A SURVEY OF THE HEALTH, STRESS AND FATIGUE OF AUSTRALIAN SEAFARERS

A survey of the health, stress and fatigue of Australian Seafarers

A.W.Parker PhD (1), L.M.Hubinger PhD (1), S. Green PhD (1), L. Sargent BA MOP (2) and R. Boyd BHMS M Com Env H (1)
1. School of Human Movement Studies, Queensland University of Technology, Brisbane, Australia.
2. School of Management, Human Resources and Industrial Relations, Queensland
University of Technology, Brisbane, Australia.

PREFACE

The Australian maritime industry is composed of a blue water or trading fleet, and vessel operators that are contractors to the offshore oil and gas industry. The trading fleet is comprised of 66 vessels which are predominantly dedicated to carrying cargo (e.g. oil tankers, bulk cargo and container carriers). These vessels mostly operate in coastal trades, with a small number involved in regular international trade. Vessel operators in the offshore oil and gas industry provide and/or crew 50 specialised vessels. These vessels service companies involved in the exploration, development and production from oil and gas fields in the coastal waters of Australia and to a lesser extent in South East Asian regions.

Historically, the physical rigours of working and living at sea have been accepted as 'part of the job'. In line with international trends over the last five years, the Australian maritime industry has undergone major reforms to improve efficiency and competitiveness. These reforms have altered aspects of the physical and cultural environment of seafarers. The 'romance of the sea' is now characterised by small crew sizes, increased technology and little or no time ashore in foreign ports. The impact of these changes on the stress, fatigue and health of seafarers is not known. This prompted the Australian Maritime Safety Authority to initiate a project to investigate this problem.

The present study describes the health and lifestyle behaviours of a large sample of the Australian seafaring population. It also examines levels of stress reported by seafarers, and attempts to explore those factors which most contribute to work stress in the maritime industry. No attempt has been made in the investigation to differentiate between the "blue water" and the "offshore" sectors.

The importance of this document to the history of the Australian maritime industry is substantial. It is the first report to present information on the entire industry, and as such provides a benchmark for consideration of future industry reform for the benefits of seafarers and other industry groups. Additionally, it contributes to the international maritime database.

DEFINITION OF TERMS

AT SEA =   While working at sea. No attempt has been made to consider time in port separately.

ASHORE =   While ashore on leave.

OCCUPATIONAL GROUPS =   These groups are based on the four groups at sea: pilots, masters/mates, engineers and crew.

PILOT/S =   Coastal pilot/s operating in the Great Barrier Reef region of Queensland.

SUMMARY OF RESULTS

BACKGROUND

While individual sectors within the maritime industry have been investigated previously, a comprehensive survey of the fatigue, stress and occupational health of maritime personnel has not previously been conducted in Australia or overseas. The results of this survey therefore provide some structure to issues of concern previously identified or presumed in the industry. Additionally, the survey attempts to quantify the extent to which these issues impact on the health and sources of stress of maritime personnel.

Seafarers in Australia spend about half of each year working and living away from home in a unique environment. This environment is characterised by working conditions which are exaggerated by harsh environmental factors and an unsteady working platform, particularly during bad weather. At sea, the separation of work and recreation is not as clear as in shore based situations. Additionally, the ship's complement is made up of seafarers from different socio-economic, political and educational backgrounds who are expected to work and live together in harmony for the duration of the voyage. Maritime pilots differ somewhat from the other sea-based

occupational groups due to their work practices involving frequent changes of ships. Overall however, the factors which characterise work at sea present a unique and complex array of potential stressors which compound the occupational and lifestyle issues found in other industries.

Many of the unique aspects of seafaring are unchangeable. However, within the constraints of the working environment and economic competitiveness of the industry, it is possible to modify, supplement or develop new strategies to reduce the impact these factors have on the health of individual seafarers. As a basis for the systematic consideration of these issues, a cross-sectional survey was conducted as the first stage of an indepth investigation of the Australian maritime industry.

The response rate across the whole industry was 36.5%, with response rates for individual occupational groups being 50% for pilots, 49% for masters/mates, 47% for engineers, and 23% for the crew. This relatively low response rate, particularly amongst the crew, means that respondents may be underepresented and caution is therefore required in the interpretation of some of the results in this report.

INDUSTRY PROFILE

The Australian seafaring workforce is relatively old, almost entirely male and predominantly Australian born. A high degree of stability exists in the workforce as reflected by:

- Long years of service in the industry and in present working positions.

These characteristics indicate seafarers may be unaccustomed to change and may find difficulty adjusting to major industry reform.

Within the industry there were differences in the workforce characteristics of the occupational groups with pilots being relatively older, and with a large percentage of this group serving for more than 30 years at sea. A higher percentage of crew than other seafaring groups were single or divorced.

HEALTH STATUS

Self-reported health data showed that the prevalence of a number of physical and mental health problems amongst seafarers was consistent with Australian population data, with the exception of blood pressure, which was slightly higher. Some differences were identified between the occupational groups with:

- Engineers, and to a lesser degree crew, reporting a higher incidence of auditory problems; and
- Pilots tending to display more cardiovascular risk factors.

HEALTH-RELATED BEHAVIOUR AT SEA AND ASHORE

Positive long term health outcomes are closely linked to suitable patterns of healthy lifestyle behaviours including appropriate amounts of exercise, sleep, relaxation and the avoidance of risk factors such as smoking and excessive drinking. The home and away nature of seafaring creates additional pressure in adopting and maintaining regular health-enhancing behaviours. The survey therefore compared health and lifestyle behaviours while at sea and ashore. While results are based on self-reported behaviours they are nevertheless adequate for the purpose of this stage of the project.

Smoking, Drinking and Exercise

In general, seafarers displayed greater levels of health compromising behaviours than the Australian community at large. Smoking and alcohol consumption were higher, and fewer seafarers complied with the National Heart Foundations (NHF) guidelines for exercise when at sea or ashore. Compared with the limited data from other maritime studies, the health-related behaviour of the Australian seafarers was either better or similar.

Differences were found between the occupational groups comprising the industry with:

- A higher percentage of crew smoking;
- A higher percentage of crew and to a lesser extent engineers exceeding the NHF guidelines for alcohol consumption when at sea; and
- A higher percentage of engineers than other groups not meeting the NHF guidelines for exercise when at sea.

Sleep

Maritime data indicates some sleep disruption will inevitably occur when working at sea in a 24-hour industry. The results of this survey define the extent and nature of this pattern in Australian seafarers. The majority (70%) of the sample reported fair to poor to very poor quality of sleep at sea; and 50% reported less than 6 hours of daily sleep at sea. Within the industry differences were identified between occupational groups which may be chiefly related to their specific roles and responsibilities:

- Pilots and engineers reported a higher incidence of poor quality sleep; and
- A much larger percentage of pilots than other groups reported 6 hours or less of daily sleep at sea.

A large proportion of miscellaneous comments from seafarers expressed concern about sleep quality at sea and the contribution of poor sleep patterns to ongoing fatigue at sea.

Stress

Exposure to ongoing elevated stress levels has a negative impact on physical and mental health as well as work performance. A significant percentage (80%) of the total sample reported occasional to frequent stress at sea, with 60% indicating that their stress levels were in the moderate to high category.

Differences were identified between the occupational categories with:

- Masters/mates reporting a higher incidence of occasional to frequent stress and a higher incidence of moderate to high level stress by comparison with crew members;

- Pilots reported occasional, but high stress levels; and
- The frequency and levels of reported stress tended to be lower in the crew than other groups.

The group variations in self-reported stress may relate to differences in either work tasks and/or in the type of transition between ship and shore for the groups. That is, masters/mates, engineers and crew become settled on a ship and stay in that mode for the entire duration of a voyage. In contrast, the work pattern of pilots involves alternating between shorter on board time and living in alternate accommodation away from home while awaiting the next work assignment. These factors may impact on how individuals report stress levels at work.

Relaxation

Daily relaxation is an important aspect of wellness and of particular relevance to seafarers whose recreation at sea occurs in the workplace. The majority of seafarers reported 1-3 hours of relaxation each day, with a small percentage of officers and crew reporting no daily relaxation while at sea. The on call nature of pilotage duties were reflected in the large percentage of this group reporting no daily relaxation at sea.

Nutrition

Nutrition plays an important role in good health and optimal work performance, particularly in demanding physical environments. Working and living at sea is also associated with a reliance on shipboard catering. The results of the survey provided some

evidence to suggest that seafarers nutritional habits were compromised to some extent at sea with:

- Increased consumption of sugar and fat by comparison with that consumed ashore.

Data detailing nutritional attitudes indicated that seafarers were more aware of the relevance of nutrition, were less positive about the importance of nutrition to people's lives, but more explorative with food than a normative group. All occupational groups rated the relevance of nutrition in their lives highly. Masters/mates, engineers and crew tended to consume more sugar and fat at sea than ashore; pilots on the other hand consumed these foods more frequently while ashore.

Comments from some seafarers supported the findings related to food habits and nutritional attitudes. For example, concern was expressed about the amount of fried food and the absence of low-fat foods on some ships.

Drug Use and Awareness

In this survey, drug use and awareness is associated with the use of both prescription and non-prescription drugs including caffeine. The scale essentially measures the level of functioning without the unnecessary use of drugs; that is the level of drug free functioning. By comparison with a normative group, seafarers had a slightly lower level of drug free functioning.

Summary

The results of the study thus far suggest that being at sea may significantly impact on the health-related behaviours of seafarers. When returning ashore, health-related behaviour improved with better sleep, lower stress, and increased participation in exercise.

Moreover, seafarers comments supported these findings, emphasising the importance of quality time ashore to enjoy family life, participate in family recreational outings and to generally relax before returning to sea.

OCCUPATIONAL STRESS

Major reforms in the maritime industry have the potential to impact on occupational stress levels. Therefore, one of the aims of the project was to determine both the industry-specific and general sources of occupational stress.

Industry Specific Factors

Certain questions measured the level of demand from maritime industry specific factors. These were: environmental hardships at sea, bad weather, missing home, broken rest, long working hours (including inadequate rest breaks), and industry change.

Within the industry there were some differences between the occupational categories:

- While all groups reported a similar level of stress as a function of bad weather, missing home, and long working hours, there was a tendency for pilots to report less stress from some industry specific issues;

- Engineers, and to a lesser degree, crew reported more stress than other groups from hardships associated with the work environment;

- Engineers reported more stress than other groups from broken rest; and

- While a high percentage of all groups reported significant demands from industry change; this factor affected crew members more than other groups.

General Sources of Pressure at Work

This scale measures the reported level of pressure from various sources including factors intrinsic to the job, managerial role, relationships with others, career and achievement, organisational structure and the home/work interface.

Seafarers reported a higher level of stress than normative groups on all measures of sources of work pressure. The greatest source of pressure identified for all seafarers was the home/work interface, that is, the overlap between home and work. This result was not surprising given that all groups are involved in the home and away nature of seafaring. Missing home, being away for long periods, and difficulties associated with the transition between ship and shore were common elements of concern.

With the exceptions of career and achievement and the home/work interface, differences between the occupational groups were evident in the amount of pressure experienced as a function of all other sources of work pressure. This finding is not unexpected given the divergent demographic backgrounds of the groups.

Factors contributing to the sources of work pressure were chiefly industry specific such as long working hours, weather, environmental hardships at sea, and missing home, with long working hours being the chief contributing factor to most sources of work pressure.

Job Satisfaction

This scale measures satisfaction on a number of aspects of the job. These include:

- Achievement, value and growth (current scope for advancement);

- The job itself;

- Organisational design and structure (structural aspect; communication, implementation of change);

- Organisational process (internal processes; process of promotion, decision making, freedom and

flexibility in the job) and

• Personal relationships.

Compared with normative groups, seafarers reported similar levels of satisfaction with achievement, value and growth, but were less satisfied with other organisational and personal aspects of the workplace. Miscellaneous comments from seafarers highlighted difficulties with personal and professional relationships at sea on some ships.

For all seafarers, the most satisfying aspect of working at sea was the job itself; that is the type and scope of the job tasks. Not unexpectedly, because of the differing work tasks and responsibilities at sea, occupational groups reported different levels of satisfaction on all other aspects of the workplace with the exception of personal relationships.

Factors which contributed a moderate amount of variance to the sources of job satisfaction were divided between industry specific sources of stress, particularly change in the industry, and lifestyle factors such as stress and quality of sleep.

Mental and Physical Ill Health

Compared with normative data, seafarers reported fewer mental health and more physical health problems. There were no significant group differences in the level of mental ill health, but officers and crew experienced more physical ill health than pilots despite the older age profile of the latter group.

The factors contributing to mental ill health were chiefly industry specific such as long working hours; whereas the factors contributing to physical ill health were chiefly related to lifestyle, such as stress level and frequency and quality of sleep.

Summary

The results of the survey show a relatively older, complex but stable workforce working and living in an isolated and harsh environment. While at sea, health and lifestyle behaviours are compromised to some degree and when returning ashore these behaviours are improved.

The seafarer experiences a relatively high level of occupational stress; however, seafarers reported being satisfied with the job itself in spite of dissatisfaction with organisational and personal aspects of work such as receiving appropriate supervision, participation in decision making and poor interpersonal relationships.

The level of occupational stress associated with sources of work pressure and the level of job satisfaction varied between the occupational groups. However, for all groups, the greatest source of work pressure was the home/work interface, and for officers and crew the most satisfying aspect of the workplace was the job itself.

The chief contributing factors to stress were a relatively small number of industry specific factors including long working hours, change in the industry, broken rest and missing home and lifestyle factors such as stress and sleep. This indicates that while a complex range of factors impact on working and living at sea, considerable progress in reducing occupational stress may be achieved by addressing a relatively small number of issues. These are long working hours, broken rest, missing home and sleep quality. Although the stress associated with these factors cannot be eliminated entirely, attention to these may positively contribute to work pressure, job satisfaction and health.

RECOMMENDATIONS

The following recommendations are based on a number of information sources. While they are principally founded on the detailed analysis of the industry survey, supporting information has been drawn from the maritime literature, consultation with key stakeholders and additional comments volunteered from survey respondents.

The recommendations need to be considered in the proper context of the aims of the study and the purpose of the recommendations themselves. The study aims were to use survey data to:

(i) Develop a profile of the Australian maritime industry including its physical health and health behaviours;

(ii) Determine the levels of occupational stress; and

(iii) Highlight (by the use of statistical modelling techniques) potential job/industry sectors and issues requiring further investigation.

Thus, the purpose of the recommendations is not to formulate industry policy, but rather to provide some direction for conducting objective assessment when addressing issues of immediate or future concern.

The considerable variation in circumstances experienced by employees due to the diverse nature of the industry, presents a problem when applying effective recommendations involving industry-wide issues. To overcome these difficulties to some degree, many of the recommendations refer to specific occupational groups which appear to experience greater problems with certain issues. It is anticipated that these issues can then be addressed by a particular occupational section (e.g. engineers). However, it is also understood that even within occupational groups there is considerable variation in working conditions.

Suggestions regarding approaches that may be useful in any intervention designed to address these issues in a systematic manner are based on the present findings, comments from seafarers, consultation with industry, and the success of these strategies in other industrial settings. In many cases the recommendations involve a strengthening and coordination of existing systems either within the industry or associated organisations.

PRIMARY RECOMMENDATIONS

The study has identified a relatively small number of mainly industry specific and lifestyle factors as the chief contributors to occupational stress. The industry specific factors were: long working hours, change in the industry, the home/work interface (missing home), broken rest and environmental hardships. The lifestyle factors were sleep and stress. In addition, the analysis identified that seafarers' health was compromised at sea to varying degrees by behaviour patterns relating to smoking, drinking, exercise, relaxation and nutrition.

Therefore, the two broad areas targeted in the following recommendations are occupational stress and health and lifestyle factors. Within these areas, report findings have been used to prioritise the identified issues to be considered and addressed.

RECOMMENDATION 1

Long working hours

A review of work scheduling, including the duration of rest breaks should be undertaken with a view to developing and testing procedures that will reduce the impact of these factors on occupational stress.

Long working hours including inadequate rest between periods of duty, are given high priority. This priority is based on the considerable weight of evidence in the report relating to the negative impact of long working hours on the occupational stress levels of employees. Specifically, this evidence relates to findings on:

(i) Long working hours being the greatest contributor to most sources of work pressure, and mental ill health (Sections 10 and 12); and

(ii) The demands associated with long working hours affected the majority of members of each of the occupational groups. The impact of extended hours was greater for those involved in watchkeeping and on call duties. The present findings on long working hours were also consistent with extended hours of work shown in the international maritime literature. Furthermore, miscellaneous comments from seafarers supported findings relating to the impact of long working hours across the industry.

Long working hours are a complex issue, but a closer examination of the procedures for monitoring work hours and schedules should be undertaken. It is clearly understood that operating a 24 hour industry in an isolated environment will result in extra work hours from time to time. However, respondents suggested that following major industry reform, issues such as decreased crew sizes, increased commercial pressure, and long working hours have contributed to both acute and chronic fatigue. In some cases, particularly during periods involving heavy traffic or bad weather, seafarers raised concern that safety may be compromised as a result of persistent fatigue. It should be noted that work/rest hours are applied in Australia as prescribed by the International Convention on Standards for Training and Certification of Watchkeepers (1995).

A comprehensive approach might include:

- A systematic review of the procedures involved in implementation of international conventions governing the hours of work/rest at sea;

- Verification by external authority that procedures are being implemented;

- Assessment of the suitability of international conventions regarding hours of work/rest as they relate to the Australian industry;

- On board measures of work schedules involving numbers of hours worked and scheduled rest breaks; and

- On board monitoring of work schedules to assess the effect on direct measures of physiological stress, fatigue and work performance.

RECOMMENDATION 2

Sleep/broken rest

A review of sleep issues in conjunction with wider issues of hours of work and rest between periods of duty.

The physical environment and the nature of living and working at sea means that some sleep disturbances are an inevitable part of seafaring work in a 24 hour industry. However, the present data indicate employees, particularly those involved in watchkeeping and on call duties appear to be experiencing additional stress from this aspect of the workplace. The study indicated the majority of the maritime sample (70%) reported fair to poor to very poor quality sleep (Section 5), and half the workforce reported less than 6 hours of sleep per day at sea. In particular, ~96% of pilots reported compromised sleep duration at sea. Those in the engineering group appeared to experience considerable demands from broken rest including being woken unexpectedly, being on call and unpredictable working hours (Section 9).

Results of Section 12 show sleep quality was the highest ranked of the factors contributing to physical ill health among seafarers. Comments from seafarers supported the findings on sleep quality. For example, the highest percentage of negative comments about working at sea related to the quality of sleep. Given the frequency of comments regarding difficulties with on board professional and personal relationships, inadequate rest could be contributing to some of these difficulties. It should be noted however, that rest hours are applied in Australia as prescribed by the International Convention on Standards for Training and Certification of Watchkeepers (1995).

Given the enormous environmental and economic consequences of shipping accidents it is recommended that a thorough examination of sleep patterns and their effect on work performance be conducted. Personnel involved in watchkeeping and on call duties should be a high priority in an examination of sleep patterns.

This may be achieved by:

- A systematic review of procedures involved in the implementation of international conventions for rest periods at sea;
- Verification of implementation of procedures relating to international conventions by external authority;
- Analysis of retrospective sleep data;
- Examination of sleep hours using sleep diaries and other measurement techniques to investigate the extent and quality of sleep at sea and ashore;
- Evaluation of the physical environment on board ships to determine factors associated with poor sleeping: (e.g. location and adequacy of sleeping accommodation in relation to noise sources on the ship, soundproofing, heating and cooling); and
- Evaluation of the appropriateness of international conventions regarding hours of rest as they relate to the Australian industry. It would be desirable to obtain on board measures of specific work categories to examine the cognitive and/or physiological demands of the position and the effects sleep decrements have on work performance.

RECOMMENDATION 3

Change in the industry

Support to help seafarers adjust to industry change should focus on both technical and emotional support systems. A high priority should be to provide training/retraining programs which build on the skill level in the industry. In addition, all support systems should include appropriately qualified personnel.

When industry change occurs, steps to minimise the impact of major industry reforms have been shown to have a positive effect on workers and their work performance. The relatively older age profile of the industry (Section 3) suggests that Australian seafarers may have difficulty adjusting to industry change, particularly technological change. The findings indicated that 76% of all seafarers reported increased pressure from issues associated with change in the industry; crew members were slightly more affected by change than other groups (Section 9). Moreover, change in the industry was the highest ranked of the factors affecting most aspects of job satisfaction. Seafarers' commentaries indicated that major industry reform involving uncertainty both across the industry and in the individual workplace, was an additional source of stress. Change has also impacted on the social environment at sea with fewer personnel on board, and therefore less social interaction.

While it is recognised that some companies are providing educational programs to prepare employees for industry changes, a systematic approach to strengthening and coordinating such programs by all industry areas would significantly reduce stress associated with future industry change.

A comprehensive approach might include:

- Closer examination of manning arrangements particularly given the variation in working conditions across the Australian fleet;

- Appropriate training/retraining to build on the existing skills of the seafaring workforce, particularly when change involves technology;

- Appropriate training and management of support labour groups used during peak periods of activity while in port;

- Appropriate training/retraining of managerial staff (management and personnel training) at sea to cope with the changes in a restructured workplace;

- Involvement of Maritime College expertise whenever possible in the training role;

- Publicise the availability of existing support systems within the industry for both technical and emotional support regarding industry change.

RECOMMENDATION 4

Home/work interface

Interventions to minimise problems associated with the home/work interface should utilise both social/emotional strategies and technological innovations. Social issues should involve the availability of qualified personnel to counsel families or seafarers with stress from the home/work interface, and practical assistance to families ashore. Technological innovations providing access to advanced technology in the area of ship/shore communication should be adopted when available.

The home/work interface (i.e. the overlap/transition between sea and ashore), and the difficulties for all parties (seafarers and families) associated with this aspect of seafaring have been well documented. The present investigation indicated that the home/work interface was the greatest source of work pressure for the entire maritime sample, and for each of the occupational groups (Section 10). The present findings on this topic also support previous maritime data on problems experienced by seafarers with the home/work interface.

In addition, the highest percentage of negative comments from seafarers relating to industry-wide issues centred on difficulties with the home/work interface. These comments provided insight into the emotional and physical difficulties experienced by seafarers and their families as a consequence of the "home and away" nature of seafaring work. The period when all parties appear most vulnerable is immediately prior to leaving home and after returning from sea. For example, one week before the

seafarer leaves home, tension in the household builds, and a week is required for all parties to adjust to the presence of the seafarer after he has returned home. Unresolved problems at home impact on work performance, job satisfaction and stress levels at sea and vice versa.

Working and living away from home for extended periods is very much part of seafaring work; however, strategies to reduce the associated stress from this source should be implemented. It is understood that the availability of some advancements in remote area communication will very much depend on the types of ships and sea areas worked. A point to note is that there appears to be considerable awareness of the problems of the home/work interface by some companies, but many seafarers do not appear to be taking advantage of this service. For instance, individual companies promote and fund support groups for spouses ashore and also encourage visits to ships by families when convenient for all parties.

In addressing these issues the following aspects should be considered:

- The transition period should be one major focus in addressing this issue;

- Increase awareness and promote the range of services available to seafarers and their families such as counselling, through the Seafarers' Assistance Service;

- Increase awareness of new initiatives (support groups) being undertaken by companies in the area of reducing difficulties with the home/work interface for seafarers and their families;

- Investigation of support systems available (e.g. Watch Ashore, United Kingdom) for overcoming problems with the home/work interface in the international maritime industry or other home and away working situations;

- Explore suggestions from seafarers on reducing difficulties with the home/work interface including visits to ships by families or occasional voyages by families (when convenient for all parties), and the production of a video of working and living at sea;

- Emergency communication should not be the sole focus of advancements in technology for remote area contact.

The industry should monitor progress with advances in the broader use of Internet/e-mail access for employees on ships at sea. The international maritime community has recognised the advantage of utilising technological developments in distance communication. Currently, progress in technology to enable Internet access for ships is under investigation by the Seafarers International Research Centre, Cardiff.

- Closely monitor other technological advances in remote area communication enabling communication similar to video conferencing with those at home.

RECOMMENDATION 5

Environmental hardships

A review of present practices relating to the monitoring of the levels of noise, heat, humidity and pollutants with a view to reducing the effects of these factors on occupational stress.

Long term exposure to excess levels of environmental hardships is potentially harmful to physical health and impacts on work performance. Environmental hardships at sea are chiefly related to noise, heat, humidity and pollutants. By the very nature of the different occupational tasks, some employees reported suffering more than others from these aspects of the workplace. Health profiles (Section 4) indicated auditory problems are higher in engineers and, to a lesser degree, in crew members. Results of Section 9 support this finding indicating hardships at sea (including noise, heat and humidity) are a greater problem for engineers and crew than others. Miscellaneous comments from seafarers also indicated that other environmental problems at sea related to pollutants and the lack of equipment to monitor the levels. The comments indicated a wide variation existed in the present attitude to environmental hardships in the industry.

It is understood that the procedures in place in the industry for addressing environmental hardships follow specific Occupational Health and Safety guidelines. However, the implementation of these guidelines appears to be quite varied across the industry. For this reason, a complete organisational approach involving all key parties is recommended when addressing this topic.

A comprehensive approach might include:

- On board measures to determine the present situation;

- Examination of the appropriateness of existing standards for 24 hour "capture" industries such as seafaring;

- Determination of most frequently encountered environmental hazards;

- Strict adherence to the level of medical checks to detect health problems from these environmental factors;

- Education of the health consequences of long term exposure to these factors;

- Mandatory use of appropriate protective equipment;

- Monitoring of the level of environmental hazards, adhering strictly to safe levels and exposure time; and

- Adhering to guidelines regarding adjustment of work patterns for safe exposure.

SECONDARY RECOMMENDATIONS

The secondary recommendations focus essentially on lifestyle behaviour such as exercise, relaxation, nutrition, smoking and alcohol consumption. Given the variation in facilities across ships a systematic approach to the provision of minimum facilities and promotion of their routine use applies to recommendations involving both exercise and relaxation. However, it is recognised that modern exercise and relaxation facilities are supplied on a considerable number of the ships in the Australian fleet (i.e. fully equipped gymnasiums, swimming pools, saunas, library, television, videos, compact disk players, hobby room and comfortably appointed lounges to cater for the needs of individuals in these areas). Therefore, the following recommendations tend to focus on strategies to increase awareness of long term health benefits of appropriate lifestyle behaviours. Specifically, these strategies would target increased participation in exercise and relaxation activities by utilising the wide range of available facilities.

RECOMMENDATION 1

Exercise

It is recommended that strategies to address this topic should target increased participation in exercise and reinforce participation in those who are already exercising.

Positive long term health outcomes including a reduction of stress levels are closely related to regular patterns of exercise and relaxation. The home and away nature of seafaring work places additional demands on being able to adopt regular exercise habits. Results in Section 5 show a very high number of seafarers did not meet the National Heart Foundation guidelines for a prescription of exercise adequate for cardiovascular health while at sea or ashore. This of course, may not be due to the lack of suitable facilities, but rather to the lack of awareness of the important role of exercise in positive long term health outcomes.

Another important aspect of the exercise issue is its role as a mediator of stress levels. Although not shown in the report, an analysis of the use of stress coping strategies by the present seafaring groups showed a greater use of passive strategies (smoking and drinking) rather than active strategies (exercise) to cope with stress. However, some individual commentary from seafarers highlighted that some personnel felt regular exercise at sea provided a coping mechanism for workplace stress.

Strategies for consideration include:

- Closer examination of exercise habits from the present survey data in conjunction with an assessment of exercise facilities, and the appropriateness of these in the Australian fleet;

- Incorporation of an educational approach regarding exercise awareness and associated health benefits; particularly the role of exercise in coping with stress;

- Targeting increased participation;

- Reinforcing participation in those already exercising; and

- Developing and testing appropriate models of exercise programs suitable for the maritime industry.

RECOMMENDATION 2

Relaxation

Intervention strategies to improve the time available for relaxation should be incorporated with strategies to improve sleeping habits

Sufficient time for daily relaxation is essential to ongoing work performance and the management of stress. Results in Section 5 show the majority of the workforce achieve between 1 and 3 hours per day of relaxation. Individual commentaries from seafarers indicated an educational approach to relaxation away from work (e.g. becoming computer literate, learning a particular skill/hobby) would be appreciated. An important issue is therefore optimising the quality and effectiveness of relaxation time and the utilisation of the wide range of existing facilities to provide diversity of relaxation interests.

A comprehensive approach might include:

- A closer examination of the present relaxation habits (from the survey data) in conjunction with an analysis of the relaxation activities available in the Australian fleet;
- Incorporation of an educational approach regarding the health and work benefits of some daily relaxation time;
- Implementing a program which targets improving sleep and relaxation; and
- Incorporation of an educational focus (e.g. computer literacy) in relaxation programs using existing facilities.

RECOMMENDATION 3

Nutrition

Review nutrition habits at sea across ships and voyages with a view to correcting inappropriate consumption of fat.

Healthy nutrition plays a vital role in good health and optimal work performance particularly in demanding environments. Working at sea involves total reliance on shipboard meals. The results in Section 6 indicate seafarers consumed more fat and sugar at sea than ashore. In addition, maritime personnel perceived greater personal relevance of nutrition to their lives than shore-based groups. These findings are supported by comments from seafarers which indicated a dissatisfaction with the large amount of fried food at sea and the unavailability of low fat products on some ships.

That there is a perceived level of stress associated with this issue highlights the importance of a more detailed analysis of nutrition at sea, particularly across the ships and types of voyages before the significance of personnel's comments can be fully assessed.

Strategies for consideration include:

- Closer examination of nutrition across ships and voyages (from the present data);
- Additional training for chefs in the preparation of low fat meals; and
- Educational programs and nutritional awareness.

RECOMMENDATION 4

Alcohol consumption and smoking

Review effectiveness of current alcohol policy. Provide educational opportunities at sea on the negative health consequences of smoking and excess alcohol consumption. Implement quit programs for alcohol and smoking at sea.

Results of Section 7 indicated being at sea had both positive and negative effects on health-related behaviour. For example, the incidence and intensity of alcohol consumption was lower when at sea than ashore. That approximately twice as many maritime personnel exceeded the National Heart Foundation safe limits for alcohol consumption ashore compared with at sea, might be of concern and should be further investigated.

The smoking frequency amongst smokers increased slightly while at sea. However, even ashore there was a relatively higher frequency of smoking among maritime groups compared with Australian population data. Given the relatively higher frequency of smoking among the maritime sample, strategies to address this behaviour should be considered. The effects of such strategies if implemented at sea would also potentially carry over to time ashore.

Strategies for consideration include:

- An educational approach to the negative health consequences of these behaviours; and
- Provision of access to quit programs while at sea

The issues of exercise, relaxation, smoking and alcohol have been addressed separately in the recommendations. However, if implemented there may be an interactive effect; programs which target an improvement in one area such as increased exercise, may naturally carry over to better relaxation and improved sleep and vise versa.

FUTURE RESEARCH

The recommendations indicated the need for a number of broad reviews of identified issues. While not attempting to pre-empt the outcome of such reviews, it is possible to identify a number of specific research projects which need to be undertaken. In general, the proposed projects would involve direct measures of the physiological and psychological demands of some identified sources of stress such as work hours/rest breaks and sleep quality and duration, and their relationship to work performance. While some of these projects relate specifically to the Australian maritime industry, others could be undertaken as collaborative research projects with other international maritime research centres.

1. Hours of work and sleep

A research priority would be to examine hours of work and sleep patterns, particularly for those whose work involves watchkeeping and on call situations. A focus on these occupational groups is important given the high level of responsibility of these employees for the safety of the ship. The work hours and rest experienced whilst on board and the effects of these on fatigue, stress and work performance would be assessed through physiological and psychological measures. Additionally, on board measures of the effects of sleep decrement on work performance would be assessed.

2. Sleep environment

Another priority area would be an examination of the physical sleep environment at sea. This study would involve a systematic on board assessment of the physical sleep environment across ships. The assessment would relate to issues such as location, soundproofing, heating and cooling. The objectives would be to evaluate existing conditions across the industry and to give direction for the optimal design requirements of sleeping accommodation in the Australian fleet.

3. Home/work interface

Investigation of the problems associated with the overlap between home and work was also identified as a priority area for further research. The proposed study would involve a systematic examination of the problems associated with this issue in the Australian industry. Specifically, it would focus on two issues:

(i) Methods of improving communication between home and the ship; and

(ii) The role of support in minimising the impact of this problem for seafarers and families. The study design would require input from seafarers and their families and would include an examination of services currently available to assist with this problem. Additionally, the design would also involve a comparative analysis of services available in other countries/industries which attempt to minimise difficulties associated with the home and away workforce. The overall objective would be to improve existing services and develop new initiatives for minimising the impact of this problem in the Australian industry.

4. Longitudinal assessment of counselling needs

This study would involve a longitudinal investigation of the reasons for using counselling services by Australian seafarers. An examination of the number of seafarers and families who seek counselling, and the reasons for using the service would provide data enabling the causes of these problems to be addressed.

5. Environmental hardships

This investigation would involve on board assessment of the physiological demands of environmental hardships (e.g. heat and humidity) and the effects of these on work performance.

6. Exercise

This study would involve a review of the available exercise facilities and the use of these in the industry. It would include:

(i)   An assessment of existing exercise facilities across ships;

(ii)   Closer examination of present exercise habits (from the current data);

(iii)   Needs assessment of seafarers;

(iv)   A review of the literature relating to the role of exercise in work performance and stress levels;

(v)   Examination of the barriers to the use of existing exercise facilities (shiftwork, motivation);

(vi)   The development and promotion of exercise programs at sea for the duration of a swing;

(vii)   Testing the effectiveness of such programs across the duration of a swing on a number of ships; and

(viii) The development of programs specific to the maritime industry, with special consideration to the demands of shiftwork and the work environment.

7. Relaxation

The research would focus on enhancing the quality of relaxation time of seafarers. This project would involve:

(i)   Assessment of the time available for seafarers' relaxation;

(ii)   Examination of existing relaxation facilities across ships;

(iii)   Closer examination of the current relaxation habits (from the present data);

(iv)   Review of the literature relating to the role of relaxation in work performance and stress management; and

(v)   Promotion of effective use of relaxation time. This study should be implemented in combination with the study examining exercise (6 above).

8. Nutrition

This study would involve direct assessment of dietary habits across ships and voyages. It would incorporate measures of dietary composition and choice of foods available. The overall aim would be to promote healthy eating.

9. Interaction of factors

It is well known that accidents frequently result from errors made when critical combinations of factors are simultaneously present. Future studies should therefore pay special attention to situations in which such factors as sleep loss, high stress, poor environmental conditions, and critical traffic conditions occur together.

SECTION 1

PROJECT OVERVIEW

Background to the project

Aims

Data collection

Questionnaire content

Overall data analysis strategy

1.1 BACKGROUND TO THE PROJECT

Many countries, including Australia, have increased automation, reduced crew sizes and encouraged multi-skilling in an attempt to improve efficiency and competitiveness in international shipping. These changes have had major effects on the physical and cultural environment on board ships, including the nature of the work performed, work and leisure patterns, interpersonal relations and home life. It is also likely that some of these changes have impacted on the physical and mental health of seafarers, and have contributed to increased fatigue under certain working conditions, particularly when shiftwork is involved.

Seafaring also provides a number of unique work environments which in themselves may be the source of health problems. Noise and vibration, and the continual rolling and pitching of the ship are constant problems, in addition to the possible exposure to thermal stress and pollutants. A recent review of maritime studies indicated environmental problems together with negative lifestyle practices such as smoking, poor nutrition and excessive consumption of alcohol, may be associated with health problems such as depression, cardiovascular disease and cancer among seafarers (Parker et al., 1996).

Concern regarding the impact of major reforms to improve efficiency and competitiveness in the Australian maritime industry resulted in the Australian Maritime Safety Authority (AMSA) initiating a project to investigate the effects of these changes on the health of Australian seafarers.

The Queensland University of Technology was successful in its tender to undertake a project which addressed the fatigue, stress and occupational health of seafarers, referred to as the FASTOH project. The project consisted of a number of phases:

Phase 1: A review of the existing literature relating to the health, stress and fatigue of seafarers;

Phase 2: A survey designed to develop a profile of the industry and identify concerns with respect to the occupational health of seafarers, and designed to identify priority areas for further investigation in later stages of the project;

Phase 3: Direct medical assessment of the cardiorespiratory status of seafarers;

Phase 4: On board assessment of work tasks and physiological and performance criteria associated with these tasks; and

Phase 5: Development of strategies to minimise and manage stress and fatigue.

A steering committee comprising members of the unions, employers, AMSA and the research team was established prior to the initiation of the project. Briefly, the aim of the committee was to facilitate communication between the research team and participants in the project, to provide industry specific input into the project, to monitor progress and to provide feedback to the research team in each phase of the project.

During the early stages of the project the research team experienced protracted delays in attempting to negotiate access to ships and participants for later stages of the project. Considerable time was also involved in the development of a survey instrument to adequately cover the concerns expressed by the various constituents within the industry, and to establish relatively complex data collection procedures.

On the initiative of the steering committee newsletters were produced on a regular basis and circulated to the industry to promote the project and relate its progress. Final resolution of a number of problems associated with the implementation of the project with the co-operation of the key stakeholders was achieved following a meeting of the steering committee aboard the Spirit of Tasmania. This vessel is a passenger and vehicular ferry operating across Bass Strait between the mainland of Australia and Tasmania. At this meeting details of the project, including on board measurement procedures were explained. Additionally, concerns regarding confidentiality and implications of the results of the project were discussed and general support for the project to continue was achieved. In short, the efforts made across this time period by the research team and other key stakeholders resulted in an excellent degree of co-operation between all representatives, and initiation of the survey in 1996.

To this point an extensive literature review completed in November 1995 has been published and circulated to members of the industry. The present report based on analysis of the questionnaire represents Phase 2 of the project. As indicated earlier, the results of the survey should be viewed in the larger context of the original research proposal and serves to:

- **Define the profile of the industry;**
- **Identify areas of concern with respect to the occupational health and sources of work stress of Australia seafarers; and**
- **Determine some of the factors contributing to the various sources of stress.**

As such this report provides a basis for the more detailed analyses of priority areas of concern either in the industry as a whole and/or in individual occupational groups.

An overview of the aims and procedures involved in Phase 2 of the project is shown in Table 1.0.

Table 1.0: Overview of Phase 2 of the project

Study Aims	• To develop a profile of Australian seafarers to:
	  - determine the physical health status;
	  - determine the health and lifestyle behaviours (i.e. smoking, drinking, exercise, sleep, stress, relaxation, nutrition, drug use and awareness);
	  - determine the occupational stress levels; and
	  - highlight potential job/industry sectors requiring further investigation.

Data Collection	• Target groups:
	  - Pilots,
	  - Master/mates,
	  - Engineers and Crew;
	• Distribution of a self administered questionnaire to groups using mailing lists through union offices; and
	• Reminder process: general reminders via the union network and two individual reminders.
	• Mailout sample size: 5080

Questionnaire Content	• Demographic
	  - Industry, Age & Gender, Marital Status, Country of Birth
	
	• Health and Lifestyle
	  - Health Status, Health behaviours at sea and ashore,
	  - Smoking, Sleep patterns, Stress, Relaxation, Nutrition, Drug use and awareness
	
	• Occupational Stress
	  - Sources on industry specific stress, work pressure and job satisfaction; and
	  - Mental and physical ill health
	
	• Miscellaneous Comments
	  - At Sea, Ashore

Overall Data Analysis Strategy	• Estimation of the industry profile • Comparison between industry and normative data • Comparison between groups within the industry • Ranking of issues within each occupational group within the industry • Factors contributing to occupational stress.

