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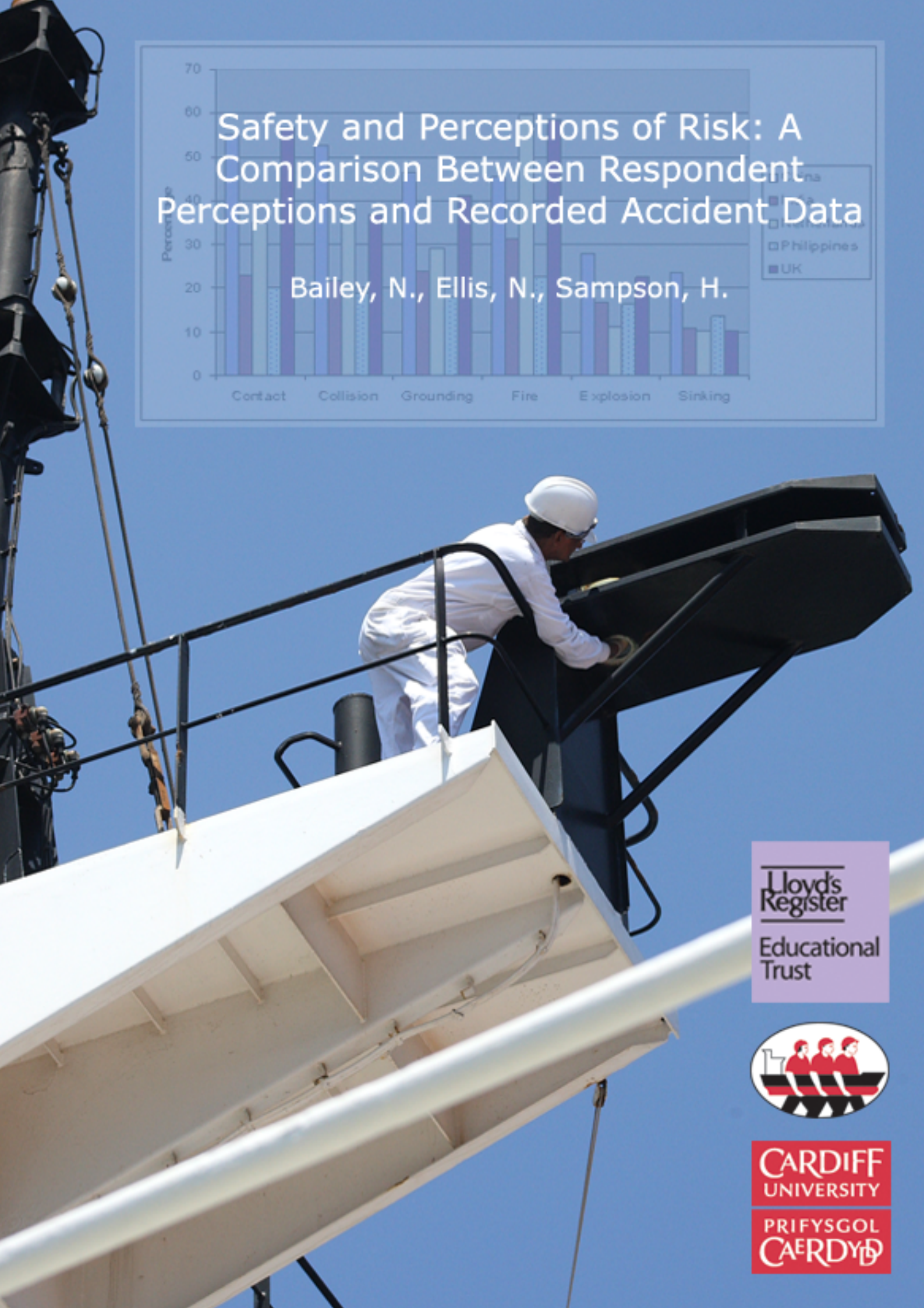

Lloyd's Register Educational Trust

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The Lloyd's Register Educational Trust (The LRET) is an independent charity working to achieve advances in transportation, science, engineering and technology education, training and research worldwide for the benefit of all.

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Executive Summary

This report is the third of a series examining 'safety and perceptions of risk' in the maritime sector. The report compares data obtained from two sources. The first are derived from a large scale questionnaire survey conducted in 2006 by The Lloyd's Register Educational Trust Research Unit (The LRETRU) at the Seafarers International Research Centre (SIRC). This was designed to identify how workers in the maritime sector perceive risk. Completed responses were received from 2,372 individuals from 50 different countries, with a response rate of 36%. The second set of data consists of incident data obtained from 16 Maritime Administrations and two shipping companies. Only six of the Administration datasets were suitable for aggregation and thus comparison. The two sets of data are compared to determine the extent to which workers' perceptions of risk correlate with reported incident frequencies.

The analysis is presented in two parts. The first examines ship level incidents, i.e. collision, fire, grounding, etc. The second focuses on factors related to personal injury, and includes the following: cause of injury; task being undertaken; broader context; place of incident aboard ship; rank; work department; nationality; age; experience; and types of vessel.

Ship Level Incidents (Questionnaire Vs Administration Data)

- Collisions and groundings were the most common types of incident recorded. By comparison, managers/seafarers perceived the risk of 'fire' as the event that would most likely be experienced by one of their colleagues. 'Collision' and 'grounding' appeared third and fourth respectively based on their perceptions.

- Managers' perceptions correlated most closely with the incident data. However there were also differences between those managers 'with' and those 'without' experience of working at sea. Those 'without' seagoing experience consistently rated the likelihood of an incident occurring as higher than their colleagues.

- Respondents from different work departments saw risk differently; with the perceptions of those working shore-side (i.e. managers) corresponding most closely with the rankings derived from the data from the Maritime Administrations.

- The nationality of respondents was relevant to how they saw risk. Chinese seafarers were more inclined to perceive an incident as likely to occur, than other nationalities examined. Also the rank order based on their perceptions more closely aligned with the recorded incident data than other nationalities.

- There was no clear correlation between the perceptions of workers on the basis of 'age' or 'experience' as compared to recorded incident data.

- From the incident data, different types of vessel were clearly seen to be more or less prone to different types of incident. However seafarers' perceptions did not reflect these differences. This was irrespective of whether a seafarer had worked on a particular type of vessel.

Personal Injury

Causes of Injury

- Taken as a group, respondents perceived 'working in a hot environment' to be the most likely cause of injury. By comparison 'slips, trips and falls' were recorded as the most frequent event in each of the combined MA and company datasets.

- Perceptions of seafarers of higher rank and managers tended to accord most closely with rankings based on recorded data.

- When perceptions of seafarers were compared with frequency of incidents according to vessel type, the perceptions of those that had 'served on' that type of vessel agreed more closely than those that 'had not served' on them.

- The perceptions of shore-side managers coincided most closely with the incident datasets, followed by those in the deck department, catering department and engineering department respectively.

- Perceptions of seafarers from the UK and Netherlands most closely matched the incident data on causes of injury. In comparison, the perceptions of Chinese seafarers were most divergent.

- No clear correlation was seen between the perceptions of seafarers on the basis of 'age' or 'years at sea' and recorded rankings of causes of injury.

Perceptions of risks associated with specific tasks

- Rankings based on 'all' respondents perceptions of risk and 'all' recorded incident data correlated well. The perceived risk of undertaking 'engine maintenance at sea' and 'the use of gangways / ladders' was underestimated, while the risk of 'welding / gas cutting' was overestimated in relation to the MA data. There was greater variation between perceptions and the data from companies.

- As with 'cause of injury' those with experience of working on given ship types were closer in their perceptions to the incident data obtained for those types of ships from the Maritime Administrations.

- The perceptions of all ranks however aligned more closely to the rankings based on the MA dataset than the companies' dataset.

- When compared to the MA dataset the perceptions of those in the deck department were closest and those in the engine department furthest from the rankings based on recorded data.

- The perceptions of workers from the UK and Netherlands were the closest fit to both datasets.

Perceptions of risk associated with broader contextual factors

- Based on workers perceptions 'working having consumed alcohol / drugs' was ranked the most likely background factor to an injury. By contrast this appeared much lower in both datasets. Notably the risks of injury during 'mooring' and 'crane' operations were both "underestimated" by respondents.

Location accident occurred

- The ranked ordering of recorded locations where injuries occurred aboard the ship was identical for both the MA and companies dataset. In each case the greatest number of injuries were recorded as happening 'on deck'. Respondent perceptions, however, were that injuries were most likely to occur in the Engine room.

Conclusion

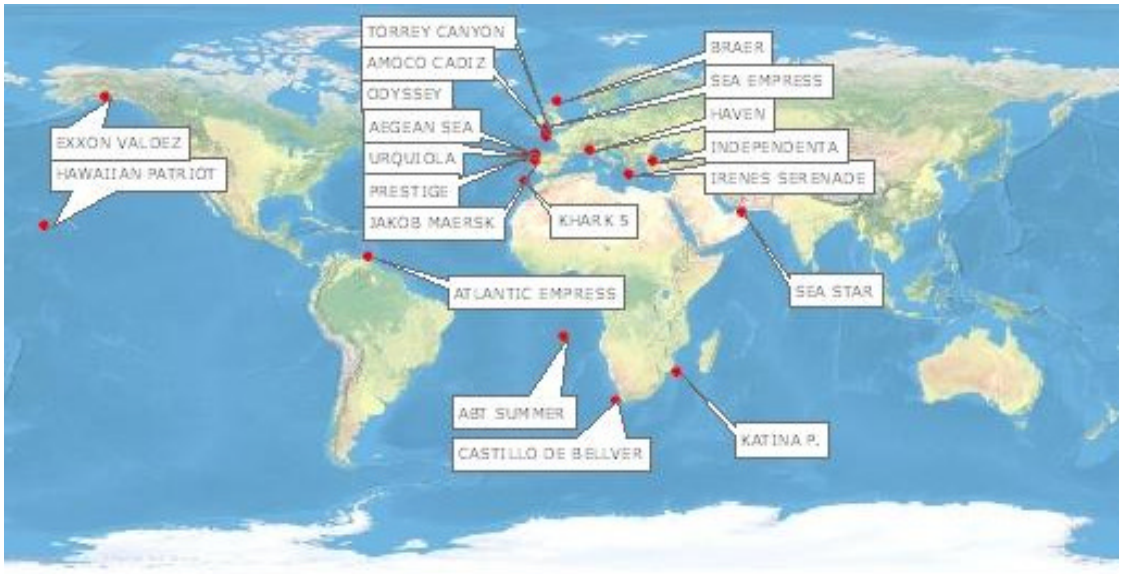
Due to the limitations of the incident datasets it is not possible to refer to the perceptions of any group of respondents as being more or less accurate. Nonetheless the comparisons presented reveal that respondents nationality and rank impact upon risk perception, while surprisingly age and experience do not.

Introduction

Although the number of accidents and incidents involving sea going vessels is said to have reduced over the last decades, accidents still occur (Transport Safety Board of Canada, 2001), and shipping is still seen as a dangerous industry (Roberts and Williams, 2007). Vessels collide with one another, run aground, catch fire, and sometimes sink. Such events produce human consequences, with individuals being killed and injured, as well as environmental costs, associated with the pollution of coastlines, and damage to wildlife and aquaculture. However, the impact of such events is not just physical. Shipping accidents play on the imagination and cause concern about, and a loss of confidence in, safety in the industry (Iarossi, 2003). This impacts upon the perceptions of the public, of seafarers, of regulators, and of potential recruits.

The way in which the media responds to accidents and incidents is critical in shaping public perception (Furedi, 2002). A number of shore-based industries have experienced significant negative consequences following exposure of major accidents and incidents involving health and safety (Garland, 2001; Kasperson, *et al.*, 2000). For example, there has been much objection to the building of nuclear power stations in the UK, due to public concern arising from nuclear incidents at Chernobyl (1986) and Three Mile Island (1979). Shipping is not immune from such publicity and events such as the well-reported loss of the *Erika* and the *Napoli* have a negative effect on public perceptions of the industry. Furthermore, there is often a general media outcry when oil spills occur off the coastlines of OECD countries, but much less attention is given to accidents in less economically developed areas (see Figure 1). Such fragmented coverage produces a distorted picture of risk in the public mind. This reminds us that perceptions and realities do not always match and a variety of factors may act upon individual perceptions, including workplace, location of residence, age, education and so forth.

Figure 1: Map showing major oil spills worldwide since 1967[1]



[1] Map found at http://www.itopf.com/information-services/data-and-statistics/statistics/

In this context datasets which aggregate information relating to reported accidents and incidents worldwide are critical in facilitating proper risk assessment and understanding. Within the transport arena there are some fairly comprehensive datasets which have been established in order to allow for the accurate monitoring of trends and to inform policy. For example, a Europe-wide database of road transport accidents was set up in 1993, and all member states provide data to feed into this on a yearly basis. Similar schemes have also been set up in the aviation industry (European Transport Safety Council, 2001). However, in the maritime industry, although administrations are legally required to collect data on vessel casualties, research has shown that (Ellis, 2007) these data are frequently poor and patchy, and are not always publicly available. Researchers have attempted to produce figures relating to injury, morbidity, and mortality amongst seafarers but they have often found themselves restricted to working with data collected by a very small number of administrations limiting the general applicability of findings notwithstanding their best efforts (see Ellis, *et al.*, 2010, Ellis, *et al.*, 2009, Philips and Daltry, 2006, Roberts, 2006). Where researchers have attempted to combat the problems of insufficient data as held by Maritime Administrations they nevertheless find that practicalities restrict them to working within limited geographical areas (e.g. Hansen *et al.*, 2007). Thus, within the shipping industry there is very little reliable information about the incidence of injuries within the workforce and there are incomplete data relating to fatalities. A similar conclusion is drawn by the European Transport Safety Council (2001) report on accidents and casualties occurring in waterborne transport.

Attempts have been made by international regulators to address this information deficit under the auspices of the International Maritime Organization (IMO). In 1994 the IMO set up a database in order to collate and report details of accidents investigated by administrations across the globe, which was later developed into the current Global Integrated Shipping Information System (GISIS). Under this arrangement Maritime Administrations which are legally obliged to conduct accident investigations (but in practice do not always do so), are required to report all incidents which are judged to carry the potential to assist in determining future requisite changes in policy[2] (Graveson, 2006), to the IMO. However, this falls short of a requirement to pass on details of all reported accidents and incidents and results in tremendous under-reporting of accidents. In undertaking a comparison of the IMO dataset and the datasets which thirteen Maritime Administrations provided to The Lloyd's Register Educational Trust Research Unit (The LRETRU) at the Seafarers International research Centre (SIRC),[3] we found Maritime Administrations reporting a total of 28,322 more incidents than appeared on the IMO website in the period 2000-2003.

In relation to its need for data the industry tends to rely a great deal on a relatively comprehensive dataset documenting vessel losses and disposals (the *Lloyd's Register Fairplay World Casualty Statistics*). By definition, however, this dataset does not provide an accurate picture of vessel level incidents at sea as it only reports on ships which have been reported as a total loss. The presence of confidential reporting schemes (such as the Confidential Hazardous Incident Reporting Programme and the

[2] Under the SOLAS regulation I/21 and MARPOL 73/78, articles 8 and 12 legislation (see MSC/Circ.953-MEPC/Circ.372 for more detail).

[3] Three of the Maritime Administrations could not be included as they did not provide data for the period from 2000-2003.

Marine Accident Reporting Scheme) in the sector often serve to highlight the under-reporting which thwarts current attempts at establishing robust accident or injury rates for the industry. In 2003/4, for example, a case was reported where it was apparent that a vessel had no record of the incident occurring. The report states: *The casualty does not feature in the IMO's Casualty analysis document[...] CHIRP has contacted the relevant Flag State to enquire whether any report resulting from an investigation into the incident exists which might be made available on a confidential basis, but has not received a reply [...] CHIRP's Advisory Board is of the view that the absence of proper accident investigations, in circumstances similar to this, by some Administrations is a dereliction of their duty to the seafarers under their Flags and to the wider maritime community'*. However CHIRP and similar programmes are not able, of themselves, to produce reliable data to compensate for the deficiencies which exist as a result of the omissions in record keeping found in some Maritime Administrations.

Thus, in summary, whilst there are a number of available sources of information about maritime accidents and incidents internationally, these are generally extremely limited. The European Transport Safety Council (2001) has suggested that 'a co-ordinated approach offers the best means to gain maximum value out of each separate system' (p7). However, to date in the maritime industry such a combined approach has not been undertaken on a large scale and indeed it is difficult to conceive of how such an approach might be successful given that there is currently no agreement on, nor criteria for, the categorising and collating of data.

Accurate information about injuries and fatalities at sea would help to counteract inaccurate perceptions of safety held by those working within the industry (where these exist). Currently, those in the industry are subject to a range of influences in relation to their perceptions of risk including, but not limited to, the following: media coverage, personal experience, training courses, company statistical data and anecdotal accounts. Given the necessarily partial and inevitably misleading nature of much of this 'information' there is a considerable need across the sector to produce a more robust and appropriate dataset to assist with rational decision-making and to allow resources to be focused on appropriate issues with regard to safety management.

