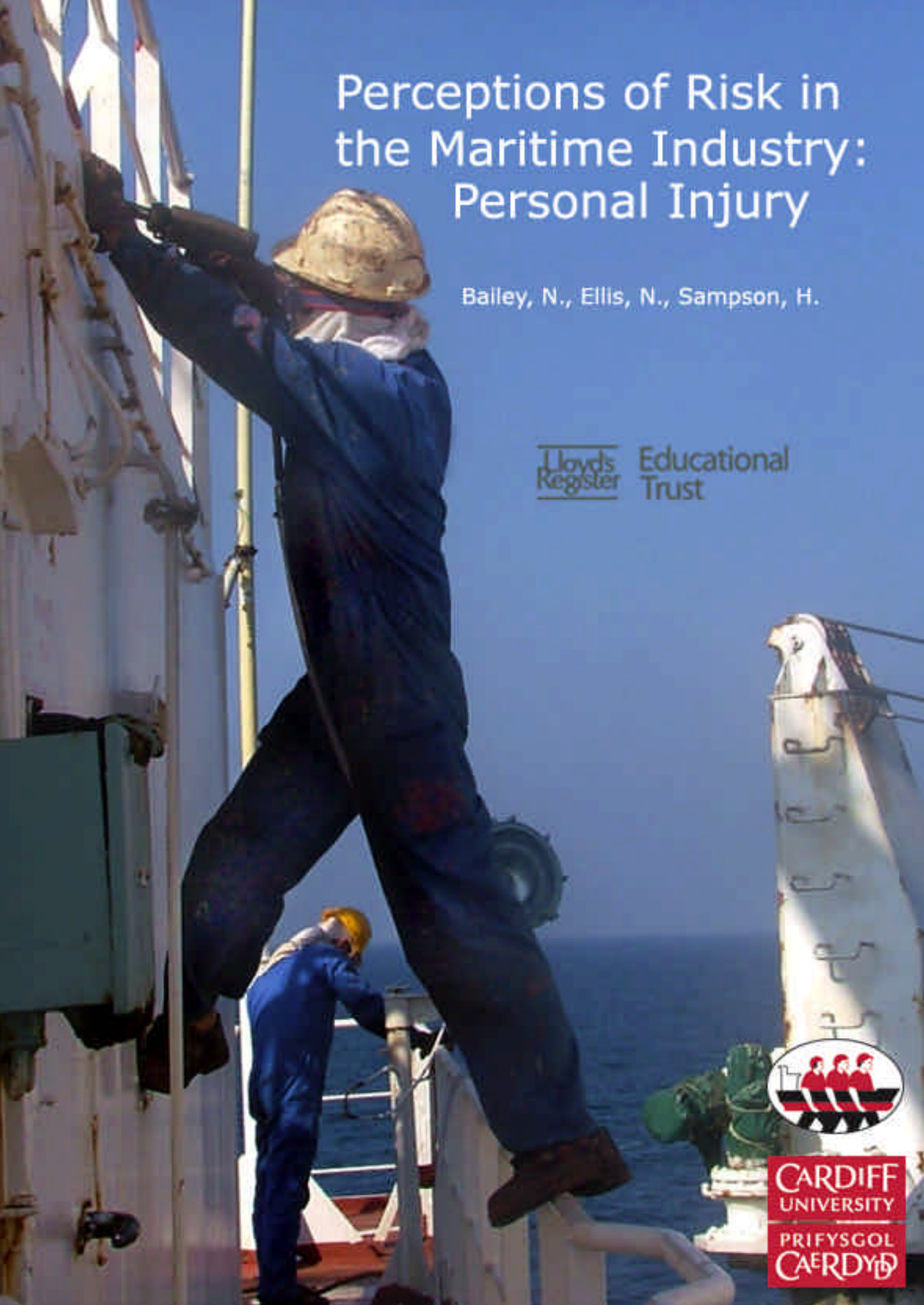

Perceptions of Risk in the Maritime Industry: Personal Injury

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Lloyd's Register Educational Trust

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Executive Summary

This is the second of a series of reports which aims to consider perceptions of risk in relation to ship casualty and personal injury across the maritime industry. Specifically, data is interrogated with regard to differences in perception according to rank, department, nationality, age, and seafarers' length and nature of experience (e.g. ship type).

The report is based upon data collected via a questionnaire (see Appendix 1) survey of 2372 seafarers from 50 countries conducted in 2006. The response rate achieved in undertaking the survey was approximately 36%. The data were analysed using SPSS and the report focuses on the statistically significant findings from the survey[1].

The analysis presented here is in four sections. The first considers perceptions of risk relating to personal injury in general. The second, third and fourth parts, discuss perceptions of risk in relation to specific tasks, moments, and contexts.

The data were interrogated to determine whether there are similarities and differences in the perceptions of seafarers across rank, department, nationality, experience, etc. However, the data presented here can only demonstrate the relative perceptions of different groups, what it cannot do is indicate which group has the more 'accurate' perception of risk; an attempt to address this important question will be made in our third and final (forthcoming) report of the series.

Perceptions of injury risk

- Of a selection of choices put to respondents, working in a hot environment was thought to be the most likely potential cause of injury to someone working for their company at sea.

- Nationality was the main predictor of perceptions for each type of potential injury.

- Respondents from China tended to see the risk of injury as higher than other national groups in the sample.

[1] At the 95% confidence level.

- Respondents from the Philippines tended to see the risk of injury as lower than other national groups in the sample.

- Respondents from China, the Netherlands and the Philippines saw 'working in a hot environment' as the most likely potential cause of injury.

- Respondents from India and the United Kingdom perceived 'Slips, trips or falls on same level' as the most likely potential cause of injury.

- Different ranks had significantly different perceptions.

- Ratings saw 'working in a hot environment' as the main hazard while the other ranks scored it as third, behind 'slips, trips and falls', and 'handling, lifting or carrying'.

- Those who worked shore-side saw two hazards - 'slips, trips and falls', and 'handling, lifting or carrying' - as a greater risk than those who worked aboard ship.

- There were differences in perception based upon the type of ship that respondents had most recently worked on.

- Those who had most recently worked on tankers tended to see the risk of personal injury as lower than those who had most recently worked on other types of vessel.

- Those on passenger vessels saw the risk of personal injury as generally higher than those on other types of vessel.

- Those who worked on passenger ships saw 'slips, trips and falls', and 'handling, lifting or carrying' as posing a greater risk in terms of personal injury than those who worked on other types of vessels.

- There was greater concern about the risk of 'handling, lifting or carrying' with increased age and time served.

When it came to the conduct of particular activities we also identified differences in perception of risk in relation to personal injury.

- Entry into an enclosed space was perceived by the sample group as a whole to pose the greatest risk to seafarers' health and safety. This was seen to be the greatest risk by all ranks and nationalities; although those respondents from the Netherlands and the United Kingdom saw the risk as slightly lower than the other national groups.

- Overall, nationality was found to be the most significant factor influencing perceptions of risk in relation to specified activities.

- Filipino respondents expressed the highest 'mean' level of concern in relation to four of the nine activities listed.

- Ratings tended to respond at the extreme ends of the 'options' scale for each type of activity, i.e. they tended to suggest that it either posed 'No Risk', or 'Very Great Risk'.

- Managers tended to see the risk of each type of activity as lower than other ranks.

- Senior officers frequently identified risk as being greater than other ranks.

- The 25-35 year age group tended to identify risk as greatest while the eldest and youngest age-groups tended to see risks as smaller. The exception was in relation to manual-handling where risk was perceived to increase in conjunction with the increased age of respondents.

- Those with two (or less) years of experience tended to see risk differently to those with more experience.

- Those on 'working vessels' were significantly more likely to identify risks associated with manual-handling than those on other ship types.

- Those on passenger vessels were notably more concerned about the risk associated with engine maintenance at sea, but significantly less concerned about the risks associated with the use of power tools than were those on other types of ship.

Perceptions of risk also differed when it came to considering particular moments or contexts in relation to seafarers' work and on board lives.

- Overall the greatest risk was perceived to exist at times when individuals worked having consumed alcohol or drugs.

- Senior officers identified rough weather as a risk factor.

- Junior officers identified mooring operations as risky.

- Ratings were more likely than other ranks to identify times of mechanical breakdown as risky.

- Those in the deck department were more likely to identify mooring operations as risky than other departments.

- Engineers perceived the risk associated with mechanical breakdown to be greater than the other groups.

- Those in catering were more likely than others to identify working on exposed decks as risky.

- Those with recent experience of ‘tankers’ were more likely than others to identify mooring operations as risky.

- Those on ‘bulk carriers’ were more likely to identify rough weather, mechanical breakdown, piracy and moving vehicles as risk factors.

- Those on ‘dry cargo’ vessels were also likely to identify moving vehicles as risky, but they also identified working at heights and near open hatches as hazardous.

- Those on ‘working vessels’ were more likely than others to identify crane operations as risky.

- In general the youngest and those with the least experience tended to see risk associated with the different times listed as lower than the other groups. Notably there were instances where those with the most experience also perceived the risk to be lower than the other groups.

- Nationality was found to be the most significant factor in determining perceptions of risk.

- Respondents from the Philippines tended to see risk as higher than other national groups.

- Those from the Netherlands perceived risks to be lowest.

- Respondents from India were more likely than others to identify working having consumed alcohol or drugs, working over-side and mooring operations as risky.

- Those from the United Kingdom were more likely than others to identify working on exposed decks as risky.

- ‘Navigation at night without a dedicated lookout’ was perceived by the group of respondents to pose a considerable risk.

- Senior officers saw the high number of alarms aboard ship as posing a significantly greater risk than did any of the other groups, including managers.

- Those working in the engine department and on passenger ships were the most likely to identify the numbers of alarms as posing a risk.

- Those who had most recently worked on ‘bulk carriers’ perceived there to be greater risk to seafarer health and safety associated with the beginning and end of a seafarer’s time onboard than did those from other ship types, and generally perceived greater risk associated with differing navigational situations.

- Those respondents from ‘working vessels’ perceived greater risk when working on deck and in the galley than the others.

- Years in the company had little effect on perceptions, whereas those with less than two years experience at sea tended to see the risk as less than those with greater experience.

- Respondents from the United Kingdom were significantly more concerned about the risk associated with ‘new equipment’ than were the other national groups.

Conclusions

Significant differences were identified between groups in terms of the perceived cause of personal injury and in relation to the levels of perceived risk associated with different activities, times and factors.

The principal factor influencing differences in perception was found to be nationality. Rank, department, age and type of ship worked were also significant but to a lesser extent.

It was notable that when asked about the possibility of injury in their own company Chinese seafarers saw the likelihood of injury as high, while Filipino seafarers tended to see it as low. However when asked about the risks of injury associated with particular tasks when undertaken in any company, Filipino seafarers tended to see the risk as higher than the other national groups. This seems to suggest that the Filipinos who responded to the questionnaire regarded shipping in general as more risk prone than employment in their own companies. By contrast, Chinese respondents appeared to perceive risks to people working in their company as greater than they perceived risks in relation to seafaring in general. Those seafarers from the Netherlands tended to perceive risk to be significantly less than other national groups. Such variation in perception could have significant impact upon behaviour.

There is also a clear message that younger seafarers tend to be less aware of risk, but interestingly older more experienced seafarers, possibly towards the end of their career, also appear to see risk as less. Although older, more experienced, seafarers and managers are clearly more aware of the risk associated with muscular skeletal injury due to for example manual-handling.

These results clearly indicate that to manage risk in a maritime context, especially, in say, a mixed nationality crew, it is important to appreciate that behaviours may vary between groups as they perceive risk differently. Consequently management strategies need to be equally diverse and sensitive to such differences.

Introduction

> I feel authorities and the higher ups must actually … listen to people right from the very bottom, from the crew rank right up to the captain's rank and see what's happening, decide and then come up with a solution.[2]

The Lloyd's Register Educational Trust Research Unit is undertaking a programme of research, the aim of which is to provide an in–depth understanding of safety and perceptions of risk in the maritime industry. The first set of findings reported in August 2006[3] presented details of perceptions of risk in relation to ship level events, i.e. sinking, groundings, fire, etc. This, the second report, focuses on those who work onboard ships and the perceived risk of personal injury to them. Differences and similarities in perceptions of risk amongst the various occupational groups across the maritime industry are highlighted and discussed. Understanding how managers and workers perceive the hazards faced in the maritime industry provides a baseline for addressing issues relating to occupational health and safety (OHS). Moreover, it has been shown that an awareness of the differences in perception that exist between different groups is essential to the successful implementation of OHS initiatives[4].

This report considers perceptions of risk with regard to personal injury across the maritime industry. Specifically the aim is to identify where there are differences in perception between groups of different rank, department, nationality, age, and length and nature of experience (ship type).

The report is based upon the data from a questionnaire (see Appendix 1) survey of 2372 seafarers from 50 countries conducted during 2006. The response rate achieved in undertaking the survey was approximately 36%. The data were analysed using SPSS and the report focuses on the statistically significant findings from the survey[5].

The analysis presented here is in four sections. The first considers perceptions of risk relating to personal injury in general terms. The second, third and fourth parts discuss

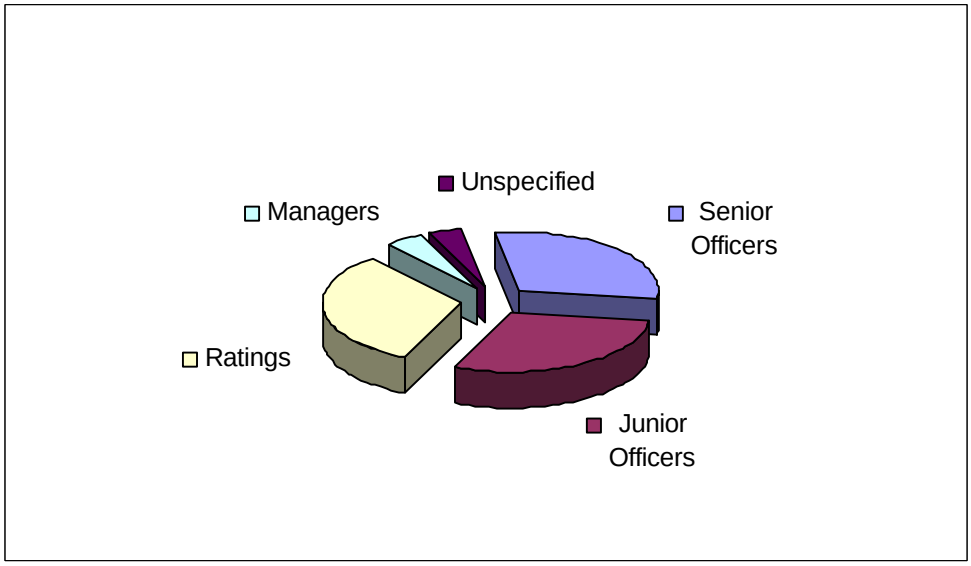
[2] Comment from a seafarer during one of the focus group sessions, used as the basis for the questionnaire design.
[3] Bailey et al, 2006, www.sirc.cf.ac.uk
[4] See for example, Clarke 1999, Harvey *et al.*, 2002.
[5] At the 95% confidence level.

perceptions of risk in relation to specific tasks, at particular times, and in connection with specific factors.

Sample and Sample Distribution

Our sample consists of 2372 ‘cases’. The largest group of respondents was ships’ officers and these divided almost evenly into two groups of senior (n=709) and junior officers (n=704), where senior officers were defined as Chief Officer and Master on the deck side and Second Engineer and Chief Engineer in the engine department[6]. Once officers were split in this way ratings remained the largest group for analysis (n=763), and managers constituted the smallest group (n=104). A further 94 respondents did not specify their rank or provided an answer that could not be interpreted (Figure 1).

Figure 1: *Sample distribution: number of respondents by rank*



In order to examine whether our sample was distributed similarly to the distribution of the general seafaring population, a comparison was made with the SIRC Global Labour Market (GLM) Database (2003). Table 1 shows the percentage of respondents in the present study by department, and compares these to the GLM Database (2003).

[6] This is the usual division between senior and junior ship management as applied within the industry.

Table 1: *The frequency and percentage of respondents by department for the current study compared to the GLM (2003) database*

	GLM		LRETRU	
	Percent	***Frequency***	***Percent***	***Frequency***
Deck	50.9%	40083	56.1%	1220
Engine	37.4%	29483	35.8%	779
Deck & Engine	1.3%	1059	2.8%	62
Catering	10.4%	8197	5.3%	115

This comparison demonstrates that the distribution of respondents by department in the present study is similar to that within seafaring in general. However, since the sample is not, in a strict sense, random, a note of caution should be exercised when generalising about the seafaring population as a whole using these data.

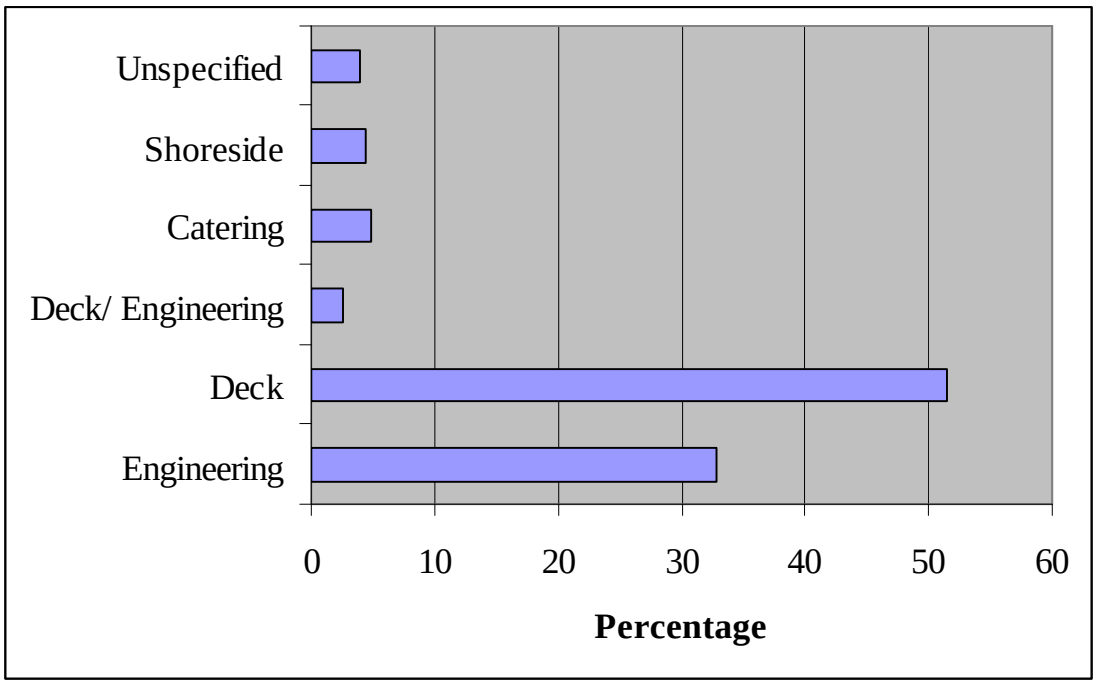
Within our sample senior officers tended to be the oldest group of seafarers, and were the most experienced in terms of years spent at sea and length of time in their present company (see Table 2). Junior officers were the youngest group and were the least experienced in both contexts.

Table 2: *Mean age, years at sea, and years in the present company*

Hierarchy	**Age of Respondents (Mean value)**	**Number of Years spent at Sea (Mean value)**	**Number of Years in present company (Mean value)**
Managers	41	14.2	8.9
Senior Officers	44	20.4	11.8
Junior Officers	32	9.3	5.5
Ratings	37	11.9	7.8

The vast majority of respondents worked in the deck (51.4%, n=1220) and engineering departments (32.8%, n=779) (see Figure 2). However there were a number of ratings and officers who identified themselves as working in both (2.6%, n=62). The other major shipboard department was catering (4.8%, n=115). The remaining work group was those based ‘shore-side’ (4.4%, n=104), (i.e. managers/ superintendents, etc). For a further 92 (4.4%) respondents it was not possible to allocate a department.

Figure 2: *Sample distribution: the percentage of respondents by department*



The majority (84.5%) of respondents came from just five countries: Philippines (39.0%, n=909), United Kingdom (17.2%, n=402), China (16.8%, n=391), India (7.7%, n=180) and Netherlands (3.8%, n=89). The single largest group was from the Philippines (See Table 3).

