-side. This mismatch however was not recorded by the seafarers. In addition, a lack of interference from shore-side regarding this mismatch enabled abuses of power to occur, as seen in the event whereby the Chief Officer instructed the Third Officer to work extra hours so as to reduce his own work schedule. This reflects seafarers' reluctance to accurately record any information which they perceived would jeopardise their ability to secure future employment – a situation caused predominantly by the use of precarious employment methods. It also reflects shore-side's lack of desire to know what exactly is going on onboard the vessels they operate. This is most likely due to the fact that an increase in crew numbers is the only realistic way in which many of the mismatches in seafarers' experiences and the requirements of shore-side could be reconciled.

7.5 Flexible labour force

In this final section, issues relating to the flexibility of the seafaring labour force are discussed. From the analysis it emerged that seafarers were considered as a homogeneous labour force and consequently were readily employed across the various sectors of the seafaring industry. Research (see for example Breslin and Smith 2006), however, has shown that a lack of workplace specific experience contributes to occupational injury risk, thus suggesting that current practices whereby seafarers are deployed to unfamiliar vessels for subsequent tours is a cause for concern. In considering this issue this section also identifies and discusses the impact that deploying to unfamiliar vessels has on seafarers' work team stability, given that unstable work teams have been seen in shore-based literature (see for example Lewchuk et al. 2003) to adversely impact on health, safety and well-being.

7.5.1 Lack of workplace specific familiarity

In the analysis presented in chapter 4.1.2 it was evident that some seafarers were deployed to familiar ship types and others were deployed to a type of vessel of which they had no prior experience. It was also seen that some of the seafarers had little, or no, knowledge of the ship or even the shipping company prior to arriving onboard. For example, there were seafarers onboard ship 2 (a tanker) who had sailed onboard tankers previously, but were new to the shipping company (and that specific vessel). There was also a seafarer onboard ship 2 who had never sailed on a tanker, and was also new to the shipping company but had previously sailed on offshore vessels.

This scenario is by no means exclusive to the seafarers in this study. Walters and Bailey (2013) stated that whilst some seafarers may be fortunate and be deployed with the same shipping company for a period of years and in some instances they may even return to the same ship, it is more likely that for each subsequent tour they will be deployed on a different ship or even with a different shipping company. Seafarers tend to be considered as flexible employees and the general approach to the seafarer labour market considers seafaring labour to be of a homogeneous nature (Leong 2012). This is in part due to the fact that – as seen in chapter one – STCW enables certified trained seafarers to be employed onboard the entire spectrum of vessels without the requirement of further qualifications.

In recognition of the well-known implications for the safety of the vessel and its crew of seafarers' unfamiliarity with their ship and its equipment, there are, however, requirements for arrangements intended to mitigate for such unfamiliarity.

Familiarisation training – as required by the ISM Code – provides information regarding the actions to be taken in an emergency, and the use of mandatory safety equipment, and seafarers are required to receive basic training prior to commencing shipboard duties. Alongside such familiarisation training, new joining seafarers are required to receive ship-specific familiarisation which provides them with instructions and information for the shipboard equipment they will be using. The familiarisation is intended to benefit the seafarer and also the vessel and the operational standards onboard.

The findings presented in chapters four and six, however, suggest seafarers' experiences in practice do not always match this theory. First, the findings in chapter 6.1.2 showed that despite regulations, familiarisation training for new-joining seafarers was sometimes poor or even non-existent – and further that the familiarisation training paperwork was completed, even when familiarisation training was not conducted. Thus, similar to Bhattacharya's (2009) findings regarding the implementation of the ISM Code, the situation would appear to shore-side as being in accordance with the requirements, even when this was not the case.

There are a number of possible explanations for familiarisation training not taking place. Seafarers commenced work immediately upon joining a vessel thus leaving little – if any – time period in which adequate familiarisation training could take place. Moreover, those who were responsible for ensuring that the familiarisation training was conducted to an adequate standard – the Captain and other senior officers – experienced substantial additional work during port visits, the time period when familiarisation training is often required and, of course, would be of particular use.

Inadequate familiarisation training is particularly concerning as the findings presented in chapter 6.1.2 indicate that new joining seafarers were unfamiliar with specific pieces of mandatory equipment onboard. The implication was that seafarers utilised mandatory equipment that they were unacquainted with. Sampson et al. (2016) stated that the mandatory equipment onboard different ships varied and that it was imperative that such mandatory equipment was understood and that it was used appropriately and maintained properly as otherwise it posed a threat to both human life and the environment. Whilst SOLAS determines the mandatory equipment onboard ships, and the specifications of this equipment, the equipment can be generic and not a specific make or model. Thus the specific make and model of the mandatory equipment depends on the decisions made by the shipping company and whilst newer models might be used on newly built ships a cost efficiency logic has been to continue to use older equipment on older vessels, rather than retrospectively fit newer models. Consequently, even between ships owned by the same shipping company makes and models of mandatory equipment onboard are likely to be different.

Second, and likely related to these issues, the analysis presented in chapter 4.1.2 indicated that the seafarers perceived a lack of workplace specific familiarity adversely impacted on personal safety (despite their qualification to work onboard any vessel). In particular, there was a clear perception among the seafarers that took part in this study of an increase in risk at the start of a tour of duty owing to a lack of workspace specific familiarity. Furthermore, when seafarers lacked specific vessel familiarity, they perceived this to be not only a concern for the individual deployed, but also to be an issue which adversely effected other colleagues onboard and the operational safety of the vessel. For example, seafarers who were more familiar with the vessel carried out tasks for their newly arrived colleagues in a conscious attempt to minimise risk.

A reasonable supposition, therefore, would be that seafarers' injuries which occurred as a consequence of vessel specific unfamiliarity would generally occur at a very early stage of a deployment – for example within the first week onboard – perhaps particularly when considered in combination with the fact that seafarers commenced work immediately upon joining a vessel, so in many cases were dealing with the effects of fatigue in addition to their unfamiliarity. However, in the three shipping company datasets analyses this was not found to be the case. It was seen in chapter five that onboard tankers the fourth week of a tour was riskier than the first three weeks of a tour. Thus the patterns of injuries sustained onboard tankers provide no clear evidence for an increase in injuries at an early stage of a deployment.

The distribution of incidences across the first four weeks of a tour did not differ significantly for offshore vessels or container vessels and would indicate that injuries sustained during the first four weeks of a seafarer's deployment were randomly distributed and not significantly related to the start of the seafarer's deployments.

However, shipping companies do not collect any information regarding injured seafarers' familiarity with the vessels on which they were injured. It was, therefore, not possible to control for familiarity in any of these analyses. This is of concern as it suggests that even among the three shipping companies that provided these data, which, arguably, represent the better end of the spectrum, familiarity – a factor known to relate to occupational health and safety – was not deemed relevant enough to record and consider. Were they to do so, other patterns may emerge. For example, Hansen et al. (2002) showed that the likelihood of a seafarer experiencing an injury decreased when the seafarer returned to a familiar vessel for subsequent tours. Parallels can also be drawn between seafarers who arrive at an unfamiliar vessel and agency workers from shore-based industries who are also placed in unfamiliar workplaces, of which they have no specific experience or knowledge. Breslin and Smith (2006) identified that workplace specific inexperience contributed to occupational injury risk, irrespective of the age of the worker, in various shore-based industries. Similarly, Underhill (2007) found that agency workers were particularly vulnerable to injury early in their placement, when the effects of unfamiliarity were most apparent.

Taken together, these findings suggest a scenario in which not only do seafarers' experiences not match the intentions of the ISM code, but the mechanisms intended to record that mismatch are inadequate and those with the potential to effectively measure its consequences are not in place. This again reflects shipping companies' averseness to acknowledging a mismatch exists. Such unwillingness is very likely the result of the current widespread cost efficiency logic whereby manning levels of ships meet safe manning requirements but are not sufficient in enabling seafarers to meet other requirements, such as having the time to carry out adequate familiarisation training.