In setting out to undertake the research and data collection which underpins the 'Perceptions of Risk' project (funded by The LRET) we made a conscientious and sustained attempt to address and to overcome this deficit. However, we report from the outset that notwithstanding these efforts we have failed to do so in a convincing or comprehensive manner. Whilst we have gathered and attentively coded data relating to maritime accidents and incidents we have been faced with a number of difficulties which proved insurmountable in the final analysis. Nevertheless this report presents and provides an interpretation of the data that we managed to collect and collate from Maritime Administrations. We have compared these data with our findings on seafarer and shore side manager perceptions of risk which have been reported on extensively in two earlier SIRC reports (Bailey, *et al*. 2006, Bailey, *et al.*, 2007). The intention here is to consider how well perceptions match reported levels of events, injuries and fatalities in the sector. Regrettably, such reported levels of injury, etc., cannot be equated with 'actual levels' due to considerable under-reporting and variations in reporting practices (see for example Ellis, *et al.*, 2009, Ellis, *et al.*, 2010).

Part 1: Maritime Administration Incident Database: Comparing Perceptions to Reported Events

1.1 Data Collection

A brief overview of how the data were collected and compared is outlined here. For more details about methods of data collection see Bailey, *et al*. (2007), and Ellis (2007).

1.1.1 Collection of Data Relating to Reported Events

In an effort to produce a comprehensive dataset a decision was made to contact the largest Maritime Administrations (the top 30) and request access to datasets held by them which are derived from records of incidents reported to administrations by vessels flying their flag, or vessels experiencing a reportable incident within their waters. Maritime Administrations are legally required to collect such information under SOLAS regulation I/21 and MARPOL 73/78, articles 8 and 12 (see MSC/Circ.953-MEPC/Circ.372 for more detail). The largest 30 flags as defined by gross tonnage were identified with reference to Lloyd's Register Fairplay *World Fleet Statistics* (2005).

In a two-stage procedure we initially sent questionnaires to administrations to establish whether records were kept, the format of such records, and their accessibility for research purposes. Of the twenty-six administrations which returned a questionnaire nineteen indicated a willingness to release data to us and ultimately sixteen of these did so. This limited collaboration immediately placed constraints on the conclusions we would ultimately be able to arrive at. However, our problems were compounded by the different recording and collating practices of Maritime Administrations which made the straightforward aggregation of data into a single dataset impossible. For example whereas all administrations recorded dates and types of incidents, only 87.5% recorded details of ship type, 75.0% recorded flag, and as few as 37.5% recorded the age of the vessel involved. Twenty-five percent recorded the cause of the incident, and 6.3% recorded information about environmental conditions. Where variables were recorded by at least half of the sixteen administrations these were included in the aggregated dataset we constructed, which ultimately contained information on: incident type; ship type; flag; gross tonnage; age of vessel; the number of personnel injured or missing; and the number of associated fatalities.

Analysis of the data recorded by Maritime Administrations was problematic for a number of reasons. Not only were there inconsistencies in the variables recorded by administrations but there were also different practices for the aggregation of data. For example whilst many administrations categorised 'fire' and 'explosion' separately a number of them conflated the two events into a single category 'fire and explosion'. Once data is collapsed into such 'multiple categories' it is impossible to disaggregate in the absence of the original raw information. This further complicates any kind of comparative exercise. It was also the case that many administrations had only recently

started to collect and collate such data. Administration number thirteen, for example, had only begun to record such data in 2006. However, perhaps the greatest problems were experienced when considering data on personal injury. Here it was clear that under-reporting was so substantial as to undermine any meaningful analysis. This could be clearly seen by the high proportion of recorded fatalities to recorded injuries with two administrations recording 60% and 80% of all recorded injuries as fatalities. The under-reporting of injury data and particularly the under-reporting of minor injuries is well-documented and understood (Ellis, *et al.*, 2010, Philips and Daltry 2006) and we anticipated under-reporting in undertaking this study.

Anticipating the under-reporting to, and under-recording by, Maritime Administrations of injuries and fatalities we made efforts to explore alternative sources of data and visited P&I clubs to examine and consider the possibilities of utilising their data as well as requesting records of injuries from five key companies with which we were closely working. The P&I club data proved to be impractical and also exclusionary because of the ways in which clubs record and store data (often as individual paper records) and the limited nature of record keeping (often only for claims of over a certain value). Company records were far more detailed but were also sometimes pre-coded making comparative analysis difficult (but not impossible and they have been drawn upon in our analysis of personal injury where we can only draw on data provided by a small subset of Maritime Administrations).

1.1.2 Collection of Data Relating to Perceptions of Risk

Data relating to seafarers' perceptions of risk were collected as part of a questionnaire survey conducted in 2006. Just over 6,600 questionnaires were distributed through maritime colleges and companies, of which 2,372 were returned completed, a response rate of 36%. A key question which provides a focus for much of the analysis presented in this report was as follows:

> 'How likely do you think it is that someone working for your company will experience the following during their sea-going career? *(Fire, Explosion, Collision with another ship, Sinking, Grounding, Contact with a fixed structure)'*.

Respondents were asked to express their view using a 5 point scale which offered them a graded series of options ranging from 'not likely at all', to 'extremely likely'. For the purpose of analysis these responses have been aggregated to produce just two categories of answer 'likely' and 'not likely'.

1.1.3 Comparison of Perceptions to Reality

The frequency of incidents as recorded in the MA datasets cannot be directly compared to the perceptions of seafarers as reported in our questionnaire as the nature of the two measures is different: one being a frequency, and the other being a categorised response (likely or unlikely). In order to compare these data we therefore made use of rank order. Incidents were ranked according to frequency and seafarers' perceptions were also ranked.

1.2 Findings

1.2.1 Perceptions of Risk Study Summary

A brief overview of seafarers' perceptions of risk is presented here, however, full details can be found in the SIRC reports titled, '*Perceptions of Risk in the Maritime Industry: Ship Casualty*' and '*Perceptions of Risk in the Maritime Industry: Personal Injury*' which are available online at www.sirc.cf.ac.uk.

The majority of respondents (seafarers and managers) who completed the questionnaire generally perceived it to be 'unlikely' that someone working for their company would experience a ship level casualty. However when responses were ranked, according to type of event considered, differences in perception became apparent such that some events were considered more unlikely than others and vice versa. 84.8% of respondents saw the risk of sinking as unlikely, for example, while a smaller group 61.9% saw fire as such (see Table 1).

Table 1: Relative percentages of overall group perceiving likelihood of experiencing an incident as likely/unlikely

Type of Incident	Percentage perceiving risk to be *unlikely*	Percentage perceiving risk to be *likely*
Fire	61.9%	38.1%
Contact	63.5%	36.5%
Collision	69.1%	30.9%
Grounding	69.9%	30.3%
Explosion	80.1%	19.9%
Sinking	84.8%	15.2%

Whilst the majority of respondents saw major ship level incidents as being unlikely, significant proportions did envisage that a colleague within the company would experience one of the given incidents in the course of their seagoing career. A sixth of respondents (15%) thought that a colleague would experience sinking at first hand whilst roughly a third felt that colleagues would experience contact with a fixed structure, collision, and grounding.

1.2.2 Comparing Perceptions to Reality

1.2.2.1 The Overall Picture

In general terms, as expected, we found differences between perceptions and the ranked frequency of events recorded in the aggregated Maritime Administration dataset (see Table 2).

Table 2: Recorded accidents versus perceptions of likely incidents

	MA Accident Database		**Perceptions Questionnaire**	
Event	*Percentage*	*Rank Order*	*Percentage*	*Rank Order*
Collision[4]	33.0%	1	30.9%	3
Grounding	28.7%	2	30.3%	4
Contact	19.9%	3	36.5%	2
Sinking	12.7%	4	15.2%	6
Fire	5.4%	5	38.1%	1
Explosion	0.3%	6	19.9%	5

Collision which was the most highly recorded event by Maritime Administrations was only perceived by seafarers and managers to be the third mostly likely event to occur to a colleague in the course of their seagoing career. Conversely, fire was perceived by seafarers and managers to be the most likely event to be experienced by a colleague in their seagoing career, but was actually the second least recorded event in the data from the Maritime Administrations.

In order to better illustrate the differences between perceptions and recorded incidents as depicted in Table 2 we have presented the same data differently in Table 3 (below). The first column 'Perceptions' represents the perceived likelihood of such incidents occurring, in rank order, while the second column 'MA dataset' shows the recorded occurrence of incidents again in rank order. The final column, termed 'Rank order differences' indicates the distance between ranked perceptions and ranked occurrence. Scores are either positive or negative to indicate whether the risk was under estimated (negative score) or over estimated (positive score).

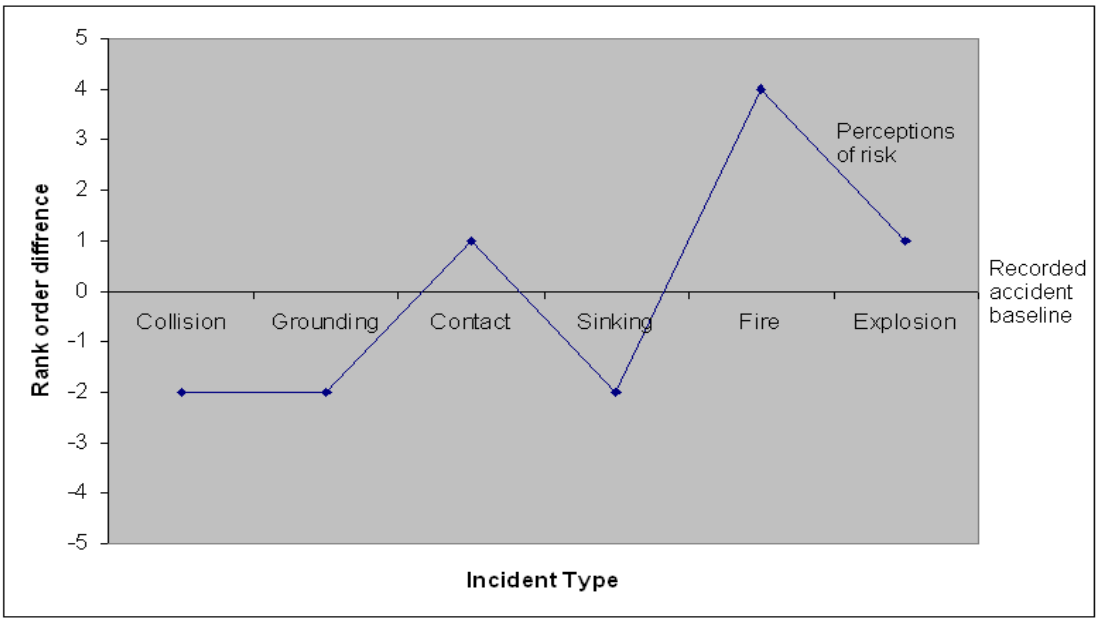
Table 3: Rank order differences between recorded accidents and perceptions of likely incidents

Perceptions	**MA dataset**	**Rank Order Difference**
Fire	Collision	Fire = 4
Contact	Grounding	Contact = 1
Collision	Contact	Collision = -2
Grounding	Sinking	Grounding = -2
Explosion	Fire	Explosion = 1
Sinking	Explosion	Sinking = -2

Using the Maritime Administrations recorded incidents as a baseline, the difference between this and rankings of perceptions are shown graphically in Figure 2 below.

[4] From this point forward in the report 'Collision with other ship' will be shortened to 'Collision' and 'Contact with structure' will be shortened to 'Contact'.

Figure 2: Discrepancies between the perceptions of recorded events



These data indicate that when the perceptions of respondents are compared with data recorded by Maritime Administrations there are some notable differences. Collision and grounding are only ranked by respondents as the third and fourth most likely events to be experienced, by colleagues, but they appear as the two most likely occurrences in the Maritime Administration data. Fire which was recorded as the fifth most frequent event in the Maritime Administration data was perceived by respondents as the most likely event to be experienced by colleagues.

These differences may indicate real discrepancies between seafarers' and managers' perceptions of risk and the frequency with which the cited events occur. However, the results could also be interpreted as consistent with the under-reporting of minor events to Maritime Administrations given, for example, that many fires on board (e.g. scavenge fires) may be dealt with locally and never reported to Maritime Administrations (thus accounting for respondents 'over-estimate' of fires). Minor contact with a fixed structure (which also seems to be 'over-estimated' by respondents when ranked perceptions are considered against ranked occurrence) might similarly be experienced by seafarers when no significant damage is done to a vessel and when the related incidents are therefore not reported to, or recorded by, Maritime Administrations. Thus the data need to be considered cautiously[5].

[5] A counter argument can also be made, however, which would tend to re-affirm the findings. The framing of questions is known to impact upon the way they are perceived and answered by respondents (see for example Bickert, 1992; Johnson, *et al*., 1998; Schuman, 1992) and in terms of this particular questionnaire individuals were asked to rate the perceived likelihood of fire as one of several types of 'major' incident such as collision, sinking and grounding. There would be some expectation therefore that respondents would be led to consider serious fires rather than, for example, a minor galley or engine room fire. Self-evidently, it is impossible to assess the impact of such effects.

1.2.2.2 The Influence of Rank on Perception

When we considered the data in greater detail, we were able to identify important differences in the perceptions of respondents in different positions across organisations. For example, when events were placed in rank order, managers' perceptions of the likelihood of events, such as collision and grounding, more closely matched Maritime Administration rank ordered events than other groups (see the 'total distance from MA ranking' scores in Table 4).

Table 4: Rank order differences between recorded accidents and perceptions of likely incidents across rank

MA Datasets		Shore Side		Onboard Ship					
		Managers		*Senior Officers*		*Junior Officers*		*Ratings*	
Event	***Rank Order***	***Event***	***Dist***	***Event***	***Dist***	***Event***	***Dist***	***Event***	***Dist***
Coll[6]	1	Contact	2	Contact	2	Fire	4	Fire	4
Ground	2	Ground	0	Fire	3	Contact	1	Contact	1
Contact	3	Coll	-2	Coll	-2	Ground	-1	Coll	-2
Sinking	4	Fire	1	Ground	-2	Coll	-3	Ground	-2
Fire	5	Sinking	-1	Exp	1	Exp	1	Exp	1
Exp	6	Exp	0	Sinking	-2	Sinking	-2	Sinking	-2
Total distance from MA ranking			6		12		12		12

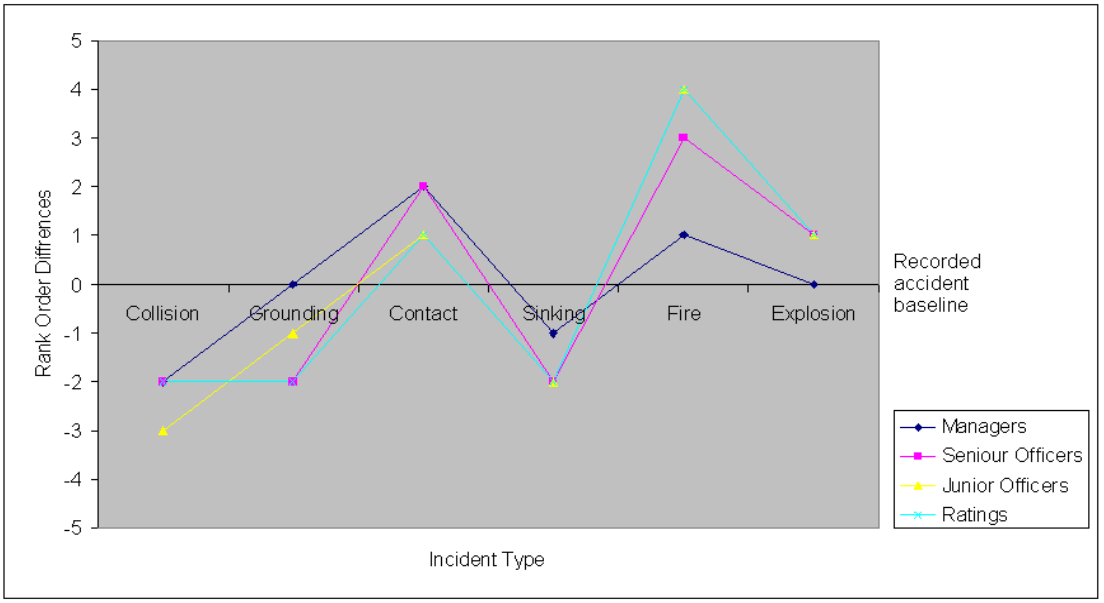
The difference between recorded incidents and perceptions of the likelihood of incidents across the different ranks is shown graphically in Figure 3.