SECTION 2

RESPONSE DETAILS

Table 2.0: Number of questionnaires sent, responses received, response rates for four occupational groups.

Group	Number Sent	Number of Responses	Response Percent
Crew	2853	680	23.8%
Masters/Mates	1060	524	49.4%
Engineers	1110	525	47.3%
Pilots	57	29	50.8%
Other *	-	48	-
TOTAL	5080	1806	35.5%

Adjusted Response rate # 36.5%

* There were 48 respondents who did not specify their occupation and these have been classified as other.

\# The response number was adjusted for the 130 questionnaires returned with address unknown.

Response % = [1806 / (5080 - 130)] X 100.

A total of 1806 useable responses were received giving an overall response rate for the industry of 36.5% (Table 2.0). The overall response rate has been calculated based on responses, returns with address unknown, and those who indicated they declined to participate. Table 2.0 also shows the response rate for each occupational group (crew, masters/ mates, engineers and pilots).

The present survey targeted 5080 Australian seafarers and was the first to attempt to sample the whole Australian or any other maritime industry. The overall response rate of 36.5% was lower than expected. It is particularly exacerbated by the low response from crew members (23.8%), which was considerably lower than the rate achieved in the other groups (~50%) (Table 2.0).

Generally, data analyses for the whole industry are based on the 1806 completed questionnaires while occupational-group comparisons are based on the occupational-group specific sample sizes given in Table 2.0. However; as is not an uncommon problem in survey-based research involving a complex questionnaire with multi-item scales, respondents do not necessarily provide complete information. For the items and scales included in this report, no more than 10% of respondents failed to answer any individual question. Therefore, the sample sizes for analyses in this report are sometimes smaller than those given in Table 2.0.

It is not expected that any potential bias associated with such item non-response will significantly increase the overall bias that might be present as a result of other sources of error; particularly that arising from the overall non-response and differences in the occupational group specific response rates. In the latter case post-hoc weighting has been used to ensure all occupational-groups are represented in proportion to their percentage in the industry.

Every attempt has been made to minimise response bias. However, there is always the possibility that some respondents may have misunderstood questions, or were unwilling to provide accurate information. Always caution should be exercised when interpreting survey results.

Generally, data analyses for the whole industry are based on the 1806 completed questionnaires, while occupational-group comparisons are based on the specific sample sizes for each occupational group (Table 2.0). Two surveys which examined the smoking habits of enlisted navy recruits showed response rates of 75% (Burr, 1984) and 45.5%, respectively (Cronan et al., 1991). The response rates of the present pilots and officers were comparable with the second of these surveys. However, the present overall response was slightly higher than the 32% response to a mailed questionnaire to offshore oil and gas personnel in Europe (n=965; Sutherland & Cooper, 1991). It is difficult to make direct comparisons with other studies, as most investigations have only targeted discrete groups rather than an entire industry, and/or examined only one topic such as smoking.

It is likely that the present response rate was affected to some degree by the length of the survey, the wide range of educational backgrounds within the industry, and a level of apprehension regarding confidentiality issues and implications of the findings of the study.

In order to address the issue of the different group response rates in the analysis of overall responses, a statistical procedure (post-hoc weighting) was applied to ensure all groups were equally represented in proportion to their percentage in the industry.

However, the different response rates from the groups still impose a number of limitations on the study which need to be considered in the interpretation of results. These include:

- The degree to which the sample represents the opinions of the total population;

- The relatively small number of respondents in some work categories limited detailed analysis of these categories; and

- Miscellaneous comments were entirely voluntary and it is possible that the respondents who provided these may not properly represent the entire population.

SECTION 3

INDUSTRY PROFILE - OCCUPATIONAL & DEMOGRAPHIC

Predominant sea area worked

Years in the industry

Years in current position

Age

Gender

Marital status

Household income

Education level

Country of birth

Miscellaneous comments

**Table 3.0: Occupational history and industry experience for the entire maritime sample and four occupational groups.**

Variable	Total %	Pilots %	Masters/ Mates %	Engineers %	Crew %	Level of Statistical Significance[1]
Predominant sea area worked						***
Blue water	38.3	13.8	31.9	39.6	41.3	
Coastal	37.1	86.2	32.0	34.3	39.7	
Off-shore	24.6	0.0	36.1	26.1	19.0	
Years in industry						**
Less than 4	4.9	3.4	0.8	3.0	7.7	
4-9	16.5	0.0	14.9	16.6	17.3	
10-19	28.5	3.4	28.6	24.8	30.8	
20-29	26.0	17.4	28.6	32.8	21.9	
30-39	17.9	37.9	19.5	20.7	15.4	
40 or more	6.3	37.9	7.6	2.1	6.9	
Years in present position						**
Less than 4	34.3	17.3	37.8	35.8	32.2	
4-9	35.0	17.2	33.9	30.4	31.1	
10-19	24.4	44.8	23.7	26.5	22.4	
20-29	5.3	20.7	4.6	7.3	4.3	

[1] Level of statistical significance: ** = $p < 0.01$ *** = $p < 0.001$ represents a statistically significant difference between the groups.

The following sections show the occupational and demographic profiles of the entire sample taken from the Australian maritime industry. The various work categories within the industry are combined into four-occupational groups which are contrasted in the presentation of results.

3.1 PREDOMINANT SEA AREA WORKED

Data in Table 3.0 shows a similar percentage of all respondents worked in the blue and coastal water areas. The lower percentage working in the offshore region was chiefly related to the absence of pilots working in this area. Group differences in the sea areas worked revealed almost all pilots worked in the coastal area, and a lower percentage of crew in the offshore area.

3.2 YEARS IN THE INDUSTRY

Nearly 25% of all respondents had been in the industry for 30 years or longer, and over 50% had served in the industry for more than 20 years (Table 3.0).

In comparison to international shipping data, a higher percentage of Australian seafarers remain in the industry longer than 10 years. For instance, about 78% of the present respondents had been in the industry for more than 10 years, whereas international data indicated only 12% remained at sea after the same period (Dyer-Smith and Stein, 1993). Although not directly comparable with the results of the present survey, Sparks (1992) reported a sample of 93 American masters/mates and pilots in the State Ferries System averaged 16 years of service in the industry.

A higher percentage of pilots than others had been in the industry for 30 years or more; 37% of this group had in fact been in the industry for 40 or more years. The percentage of officers and crew serving more than 30 years in the industry was similar. The higher percentage of pilots serving 40 years or more in the industry is not unexpected given that pilots had served for many years in the industry prior to entering into marine pilotage.

Figure 3.0: Years of service in the industry for four occupational groups.

Statistically significant difference between the groups, p<0.01
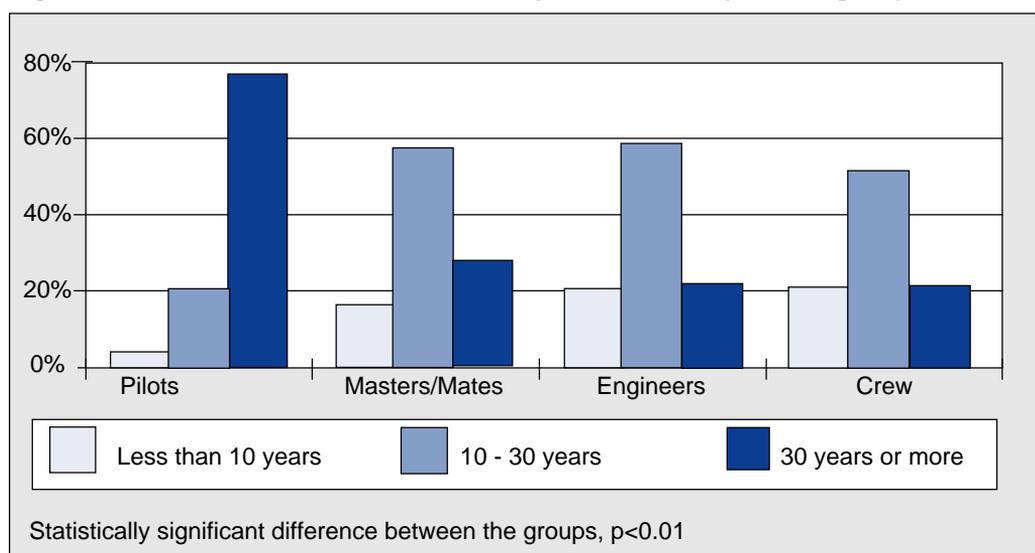
Table 3.1: Demographic data for the entire maritime sample and four occupational groups.

Variable	Total %	Pilots %	Masters/ Mates %	Engineers %	Crew %	Level of Statistical Significance
Age categories (yrs)						**
Less than 30	14.3	0.0	15.4	11.8	15.3	
30-49	56.5	41.5	59.5	56.0	55.7	
50-59	25.4	41.3	20.9	27.8	25.7	
More than 60	3.8	17.2	4.2	4.4	3.3	
Age (yrs) Mean (SEM)	42.6 (0.25)	52.6 (1.7)	41.5 (0.5)	43.7 (0.5)	42.3 (0.4)	***
Median (Interquartile range 25-75)	44 (34-51)	54 (46-58)	41 (33-50)	45 (36-51)	43 (33-51)	***
Gender						**
Male	98.3	100.0	97.7	99.6	97.9	
Female	1.7	0.0	2.3	0.4	2.1	
Current marital status						**
Married	57.1	86.2	61.7	65.5	50.4	
Widowed	0.6	0.0	0.6	0.4	0.7	
Separated	5.1	0.0	4.4	4.2	5.9	
Divorced	6.9	3.4	4.9	5.7	8.4	
Single	20.1	3.4	19.7	16.0	22.5	
Defacto	10.3	6.9	8.6	8.2	12.1	
Gross household income ($)						**
Less than 40 000	9.4	3.6	5.4	4.8	13.5	
40-80 000	71.8	60.7	56.8	66.3	81.6	
80-120 000	16.9	21.4	33.7	26.6	4.5	
More than 120 000	1.9	14.3	4.0	2.3	0.4	
Highest Education level						**
Primary school	4.8	0.0	0.8	0.6	8.7	
High school	27.3	6.9	9.4	4.8	46.4	
Technical/Maritime College	64.5	93.0	81.9	85.9	44.0	
University	4.4	0.0	7.9	8.6	0.9	
Country of birth						**
Overseas						
- English speaking	21.7	48.3	26.7	20.7	19.1	
- Non English speaking	5.1	0.0	8.2	6.5	3.2	
Australia	66.6	48.8	56.9	66.3	71.6	

[1]Level of statistical significance: ** = $p < 0.01$, *** = $p < 0.001$, represents a statistically significant difference between the groups.

3.3 YEARS IN THE PRESENT POSITION

Thirty percent of all respondents had been in their present position in the industry for more than 10 years (Table 3.0). A much higher percentage of pilots than other groups had served in their present position for between 20 and 29 years. This may be explained by the nature of the business; essentially the pilot group investigated were self-employed. In comparison, a sample of 93 master/mates and pilots employed by the State Ferries System in the US had served an average of 7 years in their present working position (Sparks, 1992).

Demographic data covering age, gender, socio-economic status, level of education and birthplace are shown in Table 3.1

3.4 AGE

Over 80% of respondents were aged between 30 and 60 years; 14% were aged under 30 years, with a small percentage over 60. The mean and median age of respondents was 42.6 and 44 years, respectively. The median age (44 years)

of the present sample (and of each group) was slightly higher than the median age (38.7 years) reported for international seafarers (Dyer-Smith and Stein, 1993). The older age profile of Australian seafarers is consistent with increasingly older age profiles shown for international seafarers between 1981 and 1988 (Dyer-Smith and Stein, 1993). The relatively older age profile of the Australian industry is also a factor in implementing change as older individuals quite often find change, particularly technological change, stressful (Legge et al., 1996).

There were significant differences between the groups in the age profiles (Figure 3.1). Similar age profiles were evident for master/mates, engineers and crew with a high percentage in the 30-49 year age category. In contrast, the profile for pilots indicated a higher percentage in the 50-59 and the over 60 categories. Given the extensive amount of experience required prior to recruitment to pilotage duties this finding is not unexpected. The average age for the present pilots (52.6 years) was slightly higher than data previously shown for

Figure 3.1: Age profiles of four occupational groups

Statistically significant difference between the groups, p<0.01
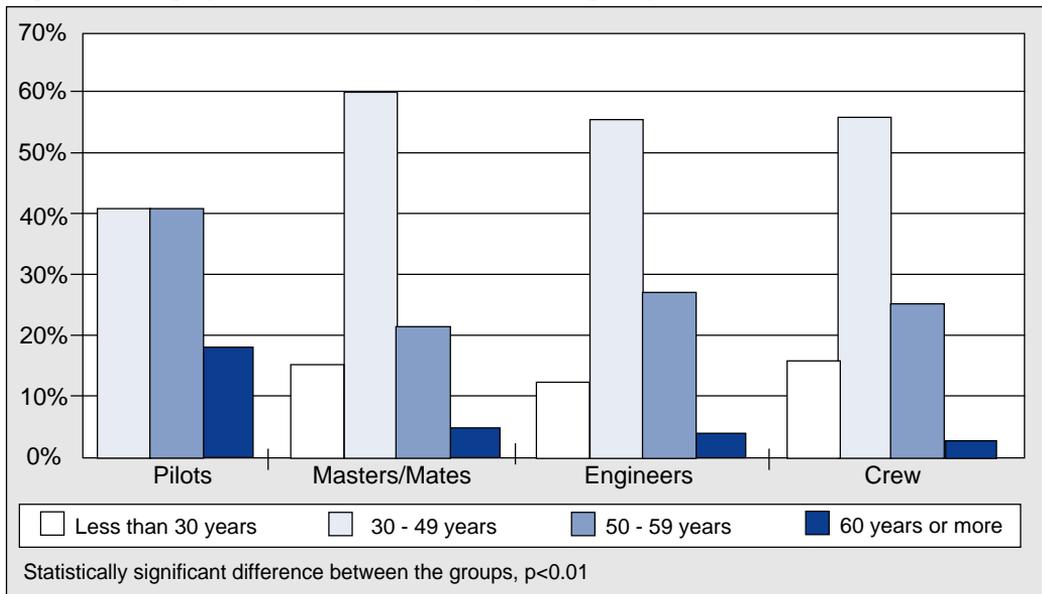
Port Phillip pilots (48.8 years; Berger, 1984), UK pilots (49 years; Shipley, 1978) and American masters, masters and pilots (44 years; Sparks, 1992).

The relatively higher age profile of the Australian seafarer may have implications for the Australian industry. For example, a review of maritime studies indicated that increasing age was a factor for employees with respect to the impact of demanning, increased work schedules/hours and tolerance for shiftwork and fatigue (Parker et al., 1996).

3.5 GENDER

Respondents to the survey were predominantly male (98.3%) (Table 3.1). The low percentage of females reflects the low number of females in the Australian maritime industry (currently estimated at 150) and demonstrates that relatively few women are attracted to the industry. The low percentage of females in the Australian industry is consistent with American data indicating ~4% of a sample of 93 masters, mates and pilots in the State Ferries System were female (Sparks, 1992).

3.6 CURRENT MARITAL STATUS

Table 3.1 shows the majority (67%) of the sample are currently married or in a defacto relationship. Twenty percent of respondents were single and nearly 7% divorced.

Fifty-seven percent of the maritime sample were currently married (Table 3.1), a figure which is the same as data from the Australian population (ABS, 1995) showing 57% of Australian males are married. The percentage of single seafarers is somewhat lower than Australian population data showing 30% of males are single (ABS, 1995).

Anecdotal and other evidence (Foster and Cacioppe, 1986; Berger, 1983b) from the

Australian maritime industry suggests the seafaring life contributes heavily to marriage breakdown. The percentage of all respondents who were divorced did not substantially differ from the general population data which indicates that 6.3% of Australians are divorced (ABS, 1995). However, the present survey requests current marital status; whereas variations in the wording of other surveys which may include previous and/or present marital status may account for some of the differences in reported divorce rates. Therefore, the possibility exists that the marital status of the present seafarers may be an under estimation of the situation if previous as well as current marital status has been investigated.

Within the industry, there were significant differences between the groups in marital status. Compared with other groups, a slightly higher percentage of crew were either divorced or single; a higher percentage of pilots were married (Figure 3.2).

In comparison with other maritime data, a lower percentage of Australian seafarers were divorced. For example, 10 and 25 percent of a London sub-sample (Shipley, 1978) and Port Phillip pilots (Berger, 1983b) respectively were divorced, in contrast with 3.4% of the pilot group in the present survey. The variations in wording between studies, as mentioned above needs to be considered in the interpretation of this data.

Positive family life appears to play an important role in seafaring work. For example, negative comments from seafarers highlighted unsatisfactory personal relationships ashore as an additional source of stress while working at sea. In contrast, positive relationships with wives, partners and families played an important role in reducing stress associated with the home and away nature of seafaring work. Other positive comments indicated

seafarers enjoy the time ashore with wives and family members, and work hard at ensuring that quality time is enjoyed by the entire family.

Married seafarers have tended to be the focus of the difficulty with relationships ashore. However, single seafarers have also indicated a level of stress associated with forming and keeping satisfactory friendships and relationships ashore.

3.7 GROSS HOUSEHOLD INCOME

The majority (71%) of respondents reported a total yearly household income between $40-80,000 (Table 3.1). This places Australian seafarers in the higher income bracket for gross household income for Australians (ABS, 1996). There were significant group differences in gross household income. For instance, a much higher percentage of crew than other groups reported receiving less than $40,000 and between $40-80000; whereas a

much higher percentage of pilots and officers reported an annual household income of more than $80,000. Gross household income may have reflected income from seafaring work and any other sources of income such as investments or partners salary. Caution is recommended when analysing income data given the sensitive nature of this issue.

3.8 HIGHEST EDUCATION LEVEL

Over 60% of respondents were educated to technical or maritime college level. In comparison, 42% of the Australian population (ABS, 1993) held post-school qualifications. The higher percentage of maritime personnel reporting post-school education may reflect the requirements of a highly skilled and adaptable workforce within this industry.

There were significant differences between the educational backgrounds of the occupational groups which reflected the technical work demands at sea. For

Figure 3.2: Current marital status for four occupational groups.

Statistically significant difference between the groups, $p < 0.01$
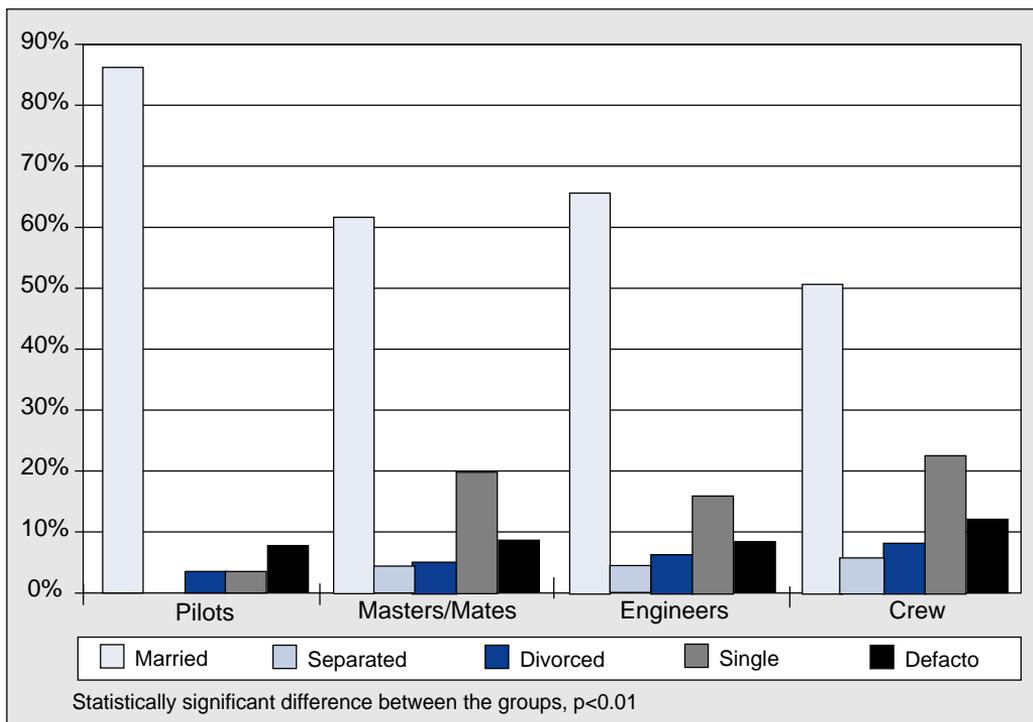
example, over 80% of masters/mates, engineers and pilots were educated to the level of technical or maritime college; in contrast 44% of crew had received this type of training (Table 3.1). It should be noted that no attempt was made to differentiate between the different types of tertiary education (e.g. certificate, associate or advanced diploma or degree). Data relating to the percentage of crew reporting technical/maritime college training should also be interpreted cautiously, as all crew members underwent 9-11 weeks of re-training at the Australian Maritime College between the period of 1986-1994. It is possible some respondents may have included this in their replies to the questions on the educational background.

Comments from seafarers suggested there were difficulties in undertaking additional educational courses given the home and away nature of seafaring work. It is possible that particular institutions may be able to accommodate seafarers, with more programs now being offered through flexible delivery methods.

3.9 COUNTRY OF BIRTH

Australian born respondents comprised 66% of the sample, ~21% were born overseas in English speaking countries with less than 10% born overseas in non-English speaking countries (Table 3.1). There were differences between the groups in the country of birth; notably a higher percentage of crew members than other groups were of Australian birth.

An overview of the demographic characteristics of Australian seafarers is shown in Figure 3.3.

3.10 SUMMARY

Industry data based on the years of service in the industry and years in present working position indicate Australian seafarers exhibit a high degree of stability within their occupation. The demographic results shows the Australian maritime industry to comprise an older, almost totally male workforce, two-thirds of whom are married or in defacto relationships. The respondents are primarily of Australian birth, with a large percentage educated to the level of technical or maritime college.

Figure 3.3: Demographic profile of Australian seafarers.
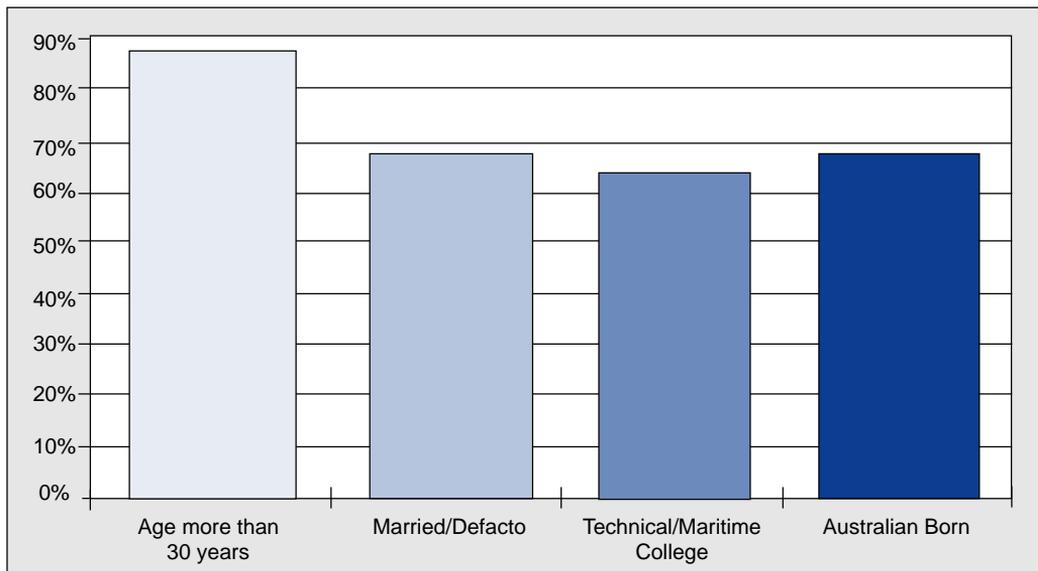
SECTION 4

HEALTH STATUS

No diagnosed illnesses

History of hospitalisation (within the last 10 years)

Medications taken

Family history of disease

Cholesterol levels

Medical conditions causing permanent restriction

Miscellaneous comments

Table 4.0: Self-reported health status for the entire maritime sample and four occupational groups.

Variable	Total %	Pilots %	Masters/ Mates %	Engineers %	Crew %	Level of Statistical Significance[1]
No diagnosed illness	45.3	51.7	51.7	40.4	44.4	ns
Heart disease	3.9	6.9	2.9	2.3	5.0	ns
Blood pressure abnormalities	14.3	17.2	11.8	16.7	14.2	ns
Lung disease	8.3	0.0	9.2	7.2	8.7	ns
Auditory disease	17.0	6.9	9.9	26.8	16.0	**
Psychiatric problems	2.8	0.0	1.9	1.5	3.8	ns
Hospitalisation	46.0	41.4	42.2	42.8	49.5	ns
Medication	26.1	31.0	23.2	27.0	26.7	ns
Family history of CVD	14.8	6.9	13.4	16.4	14.8	ns
Cholesterol higher than 5.5 mmol/l	10.5	25.9	9.3	13.2	9.4	ns
Permanent restriction on activity	8.0	3.6	4.9	6.4	10.3	**

[1] Level of statistical significance: ** = $p < 0.01$, represents a statistically significant difference between the groups after adjusting for age differences, ns = not significant at $p < 0.01$ level. CVD = Cardiovascular disease.

Results of self-reported health status for the entire maritime sample and the occupational groups (adjusted for differences in employee age) are shown in Table 4.0. When interpreting self-reported health data the following issues should be considered: men tend to under utilise the health services, and individuals are concerned regarding implications of negative health profiles in job security.

The selection of medical conditions surveyed in the present study is consistent with previous population studies attempting to determine the level of disease and associated risk factors in Australian populations (National Heart Foundation, 1989; National Heart Foundation, 1996). In addition medical conditions associated with occupational risk are included.

In an attempt to develop a health profile of Australian seafarers comparisons with other maritime data have been made where possible. It is recognised that existing data, in some instances, is quite dated and distinct differences in occupational conditions between the comparison groups may exist. For instance, the work circumstances of Port Phillip sea pilots are markedly different from the present pilot group. Despite these limitations, by contrasting groups within the same industry who experience common elements in their work tasks, trends particular to occupational groups may be identified.

With the exception of auditory disease and permanent restriction on activity, occupational groups exhibited similar self-reported health profiles. A selection of self-reported conditions by the occupational groups is shown in Figure 4.0.

Figure 4.0: Selection of self-reported medical conditions for the entire sample and four occupational groups.

** = Statistically significant difference between the groups, p < 0.01.
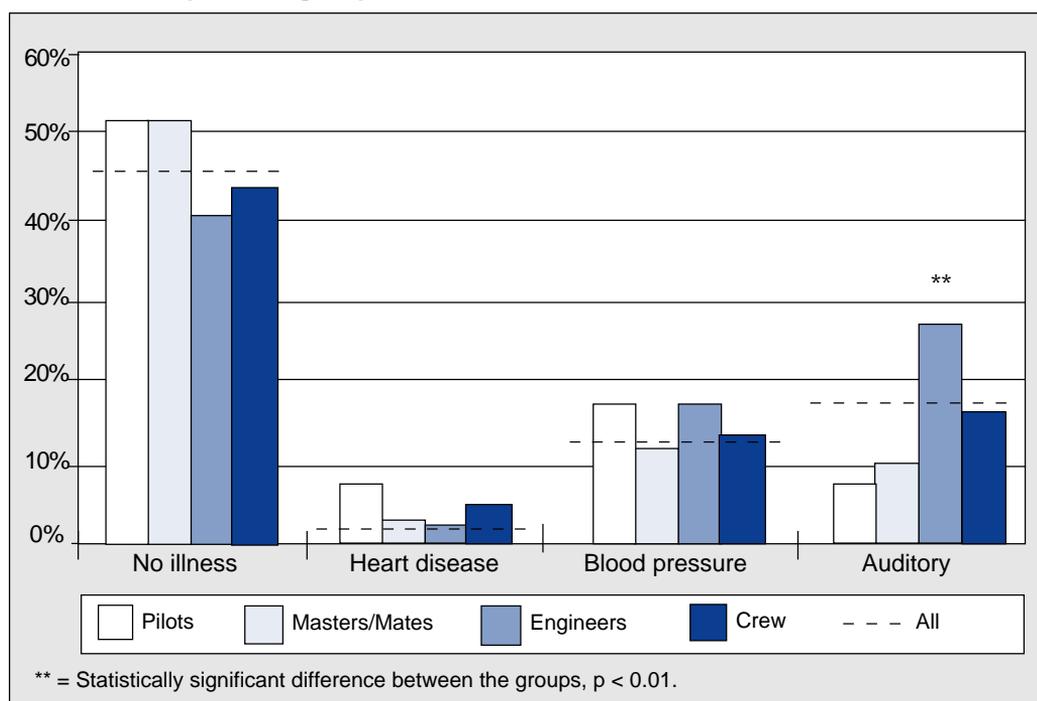
4.1 NO DIAGNOSED ILLNESS

As shown in Table 4.0, 45% of all respondents reported no diagnosed illnesses. This was similar to self-reported normative Australian population data in which 41% of males reported no illness (ABS, 1992). Group percentages for being free of illness were lower in engineers and crew, and higher in pilots and masters/mates.

4.2 HEART DISEASE

Approximately 4% of all respondents reported having some form of heart disease (Table 4.0). This percentage was similar to Australian normative data for males (3.8%: ABS, 1992) and a group of Polish seafarers in which 3% were reported to be suffering from heart disease (Filikowski, 1989). As the present level of heart disease is self-reported, it is difficult to compare with some maritime studies which have reported data derived from direct measures of heart status. For example, Jinzhong (1991) reported 20% of Chinese seafarers showed abnormal electrocardiograms indicative of heart disease. A higher percentage of pilots and crew than other groups in the present sample reported heart disease (Figure 4.0).

For some seafaring groups, comparisons of the incidence of heart disease with other maritime groups are possible. For example, the percentage of pilots (6.9%) reporting heart disease was much lower than the figures shown by Berger (1983b), indicating that between 1963 and 1983, 50% of Melbourne pilots were suffering from some form of heart disease severe enough to force their retirement. Again, differences in data collection procedures (direct measures vs self report) make direct comparisons difficult.

4.3 BLOOD PRESSURE ABNORMALITIES

Fourteen per cent of respondents suffered from blood pressure abnormalities (Table 4.0). This figure is slightly higher than normative data for Australians (ABS, 1992) which showed that 10.5% of all males suffer from elevated blood pressure. In Australian males over 44 years, however, the figure increased to 22% and since approximately 30% of the current sample were over 50 years of age, blood pressure comparisons with older age categories are more appropriate.

There is evidence to suggest that engine room employees are more likely to suffer from hypertension due to noise exposure (Vukelic et al., 1989). In the present study, however, the percentage of engineers reporting blood pressure abnormalities did not significantly differ from other groups (Table 4.0). The percentage of pilots reporting elevated blood pressure was similar to the figure for Port Phillip Pilots (15%) (Berger, 1983b) but lower than that reported by 93 American masters, mates and pilots working in the State Ferries System (21%) (Sparks, 1992).

4.4 LUNG DISEASE

Less than 10% of the entire sample reported suffering from lung disease (Table 4.0). This is considerably lower than the Australian Bureau of Statistics (1992) data showing 33% of respondents from professional and trades occupations reported some form of lung disease.

Reported lung disease was similar (differences were borderline in statistical significance) in the four occupational groups. Notably, no pilots reported lung disease and a considerably lower percentage of pilots than other groups currently smoked (Section 5). Since a

substantially higher percentage of crew members smoked (Section 5) the absence of a correspondingly higher incidence of lung disease in this group is surprising.

Some maritime reports indicate an occupational risk of cancer in seafarers (respiratory cancer being twice that of non-seafarers) (Kelman & Kavaler, 1990); however, the present self-reported data for lung disease did not support this finding.

Despite the findings above, comments from some respondents raised concern over bronchial problems related to exposure to pollutants such as dust, exhaust fumes, asbestos, mineral fibre chemicals, charcoal ash, bulk cement and oil mist. However, it should be noted certain bronchial ailments relating to air quality can be precursors to the development of significant disease states later in life. Often these conditions are only detected by direct measurement during the early phases of disease development.

4.5 AUDITORY DISEASE

Seventeen percent of all respondents reported auditory disease, with significant differences in this disease between the occupational groups. Hearing loss has been shown to be the second most common disability in Australia, with the two most prevalent causes being aging and workplace noise (Waugh, 1991). In fact, among Australian males who reported suffering from hearing impairment, ~40% indicated working conditions were the main underlying cause (ABS, 1993). A similar trend has been shown in maritime data with the increased health hazards of exposure to excessive noise levels previously reported in a review of maritime studies (Parker et al., 1996). The higher percentage of engineers

reporting auditory problems is consistent with an Australian study of marine and power engineers (Munnerly et al., 1992) which found that 75% of participants had hearing problems (a combination of self-report and direct measures). These researchers found that ninety percent of hearing problems were associated with extended exposure to hazardous noise and increasing with age and years at sea. The incidence of auditory problems among crew members was similar to the percentage shown for all seafarers in the current study (Table 4.0). Given the older age profile of the Australian industry it is possible that some of the reported auditory problems may relate to hearing degeneration incurred prior to the mandatory use of safety equipment such as ear muffs.

Since modern ships are virtually floating factories, seafarers are subjected to typical factory conditions and many respondents indicated that while working and living at sea some degree of constant noise was an accepted part of the environment. However, the noise problem is worsened when sleeping accommodation is placed close to large noise sources on the ship, or when soundproofing is inadequate. Additional comments on noise problems are shown in Appendix 7.

4.6 PSYCHIATRIC PROBLEMS

Table 4.0 shows that 3% of the entire sample reported suffering some form of psychiatric problem. This percentage is similar to the 2.6 % of Australian males reporting disorders of the nervous/emotional system (ABS, 1989-90), but lower than the figure of ~15% reported by Polish maritime industry personnel (Nitka, 1989).

Other maritime evidence suggests the development of neurosis is a major health problem in seafarers, and appears to be related to time spent in the industry rather than age of sufferers (Filikowski, 1989). In fact, a study by Tomaszunas & Mroziski (1990) found that among seafarers repatriated from ships, mental disorders and diseases of the nervous system were the second most prevalent cause of repatriation, behind diseases of the circulatory system.

Previous comments (at the beginning of this section) regarding the limitations of self-report health data may be more applicable to psychiatric disease than some other conditions. These limitations should be heeded when considering the relatively small percentage of the present sample reporting psychiatric problems.

4.7 HOSPITALISATION

Forty six percent of all respondents reported being hospitalised within the last 10 years. The history of hospitalisation was consistent across the groups with a similar percentage of all groups (range 41-49%) reporting hospitalisation within this period. Almost half the crew members reported being hospitalised during a ten year period. This finding suggests that closer examination of the responses to this question could be warranted to determine the causes of hospitalisation (i.e. accident or illness).

Direct comparisons of hospitalisation data with other population research is difficult due to different time periods invoked for reporting the data. For example, 13.7% of the Australian population reported one or more hospital episodes during a 12 month period (ABS, 1991). Maritime data shows

that 11% of a sample of American seafarers had been hospitalised during a six-month period (Sparks, 1992).

4.8 MEDICATION

Some form of medication was taken by 26% of the respondents with the range extending from 23% for masters/mates to 31% for pilots. While the data did not differentiate between the types of medication used, it is possible that they were associated with the treatment of blood pressure or sleep problems as these were more prevalent in the maritime population. Australian normative data (ABS, 1991) indicates that 64.5% of Australian adult use some form of medication. However, direct comparison with that reported in this investigation is difficult as the ABS data also includes vitamins and mineral supplements.

4.9 FAMILY HISTORY OF CARDIO-VASCULAR DISEASE (CVD)

Approximately 15% of all seafarers reported a history of CVD in their immediate family. This percentage was similar for all groups, with a slightly higher number of pilots reporting a family history of CVD.

4.10 CHOLESTEROL > 5.5 MMOL/L

Cholesterol levels higher than 5.5 mmol/1 were reported by 10% of the entire sample. This percentage is considerably lower than that reported for Australian males, which indicated that 47% had measured cholesterol levels above this figure (NHF, 1989). Figures for American merchant seamen have shown that 37% of the seamen had measured cholesterol above this level (Brown, 1990). This discrepancy in results may reflect

differences between self-report (present study) and direct measures of cholesterol.

Comparison of the different occupational groups on this measure indicated that the percentage of pilots reporting higher cholesterol levels (26%) was higher than for other groups (borderline statistical significance) but lower than that reported for Port Phillip pilots (46%) (Berger, 1984)

Relevant health concerns of some seafarers related to the lack of direct control over shipboard meals and respondents raised concern over the large amount of fried food and the absence of low-fat products on some ships.

4.11 PERMANENT RESTRICTION ON ACTIVITY

In this case, permanent restriction on activity is defined as a medical condition (including surgery) for which a doctor has recommended some permanent restriction on activity. Restriction on activity was reported by 8% of the survey sample and significant differences were found between the groups. A higher percentage of crew members than others reported some permanent restriction on activity. Since this group may have been involved in relatively more physical work in a very unsteady working environment, it is possible that restriction on activity may relate to problems in the lower extremities (knees and ankles) and lumbar spine. Torner and co-workers (1994) indicated the motions of pitching and rolling on board ships are very much counteracted by motions of the lower extremities thus increasing the strain in these parts of the body. Additionally, individuals who are colour blind are restricted from performing lookout duties. Further

analysis would be required to show the causes of activity restriction. Additionally the percentage of seafarers reporting permanent restriction on activity may also question the effectiveness of rehabilitation programs following injury.

A recent unpublished report (Patel and Wickramatillake, 1997) analysed the incidence of disease and injury diagnosed at sea or at ports of call among Australian seafarers between 1986 and 1996. Direct comparisons with the present study are not possible given the different methods of data collection. However, the authors indicated in Australian seafarers over a 10 year period, over 50% of the diagnosed diseases were either musculo-skeletal (27%) or respiratory (26%). Digestive system (16%) and infectious diseases (12%) were the next most prevalently diagnosed problems.

4.12 SUMMARY

Blood pressure was the only cardio-vascular disease risk factor which was higher than Australian normative data. Compared with other maritime data Australian seafarers generally displayed better health profiles. However, some issues such as the type of medication being taken and the causes of hospitalisation warrant further examination. The occurrence of auditory problems in engineers is consistent with findings from previous maritime studies. Although this condition is a common problem for engineers, strict implementation of guidelines for exposure to noise levels in industry would impact on the incidence of auditory problems.

SECTION 5

HEALTH-RELATED BEHAVIOUR AND STRESS AT SEA

Smoking

Drinking

Exercise

Sleep

Relaxation

Stress

Miscellaneous comments

Table 5.0: Health-related behaviour at sea for the entire maritime sample and four occupational groups.

Variable	Total	Pilots	Masters/Mates	Engineers	Crew	Level of Statistical Significance[1]
Smoking						
Smokers (%)	28.3	10.3	20.1	17.8	37.3	***
No of cigarettes per day [Mean (SEM)]	20.2 (0.6)	15.6 (4.7)	18.4 (1.3)	17.1 (1.1)	21.3 (0.8)	ns
Drinking Alcohol						
Drinkers (%)	52.2	6.9	42.9	58.0	54.7	***
Drinking days per week						ns
< 5	74.2	100.0	77.3	68.9	75.5	
5 or more	25.8	0.0	22.7	31.1	24.5	
Drinks per day						***
1-2	41.8	50.0	71.7	53.2	25.2	
3 or more	58.2	50.0	28.3	46.8	74.8	
NHF Guidelines [a]						
Exceeds NHF guidelines for alcohol (%)	31.7	3.4	13.4	29.9	41.6	***
Aerobic Exercise						
Does not meet NHF recommended levels (%)[b]	81.5	72.4	79.0	89.3	79.5	***

[1] Level of statistical significance: *** = $p < 0.001$ represents a statistically significant difference between the groups after adjusting for age differences, ns = not significantly different at $p < 0.01$ level.