7.5.2 Unstable work teams

The analysis in chapter 4.1.2 showed that the crew onboard a vessel can consist of a mixture of seafarers: some who are permanently assigned to a specific vessel and some who are not. The implication of this is that whilst some seafarers return to a familiar vessel for subsequent deployments they may still be part of an unstable work team as their colleagues are regularly deployed to different vessels. For example, the Captain and Chief Engineers interviewed on ships 3 and 4 returned to the vessel for subsequent deployments but their other colleagues onboard did not.

Moreover, crew change staggering was also seen to result in unstable work teams. On a regular basis a number of the ship's crew departed (those who had reached the end of their deployment) and were replaced by an influx of new team members. This echoes Hansen et al. (1995) in which a study regarding the crew turnover onboard two ships found that onboard one of the ships a new crew member joined the ship, on average, every eight days and onboard the second ship it was every twenty-two days.

The qualitative findings suggest that the staggering of crew changes had both positive and negative implications. First, the findings in chapter 4.1.2 showed that newer members of the team – who were unfamiliar with the vessel and equipment onboard – were able to learn from more established team members who had more familiarity. Thus similar to Mikkelsen et al's. (2004) findings regarding offshore installation workers in the North Sea, there was the potential for increased knowledge transfer between individuals.

In recognition of the increase in the transfer of information if crew changes are staggered, there are requirements in place in some sectors of the seafaring industry to prevent certain individuals – who are deemed particularly crucial to the operational safety of the vessel – from leaving the vessel concurrently. In the tanker sector a SIRE rule requires the crew change of the senior officers onboard SIRE inspected tankers to be staggered (OCIMF 2014). This SIRE rule is an example of private regulation of health and safety in the seafaring industry. The findings presented in chapter 4.2.2, however, suggest seafarers' experiences did not necessarily match the requirements. The analysis revealed that on some occasions a number of senior officers left the vessel concurrently. There are a number of possible explanations as to why this occurred. Whilst the stagger required by SIRE is of a short duration, the trading patterns of many ships mean this simply is not possible. Take for example ship 2, which sailed for approximately six weeks between two consecutive ports. If the Captain was to leave the vessel in the first port, the Chief Officer must remain onboard (according to SIRE regulations) until the next port which would be reached in six-weeks time – irrespective of when the Chief Officer had been expecting to leave the vessel. Thus such requirements were likely to result in mandatory tour extensions, a scenario which as discussed in section 7.3.1, caused seafarers substantial levels of frustration and stress. Many senior officers were able to avoid mandatory tour extensions if SIRE requirements were not enforced.

The enforcing of such crew change requirements primarily rested with the Captain, as the analysis in chapter 4.1.1 revealed. The Captain was seen to hold the onboard responsibility for arranging crew changes – even when a scheduling arrangement was in place, and the two seafarers involved communicated via email, it was ultimately up to the Captain to permit their suggested crew change. Since the Captains themselves also wished to leave the vessel at the end of their scheduled tour (irrespective of crew change staggering requirements), it was in their own interest not to stringently enforce the rules.

The Captain's power to avoid enforcing such rules was again the result of a lack of effective monitoring from shore-side (as also discussed in section 7.4.2). Even when shore-side expressed concern over requirements not being met, the genuineness of such concern was questioned by the seafarers, since it was after all shore-side who had made the travel arrangements for the leaving and joining seafarers. The seafarers suggested that any genuine concerns from shore-side would likely have resulted in travel arrangements not being made and the crew change being vetoed and thus in effect shore-side chose to leave the Captain – and other senior officers – to do as they wished.

Furthermore, the necessity of crew change staggering was questioned by some of the seafarers in this study. In chapter 6.1.2 it was seen that many of those senior officers returning to a vessel for subsequent tours perceived that they immediately clicked back into life onboard and thus they felt they had enough experience that such a stagger was, in their case, unnecessary. Thus, overall the seafarers reported that they perceived such requirements as a hindrance rather than as a mechanism to protect them.

Second, the analysis presented in chapter 4.2.2 indicated that the staggering of crew changes meant the entire ship's crew were not adjusting to life onboard concurrently. It was seen that seafarers experienced significant adjustment when transitioning from life at home to life onboard and the seafarers in this study reported commencing work immediately upon joining the vessel despite the need to adjust.

They also commenced work when they joined irrespective of the length of time they had spent travelling to the vessel. This echoes Wadsworth et al. (2008) who found that many seafarers had no opportunity to sleep between travelling to the vessel and commencing work onboard. It was also seen in chapter 6.1.2 that seafarers commenced work whilst experiencing jet lag. This finding is a concern as jet lag is known to cause sleep disturbances and other adverse symptoms such as difficulty concentrating and clumsiness (NHS 2016). Ideally, seafarers would join a vessel and spend time adjusting to life onboard prior to commencing work. However, as the accommodation space onboard vessels is limited, on most vessels it would not be possible to accommodate new joining seafarers and leaving seafarers concurrently – especially if crew changes were conducted with a substantial number of individuals. These issues would thus suggest that an entire crew, who had not rested following prolonged travel and were experiencing jet lag, would be a safety concern and thus the staggering of crew changes does offer some potential benefits. Arguably, however, if seafarers had the opportunity to rest prior to commencing work upon joining a vessel, and handovers of adequate duration were conducted, these perceived benefits of crew change staggering would be obsolete.

Irrespective of the possible benefits that crew change staggering posed, the seafarers in this study expressed a strong preference for working with familiar individuals as part of a stable work team. They perceived working as part of a stable work team, alongside familiar individuals, to be safer for the seafarers onboard and also better for the operational safety of the vessel, in comparison to working with unfamiliar colleagues.

Unstable work teams were also perceived as a concern as they were felt to promote feelings of isolation and inhibit social support. Relationships built between seafarers became transitory, with seafarers leaving the vessel and new colleagues arriving onboard. The relationships between those onboard are especially important given that seafarers are physically removed from the interactions and support of individuals ashore. These findings resonate with findings from the offshore industry, in which a study of the working arrangements for offshore workers in the North Sea found a strong preference for stable crews among offshore workers (Mikkelsen et al. 2004). In explaining this preference Mikkelsen et al. (2004, p. 175) stated “the more stable the offshore crews were, the easier the interviewees expected to be able to relate and adapt to their team colleagues and to improve the psychosocial work environment.” Similarly, unstable work teams have been shown in other industries to adversely affect employees’ well-being (see for example Sparks et al. 2001). In their study of land-based industries, Lewchuk et al. (2003) considered the number of different supervisors and groups of co-employees an individual had to be a function of task uncertainty. Task uncertainty was seen to be a component of employment strain, an issue which – as discussed in section 7.1.1 – has a negative impact on the health and well-being outcomes of individuals.

Furthermore, besides the well-known adverse impact that social isolation has on well-being (see for example Chappell and Badger 1989), isolation has been shown to be an important factor in the ‘Job Demand Control Support’ (JDCS) model (Johnson et al. 1988). The JDCS model – expanded from Karasek’s Job Demand Control Model (1979) – hypothesis predicts that low social support (isolation) combined with high demand and low control has negative health outcomes among workers (see for example Van Der Doef and Maes 1998), as well as an adverse impact on psychological well-being (see for example Hausser et al. 2010).

By and large these findings suggest a scenario in which there is a mismatch between the advantages in terms of the social support and togetherness provided by stable work teams and the disadvantages of entire crews of seafarers commencing work immediately and adjusting to life onboard concurrently, and the related issue of the potential reduction in the transference of information. However, the advantages posed by stable work teams are such that, arguably, it is the disadvantages of the situation that need to be resolved. Such resolutions would require investment – not only in terms of money – but also in the commitment shown to workers by shipping companies. The deployment lengths of seafarers onboard the same vessel would need to be aligned – and this would not match the cost efficiency logic which is currently being followed by shipping companies worldwide. It would also require seafarers to be adequately rested prior to commencing work and the reduction in the information transferred could be substantially minimised if extended handovers occurred, scenarios again which are unlikely to occur given the seafaring industry's prioritisation of profit. Thus, the presence of unstable work teams in the seafaring industry reflects a lack of commitment to the seafarer labour force which is driven by the prioritisation of profit over safety. Arguably, this lack of commitment to seafarers' safety – as well as their well-being – is unchecked because of the absence of mechanisms which give seafarers a voice.