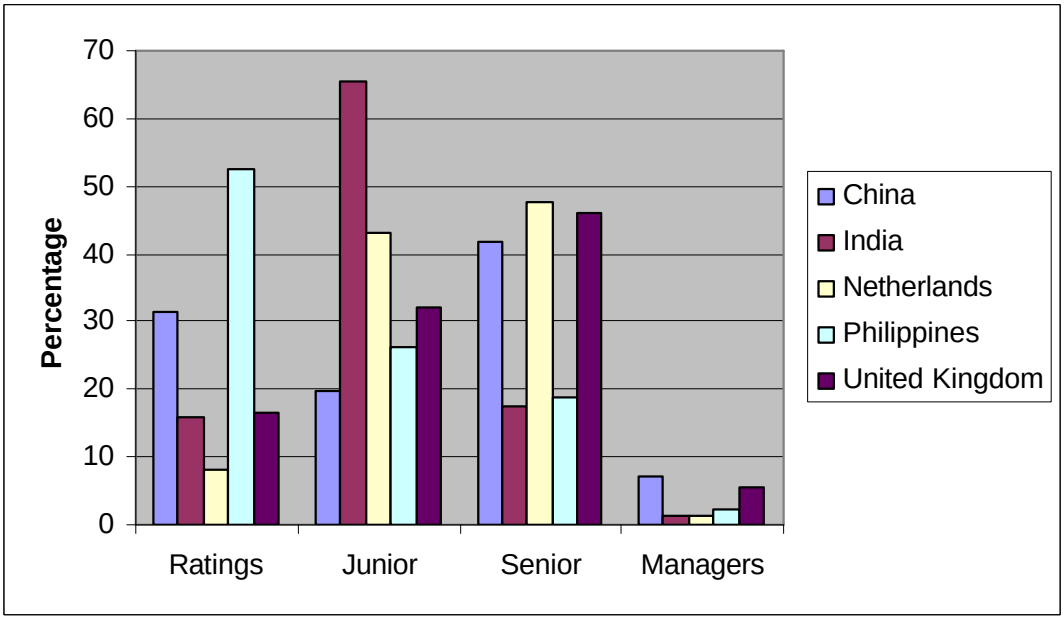
Table 3: *Sample distribution: number and frequency of respondents by nationality (top 20)*[7]

	Frequency	Percent	Cumulative Percent
1. Philippines	909	39.0	39.0
2. United Kingdom	402	17.2	56.2
3. China	391	16.8	73.0
4. India	180	7.7	80.7
5. Netherlands	89	3.8	84.5
6. Indonesia	40	1.7	86.2
7. Singapore	38	1.6	87.8
8. Ukraine	31	1.3	89.2
9. Poland	25	1.1	90.2
10. Bangladesh	22	0.9	91.2
11. Norway	19	0.8	92.0
12. Spain	19	0.8	92.8
13. Pakistan	15	0.6	93.4
14. Canada	14	0.6	94.0
15. Burma/Myanmar	14	0.6	94.6
16. Italy	12	0.5	95.2
17. Australia	11	0.5	95.6
18. Croatia	10	0.4	96.1
19. Ireland	10	0.4	96.5
20. Malaysia	8	0.3	96.8
Other	74	3.2	100.0
Total	2333	100.0	----

Taking the five most strongly represented national groups within the sample, it can be seen that each of the national groupings was represented at each of the hierarchical levels. Chinese respondents in particular were fairly evenly distributed across the different ranks, while Indians tended be more strongly represented at the junior officer level and Filipinos amongst the ratings (Figure 3).

[7] For the full Table see Appendix 2.

Figure 3: *Sample distribution: frequency of respondents by nationality and rank*



The following sections discuss the findings from our analyses. Seafarers' and managers' responses are examined in relation to a range of factors including rank, department, and nationality, to identify relevant differences in perceptions of risk.

Risk perception in relation to present employment

In order to gain an understanding of seafarers', and shore-based managers', perceptions of general risks to seafarers working on board ship we asked respondents the following question:

> *Just thinking in general terms, how likely do you think it is that someone working for your company will experience the following during their sea-going career?* (see Table 3.1)

A list of 18 possible causes[8] of injury were provided and respondents were asked to indicate their answer by circling a number on a scale of one to five; where 1=Not likely at all and 5=Extremely likely.

For the purposes of this section, '1' and '2' on the scale are understood as indicating that respondents saw the particular risk as unlikely to occur or, put another way, saw the risk as **'low'.** By contrast where they answered '3', this is understood as indicating that the particular incident was perceived as likely to occur, or there was a '**medium**' risk. Finally, '4' and '5' on the scale were treated as indicating that the incident was perceived as highly likely to occur, or the risk of it occurring was perceived as '**high**'.

In the first instance, Chi Square analysis was used to test the null hypothesis that there were no significant differences between the perceptions of the various groupings of respondents, i.e. in terms of rank, department, nationality, etc. The null hypothesis was rejected at a significance level of 0.05.

1.1 Overall perceptions

Perhaps surprisingly, of the options presented to respondents, 'working in a hot environment' was perceived by the overall group to be the most likely to cause personal injury. Fifty four percent of respondents suggested that there was a medium/high risk that someone in their company would be injured as a result of working in a hot environment, with very similar proportions of respondents

[8] These categories are based on the United Kingdom's 'Health and Safety Executive' classification.

suggesting that there was a medium/high risk of injury associated with handling/lifting/carrying, and slips/trips/falls on the same level (Table 4).

Table 4: *Ranking of possible causes of injury perceived as medium/high risk*

Rank	***Cause of Injury***	***Percentage rating Medium / High***
1	Working in a hot environment	54.4
2	Handling, lifting or carrying	54.0
3	Slips, trips or falls on same level	53.4
4	Working in cold environment	50.2
5	Contact with hot surfaces	48.0
6	Contact with moving machinery	43.0
7	Being hit by moving objects	39.7
8	Contact with electricity or electrical discharge	37.3
9	Falls from height	34.7
10	Being struck against something fixed or stationary	34.4
11	Exposure to, or contact with, harmful substances	34.4
12	Exposure to fire	28.0
13	Contact with cold surfaces	27.6
14	Drowning/ lack of oxygen/ overcome by fumes	23.8
15	Acts of violence	22.4
16	Being hit by moving vehicles	20.9
17	Trapped by something collapsing/ overturning	20.2
18	Exposure to explosions	19.7

Of the eighteen options supplied, respondents were least likely to suggest that someone in their company was likely to be injured as a result of an explosion in the course of their career. It was nevertheless the case that almost a fifth of respondents did think that there was a medium/high risk of this occurring.

1.2 The effect of hierarchy

When we considered the effect of rank on perceptions of the likely causes of personal injury, significant differences were found between different ranks in relation to their perception of eleven of the eighteen causes listed (Table 5).

Table 5: *Possible causes of injury and differences in perceptions due to rank*

Significant differences between perceptions of different ranks	**No significant differences between perceptions of different ranks**
Contact with moving machinery	Being hit by moving vehicle
Being hit by moving objects	Trapped by something collapsing/ overturning
Being struck against something fixed or stationary	Contact with cold surfaces
Handling, lifting or carrying	Working in cold environment
Slips, trips or falls on same level	Acts of violence
Falls from height	Exposure to fire
Drowning/ lack of oxygen/ overcome by fumes	Exposure to explosions
Exposure to, or contact with, harmful substances	
Contact with hot surfaces	
Contact with electricity or electrical discharge	
Working in a hot environment	

There were differences between ranks in terms of perception of the likely occurrence of an injury due to the various types of hazard. However, if the five highest ranking causes of injury are placed in order (Table 6), it can be seen that all ranks have included the same four, though not necessarily in the same order, namely: ‘slips, trips and falls’; ‘handling, lifting, or carrying’; ‘working in a hot environment’ and ‘contact with hot surfaces’. Additionally ratings included ‘contact with cold surfaces’, in their top five causes of injury, while ships’ officers included ‘contact with machinery’ and managers included ‘falling from a height’.

Table 6: *Top five perceived causes of injury by rank*

Rank	Ratings	Junior	Senior	Managers
1	Hot environment	Slips, trips, falls	Handling, lifting, carrying	Slips, trips, falls
2	Handling, lifting, carrying	Handling, lifting, carrying	Slips, trips, falls	Handling, lifting, carrying
3	Cold environment	Hot environment	Hot environment	Hot environment
4	Slips, trips, falls	Hot surfaces	Hot surfaces	Hot surfaces
5	Hot surfaces	Contact with machinery	Contact with machinery	Fall from height

Senior officers and managers tended to perceive the risk of injury from the different types of causes listed as higher than ratings and junior officers (Table 7).

Table 7: *Percentage of each rank perceiving the risk of personal injury from each hazard as medium / high*

	Shore-based Managers	Senior Officers	Junior Officers	Ratings
Working in a hot environment	51.0	**63.4**	50.9	48.6
Working in a cold environment	42.3	**44.8**	39.2	41.6
Contact with hot surfaces	50.0	**57.0**	47.8	38.3
Contact with moving machinery	44.2	**49.2**	42.3	36.1
Hit by moving object	40.4	**46.3**	37.6	34.5
Contact with cold surfaces	20.4	**27.9**	26.6	27.6
Exposure to , or contact with, harmful substances	30.4	**39.8**	32.6	30.3
Contact with electricity or electrical discharge	43.3	**46.2**	34.2	30.1
Being struck against something	37.5	**39.3**	32.3	29.6
Trapped by something collapsing/ overturning	20.4	**20.6**	18.8	20.4
Handling, lifting, carrying	**67.3**	64.0	51.8	44.2
Slips, trips, falls on same level	**72.1**	63.4	53.3	40.8
Falls from a height	**45.2**	36.4	34.1	30.8
Exposure to fire	**34.6**	30.3	25.4	25.9
Drowning /lack of oxygen/ overcome by fumes	**29.8**	24.3	20.9	24.2
Being hit by moving vehicle	**21.2**	21.1	18.0	21.0
Acts of violence	**25.0**	24.6	20.6	19.9
Explosions	15.5	19.5	17.2	**20.7**

* Shaded areas with figures in bold indicate group who perceived the risk to be highest.

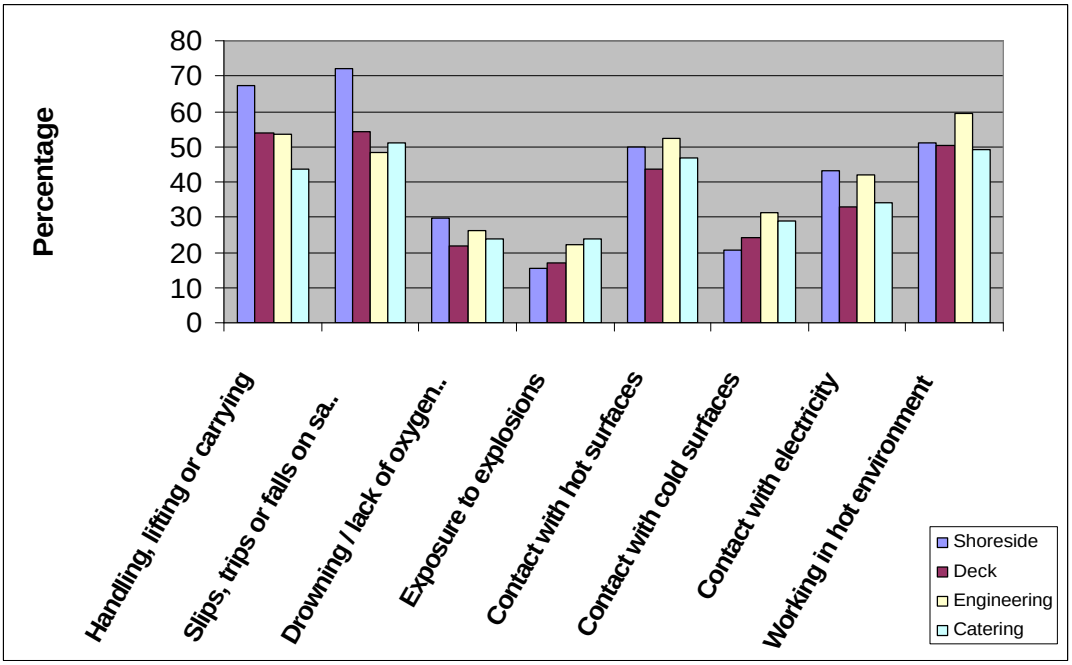
1.3 The effect of department

There were significant differences between the ways in which personnel from different departments perceived the likelihood of eight of the eighteen suggested causes of injury to someone working in their company:

- Handling, lifting or carrying
- Slips, trips or falls on same level
- Drowning/ lack of oxygen/ overcome by fumes
- Exposure to explosions
- Contact with hot surfaces
- Contact with cold surfaces
- Contact with electricity or electrical discharge
- Working in a hot environment

While there were no discernable patterns in the different perceptions of personnel from different departments i.e. with personnel from one department consistently identifying risks as greater than respondents from other departments (see Figure 4), it can be seen that shore side managers perceived the risk of an injury due to ‘handling, lifting or carrying’ or a ‘slip, trip or fall’ as markedly greater than those who worked onboard ship. By contrast, they perceived the risk of an injury due to ‘explosion’ or ‘contact with a cold surface’ as lower than those onboard. Those in the deck and catering departments saw the risk of an injury due to contact with electricity as lower than those in the engineering departments or those ashore; whereas engineers saw the risk of injury associated with working in a hot environment as higher than respondents working in all other departments.

Figure 4: *Percentages of respondents identifying the risk of injury due to listed causes as medium / high by department*



1.4 The effect of last ship type served on

Significant differences in perceptions of likely causes of injury were found between those who were working on different types of vessel in relation to twelve of the eighteen causes listed (Table 8):

Table 8: *Percentages that see the risk of an injury due to the listed causes as medium / high by last ship type worked on*

Injury cause	Tankers	Bulk Carriers	Dry Cargo	Passenger	Working
Contact with moving machinery	39.2	44.4	41.4	49.3	**49.5**
Being hit by moving objects	32.4	43.3	38.4	45.5	**48.2**
Trapped by something	15.1	22.4	19.7	19.7	**27.5**
Working in a hot environment	48.2	52.6	56.4	49.4	**63.1**
Slips, trips or falls	50.7	55.9	50.3	**64.9**	58.6
Contact with hot surfaces	47.0	49.9	45.1	**66.2**	46.1
Acts of violence	17.5	22.6	20.3	**36.8**	27.1
Handling, lifting or carrying	14.3	27.4	19.7	**40.3**	13.9
Being hit by moving vehicles	49.3	60.9	50.5	**61.0**	59.8
Falls from height	29.6	**42.5**	32.8	31.6	35.3
Drowning/ lack of oxygen/ fumes	**27.7**	26.8	17.7	21.1	23.6
Exposure to harmful substances	**40.6**	33.3	29.3	30.3	34.4

* Shaded areas indicate group who perceived the risk to be highest while figures in green indicate where risk was perceived as lowest.

Notably, those on tankers perceived risk as the *lowest* in seven out of the twelve cases. However, where there were significant differences in perceptions. Those on tankers actually saw the risk of injury as highest in relation to:

- Exposure to harmful substances
- Drowning/ lack of oxygen/ overcome by fumes

Presumably in these two cases the perceived danger is associated with the cargo carried in this type of vessel.

Those who worked on passenger ships saw the likelihood of an injury associated with a 'slip, trip or fall' and 'handling, lifting or carrying' as higher than those working on other types of ship. This is possibly due to the large number of hotel staff constantly moving about the ship carrying food and drink, etc. Passenger ship personnel also saw the likelihood of injury from 'an act of violence' and 'contact with a hot surface' as high. The former is possibly due to the large numbers of people on passenger ships and so the increased potential for conflict, while the latter is possibly explained again by large numbers of hotel staff involved in catering and laundry etc., and the use of hot equipment. That passenger ship crews perceive the risk of injury from 'being hit by a moving vehicle' as high is possibly due to the inclusion of passenger / Ro-Ro vessels within this group.

Those on bulk carriers also saw the likelihood of injury due to 'being hit by a moving vehicle' as a high risk, possibly due to vehicles in the hold during discharge operations. This same group also perceived the risk of 'falling from a height' as higher than those on other types of vessel. This may be due to the increased frequency of ladder use when accessing ships' cargo holds and the practices associated with cleaning holds.

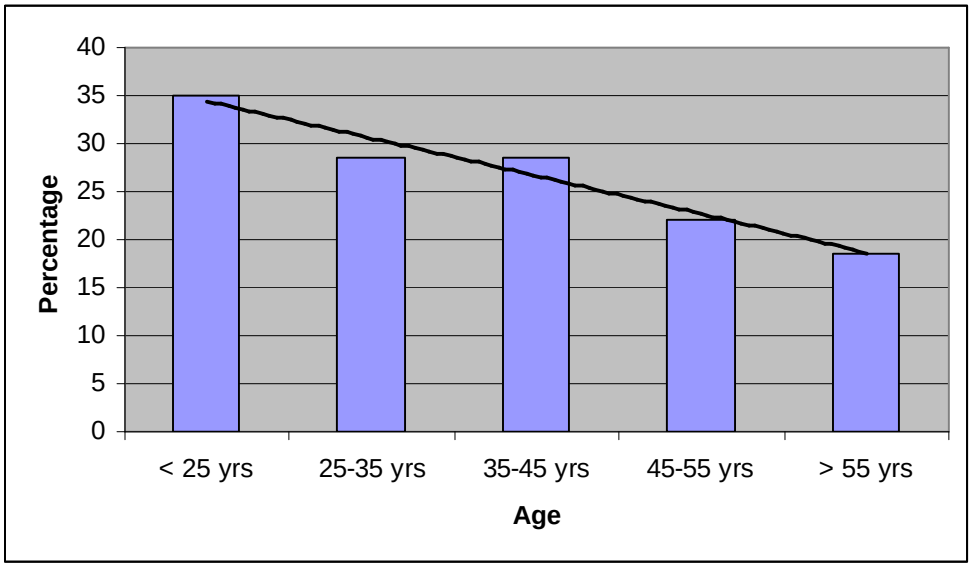
1.5 The effect of age

When we consider perceptions of risk of personal injury in relation to respondents' age, it can be seen that there are only statistically significant differences between respondents of different ages in 6 of the 18 cases.

- Handling, lifting or carrying
- Contact with cold surfaces
- Working in cold environment
- Being hit by moving vehicles
- Falls from height
- Contact with hot surfaces

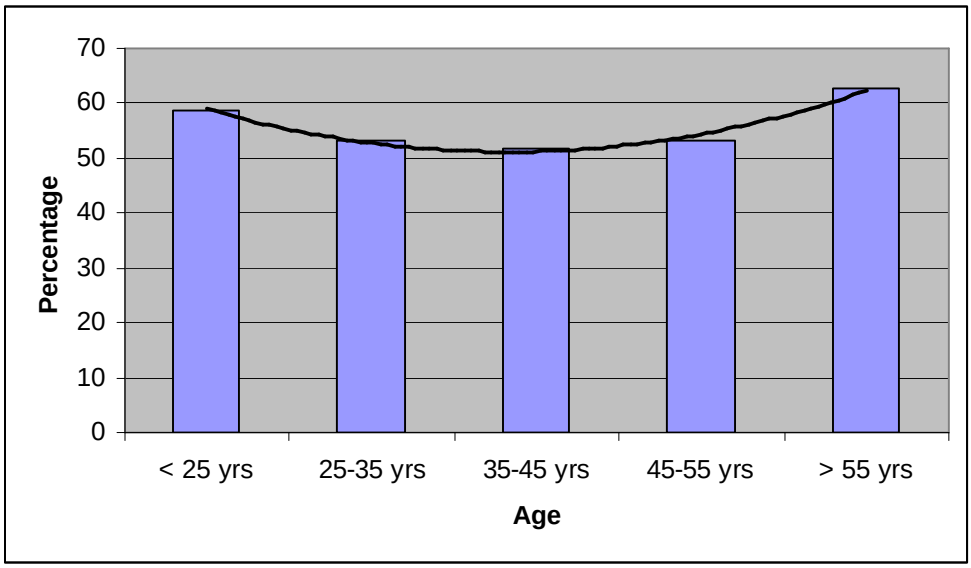
Thus in general there is a consistency of perception across the different age groups. However, where there were differences there was a tendency for the risk to be perceived as less with increased age (for example, Figure 3.2)

Figure 5: *Perceptions of risk of injury associated with contact with cold surfaces as medium / high, dependent upon respondents' age*



There was a notable exception to this trend however in relation to 'handling, lifting or carrying'. When we looked at perceptions of injury in relation to this particular cause we found a different pattern of response. What we saw was that the youngest and oldest respondents perceived the risk of injury from 'handling, lifting or carrying' to be higher than other age groups (Figure 6).