It can be seen that in the Maritime Administration dataset, collision was the most frequent recorded event. However, if we look at those onboard the perception was that the most likely event to occur was fire (see Table 4), appearing at the top of the rank-orderings: in first place for junior officers and ratings and in second place for senior officers. Collision and grounding were generally considered to be less likely to occur than fire or contact with fixed structures, in contrast to the rank order of events indicated in the Maritime Administration dataset.

The perceptions of respondents in relation to the likelihood of a colleague experiencing a collision in their seagoing career was further interrogated. Amongst managers, senior officer and ratings, the most frequent event in the Maritime Administrations dataset, collision, appeared in third place whilst junior officers ranked collision as the fourth most likely event that they thought their colleagues might experience (see Table 4 and Figure 3). When the responses of junior officers were further considered by department, we found that 25.6% of junior deck officers and 25.1% of junior engineering thought it was likely that a colleague in their company would experience a collision. Thus we did not find that officers in charge of a navigational watch perceived the risk of a collision any more 'accurately' (when compared with reported incidents) than those who were not (engineers).

[6] As there is not much room in this table, 'Collision' is shortened to 'Coll', 'Grounding' to 'Ground', and 'Explosion' to Exp. Such abbreviations are also used in some tables throughout the report.

Figure 3: Discrepancies between the perceptions of different ranks (jobs) and recorded events



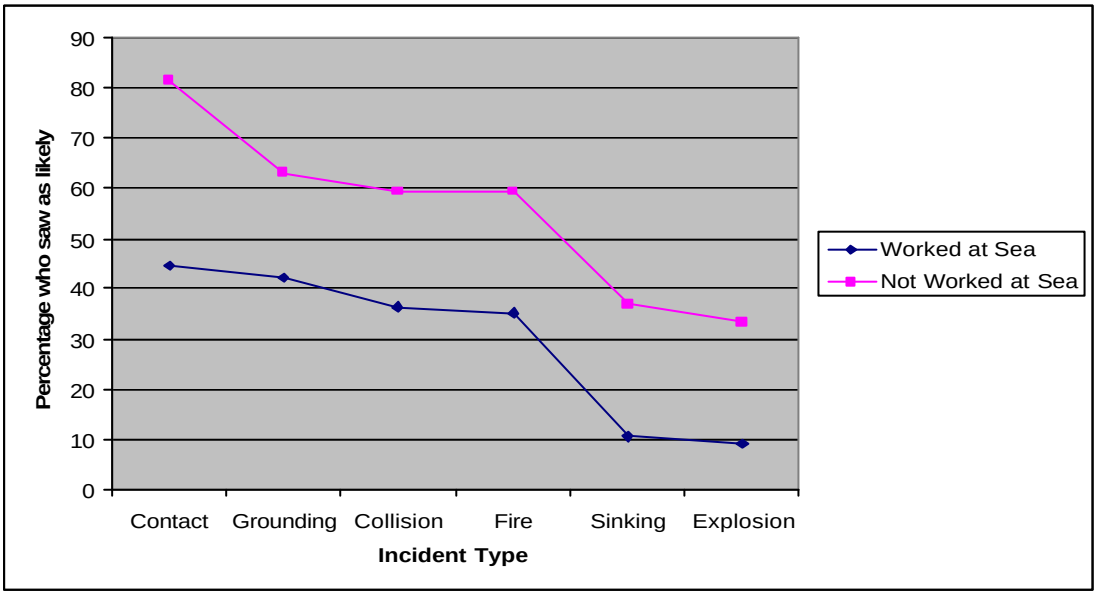
Although it is clear that the perceptions of those onshore (i.e. managers) tended to match the Maritime Administration dataset much better than those onboard vessels we were interested in further interrogating the data in order to consider whether managers with seagoing experience had different perceptions to managers without seagoing experience. We found that whilst seagoing experience did not appear to impact upon the rank ordering of events by managers, a big split was noticeable between those with and without experience in terms of the perception of how likely an incident was to occur (see Table 5). Those without experience of work at sea suggested a significantly higher likelihood of event occurrence (see Table 5 and Figure 4) than those with experience of being at sea (for all event $p<0.05$). The implication of this finding is that we cannot assume that the 'accuracy' of the rankings of managers means that they judge risk levels 'accurately' – given that both groups of managers (with and without experience at sea) saw the likelihood of events occurring quite differently i.e. both groups could not be 'accurate' illustrating that equally neither might be.

Table 5: The percentage of managers seeing events as likely in rank order split by whether they had worked at sea or not

MA Accident Database	**Managers**			
	Worked at Sea		*Not Worked at Sea*	
Event	*Event*	*Percentage*	*Event*	*Percentage*
Collision	Contact	44.7%	Contact	81.5%
Grounding	Grounding	42.1%	Grounding	63.0%
Contact	Collision	36.4%	Collision	59.3%
Sink	Fire	35.1%	Fire	59.3%
Fire	Sinking	10.7%	Sinking	37.0%
Explosion	Explosion	9.3%	Explosion	33.3%

The difference between the rating of the likelihood of events happening for those managers who had or had not worked at sea is illustrated below in Figure 4.

Figure 4: The percentage of managers who saw events as likely to happen split by whether they had worked at sea or not (in rank order)



1.2.2.3 The Influence of Department on Perception

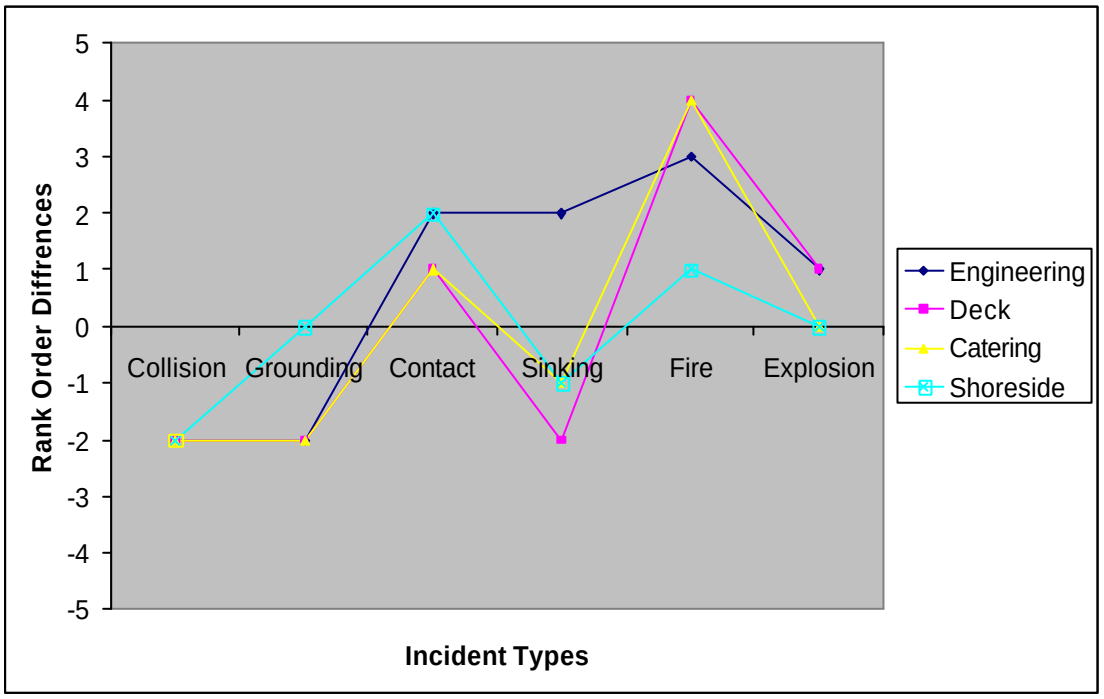
Not surprisingly, as with rank, when we look at those working in different departments it is again the perceptions of those that work shore side that most closely match actual events as recorded by Maritime Administrations (see Table 6).

Table 6: Rank order differences between recorded accidents and perceptions of likely incidents across departments

MA Dataset		Department							
		Engineering		***Deck***		***Catering***		***Shoreside***	
Event	***Rank Order***	***Event***	***Dist***	***Event***	***Dist***	***Event***	***Dist***	***Event***	***Dist***
Coll	1	Contact	2	Fire	4	Fire	4	Contact	2
Ground	2	Fire	3	Contact	1	Contact	1	Grounding	0
Contact	3	Collision	-2	Collision	-2	Collision	-2	Collision	-2
Sinking	4	Grounding	-2	Grounding	-2	Grounding	-2	Fire	1
Fire	5	Explosion	1	Explosion	1	Sinking	-1	Sinking	-1
Exp	6	Sinking	2	Sinking	-2	Explosion	0	Explosion	0
Total distance from MA Ranking			12		12		10		6

These differences between actual incidents and perceptions of likely incidents across the departments are shown graphically in Figure 5.

Figure 5: Rank order differences between recorded accidents and perceptions of likely incidents across departments



As with rank, when considering the effect of department we found that shore-based managers' perceptions of the likelihood of events, such as collision and grounding, were most closely aligned to administrations' recorded details of actual events.

If we focus on those onboard, it is actually those in the catering department whose perceptions most closely match events as recorded by the Maritime Administrations. However, this result should not be overplayed as the increase in "accuracy" (as indicated by the total rank order score) is only small, and might be an artefact given

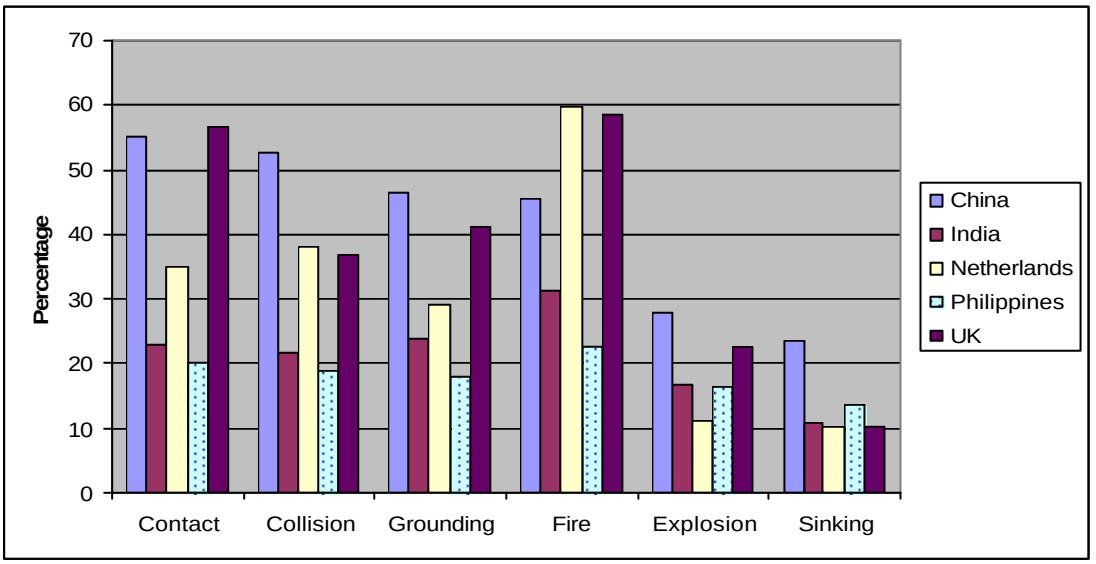
that the catering group was relatively small in comparison with other onboard departments.

Focusing on the main two departments onboard (deck and engineering), some subtle differences in perceptions can be seen. For example, the perceptions of seafarers working in the deck department, who are primarily involved with the navigation and handling of the vessel showed a closer relationship to the recorded data than engineers when it came to the ranking of the likelihood of contact with a fixed structure. In contrast the responses of those in the engineering department, who are more involved in mechanical maintenance on the vessel, were more closely aligned with the data in relation to the likelihood of fire.

1.2.2.4 Nationality and Perception Differences

In the previous publication, 'Perceptions of Risk in the Maritime Industry: Ship Casualty' statistical modelling showed that nationality was the strongest predictor of variance in perceptions of the likelihood of an incident occurring. Chinese seafarers rated the risk of an incident occurring as significantly higher than other nationalities for all incident types, with the only notable exception to this trend being the perceptions of seafarers in relation to fire (see Figure 6). In contrast Filipino seafarers saw the likelihood of incidents occurring as significantly lower than all other nationalities (see Figure 6).

Figure 6: Percentages by nationality that saw each type of incident as likely



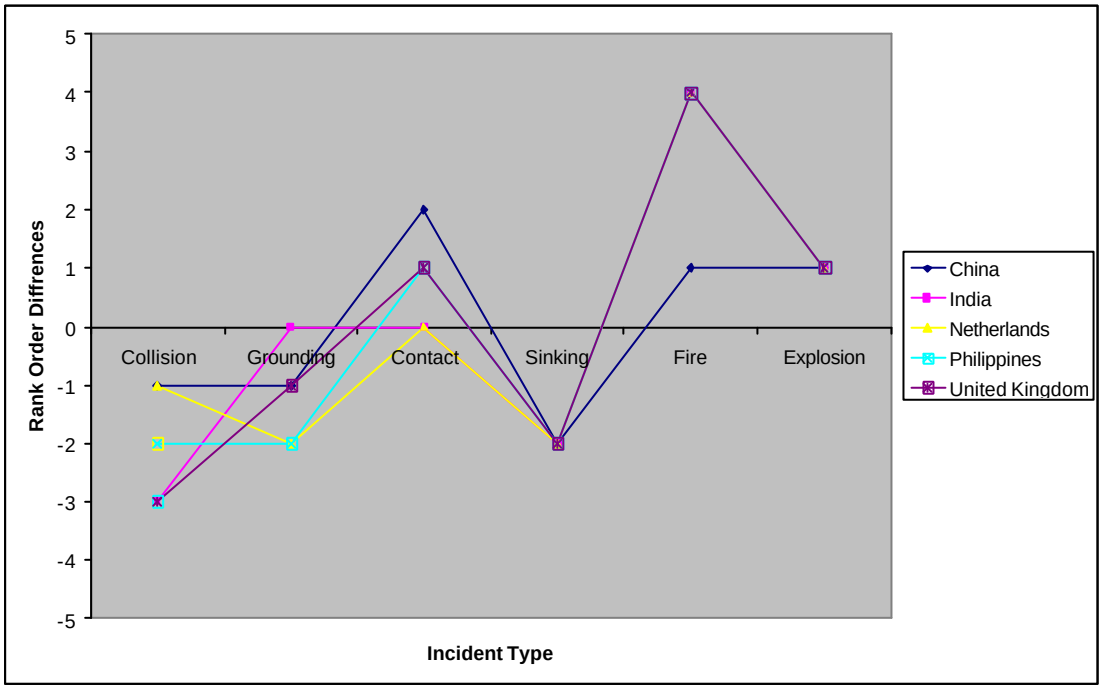
Although clear differences are apparent between nationalities in relation to perceptions of how likely it is that a listed event will occur, at this stage it is not possible to state which nationalities have the most 'accurate' perception of risk as depicted by the data provided by Maritime Administrations. Therefore, in order to try and consider this further, rank ordered perceptions split by nationality groups were compared to ranked incidents as recorded by the Maritime Administrations (see Table 7).

Table 7: ***Rank order differences between recorded accidents and perceptions of the likely incidents split by seafarer nationality***

MA Datasets		Nationality									
		China		India		Netherlands		Philippines		United Kingdom	
Event	***Rank Order***	***Event***	***Dist***	***Event***	***Dist***	***Event***	***Dist***	***Event***	***Dist***	***Event***	***Dist***
Coll	1	Contact	2	Fire	4	Fire	4	Fire	4	Fire	4
Ground	2	Collision	-1	Grounding	0	Collision	-1	Contact	1	Contact	1
Contact	3	Grounding	-1	Contact	0	Contact	0	Collision	-2	Grounding	-1
Sinking	4	Fire	1	Collision	-3	Grounding	-2	Grounding	-2	Collision	-3
Fire	5	Explosion	1	Explosion	1	Explosion	1	Explosion	1	Explosion	1
Exp	6	Sinking	-2	Sinking	-2	Sinking	-2	Sinking	-2	Sinking	-2
Total distance from MA Ranking			8		10		10		12		12

These differences between recorded incidents and perceptions of likely incidents for the different nationalities are shown graphically below in Figure 7.

Figure 7: Rank order differences between recorded accidents and perceptions of the likely incidents split by seafarer nationality



Comparison of the rank ordering shows that not only are Chinese seafarers more likely to rate the chance of an incident occurring higher than other nationalities, they are also more 'accurate' in their rank ordering of events. However, whilst Chinese seafarer ratings of the likelihood of collision, grounding and fire were generally more 'accurate' than other nationalities, their ranking in relation to contact with fixed structures was least 'accurate' compared to the data recorded by the Maritime Administrations. In contrast, rank ordering of the most likely events was least

'accurate' for UK and for Filipino seafarers, (see 'total distance from MA ranking' on Table 7). Both groups "overestimated" the likelihood of fire, as did those from the Netherlands and India) and "underestimated" the likelihood of grounding and collision in relation to the recorded Maritime Administration data.

