Managing Health and Safety Through the Supply Chain: A Case Study of Supply Chain Influence in the Shipping Industry

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Abstract

This paper presents the findings of a preliminary and on-going study on the role of supply chain relations in influencing the desire of tanker operating companies and their seafarers to institute and operationalise health and safety management arrangements on board their vessels. It does so by investigating the perceptions of the seafarers and the managers of these companies concerning the influence of oil company requirements on health and safety management on board their ships and the vetting, monitoring and inspection arrangements made to ensure compliance. It sets these findings in the wider context of regulating OHS management at sea and evaluates the contribution of this form of private regulation towards supporting improved OHS management performance and compliance with international regulatory requirements. In so doing it tests some of the conclusions and postulates that emerged from a previous study concerning the operation of supply chain influences on arrangements for managing occupational health and safety more widely, and contextualises them within the discourse on the effective regulation of OHS management at sea. It is however a report that concerns only part of an ongoing investigation and as such, as the paper makes clear, its conclusions are tentative and subject to further research.

Introduction

Two years ago I presented a paper at the SIRC Symposium exploring some of the links between modern business practices in relation to supply chains and their possible effects on managing health and safety at work. It was based on a study funded by the Institution of Occupational Safety and Health (IOSH), that Philip James and I had just completed, in which we had reviewed the available literature on these effects and drawn up some postulates concerning the role of supply chain relationships in supporting or undermining occupational health and safety (OHS) management practices especially among suppliers (Walters and James 2009). As I made clear in the 2009 presentation, our findings at the time were based almost entirely on the previous research of others and it was therefore important to test our postulates with further empirical research. For the last year or so we have been engaged in a study that is intended to achieve this. This work is ongoing and not yet complete. However, in this paper I would like to present some of our preliminary findings that are particularly relevant to the maritime sector.

While we were undertaking the original study, I had become separately aware of the apparent significance of an example of supply chain influences on health and safety management in the maritime industry. This was largely as a result of the investigations of Syamantak Bhattacharya who was then one of my research students, and who had been studying the implementation of the ISM Code on board tankers (Bhattacharya 2009). As a result of an interest that both Syamantak and I had shared in exploring these insights further, because of the importance of the industry in the globalised economy and the well-known challenges that it presents for regulatory intervention in OHS management, Helen Sampson and I decided we would make the maritime industry one of the sectors for further investigation of supply chain effects. In addition, our research team has looked at these effects in construction and in the food industry. In this paper however, I want to discuss some of our preliminary findings on experiences in the maritime sector, based on data originally collected by Bhattacharya and also on that collected more recently by Xue both of whom are my co-authors. We must stress from the outset that this is a work in progress and the study is not yet complete.

We begin by defining what we mean by supply chains and why we think they might be important influences on OHS management generally and with reference to the maritime industry particularly. We do this by briefly summarising the evidence found in the previous study concerning such influences and by enumerating the key postulates that emerged from a consideration of this evidence. We next outline the challenges to OHS management in the sector, highlighting the potential role of supply chain relationships in either supporting or undermining OHS management strategies on board ships. We then turn to the part of our current investigation that we have recently completed, which is concerned with seafarers' experience of the influences of the requirements of major oil companies on OHS management on board the ships carrying their products. We outline the methods we used to collect our data on the experiences of seafarers and then try to set these findings in the wider context of regulating OHS management at sea and evaluate the contribution of this form of private regulation towards supporting improved OHS management performance and compliance with international regulatory requirements. In so doing we are also able to test some of the conclusions and postulates that emerged from the previous study concerning the operation of supply chain influences on arrangements for managing occupational health and safety, and contextualise them within the discourse on the effective regulation of OHS management at sea.

Finally, since this is a preliminary account of an on-going study we will outline the further work we need to undertake in order to complete the study.

What are supply chains and why might they be important in OHS?

Supply chains (or value chains) describe relationships involved in procurement and delivery of goods and services. They may involve simple buyer/supplier relationships between two entities or more commonly, quite long and complex chains or networks of transactional relationships involving numerous organisations involved in various business relationships between production and use. Business organisations are frequently simultaneously involved in a host of transactions in which they may be buyers in some and suppliers in others. While both private and public sector organisations have always required suppliers and been themselves suppliers of products and services, as economic globalisation and modern business methods associated with the globalised economy have grown in prominence, so too has the interest in supply chain management and the price and delivery demands dominating transactions between organisations. Current business and organisational practices such as downsizing, outsourcing, just in time management and lean production have further served to increase the importance of supply chains within business relations and the national and global economies in which they occur.