Figure 6: *Perceptions of the risk of injury associated with handling lifting and carrying as medium / high, dependent upon respondents' age*



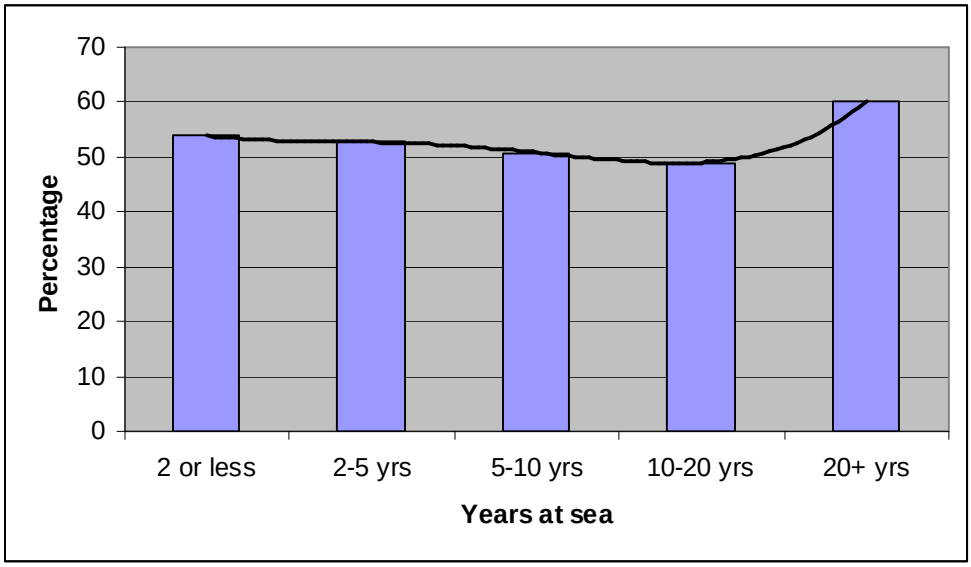
1.6 The effect of years worked at sea

Years worked at sea had little effect upon perceptions of risk associated with personal injury. This finding repeats that identified in our earlier report on ship level incidents, where years worked at sea was not found to significantly impact upon perceptions of risk (Bailey, Ellis, Sampson 2006). The only differences in perception were in relation to two of the eighteen types of possible cause of injury:

- Handling, lifting or carrying
- Slips, trips or falls on same level

In these two cases, the oldest group perceived the likelihood of injury to be highest (Figure 7). This may possibly be explained by an increased awareness of human physical limitations and the incapacitating nature of muscular / skeletal injuries amongst older respondents.

Figure 7: *Perceptions of the risk of injury associated with handling lifting or carrying as medium /high, dependent upon number of years respondents had worked at sea*



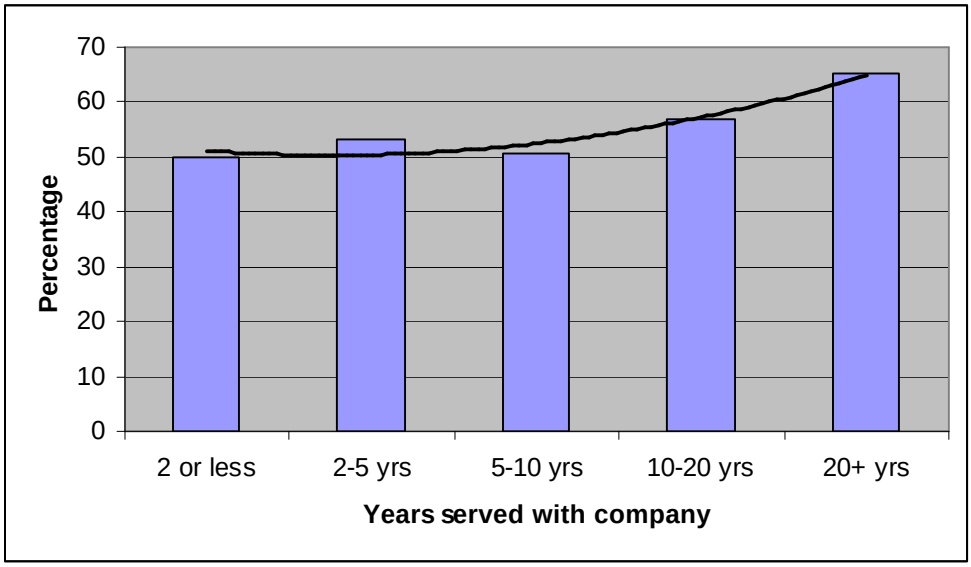
1.7 The effect of years worked for company

The length of time that respondents had worked for their company had a greater effect upon perceptions of risk of personal injury than length of time at sea, but again there were only significant differences in relation to a fire of the eighteen possible causes of injury:

- Handling, lifting or carrying
- Exposure to, or contact with, harmful substances
- Contact with hot surfaces
- Contact with electricity or electrical discharge
- Working in a hot environment

In general levels of risk were perceived to be greater the longer respondents had worked for their company. This was seen most clearly in response to the possible injury from ‘handling lifting or carrying’ (Figure 8).

Figure 8: *Perceptions of the risk of injury associated with handling lifting or carrying as medium /high, dependent upon number of years respondents had worked in current company*



1.8 The effect of nationality

Five nationalities made up 85% of our sample of respondents (Filipino 39%, British 17.2%, Chinese 16.8%, Indian 7.7%, Dutch 3.8%) and are considered individually in relation to one and other and in relation to all of the 'others' grouped into one category. Within the category 'others' thirty-four nationalities are represented. For most of the listed cases respondents from China tended to see the risk of personal injury as highest (i.e. China was highest for ten of the eighteen causes listed). Whereas respondents from the United Kingdom and from the Netherlands respectively, each perceived four of the eighteen possible causes of personal injury to be a higher risk than the other national groups. By contrast those from the Philippines saw the risk as lowest most frequently (Table 9).

Table 9: *Percentage of different national groups that perceived listed causes as medium / high risk*

	China	United Kingdom	Netherlands	India	Philippines	Other
Working in a hot environment	74.5	59.1	82.0	45.1	42.9	53.2
Contact with hot surfaces	65.6	63.6	73.0	42.9	30.0	51.4
Contact with moving machinery	56.3	60.9	61.8	37.9	26.7	45.9
Contact with electricity or electrical discharge	51.9	53.9	68.5	30.7	21.0	38.3
Being hit by moving objects	50.5	59.4	59.1	30.1	25.2	40.8
Handling, lifting or carrying	68.4	82.5	70.5	47.2	33.7	56.1
Slips, trips or falls on same level	62.0	86.8	74.2	50.0	30.8	59.5
Exposure to fire	37.6	38.0	36.0	21.5	18.3	31.1
Falls from height	55.4	41.8	39.3	26.9	22.6	35.7
Being struck against something fixed or stationary	55.0	48.1	43.8	28.5	19.6	31.8
Exposure to, or contact with, harmful substances	51.8	40.8	47.2	30.7	23.2	33.6
Contact with cold surfaces	44.5	24.9	33.7	24.3	21.7	25.1
Drowning/ lack of oxygen/ overcome by fumes	42.1	23.6	13.5	20.9	17.6	22.1
Acts of violence	30.7	29.7	21.3	16.9	14.8	26.0
Being hit by moving vehicles	47.5	18.5	12.4	14.7	12.0	18.8
Trapped by something collapsing/ overturning	29.0	19.7	27.0	17.6	14.8	24.3
Exposure to explosions	31.1	19.0	14.6	15.3	15.1	22.2
Working in cold environment	57.6	38.4	39.8	38.4	38.8	37.4

*The shaded figures represent the national group that saw the particular hazard as posing the greatest risk.

From the table above it can be seen that respondents from China, the Netherlands and the Philippines saw ‘working in a hot environment’ as the most likely cause of injury. By contrast those respondents from India and the United Kingdom thought that of the options provided ‘slips, trips or falls on same level’ were the most likely cause of injury to someone working for their company in the course of their career.

1.9 Multivariate analysis

In this section we report on the findings of using binary logistic regression modelling to compare the effect of variables in relation to differences in perceptions of risk. The following factors were put into logistic regressions for each of the incident types:

Nationality
Rank
Department
Age
Years in company
Most recent ship type worked on

The binary logistic regression model indicates that nationality is the most influential factor in determining perceptions of risk, but that rank and last ship type served on also have an independent but lesser effect upon risk perception (see Table 3.7).

Table 10: *Summary of logistic regression showing statistically significant factors[9] for each of the possible causes of injury listed*

Possible causes of injury	**Statistically significant factors**
Contact with moving machinery	Nationality
Being hit by moving objects	Nationality Last ship Department
Being hit by moving vehicles	Nationality Last Ship
Being struck against something fixed or stationary	Nationality
Handling, lifting or carrying	Nationality
Slips, trips or falls on same level	Nationality Rank
Falls from height	Nationality
Trapped by something collapsing/ overturning	Nationality Last Ship Department
Drowning/ lack of oxygen/ overcome by fumes	Nationality Last Ship
Exposure to, or contact with, harmful substances	Nationality Last Ship
Exposure to fire	Nationality Last ship (close to significance)
Exposure to explosions	Nationality Rank
Contact with hot surfaces	Nationality Department Rank Last Ship
Contact with cold surfaces	Nationality Department Rank
Contact with electricity or electrical discharge	Nationality Department
Working in a hot environment	Nationality Last Ship Department Rank
Working in cold environment	Nationality Last Ship
Acts of violence	Nationality Last Ship

[9] At the 95% confidence level

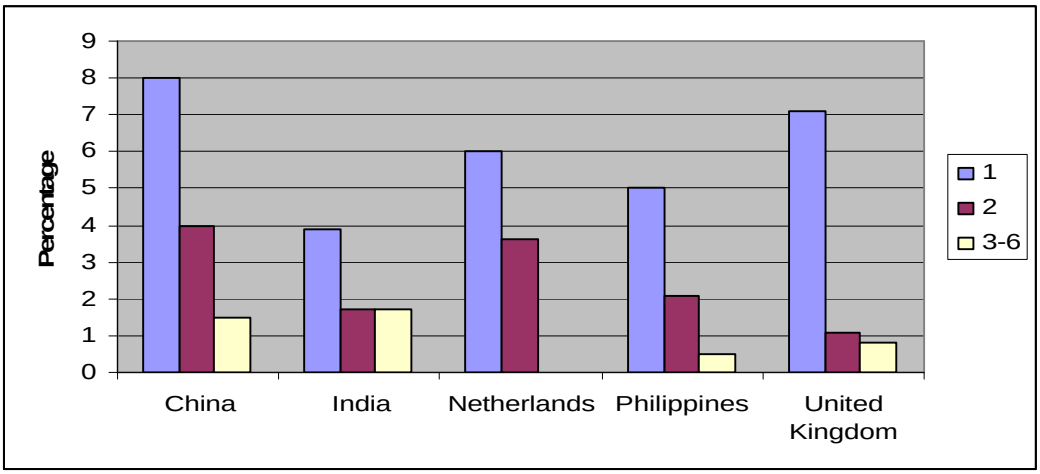
Nationality was seen to be predictive of responses in relation to all incident types. By contrast, last ship type was only predictive in relation to ten of the eighteen types of injury, department on six occasions, and rank on five. Years served in the company had no overall influence on perceptions.

That nationality is the clearest predictor of perceptions of risk of injury may possibly be explained in part by the numbers of injuries experienced by the various national groups. If we look at the self-reported accident figures, for the last two years, where serious injuries are defined as:

*[**A serious injury** is any injury that is not a major injury but results in incapacity for more than 3 consecutive days or results in the person being put ashore and left behind when the ship sails, e.g. a sprained wrist or ankle, a deep cut, a burn, a crushed finger or toe, etc.]*

We find that Chinese respondents reported the highest incidence of injury (14.5%, n=44) (Figure 9). Thus this may be the basis for their heightened sensitivity to the risk of personal injury. By contrast, those from India (7.4%, n=13) reported the lowest levels, closely followed by respondents from the Philippines (7.9%, n=67). Nine percent (n=34) of seafarers from the United Kingdom and nearly 10% (n=8) from the Netherlands reported having had a serious injury in the last two years.

Figure 9: *Percentage of respondents by nationality that reported having had, one or more, serious injuries in the last two years*[10]



[10] The maximum number of serious injuries reported was six.

1.10 Summary of findings in relation to general perceptions of risk within present employment

Working in a hot environment was perceived to be associated with the greatest likelihood of an injury by the sample group as a whole. Different ranks had different perceptions however. Ratings saw ‘working in a hot environment’ as the most likely of the options given to be associated with a personal injury while other ranks scored it as third, behind ‘slips, trips and falls’, and ‘handling, lifting or carrying’. Those working shore-side saw ‘slips, trips and falls’, and ‘handling, lifting or carrying’ as the most likely of the options given to be associated with an injury.

There were differences in risk perception between respondents when grouped according to the last type of ship they had worked upon (or were working upon). These were identified in relation to twelve of the eighteen possible causes of injury listed. Those who had most recently worked on tankers tended to see the risk of injury from the different types of cause as low compared with other groups, with the exception of two types of injuries – those associated with drowning/lack of oxygen/overcome by fumes, and exposure to a harmful substance where they rated risk as higher than other respondents. Respondents who had most recently worked on passenger vessels more frequently saw the risk of injury associated with the different options listed as higher than respondents who had most recently worked on other types of vessel.

Age and experience, in terms of time spent at sea or working for a company, had less effect on responses than the other variables considered. However, older respondents and those who had worked at sea for longest, were more likely to identify a risk of injury associated with ‘handling, lifting or carrying’, than younger and less experienced participants.

Nationality was the variable with the greatest impact upon perceptions of ‘general’ risk. Respondents from China tended to see the risk of injury associated with the options listed as higher than other national groups, while those from the Philippines tended to see the risk as lower.

Respondents from China, the Netherlands and the Philippines saw 'working in a hot environment' as the most likely cause of injury (of those given). By contrast respondents from India and the United Kingdom thought that risk of injury was highest in relation to 'slips, trips or falls on same level'.

Risk in relation to specific job-related tasks and activities in shipping in general

In this section we consider seafarers' and managers' perceptions of risk as associated with various shipboard, job-related tasks and activities. Respondents were asked the following question[11] and given a series of options to consider (e.g. 'use of ladders/gangways').

> *In your opinion, how great is the risk to a seafarer's health and safety when doing these tasks onboard any ship?*

Respondents were asked to indicate their response by circling a number for each option (e.g. 'use of ladders/gangways) on a scale of 1 to 5; where 1 = No Risk and 5 = Very Great Risk.

In contrast to the previous sections where responses were classified in relation to an ordinal scale, in this part responses were analysed using a gradated scale of 1-5; and so, for the purpose of analysis, were treated as 'interval data'. Analysis of Variance (ANOVA) was thus used to test for statistical significance[12]. On this basis 'means' and 'standard deviations' could be used as measures. Post Hoc tests were also conducted using Fishers LSD, in order to identify where significant differences occurred.

[11] Question 5.1 on the questionnaire, see Appendix 1.

[12] The ANOVA test examines the means score (for example, in this case ratings of the level of risk) of the different groups in the independent variable (i.e. rank), and test if these are different enough to have occurred due to the independent variable, and not purely by chance. If the means are different enough, and a significant result is found, the variance of scores is seen to be due to the independent variable. Post Hoc tests are then conducted, using Fishers LSD, in order to identify where the significant differences occurred. If the means are not different enough the independent variable is not seen to have an effect.

However, for purposes of description in this report the five points on the scale will be referred to as below:

1 = No Risk

2 = Low Risk

3 = Medium Risk

4 = High Risk

5 = Very Great Risk

2.1 Overall perceptions

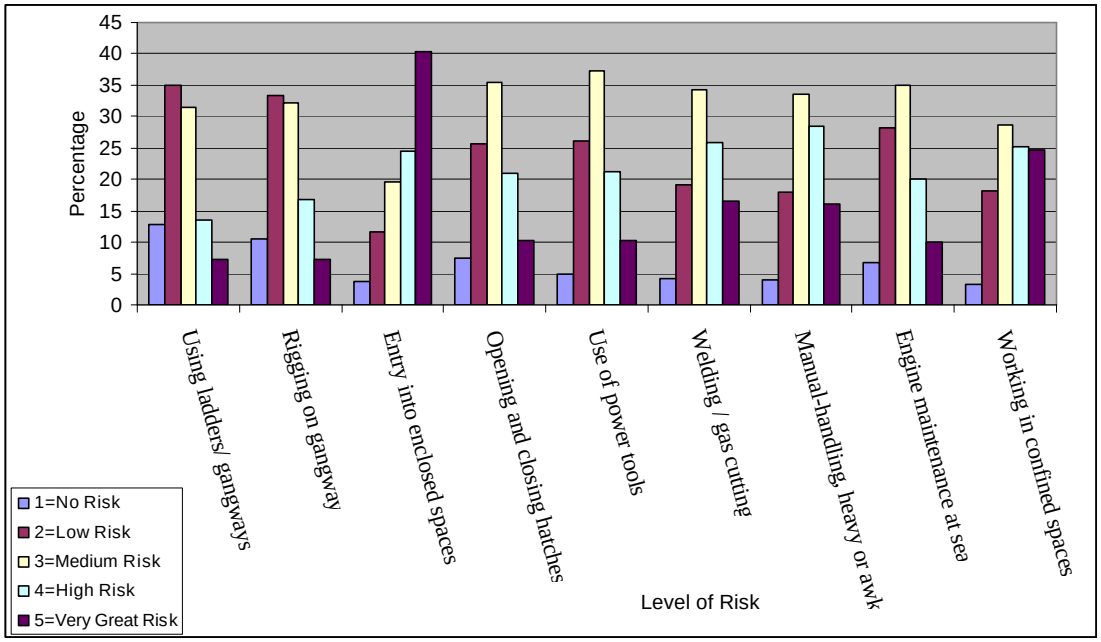
Of the options respondents were asked to consider ‘entry into an enclosed space’, and ‘work in a confined space’, were seen by the overall group as the activities that posed the greatest risk to those onboard ship, based on mean values (Table 11).

Table 11: *Mean values for activities that were seen as risky*

	Mean	**Standard Deviation**
Entry into enclosed spaces	3.86	1.176
Working in confined spaces	3.5	1.142
Manual-handling, heavy or awkward work	3.35	1.07
Welding / gas cutting	3.31	1.086
Use of power tools	3.06	1.04
Opening and closing hatches	3.01	1.089
Engine maintenance at sea	2.98	1.074
Rigging on gangway	2.76	1.074
Using ladders/ gangways	2.67	1.087

The perceived levels of risk associated with each of the activities listed are presented graphically in Figure 10 below.

Figure 10: *Overall perceptions of risk associated with shipboard activities*



2.2 The effect of hierarchy

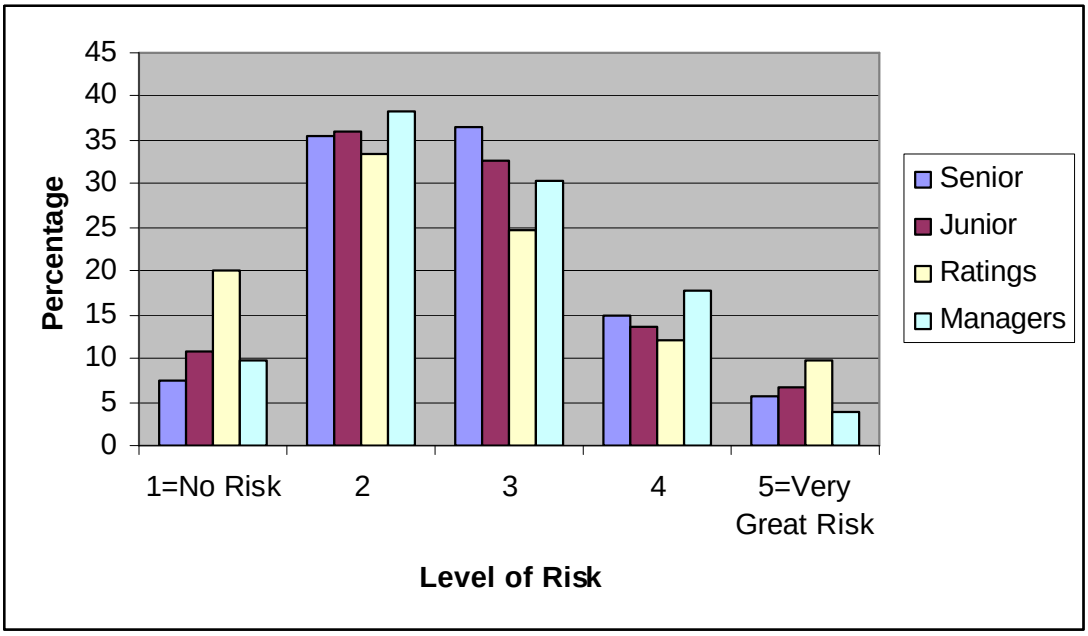
Rank appeared to have little effect on respondents' perceptions, as there were significant differences in perception between ranks in relation to just three of the nine shipboard tasks listed: 'Use of ladders/ gangways', 'Rigging of gangway' and 'Engine maintenance at sea'. Interestingly, these three tasks were also rated as least hazardous by the sample group as a whole. By contrast, all ranks perceived 'Entry into an enclosed space' and 'Working in confined spaces' as posing the greatest risk to seafarer health and safety (see Table 12).