Whilst it may be suggested that such apparent differences in perception according to nationality may reflect a genuine variation in the risks that different nationalities face (for example, by virtue of the kinds of companies/trade/sectors they are concentrated within) this may not be the whole explanation. The findings highlight that the need to further investigate this area.

1.2.2.5 The Effect of Age and Experience

At sea much learning takes place as a result of hands on experience, or 'doing the job' (Tang, 2009), and such experience may play an important role in the development of individuals' perceptions of safety and understandings of risk. It may be hypothesised that experience of seafaring will consequently impact upon perceptions of risk. In order to consider this rank ordered perceptions of the most likely events to occur to a vessel have been split by age compared to recorded Maritime Administration data (see Table 8).

Table 8: Comparison of rank ordered dataset incident to rank order perceptions split by age (grouped)

MA Datasets	**Seafarers Age**									
	<25 years		25-35 years		35-45 years		45-55 years		>55 years	
Event	***Event***	***Dist***	***Event***	***Dist***	***Event***	***Dist***	***Event***	***Dist***	***Event***	***Dist***
Collision	Fire	4	Fire	4	Fire	4	Fire	4	Contact	2
Ground	Contact	1	Contact	1	Contact	1	Contact	1	Grounding	0
Contact	Collision	-2	Collision	-2	Grounding	-1	Collision	-2	Fire	2
Sinking	Grounding	-2	Grounding	-2	Collision	-3	Grounding	-2	Collision	-3
Fire	Explosion	1	Explosion	1	Explosion	1	Explosion	1	Explosion	1
Exp	Sinking	-2	Sinking	-2	Sinking	-2	Sinking	-2	Sinking	-2
Total distance from MA Ranking		12		12		12		12		10

Contrary to expectations age does not seem to have very strong effect upon risk perception. The rank ordering of the most likely events compared with recorded incidents seems to be very similar for all age groups with only a slight variation in results for the 55 year plus category.

However, there is a problem with using the age of the seafarer as a proxy for experience, as it does not necessarily reflect how long an individual has served at sea, and indeed there may be much variance as to when individuals began their sea going career. Thus it might be more telling to consider years at sea rather than simply age. We therefore compared the rank ordering of the most likely events split by years at sea with rank ordered incidents as recorded in the Maritime Administration databases (see Table 9).

Table 9: Comparison of rank ordered dataset incident to rank ordered perceptions split by years at sea (grouped)

MA Datasets	Years at Sea									
	2 or less		**2-5yrs**		**5-10yrs**		**10-20yrs**		**20+ yrs**	
Event	***Event***	***Dist***	***Event***	***Dist***	***Event***	***Dist***	***Event***	***Dist***	***Event***	***Dist***
Collision	Contact	2	Fire	4	Fire	4	Fire	4	Contact	2
Ground	Fire	3	Collision	-1	Contact	1	Contact	1	Fire	3
Contact	Collision	-2	Grounding	-1	Grounding	-1	Grounding	-1	Grounding	-1
Sinking	Grounding	-2	Contact	-1	Collision	-3	Collision	-3	Collision	-3
Fire	Explosion	1	Explosion	1	Explosion	1	Explosion	1	Explosion	1
Exp	Sinking	-2	Sinking	-2	Sinking	-2	Sinking	-2	Sinking	-2
Total distance from MA Ranking		12		10		12		12		12

However, as with age, there was no strong effect of years at sea

Although these findings seem to suggest that experience does not exert a strong influence on perceptions of risk, as both seafarer age and the duration at sea had no effect on how closely perceptions matched recorded events, the relationship may not be so straightforward. Experience is unlikely to be the only factor to inform an individual's perceptions of risk. Negative personal experiences, such as accidents witnessed and experienced, may bias perceptions, and cause individuals to overestimate the likelihood of particular events (see Bailey 2009). Although it is not within the scope of this report to look at how such negative experiences influence perceptions we have conducted a number of interviews, as part of the ongoing perceptions project within The LRETRU, with seafarers about safety onboard. Analysis of these will be reported on at a future date and may help us to better understand the influence of experience on perceptions of risk.

1.2.2.6 Perceptions of Risk and Vessel Type

It is likely that certain ship types due to their size, construction, and nature of operation, may be more prone to certain types of incidents. For example, it may by hypothesised that there is likely to be a greater risk of collision to passenger vessels operating in busy shipping lanes, whereas the risk of collision may be greatly reduced for deep sea bulk carriers. Table 10 shows the frequency and percentage of incident types (in rank order) for the different vessel types recorded in the Maritime Administration dataset.

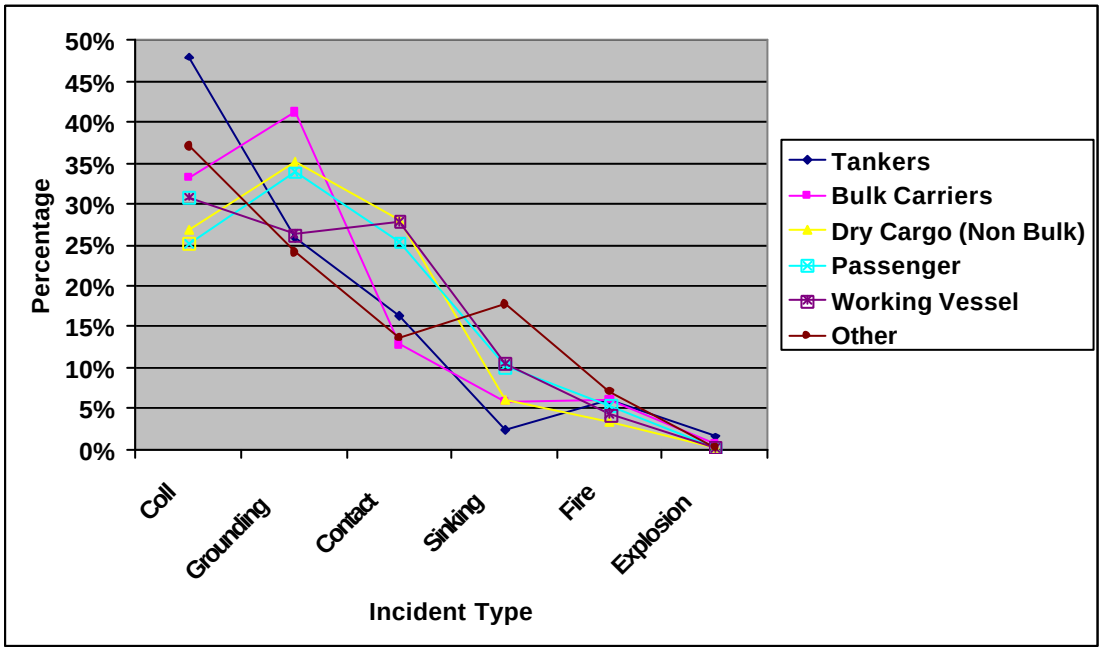
Table 10: The percentage of incident types in rank order for each vessel type

Tankers		Bulk Carriers		Dry Cargo (Non Bulk)	
Incident	***Percent***	***Incident***	***Percent***	***Incident***	***Percent***
Coll	47.9%	Grounding	41.2%	Grounding	35.2%
Grounding	25.9%	Coll	33.3%	Contact	28.1%
Contact	16.3%	Contact	12.8%	Coll	26.7%
Fire	6.1%	Fire	6.2%	Sinking	6.2%
Sinking	2.3%	Sinking	5.9%	Fire	3.4%
Explosion	1.6%	Explosion	0.6%	Explosion	0.3%
Total	100.0%	Total	100.0%	Total	100.0%

Passenger		Working Vessel		Other	
Incident	***Percent***	***Incident***	***Percent***	***Incident***	***Percent***
Grounding	33.9%	Coll	30.8%	Coll	37.1%
Contact	25.3%	Contact	27.9%	Grounding	24.1%
Coll	25.2%	Grounding	26.2%	Sinking	17.7%
Sinking	10.1%	Sinking	10.6%	Contact	13.6%
Fire	5.4%	Fire	4.3%	Fire	7.1%
Explosion	0.1%	Explosion	0.3%	Explosion	0.3%
Total	100.0%	Total	100.0%	Total	100.0%

Although the pattern of incidents is not as we had anticipated, clear differences can be seen between the most frequent incident types recorded for different types of vessel. For tankers and working vessels the most frequently recorded incident type was collision. However for bulk carriers, dry cargo vessels, and passenger vessels grounding was the most frequently recorded incident. These differences can be plainly seen in Figure 8.

Figure 8: The percentage of incident types for each vessel type



Further analysis was undertaken to see how respondents' perceptions of risk in relation to particular types of ship compared with reported incidents by ship type (see Table 11).

Table 11: ***Rank order differences between recorded accidents split by ship types and perceptions of likely incidents***

Tankers			Bulk Carriers			Dry Cargo (Non Bulk)		
MA Dataset	**Percept**	***Dist***	***MA Dataset***	**Percept**	***Dist***	***MA Dataset***	**Percept**	***Dist***
Coll	Fire	3	Ground	Fire	3	Ground	Fire	4
Ground	Contact	1	Coll	Contact	1	Contact	Contact	0
Contact	Coll	-2	Contact	Coll	-1	Coll	Coll	0
Fire	Ground	-2	Fire	Ground	-3	Sinking	Ground	-3
Sinking	Exp	1	Sinking	Exp	1	Fire	Exp	1
Exp	Sinking	-1	Exp	Sinking	-1	Exp	Sinking	-2
Total distance from MA ranking		10			10			10

Passenger			Working Vessel			Other		
MA Dataset	**Percept**	***Dist***	***MA Dataset***	**Percept**	***Dist***	***MA Dataset***	**Percept**	***Dist***
Ground	Fire	4	Coll	Fire	4	Coll	Fire	4
Contact	Contact	0	Contact	Contact	0	Ground	Contact	2
Coll	Coll	0	Ground	Coll	-2	Sinking	Coll	-2
Sinking	Ground	-3	Sinking	Ground	-1	Contact	Ground	-2
Fire	Exp	1	Fire	Exp	1	Fire	Exp	1
Exp	Sinking	-2	Exp	Sinking	-2	Exp	Sinking	-3
Total distance from MA ranking		10			10			14

It seemed that respondents' perceptions of risk in relation to different ship types did not match reported incidents very closely.

However, such findings are perhaps misleading, as they do not take into consideration the types of vessel the seafarers have experience of. For example, a seafarer who has spent their entire working life on a bulk carrier may have little, or no, knowledge of the complex working of a highly specialised LNG tanker, and thus little concept of the most likely incident that will occur onboard such vessels. Therefore we considered perceptions of the most likely event by rank order and split by ship type as well as whether, or not, the person had served on that vessel type (see Table 12).

Table 12: Comparison of rank ordered incidents split by ship type to rank ordered perceptions split by whether seafarers have served on that ship type

Tankers					Bulk Carriers					Dry Cargo (Non Bulk)				
MA Data	***Not worked on***	***Dist***	***Worked on***	***Dist***	***MA Data***	***Not worked on***	***Dist***	***Worked on***	***Dist***	***MA Data***	***Not worked on***	***Dist***	***Worked on***	***Dist***
Coll	Fire	3	Contact	2	Ground	Fire	3	Contact	2	Ground	Contact	1	Fire	4
Ground	Contact	1	Fire	2	Coll	Contact	1	Fire	2	Contact	Fire	3	Contact	0
Contact	Coll	-2	Ground	-1	Contact	Coll	-1	Coll	-1	Coll	Ground	-2	Coll	0
Fire	Ground	-2	Coll	-3	Fire	Ground	-3	Ground	-3	Sinking	Coll	-1	Ground	-3
Sinking	Exp	1	Exp	1	Sinking	Exp	1	Exp	1	Fire	Exp	1	Exp	1
Exp	Sinking	-1	Sinking	-1	Exp	Sinking	-1	Sinking	-1	Exp	Sinking	-2	Sinking	-2
Total distance from MA Ranking		10		10			10		10			10		10

Passenger					Working Vessels					Other				
MA Data	***Not worked on***	***Dist***	***Worked on***	***Dist***	***MA Data***	***Not worked on***	***Dist***	***Worked on***	***Dist***	***MA Data***	***Not worked on***	***Dist***	***Worked on***	***Dist***
Ground	Fire	4	Fire	4	Coll	Fire	4	Contact	1	Coll	Fire	4	Fire	4
Contact	Contact	0	Contact	0	Contact	Contact	0	Fire	3	Ground	Contact	2	Contact	2
Coll	Coll	0	Ground	-2	Ground	Coll	-2	Ground	0	Sinking	Coll	-2	Ground	-1
Sinking	Ground	-3	Coll	-1	Sinking	Ground	-1	Coll	-3	Contact	Ground	-2	Coll	-3
Fire	Exp	1	Exp	1	Fire	Exp	1	Exp	1	Fire	Exp	1	Exp	1
Exp	Sinking	-2	Sinking	-2	Exp	Sinking	-2	Sinking	-2	Exp	Sinking	-3	Sinking	-3
Total distance from MA Ranking		10		10			10		10			14		14

Experience of a specific vessel type did not seem to have any effect on the 'accuracy' of ratings of risk. This may seem counterintuitive, as we might expect that experience of a certain situation offers individuals a better appreciation of risks. However, not only are the recorded data likely to reflect reporting and recording biases which may skew the data, it is also possible that experience may impact on perceptions of risk in unanticipated ways for example heightening awareness of the most threatening incidents and generating less concern about more everyday risks.

Part 2: Seafarer Injuries and Fatalities

So far this report has considered vessels and the kinds of accidents and incidents that they may be involved in. We will now shift the focus away from the vessel and towards the individuals working aboard ships. In doing so, the report will consider the ways in which seafarers perceive the personal risks they face in undertaking their work, and the most commonly recorded contexts and causes of personal injury and seafarer fatality as identified by both participating Maritime Administrations and shipping companies.

2.1 Data Collection

2.1.1 Collection of Data From Companies

The introduction of the International Safety Management Code, in 2002, made it a legal requirement for shipping companies to set in place, and follow, documented Safety Management Systems (SMS). As part of this process, companies are required to record and maintain accident and incident data for their fleet. Although there is no prescribed format for the information they keep, it is usually very detailed. However, it is generally not publicly available and is usually kept within the company due to its sensitive nature.

In the course of the conduct of five case studies focussed upon shipping companies (as part of this research) we requested access to company level accident, and injury, datasets. Of the five companies involved in the study, three were able to assist us and provided accident and incident information for their fleet.

The first company (Company A) provided an internal report which consisted of brief summaries of individual accidents, which were further grouped into basic accident types. The information included in the report was fairly comprehensive, and covered a period from 1999 to 2005. The second (company B) simply provided raw accident and incident data, which covered a period of 2003-2005, including just over 1,600 events. This dataset included information such as the date of an accident, a description of what happened, information about the cause, and a classification of incident type. The description field in the data gave fairly detailed information (in the form of a narrative) about what had happened. The third company provided its 'in house' software package which was used to produce accident/incident reports, as well to examine more detailed information about specific incidents. Although this software package included a large amount of data, a major problem was that the raw data were not accessible. This meant that the data from this company could not be used in the following analysis, as it could not be coded or re-analysed. Therefore in the final analysis data from only two, of the five companies, could be compared with seafarer perceptions of risk.

2.1.2 Collection of Data from Maritime Administrations

Data were also collected from the 16 Maritime Administrations which provided the project with data relating to vessel level incidents. However, not all of this data could be utilised and data from only six Maritime Administrations could be included in the final analysis. Although the data provided by the administrations and companies was in roughly the same format, and easily comparable, these two sources will be analysed separately as the data provided by the companies might also be represented amongst the data contained within some of the Maritime Administration datasets, leading to double counting. Therefore in all the subsequent analysis, data from the two sources (companies and Maritime Administrations) will be presented separately.

2.2 Findings

2.2.1 General Patterns of Reported/Recorded Injury/Fatality

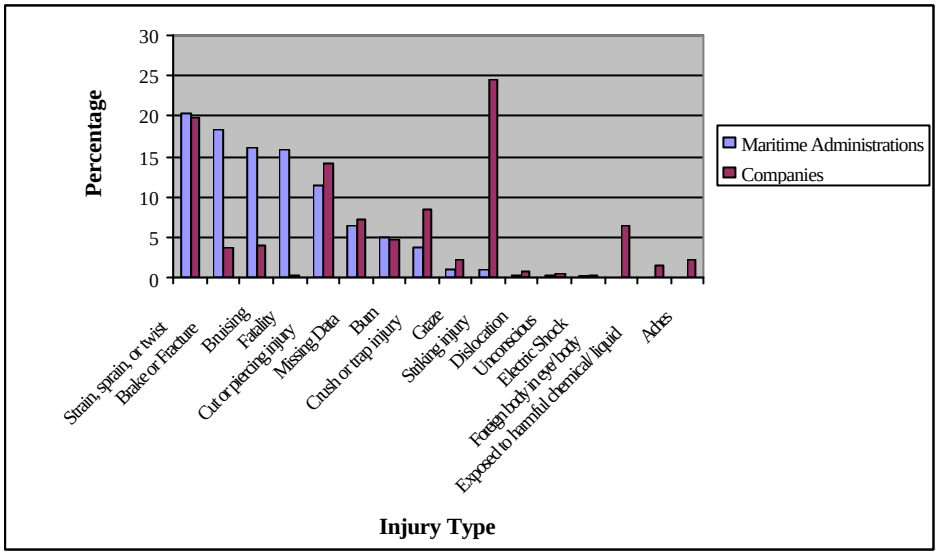
Before we begin to compare seafarers' perceptions of where they face the highest risk of injury/mortality with reported/recorded data, we will consider the types of injury that were reported/recorded in the Maritime Administration and companies' databases (see Table 13).