7.6 Conclusions

By considering seafarers' health, safety and well-being in relation to the organisation of work and employment at sea this study has shown how the mechanisms to protect those who work at sea are, at best inadequate, and at worst absent.

The findings presented in chapters four, five and six indicate that the experiences of seafarers in this study do not match the requirements and regulations determined by shore-side. For example, familiarisation training (as discussed in section 7.5.1) was reported to be non-existent or poor, despite the requirements of the ISM Code.

The differences in seafarers' experiences and the requirements determined by shore-side were, undoubtedly, possible owing to shore-side's lack of interference in the organisation of life onboard. Shore-side were reported to turn a blind eye to many of the features of the organisation of work – such as hours of work and rest and when each individual would leave the vessel – and the decisions regarding such were ultimately deferred by shore-side to the Captain. This served to give shore-side the potential to distance itself. Only when aspects of the organisation of life onboard impacted on profit did they become 'visible' to shore-side – if there were no implications for profit, the seafarers suggested that shore-side treated such aspects as though they were 'invisible'. In her work Sampson (2012) suggested that onboard a ship many of the actions of seafarers were unlikely to attract the attention of shore-side.

Furthermore, the mismatch between seafarers' experiences and the requirements determined by shore-side were not recorded as much of the recording conducted onboard was reported to be inaccurate and false. Familiarisation training paperwork was falsely completed and hours of rest records were wrongly filled in to ensure compliance was, on paper, evident. Thus, the seafarers presented themselves to shore-side as rule abiding individuals even when this was not the case. These findings corroborate Bhattacharya's conclusions regarding the implementation of the ISM Code and seafarers appearance to shore-side as being in accordance with requirements even when this was not the case. Similarly, Bloor's (2003) study regarding seafarers' falsification of rest hours records provides further support for the argument that seafarers' experiences as reported to shore-side may not be accurate.

This inaccuracy between seafarers' actual experiences and the experiences they report to shore-side has a number of implications for their health, safety and well-being. First, unless an accurate picture is presented the true scale of the impact that features of the organisation of work and employment at sea have on seafarers' experiences are not known. Moreover, it is not possible to accurately consider the appropriateness of the methods of safeguarding seafarers if seafarers do not record their experiences in a truthful manner. For example, if onboard a ship rest hours violations are not recorded then on the face of it the manning arrangements for the vessel are adequate – even if the experiences of the seafarers onboard suggest otherwise.

The reasons for seafarers presenting themselves to shore-side as rule abiding even when this was not the case were found to be closely related to the organisation of employment in the seafaring industry. Precarious employment was seen to be widespread and seafarers – many of whom were from less economically developed countries – were unwilling to do anything which could potentially jeopardise their ability to secure future employment. In effect, therefore, the mechanisms intended to record any mismatch between seafarers' experiences and the requirements determined by shore-side, were ineffective – because seafarers were unwilling to risk their continued employment and shore-side were only too willing to accept the fully compliant picture presented. Arguably, seafarers were coerced into accepting unsafe working practices – such as signing paperwork stating they had received familiarisation training when this was not the case. Consequently, these findings indicate how the organisation of employment at sea may result in seafarers experiencing unsafe working conditions.

The findings from this study also showed that when an incident occurred (and was reported) the three shipping companies only recorded superficial factors – about, for example, the location of the incident and the injuries sustained. They did not record details such as the seafarer's familiarity with the ship and his/her colleagues, the manner in which they were employed or, with any accuracy, when in their deployment the incident occurred – all of which the wider literature suggest are associated with work-related incidents and injuries. The implication of this is, of course, that shipping companies are unaware of how factors relating to the organisation of work and employment at sea impact on the safety outcomes of their workforce.

Underlying these mismatches and failures seemed to be the shipping companies' regard for seafarers as a homogeneous workforce. Yet the various seafarers in this study were afforded substantially different employment terms and conditions and thus there was wide-spread inequality among the seafaring labour force. Such inequality resulted in some seafarers being more vulnerable than others. Those seafarers who were less vulnerable were able to mitigate some of the adverse features of the organisation of work and employment at sea. Issues relating to this ability – such as a seafarers' ability to arrange their own relief schedule and the facility to exert some control over their working routine onboard – are related to those concerning job control and the question of power both onboard ships and in the seafaring labour market more generally.

When considering the power held – and utilised – by those who control the seafaring labour market this study indicates that there is a drive to use the workforce in the most cost effective way possible. This resonates with the labour process perspective on the ordering of work which argues that labour is a factor of production and the workforce is objectified in use values (ILPC 2008).

The absence of a mechanism to give seafarers a voice served to reinforce this potential. As discussed in section 7.1.2, local trade unions do not have the resources and capital to counter ship owners and, owing to multi-national crews, there is no common identity among seafarers, a factor which substantially reduces their bargaining power. This lack of voice is a particular concern given the dearth of regulation – resulting from the prevalence of Flags of Convenience – to protect labour in the seafaring industry.

Taken together, the mismatch between seafarers' experiences and the requirements determined by shore-side, the absence of an appropriate mechanism to record this mismatch, and the absence of an effective measure of any consequences, were seen to exacerbate the adverse health, safety and well-being experiences of those who work at sea. Moreover, it is particularly concerning that these findings are from what is likely to be the better end of the industry and it is possible that seafarers not employed at the better end of the industry may be facing additional challenges. In the following chapter the conclusions from this study will be considered.

CHAPTER EIGHT: CONCLUSIONS

8.0 Introduction

This concluding chapter identifies the key findings of the research. It demonstrates how the thesis has addressed the research question, through the use of both qualitative and quantitative research methods. In doing so it also acknowledges the limitations of the study, for example, the difficulties experienced in accessing shipping companies' safety data. The final section of this chapter provides reflections on the findings of this study and highlights possible approaches to addressing the problems identified. These reflections include the need for shipping companies to improve their incident reporting procedures, among others.

Against the background of enormous change in the structure of employment and labour markets in the shipping industry since the 1970s, this study set out to consider the impact that the work patterns prevalent throughout today's seafaring industry have on the safety, health and well-being of those who work at sea. Thus this thesis has sought to address the following research question: What are the health, safety and well-being experiences of seafarers in relation to the organisation of work and employment at sea? In particular, this thesis explores an important aspect of the organisation of work at sea – seafarers' work patterns – and considers when and where within an entire tour of duty the adverse health, safety and well-being experiences of seafarers were most apparent and the underlying reasons, implications and consequences.

The literature review – drawing predominantly on research regarding health, safety and well-being in shore-based industries, owing to the dearth of pertinent literature from the seafaring industry – revealed that adverse health, safety and well-being outcomes could be attributed to features of the structure and organisation of employment, as well as ways in which work at sea is organised.

The literature highlighted that within all industries occupational accidents are more likely to occur at an early stage of a worker's employment – especially if workers lacked specific workplace familiarity (see for example Underhill 2007). This issue is particularly salient to the seafaring industry whereby current employment practices mean that following one tour of duty, seafarers are rarely deployed to the same vessel for subsequent tours. At the same time, however, research regarding consecutive work shifts in shore based occupations found relative risk to increase over successive workdays (Folkard and Lombardi 2006). The literature also showed that between the start and end of a seafarer's tour of duty fatigue on waking increased (Wadsworth et al. 2006). Such literature would suggest an increase in risk as a seafarer's time onboard progressed. Thus the arguments in the literature steered this study to explore the organisation of work and employment in the context of the seafaring industry.

In order to address the research question a mixed methods approach was utilised. The quantitative component comprised safety data which were obtained from three multi-national shipping companies. This data comprised 650 incidences which resulted in injuries – ranging from those incidents which resulted in a fatality to those which required basic first aid – to seafarers employed onboard the ships operated by the three shipping companies. Alongside this quantitative component a total of 37 semi-structured interviews were conducted onboard four ships. Consequently, I was able to gain an in-depth and broad understanding of seafarers' health, safety and well-being outcomes in relation to the organisation of work and employment at sea.

8.1 Summary of key findings

The findings of this study are based on the testimonies of the seafarers interviewed – in conjunction with the analysis of three shipping companies' injury records. The seafarers discussed their recollections of their experiences and there are both strengths and weaknesses in this methodological approach.