Table 12: *Mean values by rank (ordered)*

Rank	Managers		Senior Officers		Junior Officers		Ratings	
	Activity	**Mean (S.D.)**	**Activity**	**Mean (S.D.)**	**Activity**	**Mean (S.D.)**	**Activity**	**Mean (S.D.)**
1	Entry into enclosed spaces	3.78 (1.10)	Entry into enclosed spaces	3.85 (1.11)	Entry into enclosed spaces	3.92 (1.11)	Entry into enclosed spaces	3.85 (1.30)
2	Working in confined spaces	3.44 (1.08)	Working in confined spaces	3.49 (1.06)	Working in confined spaces	3.53 (1.12)	Working in confined spaces	3.50 (1.24)
3	Manual-handling, heavy or awkward work	3.40 (0.91)	Manual-handling, heavy or awkward work	3.43 (1.03)	Manual-handling, heavy or awkward work	3.36 (1.00)	Welding / gas cutting	3.37 (1.21)
4	Welding / gas cutting	3.19 (0.94)	Welding / gas cutting	3.29 (1.01)	Welding / gas cutting	3.31 (1.03)	Manual-handling, heavy or awkward work	3.29 (1.18)
5	Opening and closing hatches	2.96 (0.87)	Use of power tools	3.11 (0.98)	Use of power tools	3.02 (0.98)	Use of power tools	3.06 (1.16)
6	Use of power tools	2.93 (0.97)	Engine maintenance at sea	3.06 (1.00)	Engine maintenance at sea	2.99 (1.02)	Opening and closing hatches	3.03 (1.19)
7	Engine maintenance at sea	2.75 (0.84)	Opening and closing hatches	3.03 (1.04)	Opening and closing hatches	2.99 (1.06)	Engine maintenance at sea	2.93 (1.20)
8	Rigging on gangway	2.69 (1.00)	Rigging on gangway	2.78 (0.99)	Rigging on gangway	2.87 (1.05)	Rigging on gangway	2.68 (1.18)
9	Using ladders/ gangways	2.68 (1.01)	Using ladders/ gangways	2.75 (0.98)	Using ladders/ gangways	2.69 (1.05)	Using ladders/ gangways	2.58 (1.21)

Interestingly, ratings tended to be most strongly represented at each end of the spectrum in terms of perception of risk associated with the different shipboard tasks. That is, for each different type of activity, a greater number of ratings saw it as both a ‘Very Great Risk’ and also as ‘No Risk’ than members of other ranks (see Figure 11 for example).

Figure 11: *Perceptions of risk due to 'use of ladders /gangways' by rank*



Perhaps what is most surprising is that for each of the tasks listed small numbers of individuals perceived them to pose no risk. For example, almost 10% of managers and 8% of senior officers saw 'entry into an enclosed space' as posing no risk. Of all the ranks, it was ratings who most frequently saw the various hazards as presenting 'no risk' to seafarer health and safety.

2.3 The effect of department

Work department was not significant in relation to the way in which respondents perceived the risk associated with the listed activities. The single notable exception was found when considering responses to the item 'engine maintenance at sea'. Engineers were most likely to see this as a high risk and shoreside personnel least likely to see it as such (Table 13).

Table 13: *Mean values for perceived level of risk associated with listed task by department*

	Engineering	Deck	Catering	Shoreside
Use of ladders/ gangways	2.7	2.7	2.6	2.7
Rigging of gangway	2.7	2.8	2.8	2.7
Entry into enclosed spaces	3.9	3.9	3.7	3.8
Opening and closing hatches	3.0	3.0	3.1	3.0
Use of power tools	3.1	3.0	3.1	2.9
Welding / gas cutting	3.3	3.4	3.4	3.2
Manual-handling of heavy or awkward items	3.3	3.4	3.4	3.4
Engine maintenance at sea	3.1	2.9	3.0	2.7
Working in confined spaces	3.5	3.5	3.4	3.4

**Shaded areas indicate where significant differences between departments were identified.*

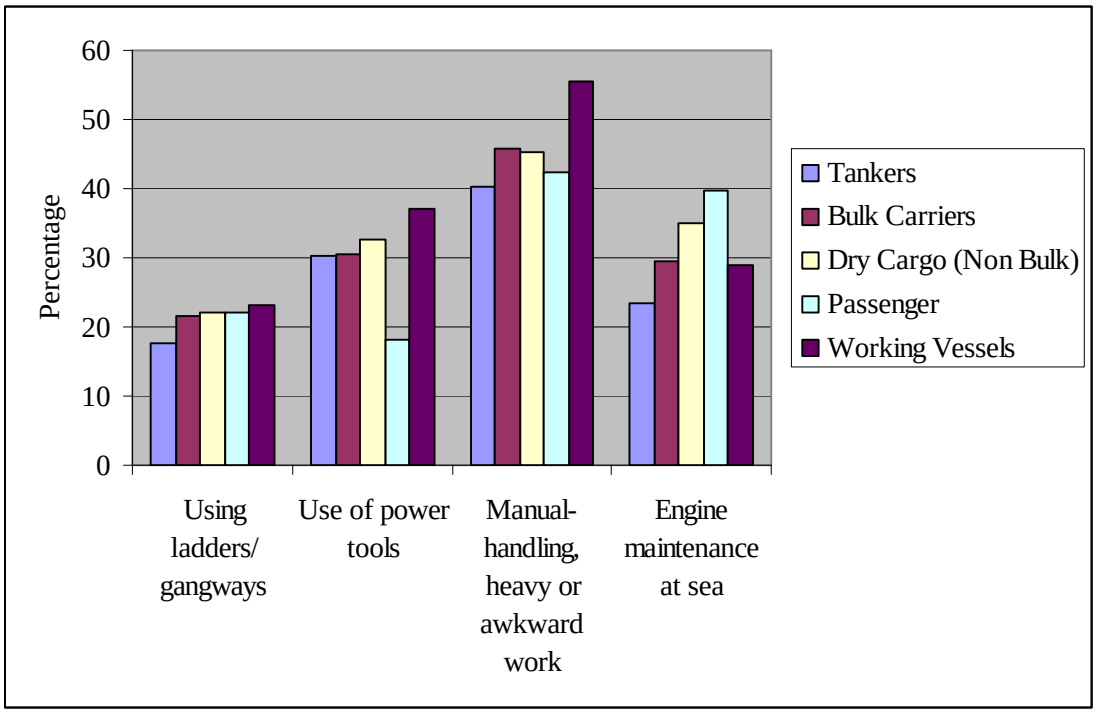
2.4 The effect of last ship type served on

Experience of different ship types was significant in relation to perceptions of risk with regard to only four of the nine tasks listed.

- Rigging of gangway
- Use of power tools
- Manual-handling of heavy or awkward items
- Engine maintenance at sea

Those whose most recent experience was on ‘tankers’ were generally the least likely to identify risk associated with each of the activities, while those from ‘working vessels’ tended to be the most likely to indicate that they thought the risk was ‘high’ or ‘very great; this was particularly the case in relation to manual-handling (Figure 12). This is possibly due to the need to handle heavy or awkward items on exposed decks in potentially rough weather.

Figure 12: *Percentage of respondents from different ship types who saw the risk associated with listed activities as high or very great*



Those whose recent experience was on passenger ships were less likely to identify a risk associated with the use of power tools than those from other types of vessel, but were more likely to indicate a perception of risk associated with engine maintenance at sea than were others. The latter perception could possibly relate to the idea that ships without propulsion pose a risk to large numbers of people when passengers are on board, rather than to the specific task of undertaking repair work.

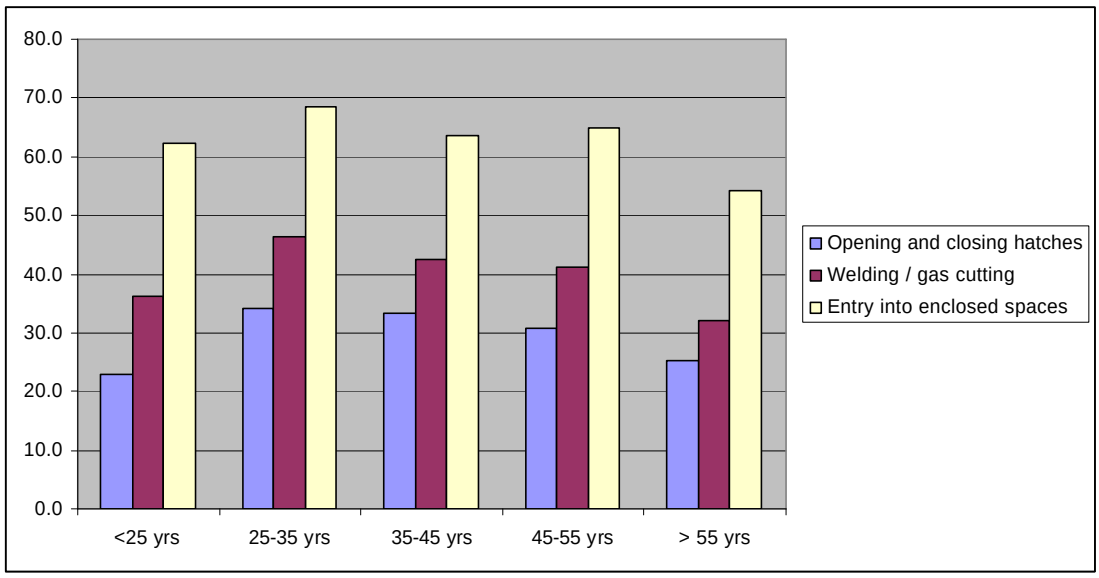
2.5 The effect of age

Significant differences in perception between respondents in different age groups were identified in relation to four of the nine listed tasks:

- Entry into enclosed spaces
- Opening and closing of hatches
- Welding / gas cutting
- Manual-handling of heavy or awkward items

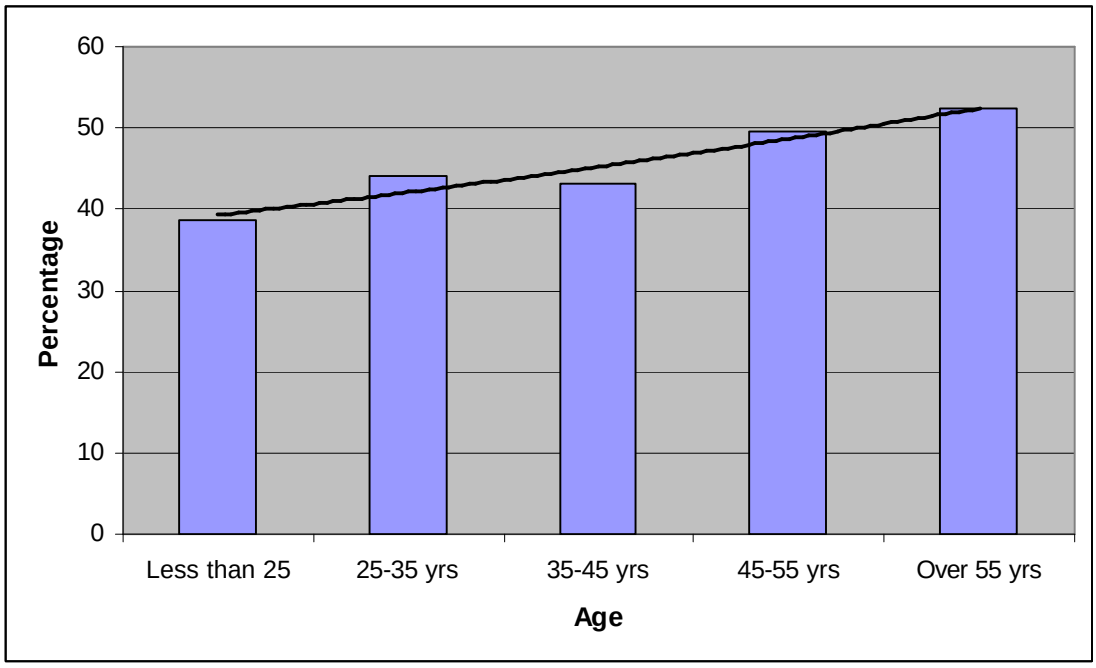
The youngest and oldest age-groups were the least likely to see the risk as high or very great, whereas those in the 25-35 age group were the most likely to see it as such (Figure 13).

Figure 13: *Perceptions of respondents who saw risk associated with listed tasks as 'high' or 'very great' based upon age*



There was a notable exception in the pattern of response however in relation to the perception of risk associated with the manual-handling of heavy or awkward items. In this case the general tendency was for the risk to be perceived as greater with increased age (Figure 14).

Figure 14: *Perceptions of respondents who saw risk associated with manual-handling as 'high' or 'very great', based upon age*



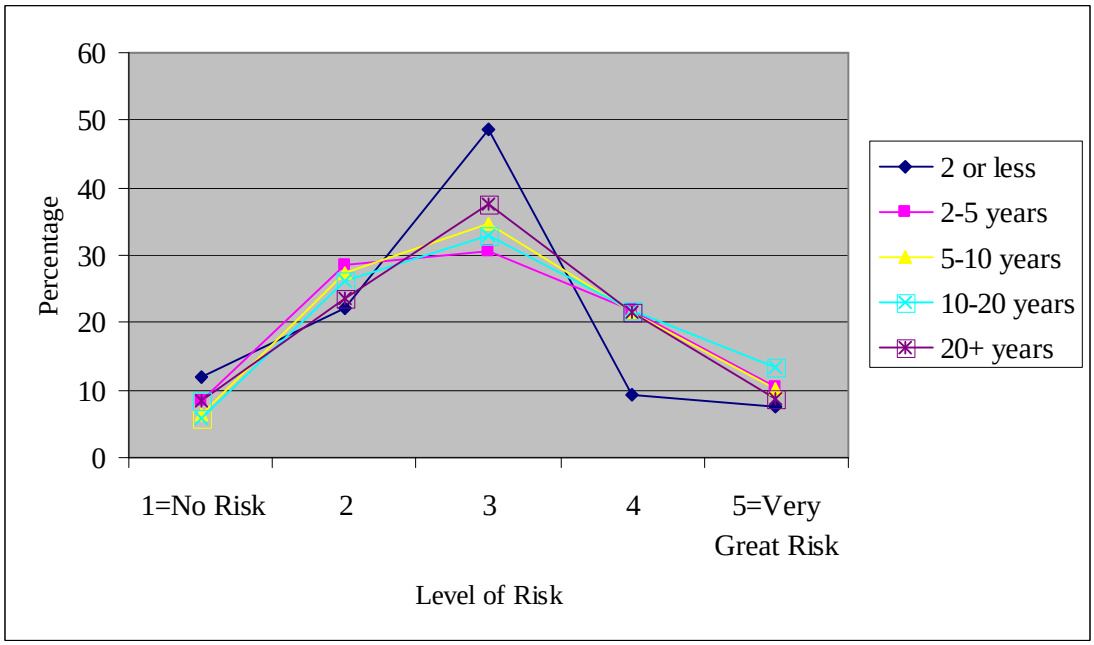
2.6 The effect of years worked at sea

Significant differences based on 'years spent at sea' exist in relation to perceptions of risk associated with:

- Rigging of gangway
- Opening and closing hatches
- Welding / gas cutting
- Manual-handling of heavy or awkward items
- Engine maintenance at sea

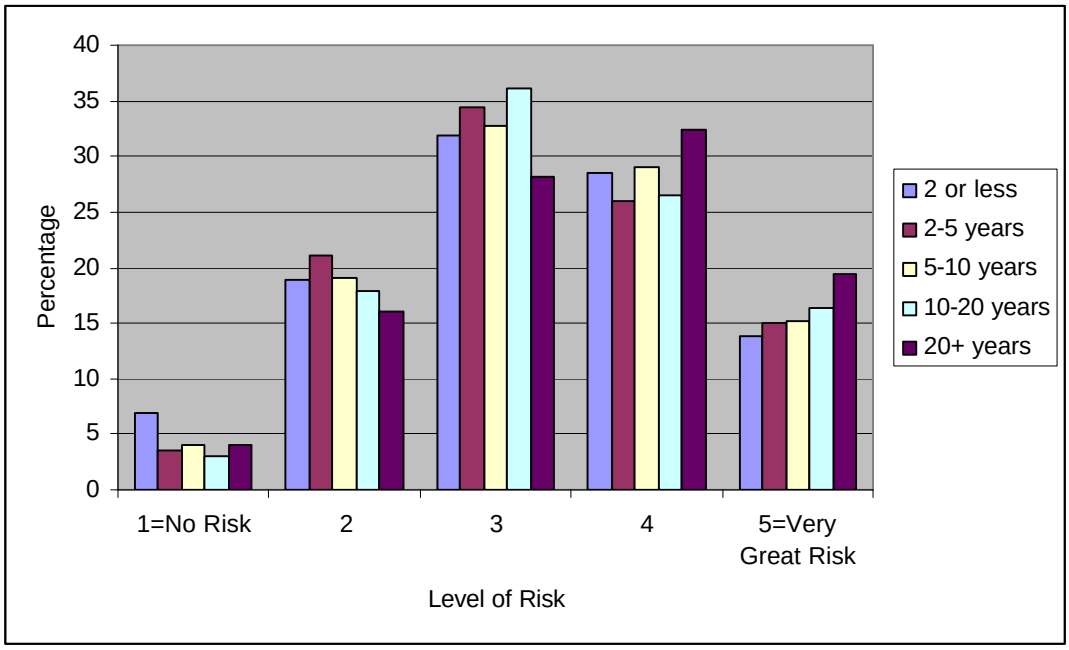
In three out of the five cases, it was those with less than two years experience at sea who saw the risk differently to the other seafarers and managers (see Figure 15 for example). In each case they were more inclined to see the activity as presenting a medium level risk.

Figure 15: *Perceptions of risk associated with the opening and closing of hatches*



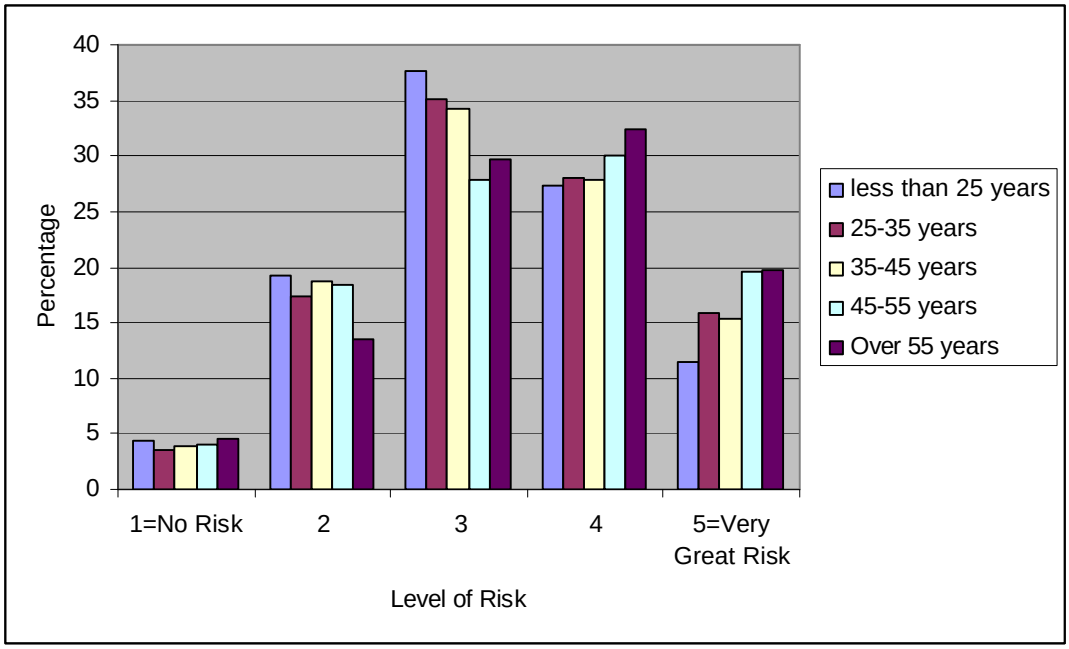
In relation to manual lifting, those with more experience at sea tended to see the risk as higher than those with less experience. Figure 16 shows this particularly clearly in terms of those who saw the risk as very great (point 5 on the scale).