Supply chains are normally hierarchical with an uneven distribution of power within them, which provides potential for dominant actors to influence the behaviour of others in the business relationships involved. As businesses increasingly try to manipulate features of supply chains to improve their profitability, efficiency and market position, the question of what happens to the health and safety conditions of workers affected by these strategies has become the focus of some attention and debate among OHS practitioners, regulators and regulatory scholars. As we discovered in our previous study, current discourse on these consequences reveals two very different effects. In summary, the previous study of nearly 200 publications in which we found these effects demonstrated both positive and negative influences of supply chain pressures on preventive health and safety arrangements. Thus, on the negative side, the vast majority of studies demonstrate that such pressures often act to generate 'indirect' adverse effects (Quinlan et al., 2001; Quinlan and Bohle, 2009). For example, in an Australian investigation of the experiences of those working under sub

contract/outsourcing arrangements in four sectors, child care, hospitality, transport and building which found that these arrangements were associated with increased economic competition, as well as work disorganisation, regulatory failure and a divided workforce, leading the researchers to conclude that in 'any organisation where outsourcing has become common, OHS standards deteriorate....' (Mayhew et al,1996). Many other studies in, for example, the food, textiles and transport industries detail similar effects, as do the majority of studies of outsourcing in the public and third sectors (Walters and James, 2009; Walters and James, 2011; Cunningham et al., 2011).

Meanwhile, on the positive side, as these authors also show, such evidence relating to how supply chain relationships can detrimentally impact on health and safety standards, somewhat paradoxically, occasionally also points to the existence of a potential for them to be used to enhance, rather than undermine, health and safety standards within supplier (and purchaser) organisations. For it also suggests that scope exists for powerful supply chain actors to use the market power at their disposal to improve such management. They might do so for example, by laying down requirements as to how it is undertaken and by taking action to monitor and enforce compliance with these requirements. Examples of such practices have come to feature significantly in discourse around public/private regulatory strategies to improve labour standards, including those on health and safety in globalised production and also, more specifically, to improve OHS management in industries such as construction.

However, as Walters and James (2009 and 2011) have argued, for such potential to be realised a set of conditions apply. These include:
a) the extent to which the OHS management arrangements made by suppliers, create implications for their effective supply of whatever goods or services were required of them by buyers; and
b) the extent to which relevant external pressures are exerted by legislative provisions, regulatory agencies and others.

That is, attempts by buyers to influence supplier health and safety management are likely to be more effective where they are supported by adequate monitoring and penalty regimes; and occur within a relatively collaborative and trust based supply relationship. These kinds of supply relationships are mostly found where buyers and suppliers have worked together,

satisfactorily, for a relatively long period, the wider institutional context is supportive of them and again, where there is some form of public or private regulatory scrutiny in place.

Conversely, buyer attempts to influence supplier health and safety management are less successful where they: (a) clash with the business interests of suppliers and (b) where suppliers regard the risks of failing to comply with them to be relatively low.

The nature of supply chain relationships and the behavioural dynamics within them are further likely to be crucially affected by the characteristics of the goods and services provided through supply chains, the objectives and wider business interests of buyers and sellers, as well as the distribution of power between them, and the institutional (including regulatory) context within which buyer-supplier relations are developed.

The significance of supply chains in the maritime industry

Taking these postulates into account, we turn our attention to the maritime industry. Here we find an industry in which there has been an increased focus on the externalization of the supply of services. This is, of course, mainly because of its role in the logistics of supply internationally and its critical position in this respect has caused major transformations in the way in which the industry is structured and organized. At the same time, it continues to be one of the most hazardous industries for the workers involved, with occupationally related mortality, illness and injury rates at levels as high as those in land-based sectors such as construction and agriculture (if not even higher). However, unlike these land-based activities, the global nature of maritime activity means it takes place, for the most part, in situations that are largely beyond the reach of conventional regulatory inspection.

The industry is complex and fragmented, its vessels and the companies that own or manage them often have distinct features according to their trade. In recent decades it has undergone major transformations in its efforts to improve its competitiveness. These have been driven largely by the price and delivery demands of clients worldwide, and have profoundly affected the nature of ownership and management of shipping, the origins of the maritime labour force and its recruitment and management in the sector as well as ship design and the design and location of port facilities. It would be surprising indeed if such transformation had not also

had a significant impact on experiences of work and its management in the industry, including that of the management of health and safety at sea. Given this situation we reasoned it was an ideal case in which to test some of our previous postulates concerning both the positive and negative effects of supply chain relations on OHS management.

For our purposes, one of the most interesting elements of change in the modern maritime industry concerns that occurring in relationships between clients, shipping companies and the seafarers that crew the ships carrying clients' goods from port to port around the world. These are precisely the kinds of change that the previous review of research on land-based industries demonstrated to be responsible for significant effects on health and safety management and outcomes. In this respect shipping operators typify the 'porous organisations' it identified in land-based examples, where the demands of clients superimpose upon relations between employers and employees and come to dominate concerns about the management of work. As such they are powerful and growing influences on the nature of working conditions and the work environment. While they may lead to work intensification and poorer working conditions, as is the case elsewhere there is also the possibility that, in certain circumstances these influences may contribute to the improvement of arrangements for health and safety management and the working conditions of the seafarers involved. We wished to examine both these sets of circumstances in the present study.