First, there is a weakness in that the findings I describe in this study were not observed by myself, they are the recalled experiences of those individuals who I interviewed. It is important to acknowledge that the recalling of experiences may not necessarily be accurate as memories of experiences may have changed over time. These recollections of the seafarers were also a phenomenological interpretation of experiences, an issue which intrinsically ties in with subjectivity.

Nevertheless, in asking seafarers to recall their experiences I was able to shed light on the lived experiences of the impact of the organisation of work and employment at sea on the health, safety and well-being of those seafarers who were interviewed. And in doing so a number of key findings emerged and these key findings are presented in this section. The section begins by highlighting the fluctuations in the health, safety and well-being experiences of seafarers in relation to their work patterns. The mismatch between seafarers' experiences and the requirements determined by shore-side is then considered and the inadequacy of the mechanisms intended to record the mismatch highlighted.

8.1.1 Fluctuations in health, safety and well-being experiences in relation to work patterns

On the whole the impact on seafarers' well-being resulting from their work patterns featured many of the issues – such as employment uncertainty, task uncertainty and scheduling uncertainty – that Lewchuk et al. (2003) identified as components of employment strain. But the impact of employment related geographical mobility – which is an intrinsic part of the work-life of seafarers – may serve to increase their vulnerabilities in this respect as it is often overlooked by both protective regulation and occupational health and safety management (Fitzpatrick and Neis 2015).

The impact these components of employment strain had on seafarers varied in relation to work patterns. The impact of location uncertainty – which was considerable during an early stage of a seafarer's tour of duty – decreased as they became familiar with the vessel. Similarly, the impact of task uncertainty was substantial at an early stage of a tour when seafarers were unfamiliar with their colleagues and supervisors onboard. Task uncertainty decreased when, as time progressed, the seafarer became familiar with the vessel. However, the regular influx and departure of colleagues and supervisors at crew changes meant that familiarity with those onboard – something which can be considered as an aspect of task uncertainty – fluctuated throughout an individual's tour.

Scheduling uncertainty impacted on seafarers predominantly towards the end of their expected tour of duty. The uncertainty seafarers experienced regarding when they would go home was a clear source of stress and anxiety for many in this study. The impact of scheduling uncertainty was also felt in the period immediately preceding a deployment, with seafarers unsure of when they would be instructed to leave home and commence work on a vessel.

Moreover, seafarers – predominantly those from less economically developed countries – requested tour extensions towards the end of their deployment and this can also be considered as a consequence of employment uncertainty. Despite having been onboard for a prolonged period of time seafarers asked to stay longer as the alternative was to return home without any certainty of when they would next receive a wage.

Thus the impact of employment strain – something which has been seen in research regarding shore-based industries to be adversely related to stress and job satisfaction (see for example Lewchuk et al. 2008) – fluctuated in relation to seafarers' work patterns.

Other factors which are not attributed to employment strain but are associated with the way in which employment and work at sea is organised were also seen to impact on seafarers' well-being. The analysis revealed that as well as during times of increased operational activity onboard and poor weather conditions, fatigue was also a concern at a very early stage of a tour when seafarers had recently arrived onboard. Such fatigue can – at least in part – be attributed to the time spent travelling, jet lag and inadequate rest before the tour of duty commences. Seafarers further perceived fatigue to increase as a tour progressed, a finding also supported by at least one previous study where between the start and end of a tour fatigue on waking increased (Wadsworth et al. 2006).

The findings from the analysis of the shipping companies' injury records were mixed, suggesting that whilst several patterns regarding time within a tour of duty and injury risk could be identified, a mismatch in terms of recording outcomes was evident in the limited – and superficial – factors recorded when a seafarer sustained an injury. The factors recorded by the shipping companies focused on the injured seafarers' basic details – for example rank and working department, and included no information pertinent to the organisation of work and employment. Thus, the shipping companies were unable to assess how features of the organisation of work and employment at sea related to the safety of their labour force.

When seen in the context of the qualitative findings the inherent problems of relying exclusively on the data the shipping companies were collecting become apparent. For example, it emerged during the analysis that seafarers were reluctant to report injuries and this reluctance was greater at certain time periods within a tour of duty – in particular at both an early and late stage of a tour of duty. It was evident that many seafarers – particularly those from less economically developed countries – were reluctant to say or do anything which might jeopardise their future employment. Thus seafarers were disinclined to report injuries as they perceived doing so would draw negative attention to themselves and such attention could potentially adversely affect their career. For many seafarers the salary earned at sea was significantly greater than the salary they would earn in occupations ashore. And in many countries there is an abundance of surplus seafarers ready to snap up any opportunity afforded to them. These findings regarding seafarers' reluctance to draw attention to themselves mirror those of other studies (see for example Sampson 2013).

Moreover, some seafarers suggested they had failed to report injuries, particularly injuries they felt could be dealt with onboard which would not need the input of any services ashore. Consequently, the patterns which emerged – or indeed did not emerge – from the shipping companies' data may simply be the consequence of seafarers' incident reporting patterns, as opposed to accurate reflections of incidents.

8.1.2 Mismatch in seafarers' experiences and shore-side's requirements and the inadequacy of mechanisms to record this mismatch

In exploring the impact of the organisation of work and employment at sea on seafarers' health, safety and well-being outcomes several ways in which seafarers attempted to circumvent requirements that had been determined by shore-side were revealed, indicating that there are short-comings in the ways in which seafarers are safeguarded.

It was particularly concerning that the seafarers reported needing to circumvent instruments of global governance, as the requirements of the shipping companies meant compliance with such regulations was unfeasible. During the discussion on hours of rest (chapter 7.2.3), for instance, it was apparent that seafarers were not experiencing the hours of rest determined by the Maritime Labour Convention. The seafarers reported 'playing' with their hours of work records, so that where possible, they were able to avoid recording hours of rest violations. Similar findings were identified by Allen et al. (2006) who found that 40% of a sample of officers reported under recording the hours they worked, so as to comply with legislation.

Requirements of the ISM Code were also circumvented. For example, in section 8.1.1 above it was seen that some seafarers failed to report injuries – yet the reporting of injuries is an important requirement of the ISM Code. The findings regarding the under-reporting of injuries mirror those from previous studies (see for example Bhattacharya 2009) that found a considerable mismatch between the purpose of the ISM Code and what it actually achieved in practice.

Another requirement of the ISM Code is that suitable familiarisation training must be carried out, however, the findings revealed that familiarisation was poor or even non-existent.

The mismatches between seafarers' experiences and the requirements determined by shore-side were not evident on paper, however, as despite circumventing shore-side's requirements seafarers completed paperwork – as required by shore-side – in a manner which failed to show the mismatch. For example, seafarers falsely reported familiarisation training to have been carried out and inaccurately recorded their hours of rest.

As individuals who were precariously employed, the seafarers likely presented themselves as rule abiding individuals even when this was not the case in order to avoid potentially inhibiting their ability to secure future employment. It was apparent that unless they were willing to draw attention to themselves, seafarers were left with little option other than falsifying records as the requirements determined by shore-side were not feasible. For instance, seafarers falsified their hours of rest as they needed to work more hours than permitted owing to the fact that crewing levels were aligned with the minimum safe manning requirements rather than the actual number of seafarers needed for the crew to operate without working excessive hours. Similarly, the analysis revealed that those who were responsible for ensuring that the familiarisation training was conducted experienced substantial additional work during port visits, the time period when familiarisation training was required. Again, this indicates that crewing levels were not adequate and that conducting familiarisation in the manner determined by shore-side was not feasible.

There were also short-comings in the use of private regulators in the safeguarding of seafarers. For example, the analysis showed that senior officers departed the vessel even when SIRE crew staggering requirements were not met. SIRE requirements stipulate that senior officers – such as the Captain and Chief Officer – should not leave the vessel at the same time and thus the relieving of these individuals is to be staggered.

Thus irrespective of whether they were requirements of private regulators or instruments of global governance, the findings from this study suggest that the mismatch between seafarers' experiences and shore-side's requirements was – at least in part – the consequence of the infeasibility of shore-side's requirements. They also indicate seafarers' reluctance to truthfully record the mismatch, which was likely the result of their fears on the impact this might have on their ability to obtain future employment.