Figure 16: *Perceptions of risk associated with the manual handling of heavy or awkward items according to years experience at sea*



Although the overall perception of risk due to manual lifting was not significantly different amongst seafarers and managers of different ages it is notable that a similar pattern is repeated in terms of those who saw the risk as 'very great' (see Figure 17).

Figure 17: *Perceptions of risk associated with the manual handling of heavy or awkward items according to age of respondents*



2.7 The effect of years worked for company

There were no significant differences in perceptions of risk in relation to the tasks listed based on 'years worked with present company'.

2.8 The effect of nationality

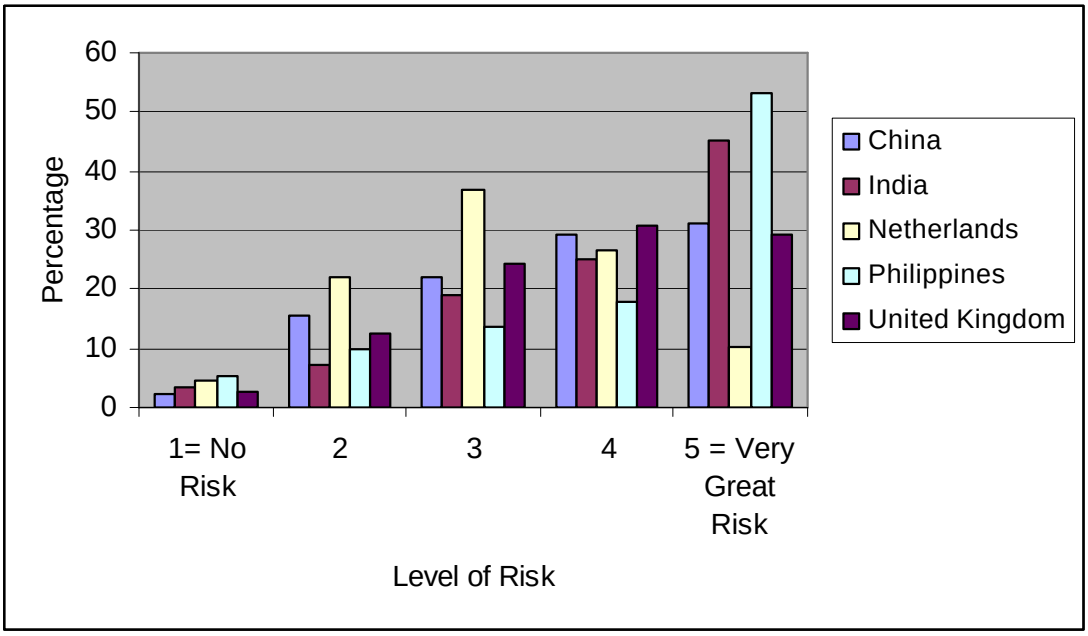
There were statistically significant differences between national groups in terms of the ways they perceived risks to seafarers' health and safety when considering a range of specified activities (see Table 14).

Table 14: *Mean values and standard deviation for perceptions of risk by nationality*

	China	India	Netherlands	Philippines	United Kingdom
Entry into enclosed spaces	3.72 (s.d.=1.12)	4.02 (s.d.=1.11)	3.16 (s.d.=1.03)	4.04 (s.d.=1.24)	3.72 (s.d.=1.09)
Welding / gas cutting	3.12 (s.d.=1.06)	3.36 (s.d.=1.01)	2.70 (s.d.=0.88)	3.47 (s.d.=1.15)	3.20 (s.d.=0.94)
Working in confined spaces	3.11 (s.d.=1.01)	3.54 (s.d.=1.12)	2.90 (s.d.=0.88)	3.77 (s.d.=1.23)	3.33 (s.d.=0.99)
Opening and closing hatches	3.08 (s.d.=1.03)	2.96 (s.d.=1.04)	2.41 (s.d.=0.88)	3.07 (s.d.=1.18)	3.01 (s.d.=0.96)
Use of power tools	3.06 (s.d.=1.02)	3.10 (s.d.=0.97)	2.73 (s.d.=0.93)	3.11 (s.d.=1.12)	2.99 (s.d.=0.93)
Manual-handling, heavy or awkward work	3.02 (s.d.=0.97)	3.20 (s.d.=1.06)	3.11 (s.d.=0.93)	3.39 (s.d.=1.16)	3.64 (s.d.=0.94)
Engine maintenance at sea	2.78 (s.d.=0.95)	3.07 (s.d.=1.13)	2.95 (s.d.=0.93)	3.01 (s.d.=1.18)	3.09 (s.d.=0.93)
Using ladders/ gangways	2.77 (s.d.=1.01)	2.54 (s.d.=1.03)	2.66 (s.d.=0.90)	2.52 (s.d.=1.18)	2.92 (s.d.=0.97)
Rigging on gangway	2.61 (s.d.=1.04)	2.98 (s.d.=1.08)	2.90 (s.d.=0.93)	2.70 (s.d.=1.13)	2.90 (s.d.=1.02)

As an overall group, seafarers and managers mostly saw the activity of entering an enclosed space as presenting a 'very great' risk to seafarers' health and safety. However when we looked at the same group in terms of nationality we found that those respondents from the United Kingdom and the Netherlands saw the risk as lower than those of the other nationalities listed (see Figure 18).

Figure 18: *Perceived level of risk associated with 'entry into an enclosed space' by national grouping*



It can be seen that all national groups perceived 'entry into an enclosed space' as the most dangerous activity of those given (Table 15). However there was some variance between national groups in relation to the ordering, by risk perception, of other activities. Those from India and the Philippines shared the same perception of risk in relation to the identification of the top five activities in terms of risk (including the commonly shared perception that entry into enclosed spaces was the most risky activity), and those from the United Kingdom and the Netherlands had a shared perception of the top two most risky activities (entry into enclosed spaces and manual handling of heavy items).

Table 15: *National rankings of activity according to perceived levels of risk in descending order based on mean values*

China	India	Philippines	Netherlands	United Kingdom
Entry into enclosed spaces	Entry into enclosed spaces	Entry into enclosed spaces	Entry into enclosed spaces	Entry into enclosed spaces
Welding / gas cutting	Work in confined space	Work in confined space	Manual-handling of heavy or awkward items	Manual-handling of heavy or awkward items
Opening and closing hatches	Welding / gas cutting	Welding / gas cutting	Engine maintenance at sea	Work in confined space
Work in confined space	Manual-handling of heavy or awkward items	Manual-handling of heavy or awkward items	Rigging of gangway	Welding / gas cutting
Use of power tools	Use of power tools	Use of power tools	Work in confined space	Engine maintenance at sea
Manual-handling of heavy or awkward items	Rigging on gangway	Opening and closing hatches	Use of power tools	Opening and closing hatches
Use of ladders / gangways	Opening and closing hatches	Engine maintenance at sea	Welding / gas cutting	Use of power tools
Engine maintenance at sea	Use of ladders / gangways	Rigging of gangway	Use of ladders / gangways	Rigging of gangway
Rigging of gangway	Engine maintenance at sea	Use of ladders/ gangways	Opening and closing hatches	Use of ladders / gangways

Different perceptions of risk across national groups could be explained in a variety of ways. They might relate, for example, to experience of national fleets, to seafarers' labour market positions and the impact of these upon the quality of the ships aboard which they are offered opportunities, or to their education and training. It is beyond the scope of this study to explain *why* such national differences in perception occur; however, the data suggest that they are a strong influence and further investigation would be helpful in exploring the associated issues. .

In section 1.8 above, we discussed how different national groups perceived the likelihood of an injury occurring as a result of certain events in relation to people working for their company. When considering their own company, we saw that Filipinos perceived the risks as lower than other groups for 15 of the 18 listed causes

of injury. By contrast, those from the Philippines were the group most inclined to see the risk as 'high/very great' for five of the nine activities listed when undertaken on any ship. This seems to suggest that the Filipinos who responded to the questionnaire regarded shipping in general as more risk prone than employment in their own companies.

Table 16: *Percentage of national group perceiving the risk as high/very great for each of the listed activities*

	China	India	Netherlands	Philippines	UK
Working in confined spaces	32.6	51.1	22.1	62.7	41.9
Welding / gas cutting	33.8	46.9	18.4	49.4	36.1
Use of power tools	32.4	32.0	20.9	35.1	25.9
Opening and closing hatches	31.5	28.1	10.3	36.4	27.9
Entry into enclosed spaces	60.3	70.4	36.8	71.3	60.3
Engine maintenance at sea	20.8	34.9	26.4	33.2	31.1
Rigging of gangway	20.3	29.7	26.4	22.6	28.2
Manual-handling, heavy or awkward work	29.1	36.2	31.0	48.7	56.6
Using ladders/ gangways	23.8	17.5	16.1	19.1	23.8

* Shaded areas indicate group who perceived the risk to be highest.

Chinese respondents also answered questions differently when asked about the likely experiences of seafarers in their company and seafarers in general. In this case however they appeared to perceive risks to people working in their company as greater than they perceived risks in relation to seafaring in general. This merits further investigation.

2.9 Multivariate analysis

Using logistic regression, the following factors were compared in terms of their effect on responses in an effort to ascertain which factors had the strongest influence on seafarers' risk perceptions:

Nationality
Rank
Department
Years in company
Age
Most recent ship type worked on.

Our analysis indicated that nationality was the most influential factor in predicting perceptions of risk, but that last ship type served on, rank and age also had an independent but lesser effect (Table 17).

Table 17: *Summary of logistic regression showing statistically significant factors for listed shipboard activities*

Shipboard Activity	Statistically significant factor
Use of ladders /gangways	Nationality Age
Rigging of gangway	Nationality Last ship type
Entry into enclosed space	Nationality Rank
Opening and closing hatches	Nationality
Use of power tools	Nationality
Welding / gas cutting	Nationality
Manual-handling of heavy or awkward items	Nationality
Engine maintenance at sea	Nationality Last ship type
Working in a confined space	Nationality

2.10 Summary of findings in relation to specific job-related tasks and activities in shipping in general

When presented with a range of activities seafarers and managers identified ‘entry into an enclosed space’ as carrying the greatest risk for seafarers. This was seen to be the greatest risk by all ranks and nationalities; although respondents from the Netherlands and the United Kingdom tended to see risk as slightly lower than other national groups. Overall, nationality was found to be the most significant factor in predicting perceptions of risk in terms of the specific activities listed. Filipino respondents expressed the highest ‘mean’ level of risk perception with regard to four of the nine activities listed.

Ratings tended to be most highly represented at the extreme ends of the risk perception scale for each type of activity. That is, they most frequently saw the activities as posing ‘No Risk’, and as posing ‘Very Great Risk’. Based on mean

values shore-based managers tended to see the risk connected with each type of activity as lower than other respondents, while senior officers frequently saw the risks as greater than other ranks (i.e. in terms of five of the nine activities).

There were significant differences in perceptions between respondents of different age groups in terms of four of the nine tasks listed. Where there were differences in perception those in the 25-35 year age group tended to see the risk as greatest while the oldest and youngest groups tended to see the risk as lower than the other age groups. The exception was in relation to manual-handling where the risk was perceived to increase with age.

Experience in terms of years spent at sea was significant in relation to five of the nine activities. Those with two or less years experience tended to see the risks differently to those with more experience.

Likewise, last ship type was also significant in relation to four of the nine activities. Those on 'working vessels' were significantly more concerned about manual-handling than those on other ship types. While those on passenger vessels were notably more concerned about the risk associated with engine maintenance at sea, but significantly less concerned about the risks associated with the use of power tools than were those on other types of ship.

Risk in relation to specific onboard occasions and contexts in shipping in general

Respondents were asked the following question[13].

> *In your opinion, how great is the risk to a seafarer's health and safety during these times onboard any ship?*

The 'times' listed were during: rough weather, mechanical breakdown, crane operations, helicopter operations, mooring operations, operating in piracy areas,

[13] Question 5.2 on the questionnaire, see appendix 1.

working over-side, working on exposed deck, working in the vicinity of moving vehicles, working at height, working near open hatches/ tanks, doing unfamiliar work and working having consumed alcohol / drugs.

Respondents were asked to indicate their response by circling a number for each item on a scale of 1 to 5; where 1 = No Risk and 5 = Very Great Risk.

Significance was tested for using ANOVA14 and results are presented in terms of 'mean' values. However, for purposes of description when discussing the responses, we interpret the five point scale as follows:

1 = No Risk
2 = Low Risk
3 = Medium Risk
4 = High Risk
5 = Very Great Risk

3.1 Overall perceptions

When considered as a single group respondents clearly saw 'working having consumed alcohol / drugs' as posing the greatest risk (of all the given options) to seafarer and health and safety with 76.7% of respondents perceiving this a 'Very Great Risk'. 'Operating in piracy areas' was perceived to be the second highest risk with 41.6% of respondents rating it as a 'Very Great Risk'.

An examination of the combined percentage of respondents stating that there was a 'high risk' or 'very great risk' associated with the listed occasions produced the ranking illustrated in Table 18 .

[14] For details see p.XX Findings 4

Table 18: *Times seen as greatest risk*

Rank order	Times onboard ship	Percentage
1	Working having consumed alcohol / drugs	88.8
2	Doing unfamiliar work	69.0
3	Operating in piracy areas	67.5
4	Working over-side	59.2
5	Rough weather	58.1
6	Working at height	57.3
7	Working near open hatches / tanks	52.6
8	Working in vicinity of moving vehicles	47.9
9	Mooring operations	47.1
10	Mechanical breakdown	40.7
11	Helicopter operations	37.1
12	Crane operations	27.0
13	Working on exposed decks	26.6

Here undertaking unfamiliar work replaces operating in piracy areas as the second highest ranked ‘context’ in relation to risk to seafarers.

3.2 The effect of hierarchy

When the sample group was analysed with regard to hierarchy, significant differences in perception were found in relation to four of the thirteen ‘times’ listed, namely: mooring operations, working having consumed alcohol/ drugs, rough weather, mechanical breakdown.

Table 19: *Perceptions of risk at different times on board ship presented as mean values by rank*

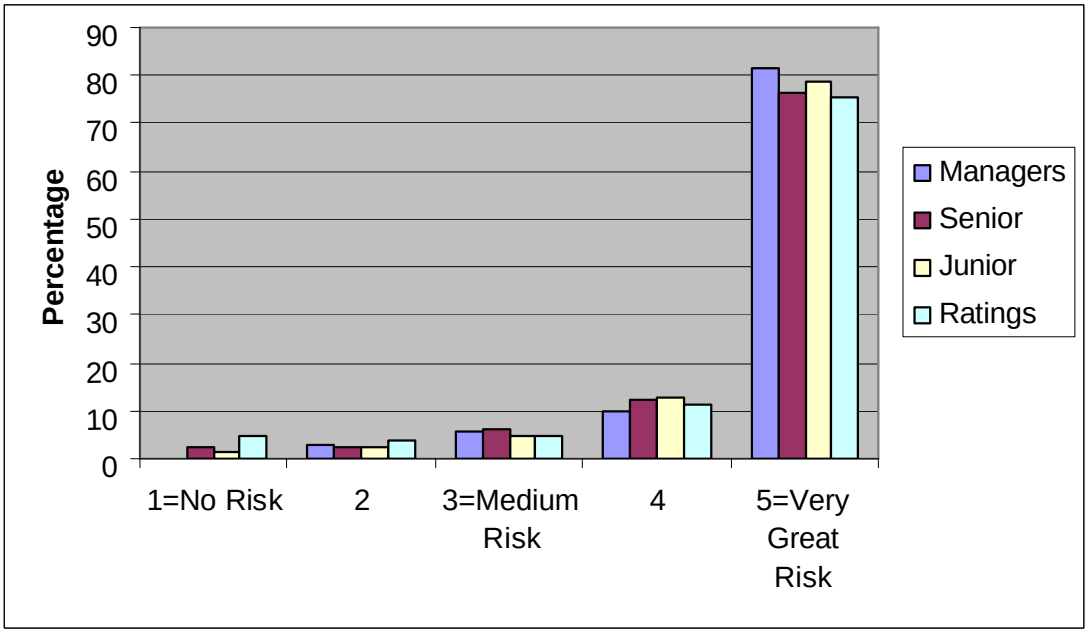
	Managers	Senior Officers	Junior Officers	Ratings
Working having consumed alcohol / drugs	4.7	4.6	4.6	4.5
Rough weather	3.6	3.8	3.6	3.7
Mooring operations	3.1	3.4	3.5	3.4
Mechanical breakdown	3.0	3.2	3.2	3.3

* Shaded areas indicate group who perceived the risk to be highest

Of the four factors identified as significant it can be seen that a different rank or hierarchical group perceives each of the four to pose the greatest risk.

In the case of 'working having consumed drugs or alcohol' a large percentage of all groups saw this as posing a 'high' or 'very great' risk. However managers were more inclined to identify this as high risk. Indeed no managers perceived such times to be risk free.

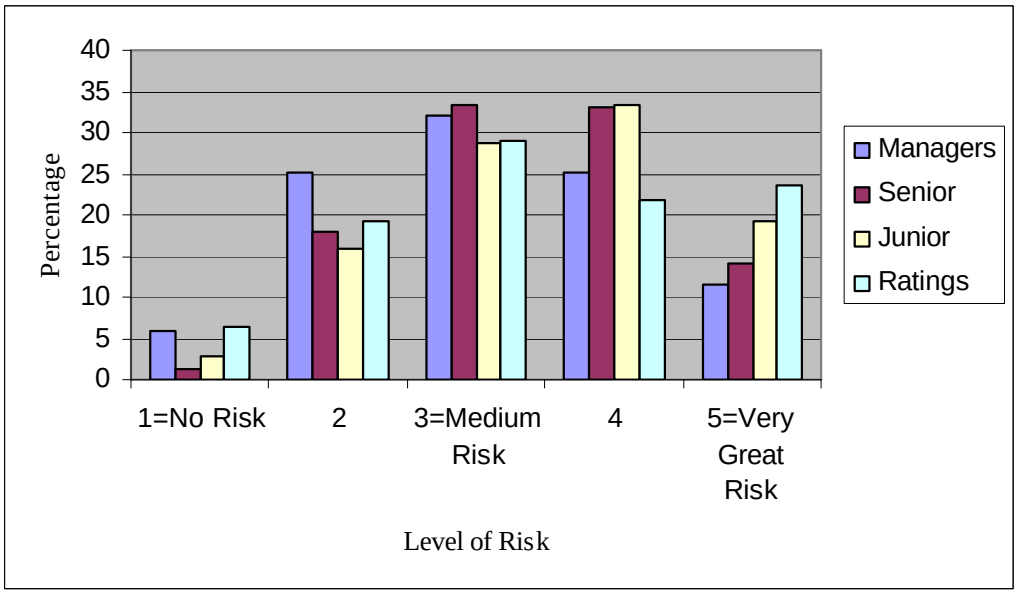
Figure 19: *Perceived level of risk of working when having consumed alcohol /drugs, by rank*



Senior officers were most likely to identify a risk in connection with rough weather. In contrast, junior officers were more likely to identify mooring operations as times of high risk than other groups. Senior officers were most inclined to see mooring as a

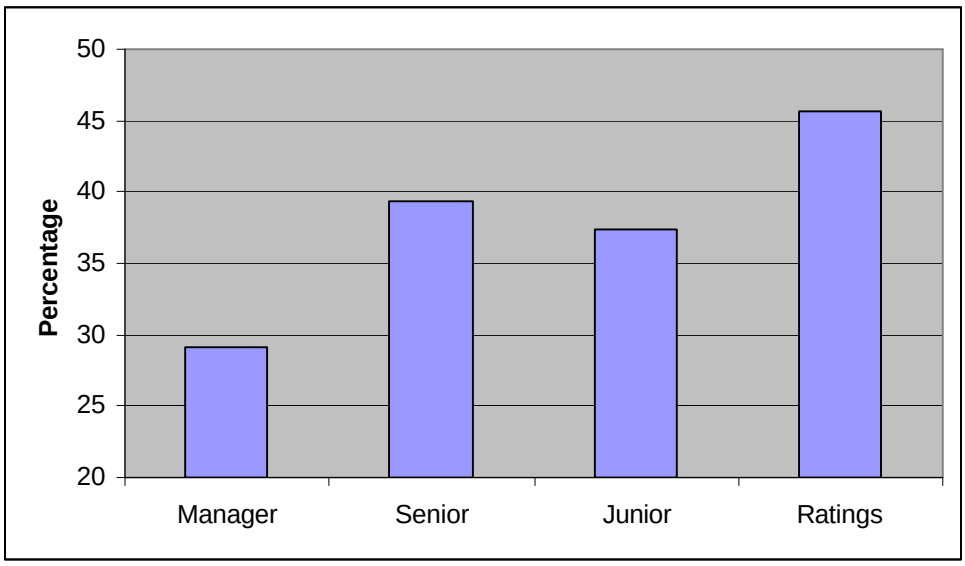
time of medium or high risk (Figure 20), and managers as a group perceived it to be less of a risk than other ranks.