Aims of the study

The broad aim of the study was to discover more about the nature of supply chain relations, and the ways and circumstances in which they might affect health and safety at sea. The specific aim of this paper however, is to consider the application of the postulates we have derived from the previous general review, in one sub-sector of the industry in which we have some reason to believe these influences may have positive effects on OHS management – namely the petrochemical tanker trade. Here we are concerned with describing the systems in operation to achieve this, their strengths and limitations and especially the experiences and attitudes of seafarers and ship operating company managers in relation to them.

Methods

We have examined supply chain leadership and management practices relating to health and safety and their effects on board ships in the petrochemical tanker sector because we already had some information on these effects from Bhattacharya's (2009) previous fieldwork on the implementation of the ISM code. We were able to revisit this field work, which had been carried out in 2006, on board four ships managed by two major ship operating companies, and explore his data with more detailed specific focus on seafarers' experiences of the influences of the OHS management requirements of the oil companies to which their ships were chartered. In addition we were able to use data collected by Xue in the course of his more recent (2009-2010) fieldwork on board four tankers operated by two Chinese shipping companies to investigate the same influences. In each case we have tried to explore the operation of such influences on arrangements for health and safety management on board ships, from the perspective of both officers and ratings, and to examine responses to these issues from the management of the ship operating companies.

In the course of their combined fieldwork Bhattacharya and Xue interviewed nearly 120 seafarers while sailing with them on board eight different vessels. They also interviewed 23 shore based managers in the four companies responsible for operating these vessels. Among other things, these interviews sought information on ship operating company strategies in relation to OHS management and the seafarers' experiences of them on board ships. This included especially the experience of the operation of systems to implement the ISM Code, covering reporting and communication systems for safety management, inspection practices and audit and review, as well as the involvement of the seafarers themselves in securing good practice on board the tankers on which they sailed. It needs to be stressed that the main focus of their fieldwork, the research questions they set out to address and the instruments they used to gather data, did not directly concern supply chain influences. In both cases these matters were raised by respondents in response to wider questions on the influences on shipboard management arrangements for OHS, and although the questions respondents were asked were different in both studies, there were substantial overlaps in the responses they elicited. In the analysis presented here we have focused solely on the material volunteered by respondents concerning supply chain influences on health and safety management practices.

Our findings on the effects of supply chains

Oil and chemical tankers normally carry hazardous cargoes and are therefore subject to particularly stringent requirements concerning their safe transport. In this account we want to focus not so much on these requirements, as on the influences on the will and capacity of ship operators and their crews to implement them.

With their capacity to choose which ships to employ, charterers have the opportunity to be highly influential in the way that ships are operated. The oil sector has arguably advanced furthest along this road, due to the small number of large players in the sector. The oil majors claim to account for some 20-30% of the market, with the other 70-80% being served by independent tanker operators. Through their representative organisation, the Oil Companies International Marine Forum (OCIMF), the oil majors are able to present their views within the IMO and other regulatory and legislative arenas. The independents are similarly represented by INTERTANKO.

To be able to compete for contracts with the oil majors, either directly or indirectly, 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 on board. The situation is quite complex, but generally the dominance of the oil majors is much in evidence in the sector. Vessels and the companies that operate them are vetted and required to meet rigorous standards concerning a matrix of procedural and manning requirements that influence the management of OHS among other things. Inspections are performed according to standard report formats developed by the OCIMF (see below) and provide each oil company's vetting department with the information necessary to apply its criteria for the selection and/or continued use of tankers and their operating companies. Tanker vetting inspections are usually carried out during unloading operations, with the prior agreement of the ship owners and operators, and include access to confidential documents relating to the vessel's maintenance and classification. Where a fleet operation fails to meet the required standards, even if it is the result of the lower performance of only one owner's ships, it may result in the entire fleet being denied business. Oil Majors carry out vetting primarily to protect themselves and their business, to be seen to be exercising due diligence and to provide the necessary paper trails in the event of an accident. Their investment in the management of the vetting process is considerable.

In addition safety management issues with relevance to the berths at refineries where tankers load and unload their cargoes are also significant. Since many of these will be owned and/or operated by major petrochemical companies they are further able to require contractual safety management standards from tanker operating companies in relation to these too.

As well as producing technical and operational guidelines for the sector, OCIMF has developed a common ship inspection report programme (SIRE). Launched in 1993 as a response to concerns of sub-standard shipping, SIRE is presented as a 'risk assessment' tool. Using a standard inspection guide, information is entered into a database enabling potential charterer's access to up-to-date inspection information concerning oil tankers (OCIMF, 2010). Since its introduction, more than 180,000 inspection reports have been submitted to SIRE. On average Programme Recipients access the database at a rate of more than 8,500 reports per month. OCIMF members appoint the inspectors who make these reports.