[a]= NHF (National Heart Foundation) guidelines for alcohol consumption = 1-2 standard drinks per day with at least 2 days per week alcohol free. This was calculated from the number of drinkers per day, and the number of drinking days per week in questionnaire responses. Instructions were provided in the questionnaire describing standard drinks.

[b]= NHF (National Heart Foundation) guidelines for exercise prescription for health and general; that is, moderate intensity aerobic type activity (e.g., running, jogging, cycling, aerobics), 3 or more times per week for a duration of 20 minutes or more. This was calculated from the number of exercise sessions per week and the duration of exercise sessions.

5.1 SMOKING

Approximately 28% of maritime personnel were regular smokers, which is slightly higher than the incidence (~24-26%) amongst Australian men (NHF, 1989; ABS, 1989-90) (Table 5.0). This relatively higher incidence of smoking was primarily due to the high incidence amongst crew (37%) (Figure 5.0). The percentage of smokers among crew was similar to Port Philip pilots (33%) surveyed more than 10 years ago; whereas the incidence in the remaining groups was lower than the national average for men. Compared with the smoking incidence amongst Polish (40%; Tomaszewski et al., 1990) and Chinese seafarers (80%; Jinghong, 1991) as well as American navy personnel (50%; Cronan et al., 1991), the incidence amongst the present Australian maritime population is very low; it is, however, comparable to the incidence of smoking among American masters, mates and pilots (29%; Sparks, 1992). The number of cigarettes smoked per day (20.2) was slightly higher in the entire maritime group compared with other Australian males (18 per day; NHF, 1989). This relatively higher frequency was, again, due to crew who smoked more frequently than the remaining groups (Table 5.0). Individual comments raised concern about the discomfort associated with exposure to high levels of passive smoke in certain enclosed work areas (e.g. wheelhouse). Hence, consideration to further enforce designated non-smoking zones may enhance the working environment.

Despite the slight differences in both smoking incidence and frequency between the crew and remaining groups, crew do not self-report a higher incidence of cardiovascular or lung disease (Table 4.0). This suggests that the health impact of these differences may not be clinically significant at the present time; however, objective testing of lung function would enable early signs of disease to be detected.

Figure 5.0: Percentage of smokers at sea for the entire maritime sample and four occupational groups.

Statistically significant difference between the groups, p < 0.001.
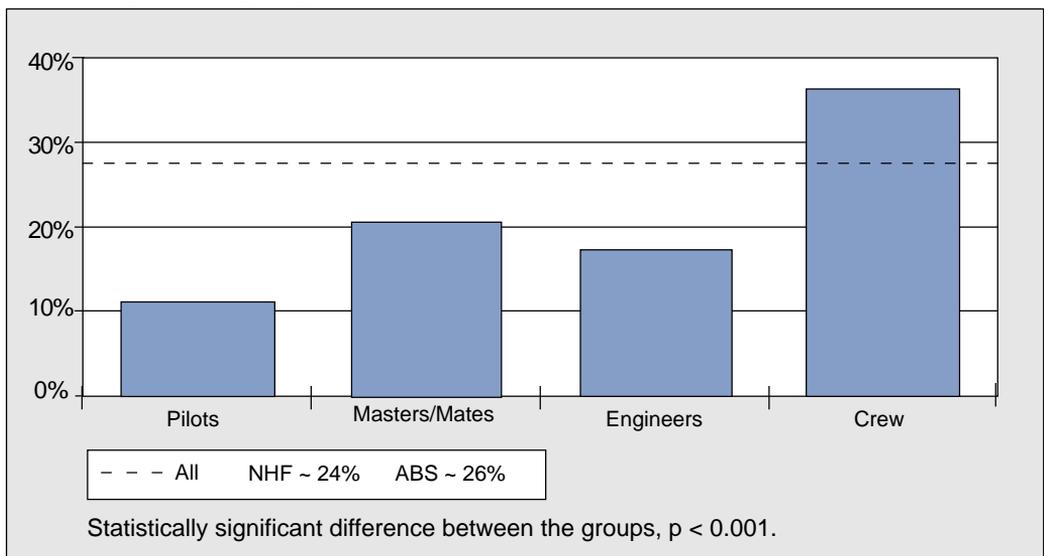
5.2 DRINKING ALCOHOL

Over half the maritime personnel reported drinking alcohol at sea, with significant differences in drinking incidence between the maritime groups (Table 5.0). The incidence of drinking in Australian seafarers is comparable to a figure indicating 51% of a sample of American masters, mates and pilots (n=93) drank alcohol while working at sea (Sparks, 1992).

In the present sample, the incidence of drinking was higher in engineers and crew compared with masters/mates and, in particular, the pilots (Table 5.0). Approximately 32% of all maritime personnel exceeded the safe limits of alcohol consumption recommended by the National Heart Foundation (1989). Again, a relatively higher proportion of both crew and, to a lesser extent, engineers exceeded these recommended limits (Figure 5.1). This is consistent with the finding that relatively more crew who drank consumed three or more drinks per day, as opposed to a

relatively lower incidence of high frequency drinking amongst those who consumed alcohol in the other groups (Table 5.0).

Comparative data on alcohol consumption in other occupational groups is lacking. However, drinking and smoking are 'social' behaviours. That they are both relatively higher in incidence and frequency amongst crew is consistent with the relaxation habits reported for the occupational groups (see Table 5.1). The relatively low frequency of drinking amongst pilots is also consistent with the relatively short periods they spend relaxing at sea and the on call nature of a pilot's work while on the ship. Given that many respondents indicated a need for "quit" drinking and smoking programs, further data analysis would be required to determine if such programs are warranted. If so, targeting "social" time at sea might be one strategy by which to attempt to reduce smoking and/or drinking in maritime personnel.

Figure 5.1. The percentage of drinkers who exceed the National Heart Foundation guidelines for alcohol consumption at sea for the entire maritime sample and four occupational groups.

Statistically significant difference between the groups, p < 0.001.
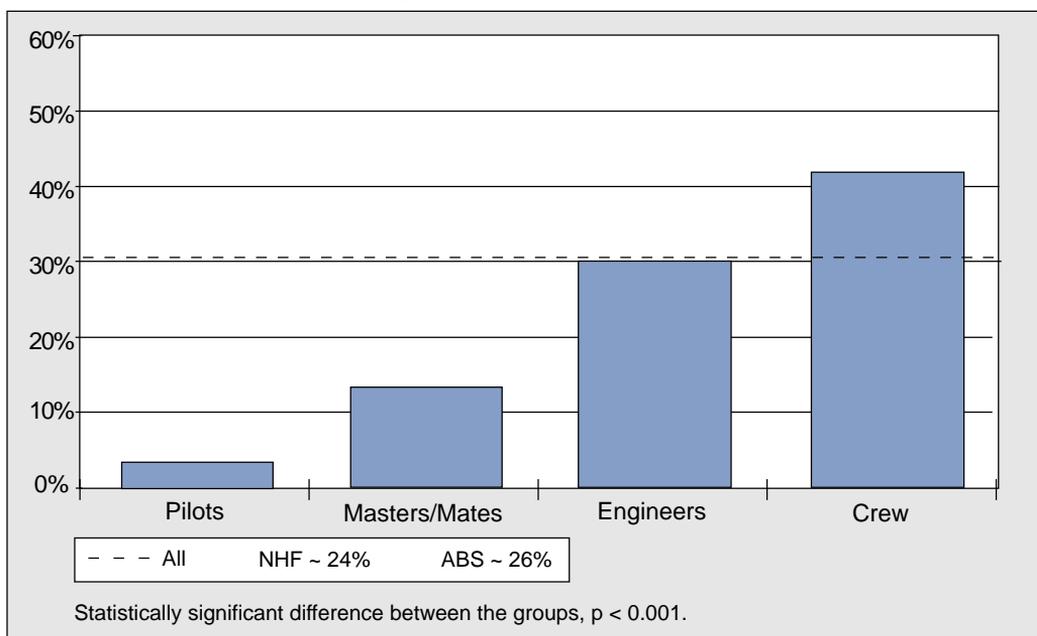
5.3 AEROBIC EXERCISE

Aerobic exercise includes activities such as walking, jogging, cycling or swimming. Alternative types of exercise, such as weight lifting, were not included in the data represented in Table 5.0. To achieve the levels of aerobic exercise that appear to exert a significant and positive effect on cardiovascular and respiratory health, the National Heart Foundation (1989) has published guidelines that establish minimal levels for exercise intensity, duration and frequency. Approximately 81% of maritime personnel failed to reach these minimum exercise levels required for good health and cardiorespiratory fitness (Figure 5.2) (NHF, 1989). This figure is higher than the statistic reported for Australian men on shore (i.e. ~70%: NHF, 1989) Miscellaneous responses indicated that exercise facilities varied considerably across ships, ranging from excellent to either inappropriate or non-existent.

Improving inadequate exercise facilities on ships and increasing access to these facilities would help maintain exercise behaviours adopted ashore, and perhaps encourage less active personnel to be more active.

There were significant differences between the groups, with relatively poorer exercise habits in engineers compared with crew, masters/mates and, in particular, pilots (Figure 5.2). This discrepancy might be related to the perception by engineers, obtained from miscellaneous comments, that they undertake enough exercise 'while working', and that exposure to heat and humidity in the engine room makes them less inclined to pursue additional exercise. Such perceptions, together with a consideration of other health-related behaviour, should inform judgement concerning strategies that might be implemented to encourage a healthier approach to working and living at sea.

Figure 5.2: Percentage of the entire maritime sample and four occupational groups who do not meet NHF guidelines for exercise at sea.

Statistically significant difference between the groups, p < 0.001.
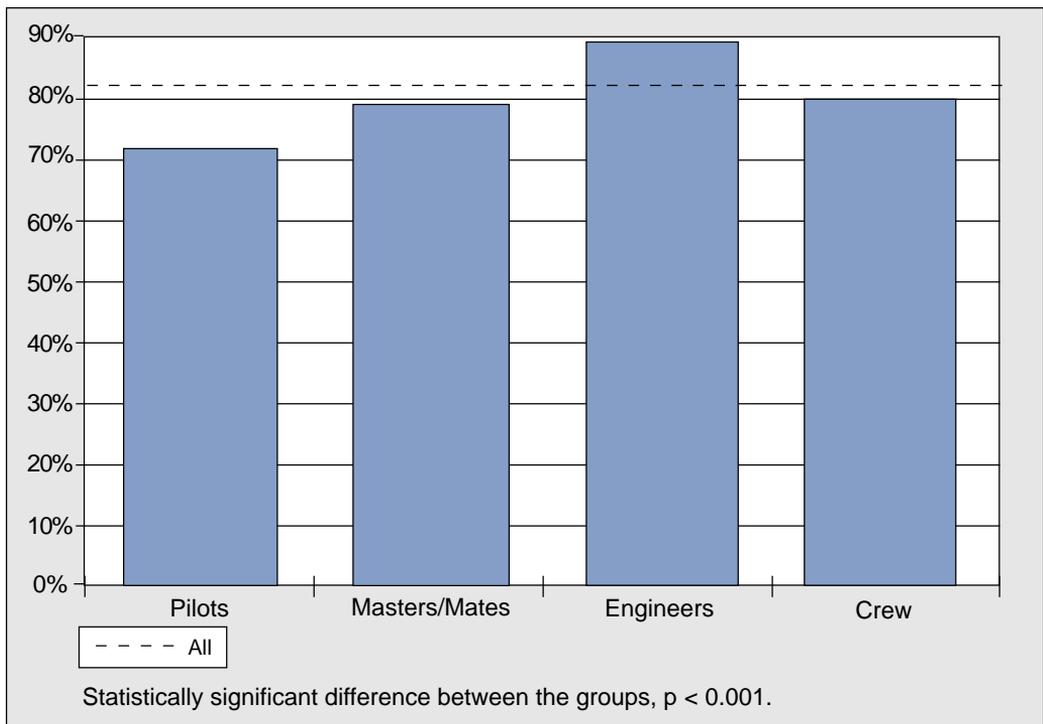
Table 5.1: Sleep, stress and relaxation at sea in the entire maritime sample and four occupational groups.

Variable	Total %	Pilots %	Masters/ Mates %	Engineers %	Crew %	Level of Statistical Significance[1]
Sleep quality						** X
Very poor-poor	27.5	31.0	24.4	30.3	27.7	
Fair	42.3	24.2	41.7	43.8	42.1	
Good-very good	30.2	44.8	33.9	25.9	30.2	
Hours of daily sleep						*** X
Less than 4	2.2	30.7	1.3	1.5	2.2	
4-6	47.9	65.5	49.6	45.6	47.9	
7-8	46.8	3.8	48.7	50.3	45.7	
More than 8	3.3	1.0	0.4	2.6	4.2	
Hours of daily relaxation						*** X
0	4.6	50.0	7.9	4.2	2.2	
1-3	80.4	50.0	87.5	85.4	75.5	
4-7	14.5	0.0	4.6	10.4	21.4	
Frequency of stress						*** X
More than 7	0.5	0.0	0.0	0.0	0.9	
Never	9.3	20.7	4.8	5.4	13.0	
Occasional	61.5	68.9	65.0	57.7	61.5	
Frequent	23.7	10.3	25.4	31.5	19.6	
Constant	5.5	0.1	4.8	5.4	5.9	
Level of stress						*** X
Mild	39.9	60.8	38.1	32.6	42.1	
Moderate	49.4	21.7	51.4	54.9	44.6	
High	10.7	17.5	10.5	12.5	13.3	

[1] Level of statistical significance: *** = $p < 0.001$, ** = $p < 0.01$ represents a statistically significant difference between the groups.

X Age adjustment was not permitted due to the skewed distribution of responses in some groups

5.4 SLEEP

As revealed in Table 5.1, approximately 30% of the entire maritime sample reported the quality of their sleep at sea was good; whereas the majority of the sample (~70%) reported that their sleep quality was either fair or poor-very poor (Figure 5.3). Given that sleep at sea is associated with many factors such as noise and vibration from engines, generators, airconditioning and ventilation units (Osler, 1997; Parkes, 1994), this finding is not unexpected, and raises question about the suitability of current noise standards for the accommodation areas of ships. The incidence of poor sleep quality in the entire sample (~28%) is consistent with other reports of poor sleep quality amongst UK (30%; Shipley, 1978) and Port Philip pilots (25%; Berger, 1983b). These comparisons suggest that the relatively high incidence of poor sleep quality in seafaring personnel is not solely limited to the Australian industry.

Both pilots and engineers reported a slightly higher incidence of poor sleep quality compared with crew and masters/mates. This may be attributable to the fact that both of the former groups are involved in on call duties while at sea. Apprehension associated with being on call has been reported as reducing perceived sleep quality (Torsvall et al., 1987; Torsvall & Akerstedt, 1988).

Even in the presence of good sleep quality, insufficient duration of sleep could lead to a progressive accumulation of fatigue (Krueger, 1989). The majority of the entire sample (i.e.

~95%) received either 4-6 or 7-8 hours sleep per day. However, there were significant differences between groups. Approximately 30% of pilots received less than 4 hours sleep per day (Figure 5.4), while a further 65% reported between 4 and 6 hours. These differences reflect the on board nature of pilotage duties. Pilots are required to be on call at all times while at sea, and the hours of sleep experienced are dependent upon such factors as: weather conditions, shipping traffic density, reliability of the bridge team and the ship's equipment. Furthermore, pilots sleep may be compromised between work assignments due to time spent travelling to the next assignment, and the varying standards of sleeping accommodation in some remote areas while ashore.

Inadequate amounts of sleep have been linked with performance decrements, mood deterioration, and fatigue (Bohnen

Figure 5.3: Percentage of the entire maritime sample and four occupational groups reporting fair-poor-very poor quality sleep at sea.
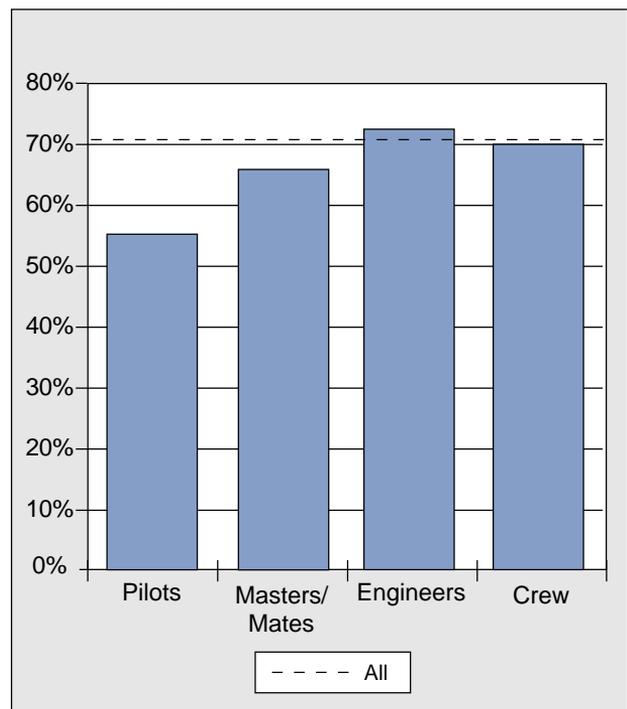
& Gaillard, 1994; Haslam, 1982; Krueger, 1989) which in turn increase the risk of errors and/or accidents (Krueger, 1989). Given the enormous economic and environmental consequences associated with shipping accidents, the impact of reduced sleep on work performance requires close scrutiny across the industry.

There is some evidence that even the moderate levels of sleep received by most of the maritime sample (i.e. 4-6 hours per night) (Table 5.1) could be detrimental to performance and mood. Naitoh (1976) described the concept of personal individualised sleep barriers. This barrier represents the absolute minimum amount of sleep an individual can function on without impairment. If sleep duration is less than this barrier, an accumulated sleep deficit is incurred (Naitoh, 1976; Tilley et al., 1982) and adverse effects (previously described) may be experienced. Additionally, poor quality sleep compounds the sleep decrements (Krueger, 1989). As a consequence, safety within the workplace may be seriously jeopardised (Tilley et al., 1982).

The impact of, and reasons for, the moderate sleep duration (4-6 hours), particularly if combined with fair or poor sleep quality, reported by Australian seafarers should be further investigated. This is relevant given that the highest percentage of miscellaneous comments regarding additional sources of stress at sea related to the poor sleep behaviour and its progressive effect on fatigue. For example, some respondents reported working for 16-18 hours daily and then experiencing poor quality, short duration sleep during subsequent days or weeks. Under such circumstances it is highly probable that a sleep deficit will be experienced. In turn, fatigue may

accumulate and performance and mood will deteriorate (Tilley et al., 1982). The present seafarers' comments raised concern that safety was being compromised when returning to duty after poor sleep, particularly when more dangerous tasks, such as ship handling in busy traffic and bad weather, were performed. Similar reports of long working hours and poor quality sleep in the maritime industry have been reported elsewhere (Osler, 1997).

Comments from the present respondents indicated they accepted that working at sea was, by the nature of the environment, associated with some disturbances to normal sleeping patterns. However, sleep was worsened on many ships by factors such as the location of the sleeping accommodation in close proximity to noise sources, as well as the poor soundproofing of sleeping accommodation. Moreover, seafarers also indicated that the short duration sleep (4-6 hours) was more fragmented, often being broken into two, three hour periods of sleep of poor quality. This was often the case when the ship visited a number of ports in a short time and/or during bad weather.

Figure 5.4: Percentage of the entire maritime sample and four occupational groups reporting less than 4 hours of daily sleep at sea.
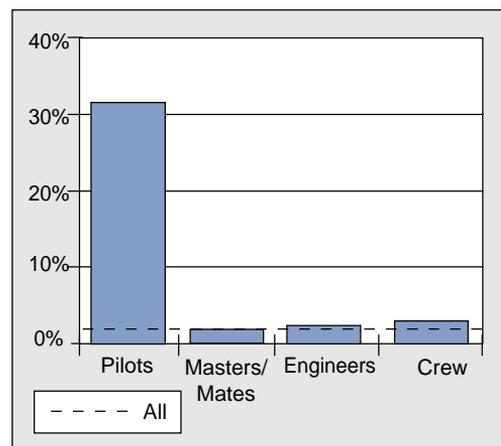
5.5 STRESS

Data shown in Table 5.1 provides an initial insight into stress in the Australian maritime population. It clearly illustrates that all aspects of maritime work are potentially associated with stress that, in most respondents, is experienced occasionally, and in about 24% of the sample, is experienced frequently. A very small percentage of seafarers reported constant stress. The level of stress ranges from mild (in 40% of the sample) to high (in 11% of the sample). That the majority of seafarers reported occasional or frequent stress (~85%) and moderate to high levels of stress (~60%) at sea demonstrates that work at sea, regardless of the occupation, is associated with considerable stress (Figures 5.5 and 5.6).

Miscellaneous comments provide some further insight into the causes of stress across all groups. Respondents indicated that stress at sea was chiefly related to the quality of sleep, work schedules and hours and feeling fatigued. This is consistent with data presented in Table 5.1 which shows the high incidence of fair or poor quality sleep amongst personnel, as well as with other miscellaneous commentaries that related this phenomenon to the accumulation of fatigue in some workers. Furthermore, changes in pilotage operations resulting in increased competition for business have been cited as causing considerable stress amongst this professional group.

Figure 5.5: Percentage of the entire maritime sample and four occupational groups reporting occasional-frequent stress at sea.

Figure 5.6: Percentage of the entire maritime sample and four occupational groups reporting moderate-high stress levels at sea.
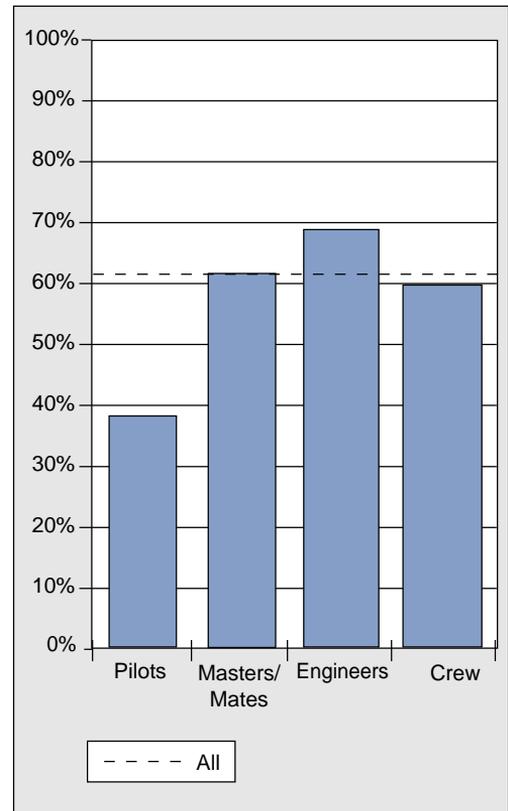
5.6 RELAXATION

Relaxation was classified as watching television, reading, playing cards or engaging in hobbies. The majority of maritime personnel reported achieving 1-3 hours of relaxation per day, with approximately 15% of the group achieving more relaxation per day (Table 5.1).

In the present sample significant differences between the groups were evident; in particular, 50% of pilots failed to achieve any relaxation during the day (Figure 5.7). This is consistent with the on call nature of pilotage work whilst at sea. In contrast to other seafaring groups, pilots are allocated time ashore between work assignments for relaxation and recuperation. It can also be noted that between 2 and 8% of other seafaring groups reported no daily relaxation. This may reflect individual commentaries which indicated that in some instances, excessive workloads were experienced for a large proportion of the swing leaving no time for relaxation (Appendix 7).

5.7 SUMMARY

The data indicates that, while working and living at sea, a considerable proportion of seafarers smoke, about one-third exceed the NHF safe limits for alcohol consumption, and a very high number of seafarers do not meet the exercise levels recommended by the NHF. This is especially the case with crew. The potential impact that these behaviours have on common disorders such as cardiovascular and lung disease suggests they should be more closely examined. The quality and duration of sleep is often fair to poor, particularly amongst pilots. Because of the nature of pilotage duties this group also report they have very little if any, time for relaxation whilst at sea. All groups of seafarers experience occasional to frequent stress that, more often, ranges between moderate and high levels. The impact that this has on both health and work performance warrants closer evaluation.

Figure 5.7: Percentage of the entire maritime sample and four occupational groups reporting no daily relaxation at sea.
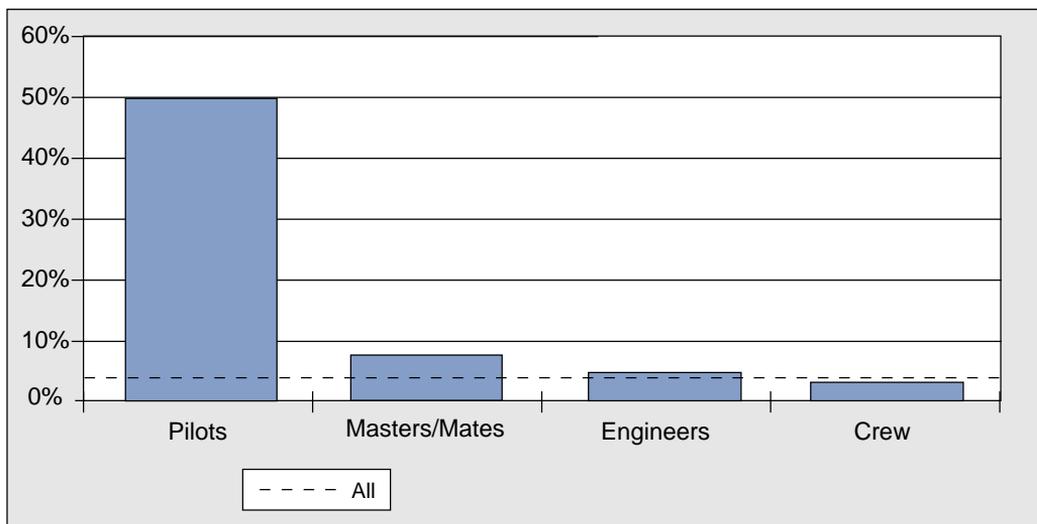
SECTION 6

NUTRITION AND ASSOCIATED ATTITUDES AT SEA

Sugar

Fat

Fibre

Nutritional relevance

Pronutrition

Nutrition excuses

Food exploration

Miscellaneous comments

Table 6.0: Scores for the frequency of food habits at sea in the entire maritime sample and four occupational groups. Values are mean (SEM)

Variable	Total %	Pilots %	Masters/ Mates %	Engineers %	Crew %	Level of Statistical Significance[1]
Sugar food habit	2.6 (0.02)	1.9 (0.20)	2.7 (0.04)	2.7 (0.03)	2.5 (0.03)	***
Fat food habit	2.6 (0.01)	2.3 (0.11)	2.7 (0.02)	2.7 (0.02)	2.6 (0.02)	***
Fibre food habit	4.4 (0.02)	3.7 (0.16)	4.4 (0.04)	4.3 (0.04)	4.3 (0.04)	***

SEM = Standard Error of the Mean

[1] Level of statistical significance: *** = $p < 0.001$ represents a statistically significant difference between the groups after adjusting for age differences.

Table 6.1: Nutritional attitude scores in the entire maritime sample and four occupational groups. Values are mean (SEM)

Variable	Normative Group*	Total %	Pilots %	Masters/ Mates %	Engineers %	Crew %	Level of Statistical Significance[1]
Nutritional relevance	4.3 (0.04)	5.2 (0.02) #	5.0 (0.17)	5.3 (0.03)	5.3 (0.03)	5.1 (0.04)	***
Pro-Nutrition	1.9 (0.02)	2.1 (0.03) #	2.1 (0.22)	2.1 (0.05)	2.1 (0.05)	2.0 (0.04)	ns
Nutrition excuses	3.8 (0.03)	3.9 (0.03)	3.1 (0.24)	3.8 (0.05)	3.9 (0.05)	3.9 (0.05)	ns
Food exploration	4.4 (0.02)	5.0 (0.03) #	5.1 (0.18)	5.2 (0.05)	4.9 (0.05)	4.9 (0.05)	ns

SEM = Standard Error of the Mean

[1] Level of statistical significance: *** = $p < 0.001$ represents a statistically significant difference between the groups after adjusting for age differences, ns = not significantly different at $p < 0.01$ level.

 * Normative group= 1195 responses from white and blue collar workers.

Significantly different to normative data, $p < 0.01$ level.

Table 6.0 shows scores for the frequency of three food habits (propensity to eat certain types of food: i.e. sugar, fat and fibre) amongst the maritime groups. The score for each of the food habits was the sum of the responses to a number of individual questions measuring the frequency of consuming sugar, fat and fibre. Scoring for each of the food habits was based on a six-point scale ranging from never (score = 1) to every day (score = 6). Consequently, a higher score for a particular item indicates more frequent consumption of that particular food.

The three food habit scores are correlated with the actual sugar, fat and fibre consumption as measured by a full food frequency questionnaire in a test sample (Cochrane, 1994). The three scores are used here because a full food frequency questionnaire would have placed unreasonable demands on the present respondents. The scores do not actually measure the amount of sugar, fat and fibre consumed in absolute terms but can be used to make comparisons across groups and between sea and ashore.

6.1 SUGAR, FAT AND FIBRE

Table 6.0 indicates those personnel at sea for extended periods of time reported more frequent consumption of sugar, fat and fibre than the pilot group. This difference might relate to the reduced time that pilots spend aboard each ship, and relatively longer periods of exposure to these foods experienced by officers and crew members.

As the data were corrected for age, the lower consumption of sugar, fat and fibre by the pilots were not attributable to the older age profile of this group. It is possible that the work practices of changing ships and the varying fare offered on foreign flag vessels may have influenced the results.

Comments from individual seafarers relevant to this issue raised concerns relating to the lack of direct control over shipboard meals, and the large amounts of fried food and absence of low-fat products on some ships.

No data were collected regarding timing of meals during the working day.

6.2 NUTRITIONAL ATTITUDES

Nutritional attitudes are defined as the preferences and feelings one holds towards nutrition. These attitudes were assessed through four dimensions: nutritional relevance, pronutrition, nutrition excuses and food exploration (Cochrane, 1994). Nutritional attitude data is shown in Table 6.1.

The score for each of the dimensions of nutritional attitude was the sum of responses to a number of individual questions. Scoring for each of the dimensions of nutritional attitude (nutritional relevance, pronutrition, nutrition excuses and food exploration) was measured on a six-point scale ranging from strongly agree (scale = 1) to strongly disagree (scale = 6).

6.3 NUTRITIONAL RELEVANCE

Nutritional relevance measured if and why nutrition was important to the respondent. A higher score indicated that the respondents perceived nutrition as being of greater relevance. Overall, maritime personnel rated the relevance of nutrition to their own health significantly higher than the normative group.

When contrasting seafaring groups, significant differences existed. Pilots and crew members rated nutrition as less relevant to their health than engineers and masters/mates.

6.4 PRONUTRITION

Pronutrition measured the beliefs the respondents had about the importance of nutrition to peoples' lives. A higher score indicated negative nutritional beliefs (e.g. nutrition was not important). Seafarers, held more negative beliefs than the normative group regarding the importance of nutrition.

Comparisons between the maritime groups revealed no significant differences on pronutrition scores, thereby indicating each of the occupational groups held similar beliefs about the importance of nutrition.

6.5 NUTRITION EXCUSES

Nutrition excuses measured the reasons people offer for not adopting healthier eating practices. A higher score indicated that the individual offered fewer excuses for not adopting healthier eating habits. As revealed in Table 6.1, seafarers were similar to shore-based workers in the number of nutritional excuses offered for not adopting healthier eating habits.

The slightly lower score in the pilot group suggests that there was a tendency for pilots to offer more excuses for not adopting healthier eating habits than other groups. This may be related to the fact that when on a tour of duty, the pilots catering source continually changes. Pilots move between various on shore accommodation sites and work on a number of different types of ships. Hence, pilots may perceive that they have very little control over what they eat.

6.6 FOOD EXPLORATION

Food exploration measured the tendency of individuals to try new foods. A higher score indicated individuals were more explorative with food. The total maritime group demonstrated a greater tendency towards exploring new foods compared with the normative group. Given that seafarers have little control over shipboard catering this finding is not unexpected. There were no significant differences in this nutritional dimension between maritime groups.

6.7 SUMMARY

The findings from this section indicated that pilots consumed less sugar, fat and fibre whilst at sea as compared with the other maritime groups. This may be related to the distinct differences in work patterns between the groups (i.e. pilots frequently transit between shore and sea, and work on a number of different ships). Individual seafarers did express concern relating to their lack of direct control over shipboard meals, the large amounts of fried food and lack of availability of low-fat products on some ships.

Overall, the maritime groups rated the relevance of nutrition higher, had slightly more negative beliefs about the importance of nutrition, and were more explorative with food than the normative group. The only difference between the maritime groups was in the measure of nutritional relevance. Pilots and crew members rated nutrition as less relevant to their health than engineers and masters/mates.

SECTION 7

COMPARISON OF HEALTH -RELATED BEHAVIOUR AND
STRESS AT SEA AND ASHORE

Smoking

Drinking

Exercising

Sleep

Stress

Relaxation

Sugar

Fat

Fibre

Miscellaneous comments

Table 7.0 : Health-related behaviours at sea and ashore for all maritime personnel

Behaviours	Sea	Ashore	Level of Statistical Significance[1]
Smoking			
Smokers (%)	28.3	28.8	ns
Cigarettes per day [Mean (SEM)]	20.2 (0.6)	18.1 (0.5)	***
Drinking			
Drinkers (%)	52.2	90.3	***
Drinks per week [Mean (SEM)]	11.6 (0.4)	14.8 (0.4)	***
Exceeds NHF Guidelines for alcohol (%) [a]	31.7	68.7	***
Aerobic Exercise			
Percentage that exercise (%)	38.7	39.2	ns
Exercise frequency (3 times per week) (%)	39.9	49.0	***
Exercise duration (20 minutes or more) (%)	75.8	98.5	***
Meet NHF guidelines [b] for exercise (%)	18.3	18.7	ns

SEM = Standard Error of the Mean

[1] Level of statistical significance: *** = $p < 0.001$ represents a statistically significant difference between the groups after adjusting for age differences, ns = not significantly different at $p < 0.01$ level.

[a]= NHF (National Heart Foundation) guidelines for alcohol consumption = 1-2 standard drinks per day with at least 2 days per week alcohol free. Instructions were provided in the questionnaire describing standard drinks.

[b]= NHF (National Heart Foundation) guidelines for exercise prescription for health and general fitness = moderate intensity aerobic type activity, 3 or more times per week for a duration of 20 minutes or more.

7.1 SMOKING

The percentage of smokers at sea and ashore were not significantly different; however, the smoking frequency was significantly higher when at sea (Figure 7.0). A similar pattern has been reported by Cronan & Colleagues (1991) who noted that sea-going navy personnel have a higher frequency of smoking compared with those personnel ashore. This apparent trend may be related to the higher levels of boredom and/or stress experienced at sea, as both these factors have been associated with an increased frequency of smoking (Berger, 1983a; Fisher, 1993). In addition, other factors such as the lower cost of cigarettes and the availability of leisure time may contribute to the higher smoking rates at sea. Thus when looking to implement strategies to reduce smoking incidence and frequency, factors such as stress and boredom should be addressed. That some personnel stated there was a need for 'quit' programs for smoking to be implemented at sea illustrates that, at least some personnel might be receptive to strategies that attempt to reduce smoking at sea.

Figure 7.0: Number of cigarettes smoked per day by the entire maritime sample at sea and ashore.

NHF ~ 18/day

*** = Statistically significant difference between sea and ashore, $p < 0.001$.
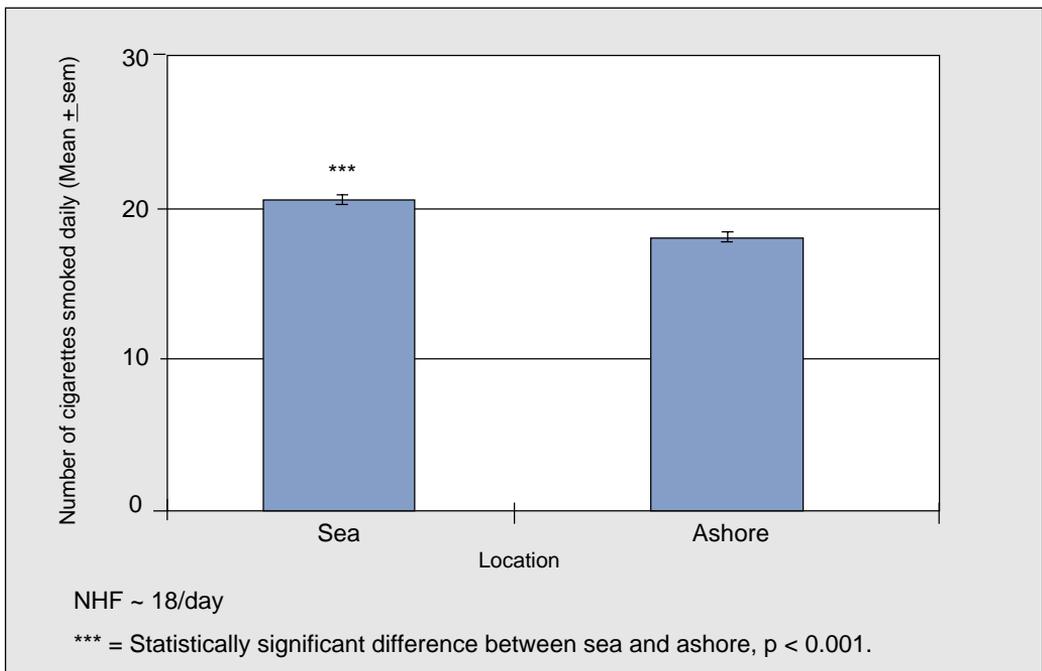
7.2 DRINKING ALCOHOL

There were significant differences in drinking habits at sea and ashore. (Figure 7.1). While ashore nearly all personnel reported drinking alcohol, and drinkers consumed a significantly higher number of drinks per week. The higher number of drinks per week consumed ashore compared with at sea (Table 7.0) is consistent with data showing an increase in the amount of alcohol consumed by shiftworkers on days off (or time ashore in this case) (Fisher & Read, 1987).

Importantly, the proportion of maritime personnel who exceeded the NHF safe limits for alcohol consumption increased more than two-fold when ashore (68.7%)

compared with at sea (31.7%), and was higher than Australian population data indicating ~50% of males exceed the guidelines (NHF, 1989). Traditionally, the seafaring life has been associated with a considerable degree of alcohol consumption by some employees. In fact, in a review of maritime studies alcoholism has been cited as a potential occupational risk of seafaring (Parker et al., 1996). The differences in the consumption of alcohol in the present seafarers at sea and ashore may be partly related to recent maritime industry guidelines for drinking at sea, and the existence of alcohol free or 'dry' ships in some sections of the industry (i.e. Offshore Oil and Gas).

Figure 7.1: Drinking habits of the entire maritime sample at sea and ashore.