Figure 20: *Perceived level of risk during mooring operations by rank*



Ships' ratings were more likely to identify mechanical breakdown as a time of risk than other groups, and once again managers as a group were least inclined to see this as a time of high or very great risk.

Figure 21: *Percentage perceiving risk of mechanical breakdown to be a time of high or very great risk by rank*



It is impossible to account for such differences in perception although a number of speculative suggestions could be made. For example it is possible that senior officers are more sensitised to risk during heavy weather because of their overall responsibility for safe navigation and the safety of others. Decisions as to whether to slow the vessel, change course, or take other precautionary action are theirs and it is therefore possible that this impacts upon their sense of risk. Similarly we could speculate that junior officers are most aware of the risks during mooring operations as this is the time when those on the deck side, at least, are most directly responsible for the safety of others. However no single explanation is likely to account for all the differences observed and in general it is only within the scope of this report to identify differences in perceptions rather than explain them.

3.3 The effect of department

The department in which respondents worked was significant in relation to perceptions of risk in terms of just three of the thirteen times listed. These were during: mooring operations, mechanical breakdown and working on exposed decks.

In two of the three cases, those directly involved in the specified work perceived the risk to be higher than those who worked in other departments. There were significant differences between the perceptions of engineers and those in the deck and shore side departments in relation to mechanical breakdown; engineers perceived the level of risk to be higher than those in all other departments. Similarly, there were significant differences in perception between those working in the deck department and those in all other departments, in relation to mooring operations, with those in the deck department perceiving the level of risk to be greater (Table 20).

Table 20: *Perceptions of risk associated with different times by department, as a mean value*

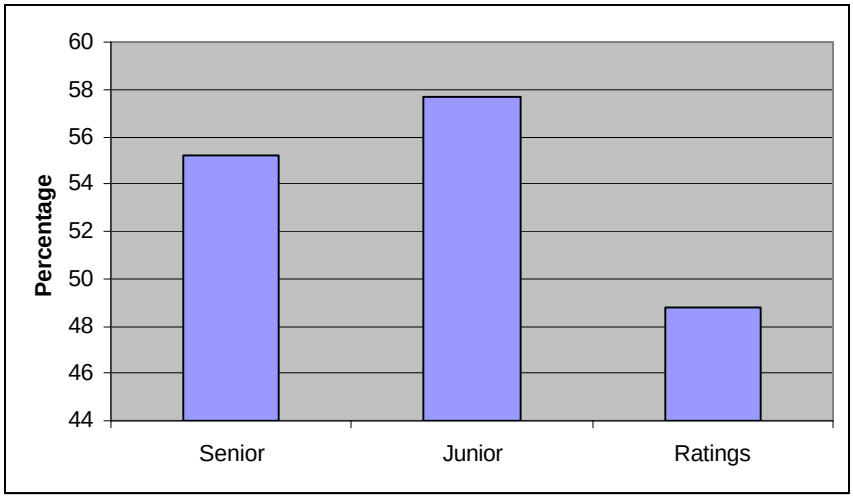
	Engineering	Deck	Catering	Shore side
Mechanical breakdown	3.4	3.2	3.3	3.0
Mooring operations	3.3	3.6	3.3	3.1
Working on exposed decks	3.0	2.8	3.2	2.8

* Shaded areas indicate group who perceived the risk to be highest.

Respondents working in catering departments perceived the risk associated with working on exposed decks to be higher than those working in other departments. A possible explanation could relate to the fact that catering personnel, on most ships, do assist on deck, or may have to cross decks, on occasion, to get to store rooms, dispose of garbage, participate in drills, etc. Thus working on deck is something they have limited experience of, and it may be this partial experience accounts for a heightened perception of risk. Interestingly the difference in perception between those in catering and those in engineering was not statistically significant and the same explanation could equally be applied to engineering workers.

Those in the deck department identified mooring operations as posing a greater risk than those in other departments. This was true of all ranks, but junior officers identified the risk as highest (Figure 22).

Figure 22: *Perceptions of level of risk during mooring as 'high or very great' by rank within the deck department*



3.4 The effect of last ship type served on

There were significant differences found between respondents who had last worked on different ship types in relation to eight of the thirteen different periods listed. These related to times of:

- Rough weather
- Mechanical breakdown
- Crane operations
- Mooring operations
- Operating in piracy areas
- Working in vicinity of moving vehicles
- Working at height
- Working near open hatches/ tanks

Table 21 illustrates how respondents working on different ship types perceived the risk associated with the different time periods.

Table 21: *Perceptions of risk associated with different times based on last ship type, as a mean value*

	Tanker	Bulk Carrier	Dry Cargo*	Working Vessel	Passenger
Mooring operations	3.51	3.30	3.48	3.29	3.19
Rough weather	3.57	3.84	3.69	3.73	3.29
Mechanical breakdown	3.15	3.34	3.28	3.25	3.09
Operating in piracy areas	3.97	4.04	3.87	3.98	3.45
Working in vicinity of moving vehicles	3.24	3.50	3.50	3.34	3.28
Working at height	3.56	3.73	3.76	3.61	3.44
Working near open hatches/ tanks	3.46	3.57	3.68	3.60	3.39
Crane operations	2.84	2.99	2.95	3.15	2.88

* (Non-Bulk) (Shading indicates highest value per time frame considered).

Those respondents whose most recent ship type was a tanker perceived the risk associated with ‘mooring operations’ to be greater overall than those respondents working upon other types of vessels, although the difference between this group and those working on dry cargo vessels was not statistically significant.

In contrast, those working on bulk carriers were more likely to identify periods of rough weather, mechanical breakdown, and operating in piracy areas as high risk than

those on other types of vessel. Additionally along with respondents who had last worked on non-bulk dry cargo vessels those working on bulk carriers identified ‘working in the vicinity of moving vehicles’ as a time of high risk.

Respondents whose most recent ship type was a dry cargo vessel were more likely than other groups to identify ‘working at height’ and ‘working near open hatches/ tanks as times of high risk.

Finally those who were most recently employed on ‘working vessels’ were more likely to identify times of crane operation as high risk than those on the other types of vessel. This group contains offshore supply vessels which must undertake crane operations close to offshore platforms often in rough sea conditions, along with research vessels which often launch and recover heavy equipment at sea.

3.5 The effect of age

Significant differences in risk perception existed between different age groups in relation to eight of the thirteen ‘time periods’ listed. Those who perceived the least risk were in both the youngest and the oldest age categories (Table 22).

Table 22: *Perceptions of risk expressed as mean values by age group*

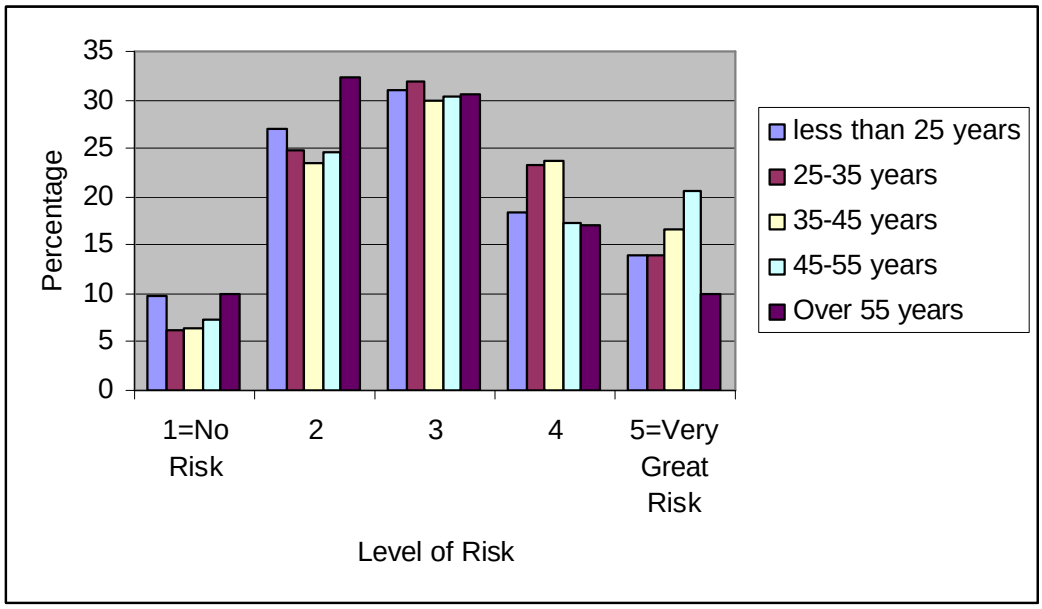
Time Onboard	**Age Group**				
	< 25	25-35	35-45	45-55	> 55
Rough weather	3.4	3.7	3.8	3.7	3.7
Mooring operations	3.2	3.5	3.4	3.4	3.3
Operating in piracy areas	3.6	3.9	4.1	4.0	3.8
Working in vicinity of moving vehicles	3.3	3.3	3.5	3.5	3.4
Working near open hatches/ tanks	3.4	3.5	3.6	3.6	3.6
Mechanical breakdown	3.1	3.3	3.4	3.2	2.9
Helicopter operations	3.0	3.1	3.2	3.2	2.8
Working over-side	3.6	3.8	3.7	3.7	3.5

* Shaded areas indicate group who perceived the risk to be lowest.

We might speculate that the youngest respondents perceived the least risk because they are likely to have been exposed to fewer incidents and to have had less training

than their more senior counterparts. Similarly we could postulate that eventually experience produces a familiarity with the ship setting and a dulling of risk awareness although in both cases we are posing highly speculative accounts. However even these explanations would not adequately explain why those who were older were less concerned than others about the specific time periods of helicopter operations and working over-side in particular: The over 55 years age group were much more inclined to see the risk associated with helicopter operations as low compared with the other age groups (Figure 23). It is apparent therefore that the explanations for such variations in risk perception cannot be immediately grasped and are likely to be complex and worthy of further exploration.

Figure 23: *Perceptions of risk during helicopter operations based on age*



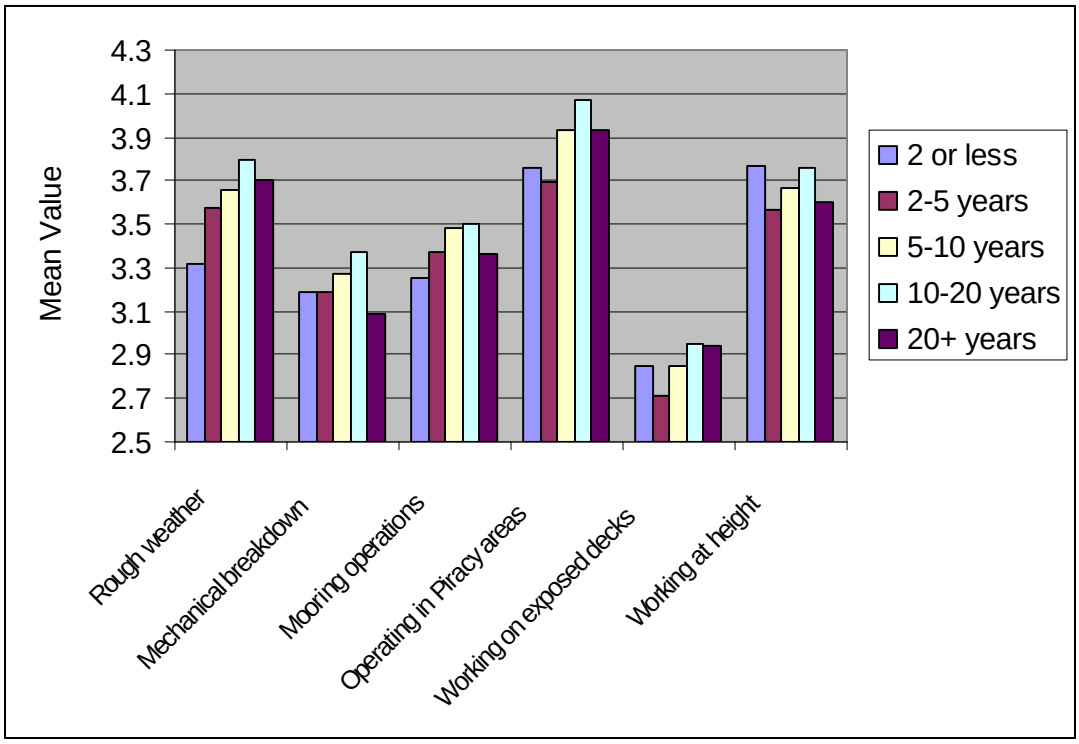
3.6 The effect of years worked at sea [15]

Consideration of the effect of years spent at sea reveals that there were differences in respondents' perceptions in relation to six of the thirteen items listed (Figure 24). These were:

- Mooring operations
- Rough weather
- Mechanical breakdown
- Operating in piracy areas
- Working on exposed decks
- Working at height

[15] Length of time spent in management was not significant.

Figure 24: *Perceptions of risk based upon years worked at sea*



The general tendency was for the perceived risks to increase with years spent at sea. However perception of risk was highest amongst respondents with 10-20 years experience; this group identified higher levels of risk than those with both more, and less, experience.

3.7 The effect of years worked for company

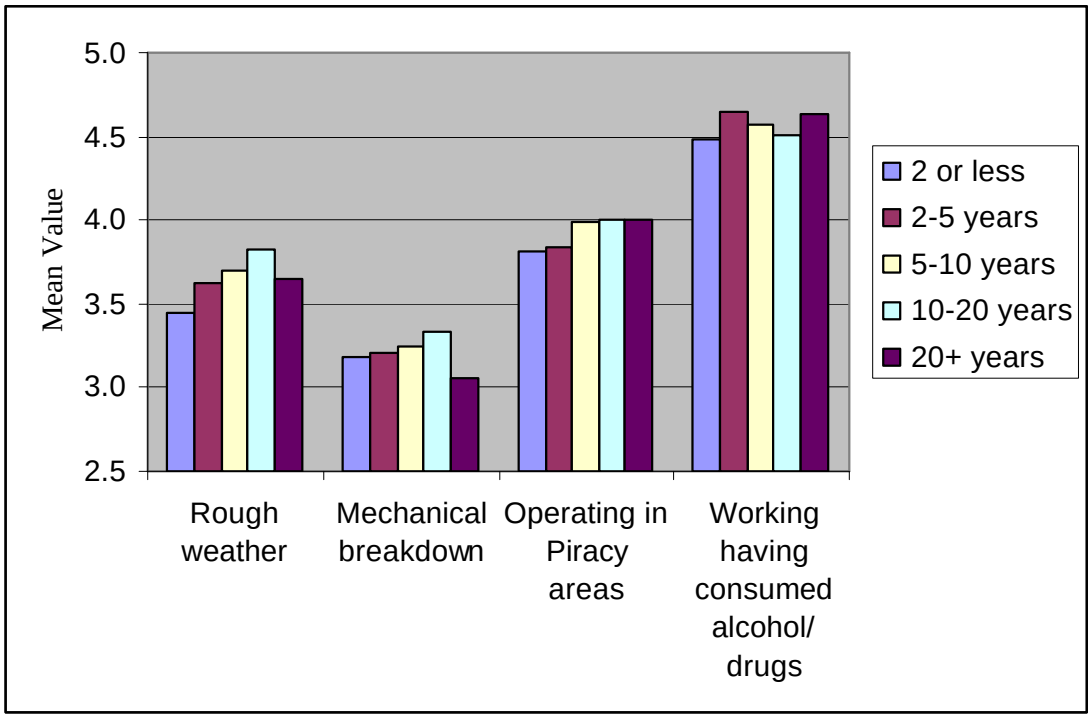
There were significant differences between respondents' perceptions of risk based upon the length of time that they had worked for their present company in relation to four of the thirteen times listed:

- Rough weather
- Mechanical breakdown
- Operating in piracy areas
- Working having consumed alcohol / drugs

In general, where there were significant differences, those who had been in the company the least time, i.e. 2 years or less, tended to perceive risk as lower than those who had been with their company longer. The notable exception was in relation to

periods of mechanical breakdown where the group that had been in the company longest, i.e. 20 years plus, perceived the risk as lowest. This may be due to their familiarity with their companies' vessels and the types of problem that they were prone to (Figure 25).

Figure 25: *Perceptions of risk based on time worked for present company*



3.8 The effect of nationality

Nationality was the most significant factor with different national groups perceiving risk differently in relation to all thirteen of the time periods listed.

Filipino seafarers were the most inclined to see the risk associated with these different times as high. By contrast, respondents from the Netherlands were much more inclined to see the risk as low compared with other national groups (Table 23).

Table 23: *Perceptions of risk during different times by national group, presented as mean values*

	China	Philippines	India	United Kingdom	Netherlands
Rough weather	3.80	3.79	3.51	3.66	2.93
Mechanical breakdown	3.44	3.48	2.91	2.92	2.53
Crane operations	2.90	3.04	2.89	2.88	2.69
Helicopter operations	2.86	3.34	3.09	2.95	2.73
Operating in piracy areas	3.99	4.15	3.89	3.61	3.14
Working in vicinity of moving vehicles	3.22	3.61	3.12	3.35	2.98
Working at height	3.62	3.82	3.64	3.44	3.13
Working near open hatches / tanks	3.23	3.82	3.52	3.38	3.20
Doing unfamiliar work	3.70	4.08	3.84	3.97	3.53
Mooring operations	2.97	3.57	3.65	3.40	3.38
Working having consumed alcohol/ drugs	4.57	4.52	4.74	4.56	4.36
Working over-side	3.72	3.82	3.94	3.53	3.21
Working on exposed decks	2.59	3.00	2.77	3.05	2.44

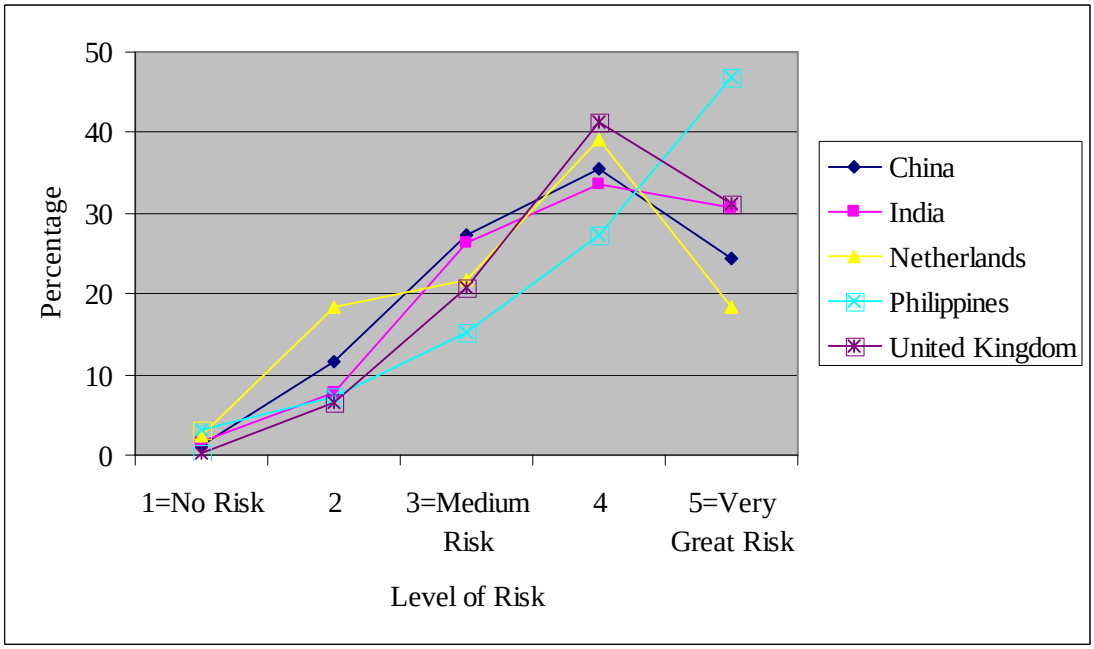
*Values shaded in yellow indicate those who saw the risk as highest.