In addition to the SIRE inspection system, the Tanker Management and Self Assessment (TMSA) programme claims to provide a best practice guide to ship operations and means by which the determination of a quality ship operator can be undertaken. It offers 'a comprehensive tool to help ship operators measure and improve their management systems'. As well as providing instruction and methods to encourage ship operators to assess their safety management systems against key performance indicators and develop continuous improvement, it provides an on-line tool enabling them to share their results with those who might request them for the purposes of their own internal vetting. The advantages to oil companies of the implementation of such a tool are obvious, as is the business necessity on the part of such tanker companies to ensure they comply with the requirements of the scheme. According to the latest OCIMF Annual Report (2010) the TMSA programme continues to grow, with more than 1,200 companies now registered to submit reports.

There are 576 SIRE inspectors accredited under the Programme. The majority (463) are accredited to inspect larger tankers (Category 1 ships) while a few (8) are accredited for small tankers (Category 2 ships) and others (105) for inspecting various additional kinds of vessels including barges, vessels utilised for towing vessels carrying petroleum products, and vessels carrying packaged cargoes (Category 3 ships). They are selected by OCIMF member organizations and are required to familiarise themselves with the inspection processes by attending SIRE inspections in the company of SIRE accredited inspectors, prior to attending

an OCIMF SIRE Inspector Training Course. Following the course they must complete a written examination and successful candidates are then further audited during an inspection before being accredited as inspectors. The SIRE accreditation process is cyclical and each accreditation period runs for three years. There are 28 SIRE auditing inspectors who, according to OCIMF (2010) are at the heart of the SIRE inspector accreditation programme. They are experienced inspectors, who collectively audit approximately 150 SIRE inspectors each year.

It is also worth noting that external supply chain influences in the petro-chemical tanker trade are by no means limited to the activities of OCIMF, SIRE and the TMSA programme. For example, in relation to chemical tankers, since the 1990s, the Chemical Distribution Institute (CDI), a non-profit making organisation funded by the chemical industry founded in 1994, has aimed to ensure the development and the preservation of an inspection system for transport and storage of bulk liquid chemicals (CDI, 2011). The CDI-Marine Scheme was created to improve the safety and quality performance of bulk liquid chemical shipping. It now provides annual inspection reports on the world fleet of chemical and liquid petroleum gas tankers, in which over 600 ship operators and 3000 ships participate (ibid, 2008). Ships having a CDI-Marine Scheme report on its database are also listed on EQUASIS (the European Quality Shipping Information System) used by Port State Control authorities and chemical terminals acknowledge the CDI standards so that if a ship passes the CDI inspection, it will be able to call at their berths.

Our further analysis of Bhattacharya's (2006) data and that collected more recently by Xue shows that both ship operating company managers and seafarers take these supply chain influences very seriously indeed. It does so in several ways. To begin with, there was a view shared by the seafarer respondents that these kinds of inspections enhanced the adherence to safety management arrangements on board ships, making their ships safer. This effect was clearly welcomed by seafarers of all ranks.

> We have several types of inspections from PSC, Terminal, Harbour Master, also audit internal as well as external, and from the P&I Club and on and on. They are all important. You can't start cargo operation without Terminal or Harbour Master's approval, deficiencies pointed out by PSC don't help either; we need insurance cover

from the P&I Clubs *but on the whole you'll have to say that ships are safer due to Oil Majors – Captain* (our italics)

'My last ship as a cadet I was on a bulk carrier. We had nothing like this. It was a good ship but we never heard of such inspection. I think Oil Major Inspection makes this ship safer than bulk carriers' — *Junior officer*

'There are many Oil Major Inspections on this ship and lots of stores and safety equipments are coming. But I am happy to have inspection – it is good for my safety.' — *Rating*

It was also a view held by the representatives of company management:

'Tankers are better managed because they have so many extra inspections. Who takes interest in bulk carriers? We have (equivalent bulk charterer) but they don't get excited about safety although we all know bulk carriers are probably far weaker in construction and take a lot of beating (subject to damage during cargo operation). Our tanker ship-owners have to allocate a higher level of budget for safety but the same cannot be expected from the bulk carrier ship-owners' — *Manager*

And as one of the Marine Superintendents from the Chinese operating companies put it when talking about the impact of oil company inspections:

'In terms of the safety consciousness, oil companies go a step ahead. Actually, this is good for safety. It was strict and for the purposes of safety, for everybody. — *Marine Superintendent*

In the case of the operating company managers, this view was often accompanied by a sense that the nature of the business relationship involved was not an equal one and the company had little choice but to follow terms dictated by the oil companies with which they did business:

'Oil Majors are brilliant. Due to their inspection safety is enhanced yes, but there is also a lot of dominance. We always have to please them. Each inspector has his own

peculiarities and not all are reasonable. We have to stay prepared for such mad demands. Since TMSA they now have control even over us in the office. They can say how to run our ships, how to manage store supply, which courses we should conduct in-house, how many additional safety equipments should be placed on our ships and so on'— *Manager*