By employing seafarers on single voyage contracts, providing them with short-notice prior to joining, deploying them to unfamiliar vessels and relieving them at a time that suited them, the shipping companies indicated to seafarers that they perceived them as commodities. Thus it was unsurprising that many of the seafarers perceived themselves as easily replaceable by shore-side and this perception was particularly evident in the discussion regarding mandatory tour extensions (chapter 7.2.1).

The perception of being replaceable also reduced the seafarers' perceptions of the power they held in relation to shore-side. Furthermore, the deregulating of the seafaring industry – which has given rise to the precarious employment methods experienced by today's seafarers – has further served to tilt the balance of power in the favour of shipping companies.

Moreover – and a further consequence of the deregulating of the seafaring industry – the use of multi-national crews has inhibited a common identity among seafarers and in the context of the physical separation brought about by open registers, national trade unions are inadequately equipped to defend their members' interests.

Consequently, the mechanisms to give seafarers a voice are inadequate and without these mechanisms, those who work at sea are reliant on the Captain – and other senior officers – to ensure that the organisation of life onboard results in a safe and positive work experience. This reliance is a consequence of the power the Captain – and other senior officers – were seen to hold in relation to the organisation of life onboard (as discussed in chapter 7.1.5). The danger of such a scenario is that without interference from shore-side abuses of power are able to go unchecked – especially given seafarers reluctance to draw attention to themselves.

Onboard the ships visited the Captains, and other senior officers, reported using this power in ways which benefited those onboard – and the other individuals suggested this was also the case. These individuals, however, likely represent the better end of the industry, particularly given that they themselves gave me permission to conduct research onboard their ships regarding the health, safety and well-being of their crew. Those Captains and senior officers who are not so benevolent would likely not have indulged my request and it was apparent that seafarers' experiences on previous vessels had not always been so positive. For example, a Third Officer reported working extra hours during a previous tour of duty as a consequence of the Chief Officer's abuse of power.

Nevertheless, throughout the discussion shore-side appeared only too willing for many of the features of the organisation of life onboard to remain invisible to them. The inadequacy of mechanisms to record the mismatch between seafarers' experiences and the requirements enables companies to potentially distance themselves from any negative outcomes. In simply accepting the reports of seafarers at face value the shipping company is able to present itself as committed, yet they are able to avoid any remedies – such as increasing crewing levels – which would adversely impact on their profit. This indicates a lack of desire to regulate, with shipping companies appearing to regulate seafarers, when in actual fact they are only too willing to turn a blind eye when seafarers' experiences do not match the regulations. This lack of interference by shore-side and the related inadequacy of mechanisms to record the mismatch between seafarers' experiences and the requirements is, undoubtedly, possible due to the inadequacy of mechanisms to give seafarers a voice. Moreover, these findings are likely related to changes in the structure of the seafaring industry whereby ship owners have flagged out their vessels to Flags of Convenience and the national link between the ship owner and the flag of the ship no longer exists. In turn, these structural changes to the industry have impacted on the ways in which seafarers are now employed – and also deployed – by shipping companies.

8.2 Limitations of study

This research was not free from limitations, as noted in chapter 3.1. It was conducted by a lone researcher and there were a number of constraints including limited time and financial resources. In this section the ways in which the study may be improved will be highlighted.

In total, four ships were visited and I arrived onboard each of them as soon as they were cleared for visitors and I left each ship once the final preparations for departure had begun. Consequently, I had around two days onboard each ship during which I conducted interviews. The data these interviews produced was rich, however, had I been onboard for longer time periods it is likely that I would have generated more data. The limited time onboard meant that I had little opportunity to gain familiarity with the participants and this may have adversely impacted on the depth of the responses obtained in some instances. If I had sailed onboard the vessels I would have been able to make “observations in the context of people doing their jobs and interacting with others at work” (Whitfield and Strauss 1998, p.115). Clearly, there are differences between researcher observations and the recollections and experiences of interview participants. As discussed in section 8.1 the recalled experiences of seafarers are dependent on seafarers’ memories and the reliability of memory. Retention may also be dependent on personal significance (Whitfield and Strauss 1998). Conversely, researcher observations of events would have been recorded as and when they occurred. Nevertheless, the recalling of experiences of seafarers provided areas of insight that my observation of events would not have provided.

From the outset I have been aware of my position as a researcher, in so much that I identify myself as a seafarer owing to my previous employment. Literature regarding practitioner research (see for example Costley et al. 2010) warns against insider bias. Such literature argues the importance of using a research informed knowledge base as opposed to using previous knowledge. Thus throughout this study I have endeavoured to keep an open mind and separate my own prior knowledge and experience from the data I collected and analysed. My position as a practitioner researcher also brought with it substantial advantages, such as my ability to gain interviewees' trust and build rapport in a short space of time. These issues regarding my position as a researcher – both the positives and negatives – were considered in greater detail in chapter 3.1.1 and I am confident that the rigorous manner in which the data were collected and analysed has prevented my position as an insider researcher from compromising the authenticity of this study.

It was also seen in chapter 3.2.1 that the analysis of seafarers' injury data is fraught with difficulties, in the most part due to difficulties in accessing such data. Thus obtaining injury data from three large multi-national shipping companies was a significant strength of this study, however such an approach was not without limitations. Many of the limitations associated with the data obtained were presented in chapter 6.4.

There were also limitations regarding obtaining secondary data, the main one being that I was limited to whatever data the gatekeepers – who in each instance were the shipping company's health and safety superintendent – granted me access to. The implication of this was that I was reliant on these gatekeepers to provide me with accurate data and any data which these individuals did not wish to divulge could simply be withheld from me. In fact, as presented in chapter three, the Superintendent at one of the shipping companies was unwilling to provide data regarding when the injured seafarers had been expected to leave the vessel. Nevertheless, such limitations were somewhat mitigated by analysing data obtained by a number of shipping companies (and thus from a number of gatekeepers) and also through the use of qualitative research methods in conjunction with the analysis of the quantitative data.

Also, despite obtaining injury data covering a number of years for large fleets more incidences of injuries would have permitted further analyses to be conducted. Similarly, without knowing the denominator population of the seafarers the ability to conduct relevant and worthwhile analyses was restricted. The denominator population would have identified the total number of individuals at risk and thus enabled an analysis of the frequency of reported incidences in relation to the total population at risk.

The fact that the three shipping companies granted me – albeit limited – access to their safety records indicated that they operated in a relatively transparent manner, at the better end of the seafaring industry. Thus whilst the findings from this study have demonstrated patterns of injuries for three shipping companies, it is possible that they have not captured any additional issues faced by seafarers employed at the poorer end of the industry. It is likely that an analysis of a wider sample of the overall seafaring industry would reveal problems of an even greater magnitude.

8.3 Reflections

In light of some of the issues which emerged in this thesis regarding the impact of the organisation of work and employment at sea on seafarers' health, safety and well-being outcomes this section highlights possible approaches to ways in which these problems can be addressed.

An obvious possible approach to the problem regarding the adverse effects on well-being resulting from unfamiliarity would be for seafarers to return to familiar vessels for subsequent deployments. Research (see for example Hansen et al. 2002) has drawn attention to the improved safety outcomes that result from such an approach and this study has extended such research and highlighted the improved well-being resulting from returning to a familiar vessel. Ultimately, this approach is not feasible in all situations. However, in instances whereby a seafarer is deployed to an unfamiliar vessel an extended handover would alleviate many of the problems associated with a lack of specific workplace familiarity. Importantly, such extended handovers would enable seafarers to become suitably familiarised with both the vessel and the equipment onboard prior to commencing work, as well as aiding the transferring of information.

With regards to the problems associated with seafarers experiencing inadequate rest between travelling to a vessel and commencing work, one possible approach would be that in determining the rest required a range of issues, such as the total amount of time spent travelling from door-to-door and time zones crossed, are considered. Adequate rest immediately prior to joining a vessel would likely result in seafarers commencing work in a less fatigued state and by taking this approach seafarers' safety outcomes may be improved and the negative effects on their well-being may be reduced.