*** = Statistically significant difference between sea and ashore, p < 0.001.

64
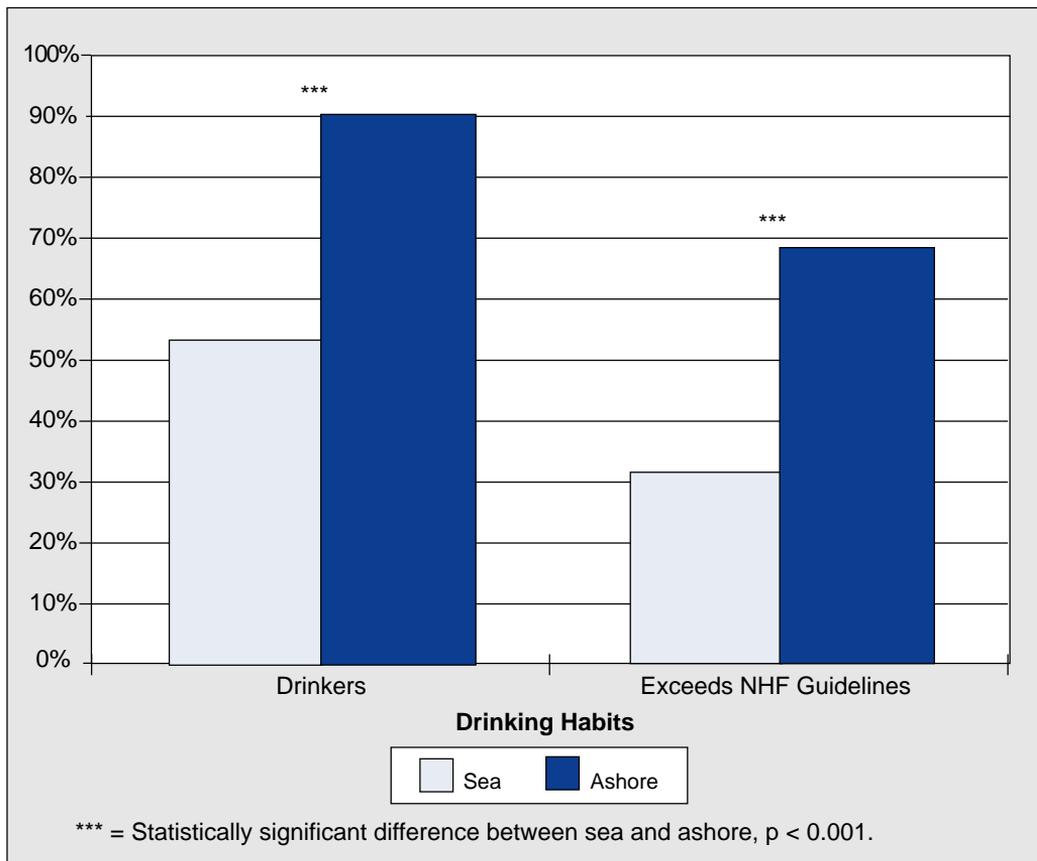
7.3 AEROBIC EXERCISE

A similar proportion of maritime personnel engaged in aerobic exercise at sea and ashore.   This suggests that those who perform aerobic exercise at sea also exercise ashore. The proportion of exercisers who met the National Heart Foundation limits for exercise duration and frequency increased significantly when ashore, suggesting that the at-sea environment impedes good exercise behaviour to some extent (Figure 7.2). However, improvement in exercise behaviour did not have a significant impact on the number of exercisers who met the NHF guidelines for exercise required to exert a positive effect on cardiorespiratory health. This would imply a need to educate those who do exercise to modify their exercise habits, perhaps only slightly, to achieve the minimal levels recommended

by the NHF. Although not presented in the report, data on the use of stress coping strategies indicated the present seafarers used stress coping strategies more than shore-based workers. In particular, crew members tended to use passive coping strategies (i.e. smoking) to a greater degree than other groups. Given the well established role of exercise as an active strategy to moderate stress levels, this focus for exercise could be incorporated with strategies to promote increased exercise participation. Strategies that encourage good exercise habits might also focus on promoting regular exercise amongst non-exercisers. In conjunction with other strategies designed to reduce stress and fatigue, the impact that increased exercise participation might have on health and, in particular, stress at sea deserves close attention.

Figure 7.2: Exercise habits of the entire maritime sample at sea and ashore.

*** = Statistically significant difference between sea and ashore $p < 0.001$.
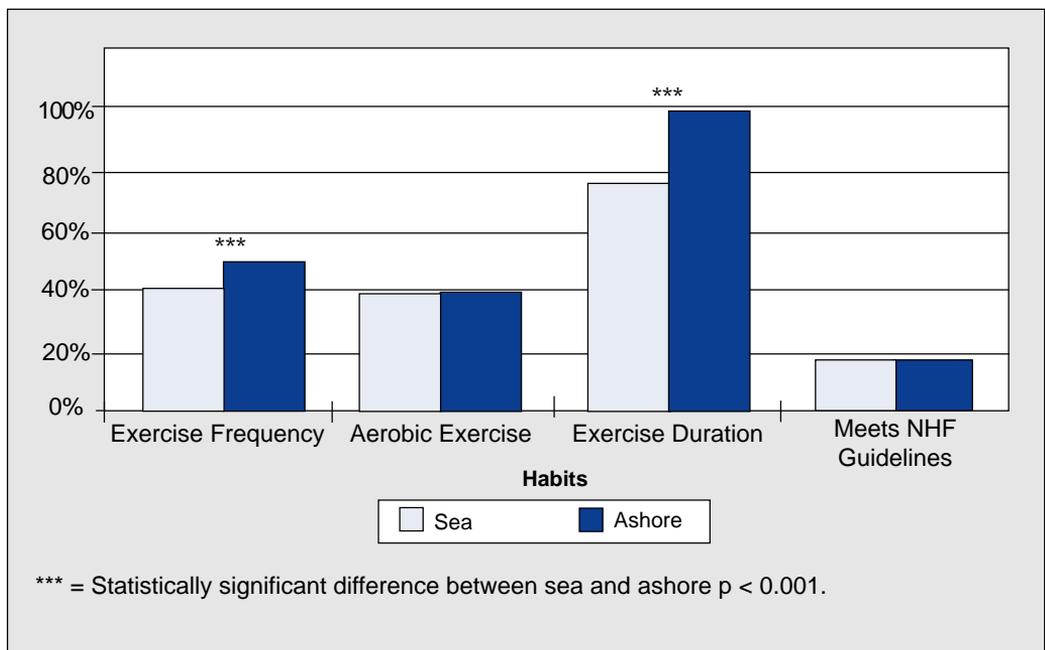
7.4 SLEEP, STRESS AND RELAXATION AT SEA AND ASHORE

Comparisons of health and lifestyle behaviour between sea and ashore revealed significant differences in the quality and duration of sleep (p < 0.001), the frequency and level of stress (p < 0.001) and the time spent relaxing each day (p < 0.001). Indications of the extent of these differences in selected levels of sleep, stress and relaxation are shown in Figure 7.3.

On these lifestyle variables it can be noted that when at sea the duration and quality of sleep was inferior, and stress was more frequent and of a higher level. However, the data indicated that seafarers were able to return to normal sleep patterns, experience less stress and spend more time relaxing when ashore.

Given the relatively long periods that can be spent at sea, and given the potential impact that inadequate sleep and relaxation can have on stress, fatigue and the health of the individual, the implementation of strategies that improve sleep and relaxation in all maritime groups needs to be considered.

Figure 7.3: Summary of selected sleep, stress and relaxation habits at sea and ashore for the entire maritime sample.
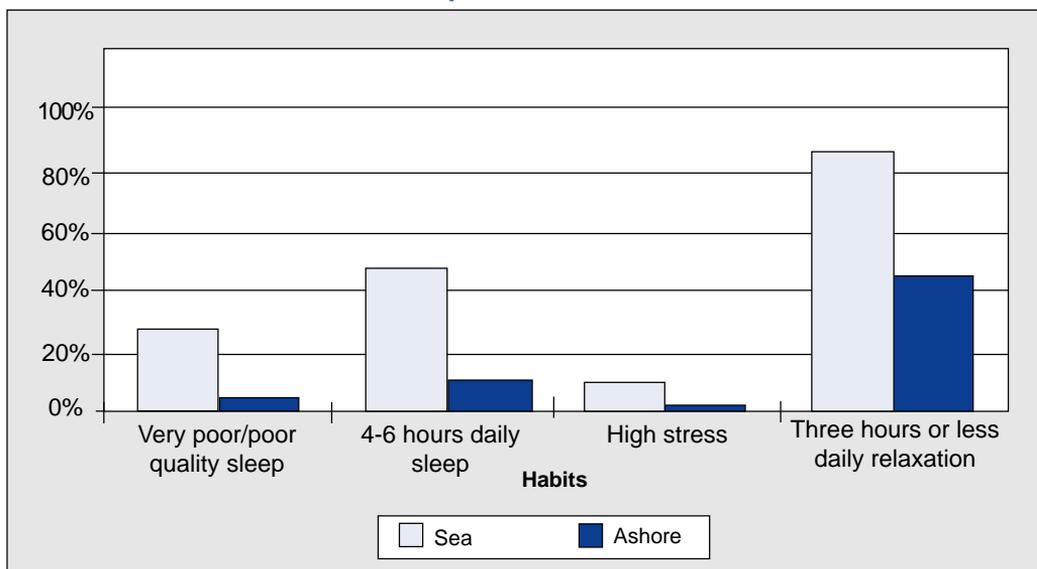
7.5 NUTRITION HABITS

Table 7.1 show a comparison of food habits at sea and ashore for the entire maritime group. The data indicate a significantly higher consumption of sugar and fat at sea compared with ashore. This suggests that the consumption of these foods may be influenced by the environment.

That slightly less fat is consumed ashore supports negative comments made by some maritime personnel suggesting foods high in fat due to cooking procedures are prevalent on board some ships. In addition, respondents suggested that there should be more low-fat food available while at sea. The food data indicates that a closer inspection of the types of food made available at sea, and its relationship to both the type of ship

and the duration of the swing, is required before further comment can be made about the real significance of both this data and personnels' individual comments.

Table 7.1: Food habits at sea and ashore for the entire maritime sample. Values are mean and (SEM).

| Food Habit	Sea	Ashore	Level of Statistical Significance[1]
Sugar	2.6 (0.02)	2.5 (0.02)	***
Fat	2.6 (0.01)	2.3 (0.02)	***
Fibre	4.4 (0.02)	4.3 (0.03)	ns

SEM= Standard error of the mean

[1] Level of statistical significance: *** = $p < 0.001$ represents a statistically significant difference between the groups after adjusting for age differences, ns = not significantly different at $p < 0.01$ level.

7.6 SUMMARY

The at-sea environment exerted both positive and negative effects on health-related behaviour. For example, the incidence and intensity of alcohol consumption was lower at-sea than ashore. That approximately 2-fold more maritime personnel exceeded the NHF safe limits for alcohol consumption ashore compared with at-sea might be of concern and, if so, its causes need further study. In contrast to drinking behaviour, the smoking frequency amongst those who smoked decreased slightly whilst ashore, and the exercise habits improved ashore amongst those who also exercised at sea. Yet, even ashore there was a relatively higher than normal smoking incidence amongst some maritime groups, as well as a relatively lower than normal incidence of exercise behaviour required to exert a positive cardiorespiratory health benefit. Given the consistency of the behaviours between the two environments, strategies to improve smoking and exercise behaviour could be considered and might even be implemented at-sea, with the potential for such effects to transfer to life ashore.

The duration and quality of sleep, as well as the time spent relaxing, improved amongst all maritime groups while ashore. This supports the common notion amongst seafarers that sleep is impaired at sea. That poor sleep probably contributes to fatigue and stress represents a primary problem with the at-sea environment that should be addressed. Nutritional habits were not influenced greatly by the environment, although the decrease in fat consumption ashore supports personnels' comments about the inadequate availability of foods with lower fat content while at sea. That this is also perceived by some to be a source of stress highlights the importance of a more detailed analysis of nutrition at sea and, in particular, its variability across the ships and types of voyages.

SECTION 8

DRUG USE AND AWARENESS

Drug free functioning

Miscellaneous comments

8.1 DRUG FREE FUNCTIONING

The level of drug free functioning was determined from responses to questions associated with drug use and awareness. The questions related to:

(i) The use of prescription and other drugs such as social drugs, stimulants and depressants; and

(ii) Awareness of the effects of drugs and the reliance on strategies other than drugs to cope.

The score for drug use and awareness was the sum of the responses to a number of individual questions relating to attitudes and use of prescription and non-prescription drugs. Scoring was based on a six-point scale ranging from never (score = 1) to always (score = 6). The scores represent being able to function without the unnecessary use of chemicals, prescription and non-prescription drugs (i.e. being drug free). A higher score indicates being more drug free.

Compared with normative groups, based on studies conducted by the National Wellness Institute (1994), seafarers functioned less well without the use of drugs (normative 91 vs maritime 80.4) (Table 8.0). Since the questions address prescription and non-prescription drugs there is the possibility that the finding of less drug free functioning in maritime personnel may be related to prescription drugs for blood pressure and sleep problems.

There were significant differences between the groups on the degree to which respondents functioned without drugs.

Compared with other groups, crew members relied more on the use of drugs to function. There is evidence in the

Table 8.0: Functioning drug free in the entire maritime sample and four maritime groups. Values are mean (SEM).

Variable	Total	Pilots	Masters/ Mates	Engineers	Crew	Level of Statistical Significance[1]
Drug free	80.4 (2.3)	81.5 (1.2)	81.5 (0.3)	81.9 (0.3)	78.9 (0.3)	***

SEM = Standard Error of the Mean

Level of statistical significance: *** = $p < 0.001$ represents a statistically significant difference between the groups after adjusting for age differences.

maritime literature that demanning has influenced both working and living at sea with some alteration of social structures. Although not shown in this report, the present investigation showed that crew members more than other groups, reported using social support to cope with occupational stress. It has been shown that a lack of social contact can increase boredom and loneliness (Dyer-Smith, 1993), and it is possible that crew members may be more affected by the social environment at sea than other groups. Therefore, the finding that this group is more likely to use drugs to cope while at sea is not completely unexpected.

A closer examination of this issue would be required before any definite conclusions can be drawn.

Figure 8.0: Level of drug free functioning for the entire maritime sample and four occupational groups.

Statistically significant difference between the groups, p < 0.001.
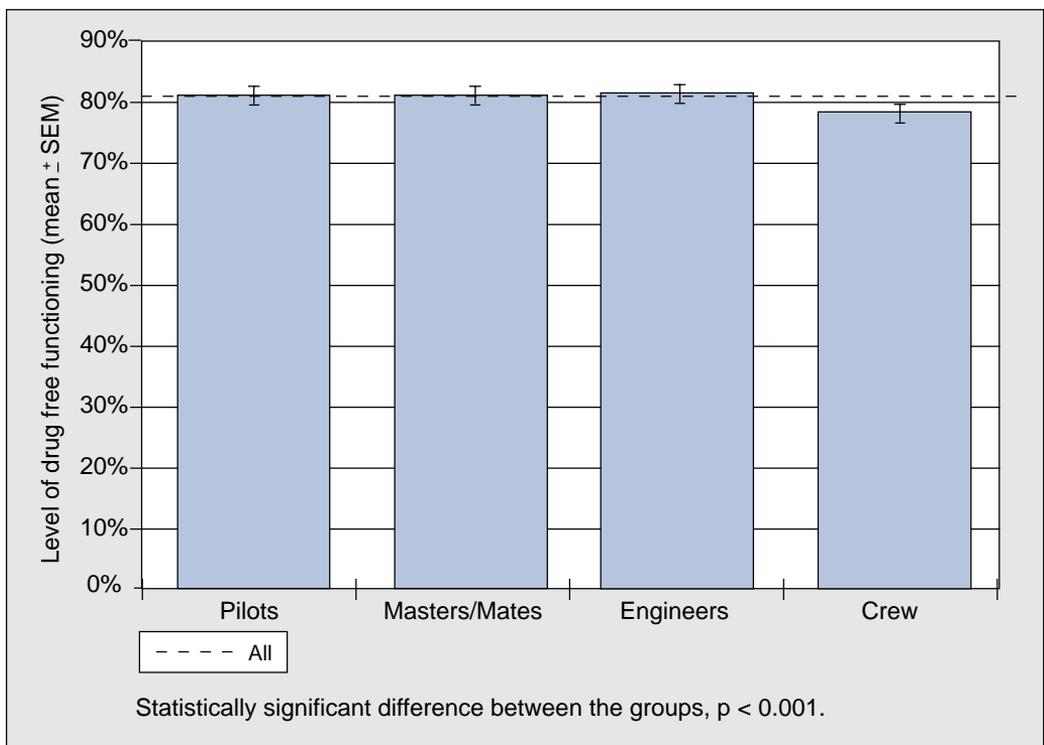
RESULTS AND DISCUSSION

PART B - OCCUPATIONAL STRESS

Stress is a significant occupational health problem resulting in heavy costs not only to individuals, but also to organisations and society. Occupational stress occurs when a person is confronted with an environment that poses a threat or demand, and they perceive they do not have the capability or resources to match or exceed the source of stress. The resulting imbalance can lead to reduced work performance and reduced employee health and well-being.

Major reforms in the Australian maritime industry have the potential to impact on occupational stress levels. Therefore, one of the specific aims of the project was to determine the sources and consequences of occupational stress within the industry. The instrument used for this purpose was the Occupational Stress Indicator (OSI) which has been used by a large number of organisations in the private and public sector (Cooper et al., 1988). This instrument is a well validated measure of occupational stress (Cooper & Bramwell, 1992; Cooper & Williams, 1991; Robertson,

Cooper & Williams, 1990). The area of examination and broad data analysis strategies are presented in Figure 9.1.

Data analysis enabled the raw scores on sources of occupational stress for seafarers to be compared with normative groups of shore-based workers, and between occupational groups. Normative data was based on results of 22 studies which investigated white and blue collar workers, thereby providing a sample size of between 7000 and 8000 (Cooper et al., 1994). In some instances, direct comparisons were possible with the present results and other maritime data. A further step in the analysis procedure ranked the OSI scores enabling the most stressful aspect of work to be identified for the entire sample and for each occupational group (Figure 9.1). Appendix 1 outlines the sampling strategy and the number of respondents by job category.

The final analysis stage enabled the factors contributing to occupational stress to be

Figure 9.1: Broad analysis plan of occupational stress data

- Industry specific sources of stress
- General sources of stress at work
- Sources of job satisfaction
- Mental and physical ill health

ANALYSIS

- OSI SCALES: Comparisons with normative data and between groups
- RANKED OSI SCORES: Highest sources of stress or job satisfaction
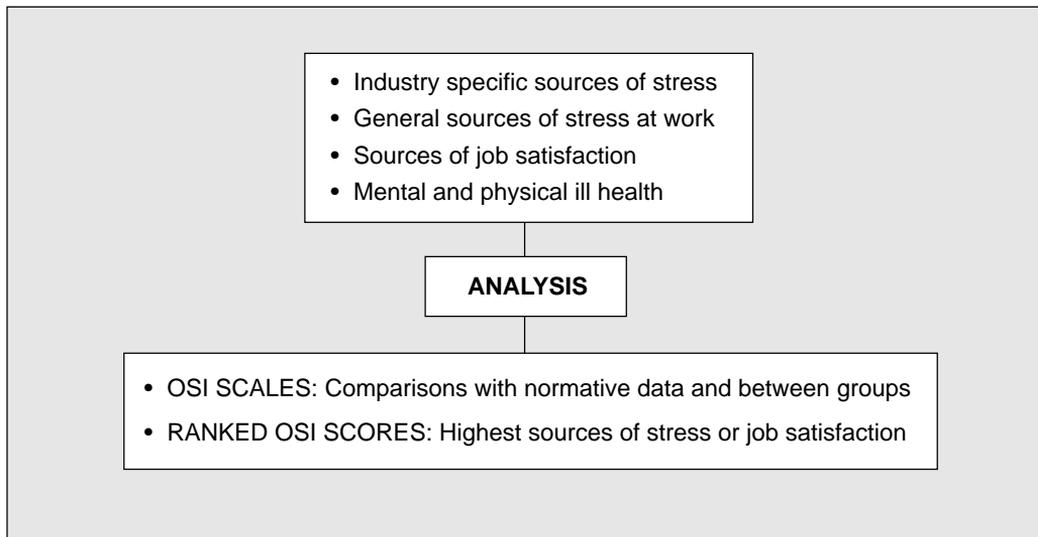
determined. Figure 9.2 shows the broad areas from which factors contributing to occupational stress were identified. Details of the methods used to determine these factors are shown in statistical methods (Appendix 1).

Data analysis in this section were based on 168 questions (140 OSI and 28 industry specific). The four separate questionnaires were entitled:

SOURCES OF STRESS

- **Industry specific sources of stress**
  - Hardships at sea
  - Weather
  - Missing home
  - Broken rest
  - Long hours
- **General Sources of stress at work**
  - Factors intrinsic to the job
  - Managerial role
  - Relationships with others
  - Career and achievement
  - Organisational structure
  - Home work interface

INDIVIDUAL CONSEQUENCES OF STRESS

- **Sources of job satisfaction**
  - Achievement, value and growth
  - Job itself
  - Organisation design and structure
  - Organisational process
  - Personal relationships
- **Mental and physical ill health**
  - Mental ill health
  - Physical ill health

Throughout the following sections a brief description is included for each subscale as well as an interpretation of the scale responses.

In the final section of the survey, seafarers were also invited to provide written comments in relation to stress and fatigue at sea and ashore.

Figure 9.2: Factors contributing to occupational stress.
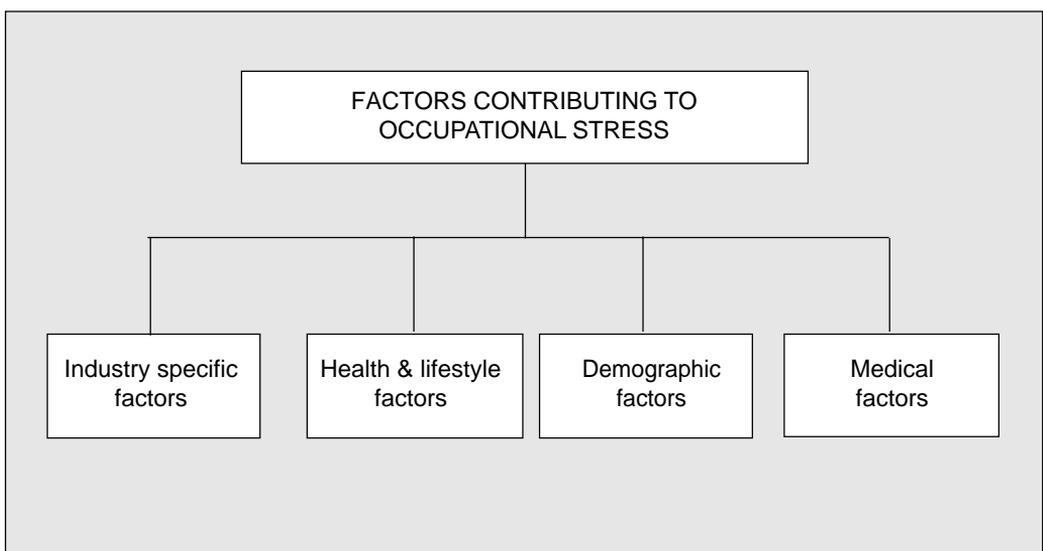
SECTION 9

INDUSTRY-SPECIFIC SOURCES OF STRESS

Environmental hardships at sea

Weather

Missing home

Broken rest

Long hours

Change in the Industry

Miscellaneous comments

Table 9.0: Industry specific sources of occupational stress for the entire maritime sample and four occupational groups. Values are mean (SEM).

Variable	Seafarers	Pilots	Masters/ Mates	Engineers	Crew	Level of Statistical Significance[1]
Hardships at sea	15.4 (0.1)	10.5 (0.8)	12.5 (0.2)	17.8 (0.2)	15.7 (0.2)	***
Weather	7.1 (0.1)	6.2 (0.7)	7.3 (0.1)	7.1 (0.1)	7.1 (0.1)	ns
Missing home	13.4 (0.1)	11.8 (0.9)	13.4 (0.1)	13.3 (0.2)	13.4 (0.2)	ns
Broken rest	12.6 (0.1)	10.2 (0.9)	12.7 (0.2)	14.2 (0.2)	11.8 (0.2)	***
Long hours	12.1 (0.1)	10.2 (0.9)	12.4 (0.2)	12.3 (0.2)	11.8 (0.2)	ns
Industry change[2]	76.5%	77.8%	71%	75.1%	82.2%	**

SEM = Standard Error of the Mean

[1] Level of statistical significance: *** = $p < 0.001$, ** = $p < 0.01$ represents a statistically significant difference between the groups after adjusting for age differences, ns = not significant at $p < 0.01$ level.

[2] = % of the entire sample and each occupational group who reported they found changes in the industry a demand (scoring 4, 5, 6 on a six-point scale as shown above). Industry change consisted of one single item question.

Definitions of the measures identified under industry specific sources of stress are as follows:

- **Hardships at sea** = Environmental hardships: excessive noise, hot working environment, inadequate lighting, level of humidity.

- **Weather =** Excessive gales, bad weather

- **Missing home** = Being away from home for extended periods, concern for loved ones ashore, insufficient time with family/spouse/children.

- **Broken rest** = Being woken unexpectedly from sleep, unpredictable working hours, being on call during rest breaks.

- **Long working hours** = Long working hours, inadequate rest during trips, inadequate rest between shifts and watches.

- **Change in the industry =** Change in the maritime industry (one single item question).

Results for industry specific sources of stress for the entire maritime sample and four occupational groups are shown in Table 9.0. Differences between the occupational groups on these measures are shown in Appendix 3.0 (Figures 3a-d). Individual comments from seafarers (Appendix 7) are used when appropriate to provide some explanation for the differences identified.

The scores for industry specific sources of stress measure the degree of demand associated with each source. The score for each source is the sum of the responses to a number of individual questions. Scoring is based on a six-point scale ranging from very definitely is not a demand (scale = 1), to very definitely is a demand (scale = 6). A higher score for an occupational group indicates a particular industry specific source is reported to be a greater demand for that group.

9.1 ENVIRONMENTAL HARDSHIPS AT SEA

Data in Table 9.0 shows significant differences between the groups on the level of stress associated with hardships at sea. Since this scale measures environmental hardships (heat, humidity and noise) it is not unexpected that engineers and, to a lesser degree, crew members reported higher stress from this source, given their on board occupational tasks. Pilots (score 10.5) and masters/mates (score 12.5) scored considerably lower than the entire sample (score 15.4), indicating these groups experience less stress than others from this aspect of the work environment (Table 9.0).

The greater level of stress for engineers from this source was supported by miscellaneous comments from this group. For instance, engineers raised concern regarding the level of added stress experienced from heat, humidity and noise and its impact on health. Previous maritime data indicates hardships experienced with exposure to extreme environmental conditions have a significant negative influence on health and performance (Saunders & McCormick, 1992).

In a review of maritime studies, high level and constant noise exposure have been shown previously to be associated with poor health outcomes (Parker et al., 1996). In particular, noise discomfort

increases as a function of time and can contribute to fatigue and other health conditions such as neurotic syndromes, arterial hypertension, gastric and duodenal ulcers (Filikowski, 1989; Warr, 1992). There is also some evidence indicating the effort required to sustain communication under conditions of excessive noise can lead to aggressive behaviour (Jones & Broadbent, 1987). The finding of more self-reported auditory problems amongst engineers and to a lesser extent crew (Section 4.0), supports a possible relationship between excessive noise and deterioration of hearing abilities in these groups.

Other environmental hardships at sea also caused concern for seafarers. For example, although not examined in this survey, miscellaneous comments indicated seafarers were concerned with the health consequences of excessive levels of pollutants. Exposure to dangerous materials such as detergents, fumes, solvents, oils and dust was considered problematic. Additionally there appears to be inadequate equipment on some ships to monitor the level of these substances.

9.2 WEATHER

All groups reported a similar level of stress from excessive gales and bad weather (Table 9.0). Comments from seafarers drew attention to the consequences of bad weather. For example, some respondents indicated prolonged bad weather resulted in additional physical and mental fatigue, as well as poor sleep and joint soreness from the constant pitching and rolling of

the ship. This latter complaint is substantiated by the fact that during bad weather, the pitching and rolling of the ship is counteracted by motions of the lower extremities (knees and ankles) and the lumbar spine resulting in increased stress on joints in these parts of the body (Torner et al., 1994).

9.3 MISSING HOME

All groups reported a similar level of stress from missing home (Table 9.0). This finding was supported by miscellaneous comments pointing out that stress levels at sea increased when family members were ill, particularly if telephone contact was difficult. These reports are consistent with findings in offshore industries which indicated that separation from family and home was the most significant factor contributing to occupational stress in offshore industries (Sutherland & Flin, 1989). While missing home is 'part-of-the-job', some suggestions to minimise the impact of this are related to permitting occasional visits to, or voyages on ships by the family (Appendix 7). Interestingly, similar suggestions to reduce problems associated with missing home were reported by Foster and Cacioppe (1986) - over 10 years ago. It appears that this issue is still largely unresolved across the industry in Australia (although some union groups and shipping companies are proactive with this issue and appear to be most supportive). In some countries such as the United Kingdom and New Zealand, having families at sea occasionally is, and has been quite common for many years (Foster & Cacioppe, 1986).

9.4 BROKEN REST

Data in Table 9.0 reveals the occupational groups experienced significantly different levels of stress from broken rest. The group differences were chiefly due to the higher scores for broken rest by engineers and masters/mates. This result indicated that these groups are affected more by this aspect than either the crew or pilots (Table 9.0). The considerably lower score by pilots may indicate that members of this group may have adjusted to taking short naps rather than a single block of sleep, given the variable hours across day and night of pilotage duties.

Comments from engineers highlighted concern over the broken sleep periods, being called out unexpectedly, and the resulting cumulative fatigue over the swing duration of monitoring unmanned machinery space (Appendix 7). This is consistent with maritime data which has shown that on call situations disturb sleep not only by reducing the actual time spent in bed, but also through indirect effects possibly associated with apprehension (Torsvall & Akerstedt, 1988).

9.5 LONG HOURS

Similar levels of demand from long working hours were experienced by the groups, with engineers and masters/mates scoring slightly higher, and pilots scoring lower. This indicates that while long working hours impacted on all groups, the impact was marginally higher on officers than crew or pilots, though this result was not statistically significant (Table 9.0). Comments from seafarers supported the findings of this section. Seafarers indicated that long

working hours combined with poor quality sleep resulted in acute and chronic fatigue, with fatigue becoming especially prevalent towards the end of shifts. As a consequence, poor decisions are made and safety is compromised particularly when handling and manoeuvring vessels in bad weather close to fixed structures. It was suggested that these problems have become more prevalent since demanning.

The demands of long working hours reported by Australian seafarers are consistent with previous data showing the length of working hours for some groups of international seafarers. For example, a survey of 863 Swedish merchant seamen revealed that the average number of hours worked per week by the group was 65. Additionally, the results showed that crew members worked between 65-70 hours per week, with the chief officer working ~ 75 hours each week (cited in Seafarers International Research Centre, 1996). Data from the United Kingdom also shows a similar trend of long working hours by merchant seamen; workdays ranged from 12-20 hours and working weeks of more than 85 hours have been reported (NUMAST, 1990).

According to one recent report (Seafarers International Research Centre, 1996), seafaring work will always contain an element of fatigue which will vary according to workload (as defined by a combination of long hours and poor sleep). However, appropriate steps must be taken to minimise the impact of this factor across the industry.

9.6 INDUSTRY CHANGE

A high percentage of the entire sample (~76%) and each occupational group (ranging from 71% in masters/mates, to ~82% in crew members) reported that industry change was associated with increased demands (Table 9.0). Major reforms in the industry have affected several aspects of the seafarer's physical and cultural environment. These include the type of work, patterns of work and leisure, work environment and interpersonal relationships identified in a review of maritime studies (Parker et al., 1996). The relatively older age profile, coupled with the stability of the workforce suggests that change, particularly of a technological nature, would be an extra source of occupational stress for Australian seafarers. Additionally, for the younger members of the workforce, industry change may result in more concern over career and financial security (Legee et al., 1996).

Differences in the response of individual occupational groups to industry change indicated that a higher percentage of crew experienced more stress from this source than other groups. This finding may reflect the general uncertainty in the industry and individual concerns with respect to job security following reform. Individual commentaries from crew raised concern regarding the uncertainty associated with issues such as the removal of cabotage, and reduction in job numbers.

As shown in Table 9.0 industry change appeared to impact least on masters/mates, with pilots and engineers affected to a similar degree. Comments from pilots raised concern regarding some of the recent changes in pilotage operations. For instance, the intervention by Federal government authorities in the regulation and licensing functions of pilotage services, resulting in a commercially competitive environment, appears to have caused the pilot group additional levels of stress. Engineers highlighted the decreased numbers in the engineering department and the increased workloads since demanning as issues of concern, particularly the availability of sufficient time and personnel to carry out maintenance programs.

9.7 SUMMARY

The results of this section show common elements of a seafarer's work such as missing home, bad weather and long working hours constituted a similar demand for all groups. The different demands between the occupational groups from industry specific sources of stress reflected the different occupational tasks on board. For instance, engineers and crew experienced more stress with hardships at sea associated with the working environment (heat, humidity and noise). Broken rest was a greater source of stress for those required to respond to alarms (engineers) and keep watches (masters/mates). Pilots reported less stress from industry specific sources than other groups. Notably, a high percentage of all groups reported demands associated with change in the industry. The level of stress from industry specific factors appears to have an additive effect on fatigue. For example, prolonged working hours in a harsh environment coupled with poor quality and broken sleep have the potential to contribute to acute and chronic fatigue. The results suggest that at the very least, a closer examination of long working hours and sleep patterns is necessary.

SECTION 10

GENERAL SOURCES OF PRESSURE AT WORK

Factors intrinsic to the job

Managerial role

Relationships with others

Career and achievement

Organisational structure

Home/work interface

Miscellaneous comments

Table 10.0: Sources of pressure at work for normative groups, the entire maritime sample and four occupational groups. Values are mean (SEM).

Variable	Normative groups #	Seafarers	Pilots	Masters/ Mates	Engineers	Crew	Level of Statistical Significance[1]
Factors intrinsic to the job	30.22 (0.1)	32.8 (0.2)**a	27.3 (1.9)	33.0 (0.3)	33.2 (0.3)	31.3 (0.3)	***
Managerial role	35.5 (0.1)	36.7 (0.2)**a	29.9 (2.4)	38.2 (0.4)	37.4 (0.4)	35.6 (0.3)	***
Relationships with others	30.3 (0.1)	34.5 (0.2)**a	25.8 (2.5)	36.3 (0.3)	34.6 (0.4)	33.7 (0.3)	***
Career and achievement	28.4 (0.1)	29.8 (0.2)**a	25.9 (1.9)	30.4 (0.3)	30.0 (0.4)	29.5 (0.3)	ns
Organisational structure	38.9 (0.1)	40.0 (0.2)**a	28.8 (2.3)	40.6 (0.4)	40.8 (0.4)	39.5 (0.4)	***
Home/work interface	30.9 (0.1)	33.8 (0.3)**a	31.1 (2.1)	33.8 (0.5)	32.8 (0.5)	34.3 (0.5)	ns

SEM = Standard Error of the Mean

[1] Level of statistical significance: *** = $p < 0.001$ represents a statistically significant difference between the groups after adjusting for age differences, ns = not significant at $p < 0.01$ level

**a = significant difference ($p < 0.01$) between Australian seafarers and normative data, ns= not significant.

Normative groups: Data are collected from 22 different groups of workers including white and blue collar workers involved in normal hours and shiftwork (n = 7000-8000).

Definitions of the measures identified under sources of pressure at work are as follows:

- **Factors intrinsic to the job** - "sources of stress originating from the fundamental nature of the job - tasks, hours, variety, keeping up with technology, the accumulative effects of minor tasks and decision making."

- **Managerial role** - "how individuals perceive the expectations that others have of them when performing their jobs - conflicting job tasks, adopting negative roles, implications of decisions".

- **Relationships with others** - "relationships with others inside and outside the organisation and relationships with superiors - supervising others, coping with politics, lack of social support, feeling isolated, personality clashes with others".

- **Career and achievement** - "the need to achieve can be a major source of corporate and personal success, or in terms of its blockage, a major stress - career path, promotion prospects, opportunities for personal development, threat of redundancy or early retirement".

- **Organisational structure** - "sources of organisational stress originate from structural design and process features of the organisation - associated with the various elements in the industry such as administrative and managerial issues".

- **Home/work interface** - "the overlap between work and home; the two way relationship involves the source of stress at work affecting home life and vice versa - affects of seafaring on home life, demands from work at home, no support from home, absence of stability in home life".

Results concerned with sources of pressure at work for seafarers and normative groups are shown in Table 10.0. Differences between the occupational groups on these measures are shown in Appendix 4 (Figures 4a-d). Individual comments from seafarers (Appendix 7) are used when appropriate to provide some explanation for differences identified.

The scores for sources of pressure at work measure the degree of demand associated with each source. The score for each source is the sum of the responses to a number of individual questions. Scoring is based on a six-point scale ranging from, very definitely is not a demand (scale = 1), to very definitely is a demand (scale = 6). A higher score for an occupational group indicates a particular subscale is a greater source of pressure at work for that group.

10.1 SEAFARERS VS NORMATIVE GROUPS

Seafarers reported a significantly higher level of pressure from all sources of work pressure than normative groups. These differences were notably higher on two of the subscales: relationships with others and the home/work interface (Table 10.0). Given that for the duration of the voyage seafarers work and live in the same place with the same people, it is not surprising workplace relationships are a greater source of pressure for seafarers than shore-based workers. Difficulties with workplace relationships are supported by seafarers'

comments which indicated that continual problems with personal and professional relationships at sea create additional stress on some ships (Appendix 7).

The higher level of pressure for seafarers from the home/work interface supports a previous maritime report (Foster & Cacioppe, 1986) detailing the problems of the home and away nature of seafaring for both seafarers and their families. This issue is discussed more fully later in this section.

10.2 OCCUPATIONAL GROUP COMPARISONS

Occupational groups reported a similar level of pressure from career and achievement and the home/work interface. On all other sources of work pressure, the groups reported significantly different levels of pressure.

The similar level of pressure reported by all groups for career and achievement (promotion prospects, redundancy issues) may indicate that the present uncertainty in the Australian maritime industry has impacted across the whole industry. Comments from respondents elaborated on this issue. Specifically, career prospects within the industry were influenced by issues such as the removal of cabotage, likelihood of redundancy, the reduction in the number of ships in the Australian industry and overall job security. Lack of job security has been previously shown to be a high stressor for men working in the offshore oil and gas industry (Sutherland & Cooper, 1986).

A common element of working at sea is the transition between ship and shore and vice versa (home/work interface). It is

therefore not surprising that pressure from this source was similar for all at sea regardless of their on board tasks (Table 10.0).

Pilots generally reported a lower level of pressure from all sources of work pressure than other groups (Table 10.0). This may simply be due to the shorter time spent on any one particular ship by pilots and therefore, a lower degree of involvement in organisational and personal issues in the workplace. Group differences are shown graphically in Appendix 4 (Figures 4a-d).

The group differences shown in workplace relationships were chiefly related to officers, particularly masters/mates who reported greater pressure, and pilots who reported less pressure from all sources of work pressure (Table 10.0). Respondents comments indicated personal and professional relationships (often centered on union politics) were a constant source of stress on some ships. Moreover, in some cases relationships at sea were further strained by the lack of commitment and poor attitudes of some employees (Appendix 7).