Seafarers also felt considerable pressure to ensure successful outcomes from these inspections. This was evident in responses from the seafarers across the full range of ships from which data was collected and among officers and ratings alike:

'There is a lot of pressure to pass oil major inspections….if inspections fail the company will be in trouble — *Motorman*

'…..the loss will be huge if the ship does not pass oil major inspection — *Chief officer*

A second officer from one of the Chinese vessels explained that on his ship:

We expect those oil majors' inspection; meanwhile, we also fear these companies' inspection. Their inspection was very strict. They would inspect from the major part to tiny point, the glove you wore, the torch you used. The inspection was very strict. This was what we were hoping (for safety). But as seafarers, we also feared (these inspections), since their inspection included hundreds of items. The inspection was very much detailed.— *Second officer*

It was further clear that the source of this pressure came from the concerns of the operating company and the seafarers were in little doubt of the importance with which this was regarded by company management:

'Once the discharge port gets fixed the office informs us if they plan to hold Oil Major Inspection. On most occasions we get two weeks to prepare and even the superintendent may also fly down. You need to witness the tremendous pressure from office to pass inspections. Many reminder emails fly' — *Captain*

These feelings were confirmed in the responses from the ship operating company management, where there was a similar concern:

> 'We have no choice – we have to pass them. Effectively they give us our wages. Our principles expect us to pass – simple. I dread to imagine their reaction if we ever have to convey the news of failing. You know they can always withdraw the ships from our management by giving us just one month's notice... I'll have to look for another job then' — *Manager*

And:

> 'If we fail [Oil Major Inspections] – disaster! Right from MD to clerks we start dancing. Last year on ship X we had too many observations which effectively meant that the ships could no longer carry their cargo. While that ship had problems but the issue is that our reputation gets tainted as owners. Immediately after that we had more stringent inspections across our fleet ' — *Manager*

The business dependency on their oil company charters that was felt by operating company managers dominated Bhattacharya's interviews with them (it was mentioned in nine of the ten interviews he conducted with these managers). The sense that the profitability of their business depended on them doing the oil companies' bidding was reflected strongly in their comments:

> 'When we go to any terminal [non- Oil Major] or even charter our ships to non Oil Majors we still need to be inspected and passed by them. Such is their reach in this sector. The whole [oil] industry is run by them – you can't do business without their approval' *Manager*

In the Chinese companies, there was a similar strong sense of business dependency:

> Now it was the cargo-owner market. There were no other choices. If your ship doesn't accept inspection, it doesn't have cargoes to carry and you company goes into bankruptcy'— *Marine superintendent*

It was also clear that respondents felt this dependency on approval from the oil majors went further than merely affecting the direct relationship between the company and the oil majors. The pervasive influence of the major oil companies affecting the ship operator's relationships with other potential charters. As the captain of one of the Chinese ships explained with reference to the vessel on which the researcher was sailing:

> Even if your ship is contracted to carry cargoes by the shipper, the ship would not be allowed to call at X's (names a major oil company) berth if the ship did not receive and pass its inspection. Like this ship, it is chartered by Y (names a small Chinese Petrochemical company). In the contract terms, it is stated that the ship must pass X's (names a major oil company) inspection since the charterer has cargo with this oil major. It is also the case with other oil majors. If the ship failed to pass (oil major) inspections, the charter party might be cancelled or hire would be deducted — *Captain*

It was clearly the case that such concerns had been successfully transferred to the crews of vessels. This was so with regard to the financial benefits of doing the right thing by the oil companies generally, and in the case of the crews on board the Chinese ships, in the most frequently mentioned aspect of their relations with the oil companies, seafarers pointed out that good results from the inspections improved the freight rate for their employers and were specifically linked to their own pay and bonuses:

> 'There was a reward and punishment scheme in the company. For example, if your ship passed the oil majors' inspection, you would be rewarded. If it failed….the bonus for those who were responsible for the identified deficiencies would be deducted — *Second officer*

They were quite specific about these consequences, which were an obvious worry for them:

> If it was OK, the inspection was passed, the company rewarded 200 RMB to me. If it failed (because it received) one 'high risk', 1000 RMB will be deducted. If there were just minor deficiencies….100 to 200 RMB — *Second officer*

While such compensation may seem a positive development, studies from other sectors (see for example those reviewed by Walters and James 2009) indicate such managerial initiatives can also be interpreted as exploitive of labour through leading to work intensification and adding to stress resulting from this, as well as to stress associated with payment systems. Indeed in the present study the seafarers repeatedly identified the inspection process as 'a source of stress'. As one of the captains pointed out:

> 'When an inspection gets fixed, immediately we start getting reminder emails with a long list of suggestions from the managers... They expect us to do everything. They copy and paste the same defects we had informed them earlier [reminding us what to do]. It is pressurising.' – *Captain*.