*Values shaded in blue indicate those who saw the risk as lowest.

Respondents from India perceived mooring operations to be a time of greater risk than other national groups, while those from the United Kingdom were more likely to identify working on exposed decks as high risk than other nationalities (Table 23).

Filipinos saw the risks as higher than other nationalities overall, i.e. they achieved a higher mean score, and were more inclined than other national groups to perceive risk as ‘very great’ (Figure 26).

Figure 26*: Perceptions of risk associated with 'doing unfamiliar work' by nationality*



3.9 Multivariate analysis

The following factors were put into logistic regressions for each of the times listed to compare their significance in relation to differences in perceptions of risk:

Nationality
Rank
Department
Age
Years in company
Most recent ship type worked on.

The outcome of the model indicates that nationality is by far the clearest predictor in determining perceptions of risk, as it was shown to be significant in relation to ten of the thirteen questions. To a lesser extent rank, last ship type, and department were also shown to be linked to perceptions of risk.

Table 24: *Summary of logistic regression for times listed*

Time	Statistically significant factor
Rough weather	Nationality Rank
Mechanical breakdown	Nationality Department Last ship
Crane operations	Nationality Last ship
Helicopter operations	Nationality
Mooring operations	Nationality Department
Operating in piracy area	Nationality Rank
Working over-side	*No factor significant*
Working on exposed decks	Nationality Department
Working in vicinity of moving vehicles	Nationality Last ship
Working at height	Nationality Last ship
Working near open hatches /tanks	Nationality Rank
Doing unfamiliar work	Nationality
Working having consumed alcohol /drugs	Rank

It is worth noting that variations in perception concerning the risk during times associated with working having consumed alcohol / drugs only related to differences in rank. As we saw in section 3.2 mangers saw the risk as higher than other groups, and ratings as lower than other ranks.

3.10 Summary of findings in relation to perceived risk of specific onboard occasions and contexts in shipping in general

In this section of the report we have looked at perceptions of risk in relation to different times/contexts onboard ship. The findings demonstrate that the greatest risk was perceived to exist at times when individuals worked having consumed drugs or alcohol and that managers were most likely to identify risk at such times. Senior officers identified high risk associated with rough weather, junior officers identified risks associated with mooring operations and ratings were more likely than other ranks to identify times of mechanical breakdown as risk prone.

Significant differences in perception between respondents based in different work departments were only present in relation to three of the thirteen times listed. Those in the deck department identified mooring operations as higher risk than those in other work groups, whereas engineers perceived the risk associated with mechanical breakdown to be greater than other groups. Seafarers working in catering identified risk when working on exposed decks as greater than other groups.

Last ship type had a significant effect on perceptions in relation to eight of the thirteen listed times/contexts. Respondents with recent experience of tankers were more likely to identify mooring operations as risky than others, while those on bulk carriers were more likely than others to suggest that rough weather, mechanical breakdown, piracy and moving vehicles posed a risk. Seafarers whose most recent experience was on dry cargo vessels also saw the risk associated with moving vehicles, but also working at height and near open hatches, as greater than those on other types of vessel. Respondents whose most recent experience had been on working vessels were more likely to identify crane operations as risky than other groups.

Years in the company, years at sea and age were all considered. In general the youngest and those with the least experience tended to see risk associated with the different times/contexts listed as lower than the other groups. Notably there were

instances where those with the most experience also perceived the risk to be lower than the other groups.

There were significant differences in perception when considered from the perspective of nationality in relation to all thirteen times/contexts listed. Respondents from the Philippines tended to see the risk as highest, in eight of the thirteen instances, while those from the Netherlands saw it as the lowest. Respondents from India were more likely to see a high risk associated with working having consumed alcohol or drugs, working over-side and mooring operations than other nationalities. Respondents from the United Kingdom were more likely to suggest that working on exposed decks was risky than others.

The logistic regression model which was utilised indicated that 'nationality' was the most significant factor in relation to perceptions of risk and the different times/contexts listed. However, rank, last ship type served on and department also had an independent but lesser effect on perceptions.

Risk in relation to specific factors: shipping in general

In this section we consider seafarers and managers perceptions of the risks associated with various factors. Respondents were asked the following question[16].

> *In your opinion, how great is the risk to a seafarer's health and safety due to these factors?*

[16] Question 5.3 on the questionnaire, see Appendix 1.

The fifteen factors listed were:

- navigation at night without a dedicated lookout
- high numbers of alarms
- new equipment
- working in the galley
- working in the engine room
- working on deck
- working in the accommodation
- working on the bridge
- working in shore-side office
- having just joined the ship
- approaching the end of the time onboard
- entering and leaving port
- navigation in restricted /congested waters
- navigation in open water
- navigation near fishing vessels

Respondents were asked to indicate their response by circling a number for each item on a scale of 1 to 5; where 1 = No Risk and 5 = Very Great Risk.

Significance was tested using ANOVA and results are presented in terms of 'mean' values. However, for the purpose of description when discussing the responses, we interpret the five point scale as follows:

1 = No Risk
2 = Low Risk
3 = Medium Risk
4 = High Risk
5 = Very Great Risk

4.1 Overall perceptions

When the responses were considered as a single group the factors listed were ranked in the following order, with those perceived to pose the greatest risk to seafarer health and safety at the top (Table 25).

Table 25: *Ranking of factors by overall group on basis of perceived risk*

Factor	Mean
Navigation at night without dedicated lookout	4.2
Navigation in restricted/ congested waters	3.5
High number of alarms	3.4
Navigation near fishing vessels	3.4
Entering and leaving port	3.1
Having just joined the ship	3.0
Working in the engine room	2.9
Approaching the end of the time onboard	2.9
New equipment	2.8
Working on deck	2.8
Working in the galley	2.5
Navigation in open water	2.2
Working on the bridge	2.2
Working in the accommodation	2.1
Working in the shore-side office	1.8

4.2 The effect of hierarchy

When considered from the perspective of different ranks there were seen to be statistically significant differences in perceptions of risk in relation to nine of the fifteen factors listed. These were:

- High number of alarms
- New equipment
- Working on the bridge
- Working in the shore-side office
- Having just joined the ship
- Approaching the end of the time onboard
- Entering and leaving port
- Navigation in restricted/ congested waters
- Navigation in open water

From Table 26, it can be seen that where there are differences in perception, senior officers are more inclined to see risk as higher than other groups, while junior officers are the least likely to see it as higher than others.

Table 26: *Perceptions of risk in relation to different factors based on hierarchy and presented as mean values*

	Managers	Senior	Junior	Ratings
New equipment	3.07	2.87	2.81	2.61
Having just joined the ship	3.18	3.21	3.01	2.90
Approaching the end of the time onboard	2.91	3.02	2.84	2.72
Entering and leaving port	3.05	3.27	3.12	2.86
Navigation in restricted/ congested waters	3.43	3.59	3.57	3.40
High number of alarms	3.17	3.49	3.40	3.24
Navigation in open water	2.23	2.15	2.13	2.27
Working on the bridge	2.12	2.07	2.12	2.28
Working in the shore-side office	1.83	1.67	1.75	2.03

* Shaded areas indicate group who perceived the risk to be highest

The results of the post hoc statistical tests indicate that managers and senior officers in general tend to perceive the levels of risk similarly. The notable exception is in relation to the perceived risk due to the high number of alarms; ships officers see this as significantly more of a risk than do managers. By contrast, ratings are most frequently at variance in their perceptions with the other groups. Generally ratings perceived the level of risk as lower than officers and managers; however, in relation to 'navigation in open water' and 'working on the bridge' they perceived the risk to be significantly higher than ships' officers. In relation to 'working in the shore-side office' ratings saw the risk as significantly higher than both ships' officers and shore-side managers.

4.3 The effect of department

There were significant differences in perception between groups based upon their work department in relation to twelve of the fifteen factors listed.

- High number of alarms
- New equipment
- Working in the galley
- Working in the engine room
- Working on deck
- Working in the accommodation
- Working on the bridge
- Working in the shore-side office
- Having just joined the ship
- Approaching the end of the time onboard
- Entering and leaving port
- Navigation in restricted/ congested waters

We saw above that senior officers were significantly more concerned about 'high numbers of alarms' than managers and from Table 27 it can now be seen that engineers, in particular, were more concerned about this issue than those in other departments.

Table 27: *Perceptions of risk in relation to different factors based on hierarchy and presented as mean values*

	Engineering	Deck	Shore-side	Catering
High number of alarms	3.5	3.3	3.2	3.3
Approaching the end of the time onboard	2.7	3.0	2.9	2.8
Entering and leaving port	3.0	3.2	3.0	2.7
Navigation in restricted/ congested waters	3.5	3.6	3.4	3.3
New equipment	2.7	2.8	3.1	2.8
Having just joined the ship	3.0	3.1	3.2	2.8
Working in the galley	2.4	2.5	2.4	2.7
Working in the engine room	3.0	2.9	2.8	3.1
Working on deck	2.8	2.8	2.7	3.1
Working in the accommodation	2.0	2.2	2.1	2.4
Working on the bridge	2.1	2.2	2.1	2.4
Working in the shore-side office	1.8	1.8	1.8	2.1

* Shaded areas indicate group who perceived the risk to be highest.

In general the greatest difference in perception of risk associated with the factors listed was between those in the catering department as compared to those in other departments. Perhaps not surprisingly those in catering saw the risk associated with

working in the galley as significantly higher than those in other departments. In interpreting this result it seems reasonable to assume that they are more aware of the hazards in their work space than seafarers who never enter it and may have limited experience of working in kitchens generally. However, catering personnel also saw the risk associated with working on deck, on the bridge and in the shore-side office as significantly higher than those in other departments. By contrast those in catering perceived the risk associated with 'entering and leaving port' as markedly lower than those in all other departments. Notably those in the shore-side department saw the risk associated with 'new equipment' differently to all those onboard ship. They saw the risk associated with the introduction of new equipment as significantly higher than those who work onboard.

4.4 The effect of last ship type

The type of ship respondents had worked on most recently was associated with significant differences in perception of risk in relation to nine of the fifteen factors listed. Table 28 illustrates that, of all respondents, those who had most recently worked on bulk carriers most frequently perceived the risk associated with the various listed factors to be greatest (seeing it to be greatest in relation to five of the nine factors where significant differences in perception based on ship type were identified). Respondents whose most recent work at sea was aboard 'working vessels' perceived a similar level of risk in relation to having just joined the ship as those whose most recent experience was aboard bulk carriers. One possible explanation for this may be that these kinds of vessels are often only in port for a very short time and handovers can be very brief. Moreover it may be the case that individuals have travelled overland to join such vessels and despite having perhaps travelled for many hours may be required to immediately take up their duties.

Table 28: *Mean risk for work tasks by last vessel type*

	Tankers	Bulk Carriers	Dry Cargo (Non Bulk)	Passenger	Working Vessels
Working in the galley	2.42	2.37	2.44	2.57	2.68
Working on deck	2.69	2.87	2.76	2.76	2.86
High number of alarms	3.27	3.30	3.50	3.65	3.21
Working in the shore-side office	1.81	1.72	1.92	1.49	1.80
Having just joined the ship	2.95	3.23	3.00	2.86	3.21
Approaching the end of the time onboard	2.91	2.96	2.78	2.79	2.80
Entering and leaving port	3.09	3.28	3.08	3.10	2.84
Navigation in restricted/ congested waters	3.47	3.68	3.53	3.51	3.40
Navigation near fishing vessels	3.39	3.49	3.38	3.10	3.19

* Shaded areas indicate group who perceived the risk to be highest.

Respondents whose most recent experience was with ‘working vessels’ perceived the risk associated with working on deck and working in the galley to be higher than those on other types of vessel and this is possibly due, at least in part, to the movement experienced onboard such vessels and the nature of their work.

Respondents whose most recent sea-experience was on passenger vessels perceived the risk associated with high numbers of alarms to be the greatest.

4.5 The effect of age

Age had a significant impact on perceptions of risk in relation to just four of the fifteen factors listed these were:

- Navigation at night without a dedicated lookout
- High number of alarms
- Entering and leaving port
- Navigation near fishing vessels

From Table 29 it can be seen that the oldest and / or the youngest respondents tended to see the risk as less than other age groups.

Table 29: *Perceptions of risk due to various factors based on age and expressed as mean values*

Factor	Age group				
	<25 yrs	25-35 yrs	35-45 yrs	45-55 yrs	> 55 yrs
Navigation at night without dedicated lookout	4.01	4.25	4.24	4.20	4.17
High number of alarms	3.17	3.30	3.45	3.53	3.30
Entering and leaving port	2.96	3.11	3.14	3.04	2.85
Navigation near fishing vessels	3.21	3.38	3.44	3.38	3.17

* Shaded areas indicate group who perceived the risk to be lowest.

4.6 The effect of years worked at sea

There were significant differences between the perceptions of groups with different lengths of experience in relation to nine of the fifteen factors listed. Table 30 illustrates that those respondents with the least experience generally tended to see the risk associated with each of the different factors as lowest, except in relation to ‘navigation in open water’ and working in the shore-side office. In relation to the former, ‘navigation in open water’, those with 2-5 years experience perceived this to pose the least risk.

Table 30: *Perceptions of risk associated with listed factors by number of years experience at sea expressed in mean values*

	Years at Sea				
	2 or less	2-5 yrs	5-10 yrs	10-20 yrs	20+
High number of alarms	3.11	3.35	3.25	3.44	3.50
New equipment	2.64	2.72	2.78	2.71	2.91
Working in the galley	2.24	2.46	2.41	2.45	2.55
Navigation near fishing vessels	3.17	3.27	3.39	3.47	3.32
Entering and leaving port	2.84	3.01	3.10	3.18	3.01
Navigation in restricted/ congested waters	3.29	3.45	3.50	3.62	3.49
Navigation at night without dedicated lookout	3.95	4.20	4.27	4.25	4.15
Navigation in open water	2.20	2.06	2.21	2.26	2.12
Working in the shore-side office	1.86	1.85	1.80	1.92	1.73

* Shaded areas indicate group who perceived the risk to be lowest.

When we considered perceptions of the risk related to the presence of 'new equipment' and 'high numbers of alarms', it was respondents with the most experience of working at sea, i.e. 20+ years who perceived the greatest risk.

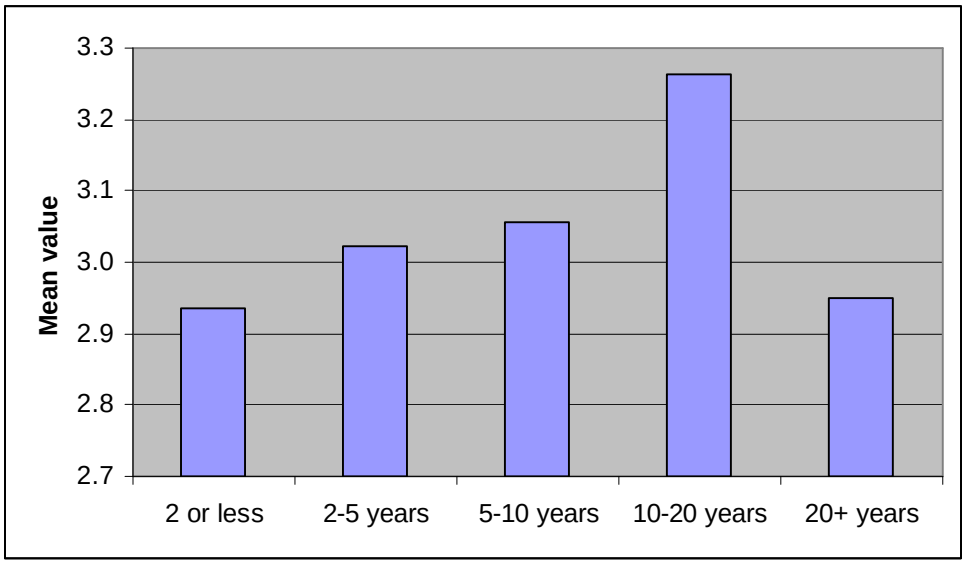
4.7 The effect of years worked for company

Length of experience in respondents' current company was only significant in relation to perceptions of the risk associated with:

- Having just joined the ship
- Entering and leaving port

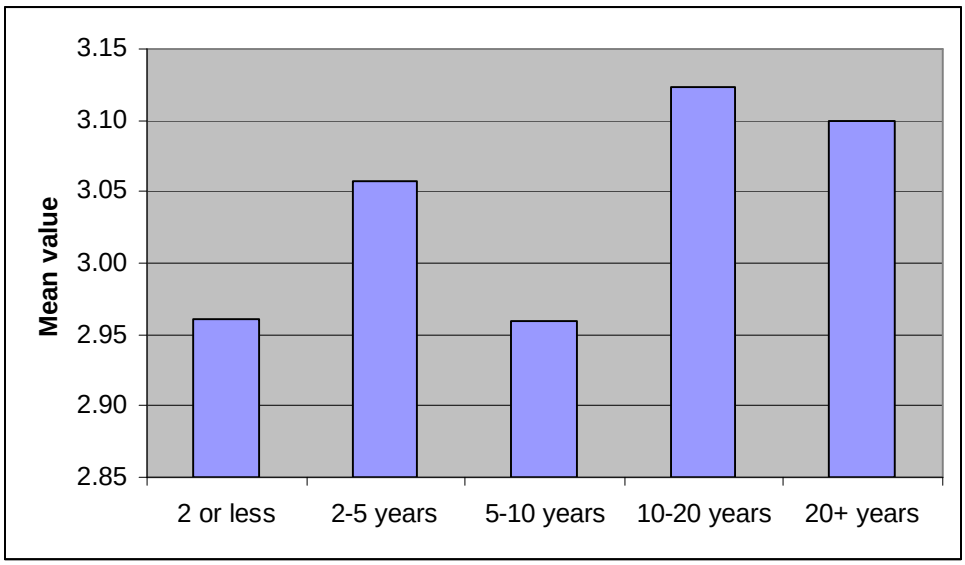
In both cases those with 10-20 years experience saw the risk differently to those with other lengths of experience. When we looked at 'entering and leaving port' it was clear that those with 10-20 years experience saw the risk as higher than the other groups. Those with the least and most experience seeing the risk as considerably lower (Figure 27).

Figure 27: *Perceptions of risk of entering and leaving port based on years experience in the company and presented as mean values*



Although those with 10-20 years experience saw the risk associated with having just joined the ship as greater than the other respondents, the pattern was less clear (see Figure 28).

Figure 28: *Perceptions of risk associated with having just joined the ship based on years experience in the company and presented as mean values*



4.8 The effect of nationality

Nationality was again a highly significant factor in relation to perceptions of risk. There were significant differences in response between different national groups in relation to all fifteen of the factors listed.

Respondents from the Philippines were more inclined to see risk as high compared to other national groups. Issues relating to navigation, in particular, were perceived to pose a greater risk by Filipinos than other nationalities (Table 31).