Table 13: Injuries Recorded in the maritime administration and companies' datasets

Maritime Administrations		Companies	
Injury	**Percent**	**Injury**	**Percent**
Strain, sprain, or twist	20.4	Striking injury	24.4
Break or Fracture	18.3	Strain, sprain, or twist	19.7
Bruising	16.0	Cut or piercing injury	14.1
Fatality	15.8	Crush or trap injury	8.5
Cut or piercing injury	11.5	Missing Data	7.2
Missing Data	6.4	Foreign body in eye/ body	6.4
Burn	4.9	Burn	4.6
Crush or trap injury	3.8	Bruising	4.1
Graze	1.1	Break or Fracture	3.6
Striking injury	0.9	Aches	2.1
Dislocation	0.3	Graze	2.1
Unconscious	0.3	Exposed to harmful chemical/ liquid	1.5
Electric Shock	0.2	Dislocation	0.8
Foreign body in eye/ body	0.0	Unconscious	0.5
		Electric Shock	0.3
		Fatality	0.3

Although some similarities can be seen in the patterns of reported/recorded injury types between the Maritime Administrations and the companies data sets, with 'strains, sprains, and twists', and to some extent 'cut or piercing' making up a large proportion of injuries, there are also many differences (see Figure 9).

Figure 9: Injuries recorded in the maritime administration and companies' datasets



'Breaks and fractures' which were the second most frequent event within the MA dataset, accounting for 19.5% of injuries overall, were significantly less prevalent in the company datasets, accounting for only 3.9% of injuries (p<.005). Similarly 'bruising' which makes up 17.1% of the Maritime Administration injuries, was also significantly less frequent in the company injury datasets and only accounted for 4.4% of total injuries (P<.005).

A more striking difference however, is the proportion of 'fatalities' for the two datasets, with only 0.3% of the company dataset representing fatalities, compared to 16.8% of the Maritime Administrations dataset, a significant difference (p<.005). This is strongly suggestive of a considerable amount of under-reporting/recording of more minor injuries within Maritime Administration datasets (see Ellis, *et al.* 2010, for a fuller explanation of this phenomenon). However, it could also reflect the small size of the company dataset (455 cases) compared to the administration dataset (20,715 cases).

It may also be the case that certain injuries are more prevalent for certain vessel types, due to the different nature of these vessels, and the cargoes they carry. Table 14 presents the most frequent injury types for the six vessel types identified in part one of this report. These variations in vessel type were only present in the data available from the Maritime Administrations, as where vessel type information was available for companies, all the ships were identified as 'tankers'.

Table 14: Injuries by vessel type within maritime administration dataset

Tankers		**Bulk Carriers**		**Dry Cargo (Non Bulk)**	
Injury	*Percent*	*Injury*	*Percent*	*Injury*	*Percent*
Strain, sprain, or twist	20.9	Fatality	37.9	Brake or Fracture	20.8
Break or Fracture	18.9	Break or Fracture	14.3	Fatality	18.6
Bruising	16.8	Bruising	14.0	Strain, sprain, or twist	18.0
Fatality	13.8	Strain, sprain, or twist	11.6	Bruising	16.9
Cut or piercing injury	11.8	Cut or piercing injury	8.7	Cut or piercing injury	13.1
Burn	10.6	Burn	7.2	Burn	5.5
Crush or trap injury	3.1	Crush or trap injury	3.6	Crush or trap injury	3.6
Graze	1.8	Graze	0.9	Graze	1.8
Striking injury	1.4	Unconscious	0.9	Striking injury	1.0
Dislocation	0.4	Striking injury	0.6	Unconscious	0.3
Electric Shock	0.3	Foreign body in eye/ body	0.3	Electric Shock	0.2
Unconscious	0.1			Dislocation	0.2

Passenger		**Working Vessel**		**Other**	
Injury	*Percent*	*Injury*	*Percent*	*Injury*	*Percent*
Strain, sprain, or twist	25.2	Strain, sprain, or twist	24.5	Break or Fracture	24.0
Break or Fracture	18.0	Break or Fracture	19.1	Strain, sprain, or twist	23.7
Bruising	16.9	Bruising	18.1	Bruising	14.4
Cut or piercing injury	14.6	Fatality	16.6	Fatality	12.5
Fatality	13.4	Cut or piercing injury	11.4	Cut or piercing injury	11.4
Crush or trap injury	5.1	Crush or trap injury	4.3	Burn	4.6
Burn	4.2	Burn	3.9	Crush or trap injury	4.6
Dislocation	0.9	Graze	0.9	Unconscious	2.5
Striking injury	0.7	Striking injury	0.8	Striking injury	1.1
Graze	0.5	Electric Shock	0.2	Dislocation	0.7
Unconscious	0.4	Dislocation	0.1	Electric Shock	0.4
Electric Shock	0.2	Unconscious	0.1	Graze	0.4

For the majority of vessel types (including tankers, passenger vessels, working vessels, and other vessels), roughly similar patterns of injury are found with the most frequently recorded injury types being 'strains, sprains, and twists', or 'breaks and fractures'. 'Bruising' was also a frequent injury, appearing in the top four injuries for all of the vessels.

However, an important difference arose in relation to fatalities. For 'bulk carriers' fatalities accounted for over 1/3 (37.9%) of the overall 'injuries', and was the most frequently reported 'injury' of all. Whilst bulk carriers may well be more dangerous places to work than other vessels, it is also possible that this reflects a reporting bias as consideration of reports of minor injuries aboard bulk carriers indicates a very low rate of reporting/recording for minor injuries such as strains sprains and twists. Thus it may well be that only reports of more serious injuries and fatalities are made to Maritime Administrations from bulk carriers and bulk carrier companies and thus fatalities make up a greater overall proportion of total reports.

2.2.2 Comparing seafarer perceptions of risk with reported/recorded injuries and fatalities

As with vessel level accident data, recorded data about seafarer injuries can be compared to the perceptions of risk of those working at sea and in shore-side shipping offices. Within our questionnaire there were four sets of questions that we were able to use in comparing perceptions of risk with reported/recorded injury data from both the Maritime Administrations and companies (see Table 15). For some items in the questionnaire, comparable data were not collected from Maritime Administrations and companies and thus these were excluded from analysis (highlighted in grey).

Table 15: Survey questions used for comparison to recorded data

Causes of Injury (Question 3)
3.1. Contact with moving machinery 3.2. Being hit by moving (includes flying / falling) object 3.3. Being hit by moving vehicle 3.4. Being struck against something fixed or stationary 3.5. Handling, lifting or carrying 3.6. Slips, trips or falls on same level 3.7. Falls from a height 3.8. Trapped by something collapsing / overturning 3.9. Drowning / lack of oxygen / overcome by fumes 3.10. Exposure to, or contact with, a harmful substance 3.11. Exposure to fire 3.12. Exposure to an explosion 3.13. Contact with hot surfaces 3.14. Contact with cold surfaces 3.15. Contact with electricity or electrical discharge 3.16. Working in hot environment 3.17 Working in cold environment 3.18 Acts of violence
Task Being Undertaken (Question 5.1)
5.1.1 Use of ladders /gangways 5.1.2 Rigging of gangway 5.1.3 Entry into enclosed space 5.1.4 Opening and closing hatches 5.1.5 Use of power tools 5.1.6 Welding / gas cutting 5.1.7 Manual-handling of heavy or awkward items 5.1.8 Engine maintenance at sea 5.1.9 Work in a confined space

Table 15 (cont.): Survey questions used for comparison to recorded data

Overall Action Being Undertaken (Question 5.2)
5.2.1 Rough weather
5.2.2 ~~Mechanical breakdown~~
5.2.3 Crane operations
5.2.4 Helicopter operations
5.2.6 Mooring operations
5.2.7 ~~Operating in piracy areas~~
5.2.8 Working over-side
5.2.9 Working on exposed deck
5.2.10 Working in vicinity of moving vehicles
5.2.11 Working at height
5.2.12 Working near open hatches / tanks
5.2.13 ~~Doing unfamiliar work~~
5.2.14 Working having consumed alcohol / drugs
Location Accident Occurred Onboard (Question 5.3)
5.3.1 ~~Navigation at night without a dedicated lookout~~
5.3.2 ~~High numbers of alarms, for example, on the bridge / in the engine room~~
5.3.3 ~~New equipment~~
5.3.4 Working in the galley
5.3.5 Working in the engine room
5.3.6 Working on deck
5.3.7 Working in the accommodation
5.3.8 Working on the bridge
5.3.9 Working in shore-side office
5.3.10 ~~Having just joined the ship~~
5.3.11 ~~Approaching the end of the time onboard~~
5.3.12 ~~Entering and leaving port~~
5.3.13 ~~Navigation in restricted / congested water~~
5.3.14 ~~Navigation in open water~~
5.3.15 ~~Navigation near fishing vessels~~

In undertaking the analysis it is important to note that the frequency of accidents (as recorded in the MA datasets) cannot be directly compared to the perceptions of questionnaire respondents because the nature of the two measures that are used is different: one is a frequency, and the other is either a categorised response (likely or unlikely) or a mean risk score (ranging from 1 'no risk' to 5 'very great risk'). In order to compare these data we therefore made use, once again, of rank order. Injuries were ranked according to frequency as recorded in the company and Maritime Administration datasets, and respondents' perceptions were also ranked according to the findings from the questionnaire. These rankings were then compared.

2.2.3 Comparing Perceptions to Reported/Recorded Injuries and Fatalities

2.2.3.1 Cause of Injury

The first set of questions that will be examined concern the cause of accidents. We will examine how perceptions of the most likely cause of accidents vary with organisational factors such as hierarchy and department, individual characteristics,

such as age and experience at sea, and finally, factors relating to the vessel, such as the type.

Cause - The overall picture

Looking at general perceptions of the causes of injuries, large differences between ranked perceptions and the ranked frequency of causes of accidents as recorded within the administration datasets can be seen (see Table 16).

Table 16: Recorded causes of accidents versus perceptions of likely causes for the maritime administrations data

Administration Dataset	%	Perceptions	% likely	Rank Order Diff.
Slips, trips or falls on same level	31.6	Working in hot environment	54.4	16
Falls from a height	23.6	Handling, lifting or carrying	54.0	2
Hit by moving (includes flying / falling) object	15.0	Slips, trips or falls on same level	53.4	-2
Handling, lifting or carrying	10.3	Contact with hot surfaces	48.0	3
Drowning / lack of oxygen / overcome by fumes	7.2	Contact with moving machinery	43.0	5
Exposure to, or contact with, a harmful substance	4.2	Working in cold environment	41.8	6
Contact with hot surfaces	3.3	Hit by moving (includes flying / falling) object	39.7	-4
Acts of violence	1.2	Contact with electricity or electrical discharge	37.3	1
Contact with electricity or electrical discharge	0.8	Falls from a height	34.7	-7
Contact with moving machinery	0.8	Struck against something fixed or stationary	34.4	6
Exposure to an explosion	0.7	Exposure to, or contact with, a harmful substance	34.4	-5
Working in cold environment	0.6	Exposure to fire	28.0	2
Hit by moving vehicle	0.4	Contact with cold surfaces	27.6	5
Exposure to fire	0.1	Drowning / lack of oxygen / overcome by fumes	23.8	-9
Trapped by something collapsing / overturning	0.1	Acts of violence	22.4	-7
Struck against something fixed or stationary	0.0	Hit by moving vehicle	20.9	-3
Working in hot environment	0.0	Trapped by something collapsing / overturning	20.2	-2
Contact with cold surfaces[7]	0.0	Exposure to an explosion	19.7	-7

Amongst respondents, the most likely cause of an accident was perceived to be 'working in a hot environment'. However, this was the least recorded cause of injury in the Maritime Administration dataset.

The second most frequent cause of injury recorded in the Maritime Administration datasets was 'fall from heights'. However, this was seen as only the ninth most likely event by questionnaire respondents.

A similar picture can be seen for company data (see Table 17), as again, whilst the most likely cause of injury was perceived to be 'working in a hot environment', this was the least frequently listed cause of an accident in the company dataset. As with the administrations, the most frequent cause of injury as listed in the company dataset was 'slips, trips, and falls'. The third most frequent cause of injury listed in the companies data was 'being struck against something fixed or stationary', which was perceived by questionnaire respondents as only the tenth most likely cause of injury.

[7] Although no cases of 'contact with cold surfaces' were actually recorded, it is included in the table so that all perceptions questions may be included in the analysis. Shading is used to indicate this missing item, and such shading will be used throughout the rest of the report.

Table 17: Recorded causes of accidents versus perceptions of likely causes for the companies data

Company Dataset	%	Perceptions	% likely	Rank Order Diff.
Slips, trips or falls on same level	31.7	Working in hot environment	54.4	11
Hit by moving (includes flying / falling) object	21.4	Handling, lifting or carrying	54.0	2
Struck against something fixed or stationary	13.3	Slips, trips or falls on same level	53.4	-2
Handling, lifting or carrying	12.2	Contact with hot surfaces	48.0	3
Exposure to, or contact with, a harmful substance	8.9	Contact with moving machinery	43.0	4
Falls from a height	5.5	Working in cold environment	41.8	7
Contact with hot surfaces	2.2	Hit by moving (includes flying / falling) object	39.7	-5
Acts of violence	2.2	Contact with electricity or electrical discharge	37.3	3
Contact with moving machinery	1.5	Falls from a height	34.7	-3
Exposure to fire	0.4	Struck against something fixed or stationary	34.4	-7
Contact with electricity or electrical discharge	0.4	Exposure to, or contact with, a harmful substance	34.4	-6
Working in hot environment	0.4	Exposure to fire	28.0	-2
Working in cold environment	0.0	Contact with cold surfaces	27.6	0
Contact with cold surfaces		Drowning / lack of oxygen / overcome by fumes	23.8	-1
Drowning/ lack of oxygen/ overcome by fumes		Acts of violence	22.4	-7
Being hit by moving vehicles		Hit by moving vehicle	20.9	-3
Trapped by something collapsing/ overturning		Trapped by something collapsing / overturning	20.2	-4
Exposure to explosions		Exposure to an explosion	19.7	-5

Comparing individual administration and company results to perceptions

Data on personal injury were collected from six different administrations, as well as two different companies. In order to consider differences between the rank order of respondent perceptions and those of the various datasets, use is made of the value assigned to 'rank order difference' (see Table 18).

Table 18: Rank order difference scores for cause for individual maritime administrations and companies

	Total Rank Order Difference Scores For all listed Causes of injury
Maritime Administrations	
Administration A	134
Administration B	96
Administration C	117
Administration D	91
Administration E	111
Administration F	77
Companies	
Company A	77
Company B	78

Generally speaking perceptions most closely match the data recorded by Maritime Administration F, and were most distant from the data recorded by Maritime Administration A (see Tables 19 and 20).

For the companies, no real differences could be seen between the two datasets when aggregate rank order difference scores were compared. However, it is interesting to note that the aggregate difference scores for the companies indicate that the

perceptions of respondents matched company recorded data as closely as that of Maritime Administration F (the closest match of all the Maritime Administrations).