Comparisons with similar data from shore-based workers (Cooper et al., 1994) suggests that seafarers experience significantly more pressure from manager/worker roles and relationships with others (Appendix 4, Figures 4b & c). There is also evidence that industry reorganisation has the potential to impact negatively on manager/worker relationships (Saksvik & Forseth, 1996). The recent reform and differences found in the Australian maritime industry may explain some of the stress from these

sources between shore and sea-based managers. By comparison with shore-based managers, seafarers reported higher stress from relationships with others (Appendix 4, Figure 4c). This finding may reflect the level of managerial training provided in the maritime industry or lack thereof, and the need for managerial training opportunities in line with changes in the industry and a shift away from more traditional concepts of management on board ships. A number of comments from seafarers raised concern with the lack of training offered to maritime employees whose work involves a considerable managerial role.

10.3 RELATIVE IMPORTANCE OF SOURCES OF PRESSURE AT WORK

By scaling the OSI scores, the different sources of pressure were ranked according to their impact on the entire maritime sample and each of the four occupational groups. Table 10.1 shows the ranked OSI scores for each of the sources of pressure at work for the entire maritime sample. Data relating to different occupational groups are presented in Appendix 4 (Tables 4a-d).

Table 10.1: Ranked OSI scores on sources of pressure at work for the entire maritime sample. Values are mean (SEM).

Variable	Seafarers
Home/work interface	62.7 (0.4)
Factors intrinsic to the job	52.9 (0.4)
Organisational structure	52.7 (0.4)
Relationships with others	48.9 (0.4)
Managerial role	46.7 (0.4)
Career and achievement	46.3 (0.3)

For the entire maritime sample and for each occupational group, the home/work interface was notably the most stressful aspect of their work. For all seafarers the ranked score for the home/work interface was notably higher than other ranked scores. The considerably higher ranking for the home/work interface also applied to each occupational group (Appendix 4). Factors intrinsic to the job (tasks, hours, variety, keeping up with technology) was ranked as the second most prominent source of pressure at work.

Pressure associated with the home/work interface has been extensively referred to in comments from seafarers, and the largest percentage of comments on industry wide issues related to this source of pressure. Problems centred around the adjustments required by all parties (seafarers and families) during the transition from ship to shore and vice versa. Comments describe how tension builds during the week before the seafarer leaves home, and after returning home, 7 to 10 days are required in some cases to wind down and settle into family life again. Time is also needed for the family to readjust to the presence of the seafarer again. Seafarers' comments also clearly emphasised the important role a stable family life ashore has in reducing stress and increasing job satisfaction at sea (Appendix 7).

Previous maritime reports on UK seafarers (Shipley & Cook, 1980) and data on the wives and families of Australian seafarers (Foster & Cacioppe, 1986) support the findings related to the difficulties of transition between ship and shore identified previously, as an important source of stress. Suggestions

from seafarers on how to help overcome these difficulties related to:

(i)   Occasionally having wives and families at sea;

(ii) Arranging family visits to ships to see the workplace;

(iii) Producing a video showing working and living at sea; and

(iv) Having a support officer in the shipping company or other organisation qualified to assist with problems of family stress in the absence of the seafarer.

However, it should be noted that an organisation (Seafarers' Assistance Service) does exist in Australia which provides free counselling to seafarers and their families for work and home-related problems. It would appear from some of the findings in the present study that greater promotion of this program is required to increase the awareness of the services available to seafarers and their families.

Some Australian shipping companies have initiated wives support groups enabling communication with others ashore in similar situations, and similar programs are used overseas in the United Kingdom. For instance, a community support structure "Watch Ashore" has been established to provide back up and focus for seafaring families in the United Kingdom. In addition, an examination of support programs utilised by organisations operating in other home and away remote situations such as the military and mining industries may have application to the maritime situation.

Other highly ranked sources of pressure were factors intrinsic to the job, and organisational structure. Comments indicated that hours of work and the amount of extra work was a source of stress. This was particularly problematic when extra paperwork for the shore office was required on completion of normal shift time by some departments. Comments relating to organisational structure chiefly targeted shore management and the lack of proper managerial and consultative procedures by some companies. For example, problems with shore management mostly related to poor communication and planning, lack of technical support, lack of emotional support, and delay in implementing correct procedures for handling dangerous cargo. In many cases, advanced communication technology has enabled shore management tasks to be transferred to ships without any increase in resources or additional training (Appendix 7).

10.4 OTHER FACTORS INFLUENCING SOURCES OF PRESSURE AT WORK

This section examines the contribution to the sources of pressure at work from factors previously identified in the results (i.e. industry specific, health and lifestyle, demographic, medical). Details of the statistical procedures used in the analysis are shown in Appendix 1. The factors which contributed a significant independent association with each of the sources of work pressure (ranked according to their impact) for the entire maritime sample are shown in Table 10.2. The factors in Table 10.2 are those which were found to be significantly associated with the sources of work pressure that remain significant ($p < 0.01$) after being included in a stepwise regression analysis. Group data are shown in Appendix 4 (Tables 4e-j).

10.4.1 All seafarers

Statistical modelling techniques were applied to identify those factors most closely associated with the different sources of work pressure. Data in Table 10.2 indicate that a substantial variance (ranging from 22-55%) in all of the sources of pressure at work is attributable to chiefly industry specific factors; (i.e. long working hours, weather, missing home, hardships at sea).

Moreover, long working hours are the highest ranked of the contributing factors on five of the six subscales and account for over half of the variability from all the contributing factors on each of these subscales (Table 10.2).

Of the factors contributing to 44% of the variance in the degree of pressure from the home/work interface, missing home accounted for 38% of the variance on this subscale (Table 10.2). Previous maritime

Table 10.2: Factors exhibiting a significant independent association with scores measuring the degree of pressure experienced at work (ranked by magnitude of contribution), for the entire maritime sample.

Factors Intrinsic to the Job	Managerial Role	Relationships with Others	Career and Achievement	Organisational Structure	Home/work Interface
54.7% #	42% #	33.8% #	24.3% #	22.3% #	44% #
1. Long working hours (38.5%)	1. Long working hours (27.8%)	1. Long working hours (18.5%)	1. Long working hours (13.1%)	1. Long working hours (22.3%)	1. Missing home (38.2 %)
2. Weather	2.Weather	2.Sleep type at sea	2. Missing home	2.Hardships at sea	2.Stress frequency at sea
3. Change in the industry	3.Broken rest	3.Missing home	3. Hardships at sea	3. Stress frequency at sea	3.Age
4. Hardships	4.Change in industry	4.Hardships at sea	4. Age	4.Change in the industry	4.Nutrition excuses
5. Stress frequency at sea	5.Stress frequency	5.Stress type at sea	5. Change in the industry	5.Missing home	5 Long working hours
6. Group	6. Hardships at sea	6. Group	6. Nutrition excuses	6. Group	6. Marital
7. Missing home	7. Group	7. Change in the industry	7. Stress type at sea	7. Age	7. Hospitalisation
8. Broken rest	8.Nutrition excuses	8.Weather			8. Drug free functioning
	9.Sleep type at sea	9.Nutrition excuses			
	10.Stress type at sea	10. Age			

 # = percentage contribution of the variance by listed factors

data has also substantiated the contributing role of missing home to occupational stress while working at sea. In a review of studies investigating offshore industries, (Sutherland & Flin, 1989) the most apparent factor contributing to occupational stress was the separation from family (missing home) and social networks. Comments in this report pointed out the difficulties with missing home and worry for loved ones while working at sea (Section 7).

10.4.2 Occupational Groups

Statistical models were developed for each group showing the factors contributing to sources of pressure at work (Appendix 4, Tables 4e-j). The group models revealed a similar trend to the model for all seafarers; that is, chiefly industry specific factors (long working hours, broken rest and missing home) contributed to the variance in the sources of work pressure for each occupational group.

The appearance of long working hours as the highest ranked contributor on many of the scales (including organisational and personal scales) is consistent with the appearance of long working hours in the model for all seafarers. This suggests issues associated with the hours of work such as the amount of rest, impacts on all occupational groups.

10.5 SUMMARY

While direct comparisons with non-seafaring industries should be interpreted with caution, the results of this section show seafarers report significantly more pressure from all sources of work pressure than shown by normative groups surveyed with the OSI. This may partly relate to the isolation and unique environment encountered while working and living at sea. Seafaring groups experienced a similar level of pressure associated with career and achievement and the home/work interface; however on all other sources of pressure at sea, the groups differed significantly. These differences are possibly due to their divergent demographic backgrounds and differing work roles and responsibilities at sea.

The greatest source of pressure at work for the entire maritime sample and each occupational group was the home/work interface. Chiefly industry specific factors (long working hours and missing home) contributed to the variance in the sources of work pressure for the entire sample and each occupational group. These findings clearly suggest that a closer examination of long working hours and the limited rest breaks needs to occur. Strategies designed to address long working hours, work scheduling (including rest breaks) and minimise the problems of missing home may impact substantially on sources of pressure and accompanying stress experienced by seafarers.

SECTION 11

SOURCES OF JOB SATISFACTION

Achievement value and growth

Job itself

Organisational design and structure

Organisational process

Personal relationships

Overall job satisfaction

Miscellaneous comments

Table 11.0: Sources of job satisfaction for normative groups, the entire maritime sample and four occupational groups. Values are mean (SEM).

Variable	Normative groups #	Seafarers	Pilots	Masters/ Mates	Engineers	Crew	Level of Statistical Significance[1]
Achievement, value and growth	21.3 (0.1)	21.6 (0.1) ns	22.9 (1.3)	22.6 (0.3)	22.8 (0.3)	19.9 (0.2)	***
Job itself	16.3 (0.0)	15.1 (0.1) **a	16.8 (0.7)	15.7 (0.1)	15.7 (0.2)	14.4 (0.1)	***
Organisation design and structure	16.4 (0.0)	16.1 (0.1) ns	19.6 (0.9)	16.6 (0.2)	16.4 (0.2)	15.7 (0.2)	***
Organisational process	15.3 (0.0)	14.8 (0.1) **a	18.8 (0.9)	15.5 (0.2)	15.9 (0.2)	13.8 (0.2)	***
Personal relationships	11.6 (0.0)	10.6 (0.1) **a	12.6 (0.6)	10.7 (0.1)	10.7 (0.2)	10.5 (0.2)	ns
Overall job satisfaction	82.1 (0.2)	77.8 (0.5) **a	22.8 (4.2)	19.7 (0.8)	19.7 (0.9)	18.5 (0.8)	***

SEM = Standard Error of the Mean

[1] Level of statistical significance: *** = $p < 0.001$ represents a statistically significant difference between the groups after adjusting for age differences, ns = not significant at $p < 0.01$ level.

**a = significant difference ($p < 0.01$) between Australian seafarers and normative data, ns= not significant.

Normative groups: Data are collected from 22 different groups of workers including white and blue collar workers involved in normal hours and shiftwork (n = 7000-8000).

Definitions of the measures identified under sources of job satisfaction are as follows:

- **Achievement value and growth** - "measures how an individual perceives their current scope for advancement - career opportunities, value of your efforts, develop and grow in the job, utilisation of skill level of employees".

- **Job itself - "**measures the satisfaction experienced with the type and scope of job tasks - actual job, level of security, kind and amount of work".

- **Organisation design and structure - "**measures the satisfaction with several different structural aspects of organisations - communication of information around the organisation, implementation of change, conflict resolution, overall structure of the organisation".

- **Organisational process - "**measures the satisfaction with internal processes within an organisation - processes for promotion, motivation in the job, style of supervision, involvement in decision making, amount of freedom and flexibility in the job".

- **Personal relationships - "**measures the satisfaction with interpersonal contact within an organisation - relationships with others at work, identification with the public image of the organisation, the organisational climate or feel about the organisation".

- **Overall job satisfaction - "**measures the satisfaction with the job as a whole - personal and organisational issues."

Results concerned with sources of job satisfaction are shown in Table 11.0. Differences between the occupational groups on these measures are shown in Appendix 5 (Figures 5a-e). Individual comments from seafarers (Appendix 7) are used when appropriate to provide some explanation for the differences identified.

The scores for sources of job satisfaction measure the degree to which individuals report being satisfied with the different aspects of work. The score for each source is the sum of the responses to a number of individual questions. Scoring is based on a six-point level of satisfaction scale ranging from very much dissatisfied (scale = 1) to very much satisfied (scale = 6). A higher score for an occupational group indicates a greater degree of satisfaction with a particular aspect of work for that group.

11.1 SEAFARERS VS NORMATIVE GROUPS

Compared with normative groups, seafarers scored lower on most measures of job satisfaction. Although statistically significant, these differences were small with the exception of the score for overall job satisfaction on which seafarers scored substantially lower (Table 11.0). Seafarers and normative groups reported similar scores on measures of achievement, value and growth and organisational design and structure.

The generally lower level of satisfaction of seafarers is reflected in those factors which relate to job security, organisational change, influence over

decision making, and issues relating to the kind and amount of work. Satisfaction with personal relationships was also lower in seafarers and comments from individuals highlighted the difficulties associated with personal and professional relationships on some ships.

Differences on some aspects of job satisfaction between seafarers and shore-based workers may be partly related to problems associated with shiftwork. There is evidence which suggests that many shiftworkers experience a decreased sense of well being which is chiefly attributable to the shift work schedule used (Ladou, 1982).

11.2 OCCUPATIONAL GROUP COMPARISONS

Significant differences were found between all groups on measures of job satisfaction with the exception of personal relationships (Table 11.0). Group differences are illustrated in Appendix 5 (Figures 5a-e). The differences between groups were mainly accounted for by the large differences which existed between scores of satisfaction for pilots and crew members. Masters/mates and engineers had similar scores for most measures of job satisfaction which may reflect satisfaction with on board roles associated with their level of responsibility, opportunities for decision making and involvement in organisational tasks. Overall, crew members reported less satisfaction than other groups in all aspects of job satisfaction

including scope for advancement and organisational aspects of the workplace.

All groups recorded similar scores for satisfaction with personal relationships and these scores were significantly less than those found in other industries. This finding suggests that personal relationships are a major source of dissatisfaction for those who work at sea.

It is notable that seafarers were less satisfied with personal relationships in the workplace than shore-based managers, management consultants, blue collar workers or those involved in high stress workplaces such as air traffic controllers (Cooper et al., 1994) (Appendix 5, Figure 5e).

11.3 RELATIVE IMPORTANCE OF SOURCES OF JOB SATISFACTION

By scaling the OSI scores, the sources of job satisfaction were ranked according to the degree of satisfaction reported with the subscales. Table 11.1 shows the ranked OSI scores for each of the sources of job satisfaction. Group comparisons are shown in Appendix 5 (Tables 5a-d).

Table 11.1: Ranked OSI scores on sources of job satisfaction for the entire maritime sample. Values are mean (SEM).

Variable	Seafarers
Job itself	55.4 (0.5)
Organisational process	53.9 (0.5)
Personal relationships	51.2 (0.5)
Achievement, value and growth	51.1 (0.5)
Broad job satisfaction scale	50.7 (0.5)
Organisational design and structure	44.5 (0.5)

The entire maritime sample ranked the job itself as the highest source of job satisfaction. This indicates that in spite of the previously mentioned difficulties associated with organisational structure and personal relationships, seafarers experience satisfaction with the job itself.

In contrast to previous categories in which the first ranked factor was substantially higher than the next ranked factor, the ranking of sources of job satisfaction showed all factors were more closely grouped. The least satisfying aspect of working at sea related to organisational design and structure, which incorporates issues of communication of information, implementation of change, conflict resolution and overall structure of the organisation.

Analysis of individual groups identified differences in the relative importance of the sources of job satisfaction. Satisfaction from personal relationships was ranked lowest for officers and crew members, which is consistent with previous comments on this issue. It is noteworthy that relationships with others was a source of stress for these occupational groups.

Satisfaction by seafarers with the job itself has also been reported by Sparks (1992). Eighty-eight percent of a sample of 93 masters/mates and pilots indicated that overall they were satisfied with working at sea; however, they also reported varying levels of satisfaction with organisational and personal aspects of the workplace. Similarly, maritime pilots are mainly satisfied with their work and enjoyed the responsibility and authority associated with it. (Shipley, 1978; Berger, 1984).

Individual comments from seafarers supported the finding that the job itself was the most satisfying aspect of working at sea. Analysis of these comments indicated that a greater percentage of positive comments from seafarers on job satisfaction related to the opportunity to work at sea. Therefore, although the unique nature of seafaring contributes to a number of previously identified stresses, it is also an important source of job satisfaction. While seafarers indicated that the level of satisfaction with working at sea was very much dependent on the ship's crew and officers, in general seafarers enjoyed working at sea and felt challenged by many aspects of the job. Satisfaction with working at sea may also be associated with the long family history of seafaring work for some employees and the attraction of particular personality types to seafaring. Therefore, those working at sea may be retained in the industry due to their attraction to, and survival in, a unique working environment.

Members of some departments experienced more satisfaction with work when they had been given greater responsibility (e.g. managing catering budgets). In contrast, dissatisfaction was in some cases related to poor utilisation of trade skills of employees, insufficient time for proper training of junior employees, rushed maintenance and extra duties involving quality assurance procedures.

Table 11.2: Factors exhibiting a significant independent association with scores measuring the degree of job satisfaction (ranked by magnitude of variance), for the entire maritime sample.

Achievement Value & Growth	Job Itself	Organisational Design & Structure	Organisational Process	Personal Relationships	Broad View of Job Satisfaction
14.9% #	21.0% #	19.8% #	16.0% #	16.8% #	23.0% #
1. Change in the industry (7.1%)	1. Change in the industry (8.1%)	1. Change in the industry (7.8%)	1.Change in the industry (5.0%)	1. Stress frequency at sea (8.3%)	1. Change in the industry (8.8%)
2. Sleep type at sea	2. Sleep type at sea	2. Stress frequency at sea	2. Sleep type at sea	2. Change in the industry	2. Stress frequency at sea
3. Group	3. Group	3. Sleep type at sea	3. Group	3. Nutrition excuses	3. Sleep type at sea
4. Stress frequency at sea	4. Stress frequency at sea	4. Nutrition excuses	4. Stress frequency at sea	4. Hardships at sea	4. Group
	5 Long working hours	5. Group	5. Long working hours	5 Stress type at sea	5. Nutrition excuses
	6. Smoking at sea	6 Long working hours	6. Nutrition excuses	6. Age	6. Long working hours
	7. Broken rest	7. Permanent restriction on activity	7. Permanent restriction on activity	7. Permanent restriction on activity	7. Permanent restriction on activity
	8. Hardships at sea	8. Broken rest			8. Broken rest
		9. Hardships at sea			9. Missing home
		10.Weather			

= percentage contribution of the variance

11.4 OTHER FACTORS INFLUENCING THE SOURCES OF JOB SATISFACTION

This section examines the contribution to the sources of job satisfaction from factors previously identified in the results (i.e. industry specific, health and lifestyle, demographic, medical). Details of the statistical procedures used in the analysis are shown in Appendix 1. The factors which contributed a significant independent association with each of the sources of job satisfaction (ranked according to their impact) for the entire maritime sample are shown in Table 11.2. The factors in Table 11.2 are those which were found to be significantly associated with the sources of work pressure that remain significant ($p < 0.01$) after being included in a stepwise regression analysis. Group comparisons are shown in Appendix 5 (Tables 5a-j).

11.4.1 All seafarers

Statistical modelling techniques were applied to identify those factors most closely associated with the different categories of job satisfaction. The results presented in Table 11.2 indicate a moderate amount of the variance (ranging from 15-23%) was contributed to by similar industry specific issues. These include: change in the industry, hardships at sea, long working hours. A consistent finding was the high ranking for change in the industry in five of the six sources of job satisfaction. Moreover, change in the industry accounts for approximately half of the variability from all other contributing factors on these five scales (Table 11.2).

Similarly, sleep quality and stress were highly ranked on many of the sources of job satisfaction. Coupled with earlier findings in this survey of poor quality sleep and undesirable stress levels (Sections 5), this finding suggests that these factors may be important sources of job satisfaction and dissatisfaction.

11.4.2 Occupational Groups

For each occupational group the models showing factors contributing to the sources of job satisfaction were similar to the model for all seafarers. Details of group models are shown in Appendix 5 (Table 5e-j). That is, the models were moderately strong and about half of the variance in sources of job satisfaction was attributable to industry specific or lifestyle factors. Consistent with the model for all seafarers, change in the industry, stress and sleep were highly ranked contributing factors in the group models.

Given the stable and relatively older workforce which comprises the Australian maritime industry (Section 3), it is not surprising that industry change is ranked highly among the factors contributing to the sources of job satisfaction. The effects of structural change on different age profiles is supported by recent findings. Legge and colleagues (1996) reported that older workers in particular were most concerned with issues such as new technology and reductions in employee numbers. It is possible that the concerns of maritime personnel may relate not only to change itself, but also to the level of preparation, training and support

provided when change is implemented. It has been shown that the negative consequences of organisational change can be reduced when employees are provided with appropriate levels of organisational communication, strong leadership and consultation during adjustment to change (Callan & Terry, 1996).

Specific commentary on the impact of changes in the maritime industry was provided by analysis of individual comments of seafarers. Issues such as financial security, removal of cabotage, uncertainty of employment/career prospects were of concern to a considerable number of respondents. These issues were more frequently raised by those who belonged to the unskilled section of the workforce. It was suggested that the results of uncertainty contributed to low morale within the industry and increased stress levels. Suggestions to improve job satisfaction mainly related to the provision of increased training opportunities on computerised equipment, and improvement in administrative and management procedures.

11.5 SUMMARY

In general seafarers were less satisfied with most sources of job satisfaction than shore-based workers. The most satisfying source of job satisfaction was found in the job itself suggesting that seafarers generally enjoyed some of the unique characteristics of life at sea, their work tasks, workload and job security. Varying degrees of satisfaction were associated with organisational and

personal aspects of the workplace. A substantial amount of the variance in job satisfaction was contributed by industry specific factors, particularly change in the industry and lifestyle factors such as sleep and stress. While it is acknowledged that industry change is inevitable, appropriate training and support during adjustment phases may minimise its negative impact on many sources of job satisfaction.

SECTION 12

MENTAL AND PHYSICAL ILL HEALTH

Mental ill health

Physical ill health

Miscellaneous comments

Table 12.0: Mental and physical ill health for normative groups, the entire maritime sample and four occupational groups. Values are mean (SEM)

Variable	Normative groups #	Seafarers	Pilots	Masters/ Mates	Engineers	Crew	Level of Statistical Significance[1]
Mental ill health	55.5 (0.1)	52.7 (0.3)**a	49.2 (1.7)	52.0 (0.5)	53.3 (0.6)	52.8 (0.5)	ns
Physical ill health	29.8 (0.1)	31.1 (0.2)**a	24.7 (1.5)	29.4 (0.4)	31.2 (0.4)	31.9 (0.4)	***

SEM = Standard Error of the Mean

[1] Level of statistical significance: *** = $p < 0.001$ represents a statistically significant difference between the groups after adjusting for age differences, ns = not significant at $p < 0.01$ level.

**a = significant difference ($p < 0.01$) between Australian seafarers and normative data, ns= not significant.

Normative groups: Data are collected from 22 different groups of workers including white and blue collar workers involved in normal hours and shiftwork (n = 7000-8000).

Definitions of the measures of mental and physical ill health are as follows:

- **Mental ill health** - "focuses on an individual's emotional well-being".
- **Physical ill health -** "refers to the frequency of occurrences of physical problems".

The scores for mental and physical ill health are shown in Table 12.0. Differences between the occupational groups on these measures are shown in Appendix 6 (Figures 6a & b). Individual comments from seafarers (Appendix 7) are used when appropriate to provide some explanation for the differences identified.

The scores for mental ill health measure the degree to which feelings and behaviour are affected by perceived job pressure over the last three months. The score for mental ill health is the sum of the responses to a number of individual questions. Scoring is based on a six-point scale ranging from, very negative (scale = 1) to very positive (scale = 6). A higher score on mental ill health for a particular group indicates that there is a lower sense of emotional well-being, for example seafarers or a particular seafaring group feel more anxious or depressed.

The scores for physical ill health measure the frequency of occurrence of physical symptoms over the last three months. The score for physical ill health is the sum of the responses to a number of individual questions. Scoring is based on a six-point scale ranging from never (scale = 1) to very frequently (scale = 6). A higher score on physical ill health

indicates the frequent occurrence of ailments for all seafarers or a particular seafaring group.

12.1 SEAFARERS VS NORMATIVE GROUPS

Data in Table 12.0 shows that compared with normative groups, seafarers scored significantly lower on mental ill health and higher on physical ill health. The mental health score indicates that the pressure at work perceived by seafarers affects their feelings and behaviour to a lesser degree than normative groups working ashore. In contrast, the physical ill health score indicates seafarers report a higher frequency of physical health problems than normative groups.

It is well established that a positive outlook at work reflects better life adjustment and better work output and efficiency (Barnes, 1984). The more positive self-reported mental health of seafarers as a whole was in contrast to a survey of Polish seafarers which identified neuroses as a major health problem. It was also identified that the development of neurosis occurred as a function of time spent at sea rather than an individuals age (Filikowski, 1989). Furthermore, mental disorders and diseases of the nervous system were the second most prevalent cause of repatriation behind diseases of the circulatory system in Polish seafarers (Tomaszunas & Mroziski, 1990). Direct comparison of the combined results of all seafarers in the present investigation with these studies however is difficult, as individual group differences may be masked by this process.

12.2 OCCUPATIONAL GROUP COMPARISONS

As shown by Table 12.0 all occupational groups reported similar levels of mental ill health problems, with the lower score for pilots borderline in statistical significance.

The differences in physical ill health between the groups was chiefly related to the lower score for pilots and the higher scores for engineers and crew. The higher score for these groups may be related to the nature of their work and the relative influence of environmental hardships on these workers (Section 9). Additionally, the compromised health behaviours (increased smoking and drinking, and decreased exercise) of these groups (Section 5) may help explain some of the group differences in physical health.

There is some indication in the literature that the mental health of marine officers may be compromised when compared with army officers. For instance, when a group of merchant marine officers was compared with army officers, the marine officers had a higher incidence of disturbed thought processes. The authors of the study suggested the differences between army and marine officers reflected the higher prevalence of occupational stress amongst the mariners (Barnes, 1983).

Comparisons of mental ill health scores with other specific groups of shore-based workers are shown in Appendix 6 (Figure 6a). Data indicated scores for the entire maritime sample and the seafaring occupational groups suggested a lower sense of emotional well-being than shore-based workers employed in the areas of

management or shiftwork. Physical ill health scores for seafarers were also more apparent than groups of shore-based workers from either management or blue collar sectors (Appendix 6, Figure 6b)(Cooper et al., 1994).

12.3 OTHER FACTORS INFLUENCING MENTAL AND PHYSICAL ILL HEALTH

This section examines the contribution to the sources of mental and physical ill health from factors previously identified in the results (i.e. industry specific, health and lifestyle, demographic, medical). Details of the statistical procedures used in the analysis are shown in Appendix 1. The factors which contributed a significant independent association with each of the sources of mental and physical ill health (ranked according to their impact) for the entire maritime sample are shown in Table 12.1. The factors in Table 12.1 are those which were found to be significantly associated with the sources of work pressure that remain significant ($p < 0.01$) after being included in a stepwise regression analysis. Group comparisons are shown in Appendix 6 (Tables 6a & b).

12.3.1 All Seafarers

Statistical modelling indicated that six factors accounted for 15.4% of the variance in mental ill health (Table 12.1). These factors were chiefly industry specific factors such as long working hours, missing home and change in the industry (in that order). Notably, the highest ranked of these factors, long working hours, accounted for about half of the variance from all other contributing factors.

A larger array of factors were identified as independent contributors to physical ill health and accounted for 43% of the variance (Table 12.1). These factors were chiefly lifestyle factors such as sleep type at sea, nutrition excuses, hardships at sea and stress type at sea (in that order). Notably, sleep type (including quality and duration) at sea was the highest ranked of the contributing factors and accounted for 20% of the variance from all contributing factors. This data highlights the importance of adequate sleep with respect to physical ill health. Coupled with earlier results showing poor sleep quality and relatively high stress levels, this finding amplifies the need for more careful consideration of the sleep patterns of seafarers. It is also notable that food-related factors such as nutritional attitude and some food habits appeared as contributors to physical ill health. Previous findings (Sections 6 & 7) indicate some compromised food habits at sea and the issue may warrant further investigation.

Table 12.1: Factors contributing significant independent association with scores measuring mental and physical ill health (ranked by magnitude of variance) for the entire maritime sample.

Mental Ill health	Physical Ill health
15.8% #	43% #
1. Long working hours (8.8%)	1. Sleep type at sea (20.5%)
2. Missing home	2. Nutrition excuses
3. Change in the industry	3. Hardships at sea
4. Number of illnesses	4. Stress type at sea
5. Age	5. Smoking at sea
6. Broken rest	6. Permanent restriction on activity
	7. Missing home
	8. Number of illnesses
	9. Fibre at sea
	10. Fat at sea
	11. Stress frequency at sea
	12. Change in the industry
	13. Drug free
	14. Medications
	15. Long working hours
# = percentage contribution of the variance	

12.3.2 Occupational Groups

For each occupational group the models showing the factors contributing to mental and physical ill health are shown in Appendix 6 (Tables 6a & b). The models for each group are consistent in the type and degree of contribution of factors influencing the mental and physical ill health for the entire sample.

12.4 SUMMARY

Statistical modelling to determine the strength of the contributing factors to mental ill health indicated that the key factors were industry specific, in particular long working hours. In contrast, application of the same modelling procedures to physical ill health indicated that chiefly lifestyle factors such as sleep quality and stress contributed more strongly to the variance. These findings suggest the need for further investigation of both working hours and sleep quality across the industry to determine the precise nature and extent of these problems. Such investigation may facilitate the implementation of strategies to address these issues and in turn contribute to improvement of both the mental and physical health of seafarers.

SECTION 13

OVERALL SUMMARY - PARTS A & B

13 OVERALL SUMMARY

A comprehensive survey of Australian seafarers was undertaken to develop a profile of the health status, health-related behaviours and occupational stress within the industry.

The sample, representing pilots, masters/mates, engineers and crew, consists of more than 1800 responses. Occupational and demographic results indicated the Australian seafaring workforce was relatively older, almost entirely male and predominantly of Australian birth. The workforce was characterised by a high degree of stability reflected both in the long years of service in the industry, and years in present working positions. Additionally, differences in the socio-economic and educational backgrounds of the occupational groups indicated a high degree of complexity within the workforce.

The self-reported health status of Australian seafarers was generally consistent with that of Australian population data, with the exception of blood pressure which was higher. Within the industry, auditory disease was more prevalent among engineers and crew members than other groups, which is consistent with previous maritime reports.

Generally, seafarers displayed greater levels of health-compromising behaviour than the Australian population. While working at sea a considerable proportion of seafarers smoked, about one-third exceeded the NHF recommended limits for alcohol consumption, and a high percentage of seafarers did not meet NHF guidelines for exercise. Compared with the limited data for other maritime studies, the Australian seafarer's health-related behaviour was either better or similar.

The quality and duration of sleep was reported as being fair to very poor; approximately half the workforce reported less than six hours sleep each day. Those employees involved in watchkeeping and on call situations appeared to be more affected by poor sleep than others at sea. All groups of seafarers reported occasional to frequent stress which often ranged between moderate and high levels. Time available for relaxation at sea appeared to be directly related to the on board tasks of the groups. In comparison with time at sea, when returning ashore on leave, seafarers reported improved sleep, less stress and more time for relaxation.

Additionally, the data revealed nutritional habits were compromised somewhat with seafarers consuming more fat and sugar while at sea. The results for health and health-related behaviour indicate that the impact of inappropriate patterns of behaviour while at sea requires closer examination.

A comprehensive survey of the occupational stress experienced by all maritime personnel has not previously been attempted. Therefore, direct comparisons in workplace stress between this study and other maritime investigations is difficult. As such, the results have been compared with those derived from different occupational

groups previously surveyed using the OSI. Normative group data was based on the combined results from 22 different groups of white and blue collar workers producing a sample size of between 7000 and 8000.

The results indicate that when compared with data from other occupational groups, the seafarers surveyed in this study generally experience more pressure from work, and are less satisfied with most aspects of the job. Additionally, they have fewer mental health problems and poorer physical health.

Differences in occupational stress between the four occupational groups in this survey reflected the different tasks and responsibilities associated with each particular group's role at sea. For example, engineers and crew found relatively greater stress from their work environment with problems of exposure to noise, heat and humidity. Similarly, those employees required to respond to alarms and on call situations such as engineers and watchkeepers reported increased stress as a result of broken sleep patterns.

Elements of seafaring which are common to all groups such as missing home, bad weather and long working hours were also important sources of occupational stress.

Considering the relatively older age profile and stability of the workforce, it is not surprising that a high percentage of seafarers found industry change to be a significant source of occupational stress. Major industry reforms have affected the seafarer's physical and social environment, and in some cases have altered types of work, patterns of work and leisure and interpersonal relationships with negative consequences.

On sources of job satisfaction seafarers were less satisfied with their work than shown by the results of similar analyses of shore based workers. Interestingly, seafarers derived considerable satisfaction from working at sea, and much of the dissatisfaction with their work was associated with industry specific issues.

The findings for mental ill health suggest that there are no differences between occupational groups on this measure and demonstrated, as a whole, seafarers displayed a more favourable profile than the normative group. In contrast, there were differences between groups on levels of physical health with engineers and crews reporting more frequent occurrences of ailments than others at sea.

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APPENDIX 1

METHODS

Sample

A census of 5080 seafarers in the Australian maritime industry was undertaken. Participants were employed on Australian ships operating in coastal, off shore and blue water areas. The population of seafarers included crew members represented by catering attendants, cooks and integrated ratings. The sample of officers included masters, mates, chief engineers and engineers. Fifty-seven male marine pilots operating in the Great Barrier Reef region of Queensland were also included in the population.

Further detail of the estimated numbers in each of the job categories and the number and response percent from each of these categories is shown in Table 1a. However, the relatively small number of respondents in some work categories (Table 1a) limited detailed analysis of discrete work groups. Therefore on the advice of the steering committee the job categories were condensed to four occupational groups representing pilots, masters/mates, engineers and crew.

Participation was voluntary and written informed consent was obtained prior to the commencement of the study. In accordance with National Health and Research Committee guidelines the study was conducted with the approval of the Queensland University of Technology University Research Ethics Committee.

Questionnaire Distribution

Questionnaires were posted to home addresses (late May early June, 1996) using mailing lists supplied by the organisations representing the four participating groups (masters/mates, engineers, crew and pilots). The working circumstances of seafarers (at sea 8 weeks and at home 8 weeks) made workplace administration of questionnaires impossible. Postal distribution presented some problems such as outdated addresses and lost mail while at sea. Included with each

Table 1a: Workforce numbers (estimated) and response numbers by job category.

Job Category	Estimated Population	Number of Responses	Percentage
Catering attendant *	601	103	17.0
Cook *	309	81	26.0
TIR *	42	4	9.5
PIR *	27	26	96.0
Bosuns mate/IR *	1527	312	20.0
Bosun CIR *	75	70	93.0
Deck ratings *	199	70	35.0
E R ratings *	73	14	19.0
Chief engineer	385	177	46.0
Engineer	725	348	48.0
Master	392	190	48.0
Mate	668	334	50.0
Pilot	57	29	50.0
Other		48	
TOTAL	5080	1806	

TIR=Trainee integrated rating, PIR=Provisional integrated rating, CIR=Chief integrated rating

ER ratings =Engine room ratings, IR=integrated rating, Pilots=Marine pilots, *= Crew

questionnaire was a letter of support for the study from each of the participating trade union groups whose members were involved. An information page with the questionnaire explained the purpose of the study and aspects of confidentiality and informed consent.

Reminder System

To improve response rates a reminder system was implemented which consisted of two individual reminders to each person (July and September, 1996) and an ongoing general reminder system which included regular monthly facsimile messages to ships (organised by AMSA). In addition, messages encouraging participation were included in union newsletters/magazines, and reminders at monthly meetings of the unions were given by union executives and a member of the research team.

Measures

Broadly, the questionnaire included items relating to demographic information, employment history, physical and mental health and sources of occupational stress.

Specifically, the first section (Part A) of the questionnaire included items associated with age, job category, employment history, marital and income status. This section also included questions relating to health status and health behaviours (i.e., smoking, drinking, relaxation, sleep, stress and nutrition habits). Data analysis enabled a comparison of health and lifestyle behaviours between sea and ashore. The second section (Part B) included items relating to feelings about work, coping strategies used at work, as well as general feelings and behaviour. Data from Part B enabled the identification of factors contributing to sources of occupational stress. The third section was an open-ended section inviting miscellaneous comments in relation to stress and fatigue at sea and ashore to be recorded. This section was a very important source of information as the wide variation of opinion in the industry was not able to be completely addressed in the more structured sections of the questionnaire. Miscellaneous comments were used to inform and illuminate the more structured responses derived from the questionnaire.

The complete questionnaire is shown in Appendix 8.

Statistical methods

Cronbach's alpha coefficients were calculated to assess the reliability of each of the aggregate scores used in the report (Appendix 2). The reliability coefficients measure the extent to which the same response would have been achieved if the questionnaire was administered more than once. Expressed another way, the coefficients identify the extent to which the scale represents true rather than chance variation. An alpha coefficient of over 0.65 is generally acceptable. For this study, it was quite acceptable to use these scales; however scales dealing with emotional issues were less reliable than those task-related issues (Appendix 2).

The response rate amongst the crew group was considerably lower than that of the other groups. Consequently, the final sample contains proportionally fewer crew members than in the total crew population. To ensure that the group was fairly represented in the sample, post-hoc weighting was used to ensure the views of this group are properly reflected in the sample.

PARTS A & B (Profiles, Health and Lifestyle Behaviours and Occupational Stress)

For continuous measures, estimated means and standard errors of the means were calculated. Standard Analysis of Variance (ANOVA) techniques were used to assess the significance of differences in the mean scores observed in each occupational group (pilots, masters and mates, engineers and crew). When a significant difference between the groups was found, 99% confidence intervals were calculated.

In the case of non-continuous data (nominal or ordinal scaled), standard Chi-squared techniques were used to test for differences between the groups. When age was expected to play a role in the results (self-report health data, health-related behaviour and occupational stress), logistic regression or ordinal regression analysis techniques were used to ensure the comparison of groups accounted for the age profiles of the groups.

Repeated measures ANOVA, and repeated measures logistic or ordinal regression analysis techniques were used to make comparisons between behaviours at sea and behaviours ashore.

Standard statistical procedures were used in handling missing values with a distinction between single questions and multi-item scores. Single item non-response was no more than 5-10% and these were dropped out of the analysis. For the multi-item scores, if any of the items comprising the score were missing that response was omitted from the analysis and was no more than 10%. However, there is a need to consider the possibility that those who did not respond to a particular question may be different in some way to those who did.

Whenever possible the present results were compared to established scores for which normative data was available. However, in some cases direct comparisons with other maritime groups were not possible because of the absence of industry specific data.

Post-Hoc Testing

The present study was an exploratory investigation of a broad range of health and work-related issues amongst a complex workforce. The investigators were always concerned about the spurious results arising out of excessive statistical hypothesis testing. Therefore, in order to control the overall Type I error rate it was decided not to undertake post-hoc testing which would be routine in a study with a narrower focus. It was considered preferable to only informally assess and make indicative judgement

where differences lay in a series of sub-group values (e.g. occupational groups) or in levels of other variables such as the quality and duration of sleep and the frequency and level of stress.

Factors Contributing to Occupational Stress

The overall objective of this section was to identify factors which might be associated with the key elements of occupational stress in the industry; namely the sources of stress, strategies seafarers use for coping with stress, and overall job satisfaction. This enabled factors to be identified which, if modified through some intervention, might lead to reduced occupational stress, a greater use of effective coping strategies, or higher job satisfaction in the industry.

Specifically, the objectives of this section were to:

(i) Identify the important factors which might be associated with the key elements of occupational stress; and

(ii) To rank them in order of their importance.