Whatever the psychosocial pressures on seafarers resulting from such arrangements, there was a strong measure of agreement between them and their managers concerning the importance with which the oil company inspections were viewed and the consequent degree of preparation they required. Both managers and seafarers believed that these kinds of inspections required a lot of preparation**,** that this was necessary and it was worthwhile going to some lengths to ensure they were adequately prepared in advance of an inspection:

> 'We take the initiative to ensure that the ships are in order. Sometimes just to show that they are important we even visit the ship. If appropriate we also coordinate an unannounced drug and alcohol test at the time of the inspection – just to demonstrate our diligence. There is always a lot of preparation for Oil Major Inspection' — *Manager*

> 'We need a lot of preparation before Oil Major, sometime for days in advance we need to start working on the inspection'. ' — *Captain*

> 'We stop all regular maintenance jobs when we hear about Oil Major Inspections. The Chief Mate tells us do this, do that. Maybe sometime stencil this, [apply] fresh colour on the valves, clean the stores, maybe grease the mooring wires. Before oil major we would go through all the items in detail ….. we must solve all problems before inspections' — *Rating*

In this latter case, it may be that abandoning regular maintenance tasks to ensure a successful inspection outcome may cause subsequent additional work pressures, when 'normal' work patterns are resumed and regular maintenance tasks now require additional work as a consequence of their neglect.

There was also a direct effect on the form and content of the safety management system, with a willingness on the part of the ship operating companies to alter the SMS in response to the requirements of the inspection:

> Nowadays, the revision of the SMS is directed by the syllabus of the oil majors. Since the oil majors' inspection syllabus has often been changed, the SMS was led by their change. Since their syllabus kept changing, we must track and follow their revision and its latest requirement. — *Company quality and safety manager*

Similarly, crews were well aware of the need to inform the company concerning changes that may be needed in the SMS indentified during an inspection:

> Through the oil majors' inspection, we found that some things might not be in the SMS, then we would report to the company to revise the SMS.— *Chief officer*

Another measure of the seriousness with which seafarers regarded the inspections instigated by the oil companies was reflected in the way they rated their significance in comparison with other forms of inspection and monitoring of arrangements for OHS management on board ships. In terms of comparison with the internal company auditing and review of these arrangements, there was little question which form of inspection was treated more seriously:

> 'Oil Major Inspections mean a wider scope of inspection than others. They are so thorough that it is never possible for us to hide anything. We have to prepare very thoroughly ' — *Senior Officer*

Some seafarers also found the types of inspection required by oil companies more demanding, thorough and requiring of compliance than the regulatory inspections to which their vessels were subject under the requirements of Port State Control (PSC). This was the case regardless of the parts of the world in which they sailed and despite the knowledge that

failure to satisfy public regulatory inspection via PSC could mean that their ship might be subject to detention.:

> ‘Compared to PSC these people are more organised, more thorough’ — *Captain*

> ‘We didn’t feel special in the PSC inspection. After the oil major’s inspection we felt that it was simple to deal with the PSC inspection. We felt (that we) had confidence — *Second Officer*

> ‘The strictness and thoroughness is more than PSC’ — *Chief Officer*

Altogether then, the data emerging from the shipboard interviews is unequivocal in the extent to which it confirms the powerful influence of the oil company requirements on safety management practice on board vessels in the tanker trade. While to some extent we can assume that the companies on whose vessels we were allowed to sail in order to collect this data represent best case situations in terms of health and safety management, it seems likely that the dominance of the major oil companies would lead to a fairly widespread occurrence of similar findings. As such, the relationship described fits closely with the postulates derived from the earlier review. Specifically, the tanker trade is comparatively highly regulated by maritime industry standards, largely because of the economic, human and environmental consequences associated with accidents and loss. There is therefore substantial external pressure on both buyers and suppliers in the sector. This comes from regulatory provisions and agencies, but even more significantly, from others potentially affected by the economic, environmental and human consequences of failure. As well as the potentially expensive losses experienced by both ship operators and their oil company charterers as the result of ship safety failures that lead to major incidents, the reputational risks associated with these high profile events ensure an exceptional degree of vigilance is practiced by buyers in the maintenance of supply chain influences on safety practices on board tankers. Equally, while the systematic OHS management arrangements made by ship operators in response to these pressures, may create cost implications for the carriage of the goods in the sector, neither the ship operators or their charterers see such costs as significant in comparison with the potential costs of failures. Price and delivery pressures are therefore unlikely to influence the actions of ship operator management towards non-application or circumvention of such arrangements. Furthermore, it is obvious that the practices we have just described in the

tanker trade are made possible because they fit with the objectives and wider business interests of the oil companies and ship operators (buyers and sellers) in the supply chain in the sector, as well as reflecting the distribution of power in the chain.