One approach to addressing the problems associated with mandatory tour extensions and scheduling uncertainty would be for shipping companies to share their plans regarding scheduling with seafarers in a clear and timely manner. Whilst the imposing of mandatory tour extensions is undesirable, the issues related to such extensions may be lessened if shipping companies communicated more openly with seafarers – something that is also clearly related to the ways in which seafarers are employed.

A substantial issue which emerged in this thesis is the inadequacy of the incident reporting procedures of shipping companies and a way in which this problem could be addressed would be through the implementation of a universal standard for incident reporting within the seafaring industry. Given the current regulating climate within the global seafaring industry a universal standard appears unlikely and as such greater emphasis placed on the information individual shipping companies record when an incident occurs would go some way to addressing the issue. This recorded information should include aspects such as the manner in which the seafarer is employed, their length of time working as a seafarer, their length of time working onboard different vessel types, their hours of rest and when and where within a tour of duty the incident occurred – among many others factors. This approach may enable shipping companies to identify trends regarding health, safety and well-being risks in the labour force and the identification of such trends and risks would likely enable shipping companies to actively target areas which require improvement.

A further problem regarding incident reporting relates to seafarers' reluctance to report injuries, with the under-reporting of injuries seen in this study confirming well-established understandings in this area (see for example Bhattacharya 2009). Approaches to addressing this problem are complex and could include shipping companies allaying – both on paper and in practice – seafarers' fears of repercussions should they report an injury. Unless the current conditions within the industry which inhibit seafarers' willingness to report injuries are addressed, accurate information will simply not be recorded by shipping companies.

Overall, this study indicates that further research regarding seafarers' occupational health, safety and well-being is required. Whilst my study has shed light on seafarers' health, safety and well-being experiences in relation to the organisation of work and employment at sea, it is by no means exhaustive. It would be of interest to explore seafarers' health, safety and well-being experiences in relation to the organisation of work and employment in other sectors of the industry – for example, within the cruise sector, where due to the nature of the organisation of employment, scheduling uncertainty is unheard of. Given the substantial impact that scheduling uncertainty was seen to have on seafarers' well-being experiences in this study, further research into the prevalence of mandatory tour extensions would also be of particular interest.

In light of the substantial variation in the duration of seafarers' tours of duty – as well as differences in the ways in which various seafarers are employed – this study has challenged the appropriateness of analysing the frequency of seafarers' injuries in relation to days into tour of duty lapsed. Rather, the findings from this study indicate the importance of exploring injury frequency in the context of an entire tour of duty and further research in this area could build on this approach to achieving a more in-depth understanding of occupational injuries among those working at sea.

In addition, whilst previous studies (see for example Hansen et al. 2002) have explored seafarers' injury rates in relation to returning to the same vessel for subsequent tours of duty, further research regarding seafarers' health, safety and well-being in relation to workplace specific familiarity is undoubtedly required. Such research is of particular importance given that mandatory safety equipment varies from ship to ship.

Similarly, studies (see for example Mikkelsen et al. 2004) have explored stable work teams in the offshore oil and gas installation industry but little is known about the impact of stable crews on seafarers' health, safety and well-being outcomes. Thus an exploration of stable crews onboard vessels is required.

The scope of future research could also be expanded and the views of other stake-holders, such as, trade unions, shipping companies and manning agencies, explored in order to appreciate their perceptions on the underlying issues regarding the organisation of work and employment at sea.

A key feature of the present research concerns the way in which it has tried to understand the effects upon the health of workers of the ways in which work and employment are organised. For this reason it has taken into account the possible consequences of long distance travel between home and worksite and vice versa, along with the consequences of the overrun of contracts and repatriation delays, which in turn raise issues concerning the contractual basis of employment in the seafaring industry. Throughout it has acknowledged the considerable challenges involved in collecting and analysing meaningful data to measure the effects of these issues. While it has been concluded that there are no easy solutions to this problem, this is no reason for not accepting the challenge they present for seeking appropriate ways to further explore associations between these issues and work-related health.

8.4 Final words

This research set out to explore the impact of the organisation of work and employment at sea on the occupational health, safety and well-being of seafarers. Through the use of a mixed-methods approach this study has generated several important findings. It has largely indicated the presence of hierarchies of vulnerability among seafarers which were strongly associated with the ways in which their work and employment were organised. These appear to reflect a shift in the balance of power between seafarers and their employers, which has been a consequence of fundamental changes in the structure and organisation of the seafaring industry and its labour market.

Through an in-depth analysis it has further been revealed that there are features of the associations between poor occupational health, safety and well-being outcomes and the way that work and employment at sea is organised that are not (and cannot be) captured by the arrangements in place which are intended to safeguard seafarers, nor are the outcomes of these presently monitored.

By highlighting the associations between occupational health, safety and well-being outcomes and the organisation of work and employment at sea, this study has extended the boundaries of a relatively sparse body of literature regarding occupational health and safety in the seafaring industry. It has also shown the need for the health, safety and well-being of those who work at sea to be understood in the context of broader factors concerning the sociology of work and employment. In doing so, this study has contributed to academic knowledge and has importance for those who control the seafaring labour force, as well as for those who work at sea.

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APPENDIX I: RESEARCH PARTICIPANT DISCLAIMER (SHIPPING COMPANY SUPERINTENDENT)

Helen Douglass
SIRC/Nippon PhD Research Fellow
SREC Application for Ethical Approval

ACCIDENT BLACK TIMES AMONG SEAFARERS RESEARCH PARTICIPANT DISCLAIMER

Research conducted by: **HELEN DOUGLASS**
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DISCLAIMER FOR COLLECTION OF COMPANY ACCIDENT DATA

- I am willing to provide data to be used for this research as follows:
 - For seafarers who experienced an occupational accident:
 - date the seafarer joined the ship, date the seafarer experienced the accident,
 - type of occupational accident (restricted work accident/lost time incident/medical treatment case),
 - date the seafarer expected to leave the ship (end of planned contract),
 - date the seafarer left the ship,
 - ship name (to be used to ascertain ship type)
 - For each ship on which a seafarer experienced an occupational accident:
 - total number of seafarers onboard at the time
 - total number of seafarers from this group that over-stayed their planned contract end
- I have been informed that all information I give will remain confidential and all participants will remain anonymous. Any details which may compromise this anonymity will be removed or masked as appropriate. No company identifiable data will be used at all during the work.
- I understand that the data will be stored securely throughout the period of research and also for a period of five years following the completion of the research as per the Cardiff University guidelines. I understand that access to the data will be restricted to Helen Douglass and two PhD supervisors.
- I have been informed that the data I give will be used for PhD research. The data will appear in a PhD thesis and may be published in the form of journal articles, books or used as training material.
- I understand that I have the right to withdraw my consent for the use of any data provided at any time and that the partaking in this research is voluntary.

Signature of participant

Name

Date

Signature of researcher

Name

Date

Copies: participant
Research file

APPENDIX II: INTERVIEW PARTICIPANTS

Position onboard	Department	Nationality	Age
Ship 1			
Bosun	Deck	British	37
Third Engineer	Engine	British	29
Chief Steward	Other	Polish	46
AB 1	Deck	Romanian	44
AB 2	Deck	Romanian	51
Second Officer	Deck	Polish	27
First Officer	Deck	Polish	28
Storekeeper	Other	Norwegian	62
Administrator	Other	Filipino	42
Steward	Other	Filipino	41
Ship 2			
Second Engineer	Engine	British	27
Chief Engineer	Engine	British	55
Captain	Deck	British	53
Deck Cadet 1	Deck	British	20
Deck Cadet 2	Deck	British	21
Fourth Engineer	Engine	British	23
Third Engineer	Engine	British	29
Deck Cadet 3	Deck	British	20
Third Officer	Deck	British	29
AB 1	Deck	British	52
Second Officer	Deck	British	23
AB 2	Deck	British	51
Ship 3			
Third Engineer	Engine	Filipino	43
Chief Engineer	Engine	Swedish	39
Second Officer	Deck	Swedish	54
Chief Officer	Deck	Swedish	39
Captain	Deck	Swedish	54
OS	Deck	Filipino	31
Wiper	Engine	Filipino	34
Ship 4			
Captain	Deck	Dutch	57
Chief Officer	Deck	Filipino	52
Chief Engineer	Engine	Polish	45
Cook	Other	Polish	49
Third Officer	Deck	Russian	25
AB	Deck	Filipino	42
Second Engineer	Engine	Filipino	43
Second Officer	Deck	Russian	30

APPENDIX III: ETHICAL APPROVAL LETTER

Cardiff School of Social Sciences
Director Professor Malcolm Williams
Ysgol Gwyddorau Cymdeithasol Caerdydd
Cyfarwyddwr Yr Athro Malcolm Williams



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28th May 2013

Our ref: SREC/1068

Helen Douglass
PhD Programme
SOCSI (SIRC)

Dear Helen

Your project entitled "*Accident black times among seafarers*" has now been approved by the School of Social Sciences Research Ethics Committee of Cardiff University and you can now commence the project.