The 19 Occupational Stress Indicator (OSI) scores used to measure the key elements of occupational stress are shown in Table 1b.

The factors which might be associated with these scores, and therefore represent factors which might be amenable to intervention and result in improved circumstances, are shown in Table 1c.

A two-stage modelling strategy was used to achieve the objectives. Firstly, the statistical significance of the crude associations between each of the factors in Table 1c, and the 19 OSI scores in Table 1b were calculated.

For each OSI score in Table 1b, the initial collection of factors which were significantly associated with the score (p-value < 0.01) were identified. These are factors which are associated with the OSI scores but their number was quite large. Additionally, some of these affect

Table 1b: Key elements of OSI scores

Sources of Pressure at Work	Sources of Job Satisfaction	Mental and Physical Ill health
Factors intrinsic to the job	Achievement, value & growth	Mental ill health
Managerial role	Job itself	Physical ill health
Relationships with others	Organisational design	
Career and achievement	Organisational processes	
Organisational structure	Personal relationships	
Home/work interface		
Details of how these vary across occupational groups in the industry are presented in Part B.		

the OSI score indirectly through their affects on other factors which also impact on the OSI score.

Hence, a second stage was needed to identify the important factors from this initial collection and to estimate their relative contribution. For this the factors in the initial collection were used in a stepwise regression procedure which selects those factors from the collection that best explain the OSI score, and ranks them according to their contribution. The results of this final stage are presented for the whole industry and for each occupational group in Tables in Part B and supporting material in Appendices 4-6. The tables show the total amount of the variation in the OSI score explained by the final collection of factors (as a percentage) and ranks them in order of their relative contribution.

Table 1c: Factors associated with the OSI scales.

Demographic	Health & Lifestyle	Medical	Industry specific
Age Marital	NHF guidelines for alcohol at sea NHF guidelines for exercise at sea Smoking at sea Sleep type and duration at sea Stress frequency and level at sea Relaxation at sea Sugar at sea Fat at sea Nutrition relevance Pronutrition Nutrition excuses Food exploration Drug free	Number of illnesses Heart disease Blood pressure disease Medication Hospitalisation	Change in the industry Group Long working hours Missing home Rest breaks Weather Hardships at sea
Details of how these vary across occupational groups in the industry are shown in the results section for Parts A and B.			

APPENDIX 2

CRONBACH'S ALPHA VALUES
FOR PARTS A & B

Values for Cronbach's Alpha Coefficient for the food habits and attitudes and drug use and awareness (Part A)

Cronbach's alpha coefficient is a measure of the internal consistency of the subscales. The procedure is widely used for this purpose since it uses a range of statistical characteristics from the raw data.

The following information is associated with questions relating to nutrition habits and attitudes and drug use in Part A.

Table 2a: Cronbach's alpha for the food habit variables at sea

Frequency of Eating	Cronbach's Alpha
Fibre	0.61
Sugar	0.60
Fat	0.61

Table 2b: Cronbach's alpha for the food habit variables ashore

Frequency of Eating	Cronbach's Alpha
Fibre	0.61
Sugar	0.63
Fat	0.70

Table 2c: Cronbach's alpha for food attitude variables

Attitude to Food	Cronbach's Alpha
Nutrition relevance	0.60
Pro nutrition	0.82
Nutrition excuses	0.77
Food exploration	0.74

Table 2d: Cronbach's alpha drug scale

Drugs	Cronbach's Alpha
Q 1-13	0.49

Values for Cronbach's Alpha Coefficient for the Occupational Stress Indicator (Part B)

The following information relates to questions from the Occupational Stress Indicator (Part B).

Table 2e: Cronbach coefficient alpha for OSI variables

OSI Scales	Cronbach's Coefficient Alpha
Sources of Pressure at Work	
Factors intrinsic to the job	0.71
Managerial role	0.76
Relationships with other people	0.72
Career and achievement	0.73
Organisational structure and climate	0.80
Home/work interface	0.80
Sources of Job Satisfaction	
Satisfaction with achievement value and growth	0.82
Satisfaction with the job itself	0.65
Satisfaction with the organisational design and structure	0.80
Satisfaction with personal relationships	0.62
Broad view of job satisfaction	0.72
Mental ill health	0.61
Physical ill health	0.85
Industry Specific Sources of Stress	
Excessive noise	0.74
A hot working environment	0.74
Inadequate lighting	0.74
Level of humidity	0.74
Excessive gales (wind)	0.81
Bad weather	0.81
Being away from home for extended periods	0.73
Concern for loved ones ashore	0.73
Insufficient time with family/spouse/children	0.73
Being woken unexpectedly to deal with a problem	0.85
Unpredictable working hours	0.85
Long working hours	0.85
Inadequate rest breaks during trips	0.84
Being on call during rest breaks	0.84

APPENDIX 3

INDUSTRY SPECIFIC SOURCES OF STRESS - GROUP COMPARISONS

The group comparisons relate to information presented in Section 9.

This section shows group comparisons on industry specific sources of stress:

- Environmental hardships at sea
- Broken rest
- Long working hours
- Change in the industry

Hardships at Sea

There were significant differences between the groups on the level of stress associated with hardships at sea.

Figure 3a: Environmental hardships at sea, by group.

A higher score for an occupational group indicates hardships at sea is a greater demand for a particular group.

Statistically significant difference between the groups, $p < 0.001$.
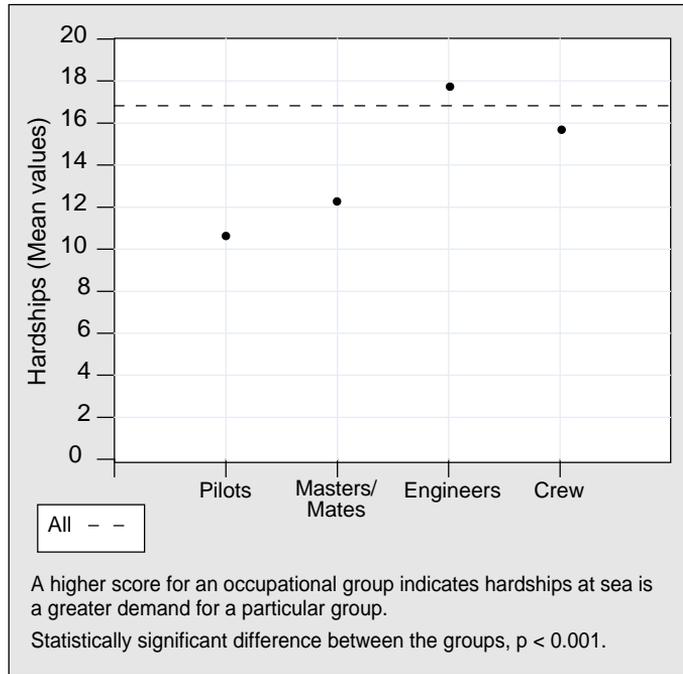
Broken Rest

The groups experienced different levels for stress from broken rest.

Figure 3b: Broken rest at sea, by group.

A higher score for an occupational group indicates broken rest is a greater demand for a particular group..

Statistically significant difference between the groups, $p < 0.001$.
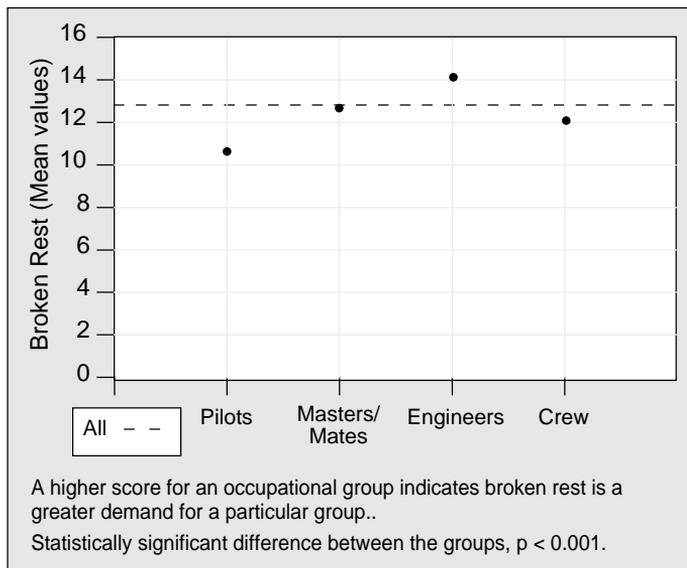
Long Hours

The groups experienced a similar level of stress with long working hours.

Figure 3c: Long working hours, by group.

A higher score for an occupational group indicates long hours are a greater demand for a particular group.
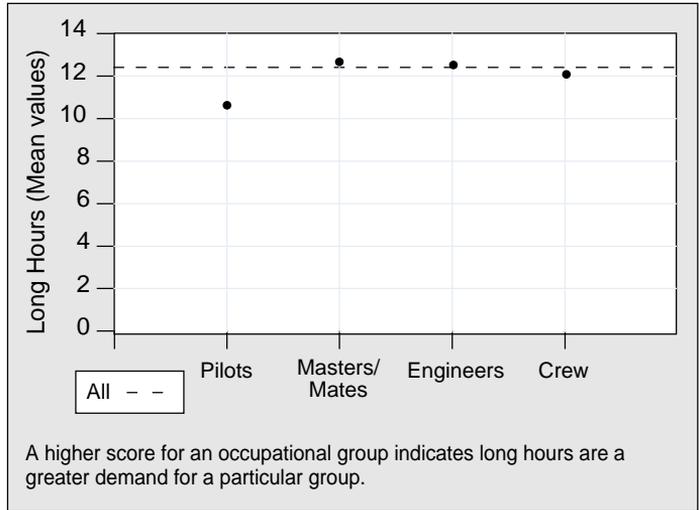
Change in the Industry

There were significant differences between the groups in the demands from industry change.

Figure 3d: Demands from industry change, by group.

Statistically significant difference between the groups, $p < 0.01$.
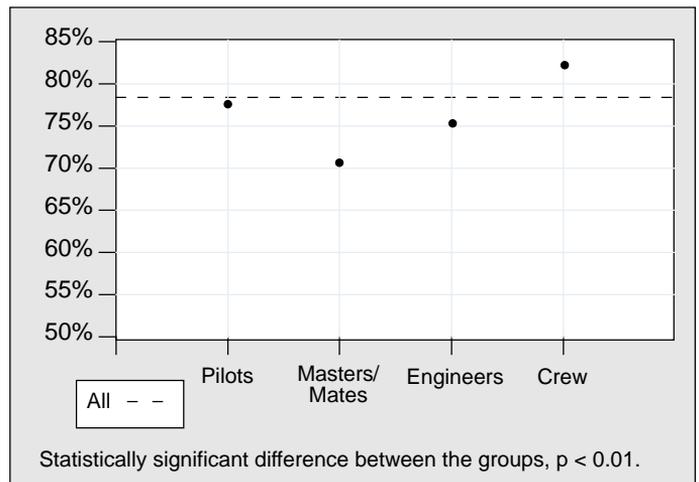
Appendices 4-6 contain information which supports and extends the material presented in Sections 9-12.

This material presents graphically and in tabular form the results of the analyses of data for the different occupational groups. Specifically, the figures present the mean scores for the OSI scales for each occupational group together with the score representing the total population surveyed. In some instances examples of data derived from similar surveys of other occupational groups are included for comparative purposes.

In addition, the results of statistical modelling procedures applied to individual group data are presented to:

- Estimate the relative importance of factors associated with occupational stress from sources of work pressure, and sources of job satisfaction.

- Determine the extent to which other previously identified factors (industry specific, health and lifestyle, medical and demographic) contribute to sources of pressure at work, sources of job satisfaction and mental and physical ill health.

APPENDIX 4

GENERAL SOURCES OF PRESSURE AT WORK - GROUP COMPARISONS

The information in this appendix support results shown on the sources of pressure at work (Section 10).

This section shows group comparisons for:

- Sources of pressure at work
- Relative importance of sources of pressure at work
- Factors contributing to sources of pressure at work

Factors Intrinsic to the Job

The groups experienced a significantly different level of pressure from factors intrinsic to the job.

Officers (masters/mates and engineers) and crew reported a greater level of pressure from factors intrinsic to the job than pilots. Pilots reported the lowest level of stress from this source.

Figure 4a: Factors intrinsic to the job, by group.

A higher score for an occupational group indicates factors intrinsic to the job are a greater demand for a particular group.

Statistically significant difference between the groups, $p < 0.001$.
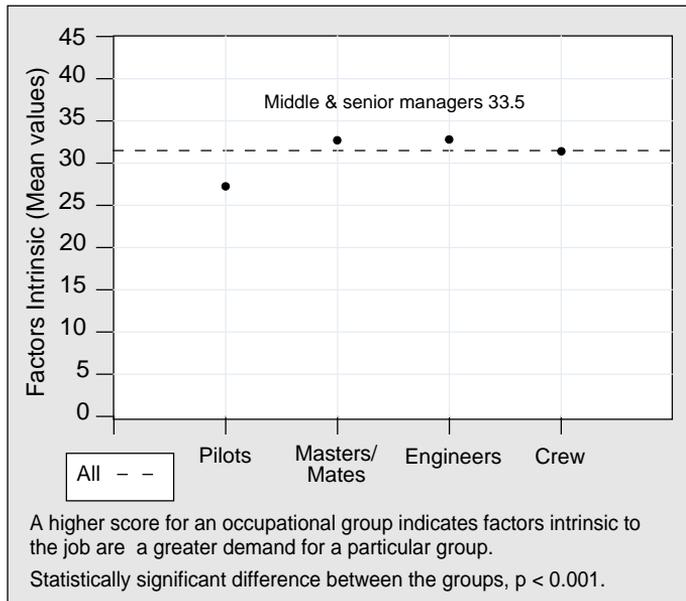
Managerial Role

The groups experienced significantly different levels of pressure with managerial role.

Managerial role was a greater source of pressure for officers than crew or pilots.

Figure 4b: Managerial role, by group.

A higher score for an occupational group indicates managerial role is a greater demand for a particular group.

Statistically significant difference between the groups, $p < 0.001$.
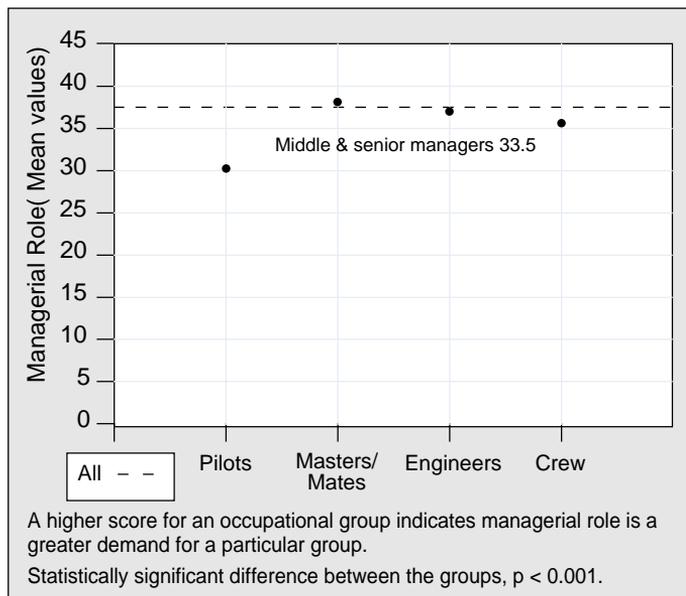
Relationships With Others

The groups experienced a significantly different level of pressure from relationships with others.

Masters/mates reported more pressure with workplace relationships than other groups; pilots reported considerably less pressure than others on this subscale.

Figure 4c: Relationships with others, by group.

A higher score for an occupational group indicates relationships with others are a greater demand for a particular group.

Statistically significant difference between the groups, p < 0.001.
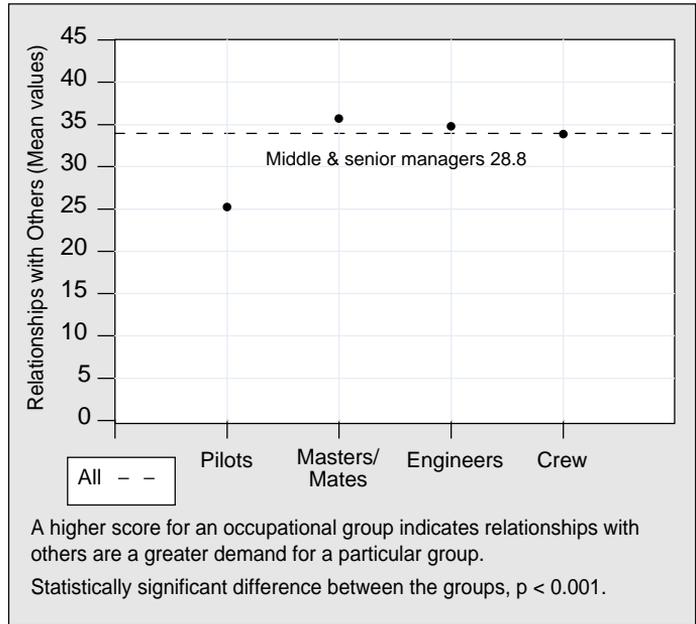
Organisational Structure

The groups experienced a significantly different level of pressure from organisational structure.

Those spending longer periods on the one ship (masters/mates, engineers and crew) reported a greater level of pressure with organisational structure than pilots.

Figure 4d: Organisational structure, by group.

A higher score for an occupational group indicates organisational structure is a greater demand for a particular group.

Statistically significant difference between the groups, p < 0.001.
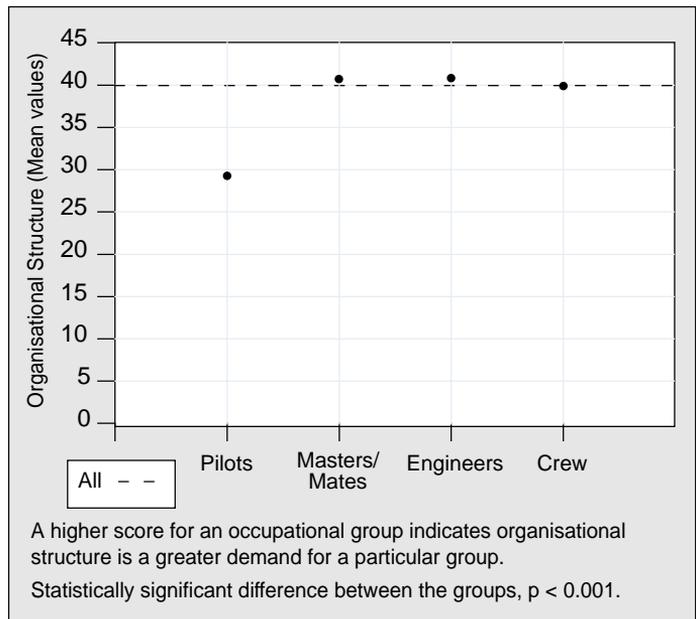
Relative Importance of Sources of Pressure at Work for Each Occupational Group

Table 4a: Ranked OSI scores on sources of pressure at work for pilots. Values are mean (SEM).

Variable	Pilots
Home work interface	56.0 (2.9)
Factors intrinsic to the job	44.1 (4.3)
Career and achievement	37.5 (4.1)
Managerial role	34.4 (4.4)
Organisational structure	32.5 (4.2)
Relationships with others	31.7 (4.9)

Table 4b: Ranked OSI scores on sources of pressure at work for masters/mates. Values are mean (SEM).

Variable	Masters/Mates
Home work interface	60.9 (0.7)
Factors intrinsic to the job	54.6 (0.7)
Organisational structure	53.9 (0.7)
Relationships with others	52.7 (0.6)
Managerial role	49.6 (0.7)
Career and achievement	47.6 (0.7)

Table 4c: Ranked OSI scores on sources of pressure at work for engineers. Values are mean (SEM).

Variable	Engineers
Home work interface	59.8 (0.7)
Factors intrinsic to the job	54.8 (0.7)
Organisational structure	54.3 (0.8)
Relationships with others	49.2 (0.7)
Managerial role	48.1 (0.7)
Career and achievement	46.6 (0.8)

Table 4d: Ranked OSI scores on sources of pressure at work for crew. Values are mean (SEM).

Variable	Crew
Home work interface	65.0 (0.7)
Factors intrinsic to the job	51.3 (0.7)
Relationships with others	47.4 (0.6)
Career and achievement	45.6 (0.7)
Managerial role	44.8 (0.6)
Organisational structure	42.7 (0.8)

Other Factors Influencing Sources of Pressure at Work for Each Occupational Group

Table 4e: Factors exhibiting a significant independent association with scores measuring the degree of pressure experienced with factors intrinsic to the job (ranked by magnitude of variance) for all groups.

Masters/mates	Engineers	Crew
58.3% #	52.6% #	43.7% #
1. Long working hours (42.4)%	1. Long working hours (38.6%)	1. Long working hours (27.9%)
2. Hardships at sea	2. Hardships at sea	2. Weather
3. Change in the industry	3. Change in the industry	3. Hardships at sea
4. Broken rest	4. Weather	4. Missing home
5. Weather	5. Missing home	5. Stress frequency at sea
6. Missing home	6. Drug free	6. Change in the industry
7. Stress frequency at sea		
# = percentage contribution of the variance		

Table 4f: Factors exhibiting a significant independent association with scores measuring the degree of pressure experienced with the managerial role (ranked by magnitude of variance) for all groups.

Masters/mates	Engineers	Crew
51.4% #	40.7% #	30% #
1. Broken rest (36.8%)	1. Long working hours (28.5%)	1. Hardships at sea (20.2%)
2. Hardships at sea	2. Hardships at sea	2. Broken rest
3. Change in the industry	3. Change in the industry	3. Stress frequency at sea
4. Weather	4. Nutrition excuses	4. Weather
5. Age	5. Weather	5. Nutrition excuses
6. Stress frequency	6. Stress frequency at sea	
# = percentage contribution of the variance		

Table 4g: Factors exhibiting a significant independent association with scores measuring the degree of pressure experienced with relationships with others (ranked by magnitude of variance) for all groups

Masters/mates	Engineers	Crew
41.5% #	35.3% #	26% #
1. Broken rest (29.8%)	1. Long working hours (22.5%)	1. Hardships at sea (15.6%)
2. Hardships at sea	2. Hardships at sea	2. Stress frequency at sea
3. Stress type at sea	3. Missing home	3. Missing home
4. Change in the industry	4. Stress frequency at sea	4. Nutrition excuses
5. Missing home	5. Change in the industry	
	6.Nutrition excuses	
# = percentage contribution of the variance		

Table 4h: Factors exhibiting a significant independent association with scores measuring the degree of pressure experienced with career and achievement (ranked by magnitude of variance) for all groups

Pilots	Masters/mates	Engineers	Crew
58% #	30.3% #	29.0% #	24.6% #
1. Missing home (44.4%)	1. Hardships at sea (15.5%)	1. Long working hours (14.0%)	1. Hardships at sea (13.4%)
2. Nutrition excuses	2. Missing home	2. Change in the industry	2. Missing home
	3. Change in the industry	3. Age	3. Age
	4. Age	4. Nutrition excuses	4. Change in the industry
	5. Nutrition excuses	5. Hardships at sea	5. Stress frequency at sea
		6. Sleep type at sea	
# = percentage contribution of the variance			

Table 4i: Factors exhibiting a significant independent association with scores measuring the degree of pressure experienced with organisational structure (ranked by magnitude of variance) for all groups

Masters/mates	Engineers	Crew
45.2% #	14.0%#	31.8% #
1. Long working hours (27.8%)	1. Change in the industry (14.0%)	1. Hardships at sea (20.6%)
2. Hardships at sea		2. Missing home
3. Change in the industry		3. Change in the industry
4. Stress type at sea		4. Long working hours
5. Nutrition excuses		5. Nutrition excuses
6. Missing home		
# = percentage contribution of the variance		

Table 4j: Factors exhibiting a significant independent association with scores measuring the degree of pressure experienced with home/work interface (ranked by magnitude of variance) for all groups.

Pilots	Masters/mates	Engineers	Crew
65.2% #	47.8% #	44.3% #	41% #
1. Long working hours (45.5%)	1. Missing home (44.3%)	1. Missing home (40.0%)	1. Missing home (30.5%)
2. Missing home	2. Long working hours	2. Nutrition excuses	2. Stress frequency at sea
	3. Marital status	3. Stress type at sea	3. Hardships at sea
	4. Hardships at sea	4. Age	4. Age
	5. Nutrition excuses		5. Permanent restriction on activity
# = percentage contribution of the variance			

APPENDIX 5

JOB SATISFACTION - GROUP COMPARISONS

The information in this appendix support results shown on the sources of job satisfaction (Section 11).

This section shows group comparisons for:

- The degree of satisfaction with sources of job satisfaction
- Relative importance of sources of job satisfaction
- Factors contributing to the sources of job satisfaction

Achievement, Value and Growth

There were significant differences between the groups in the level of satisfaction with achievement, value and growth.

Pilots, masters / mates and engineers scored higher on this measure than crew members. This suggests these groups perceive there is more scope for advancement within the industry than crew members.

Figure 5a: Satisfaction with achievement, value and growth, by group.

A higher score for an occupational group indicates achievement, value and growth is more satisfying for a particular group.

Statistically significant difference between the groups, $p < 0.001$.
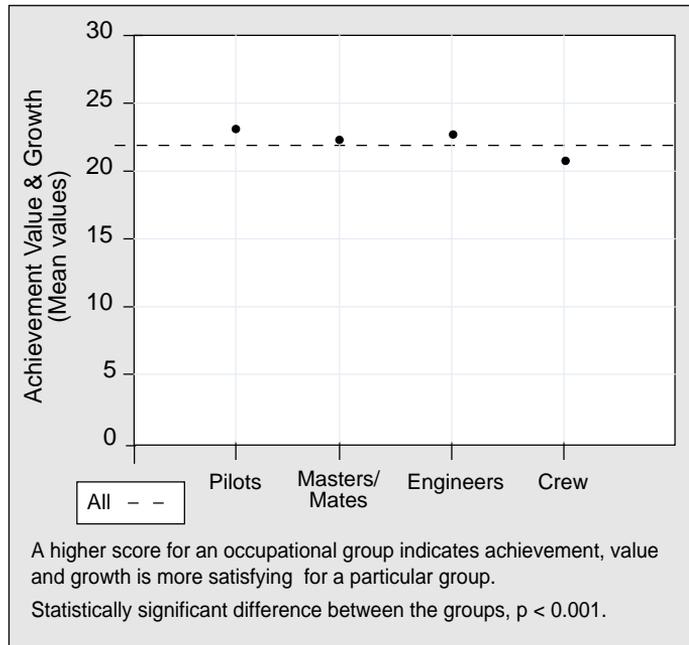
Job Itself

The groups experienced a significantly different level of satisfaction with the job itself.

Crew felt less satisfaction than other groups with the job itself such as type and scope of job tasks, including job security and the amount of work. Pilots were the most satisfied with the job itself; masters/mates and engineers were satisfied to a similar degree.

Figure 5b: Satisfaction with the job itself, by group.

A higher score for an occupational group indicates the job itself , is more satisfying for a particular group.

Statistically significant difference between the groups, p < 0.001.
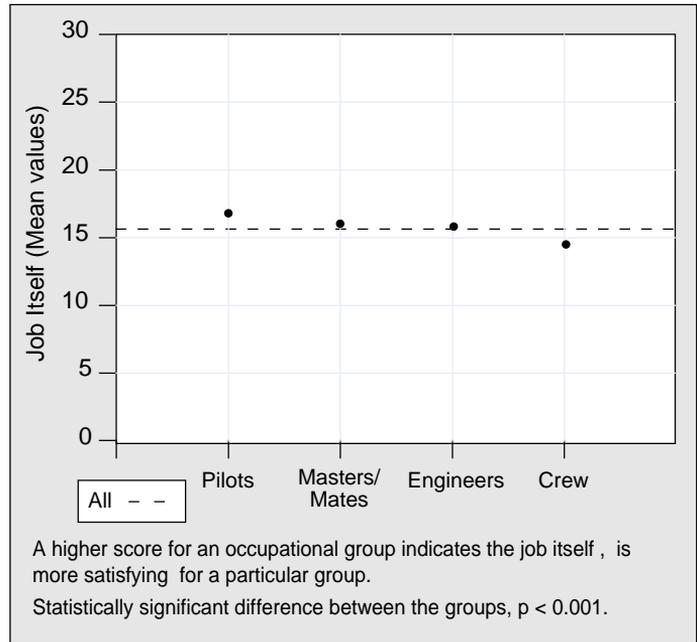
Organisation Design and Structure

The groups experienced significantly different levels of satisfaction with organisation design and structure.

Pilots were more satisfied than others with organisation design and structure representing administrative and managerial elements in the industry.

Figure 5c: Satisfaction with organisational design and structure, by group.

A higher score for an occupational group indicates organisational design and structure is more satisfying for a particular group.

Statistically significant difference between the groups, p < 0.001.
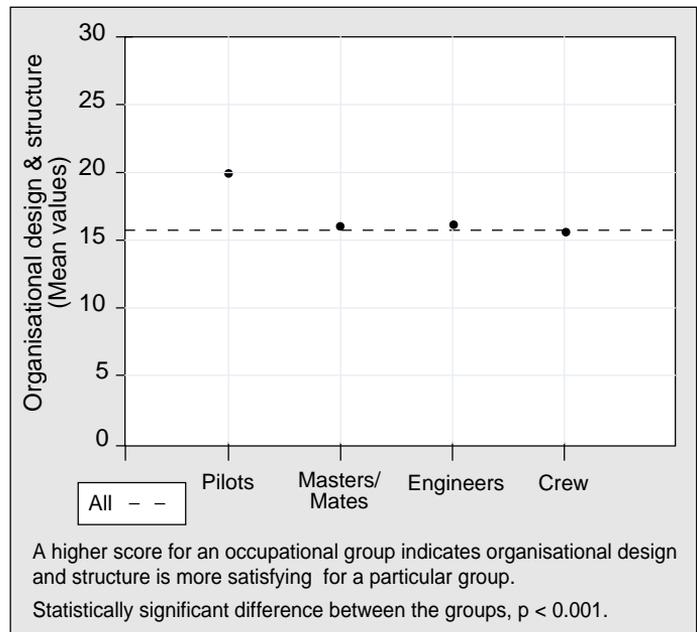
Organisational Process

The groups experienced a significantly different level of satisfaction with organisational process.

Crew members were less satisfied, and pilots more satisfied with organisational processes.

Figure 5d: Satisfaction with organisational process, by group.

A higher score for an occupational group indicates organisational process is more satisfying for a particular group.

Statistically significant difference between the groups, p < 0.001.
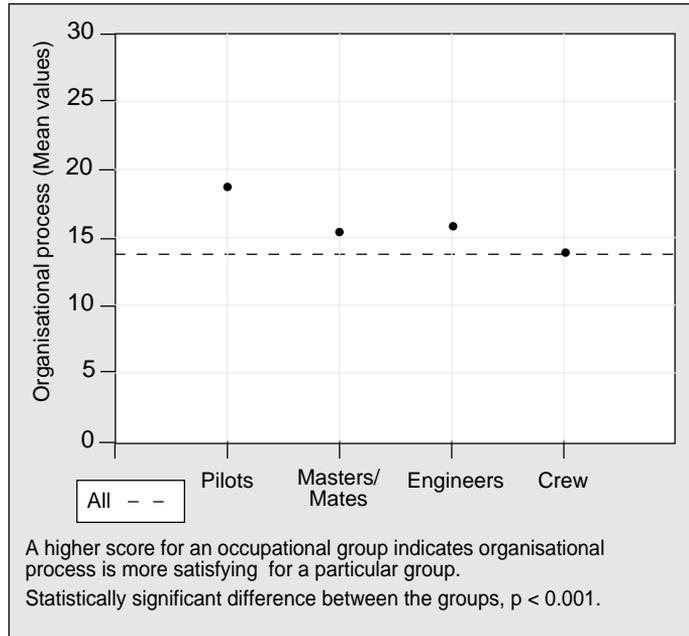
Personal Relationships

There was no difference between the groups in satisfaction with personal relationships.

Figure 5e: Satisfaction with personal relationships, by group.

A higher score for an occupational group indicates personnal relationships are more satisfying for a particular group.
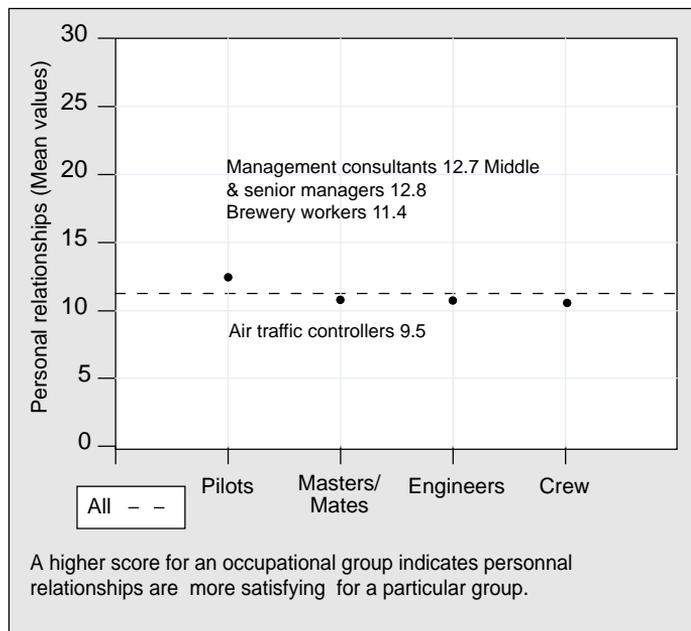
Relative Importance of Sources of Job Satisfaction

**Table 5a: Ranked OSI scores for sources of job satisfaction for pilots.
Values are mean (SEM).**

Variable	Pilots
Organisational process	74.3 (4.1)
Job itself	64.4 (3.6)
Personal relationships	63.8 (4.2)
Organisation design and structure	58.5 (3.9)
Achievement, value & growth	56.4 (4.4)

**Table 5b: Ranked OSI scores for sources of job satisfaction for Masters/masters.
Values are mean (SEM).**

Variable	Masters/Mates
Job itself	58.9 (0.8)
Organisational process	57.6 (0.9)
Achievement, value and growth	55.3 (0.9)
Personal relationships	51.7 (0.8)
Organisation design and structure	46.6 (0.8)

**Table 5c: Ranked OSI scores for sources of job satisfaction for engineers.
Values are mean (SEM).**

Variable	Engineers
Organisational process	59.6 (0.9)
Job itself	58.7 (0.8)
Achievement, value and growth	56.1 (0.9)
Personal relationships	51.6 (0.8)
Organisation design and structure	45.7 (0.9)

**Table 5d: Ranked OSI scores for sources of job satisfaction for crew.
Values are mean (SEM).**

Variable	Crew
Job itself	52.1 (0.8)
Organisation design and structure	51.9 (0.4)
Organisational process	51.9 (0.7)
Personal relationships	51.9 (0.4)
Achievement, value and growth	46.6 (0.9)

Factors Influencing Sources of Job Satisfaction

Table 5e: Factors exhibiting a significant independent association with scores measuring the degree of job satisfaction with achievement, value and growth (ranked by magnitude of variance) for all groups

Masters/mates	Engineers	Crew
11%#	13.3% #	22.9% #
1. Stress frequency at sea (5.8%)	1. Nutrition excuses (5.9%)	1. Missing home (8.9%)
2. Change in the industry	2. Stress frequency at sea	2. Stress frequency at sea
3. Sleep type at sea	3. Change in the industry	3. Change in the industry
	4. Sleep type at sea	4. Nutrition excuses
		5. Permanent restriction on activity
		6. Hardships at sea
# = percentage contribution of the variance		

Table 5f: Factors exhibiting a significant independent association with scores measuring the degree of job satisfaction with the job itself (ranked by magnitude of variance) for all groups.

Masters/mates	Engineers	Crew
17.4%#	21.7% #	17.5% #
1. Change in the industry (8.2%)	1. Stress frequency at sea (12.1%)	1. Long working hours (8.3%)
2. Sleep type at sea	2. Long working hours	2. Stress type at sea
3. Hardships at sea	3. Sleep type at sea	3. Sleep type at sea
4. Stress frequency at sea	4. Nutrition excuses	4. Pronutrition
		5. Change in the industry
# = percentage contribution of the variance		

Table 5g: Factors exhibiting a significant independent association with scores measuring the degree of job satisfaction with organisational design & structure (ranked by magnitude of variance) for all groups.

Masters/mates	Engineers	Crew
16.7%#	20.4% #	15.6% #
1. Long working hours (9.2%)	1. Stress frequency at sea (7.9%)	1. Change in the industry (8.3%)
2. Stress frequency at sea	2. Change in the industry	2. Stress frequency at sea
3. Hardships at sea	3. Nutrition excuses	3. Long working hours
4. Change in the industry	4. Sleep type at sea	4. Hospitalisation
5. Sleep type at sea	5. Permanent restriction on activity	
# = percentage contribution of the variance		

Table 5h: Factors exhibiting a significant independent association with scores measuring the degree of job satisfaction with organisational process (ranked by magnitude of variance) for all groups.

Engineers	Crew
11.6%#	17%#
1. Stress frequency at sea (6.6%)	1. Change in the industry (7.7%)
2. Sleep type at sea	2. Long working hours
3. Nutrition excuses	3. Stress frequency at sea
	4. Age
	5. Permanent restriction on activity
# = percentage contribution of the variance	

Table 5i: Factors exhibiting a significant independent association with scores measuring the degree of job satisfaction with personal relationships (ranked by magnitude of variance) for all groups.

Masters/mates	Engineers	Crew
19.7%#	18.0% #	11.4%#
1. Stress frequency at sea (9.5%)	1. Stress frequency at sea (11.9%)	1. Stress frequency at sea (6.6%)
2. Change in the industry	2. Sleep type at sea	2. Change in the industry
3. Hardships at sea	3. Nutrition excuses	3. Long working hours
4. Long working hours		4. Nutrition excuses
5. Nutrition excuses		
# = percentage contribution of the variance		

Table 5j: Factors exhibiting a significant independent association with scores measuring the degree of job satisfaction with broad job satisfaction scale (ranked by magnitude of variance) for all groups.

Masters/mates	Engineers	Crew
17.3%#	22.4% #	22.9%#
1. Long working hours (8.9%)	1. Stress frequency at sea (11.2%)	1. Change in the industry (9.1%)
2. Stress frequency at sea	2. Sleep type at sea	2. Stress frequency at sea
3. Change in the industry	3. Nutrition excuses	3. Nutrition excuses
4. Hardships at sea	4. Change in the industry	4. Hardships at sea
5. Sleep type at sea		5. Permanent restriction on activity
		6. Sleep type at sea
# = percentage contribution of the variance		

APPENDIX 6

MENTAL AND PHYSICAL ILL HEALTH - GROUP COMPARISONS

The information in this appendix support results shown on mental and physical ill health (Section 12).

This section shows group comparisons for:

- The mental and physical ill health

- Factors contributing to mental and physical ill health

Mental Ill Health

The difference in mental health between the groups was not significant.

Although not reaching statistical significance, pilots had fewer signs of mental ill health than other groups indicating behaviour was affected by perceived pressure from the job.

Figure 6a: Mental ill health, by group.

A higher score for mental ill health indicates that there is a lower sense of emotional well being for a particular group.