Even more specifically important for the maintenance of the effectiveness of these influences however are the arrangements for their monitoring and auditing through SIRE inspections, the quality of which is further assured by audit. As we argued previously, research has already demonstrated that attempts to influence supplier health and safety management are likely to be more effective where adequate monitoring and penalty regimes support them; and when they occur within a relatively collaborative and trust based supply relationship. Thus, in the tanker trade we have described the development of a leadership initiative from the head of the supply chain – in this case, the association of major oil companies whose dominant market position has enabled them to set up an association (OCIMF), through which they are able to influence practices of safety management on board tankers to their own requirements. This they do in part through the TMSA scheme they have set up and made available to ship operators and through monitoring compliance with their standards through the system of vetting inspections undertaken by SIRE accredited inspectors and the like. Moreover, they are able to audit the quality of this system through the intervention of a small group of experienced inspectors whose task it is to inspect the inspections. SIRE reports are made available to companies belonging to OCIMF who can use them to ascertain standards of compliance among ship operators, and thereby help them to decide which company will receive their business. Thus, further ensuring strong market incentives for involvement of both themselves and the ship operators in the scheme and an institutional, context within which longer-term buyer-supplier relations are developed.

Therefore, in these scenarios there is no clash between the supply chain influences on OHS and the business interests of ship operators, but the business risks of failing to comply with them are widely regarded by suppliers to be substantial and significant. It is the arrangements for monitoring compliance that really focuses the attention of operating companies and their seafarers. The requirement of external inspection of safety arrangements on board ships is clearly a significant presence in their minds — as are the consequences associated with failing to satisfy such inspection. As a consequence, their focus on achieving good results during these inspections and demonstrating they are meeting the requirements of their oil company charterers in terms of safety management procedures is paramount.

However this does not of course necessarily mean that such influence leads to improved health and safety outcomes. Some cautionary words are in order here.

While the experiences of the company management and seafarers presented in this paper clearly demonstrate the influence of supply chain requirements on the adoption, implementation and operation of safety management systems on board ships, it does not necessarily follow that such systems and the practices they require are of themselves entirely beneficial to the promotion and maintenance of improved health, safety and well-being among seafarers. Nor does it imply that the procedures that companies and seafarers adopt in order to demonstrate compliance for the purposes of external inspection are entirely beneficial either.

It is not the purpose of this paper to present a detailed account of the limitations of the systems approach to managing occupational health and safety on board ships. Nevertheless it needs to be acknowledged that since the introduction of the ISM Code more than a decade ago, there have been numerous studies that have failed to demonstrate its widespread effectiveness (see for example, Anderson, 2003; Bailey 2006; International Maritime Organisation, 2006; Knudsen 2009). These accounts have pointed to the over-bureaucratisation of safety arrangements as one reason for the limited adoption of good practices and the growth of an appropriate 'safety culture' on board ships. Indeed, in his wider study of the operation of the ISM Code, from which some of the data used in this paper has been drawn, Bhattacharya (2009) noted significant limitations in the application and effectiveness of safety management systems on board ships that his subjects ascribed to such over-bureaucratisation. While, there are many physical and operational aspects of shipboard safety that can be observed by inspectors during their inspections, the inspection practices described in the present paper also clearly contribute to the bureaucratisation of safety on board ships and are regarded as doing so by both company management and crews:

> 'The oil majors are too much paper work' — *Manager*

> 'Oil Majors spend a whole day on the ship, often from nine in the morning till six in the evening. First they come to my office where they check each and every logbook and file. That takes nearly four to six hours. ' — *Captain*

> ‘I check the bridge chart correction, passage planning, echo sounder logbook, GMDSS logbook and many, many others on the bridge. I also have to check the old records to ensure that the records are also correct. All the old logbooks should also be in order. There is a lot of preparation before an oil major inspection, mostly paperwork’ — *Junior officer*

It is also of course, obviously the case that while companies and their seafarers may put enormous effort into preparing their vessels and SMS for the scrutiny of inspection, this does not necessarily mean that they will keep up such efforts once the inspection has been passed. As two Chinese seafarers put it:

> ‘Now the main issue in the management is to deal with the oil majors inspection. After the inspection, it happened that the work became tardy, and the work would not be as serious as the time before external inspection.’ — *Second officer*

> ‘After inspection, for a certain period of time, the (bad) situation was resumed. *Pump man*

In addition, like many such inspections, they are focused on the signs and manifestations of safety on board ships rather than those of health and well-being among seafarers. Since much of the current concern about the organisation of work and the work environment experienced by seafarers is addressed to its effects on their health and wellbeing, it is not obvious how such inspections aid its improvement (see for example, Bloor et al 2000). Indeed, given the obvious stress caused to seafarers by the need to be found compliant with the stringent requirements of such inspection it is possible that they actually contribute to increasing the psycho-social risks experienced by seafarers and in this sense worsen their health outcomes.