Table 19: Recorded causes of accidents for maritime administration A compared to overall perceptions of likely causes of accidents

Maritime Administration A		Perceptions		Rank Order Diff.
Administration Dataset	**%**	**Perceptions**	**% likely**	
Drowning / lack of oxygen / overcome by fumes	25.9	Working in hot environment	54.4	15
Exposure to an explosion	19.4	Handling, lifting or carrying	54.0	12
Falls from a height	17.1	Slips, trips or falls on same level	53.4	1
Slips, trips or falls on same level	8.8	Contact with hot surfaces	48.0	8
Hit by moving (includes flying / falling) object	7.4	Contact with moving machinery	43.0	6
Acts of violence	5.6	Working in cold environment	41.8	11
Exposure to fire	4.2	Hit by moving (includes flying / falling) object	39.7	-1
Exposure to, or contact with, a harmful substance	2.8	Contact with electricity or electrical discharge	37.3	7
Trapped by something collapsing / overturning	2.3	Falls from a height	34.7	-6
Hit by moving vehicle	1.9	Struck against something fixed or stationary	34.4	3
Contact with moving machinery	1.4	Exposure to, or contact with, a harmful substance	34.4	-3
Contact with hot surfaces	1.4	Exposure to fire	28.0	-5
Struck against something fixed or stationary	0.5	Contact with cold surfaces	27.6	4
Handling, lifting or carrying	0.5	Drowning / lack of oxygen / overcome by fumes	23.8	-13
Contact with electricity or electrical discharge	0.5	Acts of violence	22.4	-9
Working in hot environment	0.5	Hit by moving vehicle	20.9	-6
Working in cold environment	0.0	Trapped by something collapsing / overturning	20.2	-8
Contact with cold surfaces		Exposure to an explosion	19.7	-16

Table 20: Recorded causes of accidents for maritime administration F compared to overall perceptions of likely causes of accidents

Maritime Administration F		Perceptions		Rank Order Diff.
Administration Dataset	**%**	**Perceptions**	**% likely**	
Slips, trips or falls on same level	32.0	Working in hot environment	54.4	12
Falls from a height	22.6	Handling, lifting or carrying	54.0	3
Hit by moving (includes flying / falling) object	19.4	Slips, trips or falls on same level	53.4	-2
Drowning / lack of oxygen / overcome by fumes	7.8	Contact with hot surfaces	48.0	2
Handling, lifting or carrying	7.1	Contact with moving machinery	43.0	3
Contact with hot surfaces	4.3	Working in cold environment	41.8	5
Exposure to, or contact with, a harmful substance	3.0	Hit by moving (includes flying / falling) object	39.7	-4
Contact with moving machinery	1.0	Contact with electricity or electrical discharge	37.3	2
Acts of violence	0.9	Falls from a height	34.7	-7
Contact with electricity or electrical discharge	0.8	Struck against something fixed or stationary	34.4	3
Working in cold environment	0.8	Exposure to, or contact with, a harmful substance	34.4	-4
Hit by moving vehicle	0.4	Exposure to fire	28.0	1
Working in hot environment	0.0	Contact with cold surfaces	27.6	0
Being struck against something fixed or stationary		Drowning / lack of oxygen / overcome by fumes	23.8	-10
Exposure to fire		Acts of violence	22.4	-6
Contact with cold surfaces		Hit by moving vehicle	20.9	-4
Trapped by something collapsing/ overturning		Trapped by something collapsing / overturning	20.2	-4
Exposure to explosions		Exposure to an explosion	19.7	-5

The influence of experience of various ship types

It was possible to split the data from Maritime Administrations by ship type. We were then able to consider the responses of seafarers with experience of each ship type and compare these with the responses of seafarers without experience of each ship type. Using rank order difference scores we were thereby able to assess whether or not experience on a particular type of ship impacted upon the distance between seafarer perceptions and the recorded data for each ship type (see Table 21).

Table 21: Rank order difference scores for cause by vessel type and whether a seafarer has served on this vessel type

Vessel Type	Rank Order Difference Scores For Cause	
	Served On	*Not Served On*
Tankers	82	88
Bulk Carriers	102	102
Dry Cargo (Non Bulk)	91	91
Passenger	92	104
Working Vessel	66	68
Other	62	69

This exercise seemed to indicate that for four of the six categories of ship type (highlighted on the Table in blue), the rank order difference score were lower when seafarers had experience of that ship type then when they had not. Thus seafarers' perceptions more closely matched the Maritime Administrations' recorded data on injuries by ship type if they had, in the course of their career, served aboard the particular ship type concerned.

Rank and risk perception

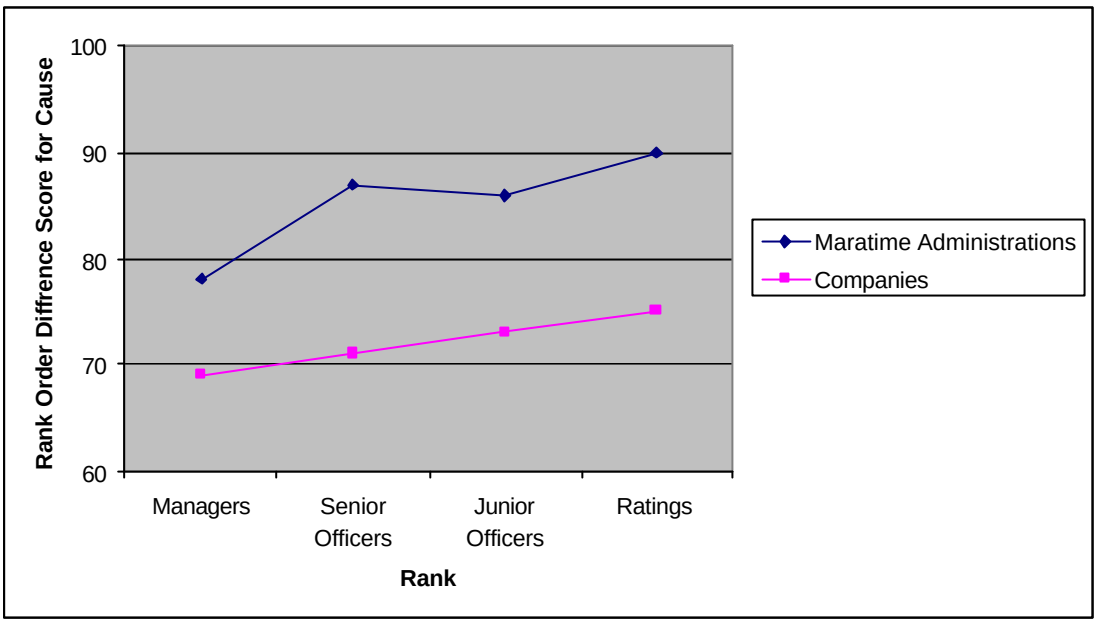
Not only does rank dictate the hierarchical position of a person onboard the vessel, but with rank comes experience and knowledge. Therefore it is reasonable to suggest that as a seafarer moves higher up the ranks aboard ship their perceptions about safety and risk may change. It is interesting to consider therefore whether or not there are variations in perception by rank and whether some ranks' perceptions are closer to the recorded data or more distant from it (see Table 22).

Table 22: Rank order difference scores for cause by ranks

	Rank Order Difference Scores for Cause
Maritime Administrations	
Managers	78
Senior Officers	87
Junior Officers	86
Ratings	90
Companies	
Managers	69
Senior Officers	71
Junior Officers	73
Ratings	75

For companies, and to a lesser extent, for the Maritime Administrations, it does appear that seafarers of higher rank have perceptions which are closer to the recorded data than seafarers of lower rank (see also Figure 10).

Figure 10: Rank order difference scores for cause by rank



Department and perceptions of risk

So far we have found what appears to be an effect of rank on perceptions of injury risk. However, onboard vessels there are also different organisational units in which people work that are known as 'departments'. It is worth considering therefore whether department impacts upon the distance between the perceptions of seafarers and the recorded data (see Table 23).

Table 23: Rank order difference scores for cause by departments

	Rank Order Difference Scores For Cause
Maritime Administrations	
Engineering	106
Deck	86
Catering	96
Shoreside	75
Companies	
Engineering	81
Deck	72
Catering	75
Shoreside	69

For both the Maritime Administrations and companies a similar pattern of rank order difference scores can be seen. In both datasets the recorded data is most closely

matched by the responses of shore side managers, followed by deck officers, then those in the catering department and finally those working in the engine room.

Nationality and risk perception

In our earlier report, '*Perceptions of Risk in The Maritime Industry: Ship Casualty*', nationality was found to impact on risk perceptions in relation to the most likely accident to occur to a vessel.

It may also be the case that similar nationality differences might exist in relation to perceptions about the most likely personal injury to occur on board. It is useful therefore to consider the perceptions of the most likely causes of injuries split by nationality and compare the rank order difference scores established between these and the recorded data (see Table 24).

Table 24: Rank order difference scores by cause for nationalities

	Rank Order Difference Scores For Cause
Maritime Administration data	
China	94
India	88
Netherlands	90
Philippines	92
UK	80
Company data	
China	77
India	73
Netherlands	69
Philippines	76
UK	61

In contrast to the findings for vessel level data, there seems to be a different picture when it comes to personal injury. Here we find that nationals from the UK and Netherlands express perceptions which most closely match the data supplied by companies, and the perceptions of UK respondents most closely match the data collated from Maritime Administrations. Of all the nationality groups considered, the views of Chinese nationals diverge most markedly from the recorded data, contrasting with vessel level data findings.

Age/years at sea and perceptions of risk

The rank order difference scores were considered for different age groups of seafarer to establish whether any patterns emerged (see Table 25).

Table 25: Rank order difference scores for cause by age

	Rank Order Difference Scores For Cause
Maritime Administrations	
<25 years old	88
25-35 years old	90
35-45 years old	92
45-55 years old	84
>55 years old	88
Companies	
<25 years old	71
25-35 years old	75
35-45 years old	77
45-55 years old	67
>55 years old	67

The picture here is confused and no clear trend emerges. As age increases perceptions appear to less closely match the recorded data until we arrive at the 35-45 age group where the trend is reversed. Such patterns are somewhat inconclusive, and when we considered years at sea we found a similar picture.

2.2.3.2 Task Being Undertaken

As well as considering direct and indirect causes of injury within the questionnaire and the datasets from administrations and companies, attention is given to the work tasks which were being undertaken when an injury occurred. In a similar manner to that utilised when considering direct and indirect causes of accidents it is possible to compare seafarers' perceptions of the most likely tasks to be associated with injuries (organised in rank order) with the tasks most frequently associated with injuries (organised in rank order) as recorded in the Maritime Administration and company datasets. In order to achieve this, rank order difference scores are once again employed.

Task and injuries - The overall picture

It is possible to consider the match between the tasks which seafarers think are most likely to be associated with injuries and those which are most closely associated with injury within the aggregated Maritime Administration datasets (see Table 26).

Table 26: Recorded task being undertaken compared to perceptions of likely task in which an accident would occur for maritime administrations

Administration Dataset	%	Perceptions	Mean	Std. Devia -tion	Rank Order Diff.
Engine maintenance at sea	61.7	Entry into enclosed space	3.9	1.2	2
Manual-handling of heavy or awkward items	21.2	Work in a confined space	3.5	1.1	3
Entry into enclosed space	13.2	Manual-handling of heavy/ awkward items	3.3	1.1	-1
Use of ladders /gangways	1.8	Welding / gas cutting	3.3	1.1	4
Work in a confined space	1.0	Use of power tools	3.1	1.0	2
Opening and closing hatches	0.4	Opening and closing hatches	3.0	1.1	0
Use of power tools	0.4	Engine maintenance at sea	3.0	1.1	-6
Welding / gas cutting	0.2	Rigging of gangway	2.8	1.1	1
Rigging of gangway	0.0	Use of ladders /gangways	2.7	1.1	-5

In relation to most of the tasks the fit between seafarer perception and rank order within the **Maritime Administrations'** dataset was relatively close. The exception to this related to injuries occurring during 'engine maintenance at sea'. These were the most frequently recorded tasks associated with seafarer injury within the dataset but appeared six places lower in the rankings when it came to seafarer perceptions, i.e. seafarers appeared to 'underestimate' the risk associated with these tasks[8]. There was a similar pattern with regard to injuries associated with 'use of ladders and gangways'. In contrast, in the case of 'welding and gas cutting' it seemed that this was the second last task associated with injury in the recorded data but was ranked as the fourth most likely task to be associated with an injury by respondents, i.e. seafarers seemingly 'over-estimated' the risk.

There were, however, quite marked differences in the rank order of the tasks which seafarers perceived as being likely to be associated with an injury and those that were recorded as associated with an injury within the **company datasets**. For example, 'entry into enclosed space', was perceived by respondents to be the most likely task with which an injury was likely to be associated and yet it did not feature at all when it came to the rankings of frequency in the companies' datasets (marked in grey on Table 27). The pattern was reversed when it came to 'use of ladders/gangways' which respondents suggested was the least likely task to be associated with injuries, whereas in the company dataset it was the second most common task associated with injuries (see Table 27).

Table 27: Recorded task being undertaken compared to perceptions of likely task in which an accident would occur for companies

Company Dataset	%	Perceptions	Mean	Std. Deviation	Rank Order Diff.
Manual-handling of heavy or awkward items	35.8	Entry into enclosed spaces	3.9	1.2	8
Use of ladders /gangways	32.5	Working in confined spaces	3.5	1.1	5
Engine maintenance at sea	15.0	Manual-handling, heavy or awkward work	3.3	1.1	-2
Opening and closing hatches	5.0	Welding / gas cutting	3.3	1.1	4
Use of power tools	5.0	Use of power tools	3.1	1.0	0
Rigging of gangway	3.3	Opening and closing hatches	3.0	1.1	-2
Work in a confined space	2.5	Engine maintenance at sea	3.0	1.1	-4
Welding / gas cutting	0.8	Rigging on gangway	2.8	1.1	-2
Entry into enclosed spaces	0.0	Using ladders/ gangways	2.7	1.1	-7

Variations between perceptions and different administrations/companies' datasets

Having considered the aggregated datasets for companies and for Maritime Administrations (Tables 27, and 26 respectively) we turned our attention to the results for individual Maritime Administrations and companies to consider variations and similarities. Table 28 shows the rank order difference scores for the recorded task being undertaken when injuries occurred as reported in the data for individual administrations and companies. No rank order difference scores were available for two of the administrations (Administration D and E) as information about the task being undertaken was not available.

[8] NB We use the terms 'underestimate' and 'overestimate' with care as reporting biases within the datasets could well-mean that seafarers' perceptions of risk are accurate and that Maritime Administration datasets are misleading

Table 28: Rank order difference scores for the task being undertaken for individual maritime administrations and companies

	Rank Order Difference Scores For The Task Being Undertaken
Maritime Administrations	
Administration A	15
Administration B	29
Administration C	20
Administration F	23
Companies	
Company A	33
Company B	31

In contrast to the data on direct and indirect causes of accidents with regard to the tasks being carried out when injuries were sustained it appears that respondent perceptions were better matched to the data recorded by the Maritime Administrations (most notably Maritime Administrations A, C and F).

Experience of ship type

To see if experience is also influential in understandings of the risks associated with specific tasks aboard specific types of ship it is worth considering rank order differentials (respondent perceptions Vs recorded data) alongside respondent experience of particular ship types (see Table 29). This is only possible with data from the maritime administrations as company data were solely related to tankers.

Table 29: Rank order difference scores for the task being undertaken by whether a seafarer has served on a vessel type or not

	Rank Order Difference Scores For The Task Being Undertaken	
Vessel Type	*Served On*	*Not Served On*
Tankers	20	20
Bulk Carriers	31	31
Dry Cargo (Non Bulk)	25	27
Passenger	18	20
Working Vessel	23	25
Other	20	23

In relation to dry cargo, passenger, working vessel and other ship types the differences between the rankings of respondent perceptions and the ranked recorded data were smaller for seafarers with experience of these types of ship (highlighted in blue). For the other two types of vessel which we considered, experience of ship type did not impact upon the rank order difference scores.

Rank and risk perception in relation to tasks

In relation to the direct and indirect causes of accidents we found earlier that rank had an impact on rank order differentials and that the responses of higher ranking officers and shore side personnel matched the recorded data from Maritime Administrations

and companies more closely than lower ranking staff (ratings and junior officers). In relation to tasks and risk perceptions we have therefore considered the impact of rank once again (see Table 30) .

Table 30: Rank order difference scores for task by rank

	Rank Order Difference Scores For The Task Being Undertaken
Maritime Administrations	
Managers	24
Senior Officers	24
Junior Officers	24
Ratings	26
Companies	
Managers	34
Senior Officers	34
Junior Officers	34
Ratings	36

In this case there is little impact of rank upon the differential between respondent perceptions and the ranked recorded data. However where a more clear difference seems to arise, it is between the two sets of recorded data: respondent perceptions more closely mirrored the ranked data from the Maritime Administrations than from companies.

Department and task

When perceptions of risk associated with particular tasks were split by respondents' department and compared with ranked recorded data the picture was again different for the Maritime Administration data as compared with the company recorded data (see Table 31).