If you make any substantial changes with ethical implications to the project as it progresses you need to inform the SREC about the nature of these changes. Such changes could be: 1) changes in the type of participants recruited (e.g. inclusion of a group of potentially vulnerable participants), 2) changes to questionnaires, interview guides etc. (e.g. including new questions on sensitive issues), 3) changes to the way data are handled (e.g. sharing of non-anonymised data with other researchers).

In addition, if anything occurs in your project from which you think the SREC might usefully learn, then please do share this information with us.

All ongoing projects will be monitored every 12 months and it is a condition of continued approval that you complete the monitoring form.

Please inform the SREC when the project has ended.

Please use the SREC's project reference number above in any future correspondence.

Yours sincerely

Professor Tom Horlick-Jones
Chair of the School of Social Sciences Research Ethics Committee

cc: E Renton / Supervisors: D Walters & E Wadsworth

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APPENDIX IV: INTERVIEW GUIDE

Three main areas:

1. Risks at sea
2. Time
3. Injuries at sea

Background

1. Can you start by telling me a bit about your background as a seafarer?
 - What ticket do you hold?
 - What is your role in your current rank?
 - How long have you worked at sea?
 - What other ship types have you worked on?
 - How long have you worked for your current employer?
 - How long have you worked onboard a [ship type]?
 - How long have you worked onboard this vessel?
2. Can you tell me about the manner in which you're currently employed, such as your contract type, trip length and so on?
 - Do you have a permanent or a voyage contract?
 - How long is your trip?
 - How long is your leave?
 - Do you do any employment during your leave?
3. Can you tell me about crew change-over such as the size of crew-change over and frequency of crew change-overs?
 - How many crew change-over at once?
 - How often do crew changes occur?
 - How often does on time relief occur?
 - How do you feel about not getting relieved on time?
 - Do you work back-to-back / do you return to the same vessel?
4. Can you tell me about your normal hours of work onboard?
 - Which watch pattern are you working?
 - How do the hours you work change within an entire trip?
 - When during a trip do you work more hours?
 - When during a trip do you work less hours?
5. Can you tell me about fatigue during a trip?
 - When are you particularly tired?
 - Why are you particularly tired then?
 - How do you identify periods when you're particularly tired?
 - How does fatigue relate to your working practices?
 - Can you give me an example of how your working practices are affected by fatigue?
6. Can you tell me about the process from leaving home until joining this vessel?

- How much notice did you get? Is this standard?
 - How long did it take to get to the airport?
 - How long was your flight?
 - What happened when you arrived at the destination airport?
 - What was the time zone difference?
 - How long did you spend in a hotel?
 - How long did you travel to the ship from the airport?
7. Next can you tell me about the process you experienced once you joined the vessel?
- Can you tell me about your familiarisation tour?
 - Can you tell me about the handover you experienced?
 - Were you already familiar with the other seafarers onboard?
 - When did you begin work?
8. Finally, thinking back can you describe the process you experienced when you signed off your last vessel?
- Can you tell me about the handover?
 - Can you tell me about your final few days of work?
 - How soon after finishing work did you leave the ship?

Risks

9. What do you think are the greatest risks faced by yourself onboard?
- Why do you think these are the most significant risks?
 - Can you give me an example of how you experience these risks?
10. How do you think risks vary depending on your position onboard?
- Why do you think this?
 - What do you think is the riskiest part of your particular job onboard?
 - Can you give me an example of why you think this is particularly risky?
11. What do you think are the greatest barriers to addressing the risks you've mentioned?
- What makes you think of these issues as barriers?
 - How do you try to overcome these barriers?
12. Can you tell me how you think these risks vary might vary?
- How do you think these risks vary with time of the day?
 - How do you think these risks vary with experience?
13. How do you think the SMS addresses these risks?
- What do you particularly like about the SMS?
 - What do you dislike about the SMS?
 - How confident do you feel using the SMS?
 - What would you change about the SMS?
14. How do the ways the SMS address the risks work in practice?
- Can you give me an example of when you haven't followed the SMS procedures?
(If no: can you give an example of when a colleague hasn't followed the SMS procedure?)

- Can you explain why you didn't follow the SMS procedure?

Time

15. What is your favourite watch to work?
 - Why do you particularly like the X to Y watch?
16. What is your least favourite watch to work?
 - Why do you particularly dislike the A to B watch?
17. How do you think risk differs between the different watches?
 - What do you think is the riskiest watch?
 - What do you think is the safest watch?
 - Why do you think this?
18. How do you think risk differs between different watch patterns?
 - What do you think is the riskiest watch pattern?
 - What do you think is the safest watch pattern?
 - Could you tell me more about your thinking on this?
19. When within your X weeks/months trip are you today?
 - It's interesting that you say you're X days/ weeks in rather than X days/ weeks from the end, when within a trip would you say that you were X days/ weeks from the end of your trip? (or vice versa)
 - What makes you choose this particular period of time?
 - How do you think this would vary depending on the length of trip you're working?
 - Why do you think this?
20. Do you think risks vary within the X weeks/months you are onboard?
 - Can you explain why you think this?
21. When do you think the riskier times within the X weeks/months you are onboard?
 - Why do you think these times are more risky?
 - Can you give me an example?
22. Do you think the SMS takes account of these times?
 - If so, how?
 - If not, what could be done differently?
 - How are these issues taken into account unofficially onboard?
23. Do your working practices differ at different times during your trip?
 - Can you tell me more about how your working practices might differ?
 - How do these times of working practice differences relate to periods of time you view as particularly risky?
23. What period of time would you consider to be the start of your trip?
 - Why do you view this particular period as the start?
 - How does this vary with the length of your trip?

24. What period of time would you consider to be the end of your trip?
- Why do you view this particular period as the end?
 - How does this vary with the length of your trip?

Injuries at sea

25. What factors would affect whether or not you reported an injury?
- What are your reasons for identifying these particular factors?
 - How would the period of time into your trip affect whether or not you reported an injury?
 - What makes you say this?
26. Can you tell me about the most recent injury have you experienced onboard?
(If no: what about an injury that you didn't report/ can you tell me about an occasion when you hurt yourself but didn't feel it warranted reporting?)
- What were the events leading up to the injury?
 - Can you tell me more about why you think the incident happened?
 - What particularly stands out in your mind about the incident?
 - Can you recall how you felt after the incident?
27. Can you tell me what happened when you reported the injury? (If didn't report it: why did you choose not to report the injury? Did anyone else witness the event? How did you feel about not reporting the injury?)
- How did the Captain react when you reported the injury?
 - How do you feel the injury report was handled by shoreside?
 - What makes you say that?
 - If you experienced a similar incident in the future would you do anything differently?
 - Can you tell me more about your thinking on that?
28. How does when this incident occurred within your trip relate to your ideas regarding risky times?
29. What else do you think is relevant that we haven't discussed?

APPENDIX V: INFORMATION SHEET FOR SEAFARERS

Helen Devereux
SIRC/Nippon PhD Research Fellow
SREC Application for Ethical Approval

Research project: Exploring the relationship between occupational injuries and time into tour in the seafaring industry.

Dear prospective participant,

You are being invited to participate in the above-stated project and before you decide if you wish to participate it is important you understand what the project will involve and why it is being carried out.

What is this project about?

The overall aim of this project is to contribute to the understanding of the ways in which different time periods within a voyage affect seafarers from different sectors of the seafaring industry.