Conclusions and further work

In conclusion then, as a preliminary finding we note that relations in the supply chain in the petrochemical tanker industry both meet and confirm the potential identified in a previous review of the literature. In that review, it was argued that provided certain postulates apply, such supply chain relations may act to support the implementation of safety management

practices among suppliers and to do so in a manner that overcomes competing tendencies to circumvent OHS management arrangements in pursuit of price and delivery demands. At the same time it is by no means entirely clear whether the methods employed in the inspection and vetting procedures, or the strong business case for the seriousness with which they are taken necessarily result in improved *health* and safety of the seafarers involved. Further work is required in the sector to explore some of the possible contradictions here.

Moreover, as we have further noted, the conditions found in the petrochemical tanker trade are by no means universal in the shipping industry and to gain a better picture of the effects of supply chain relations more generally in the industry we need to extend our attention to other trades and forms of supply chain influence within the industry.

Therefore, as well as further work in the tanker trade, we are currently undertaking a second case study focusing attention on the supports and constraints relating to the transferability of such supply chain management strategies to other trades in the sector. To this end, we have obtained the co-operation of shipping operators involved in shipment of cargoes other than petrochemicals (in this case containerized goods and bulk products) and we will explore their relations with their charterers from the perspective of the supply chain influence on health and safety, using essentially the same techniques as those involved in the tanker study reported here. In this way it is intended, through an examination of the same elements of external and internal influence on the systematic management of health and safety, within the supply chain of labour and services in this second example of maritime supply chain relationships, to compare and contrast experiences in very different supply chain situations in the same industry. As a result, we will be well placed to not only test the key postulates identified in the previous study concerning the role of supply chain relationships in influencing health and safety management, but also gain a better understanding concerning (a) the conditions for positive or negative effects of such strategies on seafarer safety and health; and (b) the role of critical external and internal drivers in influencing the direction of these effects and sustaining them in the maritime industry more generally.

We have also noted that while the influence of the heads of supply chains is a significant influence on the adoption and application of safety management practices in the petrochemical tanker trade, it does not necessarily follow that such practices are themselves always ideal means to promote the practical and useful engagement of seafarers in the

operation of risk management on board ships, or improvement in their health and well-being as well as in their safety. Moreover, the processes available to heads of supply chains in the petrochemical sector to achieve such influence may themselves promote particular kinds of safety management practice — because for example, they are easier/more convenient to inspect than others. This may serve to skew management approaches to seafarer health and well-being in the sector. Here again, such conclusions are highly tentative at the present time and require greater investigation. It is anticipated that the fieldwork currently underway in this and other sectors of the industry will help shed some further light on these issues.

References

Anderson, P. (2003) *Cracking the Code: The relevance of the ISM Code and its impact on shipping practices,* The Nautical Institute, London.

Bailey, N. (2006) Risk perception and safety management systems in the global maritime industry, *Policy and Practice in Health and Safety,* 4 (2): 59-75.

Bhattacharya, S. (2009) *The Impact of the ISM Code on the Management of Occupational Health and Safety in the Maritime Industry*. PhD thesis Cardiff University, UK.

Bloor, M., Thomas, M and Lane, T. (2000) Health risks in the global shipping industry: an overview, *Health, Risk and Society*, 2 (3): 329-40.

Chemical Distribution Institute (CDI) Inspection process http://www.cdi.org.uk/InspectionProcess.aspx accessed 28.06/11.

Cunningham I., James P. and Walters, D (2011) Social care outsourcing in Britain and its potential occupational health consequences, *Policy and Practice in Health and Safety,* 9 (1): 79-93.

International Maritime Organisation (2006) IMO (2006). *Assessment of the Impact and Effectiveness of Implementation of the ISM Code*. Maritime Safety Committee, 81st session, dated: 10-19 May 2006.

Knudsen, F. (2009) Paperwork at the service of safety? Workers' reluctance against written procedures exemplified by the concept of 'seamanship' *Safety Science*, 47: 295–303.

Mayhew, C. Quinlan, M. and Bennett. L (1996) *The effects of subcontracting on occupational health and safety,* UNSW Studies in Australian Industrial Relations, No. 38 Sydney: University of New South Wales.

OCIMF (2010) *OCIMF Annual Report 2010*, London.

Quinlan M, Mayhew, C and Bohle, P (2001) The global expansion of precarious employment, work disorganisation, and consequences for occupational health: A review of recent research. *International Journal of Health Services*; 31 (2): 335-414.

Quinlan M and Bohle P. (2009) Over-stretched and unreciprocated commitment: Reviewing research on the OHS effects of downsizing and job insecurity. *International Journal of Health Services,* 39 (1): 1-44.

Walters, D and James, P (2009) *Understanding the Role of Supply Chains in Influencing Health and Safety at Work.* Leicester: IOSH.

Walters D and James P. (2011) What motivates employers to establish preventive management arrangements within supply chains? *Safety Science,* 49 (7): 988-994.