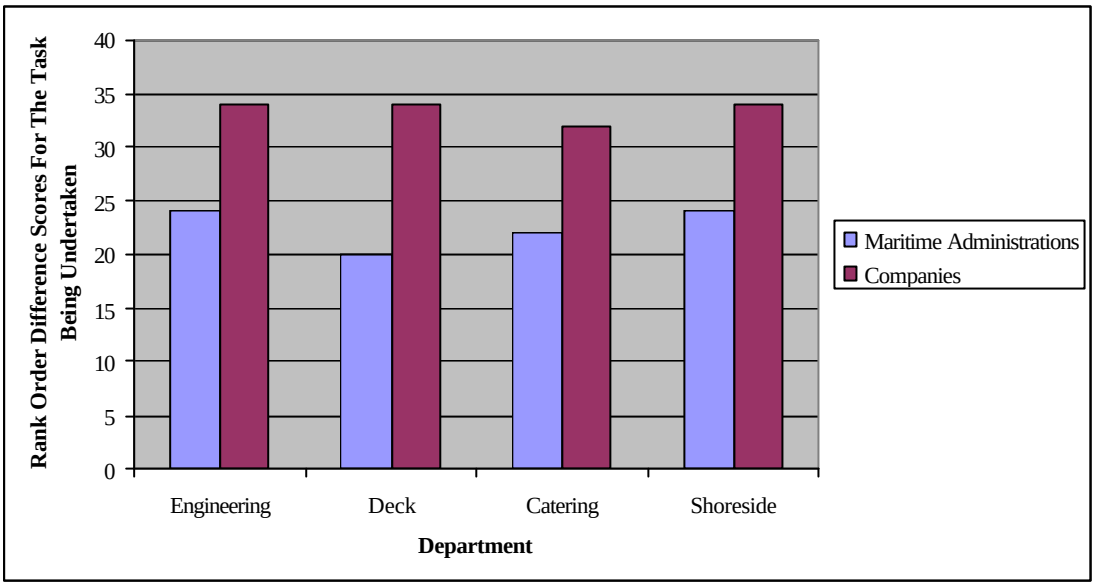
Table 31: Rank order difference scores for task being undertaken by department

	Rank Order Difference Scores For The Task Being Undertaken
Maritime Administrations	
Engineering	24
Deck	20
Catering	22
Shoreside	24
Companies	
Engineering	34
Deck	34
Catering	32
Shoreside	34

For the Maritime Administration data the results echo those found when direct and indirect causes of injuries were examined earlier in the report i.e. the personnel of the deck department mirrored the recorded data rankings most closely, and those of the engineering department matched less well. In contrast however rank order difference scores showed that shore side personnel's perceptions of the risk associated with particular tasks were a poorer fit when compared to actual data. However when the

rankings within the company recorded data were considered not only did all respondent groups rankings match the data less well than in the case of the Maritime Administration data (see Figure 11), but we also found that there was little difference between the engineering, deck and shoreside departments in terms of overall closeness of fit.

Figure 11: Rank order difference scores for task by different departments



Nationality and task

Having considered the impact of rank and department upon rank order difference scores in relation to the tasks associated with particular accidents, the impact of nationality was considered (see Table 32).

Table 32: Rank order difference scores for the task being undertaken by nationalities

	Rank Order Difference Scores For The Task Being Undertaken
Maritime Administrations	
China	27
India	28
Netherlands	18
Philippines	26
UK	16
Companies	
China	36
India	36
Netherlands	26
Philippines	36
UK	32

Once again it is interesting to note that across all nationality groups there was a better fit in terms of rankings of risk with the ranked recorded data of Maritime Administrations than there was in the recorded company data. As with perceptions of

direct and indirect accident causation (reported earlier) nationals from the UK displayed a closer fit with the Maritime Administration data.

Age/ years at sea and perceptions of risk

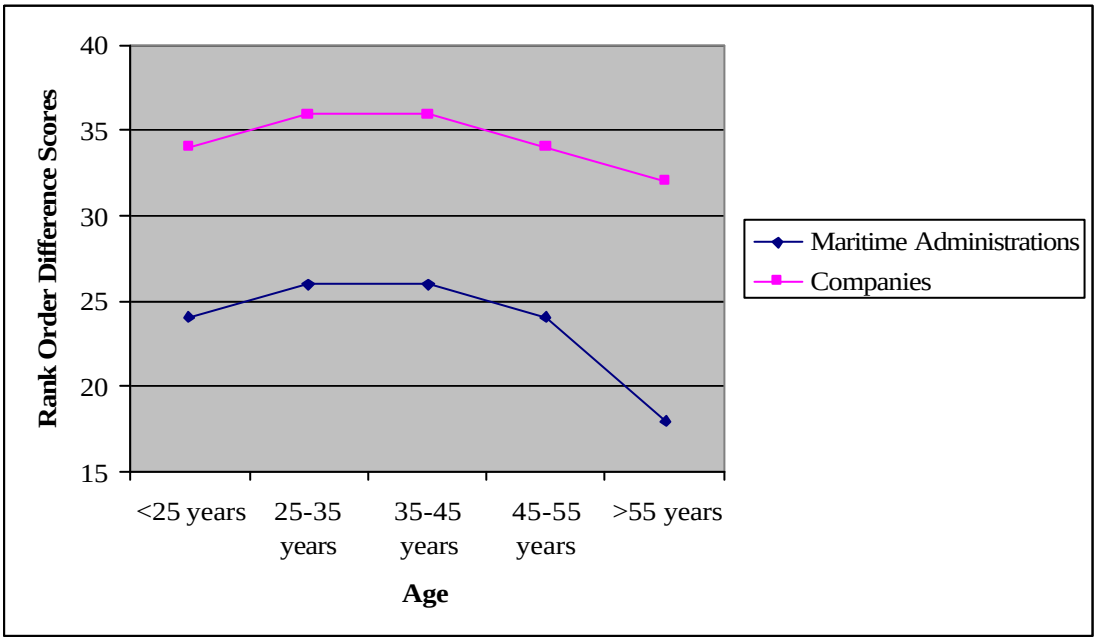
When the impact of age is considered against rank order scores (Table 33) no clear pattern emerges.

Table 33: Rank order difference scores the task being undertaken by age

	Rank Order Difference Scores For The Task Being Undertaken
Maritime Administrations	
<25 years old	24
25-35 years old	26
35-45 years old	26
45-55 years old	24
>55 years old	18
Companies	
<25 years old	34
25-35 years old	36
35-45 years old	36
45-55 years old	34
>55 years old	32

However, there is once again a closer fit between respondent rankings and ranked data from Maritime Administrations than there is between respondent rankings and the ranked data from companies (see Figure 12).

Figure 12: Rank order difference scores for task being undertaken by age



With regard to number of years experience at sea a very similar picture emerges (see Table 34), with again no clear discernable pattern.

Table 34: Rank Order Difference Scores for Task Being Undertaken by Years at Sea

	Rank Order Difference Scores For The Task Being Undertaken
Maritime Administrations	
2 or less years	22
2-5 years	26
5-10 years	26
10-20 years	24
20+ years	22
Companies	
2 or less years	34
2-5 years	36
5-10 years	36
10-20 years	34
20+ years	32

2.2.3.3 Overall Action

The questionnaire data also allowed for the consideration of the broader context in which injuries occurred (which we have termed 'overall action'). Whilst 13 questions could be seen to refer to broader context only nine of these could be compared with the injury data recorded by Maritime Administrations/companies.

Broader context in general terms

In the questionnaire, respondents ranked working having consumed alcohol/drugs as the highest risk context for seafarers working on board. In the recorded accident data for both the Maritime Administrations and companies, however, this appeared much lower in the rankings (see Table 35 and Table 36 respectively).

Table 35: Perceptions of the most risky overall actions compared to recorded overall actions in which accidents occurred for maritime administrations

Administration Dataset	**%**	**Perceptions**	**Mean**	**Std. Devia -tion**	**Rank Order Diff.**
Working at height	43.2	Working having consumed alcohol/ drugs	4.6	0.9	6
Mooring Operations	34.0	Working over-side	3.7	1.1	3
Working near open hatches/ tanks	9.7	Rough weather	3.7	1.1	3
Crane Operations	5.0	Working at height	3.7	1.1	-3
Working over the side	4.7	Working near open hatches/ tanks	3.6	1.1	-2
Rough Weather	2.5	Working in vicinity of moving vehicles	3.4	1.1	2
Working having consumed alcohol/ drugs	0.6	Mooring operations	3.4	1.1	-5
Working in the vicinity of moving vehicles	0.3	Helicopter operations	3.1	1.2	1
Helicopter operations	0.0	Crane operations	3.0	1.0	-5
Working on exposed decks		Working on exposed decks	2.9	1.0	-1

Table 36: Perceptions of the most risky overall actions compared to recorded overall actions in which accidents occurred for companies

Company Dataset	%	Perceptions	Mean	Std. Devia -tion	Rank Order Diff.
Mooring Operations	41.5	Working having consumed alcohol/ drugs	4.6	0.9	6
Rough Weather	27.7	Working over-side	3.7	1.1	2
Working near open hatches/ tanks	12.3	Rough weather	3.7	1.1	-1
Working over the side	7.7	Working at height	3.7	1.1	1
Working at height	6.2	Working near open hatches/ tanks	3.6	1.1	-2
Crane Operations	3.1	Working in vicinity of moving vehicles	3.4	1.1	2
Working having consumed alcohol/ drugs	1.5	Mooring operations	3.4	1.1	-6
Working in vicinity of moving vehicles	0.0	Helicopter operations	3.1	1.2	0
Helicopter operations		Crane operations	3.0	1.0	-3
Working on exposed decks		Working on exposed decks	2.9	1.0	-2

Another ranking difference that stood out was that respondents placed the contexts of 'mooring operations' and 'crane operations' much lower in their rankings than they were found to be in the ranked recorded data (though for crane operations this difference was less apparent in the company data than in the Maritime Administration data and for mooring operations the difference was less apparent in Maritime Administration data than in the company data).

Perceptions of broader context and the data of individual Maritime Administrations and companies?

As with direct and indirect causation and task we also considered variations between individual Maritime Administrations and individual companies when it came to the fit exhibited with regard to respondents' ranked perceptions (see Table 37).[9]

Table 37: Overall action rank order difference scores for individual maritime administrations and companies

	Rank Order Difference Scores For Overall Actions Being Undertaken
Maritime Administrations	
Administration A	30
Administration B	31
Administration C	31
Administration E	38
Administration F	38
Companies	
Company A	24
Company B	28

There was a wide variation in the fit between the ranked data of individual Maritime Administrations and respondent perceptions, with the data for Maritime Administrations A, B, and C, fitting the ranked perceptions data most closely. Respondent perceptions matched both company datasets better than they matched with any of the Maritime Administration datasets once again highlighting likely

[9]Maritime Administration D had to be excluded from this analysis as there were no rank order difference scores available for this administration.

differences in reporting practices vis-à-vis companies versus Maritime Administrations.

Broader context and vessel type

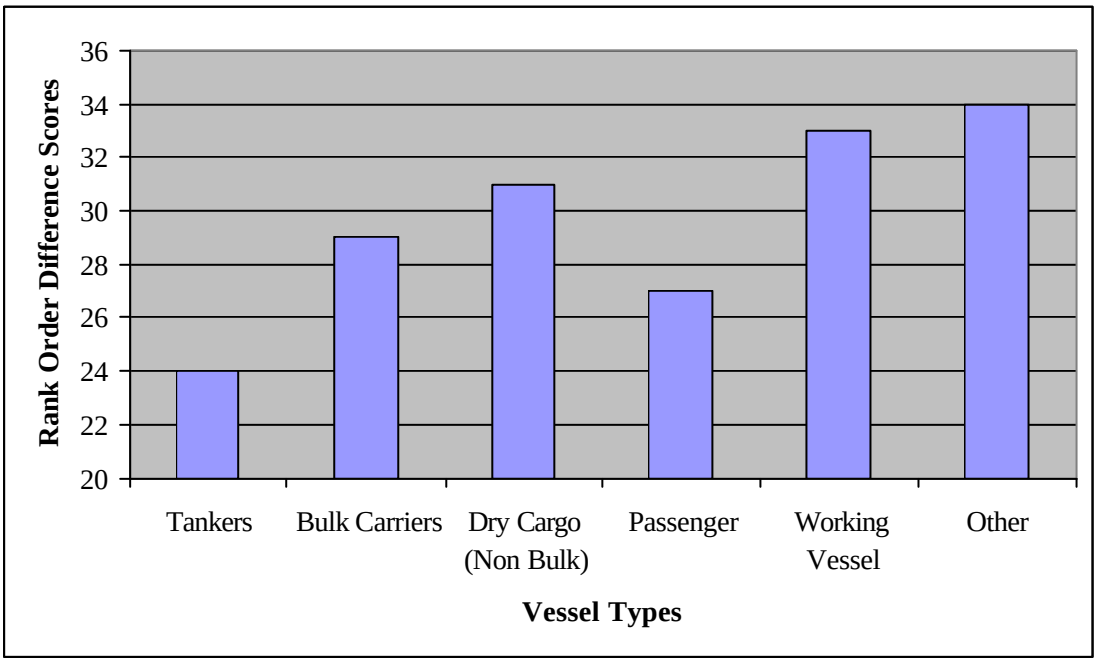
As previously described different types of vessel were only present in the Maritime Administration datasets as the two companies from which we obtained and utilised data were both specialists in a single trade (the tanker trade). We therefore considered respondents' perceptions of the risks associated with particular work contexts on certain types of ship against the ranked Maritime Administration data split by ship type (see Table 38).

Table 38: Rank order difference scores for overall actions being undertaken by vessel type

Vessel Type	Rank Order Difference Scores For Overall Actions Being Undertaken
Tankers	24
Bulk Carriers	29
Dry Cargo (Non Bulk)	31
Passenger	27
Working Vessel	33
Other	34

The perceptions of respondents most closely matched the data available for tankers and for passenger vessels when it came to a consideration of the risks associated with particular work contexts (see Figure 13).

Figure 13: Rank order difference scores for overall action by vessel type



The impact of ship type experience on perceptions of risks associated with specific work contexts

In contrast to the data relating to task, and to direct and indirect cause of accidents, experience of working aboard a particular vessel type did not produce results more closely matching the data recorded by Maritime Administrations in relation to work context for all but one of the vessel types (see Table 39).

Table 39: Rank order difference scores for overall action by vessel type and whether a seafarer has served on that vessel type or not

	Rank Order Difference Scores For Overall Actions Being Undertaken	
Vessel Type	*Served On*	*Not Served On*
Tankers	24	24
Bulk Carriers	29	25
Dry Cargo (Non Bulk)	29	31
Passenger	27	27
Working Vessel	33	30
Other	34	34

Rank and broader context

When rank was considered in relation to the differential between respondent rankings of risk and the ranked recorded data no clear pattern emerged when it came to consideration of the broader contexts in which injuries may occur (see Table 40).

Table 40: Rank order difference scores for overall action by ranks

	Rank Order Difference Scores For Overall Actions Being Undertaken
Maritime Administrations	
Managers	31
Senior Officers	31
Junior Officers	27
Ratings	29
Companies	
Managers	25
Senior Officers	23
Junior Officers	25
Ratings	27

Department and broader context

The differential between the perceptions of different departments and the recorded data from Maritime Administrations did not vary in the same way when it came to consideration of broader contexts as it did with regard to direct/indirect cause and/or task (see Table 41). In this case no clear pattern is discernable, and the findings are somewhat inconclusive.

Table 41: Rank order difference scores for overall action being undertaken for different departments

	Rank Order Difference Scores For Overall Actions Being Undertaken
Maritime Administrations	
Engineering	31
Deck	29
Catering	27
Shoreside	31
Companies	
Engineering	25
Deck	23
Catering	27
Shoreside	25

Nationality and broader context

Once again in contrast to the picture that emerged when considering accident causation and the tasks most often associated with seafarer injury, nationality did not appear to impact *strongly* on the differential scores for Maritime Administrations or for companies in relation to the broader context of accidents (see Table 42).

Table 42: Rank order difference scores for overall action being undertaken by nationality

	Rank Order Difference Scores For Overall Actions Being Undertaken
Maritime Administrations	
China	29
India	23
Netherlands	23
Philippines	23
UK	29
Companies	
China	23
India	23
Netherlands	21
Philippines	25
UK	21

Age/ years at sea and the broader context

In relation to accident causation and task we were previously unable to discern a clear variation in differential scores when comparing different age groups of respondents. This was once again the situation when it came to a consideration of the broader context of accidents (see Table 43).