Who is doing the project?

This research is being carried out by Helen Devereux a 3/O who is completing a PhD at the Seafarers International Research Centre, part of Cardiff University. Helen is being supervised by Professor David Walters and Dr. Emma Wadsworth.

Why have I been chosen?

Helen is looking to speak to seafarers who sail onboard either deep-sea tankers or offshore vessels in order to explore how these seafarers experience and perceive risk at different periods of time within a voyage.

What will I have to do?

You will be invited to participate in a conversation with Helen which will take around one hour and with your permission this conversation will be digitally recorded so that all the things that are said in the discussion will be remembered.

What kind of things will be discussed?

During the conversation you will be asked about how you perceive risk at different periods of time within a voyage and your experiences of personal injuries at sea. You are free to say as much or as little as you want and of course you can withdraw from the conversation at any time without having to give a reason.

What will be done with the information I give?

Following the conversation Helen will play back the audio recording and type the discussion exactly as it happened. This information will then be analysed and used as part of a PhD thesis. Some of the information may also be used in journals and books, however, it will not be used for any other reason.

Will the information I give be kept confidential?

When typing up the conversation all identifying details will be removed and these identifying details will only be accessible by Helen and her two supervisors. Your name will not feature on either the digital recording or the typed version and you will remain anonymous. The recording and typed version of the conversation will be stored in a secure location at Cardiff University.

What if I am concerned about the conduct of the research?

This project is being conducted with the approval of the Cardiff University School of Social Sciences Research Ethics Committee. If at any point you are concerned about any aspect of this project please contact the chair of the committee at the following address:

Cardiff University School of Social Sciences
Glamorgan Building
King Edward VII Avenue
Cardiff CF10 3WT
Wales UK

How can I contact you?

If you would like any further information about this project please contact Helen at either the following postal address or email address:

Helen Devereux
Seafarers International Research Centre
Cardiff University
Cardiff CF10 3AT
Wales UK
Email: douglassh1@cardiff.ac.uk

Thank you for taking the time to read this information and it would be a pleasure to have you participate in this project.

APPENDIX VI: INTERVIEW PARTICIPANT CONSENT FORM

Helen Devereux

SIRC/Nippon PhD Research Fellow

SREC Application for Ethical Approval

ACCIDENT BLACK TIMES AMONG SEAFARERS RESEARCH CONSENT FORM

Research conducted by: **HELEN DEVEREUX**

Seafarer International Research Centre, Cardiff University, 52 Park Place, Cardiff,
United Kingdom, CF10 3AT

douglassh1@cf.ac.uk

Supervisors: Prof David Walters & Dr Emma Wadsworth

Cardiff Work Environment Research Centre, Cardiff University, 59 Park Place, Cardiff, CF10 3AT

Email: waltersd@cf.ac.uk / wadsworth@cf.ac.uk Tel: 029 2087 0013 / 5123

CONSENT FOR PARTICIPATION IN INTERVIEW

1. I am confirm they I have read the attached participant information document and that I understand the contents of it.
2. I have been informed that all information I give will remain confidential and my participation will remain anonymous. Any details which may compromise this anonymity will be removed or masked as appropriate.
3. I understand that the data will be stored securely throughout the period of research and also for a period of five years following the completion of the research as per the Cardiff University guidelines. I understand that access to the data will be restricted to Helen Devereux and two PhD supervisors.
4. I have been informed that the data I give will be used for PhD research. The data will appear in a PhD thesis and may be published in the form of journal articles, books or used as training material.
5. I understand that I have the right to withdraw my consent for the use of any data provided at any time and that the partaking in this research is voluntary.

Signature of participant

Name

Date

APPENDIX VII: RECODING OF FACTORS

Nature of injury:

Recoding category	Original category
Break/ fracture	Cracked/ broken bone
Bruise	contusion/ bruising
Sprain/ strain	sprain/strain
Laceration/ open wound	cuts/ abrasions
	abrasions/ graze
	cut/ laceration
	open wound
Burns (scalds/ chemical)	chemical/ electrical burn
	burn/ scald
Other	dislocation
	crush
	foreign bodies
	amputation
	strike/ blow
	other
	swelling
	respiratory/ asphyxiation
	Concussion
	head injuries

Rank:

Recoding category	Original category
Officer	Captain
	Chief engineer
	First engineer
	First officer
	Chief officer
	Second engineer
	Second officer
	Third engineer
	Third officer
	Fourth engineer
	Electrician
	Senior officer deck
	Junior officer engine
	Junior officer deck
	Engine cadet
	Deck cadet
	Dual cadet
Rating	Deck rating
	Pump man
	Oiler
	SHN
	Chief cook
	Second cook
	Mess man
	SHS
	MO3
Other	Other
	Repair man
	Supernumerary
	Shore representative

Part of body injured:

Recoding category	Original category
Arm	Arm
	Hands/ fingers
	Elbow
Leg	Legs
	Knees
	Feet/ toes
Torso	Torso (front)
	Torso (back)
	Shoulder
	Internal
Head	Head
	Face
	Eye
	Teeth
Other	Other
	Groin

Seafarers working department:

Recoding category	Original category
Deck	Captain
	Chief officer
	First officer
	Second officer
	Third officer
	Deck cadet
	Deck rating
	Pump man
	Senior officer deck
	Junior officer deck
Engine Other	Chief engineer
	First engineer
	Second engineer
	Third engineer
	Fourth engineer
	Engine cadet
	Junior officer engine
	Oiler
	Electrician
	Chief cook
	Dual cadet
	Second cook
	Mess man
	Other

	Repair man
	Supernumerary
	Shore representative
	SHS
	SHN
	MO3

APPENDIX VIII: INJURY CLASSIFICATIONS

Fatality	A death directly resulting from a work injury regardless of the length of time between the injury and death.
Lost workday case	This is an injury which results in an individual being unable to carry out any of his duties or to return to work on a scheduled work shift on the day following the injury unless caused by delays in getting medical treatment ashore. Note: An injury is classified as an LWC if the individual is discharged from the ship for medical treatment.
Restricted work case	This is an injury which results in an individual being unable to perform all normally assigned work functions during a scheduled work shift or being assigned to another job on a temporary or permanent basis on the day following the injury.
Medical treatment case	This is any work-related loss of consciousness, injury or illness requiring more than first aid treatment by a physician, dentist, surgeon or registered medical personnel, e.g. nurse or paramedic under the standing orders of a physician, or under the specific orders of a physician or if at sea with no physician onboard could be considered as being in the province of a physician.
First aid case	This is any one-time treatment and subsequent observation or minor injuries such as bruises, scratches, cuts, burns, splinters etc. The first aid may or may not be administered by a physician or registered professional.

Incident classification adapted from OCIMF 1997 [online].

APPENDIX IX: INDEPENDENT VARIABLES ANALYSIS

Rank	Company A	Company B
Officer	52 (39.1%)	120 (34.7%)
Rating	76 (57.1%)	208 (60.1%)
Other	5 (3.8%)	18 (5.2%)

Injury type	Company A	Company B
Break/fracture	14 (10.6%)	22 (6.2%)
Sprain/strain	22 (16.7%)	52 (14.6%)
Laceration/open wound	52 (39.4%)	103 (29.0%)
Burn/scald	9 (6.8%)	15 (4.2%)
Bruise	20 (15.2%)	56 (15.8%)
Other	15 (11.4%)	107 (30.1%)

Location where injury occurred	Company A	Company B
Deck	58 (43.6%)	156 (40.0%)
Engine room	39 (29.3%)	125 (32.1%)
Accommodation block	32 (24.1%)	88 (22.6%)
Other	4 (3.0%)	21 (5.4%)

Part of body injured	Company A	Company B
Arm	55 (41.4%)	144 (38.6%)
Leg	29 (21.8%)	77 (20.6%)
Torso	11 (8.3%)	65 (17.4%)
Head	35 (26.3%)	84 (22.5%)
Other	3 (2.3%)	3 (0.8%)

Department	Company A	Company B
Engine	37 (32.2%)	82 (24.6%)
Deck	58 (50.4%)	97 (29.1%)
Other	20 (17.4%)	154 (46.2%)