Chart labels: Brewery workers 55.6; Primary health care workers 53.6; Management consultants 49.3; Middle & senior managers 48.6

Y-axis: Mental health (Mean values) 0, 20, 40, 60, 80

X-axis: All – –, Pilots, Masters/Mates, Engineers, Crew
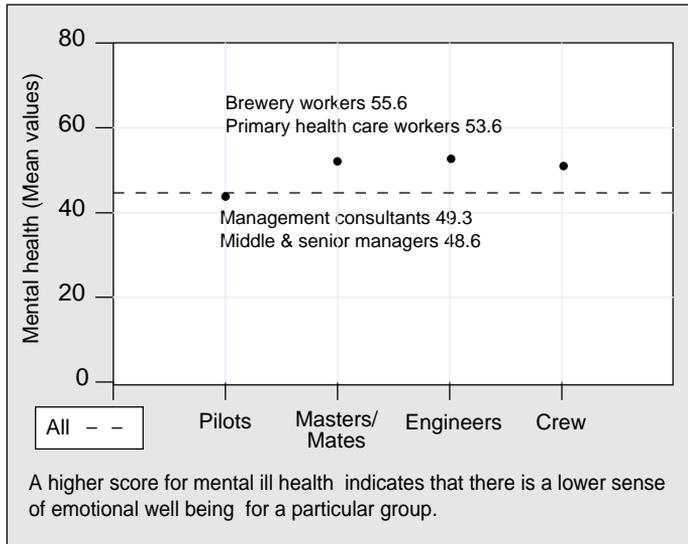
Physical Ill Health

The groups experienced significantly different levels of physical ill health problems.

Crew and officers reported a similar frequency of physical problems; whereas pilots reported fewer physical problems.

Figure 6b: Physical ill health, by group.

A higher score for an occupational group indicates the frequent occurrence of ailments for a particular group.

Statistically significant difference between the groups, $p < 0.001$.

Chart labels: Blue collar factor workers 27.8; Middle & senior managers 27.8

Y-axis: Physical ill health (Mean values) 0, 10, 20, 30, 40

X-axis: All – –, Pilots, Masters/Mates, Engineers, Crew
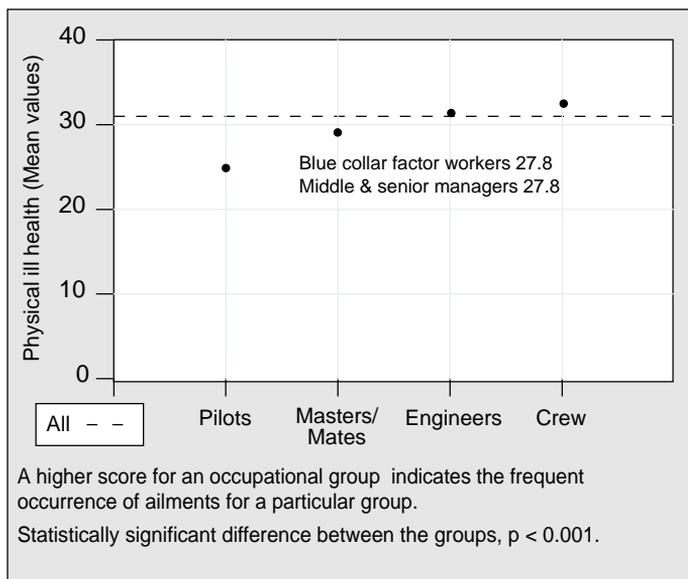
Factors Contributing to Mental and Physical Ill Health for the Occupational Groups

Table 6a: Factors exhibiting a significant independent association with scores measuring mental ill health (ranked by magnitude of variance) for all groups.

Masters/mates	Engineers	Crew
24.6% #	29.1% #	41% #
1. Sleeptype at sea (10.7%)	1. Change in the industry (13.3%)	1. Stress frequency at sea (19.1%)
2. Long working hours	2. Long working hours	2. Nutrition excuses
3. Missing home	3. Broken rest	3. Stress type at sea
4. Stress type at sea	4. Stress type at sea	4. Change in the industry
5. Change in the industry	5. NHF guidelines for alcohol at sea	5. Food exploration
6. Age	6. Nutrition excuse	6. Sleep type at sea
7. Nutrition excuses		

Table 6b: Factors exhibiting a significant independent association with scores measuring physical ill health (ranked by magnitude of variance) for all groups.

Masters/mates	Engineers	Crew
38.5% #	25.3% #	45.6% #
1. Sleep type at sea (22.7%)	1. Sleep type at sea (15.6%)	1. Sleep type at sea (22.3%)
2. Nutrition excuses	2. Long working hours	2. Nutrition excuses
3. Change in the industry	3. Nutrition excuses	3. Number of illnesses
4. Permanent restriction on activity	4. Stress type at sea	4. Long working hours
5. Fat at sea	5. Smoking at sea	5. Stress type at sea
6. Stress frequency at sea	6. Missing home	6. Drug free
	7. Sleep hours at sea	7. Medication
# = percentage contribution of the variance		

APPENDIX 7

MISCELLANEOUS COMMENTS

After completing the questionnaire respondents were invited to offer further comments regarding their health, work or sources of stress. This section was divided into two parts: sea and ashore.

The purpose of the miscellaneous comments in the open-ended section was to capture additional information on sources of stress at sea and ashore not addressed in the structured questions. The comments were used to illuminate responses for the more structured questionnaire. The section also provided an opportunity for expansion on particular issues previously addressed in the questionnaire. Additionally, the comments enabled the wide variation within the industry due to differences in ship types, sea working areas, work practices and occupational groups to be recorded. The comments depend very much on the type of ship, including its operation and construction, the harmony on board, the sea area worked and the shipping company involved. The number of seafarers who offered miscellaneous comments is shown in Table 7a.

Overall, 56% of questionnaire respondents offered miscellaneous comments in the open-ended section.

For analysis, comments were divided into the following broad areas: industry-wide, at sea or ashore. Within these broad areas, themes were identified and comments then coded as negative, positive, suggestions or other.

Only comments that accounted for more than 8% of total comments are shown.

The following sections show:-

(i) The percentage of negative and positive comments industry wide, at sea and ashore;

(ii) The percentage of comments in each area from each of the occupational groups; and

(iii) A synopsis of the comments indicating underlying issues on each topic.

Table 7b and 7c show the percentage of positive and negative comments. These comments relate to additional sources of stress industry-wide, at sea and ashore.

Table 7a: Number of seafarers offering miscellaneous comments for the entire sample and four occupational groups.

Group	Number	Response percentage
Pilots	14	50%
Masters/Mates	285	54%
Engineers	373	69%
Crew	341	44%
Total	**1013**	**56%**

Table 7b: Percentage of negative comments industry wide, at sea and ashore.

Industry-wide	At sea	Ashore
Home/work interface (28.7%)	Quality of sleep (15.6%)	Uncertainty (26.4%)
Demanning (14.2%)	Work schedules/hours (13.7%)	Relationships: wives/partners (15.4%)
Shore management (10.3%)	Fatigue (12.9%)	Quality of sleep (12.0%)
	Frying of food (10.0%)	
	Job commitment & attitude of some (8.0%)	
	On board relationships (8.0%)	

Table 7c: Percentage of positive comments industry wide, at sea and ashore.

Industry-wide	At sea	Ashore
Job satisfaction (66.0%)	Health (17.6%)	Recreation/relaxation (33.5%)
Remuneration (12.0%)	Recreation/relaxation (17.6%)	Relationships: wives/partners/children (25.3%)
Shore management (10.3%)	Communication with family (11.0%)	Quality of sleep (10.5%)

INDUSTRY-WIDE

Negative

On industry wide issues there were 894 negative comments and 50 positive comments. The highest percentage of negative comments related to sources of stress related to the work/home interface (28.7%), demanning (14.2%) and shore management (10.3%). All other categories covered less than 10%.

The sources of negative comments from each of the groups are shown below.

Pilots

The 30 negative comments from pilots chiefly related to the Australian Maritime Safety Authority (AMSA) (40%), government regulation (20%), remuneration (17%) and uncertainty in the industry (10%).

Masters/Mates

The 307 negative comments from Masters/mates mostly related to work/home interface (28%), demanning (11.7%) and shore management (9.7%).

Engineers

The 294 negative comments from engineers mostly related to work/home interface (22.4%), demanning (14.9%) and shore management (10.5%).

Crew

The 293 negative comments from crew members mostly related to work/home interface (35%), demanning (16.0%) and job security/uncertainty (10.2%).

Positive

Overall, job satisfaction and remuneration accounted for 66% and 12% of positive comments, respectively. Job satisfaction also had the highest percentage of positive comments (50%) from masters/mates, engineers and crew.

SUGGESTIONS

Suggestions on industry-wide issues related to the work/home interface, on board management, and other issues such as further surveys for wives/families and specific sections of the industry. Some respondents raised concern regarding the confidentiality of information provided in this or further surveys.

The following section shows some of the underlying issues relating to the miscellaneous comments.

Government Regulation

Some respondents felt the need for government to accept some responsibility for the stress and health of seafarers.

Shore Management

The concerns of many respondents about shore management related to difficulty with communication, planning (sudden recalls to work), the consultation/decision making process and the extra workloads placed on some officers associated with office paperwork. Some respondents highlighted the apparent lack of knowledge by shore management of some specific working areas such as Offshore Oil and Gas. Respondents were also concerned by the lack of action by shore management on health hazards associated with dangerous cargoes. A number of respondents indicated shore management showed a lack of empathy with the stress levels experienced by employees; employee stress appeared to be considered by shore management as personal rather than contributed to by occupational difficulties.

A few respondents indicated shore management had been helpful in providing relief from duty when sudden family illness had occurred.

AMSA

Negative comments related to recent changes in pilotage operations and the resulting uncertainty of income, price cutting and safety issues for pilots.

Change in the Industry, Job Security and Uncertainty

A number of respondents raised concern over major industry change and future change. Concern was expressed over:

(i) financial security;

(ii) cabotage;

(iii) long periods of unemployment and

(iv) no replacement for vessels as they leave the industry.

The consequences of these issues related to poor industry morale, loss of hard earned conditions and increased stress levels.

Demanning

A large number of respondents raised concerns over demanning issues. Concerns related to:

(i) The achievement of demanning mostly on union/political grounds and not on workload levels;

(ii) Increased workloads on certain departments (e.g. insufficient staff were available for proper maintenance);

(iii) Decreased crew sizes required a better standard of training and this was not happening;

(iv) Not in all cases was the decrease in crew size offset by advanced technology particularly in the older ships;

(v) Sufficient time to complete proper maintenance schedules (cost cutting and safety) and train young engineers;

(vi) Demanning impacted negatively on the social life on board - fewer to socialise with resulting in periods of loneliness for some employees.

Job Satisfaction

Several issues reduced job satisfaction:

(i) The poor utilisation of the trade skills of employees;

(ii) The lack of continuity of personnel in particular areas (engine room) meant meaningful tasks were difficult to assign; and

(iii) The appropriateness of having TIR cadets belong to the crews' union during their training;

(iv) Over emphasis on union politics;

(v) On some ships on board management was out of touch - younger officers appeared to handle personnel problems more appropriately;

(vi) Absence of input from the ship's master into crew selection;

(vii) No workable process whereby unsatisfactory workers can be removed from the system;

(viii) In some instances health standards for selection and termination of employment are breached;

(ix) The ship is an extension of the office; and

(x) Extra paper work additional to normal duties is very taxing for officers. Quality assurance was identified as the latest bureaucratic load.

Many respondents indicated working at sea is generally a rewarding career and job satisfaction is very much dependent on the ship's crew and officers and the

harmony on board. Some respondents indicated job satisfaction could be improved by:

(i) The opportunity wives/families to join the ship sometimes, and

(ii) Further training for employees (computerised equipment, management, administrative).

Added responsibility had improved job satisfaction; responsibility for catering budgets had been rewarding. Those employees who were in mobile phone range benefited by the improved communication with home, and were thereby more satisfied with working at sea.

Work/Home Interface

A large number of respondents indicated personal or other problems at home affected work at sea and vice versa. Respondents indicated adjustments were required during the ship/shore and shore/ship transition. For example, one week was required to settle back into shore/family life again, then approximately one week before returning to sea tension builds, arguments occur, wives and husbands become moody and depressed and children are upset. Other respondents were concerned with:

(i) The strain placed on wife/partner for bringing up children alone;

(ii) The contribution of sea going life to divorce rate in the industry;

(iii) Uncertainty of leave and return to work disrupts family plans; and

(iv) Difficulties in planning for significant family events; birthdays, anniversaries.

Respondents indicated some companies have recently addressed the issues of support for wives and families. For example, a wives support group has been established - newsletters enabling communication to occur between those ashore. A further step by some companies has been to permit families to take a short trip on the ship between ports in Tasmania. The trip has been most helpful in helping families understand work at sea and greatly appreciated by those involved.

SUGGESTIONS

Work/Home Interface

Suggestions on this topic related to the need for the family to visit the ship sometimes, and the production of a video about work and life at sea to help family understand the environment at sea.

Other suggestions indicated whenever possible advanced notification should be given of courses to be attended during the year so that these can be pre-planned for leave periods rather than hurriedly arranged.

On board Management

Suggestions on this topic related to the need for on board management to be creative to keep people motivated "pat-on-back occasionally"

Other Suggestions

Some respondents indicated seafarers would benefit from the educational benefits of computer courses held at sea. A number of respondents offered suggestions regarding several limitations of the present study:

(i) The need for further surveys for wives/partners and families of seafarers;

(ii) The need for additional surveys of specific industry areas such as Tug-boat industry Offshore Oil and Gas;

(iii) The length of the present survey and the confidentiality of information; and

(iv) The research team should visit ships to measure noise, heat and humidity.

AT SEA

Negative

There were 1744 negative and 51 positive miscellaneous comments relating to sources of stress at sea. At sea, the largest percentage of negative comments related to quality of sleep (15.6%), work schedules/hours (13.7%) and fatigue (12.9%). Not quite so important but nevertheless still important were frying of food (8.2%), job commitment and attitudes of some employees (7.4%) and on board professional relationships (6.7%).

Pilots

The very few negative comments from pilots related to health and recreation and relaxation.

Masters/Mates

The 535 negative comments from masters and mates related to the quality of sleep (19.6%), work schedules/hours (15.5%) and fatigue (14.4%).

Engineers

The 600 negative comments from engineers related to fatigue (15.0%), quality of sleep (11.6%) and job commitment and attitude of some employees (13.0%).

Crew

The 599 negative comments from crew members related to quality of sleep (16.2%), work schedules/hours (14.5%) and frying of food (11.5%).

Positive

The 51 positive comments about issues at sea related to health, recreation/relaxation and communication with family.

Suggestions

There were 18 suggestions relating to issues associated with stress at sea. Suggestions regarding work schedules/hours and fatigue related to the implementation of a half or full day's rest during a working week. Suggestions indicated that compulsory work and sleep hours as per the International Convention on Standards for Training and Certification of Watchkeepers must be adhered to across the industry.

Suggestions regarding health at sea related to the use of 'quit' programs while at sea in relation to smoking, drug and alcohol abuse. Suggestions were made in relation to decreasing stress levels on board by increasing harmony between officers and crew. It was pointed out that a more relaxed attitude on board was more conducive to productivity.

Cooking of Food

A considerable number of respondents expressed concerns regarding the excessive frying of food, with nutritious food being ruined by too much frying. Some respondents indicated cooks should be properly trained in the preparation of low fat foods. Other respondents indicated more low-fat products should be available at sea.

On some ships, there was little frying of food; cooks were very health and nutrition conscious and offered plenty of non-fried food choices.

Quality of Sleep

A very large number of respondents indicated poor quality sleep was related to two main issues:

(i) The location of the sleeping accommodation in relation to noise sources on the ship; and

(ii) The poor soundproofing of sleeping accommodation. For example, in ships working in the Offshore Oil and Gas sector sleeping accommodation is located forward (role and pitch noticed more), and noise comes from the bow thruster and/or anchor winch. Moreover, when engine room funnels are attached to the accommodation area, noise and vibration are loud and constant. Other respondents reported poor quality sleep because of noise associated with air-conditioning systems, high electrical fields (generators), public address announcements and traffic on walkways and noise from bar and recreation areas.

Further comments regarding sleep related to:

(i) Poor quality short duration sleep contributed to ongoing fatigue;

(ii) Extremely loud alarms directly over sleeping bunks - alarms far too loud;

(iii) Sleep deprivation affected the general mood of the ship and was exacerbated when the ship visited 3-5 ports per week for an 8 week work period; and

(iv) Safety procedures such as fire drills, boat drills, safety rounds (conducted during daylight hours) disturb the sleep of night shift personnel sleeping during the day.

Work Schedule/Hours

A very large number of respondents raised concern about the very long daily working hours experienced by those working in some sea areas and in some departments. Some issues associated with long hours were:

(i) Daily work hours between 12 and 18 hours, especially since demanning;

(ii) Working 7 days per week for 7-8 weeks;

(iii) Junior mates spending 6 hours on and 6 hours off for up to 36 hours;

(iv) Deck officers working 6 hours on and 6 hours off for 28 days; and

(v) The 24 hours per day on call system for 28 days was also exhausting.

Some respondents from specific sectors such as the Offshore Oil and Gas area felt fatigue from work practices of 6 hrs on 6 off with a total of 36 hours duty on 3.5 hours sleep daily. Frequent calls off-watch demonstrate the need for a second mate where continuous watchkeeping and implementation of international conventions re watchkeeping hours is required. Respondents reported being fatigued towards the end of a swing and experiencing a diminished, decision making process. This fatigued situation worsened when handling and manoeuvring vessels a number of times a day in close proximity to other ships and fixed structures in Offshore Oil and Gas. Respondents indicated safety was compromised when working during bad weather following long hours of duty.

Respondents from some departments reported suffering fatigue from being on 24 hour gear turns every 3 days (UMS), completing a full day's work after and

working much of the night. Respondents indicated some departments were struggling with the long hours and the effects of demanning. For example, in the last 15 years the engineering department workforce decreased by 62% and time in port decreased by 80%. Enormous work schedules were required to maintain equipment to minimum standards.

Fatigue

A very large number of respondents reported experiencing acute and chronic fatigue associated with the long working hours, short duration and poor quality sleep. Fatigue was worsened by:

(i) A 7 day working week and no rest day; and

(ii) Quick turnaround times in ports (particularly when a large number of ports were visited) each week.

Professional and Personal Relationships

Many respondents reported increased stress due to the politics of shipping such as union power and interdepartmental squabbles dominating workplace relationships. The disparity between groups in the level of responsibility, unequal workloads and very different work attitudes worsened the situation. A few respondents indicated in some cases officers treated crew poorly and insisted on maintaining a professional hierarchy off duty.

Communication with Family

Some respondents reported the high cost of phone calls to the family and uncertain mail caused further stress at sea. Other respondents indicated mobile phones were helpful in keeping in touch with family and reduced stress associated with being away from home for long periods.

Job Commitment and Attitudes

Some respondents were concerned the level of job commitment and attitude of some employees and the added stress this placed on others working at sea.

SUGGESTIONS

Work Schedules and Hours and Fatigue

Many respondents suggested having a day or half day off to help recover from fatigue and relax. Other respondents reported all on board should strictly adhere to work and sleep hours under the Maritime Act.

Health

Some respondents suggested the implementation of:

(i) Quit smoking programs on board ship; and

(ii) The facility should exist to take leave from sea for alcohol and or drug rehabilitation.

A few respondents reported higher physical stress (elevated heart rate) during pitching and rolling of the ship in bad weather and suggested further investigation of this issue.

Recreation and Relaxation

Some respondents indicated computers on board should be focused towards education not only games. Others suggested the industry should closely monitor progress by the UK maritime industry into Internet access; pay TV may be an option in some work areas.

Other

Some respondents suggested health cover should be extended to cover leave periods.

ASHORE

Negative

Ashore, there were 227 negative comments and 229 positive comments regarding additional sources of stress. The highest percentage of negative comments ashore related to uncertainty (26.4%), relationships with wife/husband/partner (15.4%) and quality of sleep (11.9%).

Pilots

No comments regarding life ashore were recorded for this group.

Masters/Mates

The 65 negative comments from masters/mates related to uncertainty (18.5%), friends (15.4%) and demands from work (12.3%).

Engineers

The 95 negative comments from engineers related to uncertainty (33.6%), relationships with wife/partner (16.3%) and relationships with children/other family (13.2%).

Crew

The 64 negative comments ashore related to uncertainty (23.4%), relationships with wife/partner (18.7%), and quality of sleep (14.1%).

Positive

The highest percentage of positive comments related to recreation/relaxation (33.6%), relationships with children/other family (25.3%) and quality of sleep (10.5%).

Masters/Mates

The 80 positive comments from masters and mates related to recreation/relaxation (33.7%), relationships with wife/husband/partner (27.5%), and relationships with children/other family (20.0%).

Engineers

The 58 positive comments from engineers related to relationships with wife/partner (32.7%), recreation/relaxation (24.1%), and relationships with children/other family (22.4%).

Crew

The 91 positive comments from crew related to recreation/relaxation (39.6%), relationships wife/partner (34.1%), and relationships with children/other family (31.8%).

The following section shows some of the underlying issues relating to miscellaneous comments.

Quality of Sleep

Some respondents reported poor sleep was experienced because of very young/sick children and worries over delinquent children. A large number of respondents reported excellent sleep ashore.

Uncertainty

A number of respondents were worried about uncertainty related to the future of industry and the affects on the family. Other respondents experienced difficulty with planning ashore because of the uncertainty of recall to work.

Relationships: Wife, Husband and/or Partner

Some respondents reported concerns and guilt over releasing bottled up stress at sea on wife. A number of respondents were concerned over upsetting routines of family, feel like a stranger when returning and working at fitting into the family again.

A large number of respondents stressed the importance of a stable family life to work at sea and the importance of working hard to ensure successful marriages/relationships. Some respondents indi-

cated some wives enjoy the challenge of coping with the children alone.

Relationships: Children and Wider Family

A number of respondents were worried over missing significant events in the children's lives such as birthdays, school and sporting success

Recreation & Relaxation

Many respondents reported missing participation in team sport because of work at sea. However, respondents also reported plenty of activity and exercise was organised with the family while on leave.

Demands from Work

A number of respondents reported stress associated with work demands such as:

(i)   Time ashore interrupted by having to contact company;

(ii) Calls from company regarding trivial matters and sudden calls from company to attend unplanned short courses and conferences. Other respondents indicated there was pressure while ashore to attend union rallies and meetings.

Friends

Some respondents reported difficulty in maintaining friendships outside of family; friends were mostly maritime friends.

Other

Other sources of stress reported by respondents related to:

(i)   Pressure from spouse for shore-based work;

(ii) Difficulty relaxing while ashore; and

(iii) Missing mates on the ship while ashore.

Relationships with Wife/Partner

Some respondents suggested being able to take partner/wife to sea sometimes would be helpful.

Other

A number of respondents reported making friends ashore could be improved by involvement in voluntary fire fighting helps and/or Air Sea Rescue; both organisations utilise seafarers skills and would help make friends ashore.

Additional Comments with Lower Response Frequency

Access to professional development

A number of respondents were concerned with difficulties in undertaking study courses/technical knowledge upgrades because of the time away from home. Some respondents indicated a need for more access to formal and hobby type courses through distance education. Other respondents pointed out the advantages experienced by taking correspondence courses with a flexible delivery approach while at sea.

Public Image

Respondents were concerned at the poor public image of the maritime industry and the need for some form of public awareness program. Generally, respondents felt the public had no understanding of the rigours of working and living at sea for long periods.

Environmental Damage

Some respondents were worried over accidents, oil spills (legal implications) and the lack of concern by some seafarers of these issues.

Shipowners

Some respondents were concerned shipowners focused on commercial considerations only, with little understanding shown for the demands of a seafaring life on family members.

Unions

Some respondents were concerned over the level of aggressive indoctrination by some union members of others on board and of family at home. Others were worried over the high cost of union fees, and in some instances the absence of union support for stress induced illness or advice on injury rehabilitation.

Occupational Health and Safety

A number of respondents were worried that on some ships, occupational health and safety was not taken seriously by all on board (unions, officers, crew and company). For example, smoking regulations ignored by all, breaches of safe work practices towards end of shift/swing, delay in transfer of medical cases from the ship, unattended injury (cut) leading to fatality. On some ships poor quality safety equipment and protective clothing was supplied.

However, some positive comments indicated high standards of Occupational Health and Safety in some working areas (Offshore Oil and Gas); this approach was appreciated by all on board.

Injury Rehabilitation

Some respondents had experienced difficulties with the absence of information regarding the structure of rehabilitation/return-to-work schemes and workers compensation schemes.

Recruitment

Some respondents were concerned about the appropriateness of trainee engineers and deck officers belonging to the crew's union during their training period.

Sexual Harassment

Harassment from one or two male crew can make life difficult for a female crew member.

Uncertainty

A number of respondents experienced increased stress levels when leave and return-to-work dates were not known or frequently changed.

Drugs & Alcohol

A number of respondents indicated the alcohol policy was not enforced across the industry. Respondents reported examples of problems of alcohol and or drugs during watchkeeping; and coping with employees who abuse alcohol and drugs before coming on duty. Some respondents indicated recent home problems caused a reliance on alcohol to cope; while others reported smoking drugs to cope with joint pain.

Some respondents indicated dry ships are happy ships and ships should be dry.

Recreation/Relaxation

Some respondents indicated priority was given to videos for relaxation and not enough emphasis was placed on exercise. Other respondents indicated on some ships the gym equipment was inappropriate; whereas on others it was excellent. In general, poor relaxation facilities at sea can seriously affect morale at sea.

Job Skill/Training

Respondents concerns about training related to:

(i) Whether Maritime College training was sufficient given the smaller crew sizes; and

(ii) The lack of time to give more on-the-job training.

Other respondents indicated need for more performance reviews at sea for skill and training.

Family Health

A number of respondents worried over family health while at sea. This caused extra stress especially when communication with home was difficult.

Bad Weather

A number of respondents indicated bad weather resulted in:

(i) Exhaustion - physically and mentally;

(ii) Sleep was worse; and

(iii) Joint soreness was experienced due to the constant pitching and rolling of the ship.

Social Support

Some respondents reported experiencing further stress because there was no social support on board in whom to confide.

Officers Attitudes

A number of respondents indicated some officers had a very poor attitude to crew; whereas others engendered a spirit of teamwork.

Other

Some respondents reported increased stress associated with:

(i) Berthing at night;

(ii) Extreme cold;

(iii) Fire

Leave Length

A large number of respondents reported leave ashore is very much looked forward to, and leave time with family is precious.

Single Status

Some respondents reported difficulty of building friendships and the need for staggered leave ratios.

SUMMARY

Most of the concerns regarding additional sources of stress related to industry wide issues and when at sea. In contrast, time ashore had a positive impact on seafarers and played a key role in coping with stress while at sea.

Industry-wide, the most frequent negative comments on sources of stress related to aspects of the work and home interface, demanning and shore management. Negative comments on the sources of stress associated with the work and home interface related to the transition from shore to ship, being unable to attend important family events, and the emotional strain on a seafarer's partner caring for the family. Concerns regarding demanning related mainly to the way in which demanning was achieved, and the increased workload resulting from demanning on a number

of the departments on board. The social aspect of life at sea has also suffered since demanning; fewer to socialise with leading to boredom and loneliness. Negative comments regarding shore management focused on poor communication, consultation, planning and little or no understanding by shore personnel of the hardships associated with working and living at sea.

Job satisfaction scored the highest number of positive comments from masters/mates, engineers and crew. Suggestions on sources of stress industry-wide related to the work and home interface and the chance for families to visit ships or take an occasional trip. Other comments related to target groups of further surveys (families, Tugboats and Offshore Oil and Gas).

At sea, the most frequent negative comments could be divided into two categories. The first related to sleep and work including the quality of sleep, work schedules/hours and fatigue. The second included issues such as excess frying of food, job commitment and attitudes of some seafarers and interdepartmental relations.

Negative comments relating to the quality of sleep mainly concerned the location of sleeping accommodation close to high noise areas on board and the poor soundproofing of accommodation. Negative comments relating to work schedules/hours mainly concerned the long hours worked daily by some seafarers, the absence of a rest day and the extra office/paper work to be completed at the end of a shift.

Positive comments at sea related to health, recreation/relaxation and communication with family. Suggestions at sea related to strategies to improve work schedules/hours/fatigue and health.

Ashore the most frequent positive comments related to recreation/relaxation, relationships with wife/husband/partner and relationships with children and other family. Respondents clearly indicated the importance of family relationships and recreation and relaxation while ashore. Uncertainty and stressful relationships with wife/husband/partner scored highest on negative comments ashore.

Seafarers reported a degree of positive job satisfaction. Some hardships associated with the unique working environment at sea are accepted as part-of-the-job. However, the combination of poor sleep quality, long working hours and resulting fatigue contribute to additional sources of stress while working at sea. The work and home interface is an important aspect of life as a seafarer. Positive personal and family relationships ashore do much to reduce the stress associated with the home-and-away basis of working at sea.

QUT

96

QUEENSLAND UNIVERSITY OF TECHNOLOGY

AUSTRALIAN MARITIME HEALTH SURVEY

All responses will remain confidential

If a particular item does not apply to you,
you have the right not to answer that item.

PLEASE COMPLETE, <u>FOLD</u> AND RETURN IN ENVELOPE PROVIDED

Fatigue, Stress and Occupational Health in the Australian Maritime Industry

PARTICIPANT'S INFORMATION PACKAGE

PROJECT OBJECTIVES

The objectives of the study are twofold. Firstly, the study will describe the physical and mental health of various occupational groups within the Maritime industry. Secondly, the study will identify the work, social and related at-sea demands for each of the occupational categories.

The enclosed questionnaire will enable the research team to collect information on work demands, mental health and health behaviours (e.g., diet, drugs, alcohol, exercise and smoking).

RATIONALE

There are a number of unique problems faced by the Australian Maritime industry due to the nature of the industry, and the reforms within the industry as it aims to improve efficiency and competitiveness.

TEST PROCEDURES

Information will be collected by (a) questionnaire and; (b) at a later date some simple tests measuring body weight, lung function and blood pressure. You may be contacted at a later date for part (b).

RISKS AND DISCOMFORTS

A sample of seafarers will be asked to undergo the physical examination (part b). Procedures will be the same as those in the guidelines of the Australian Maritime Safety Authority. Risks will be minimal. The only time subjects will be asked to exert themselves is during the lung function test, when they will be asked to take deep breaths and breathe out hard and fast.

INFORMED CONSENT

Participation in this project is entirely voluntary. You are free to deny consent before or during the study. In the latter case such withdrawal will be at the time you specify, and not at the end of a particular section. Your participation/or withdrawal will not influence your present or future employment in the Australian Maritime Industry or your involvement with the Queensland University of Technology. You have the right to withdraw from the study, and the right shall be preserved over and above the goals of this project.

CONFIDENTIALITY

All questions, answers and results of this study will be treated with absolute confidentiality. Names will not be recorded on data sheets, and participants will not be identified in the resultant manuscripts, reports or publications.

INQUIRIES

Questions concerning the procedures and/or rationale used in this investigation are welcome at any time. Please ask for clarification of any point you feel is not explained to your satisfaction. Your initial contact person is Dr Lyle Hubinger: phone 07 3864 5824. Subsequent inquiries may be directed to Professor Tony Parker (Head of the School of Human Movement Studies: phone 07 3864 3360).

Fatigue, Stress and Occupational Health in the Australian Maritime Industry

INFORMED CONSENT FORM

The research team conducting this project support the principles governing the ethical conduct of research, and the protection at all times of the interests, comfort and safety of seafarers.

This form and the accompanying Participant's Information Package are given to you for your own protection. They contain a detailed outline of the procedures, and possible risks. Your signature below indicates six things:

(1) you have received the Participant's Information Package;

(2) you have read its contents;

(3) telephone contact numbers for the research team are provided below for you to discuss the contents with one of the research team prior to commencing the experiment;

(4) you clearly understand the purpose, procedures and possible risks;

(5) you voluntarily agree to participate in this project; and

(6) you may end your participation in this project at any point in time without jeopardising   your employment in the Australian Maritime Industry or your involvement with the Queensland University of Technology.

Any enquires or further questions may be initially directed to the project co-ordinator, Dr Lyle Hubinger on 07 3864 5824, or subsequently to the Head of the School of Human Movement Studies on 07 3864 3360. Any queries or concerns regarding the conduct of the research may also be directed to the Secretary of the Queensland University of Technology Research Ethics Committee on 07 3864 2902.

I agree to participate in procedures set out in the Subject Information Package.

Last Name: _____   Given Name: _____

Signature: _____   Date: _____

Witness:

Last Name: _____   Given Name: _____

Signature: _____   Date: _____

THIS PAGE WILL BE REMOVED BY THE RESEARCH TEAM BEFORE DATA ANALYSIS COMMENCES TO ENSURE YOUR NAME CANNOT BE LINKED WITH RESPONSES TO THE QUESTIONS

ALL ANSWERS ARE CONFIDENTIAL

CONFIDENTIAL: PLEASE DO NOT IDENTIFY YOURSELF

SECTION ONE: BACKGROUND

The following questionnaire is concerned with various aspects of work. Some questions relate to your job, and how you feel about it, while other questions ask for more general information about yourself.

Answers to the questions will remain confidential. Information on individual questionnaires will not be examined separately, rather a general picture of work experiences will be evaluated.

When you are completing the questionnaire please tick the response that MOST reflects your current work experience. The more questions you complete the more useful the information will be. **Please complete individually.**

To define the sample of participants in the study, we would appreciate your completion of some occupational and health information shown below.

Thank you for your co-operation.

1 **IN WHICH SEA AREA DO YOU PREDOMINANTLY WORK? TICK ONE BOX ONLY.**

1 ☐ Blue water
2 ☐ Coastal
3 ☐ Off-shore

2 **WHAT IS YOUR CURRENT OCCUPATIONAL CATEGORY? TICK ONE BOX ONLY**

1 ☐ Master 8 ☐ TIR
2 ☐ Mate 9 ☐ PIR
3 ☐ Chief Engineer 10 ☐ Bosun's mate/IR
4 ☐ Engineer 11 ☐ Bosun/CIR
5 ☐ Catering Attendant 12 ☐ Deck Ratings
6 ☐ Cook 13 ☐ ER Ratings
7 ☐ Pilot 14 ☐ Other [   ]

3 **HOW LONG HAVE YOU WORKED IN THE MARITIME INDUSTRY?**

[|]
Years   Months

4 **HOW LONG HAVE YOU WORKED IN IN YOUR CURRENT POSITION?**

[|]
Years   Months

5 **WHAT ARE THE MAIN TYPES OF SHIPS YOU HAVE WORKED ON?
TICK AS MANY BOXES AS APPLY.**

1 ☐ Bulk	6 ☐ Bulk Container	11 ☐ Container
2 ☐ General	7 ☐ Car Carrier	12 ☐ Heavy Lift
3 ☐ Livestock	8 ☐ Multi-purpose	13 ☐ Passenger
4 ☐ Reefer	9 ☐ Passenger/Cargo	14 ☐ Ro-Ro/Container
5 ☐ Tanker	10 ☐ Woodchip	15 ☐ Other

6 **HOW LONG HAVE YOU BEEN ON YOUR <u>CURRENT SHIP</u>?**

Years	Months

7 **SEX:** 1 ☐ Male 2 ☐ Female

8 **AGE:** [ ] Years

9 **WHAT IS YOUR <u>CURRENT</u> MARITAL STATUS? TICK ONE BOX ONLY.**

1 ☐ Married
2 ☐ Widowed
3 ☐ Separated
4 ☐ Divorced
5 ☐ Single
6 ☐ De-facto

10 **WHAT WAS THE TOTAL <u>GROSS INCOME</u> OF YOUR HOUSEHOLD LAST YEAR?
TICK ONE BOX ONLY.**

1 ☐ under $40,000
2 ☐ $40,001 - $60,000
3 ☐ $60,001 - $80,000
4 ☐ $80,001 - $100,000
5 ☐ $100,001 - $120,000
6 ☐ over $120,000

11 **WHAT IS THE <u>HIGHEST</u> LEVEL OF EDUCATION YOU HAVE COMPLETED?
TICK ONE BOX ONLY.**

1 ☐ Primary school or less
2 ☐ High school
3 ☐ Technical school
4 ☐ Maritime College
5 ☐ Undergraduate University degree
6 ☐ Postgraduate University degree

12   COUNTRY OF BIRTH. TICK ONE BOX ONLY.

1 ☐ Australia
2 ☐ Europe
3 ☐ United Kingdom
4 ☐ Ireland
5 ☐ Asia
6 ☐ Africa
7 ☐ America
8 ☐ Other (please specify): [   ]

The following section asks briefly about your <u>health</u>. Please respond honestly.

13   HAS A DOCTOR EVER TOLD YOU THAT YOU SUFFER FROM, OR HAVE YOU EVER EXPERIENCED ANY OF THE FOLLOWING? TICK AS MANY BOXES AS APPLY.

1 ☐ Heart disease, If YES what? [   ]
2 ☐ Blood pressure abnormalities, if YES what? [   ]
3 ☐ Lung/respiratory disease, if YES what? [   ]
4 ☐ Joint problems, if YES what? [   ]
5 ☐ Nervous system problems, if YES what? [   ]
6 ☐ Auditory (hearing problems), if YES what? [   ]
7 ☐ Gastrointestinal (stomach) problems, if YES what? [   ]
8 ☐ Endocrine (gland) problems, if YES what? [   ]
9 ☐ Psychiatric problems, if YES what? [   ]
10 ☐ Other diseases, please specify? [   ]

14   HAVE YOU BEEN IN HOSPITAL IN THE LAST 10 YEARS?

1 ☐ Yes
2 ☐ No, Go to Q15

If YES, why? [   ]

15   PLEASE LIST ANY MEDICATIONS THAT YOU ARE <u>CURRENTLY</u> TAKING (NAME AND REASON):

NAME: [   ]   REASON: [   ]

16 HAS ANYONE IN YOUR <u>IMMEDIATE</u> FAMILY (FATHER, MOTHER, BROTHER OR SISTER) HAD ANY OF THE FOLLOWING DISEASES BEFORE AGE 50? TICK AS MANY BOXES AS APPLY.

1 ☐ Heart attack
2 ☐ High blood pressure
3 ☐ Diabetes
4 ☐ Elevated cholesterol

If YES, please list relative/s and the age at which they were diagnosed.

17 HAVE YOU BEEN TOLD BY A DOCTOR IN THE PAST YEAR THAT YOU HAVE HIGH CHOLESTEROL? TICK ONE BOX ONLY.

1 ☐ Yes - above 5.5 (mmol.L^{-1})
2 ☐ Yes - below 5.5 (mmol.L^{-1})
3 ☐ Yes - do not know value
4 ☐ No

18 DO YOU HAVE ANY MEDICAL CONDITIONS (INCLUDING SURGERY) FOR WHICH A DOCTOR HAS EVER RECOMMENDED SOME <u>PERMANENT</u> RESTRICTION ON ACTIVITY? TICK ONE BOX ONLY.

1 ☐ Yes
2 ☐ No, Go to Q19

If YES, please explain condition and/or restriction

19 DO YOU SMOKE AT <u>SEA</u>? TICK ONE BOX ONLY.

1 ☐ Yes, Go to Q19(a)
2 ☐ No, Go to Q20

19(a) HOW <u>MANY</u> DO YOU SMOKE PER DAY AT <u>SEA</u> ? COMPLETE THOSE BOXES WHICH APPLY.

1 ☐ Cigarettes per day
2 ☐ Cigars per day
3 ☐ Pipes per day

20 DO YOU DRINK ALCOHOL WHILE AT <u>SEA</u>? TICK ONE BOX ONLY.

1 ☐ Yes, Go to Q20(a) & Q20(b)
2 ☐ No, Go to Q21

20(a) HOW <u>MANY</u> DAYS PER WEEK DO YOU DRINK ALCOHOL WHILE AT <u>SEA</u>? TICK ONE BOX ONLY.