Table 43: Rank order difference scores for overall action being undertaken by age

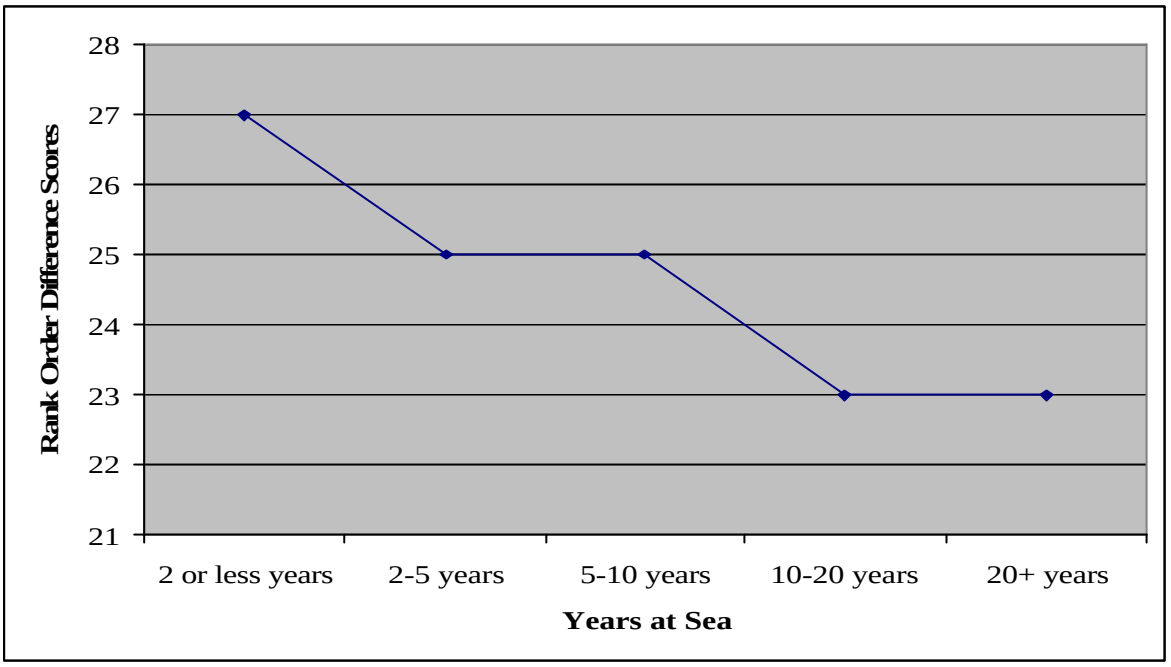
	Rank Order Difference Scores For Overall Actions Being Undertaken
Maritime Administrations	
<25 years old	24
25-35 years old	26
35-45 years old	30
45-55 years old	28
>55 years old	21
Companies	
<25 years old	25
25-35 years old	25
35-45 years old	23
45-55 years old	27
>55 years old	21

As with age, no clear pattern emerged when considering respondent experience at sea against the Maritime Administration data (see Table 44). However with regard to the company data it seemed that seafarer perceptions matched company recorded injury data more closely as their years of experience at sea increased (see Figure 14).

Table 44: Rank order difference scores for overall action being undertaken by years at sea

	Rank Order Difference Scores For Overall Actions Being Undertaken
Maritime Administrations	
2 or less years	29
2-5 years	27
5-10 years	27
10-20 years	31
20+ years	31
Companies	
2 or less years	27
2-5 years	25
5-10 years	25
10-20 years	23
20+ years	23

Figure 14: Rank order difference scores for overall action being undertaken by years at sea



2.2.3.4 Location Where Accident Occurred

The fourth set of questions from the questionnaire related to the location where injuries were sustained. Whilst there were 15 questions on the questionnaire about how risky each of these locations were seen to be in terms of seafarers' health and safety, when these were matched to the recorded accident data, only six locations were comparable. This number was further reduced to five, as very little accident data was available about accidents that occurred at shore side offices.

Although fine grained analysis could not be undertaken (as with the previous questions) the rankings of perceptions of risky location and actual recorded locations in which accidents occurred could be compared (see Table 45).

Table 45: Recorded locations in which accidents occurred compared to perceptions of the most likely locations in which accidents will occur

Administration Dataset		Company Dataset		Perceptions			
Location	**%**	**Location**	**%**	**Location**	**Mean**	**Std. Deviation**	**Rank Order Diff.**
Working on deck	65.8	Working on deck	48.6	Working in the engine room	2.9	1.0	1
Working in the engine room	16.8	Working in the engine room	32.3	Working on deck	2.8	0.9	-1
Working in the accommodation	8.3	Working in the accommodation	13.6	Working in the galley	2.5	0.9	1
Working in the galley	6.0	Working in the galley	3.5	Working on the bridge	2.2	1.0	1
Working on the bridge	3.1	Working on the bridge	1.9	Working in the accommodation	2.1	0.9	-2

For both sets of data the rank order of the recorded location of accidents were identical, although variations in the proportions of accidents in these locations were apparent. Despite the clear differences in the frequencies of accidents occurring on deck and those occurring in the engine room (with far more accidents occurring on deck) respondents nevertheless regarded the engine room as the area in which accidents were most likely to occur, ranking the deck (the most common site of accidents in the recorded datasets) as only the second most likely location. The risks associated with working in accommodation spaces were perceived as smallest by respondents whereas the Maritime Administration and company data both imply that accidents are more common there than in either the galley or on the bridge.

Conclusions

In interpreting the findings presented here it is critical that proper account is taken of the recording and reporting biases present within the datasets which we were able to compile using both Maritime Administration and company data. These make it impossible to talk of more, and less, accurate seafarer and manager perceptions of risk. It is only possible to discuss the closeness of fit between seafarer and manager perceptions and recorded data and it is very important that this is not equated with 'accuracy' of perception.

It is interesting, nonetheless, to note the respondent characteristics which appear to impact on risk perceptions and these predictably include nationality and rank but more surprisingly do not appear to include age and experience.

It is a matter of frustration to those in the industry, as well as to academics studying the maritime sector, that more comprehensive data on ship level events and seafarer injury are not available for analysis. Although steps have been taken across the industry to try to improve the reporting and recording of accidents and injuries, universal principles have not yet been adopted to underpin such practices. Such principles should ideally govern which incidents, events and injuries are reported, which data should be recorded for every reported case, and how data should be categorised. A recommended template for data collection and collation is included in Appendix One for consideration by international regulators and Maritime Administrations in relation to future policy discussions. The use of such a common instrument in recording data would impact very positively on the possibilities for the future analysis of accident and injury data in the shipping industry.

Acknowledgments

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Appendix One: Core information to be collected as a result of a vessel level incident.

General Incident Details		
Date of Incident	The date which the accident/ incident occurred.	
Location of incident	This does not have to be the specific longitude and latitude. Just the nature of the area where the incident occurred in. The following location types could be used. Coastal waters High Seas Non-tidal water Port/ Harbour area River/ Canal Restricted channels of water (added by NE, to cover locations such as the Dover Strait) Unknown	
Vessel Details		
IMO Number	The IMO number of the vessel	
Ship Type	Although it is advisable that raw ship type be recorded, this should then be classified into the 26 basic types using Lloyd's Register Basic Ship type classifications. This may also be further reduced into 6 vessel types. The Basic Lloyd's Register ship type classifications, as well as the 6 vessel type groupings are shown below.	
	6 ship type groupings	*Lloyd's Basic Ship Type Groupings*
	Tankers	Liquefied Gas
		Chemical
		Oil
		Other Liquids
	Bulk Carriers	Bulk Dry
		Bulk Dry/ Oil
		Other Bulk Dry
		Dredging
	Dry Cargo (Non Bulk)	General Cargo
		Container
		Refrigerated Cargo
		Ro-Ro Cargo
		Other Dry Cargo
	Passenger	Passenger/ General Cargo
		Passenger/ Ro-Ro Cargo
		Passenger

Ship Type (Cont.)	Working Vessel	Offshore Supply
		Other Offshore
		Research
		Towing/ Pushing
	Other	Fish Catching
		Other Fishing
		Other Activities
		Non-Propelled Ships
		Other Ships Structures
Flag	The flag of the vessel. (N.B. This should be included for all vessels, and not left blank, for example, if the vessel was part of the recording administrations own fleet)	
Gross Tonnage	The precise gross tonnage of the vessel.	
DOB of vessel	The date of build of the vessel, defined as the date when the keel was laid.	
Details of Incident		
Description of event	For all incidents, a description of the event should be kept in as much detail as possible.	
Incident Type	The incident should, be classified by incident type. A classification of 10 incident types is listed below	

Incident type classification	*Description*	*Examples of incidents for each classification type*
Fire	Events which are classified as fire, should be those the primary cause of the incident is fire, not fire as a result of explosion. Explosions, which leads to a fire, should be classified as an explosion. N.B Incidents should not be classified as 'fire/ explosion', and should always be defined as either one or another.	Fire
		Accidental ignition of flammable material
		Electrical short circuit or overload resulting in fire

Incident Type (cont.)	Explosion	Events which are classified as explosions should be those where the primary cause of an incident is explosion, and should not include explosions which occur as a result of fire.	Explosion
			Pressure Vessel: explosion, collapse or bursting
			Pipe systems: explosion, collapse or bursting
			Sudden uncontrolled release of any substance from a system
			Uncontrolled release of any harmful substance or agent
			Engine room explosion
			Blowout
	Collision with other ship	Events termed as 'collisions' should be those which involve another vessel, which is moving. These should not include cases where a vessel hits fixed objects (i.e. the quayside), or floating fixed objects (i.e. Oilrigs)	Collision
			Collision with ship
			Collision with other vessel
			Struck
	Sinking	Events termed as sinking's, should include those which completely sink below the surface, independent of whether they are re-floated or not, as well as those that take on water, but do not sink completely. In the case of vessels that list. These should be classified as sinking, when the vessel has taken on water. In the absence of ingress by water listing events should be defined as mechanical failure/damage to vessel.	Sinking
			Sank and re-floated
			Foundering
			Foundering and Sinking
			Capsizing
			Capsized / List
			Listing
			Leakage
			Flooding
			Vessel missing, vanished, assumed lost
	Grounding	Accident and incidents classified as grounding should be those where a vessel comes into contact with the seabed. Whether the vessel is actually stopped or simply makes contact it is classified as a grounding. If the result of the grounding is that the vessel sink, begins to sink, or is a total loss this is still classified as a grounding, as this was the initial cause of the incident.	Grounding
			Stranding / Grounding
			aground
			Grounding and re-float
			Grounding and total loss
			Grounding and Sinking

Incident Type (cont.)	Contact with structure	Accident and incidents termed as contact should be those which involve the vessel hitting another object which is either fixed or stationary (i.e. the quayside, or a oil rig). If the vessel hits another vessel which is at anchor or berthed, this is termed contact. However, if both vessels are moving under power this should be termed as a collision.	Contact
			Collision with object
			Collision with a fixed object
	Personnel Injury/ Fatality	Personal injury/fatality should relate to crew or passengers only. In the case of fatality, those which occur due to natural causes should also be recorded. The actual specifics of the incident should be recorded in a separate personnel injury dataset.	(Personal Injury/Fatal) non ship related
			Personnel Casualties
			Slips or Falls (on the same level)
			Slips or falls (between different levels)
			Exposure to hazardous or toxic substances
			Falls into Water
			Electric shock
			Violence to the person
			Fatality
			Natural death

Incident Type (cont.)	Mechanical failure/ Damage to vessel	Accident and incidents termed mechanical failure/damage should not be due to the occurrence of any other incident, and should relate to shortcomings of the vessels structure, machinery, or equipment.	Engine breakdown/ failure
			Equipment damage/ failure
			Faculty damage/ failure
			Machinery Failure
			Damage to Equipment
			Damage to machinery
			Damage to ship or equipment
			Hull damage
			Hull failure/ failure of watertight doors/ ports, etc.
			Structural damage
			Electrical short circuit or overload
			Failure of any lifting device
			Loss of Electrical Power
			Material Failure (Vessels)
			Loss of steering
			Propulsion machinery damage
			Collapse or overturning of any lifting equipment
			Rudder damage
	Environmental	Accident and incidents termed as environmental are those in which substance escape/ are released from the vessel into the natural environment, be it the sea, or the air. Pollution due to the occurrence of any other incident, should be coded as incidental to the primary incident and should not be recorded as an “environmental incident” per se.	Environmental damage/Pollution
			Escape Of Harmful Substance
			Oil spill
			Pollution
			Damage to the Environment
	Other	Accident and incidents classified as other, are those which do not fit into any of the aforementioned categories.	Hazardous Incident
			SOS
			Terrorist threat
			Abandonment
			Emergency Response
			Navigation hindrance

Happened when	The circumstance of/ or during which the accident/ incident occurred. These could be classified using the following categories below: Alongside or moored Anchoring operations At anchor Drifting Dry or wet dock During emergency Entering or leaving port Hove-to/dodging Involved in towing operations Loading/discharging cargo Mooring operations Negotiating canal lock Not under command On passage Other offshore operations Pleasure trip Replenishment at sea operations Unknown
Underlying cause of Incident	The underlying cause of incident FREE TEXT
Environmental Conditions	
Light when incident occurred	A general description of the light conditions when the incident occurred. These could use the follow classifications: Dark Semi-dark Light Other Unknown

Visibility	Visibility when the incident occurred, classified as follows: Poor – Less than 2 nautical miles Moderate –2-5 nautical miles Good – 5- 10 nautical miles Unknown
Sea state	Sea state when the incident occurred, classified as follows: Calm (less than 2 foot wave height) Moderate Rough Sheltered waters
Wind force	Wind force when the incident occurred, measured using the Beaufort scale, classified as follows: 0-3 (Calm to gentle breeze) 4-6 (Moderate breeze to Strong breeze) 7-9 (High wind strong gale) 10-12 (Whole gale to hurricane force)
Injuries and Fatalities	
Number of Crew	The total number of crew onboard the vessel.
Number of passengers	The total number of passengers onboard, who are not part of the contracted marine crew.
Number of injuries	The number of people injured in the incident, split into seafarers, and passengers, as well as other if necessary.
Number of fatalities	The number of fatalities in the incident, split into seafarers, and passengers, as well as other if necessary.

Appendix Two: Core information to be collected about injuries and fatalities

For the seafarers/ passengers involved in the accident/ incident it is recommended that the following information is collected for each person.

Information about the individual	
Job Title	The specific job title of the seafarer involved in the accident and incident or the classification as 'passenger'.
Rank	Rank of the seafarer involved in the accident/ incident. The following classification could be used. Senior officer Junior Officer Rating Other Unknown
Department	The department which the seafarer involved in the accident/ incident worked in. The following classification could be used. Engineering Deck Catering Shore side Other
Nationality	The nationality of the seafarer or passenger involved in the accident/ incident.
Age	The age of the seafarer or passenger involved in the accident/ incident.

Details of accident/ incident	
Description of Incident	A detailed description of what happened, the cause, who was involved, the injuries, and outcomes.
Cause of Injury	What was the cause of the accident/ incident which the seafarer/passenger was involved in. Below is a possible classification scheme for such, as used in this report: Contact with moving machinery Hit by moving (includes flying / falling) object Hit by moving vehicle Struck against something fixed or stationary Handling, lifting or carrying Slips, trips or falls on same level Falls from a height Trapped by something collapsing / overturning Drowning / lack of oxygen / overcome by fumes Exposure to, or contact with, a harmful substance Exposure to fire Exposure to an explosion Contact with hot surfaces Contact with cold surfaces Contact with electricity or electrical discharge Working in hot environment Working in cold environment Acts of violence Other Homicide Suicide Intoxication, self Intoxication, other Drugs Adverse weather Failure to use PPE Misuse of tools/ equipment Psychological factors Relating to vessel level incident

Task being undertaken	What task was being undertaken when the accident/ incident occurred. Below is a possible classification scheme for such, as used in this report: Use of ladders /gangways Rigging of gangway Entry into enclosed space Opening and closing hatches Use of power tools Welding / gas cutting Manual-handling of heavy or awkward items Engine maintenance at sea Work in a confined space Other
The Location onboard vessel which the injury(s) occurred	The location onboard the vessel in which the accident/ incident occurred to the seafarer/ passenger. Below is a possible classification scheme for such, as used in this report: Galley Engine room Deck Accommodation Bridge Shore-side offices Other However, an alternative classification could be more detailed (see below).

Alternative Main Classification	**Alternative detailed classification**
Deck Area	Aft Area
	Deck Stores
	Deck (Open)
	Forepeak
	Forward Area
	Mid-Body Area
	Paint Locker
	Windless Room
	Fire Room

The Location onboard vessel which the injury(s) occurred (cont.)	Engine Rooms	Engine Room
		Engineer Stores
		Cargo Pump Room
		Machinery Spaces
		Steering Space
		Shaft Alley
	Tanks/ Enclosed Spaces	Fuel Tanks
		Segregated Ballast Tank
		Void/Cofferdam
		Cargo Holds
		Cargo Tanks
	At Height	Masts, Booms, Rigging
	Bridge/ Offices	Bridge
		Offices
	Accommodation	Galley
		Cabin/ Quarters
		Laundry
	Other	Passageway
		Unknown
Injury	The nature of the accident/ incident that occurred to the seafarer/passenger. Below is a possible classification scheme for such, as used in this report: Aches Brake or Fracture Bruising Burn Crush or trap injury Cut or piercing injury Graze Dislocation Electric Shock Exposed to harmful chemical/ liquid Foreign body in eye/ body Strain, sprain, or twist Striking injury Unconscious Concussion Fatality Other Injuries not clear	

Location of injury on the body	The location of the injury on the individuals body: Ankle, Foot, Toe Back, Hip, Abdomen Chest, Shoulders, Arms Head (Mouth, Eye, Ears) Leg, Knee Neck, Throat Wrist, Hand, Fingers Multiple injuries No Injuries Injury Location Not Stated Unclear
Shift/ Tour Details	
Hours worked before injury	The number of hours the seafarer had worked in their current shift before the incident occurred. This is not relevant for passengers.
On or Off Duty	Was the casualty on or off duty? This is not relevant for passengers.
Days into tour	The number of days into their current tour the seafarers were. This is not relevant for passengers.
Tour length	The overall length of the seafarer's current tour.