Table 31: *Perceptions of risk associated with listed factors by nationality expressed in mean values*

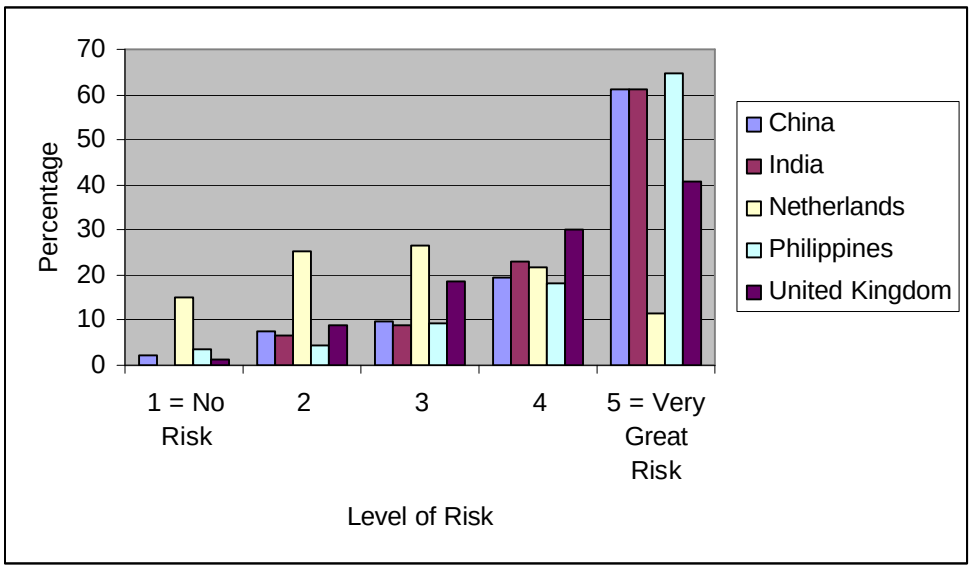
	India	Philippines	United Kingdom	China	Netherlands
Navigation at night without dedicated lookout	4.38	4.36	4.00	4.29	2.90
High number of alarms	3.16	3.48	3.47	3.09	3.15
Working on the bridge	1.90	2.35	1.99	2.14	1.71
Working in the shore-side office	1.59	2.27	1.44	1.57	1.37
Navigation in restricted/ congested waters	3.58	3.66	3.30	3.63	2.63
Navigation in open water	2.13	2.37	1.97	2.17	1.83
Navigation near fishing vessels	3.42	3.49	3.09	3.48	2.75
Working in the accommodation	1.93	2.26	2.07	2.11	1.70
Working on deck	2.66	2.78	2.86	2.82	2.49
New equipment	2.85	2.65	3.17	2.59	2.71
Working in the galley	2.63	2.48	2.76	2.01	2.09
Having just joined the ship	3.06	2.90	3.18	3.40	2.59
Approaching the end of the time onboard	3.12	2.67	2.96	3.14	2.46
Entering and leaving port	3.13	3.00	3.03	3.48	2.51
Working in the engine room	2.95	2.93	2.99	3.00	2.62

* Shaded areas indicate group who perceived the risk to be highest.

By contrast it can be seen that respondents from the Netherlands tended to see the risk associated with the listed factors as lower than other national groups. This can be seen clearly if we focus upon the perception of those from the Netherlands in relation to

'navigation at night without a dedicated lookout' (Figure 29). In section 6.1 above, it was shown that 'navigation at night without a dedicated lookout' was perceived by the group of respondents overall as the factor that posed the greatest risk but respondents from the Netherlands ranked this as considerably less risky than others.

Figure 29: *Risk associated with navigation at night without a dedicated lookout by nationality*



4.9 Multivariate analysis

The following variables were put into a logistic regression model for each of the listed factors to compare their effect in relation to differences in perceptions of risk:

Nationality
Rank
Department
Years in company
Age
Most recent ship type worked on.

The results obtained from the modelling exercise indicated that nationality was by far the clearest predictor of perceptions of risk in relation to all factors. To a lesser extent rank and department were also shown to be relevant to perceptions of risk. No effect of years at sea were indicated (see Table 32).

Table 32: *Summary of logistic regression for factors*

Factors which may effect seafarer health and safety	Statistically significant factor
Navigation at night without dedicated lookout	Nationality Rank
High number of alarms	Nationality Rank Last Ship
New equipment	Nationality Rank
Working in the galley	Nationality
Working in the engine room	Nationality
Working on deck	Nationality Rank (close to significance) Department
Working in the accommodation	Nationality Department
Working on the bridge	Nationality Age Years (close to significance) Department
Working in the shore-side office	Nationality Years (close) Department (close to significance)
Having just joined the ship	Nationality Rank Department Last Ship
Approaching the end of the time onboard	Nationality Rank Department
Entering and leaving port	Nationality Rank Department Last Ship
Navigation in restricted/ congested waters	Nationality Rank Department Last Ship
Navigation in open water	Nationality Years (close to significance)
Navigation near fishing vessels	Nationality Rank Department Age

4.10 Summary of findings in relation to perceived risk of specific factors in shipping in general

In this section we have presented and discussed perceptions of risk in relation to a list of fifteen factors. The overall group of respondents perceived navigation at night without a dedicated lookout to pose the greatest risk of those factors listed.

When we considered hierarchy we found that mangers and senior officers tended to see the risk associated with the various factors as greater than junior officers and ratings. However senior officers saw the high number of alarms aboard ship as posing a significantly greater risk than any of the other groups, including managers. Moreover when considering the responses in relation to work department, we found that those working in the engine department were most concerned about numbers of alarms. Similarly when the responses were considered from the perspective of most recent ship type, it was found that those who worked on passenger ships were most likely to identify a high numbers of alarms as risky.

By contrast, those who most recently worked on bulk carriers perceived there to be greater risk to seafarer health and safety associated with the beginning and end of a seafarers' time onboard than those whose most recent sea-experience had been of other types of ship. Furthermore they generally perceived there to be a greater risk associated with specified navigational situations. Respondents whose most recent sea-experience had been aboard 'working vessels' perceived greater risk when working on deck and in the galley than others. This could possibly be explained by the fact that such vessels tend to be smaller, work in harsh conditions, and possibly experience greater motion on a consistent basis.

Where there were differences in perception between different age groups, the youngest and oldest respondents were generally found to perceive risks to be lower than others.

Years in current company had little effect on perceptions. However, those with less than two years experience at sea tended to see the risk as less than those with greater experience.

Nationality was again found to have the most widespread impact upon perceptions of risk. There were significant differences in perception found between national groups in relation to each of the fifteen factors. Filipino respondents most frequently perceived risks as greatest, while those from the Netherlands generally saw risks as lower than other groups.

Respondents from India perceived the greatest risk to be associated with ‘navigation at night without a dedicated lookout’ however their perceptions were not significantly different to those from the Philippines and China. In general those from the Philippines saw risks as higher in relation to the listed navigation-related factors and respondents from the United Kingdom were most likely to identify ‘high numbers of alarms’ as risky. Respondents from the United Kingdom were also significantly more likely to identify risk associated with ‘new equipment’ than were the other national groups.

Acknowledgements

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APPENDIX 1

Study of Safety and Perceptions of Risk Questionnaire

Lloyd's Register Educational Trust Research Unit
Seafarers International Research Centre (SIRC)
Cardiff University

'Study of Safety and Perceptions of Risk'

The attached questionnaire is part of a research project being undertaken by Cardiff University. The aim is to find out what people in the maritime industry think about risk and safety. The questionnaire is designed to be answered by shipping company managers and all sea-going staff.

We would be very grateful if you could take the time to complete the questionnaire. Your answers are very important to us and may help to improve safety for people working in the maritime industry.

There are no right or wrong answers. We are interested in what **you** think.

The information you provide will be kept strictly confidential. Your answers will only be used for the research and will only be seen by the research team. You will not be identified in any way; we **do not** require your name, your company name or the name of your ship.

Your participation in the study is extremely important to us.
All responses will be strictly confidential.

Thank you for your cooperation!

Dr Nick Bailey and Mr Neil Ellis

SIRC, Cardiff University, 52 Park Place, Cardiff, CF10 3AT,

Wales, United Kingdom

Email: BaileyN3@cf.ac.uk or EllisN@cf.ac.uk

I

About You

1.1. What is your current (most recent) position onboard ship / on shore? ……..

1.2. How many years have you worked for your current company? …….

1.3. How many years have you worked:

- At sea ? …….

and / or

- In shore-side ship management? ……..

1.4. What ship types have you served on / managed?
(*Please circle the appropriate numbers*)

Gas Tanker	Chemical Tanker	Oil Tanker	Other Tanker	OBO Oil/Bulk Dry	Bulk Carrier	Self Discharge Bulk	General Cargo	Container Vessel	Reefer
1	2	3	4	5	6	7	8	9	10

Ro-Ro Cargo / Car Carrier	Passenger Ro-Ro	Passenger Cruise Ship	Other Dry Cargo	Offshore Supply	Other Offshore support	Research	Tug	Dredger	Other (Please write which type)
11	12	13	14	15	16	17	18	19	20

1.5. What ship types does your present (most recent) company operate?
(*Please circle the appropriate numbers*)

Gas Tanker	Chemical Tanker	Oil Tanker	Other Tanker	OBO Oil/Bulk Dry	Bulk Carrier	Self Discharge Bulk	General Cargo	Container Vessel	Reefer
1	2	3	4	5	6	7	8	9	10

Ro-Ro Cargo / Car Carrier	Passenger Ro-Ro	Passenger Cruise Ship	Other Dry Cargo	Offshore Supply	Other Offshore support	Research	Tug	Dredger	Other (Please write which type)
11	12	13	14	15	16	17	18	19	20

1.6. What ship type were you most recently on? (*Pick from above list of 1-20*) ……

1.7. In which country did you do most of your work related training? ……..

1.8. How old are you? …….

1.9. What is your Nationality? ……..

1.10. Are you? Male (man) ☐ Female (woman) ☐

II

Think about the company you work for now / the most recent company you worked for.

In the questions below, indicate your opinion by circling one number for each item.
The numbers represent a scale of 1 to 5, where "1= Not likely at all" and "5 = extremely likely"

2. Just thinking in general terms, how likely do you think it is that someone working for your company at sea will experience the following during their sea-going career?

	Not likely at all				**Extremely likely**
2.1. Fire	1	2	3	4	5
2.2. Explosion	1	2	3	4	5
2.3. Collision with another ship	1	2	3	4	5
2.4. Sinking	1	2	3	4	5
2.5. Grounding	1	2	3	4	5
2.6 Contact with a fixed structure	1	2	3	4	5

3. Just thinking in general terms, how likely do you think it is that someone working for your company at sea will actually experience a personal injury caused by the following during their sea-going career?

Personal Injury caused by:	**Not likely at all**				**Extremely likely**
3.1. Contact with moving machinery	1	2	3	4	5
3.2. Being hit by moving (includes flying / falling) object	1	2	3	4	5
3.3. Being hit by moving vehicle	1	2	3	4	5
3.4. Being struck against something fixed or stationary	1	2	3	4	5
3.5. Handling, lifting or carrying	1	2	3	4	5
3.6. Slips, trips or falls on same level	1	2	3	4	5
3.7. Falls from a height	1	2	3	4	5
3.8. Trapped by something collapsing / overturning	1	2	3	4	5
3.9. Drowning / lack of oxygen / overcome by fumes	1	2	3	4	5
3.10. Exposure to, or contact with, a harmful substance	1	2	3	4	5
3.11. Exposure to fire	1	2	3	4	5
3.12. Exposure to an explosion	1	2	3	4	5
3.13. Contact with hot surfaces	1	2	3	4	5
3.14. Contact with cold surfaces	1	2	3	4	5
3.15. Contact with electricity or electrical discharge	1	2	3	4	5
3.16. Working in hot environment	1	2	3	4	5
3.17 Working in cold environment	1	2	3	4	5
3.18 Acts of violence	1	2	3	4	5

4. **Think about shipping in general**. In your opinion, which of the following incidents is ***the most likely*** to occur in each of the following ship types. (*Please indicate by ticking the appropriate box.*)

Example: If you think that for Containerships the incident ***most likely*** to occur is 'Grounding' tick the box 'Grounding'. You should only tick **one** box per ship type.

	Major Fire	Major Explosion / Fire	Serious Collision	Major Contact with fixed structure	Grounding	Sinking	Don't Know
	1	2	3	4	5	6	7
Containership					✓		

	Major Fire	Major Explosion / Fire	Serious Collision	Major Contact with fixed structure	Grounding	Sinking	Don't Know
	1	2	3	4	5	6	7
4.1 Tankers							
4.2 Bulk Carriers							
4.3 General Cargo ships							
4.4 RO/RO ships							
4.5 Passenger ships							
4.6 Container ships							
4.7 Supply vessels							
4.8 High speed craft							

III

5.1. In your opinion how great is the risk to a seafarer's health and safety when doing these tasks onboard any ship?

(*Please circle a number for each item on the scale of 1 to 5; where 1 = No Risk and 5 = Very Great Risk*)

	No Risk				Very Great Risk
5.1.1 Use of ladders /gangways	1	2	3	4	5
5.1.2 Rigging of gangway	1	2	3	4	5
5.1.3 Entry into enclosed space	1	2	3	4	5
5.1.4 Opening and closing hatches	1	2	3	4	5
5.1.5 Use of power tools	1	2	3	4	5
5.1.6 Welding / gas cutting	1	2	3	4	5
5.1.7 Manual-handling of heavy or awkward items	1	2	3	4	5
5.1.8 Engine maintenance at sea	1	2	3	4	5
5.1.9 Work in a confined space	1	2	3	4	5

5.2. In your opinion how great is the risk to a seafarer's health and safety during these times onboard any ship?

	No Risk				Very Great Risk
5.2.1 Rough weather	1	2	3	4	5
5.2.2 Mechanical breakdown	1	2	3	4	5
5.2.3 Crane operations	1	2	3	4	5
5.2.4 Helicopter operations	1	2	3	4	5
5.2.6 Mooring operations	1	2	3	4	5
5.2.7 Operating in piracy areas	1	2	3	4	5
5.2.8 Working over-side	1	2	3	4	5
5.2.9 Working on exposed deck	1	2	3	4	5
5.2.10 Working in vicinity of moving vehicles	1	2	3	4	5
5.2.11 Working at height	1	2	3	4	5
5.2.12 Working near open hatches / tanks	1	2	3	4	5
5.2.13 Doing unfamiliar work	1	2	3	4	5
5.2.14 Working having consumed alcohol / drugs	1	2	3	4	5

5.3.In your opinion, how great is the risk to a seafarer's health and safety due to these factors?

	No Risk				Very Great Risk
5.3.1 Navigation at night without a dedicated lookout	1	2	3	4	5
5.3.2 High numbers of alarms, for example, on the bridge / in the engine room.	1	2	3	4	5
5.3.3 New equipment	1	2	3	4	5
5.3.4 Working in the galley	1	2	3	4	5
5.3.5 Working in the engine room	1	2	3	4	5
5.3.6 Working on deck	1	2	3	4	5
5.3.7 Working in the accommodation	1	2	3	4	5
5.3.8 Working on the bridge	1	2	3	4	5
5.3.9 Working in shore-side office	1	2	3	4	5
5.3.10 Having just joined the ship	1	2	3	4	5
5.3.11 Approaching the end of the time onboard	1	2	3	4	5
5.3.12 Entering and leaving port	1	2	3	4	5
5.3.13 Navigation in restricted / congested water	1	2	3	4	5
5.3.14 Navigation in open water	1	2	3	4	5
5.3.15 Navigation near fishing vessels	1	2	3	4	5

5.4 In your opinion, what is the most dangerous thing about working at sea?

……

……

……

5.5 In your opinion, if one thing could be changed to improve safety, what would it be?

……

……

……

……

IV

6. Thinking about the company you work for now (the most recent company you worked for)

Please indicate the extent to which you agree with the following statements.
(*Tick one box per item*)

6.1 **Work Situation**	Strongly Disagree	Disagree	Nether Agree nor Disagree	Agree	Strongly Agree
Crew sizes (numbers) are too small to ensure safe work					
There is too much paper work to do onboard ship					
ISM (International Safety Management) has improved safety					
ISPS (International Ship and Port Security) Code has made ships safer					

6.2 **Rules, Procedures and Shortcuts**	Strongly Disagree	Disagree	Nether Agree nor Disagree	Agree	Strongly Agree
It is more important to get the job done than follow company procedure					
It is sometimes safer not to follow company procedure					
Company procedures exist just to protect management if something goes wrong					
It is often necessary to work more hours than can be legally recorded to get the job done					

6.3 **Leadership**	Strongly Disagree	Disagree	Nether Agree nor Disagree	Agree	Strongly Agree
Shore-side management actively promote safety					
It is the responsibility of each individual to lookout for their own safety					
The shore-side management style is the most important influence on safety					
The Captain / Chief Engineer's management style is the most important influence on safety					
The attitude of the Bosun and other Petty Officers (supervisors) is the most important influence on safety					

6.4 **Management Commitment**	Strongly Disagree	Disagree	Nether Agree nor Disagree	Agree	Strongly Agree
Shore-side management put safety before profit					
Company policies and practices prevent the ship's officers from managing onboard safety effectively					
Shore-side management are aware that it is sometimes necessary to take shortcuts and break rules					

6.5 **Information and Communication**	Strongly Disagree	Disagree	Nether Agree nor Disagree	Agree	Strongly Agree
Ship's staff are well informed about the risks relating to their job					
Shore-side managers respond positively to suggestions from ship's staff					
Senior officers listen to what the rest of the crew have to say about safety					
Near-miss reporting is encouraged and used constructively to promote safety					

6.6 **Training**	Strongly Disagree	Disagree	Nether Agree nor Disagree	Agree	Strongly Agree
My company provides the training necessary for seafarers to work safely					
Different nationalities have different standards of training					
When a new piece of equipment is put onboard ship the staff receive the proper training to operate it					

6.7 **Perceptions and Attitude**	Strongly Disagree	Disagree	Nether Agree nor Disagree	Agree	Strongly Agree
I do not fully understand the purpose of ISM (International Safety Management)					
There are too many external rules and regulations on ships					
I do not always understand instructions					
Other ships do not follow the regulations					

6.8 **Equipment and Maintenance**	Strongly Disagree	Disagree	Nether Agree nor Disagree	Agree	Strongly Agree
The maintenance of safety equipment gets neglected					
Safety equipment gets locked-up and is difficult to get to in an emergency					
The safety equipment and PPE (Personal Protective Equipment) onboard ship is often unsuiTable or inadequate					
Wearing PPE (Personal Protective Equipment) sometimes interferes with doing the job					

6.9 **Well-being**	Strongly Disagree	Disagree	Nether Agree nor Disagree	Agree	Strongly Agree
In my opinion, the food quality, quantity and variety onboard are adequate for a seafarers health and well-being					
In my opinion the recreation facilities onboard are adequate for a seafarers' health and well-being					
The amount of shore leave is currently inadequate to maintain seafarer wellbeing					
Seafarers have adequate opportunities to discuss emotional problems aboard ship					
Seafarers have adequate access to means of communication with home (e.g. phone, internet, etc.)					
Seafarers are often unable to get adequate sleep when onboard ship					

6.10 **Satisfaction**	Strongly Disagree	Disagree	Nether Agree nor Disagree	Agree	Strongly Agree
I do not worry about safety on a day to day basis					
I am satisfied with safety in my company					
If I raise problems I fear I will lose my job					

This section to be completed by sea-staff only

V

*[**A major injury** is a broken bone, loss of limb or part of limb, dislocations, loss of sight (whether temporary or permanent); or any injury leading to hypothermia, unconsciousness, or requiring resuscitation or a stay in hospital for more than 24 hours, or if at sea confinement to bed for more than 24 hours.]*

7.1 How many **major injuries** have you had in the last 2 years? ……

7.2 How many major injuries (to you) have you reported to the company in the last 2 years? ….....

*[**A serious injury** is any injury that is not a major injury but results in incapacity for more than 3 consecutive days or results in the person being put ashore and left behind when the ship sails, e.g. a sprained wrist or ankle, a deep cut, a burn, a crushed finger or toe, etc.]*

7.3 How many **serious injuries** have you had in the last 2 years? ….……

7.4 How many serious injuries (to you) have you reported to the company in the last 2 years? ...…….

*[A **minor injury** is any injury that is not a major or serious injury, e.g. a bruise, a scratch or a cut, a pulled muscle, a particle in the eye, a small burn, etc.]*

7.5 How many **minor injuries** have you had in the last 2 years? ……..……

7.6 How many minor injuries (to you) have you reported in the last 2 years? ……..…..

*[A **dangerous occurrence** is any event that nearly resulted in injury, e.g. a wire or rope breaking a falling object landing nearby, nearly slipping or falling, nearly getting burned, nearly running aground, etc.]*

7.7 How many **near-misses** (dangerous occurrences) have you had in the last 2 years? ……....

7.8 How many near-misses (dangerous occurrences), involving you, have you reported in the last 2 years? .....

We very much appreciate that you took the time to complete this questionnaire. Your answers will be very helpful to us.

If you are in training centre, please return your completed questionnaire to the course lecturer or instructor.

If you are onboard ship, please place the completed questionnaire in the envelope provided and seal it. You can either post it directly back to us or give it to your captain to post. (You do not need to add a stamp, postage is free)

Thank You!