1 ☐ < 1 day per week
2 ☐ 1-2 days per week
3 ☐ 3-4 days per week
4 ☐ 5-6 days per week
5 ☐ Everyday

20(b) ON THE DAYS WHEN YOU DRINK AT <u>SEA</u>, HOW <u>MANY</u> STANDARD DRINKS DO YOU HAVE? TICK ONE BOX ONLY.

1 ☐ 1-2 drinks per day
2 ☐ 3-4 drinks per day
3 ☐ 5-8 drinks per day
4 ☐ 9-12 drinks per day
5 ☐ 13-20 drinks per day
6 ☐ More than 20 drinks per day

Note: One standard drink = 10gm alcohol which is equivalent to:
• 1 middy/pot (285mls)
• 1 can reduced alcohol beer (375mls)
• 1 small glass wine (120mls)
• 1 glass port (60mls)
• 1 nip spirits (30mls)

21 HOW <u>OFTEN</u> DO YOU EXERCISE EACH WEEK WHILE AT <u>SEA</u>? TICK ONE BOX ONLY.

1 ☐ Never, Go to Q22
2 ☐ Once per week, [Go to Q21(a) & Q21(b)]
3 ☐ Twice per week, [Go to Q21(a) & Q21(b)]
4 ☐ Three or more times per week, [Go to Q21(a) & Q21(b)]

21(a) WHEN YOU EXERCISE AT <u>SEA</u>, WHAT <u>ACTIVITIES</u> ARE YOU INVOLVED IN? (TICK AS MANY BOXES AS APPLY)

1 ☐ Running/jogging
2 ☐ Cycling
3 ☐ Weight training
4 ☐ Walking
5 ☐ Aerobics
6 ☐ Others, please specify [＿＿＿＿＿＿＿＿＿＿＿＿＿]

21(b) WHEN YOU EXERCISE AT SEA, HOW LONG IS EACH SESSION? TICK ONE BOX ONLY

1 ☐ 0-20 minutes per session
2 ☐ 20-40 minutes per session
3 ☐ 40-60 minutes per session
4 ☐ 60+ minutes per session

22 HOW WOULD YOU DESCRIBE YOUR USUAL SLEEP WHILE AT SEA? TICK ONE BOX ONLY.

1 ☐ Very poor
2 ☐ Poor
3 ☐ Fair
4 ☐ Good
5 ☐ Very good

23 HOW MANY HOURS DO YOU USUALLY SLEEP PER DAY (24 HOUR PERIOD) WHILE AT SEA?. TICK ONE BOX ONLY.

1 ☐ Less than 4 hours per day
2 ☐ 4-6 hours per day
3 ☐ 7-8 hours per day
4 ☐ More than 8 hours per day

24 HOW OFTEN DO YOU EXPERIENCE STRESS AT SEA? TICK ONE BOX ONLY.

1 ☐ Never, Go to Q25
2 ☐ Occasionally, Go to Q24(a)
3 ☐ Frequently
4 ☐ Constantly

24(a) WHEN YOU EXPERIENCE STRESS AT SEA HOW WOULD YOU DESCRIBE IT? TICK ONE BOX ONLY.

1 ☐ Mild stress
2 ☐ Moderate stress
3 ☐ High stress

25 HOW MANY HOURS EACH DAY DO YOU SPEND RELAXING (EG. WATCHING TELEVISION, READING, PLAYING CARDS OR HOBBIES) AT SEA? TICK ONE BOX ONLY.

1 ☐ 0 hours per day
2 ☐ 1-3 hours per day
3 ☐ 4-7 hours per day
4 ☐ More than 8 hours per day

26 DO YOU SMOKE <u>ASHORE</u>? TICK ONE BOX ONLY.

1 ☐ Yes, Go to Q26(a)

2 ☐ No, Go to Q27

26(a) HOW <u>MANY</u> DO YOU SMOKE PER DAY WHILE <u>ASHORE</u>? COMPLETE THOSE BOXES WHICH APPLY.

1 ☐ Cigarettes per day

2 ☐ Cigars per day

3 ☐ Pipes per day

27 DO YOU DRINK ALCOHOL WHILE <u>ASHORE</u>? TICK ONE BOX ONLY.

1 ☐ Yes, Go to Q27(a) & 27(b)

2 ☐ No, Go to Q28

27(a) HOW <u>MANY</u> DAYS PER WEEK DO YOU DRINK ALCOHOL WHILE <u>ASHORE</u>? TICK ONE BOX ONLY.

1 ☐ < 1 day per week

2 ☐ 1-2 days per week

3 ☐ 3-4 days per week

4 ☐ 5-6 days per week

5 ☐ Everyday

27(b) ON THE DAYS WHEN YOU DRINK WHILE <u>ASHORE</u>, HOW <u>MANY</u> STANDARD DRINKS DO YOU HAVE? TICK ONE BOX ONLY.

1 ☐ 1-2 drinks per day

2 ☐ 3-4 drinks per day

3 ☐ 5-8 drinks per day

4 ☐ 9-12 drinks per day

5 ☐ 13-20 drinks per day

6 ☐ More than 20 drinks per day

Note: One standard drink = 10gm alcohol which is equivalent to:

- 1 middy/pot (285mls)
- 1 can reduced alcohol beer (375mls)
- 1 small glass wine (120mls)
- 1 glass port (60mls)
- 1 nip spirits (30mls)

28 HOW <u>OFTEN</u> DO YOU EXERCISE EACH WEEK WHILE <u>ASHORE</u>? TICK ONE BOX ONLY.

1 ☐ Never, Go to Q29
2 ☐ Once per week, [Go to Q28(a) & Q28(b)]
3 ☐ Twice per week,[Go to Q28(a) & Q28(b)]
4 ☐ Three or more times per week, [Go to Q28(a) & Q28(b)]

28(a) WHEN YOU EXERCISE <u>ASHORE</u>, WHAT <u>ACTIVITIES</u> ARE YOU INVOLVED IN ?
(TICK AS MANY BOXES AS APPLY).

1 ☐ Running/jogging   6 ☐ Racquet sports
2 ☐ Walking   7 ☐ Team sports
3 ☐ Cycling   8 ☐ Weight training
4 ☐ Aerobics   9 ☐ Other (please specify)
5 ☐ Swimming

☐

28(b) WHEN YOU EXERCISE <u>ASHORE</u>, HOW <u>LONG</u> IS EACH SESSION? TICK ONE
BOX ONLY.

1 ☐ 0-20 minutes per session
2 ☐ 20-40 minutes per session
3 ☐ 40-60 minutes per session
4 ☐ 60+ minutes per session

29 HOW WOULD YOU DESCRIBE YOUR USUAL SLEEP WHILE <u>ASHORE</u>? TICK ONE BOX
ONLY.

1 ☐ Very poor
2 ☐ Poor
3 ☐ Fair
4 ☐ Good
5 ☐ Very good

30 HOW <u>MANY</u> HOURS DO YOU USUALLY SLEEP PER DAY (24 HOUR PERIOD) WHILE
<u>ASHORE</u>? TICK ONE BOX ONLY.

1 ☐ Less than 4 hours per day
2 ☐ 4-6 hours per day
3 ☐ 7-8 hours per day
4 ☐ More than 8 hours per day

31 HOW <u>OFTEN</u> DO YOU EXPERIENCE STRESS WHILE <u>ASHORE</u>? TICK ONE BOX ONLY.

1 ☐ Never, Go to following section
2 ☐ Occasionally, Go to Q31(a)
3 ☐ Frequently
4 ☐ Constantly

31(a) WHEN YOU EXPERIENCE STRESS WHILE <u>ASHORE</u> HOW WOULD YOU DESCRIBE IT? TICK ONE BOX ONLY.

1 ☐ Mild stress
2 ☐ Moderate stress
3 ☐ High stress

32 HOW <u>MANY</u> HOURS PER DAY DO YOU SPEND RELAXING (EG. WATCHING TELEVISION, READING, PLAYING CARDS OR HOBBIES) WHILE <u>ASHORE</u>? TICK ONE BOX ONLY.

1 ☐ 0 hours
2 ☐ 1-3 hours
3 ☐ 4-7 hours
4 ☐ More than 8 hours

33 SINCE YOU HAVE BEEN IN THE MARITIME INDUSTRY, WHAT IS THE <u>MOST</u> AND <u>LEAST</u> YOU HAVE WEIGHED? COMPLETE BOTH BOXES WHICH APPLY.

1 ☐ (kg) Most
2 ☐ (kg) Least

NUTRITION

THE FOLLOWING SECTION ASKS BRIEFLY ABOUT YOUR NUTRITIONAL <u>HABITS</u>. PLEASE USE THE RATING SCALE BELOW. FOR EACH STATEMENT INDICATE YOUR RESPONSE USING THE RATING SCALE BELOW. TICK ONE BOX ONLY.

Rating Scale

Never	1
Less than once a week	2
Once a week	3
2-3 times per week	4
Almost everyday	5
Everyday	6

34 WHEN <u>ASHORE</u>, HOW OFTEN DO YOU EAT:

	Never 1	2	Often 3	4	5	Everyday 6
1 lollies and/or chocolates?	☐	☐	☐	☐	☐	☐
2 cream cake and/or biscuits and buns?	☐	☐	☐	☐	☐	☐
3 ice-cream?	☐	☐	☐	☐	☐	☐
4 wholegrain breakfast cereals e.g. Vita Brits, porridge, All-Bran, Sultana Bran, muesli, etc.?	☐	☐	☐	☐	☐	☐
5 wholemeal bread or rolls?	☐	☐	☐	☐	☐	☐
6 more than 2 serves of vegetables?	☐	☐	☐	☐	☐	☐
7 more than one piece of fresh fruit?	☐	☐	☐	☐	☐	☐
8 sweet or savoury pastries and pies?	☐	☐	☐	☐	☐	☐
9 crispy snacks e.g. packet chips, corn chips, Burger Rings, Twisties etc.?	☐	☐	☐	☐	☐	☐
10 processed meats such as sausages, devon, salami, chicken loaf etc.?	☐	☐	☐	☐	☐	☐
11 battered or crumbed fish or meat?	☐	☐	☐	☐	☐	☐
12 fried or deep fried foods e.g. chips, battered saveloys?	☐	☐	☐	☐	☐	☐
13 margarines labelled polyunsaturated or monounsaturated e.g. Meadow Lea, Canola?	☐	☐	☐	☐	☐	☐

35 WHEN AT <u>SEA</u>, HOW OFTEN DO YOU EAT:

	Never 1	2	Often 3	4	5	Everyday 6
14 lollies and/or chocolates?	☐	☐	☐	☐	☐	☐
15 cream cake and/or biscuits and buns?	☐	☐	☐	☐	☐	☐
16 ice-cream?	☐	☐	☐	☐	☐	☐
17 wholegrain breakfast cereals e.g. Vita Brits, porridge, All-Bran, Sultana Bran, muesli, etc.?	☐	☐	☐	☐	☐	☐
18 wholemeal bread or rolls?	☐	☐	☐	☐	☐	☐
19 more than 2 serves of vegetables?	☐	☐	☐	☐	☐	☐
20 more than one piece of fresh fruit?	☐	☐	☐	☐	☐	☐
21 sweet or savoury pastries and pies?	☐	☐	☐	☐	☐	☐
22 crispy snacks e.g. packet chips, corn chips, Burger Rings, Twisties etc.?	☐	☐	☐	☐	☐	☐
23 processed meats such as sausages, devon, salami, chicken loaf etc.?	☐	☐	☐	☐	☐	☐
24 battered or crumbed fish or meat?	☐	☐	☐	☐	☐	☐
25 fried or deep fried foods e.g. chips, battered saveloys?	☐	☐	☐	☐	☐	☐
26 margarines labelled polyunsaturated or monounsaturated e.g. Meadow Lea, Canola?	☐	☐	☐	☐	☐	☐

ALL ANSWERS ARE CONFIDENTIAL

NUTRITION (contd)

36 THE FOLLOWING QUESTIONS REFER TO YOUR ATTITUDES TO NUTRITION. FOR EACH STATEMENT INDICATE YOUR RESPONSE USING THE RATING SCALE 1 TO 6, WHERE 1= STRONGLY AGREE AND 6= STRONGLY DISAGREE. TICK ONE BOX ONLY.

		Strongly agree					Strongly disagree
		1	2	3	4	5	6
1	Nutrition is only important for people over 40	☐	☐	☐	☐	☐	☐
2	Nutrition is only important when you are sick	☐	☐	☐	☐	☐	☐
3	If you take vitamins and minerals you do not need to eat healthy foods	☐	☐	☐	☐	☐	☐
4	Junk food is an important part of my life	☐	☐	☐	☐	☐	☐
5	The taste of food is more important than its nutritional value	☐	☐	☐	☐	☐	☐
6	Eating healthier food would improve my life	☐	☐	☐	☐	☐	☐
7	I would like to make more informed choices about food	☐	☐	☐	☐	☐	☐
8	Everyone should be careful about their nutrition	☐	☐	☐	☐	☐	☐
9	It would be good to spend more time making nutritious foods	☐	☐	☐	☐	☐	☐
10	What I eat determines my health	☐	☐	☐	☐	☐	☐
11	Because I live such a busy life I tend to eat what is handy, not necessarily what is healthy	☐	☐	☐	☐	☐	☐
12	I do not have time to prepare healthy food	☐	☐	☐	☐	☐	☐
13	I do not have the time to follow a healthy way of eating	☐	☐	☐	☐	☐	☐
14	Work pressures prevent me from keeping up healthy eating habits	☐	☐	☐	☐	☐	☐
15	It seems that most of the foods I like eating are bad for me	☐	☐	☐	☐	☐	☐
16	Social occasions make it difficult for me to keep up a healthy pattern of eating	☐	☐	☐	☐	☐	☐
17	I do not like to experiment with different foods	☐	☐	☐	☐	☐	☐
18	I do not like to try foods from different countries	☐	☐	☐	☐	☐	☐
19	I prefer to eat the same types of food everyday	☐	☐	☐	☐	☐	☐

DRUG USE AND AWARENESS

37 DRUG USE AND AWARENESS. THE FOLLOWING SECTION ASKS BRIEFLY ABOUT YOUR ATTITUDES AND USE OF PRESCRIPTION AND NON-PRESCRIPTION DRUGS. FOR EACH STATEMENT INDICATE YOUR RESPONSE USING THE RATING SCALE BELOW.TICK ONE BOX ONLY

Rating Scale

Never	1
Sometimes	2
Often	3
Almost always	4
Always	5

	Never		Often		Always
	1	**2**	**3**	**4**	**5**
1 I use prescription drugs and over the counter medications only when necessary	☐	☐	☐	☐	☐
2 I limit my consumption of caffeine	☐	☐	☐	☐	☐
3 I use marijuana	☐	☐	☐	☐	☐
4 I use hallucinogens (e.g. LSD, PCP, MDA)	☐	☐	☐	☐	☐
5 I use stimulants ("uppers" - e.g. cocaine, amphetamines)	☐	☐	☐	☐	☐
6 I use non-medically prescribed depressants ("downers" - e.g. barbiturates, quaaludes, minor tranquilizers)	☐	☐	☐	☐	☐
7 I avoid using a combination of drugs unless under medical supervision	☐	☐	☐	☐	☐
8 I follow the instructions with any drug I take	☐	☐	☐	☐	☐
9 I use drugs obtained from illegal sources	☐	☐	☐	☐	☐
10 I understand the expected effects of drugs I take	☐	☐	☐	☐	☐
11 I consider alternatives to drugs	☐	☐	☐	☐	☐
12 If I experience discomfort from stress or tension, I use relaxation techniques, exercise or meditation instead of taking drugs	☐	☐	☐	☐	☐
13 I get clear directions for taking medicine from my doctor or pharmacist	☐	☐	☐	☐	☐

SECTION TWO: EXPERIENCES OF WORK

The following section has been designed to gather information on groups of individuals. It has six questionnaires entitled: how you feel about your job; experiences of work; and the ways in which you cope with problems; how you assess your current state of health; the way you behave generally; how you interpret events around you.

What we would like you to do

- ◆ Answer all the questions

- ◆ Give your first and natural answer, be accurate and honest!

- ◆ Work quickly and efficiently through the questionnaires

- ◆ Base your answers on how you have felt during the past three months

- ◆ If you make a mistake, cross it out and make a new answer

- ◆ Check each questionnaire to ensure that you have answered all the items

HOW YOU FEEL ABOUT YOUR JOB

This questionnaire is concerned with the extent to which you feel satisfied or dissatisfied with your job. Try not to be put off by any other reactions you may have - simply rate the items against the satisfaction/dissatisfaction scale provided.
* Please answer by ticking the box under the number of your answer using the scale below.

Rating Scale

Very much satisfied	6
Much satisfied	5
Some satisfaction	4
Some dissatisfaction	3
Much dissatisfaction	2
Very much dissatisfied	1

	Very much satisfied					Very much dissatisfied
	6	5	4	3	2	1
1 Communication and the way information flows around your organisation	☐	☐	☐	☐	☐	☐
2 The relationships you have with other people at work	☐	☐	☐	☐	☐	☐
3 The feeling you have about the way you and your efforts are valued	☐	☐	☐	☐	☐	☐
4 The actual job itself	☐	☐	☐	☐	☐	☐
5 The degree to which you feel 'motivated' by your job	☐	☐	☐	☐	☐	☐
6 Current career opportunities	☐	☐	☐	☐	☐	☐
7 The level of job security in your present job	☐	☐	☐	☐	☐	☐
8 The extent to which you may identify with the public image or goals of your organisation	☐	☐	☐	☐	☐	☐
9 The style of supervision that your superiors use	☐	☐	☐	☐	☐	☐
10 The way changes and innovations are implemented	☐	☐	☐	☐	☐	☐
11 The kind of work or tasks that you are required to perform	☐	☐	☐	☐	☐	☐
12 The degree to which you feel that you can personally develop or grow in your job	☐	☐	☐	☐	☐	☐
13 The way in which conflicts are resolved in your company	☐	☐	☐	☐	☐	☐
14 The scope your job provides to help you achieve your aspirations and ambitions	☐	☐	☐	☐	☐	☐
15 The amount of participation which you are given in important decision-making	☐	☐	☐	☐	☐	☐
16 The degree to which your job taps the range of skills you feel you possess	☐	☐	☐	☐	☐	☐
17 The amount of flexibility and freedom you feel you have in your job	☐	☐	☐	☐	☐	☐
18 The psychological 'feel' or climate that dominates your organisation	☐	☐	☐	☐	☐	☐
19 Your level of salary relative to your experience	☐	☐	☐	☐	☐	☐
20 The design or shape of your organisation's structure	☐	☐	☐	☐	☐	☐
21 The amount of work you are given to do whether too much or too little	☐	☐	☐	☐	☐	☐
22 The degree to which you feel extended in your job	☐	☐	☐	☐	☐	☐

YOUR WORK EXPERIENCES

Below are a list of statements concerning your experiences. Please indicate the degree to which each of these statements is characteristic of your job.

The items below are all work demands. You are required to rate them in terms of the degree of demand each may place on you.

* Please answer by ticking the box under the number of your answer using the scale shown below.

Rating Scale

Very definitely is a demand	6
Definitely is a demand	5
Generally is a demand	4
Generally is not a demand	3
Definitely is not a demand	2
Very definitely is not a demand	1

Very definitely is a demand — Very definitely is not a demand

		6	5	4	3	2	1
1	Having far too much work to do	☐	☐	☐	☐	☐	☐
2	Lack of power and influence	☐	☐	☐	☐	☐	☐
3	Overpromotion - being promoted beyond my level of ability	☐	☐	☐	☐	☐	☐
4	Not having enough work to do	☐	☐	☐	☐	☐	☐
5	Managing or supervising the work of other people	☐	☐	☐	☐	☐	☐
6	Coping with work politics	☐	☐	☐	☐	☐	☐
7	Taking my work home between trips	☐	☐	☐	☐	☐	☐
8	Rate of pay (including perks and fringe benefits)	☐	☐	☐	☐	☐	☐
9	Personal beliefs conflicting with those of the management	☐	☐	☐	☐	☐	☐
10	Underpromotion - working at a level below my level of ability	☐	☐	☐	☐	☐	☐
11	Excessive noise	☐	☐	☐	☐	☐	☐
12	Inadequate guidance and back up from superiors	☐	☐	☐	☐	☐	☐
13	Lack of consultation and communication	☐	☐	☐	☐	☐	☐
14	Not being able to 'switch off' at home	☐	☐	☐	☐	☐	☐
15	Keeping up with new techniques, ideas, technology or innovations or new challenges	☐	☐	☐	☐	☐	☐
16	Ambiguity in the nature of job role	☐	☐	☐	☐	☐	☐
17	Inadequate or poor quality of training/management development	☐	☐	☐	☐	☐	☐
18	Attending meetings	☐	☐	☐	☐	☐	☐
19	Lack of social support by people at work	☐	☐	☐	☐	☐	☐
20	Excessive gales (wind)	☐	☐	☐	☐	☐	☐
21	My spouse's attitude towards my job and career	☐	☐	☐	☐	☐	☐
22	Having to work very long hours	☐	☐	☐	☐	☐	☐
23	Conflicting job tasks and demands in the role I play	☐	☐	☐	☐	☐	☐
24	Covert discrimination and favouritism	☐	☐	☐	☐	☐	☐
25	Mundane administrative tasks or 'paperwork'	☐	☐	☐	☐	☐	☐
26	Inability to delegate	☐	☐	☐	☐	☐	☐
27	Threat of impending redundancy or early retirement	☐	☐	☐	☐	☐	☐
28	Feeling isolated	☐	☐	☐	☐	☐	☐
29	A lack of encouragement from superiors	☐	☐	☐	☐	☐	☐
30	A hot working environment	☐	☐	☐	☐	☐	☐
31	Staff shortages and unsettling turnover rates	☐	☐	☐	☐	☐	☐
32	Demands my work makes on my relationship with my spouse/children	☐	☐	☐	☐	☐	☐
33	Being undervalued	☐	☐	☐	☐	☐	☐
34	Having to take risks	☐	☐	☐	☐	☐	☐
35	Changing jobs to progress with career	☐	☐	☐	☐	☐	☐
36	Too much or too little variety in work	☐	☐	☐	☐	☐	☐
37	Working with those of the opposite sex	☐	☐	☐	☐	☐	☐
38	Bad weather	☐	☐	☐	☐	☐	☐
39	Inadequate feedback about my own performance	☐	☐	☐	☐	☐	☐

YOUR WORK EXPERIENCES (CONTINUED)

Rating Scale	
Very definitely is a demand	6
Definitely is a demand	5
Generally is a demand	4
Generally is not a demand	3
Definitely is not a demand	2
Very definitely is not a demand	1

		Very definitely is a demand					Very definitely is not a demand
		6	5	4	3	2	1
40	Being away from home for extended periods	☐	☐	☐	☐	☐	☐
41	Misuse of time by other people	☐	☐	☐	☐	☐	☐
42	Simply being seen as a 'boss'	☐	☐	☐	☐	☐	☐
43	Unclear promotion prospects	☐	☐	☐	☐	☐	☐
44	The accumulative effects of minor tasks	☐	☐	☐	☐	☐	☐
45	Absence of emotional support from others outside work	☐	☐	☐	☐	☐	☐
46	Insufficient finances or resources to work with	☐	☐	☐	☐	☐	☐
47	Demands that work makes on my private/social life	☐	☐	☐	☐	☐	☐
48	Changes in the way you are asked to do your job	☐	☐	☐	☐	☐	☐
49	Cold working environment	☐	☐	☐	☐	☐	☐
50	Simply being 'visible' or 'available'	☐	☐	☐	☐	☐	☐
51	Lack of practical support from others outside work	☐	☐	☐	☐	☐	☐
52	Factors not under your direct control	☐	☐	☐	☐	☐	☐
53	Sharing of work and responsibility evenly	☐	☐	☐	☐	☐	☐
54	Home life with a partner who is also pursuing a career	☐	☐	☐	☐	☐	☐
55	Inadequate lighting	☐	☐	☐	☐	☐	☐
56	Dealing with ambiguous or delicate situations	☐	☐	☐	☐	☐	☐
57	Having to adopt a negative role (such as sacking someone)	☐	☐	☐	☐	☐	☐
58	An absence of any potential career advancement	☐	☐	☐	☐	☐	☐
59	Ship morale	☐	☐	☐	☐	☐	☐
60	Attaining your own personal levels of performance	☐	☐	☐	☐	☐	☐
61	Level of humidity	☐	☐	☐	☐	☐	☐
62	Making important decisions	☐	☐	☐	☐	☐	☐
63	'Personality' clashes with others	☐	☐	☐	☐	☐	☐
64	Implications of mistakes you make	☐	☐	☐	☐	☐	☐
65	Opportunities for personal development	☐	☐	☐	☐	☐	☐
66	Absence of stability or dependability in home life	☐	☐	☐	☐	☐	☐
67	Pursuing a career at the expense of home life	☐	☐	☐	☐	☐	☐
68	Characteristics of the ship's management structure and design	☐	☐	☐	☐	☐	☐
69	Excessive vibration	☐	☐	☐	☐	☐	☐
70	Concern for loved ones ashore	☐	☐	☐	☐	☐	☐
71	Work travel and having to live in hotels	☐	☐	☐	☐	☐	☐
72	Poorly maintained equipment	☐	☐	☐	☐	☐	☐
73	Inadequate rest breaks between trips	☐	☐	☐	☐	☐	☐
74	Language or communication difficulties	☐	☐	☐	☐	☐	☐
75	Long working hours	☐	☐	☐	☐	☐	☐
76	Unwanted sexual advances	☐	☐	☐	☐	☐	☐
77	Being woken unexpectedly from your sleep to deal with a problem	☐	☐	☐	☐	☐	☐
78	Unpredictable working hours	☐	☐	☐	☐	☐	☐
79	Unhygienic conditions at sea	☐	☐	☐	☐	☐	☐
80	Inadequate rest breaks during trips	☐	☐	☐	☐	☐	☐
81	Insufficient time with family/spouse/children	☐	☐	☐	☐	☐	☐
82	Changes in the maritime industry	☐	☐	☐	☐	☐	☐
83	Inadequate rest breaks between shifts/watches	☐	☐	☐	☐	☐	☐
84	Being "on call" during rest breaks	☐	☐	☐	☐	☐	☐
85	Tension between crew and officers	☐	☐	☐	☐	☐	☐
86	Difficulties getting along with your immediate supervisor	☐	☐	☐	☐	☐	☐

HOW YOU COPE WITH YOUR WORK EXPERIENCE

This final questionnaire lists a number of potential coping strategies which you are required to rate in terms of the extent to which you actually use them as ways of coping with problems at work.
* Please answer by ticking the box under the number of your answer using the scale shown below.

Rating Scale

Very extensively used by me	6
Extensively used by me	5
On balance used by me	4
On balance not used by me	3
Seldom used by me	2
Never used by me	1

	Very extensively used by me					Never used by me
	6	5	4	3	2	1
1 Deal with the problems immediately as they occur	☐	☐	☐	☐	☐	☐
2 Try to recognise my own limitations	☐	☐	☐	☐	☐	☐
3 'Buy time' and stall the issue	☐	☐	☐	☐	☐	☐
4 Look for ways to make the work more interesting	☐	☐	☐	☐	☐	☐
5 Reorganise my work	☐	☐	☐	☐	☐	☐
6 Seek support and advice from my superiors	☐	☐	☐	☐	☐	☐
7 Resort to hobbies and pastimes	☐	☐	☐	☐	☐	☐
8 Try to deal with the situation objectively in an unemotional way	☐	☐	☐	☐	☐	☐
9 Effective time management	☐	☐	☐	☐	☐	☐
10 Suppress emotions and try not to let the stress show	☐	☐	☐	☐	☐	☐
11 Having a home that is a refuge	☐	☐	☐	☐	☐	☐
12 Retreating to my cabin or private areas onboard	☐	☐	☐	☐	☐	☐
13 Talk to understanding friends	☐	☐	☐	☐	☐	☐
14 Deliberately separate 'home' from 'work'	☐	☐	☐	☐	☐	☐
15 'Stay busy'	☐	☐	☐	☐	☐	☐
16 Plan ahead	☐	☐	☐	☐	☐	☐
17 Not 'bottling things up' and being able to release energy	☐	☐	☐	☐	☐	☐
18 Expand interests and activities outside work	☐	☐	☐	☐	☐	☐
19 Have stable relationships	☐	☐	☐	☐	☐	☐
20 Use selective attention (concentration on specific problems)	☐	☐	☐	☐	☐	☐
21 Use distractions (to take your mind off things)	☐	☐	☐	☐	☐	☐
22 Set priorities and deal with problems accordingly	☐	☐	☐	☐	☐	☐
23 Try to 'stand aside' and think through the situation	☐	☐	☐	☐	☐	☐
24 Resort to rules and regulations	☐	☐	☐	☐	☐	☐
25 Delegation	☐	☐	☐	☐	☐	☐
26 Force one's behaviour and lifestyle to slow down	☐	☐	☐	☐	☐	☐
27 Accept the situation and learn to live with it	☐	☐	☐	☐	☐	☐
28 Try to avoid the situation	☐	☐	☐	☐	☐	☐
29 Seek as much social support as possible	☐	☐	☐	☐	☐	☐
30 Seek support and advice from my peers/colleagues	☐	☐	☐	☐	☐	☐
31 Drink alcohol	☐	☐	☐	☐	☐	☐
32 Change ships	☐	☐	☐	☐	☐	☐

HOW YOU ASSESS YOUR CURRENT STATE OF HEALTH

Part A of this questionnarie focuses on feelings and behaviour and how these are affected by the pressure you perceive in you job. Part B is concerned more specifically with the frequency of occurrence of manifestly physical problems. The questions assume that you can assess your health with a fair degree of accuracy and also that you will be honest in your responses.

* For each statement please tick one box only. Consider the questions with reference to how you have felt over the last three months.

PART A: HOW YOU FEEL OR BEHAVE

	6	5	4	3	2	1

1 Would you say that you tended to be a rather overconscientious person who worries about mistakes or actions that you may have taken in the past (such as decisions)?

very true □ □ □ □ □ □ very untrue

2 During an ordinary working day are there times when you feel unsettled and upset though the reasons for this might not always be clearly obvious?

frequently □ □ □ □ □ □ never

3 When you consider your level and quality of job performance recently, do you think that your contribution has been significantly useful?

very useful □ □ □ □ □ □ not useful

4 As difficult problems occur at work that require your attention, do you find that you can think as clearly and as concisely as you used to or do you find your thoughts becoming 'muddled'?

definitely think not as clearly □ □ □ □ □ □ definitely think as clearly

5 When the pressure starts to mount at work, can you find a sufficient store or reserve of energy which you can call upon at times when you need it that spurs you into action?

lots of energy □ □ □ □ □ □ not much energy

6 Are there times at work when you feel so exasperated that you sit back and think to yourself that 'life is all really just too much effort'?

often □ □ □ □ □ □ never

7 As you do your job have you noticed yourself questioning your own ability and judgement and a decrease in the overall confidence you have in yourself?

noticeable decrease □ □ □ □ □ □ no noticeable decrease

8 Generally and at work, do you usually feel relaxed and at ease or do you tend to feel restless, tense and find it difficult to 'settle down'?

relaxed □ □ □ □ □ □ tense

9 If colleagues and friends behave in an aloof way towards you, do you tend to worry about what you may have done to offend them as opposed to just dimissing it?

definitely worry □ □ □ □ □ □ definitely do not worry

Continued on next page

PART A: HOW YOU FEEL OR BEHAVE (CONTINUED)

6   5   4   3   2   1

10 If the tasks you have implemented, or jobs you are doing,
start to go wrong do you sometimes feel a lack of confidence,
and panicky, as though events were out of control?

very
often   never
☐   ☐   ☐   ☐   ☐   ☐

11 Do you feel confident that you have properly
identified and efficiently tackled your work
or domestic problems recently?

have face up   have not
properly   faced-up properly
☐   ☐   ☐   ☐   ☐   ☐

12 Concerning work and life in general, would you describe
yourself as someone who is bothered by their troubles or a 'worrier'?

definitely
yes   no
☐   ☐   ☐   ☐   ☐   ☐

13 When trying to work do you find yourself disproportionately
irritated by relatively minor distractions such as alarm bells,
loudspeakers, or PA announcements or being interrupted?

very   not irritated
irritated   at all
☐   ☐   ☐   ☐   ☐   ☐

14 As time goes by, do you find yourself experiencing fairly
long periods in which you feel rather miserable or melancholy
for reasons that you simply cannot 'put your finger on'?

often   never
☐   ☐   ☐   ☐   ☐   ☐

15 Would you say you had a positive frame of mind in which
you feel capable of overcoming your present or any future
difficulties and problems you might face such as resolving dilemmas
or making difficult decisions?

definitely   definitely
yes   no
☐   ☐   ☐   ☐   ☐   ☐

16 When you think about your past events do you feel regretful
about what has happened, the way you have acted,
decisions you have taken, etc.?

lots of
no regrets   regrets
☐   ☐   ☐   ☐   ☐   ☐

17 Would you describe yourself as a rather 'moody' sort of
person who can become unreasonable and bad tempered quickly?

definitely   definitely
yes   no
☐   ☐   ☐   ☐   ☐   ☐

18 Are there times at work when the things you have got to deal
with simply become too much and you feel so
overtaxed that you think you are 'cracking-up'?

definitely   definitely
yes   no
☐   ☐   ☐   ☐   ☐   ☐

PART B: YOUR PHYSICAL HEALTH

Examine the list below and indicate the frequency of occurrence of these ailments over the <u>last three months</u>.

* **Please answer by ticking the box under the number using the scale shown below.**

Rating Scale

Very frequently	6
Frequently	5
Sometimes	4
Infrequently	3
Very infrequently	2
Never	1

	Very frequently 6	5	4	3	2	Never 1
1 Inability to get to sleep or stay asleep	☐	☐	☐	☐	☐	☐
2 Headaches and pains in your head	☐	☐	☐	☐	☐	☐
3 Indigestion or sickness	☐	☐	☐	☐	☐	☐
4 Feeling unaccountably tired or exhausted	☐	☐	☐	☐	☐	☐
5 Tendency to eat, drink or smoke more than usual	☐	☐	☐	☐	☐	☐
6 Decrease in sexual interest	☐	☐	☐	☐	☐	☐
7 Shortness of breath or feeling dizzy	☐	☐	☐	☐	☐	☐
8 Decrease in appetite	☐	☐	☐	☐	☐	☐
9 Muscles trembling (e.g. eye twitch)	☐	☐	☐	☐	☐	☐
10 Prickling sensations or twinges in parts of your body	☐	☐	☐	☐	☐	☐
11 Feeling as though you do not want to get up for duty or work	☐	☐	☐	☐	☐	☐
12 Tendency to sweat or a feeling of your heart beating hard	☐	☐	☐	☐	☐	☐

THE WAY YOU BEHAVE GENERALLY

Quite apart from feelings and reactions, the way you approach things and your overall style of behaviour are important. In this questionnaire you are required to record the extent to which you agree or disagree with statements about yourself and your behaviour.

* **Please answer by ticking the box under the number which indicates the extent of your agreement/ disagreement using the scale shown below.**

Rating Scale

Very strongly agree	6
Strongly agree	5
Agree	4
Disagree	3
Strongly disagree	2
Very strongly disagree	1

	Very strongly agree 6	5	4	3	2	Very strongly disagree 1
1 Because I am satisfied with life I am not an especially ambitious person who has a need to succeed or progress in their career	☐	☐	☐	☐	☐	☐
2 My impatience with slowness means for example that when talking with other people my mind tends to race ahead and I anticipate what the person is going to say	☐	☐	☐	☐	☐	☐
3 I am fairly confident and forceful individual who has no qualms about expressing feelings or opinions in an authoritative and assertive manner	☐	☐	☐	☐	☐	☐
4 I am not especially achievement-oriented person who continually behaves in a competitive way or who has a need to win or excel in whatever I do	☐	☐	☐	☐	☐	☐
5 When I am doing something, I concentrate on only one activity at a time and am fully committed in giving it 100% of my effort	☐	☐	☐	☐	☐	☐
6 I would describe the manner of my behaviour as being quite challenging and vigorous	☐	☐	☐	☐	☐	☐
7 When I compare myself with others I know, I would say that I was more responsible, serious, conscientious and competitive than they are	☐	☐	☐	☐	☐	☐
8 I am usually quite concerned to learn about other people's opinions of me particularly recognition others give me	☐	☐	☐	☐	☐	☐
9 Even though I take my job seriously, I could not be described as being completely and absolutely dedicated to it	☐	☐	☐	☐	☐	☐
10 I have a heightened pace of living in that I do things quickly such as eating talking, walking and so on	☐	☐	☐	☐	☐	☐
11 When I am establishing priorities, work does not always come first because although it is important, I have other outside interests which I also regard as important	☐	☐	☐	☐	☐	☐
12 I am a fairly easy going individual, who takes life as it comes and who is not especially 'action oriented'	☐	☐	☐	☐	☐	☐
13 I am very impatient sort of person who finds waiting around difficult especially for other people	☐	☐	☐	☐	☐	☐
14 I am time conscious and lead my life on a 'time is money and can't be wasted' principle	☐	☐	☐	☐	☐	☐

HOW YOU INTERPRET EVENTS AROUND YOU

The object of this questionnaire is to record how much you feel you can or cannot influence the things that go on around you. You are asked to indicate your level of agreement to the following statements.

* **Please answer by ticking the box under the number which best represents your answer on the following scale below.**

Rating Scale

Very strongly agree	6
Strongly agree	5
Agree	4
Disagree	3
Strongly disagree	2
Very strongly disagree	1

		Very strongly agree 6	5	4	3	2	Very strongly disagree 1
1	The trouble with seafarers nowadays is that they are subject to too many constraints and punishments	☐	☐	☐	☐	☐	☐
2	Assessments of performance do not reflect the way and how hard seafarers work	☐	☐	☐	☐	☐	☐
3	With enough effort it is possible for employees generally, to have some influence over top management and the way they behave	☐	☐	☐	☐	☐	☐
4	It is not possible to draw up plans too far ahead because so many things can occur that make the plans unworkable	☐	☐	☐	☐	☐	☐
5	Socialising is an excellent way to develop oneself and an emphasis on such things in organisations is important	☐	☐	☐	☐	☐	☐
6	Even though some people try to control company events by taking part in social affairs or office politics, most of us are subject to influences we can neither comprehend nor control	☐	☐	☐	☐	☐	☐
7	Being successful and getting to be 'boss' depends on ability - being in the right place at the right time or luck have little to do with it	☐	☐	☐	☐	☐	☐
8	Management can be unfair when appraising subordinates since their performance is often influenced by accidental events	☐	☐	☐	☐	☐	☐
9	Being an effective leader is more often a function of personal skills than it is of taking advantage of every available opportunity	☐	☐	☐	☐	☐	☐
10	It is upper management rather than ordinary seafarers who are responsible for poor company performance at an overall level	☐	☐	☐	☐	☐	☐
11	The things that happen to people are more under their control than a function of luck or chance	☐	☐	☐	☐	☐	☐
12	In organisations that are run by a few people who hold the power, the average individual can have little influence over organisational decisions	☐	☐	☐	☐	☐	☐

COMMENTS

Please feel free to add any comments regarding either your health, or work, or sources of stress. For example, disturbed sleep ashore because of very young children; problems relating to shiftwork and sleep at sea.

Please print clearly

<u>SEA:</u>

_____

<u>ASHORE:</u>

Thank you - Please <u>FOLD</u> and place in the enclosed stamped-addressed envelope and post urgently to:

FASTOH RESEARCH TEAM
SCHOOL OF HUMAN MOVEMENT STUDIES
QUEENSLAND UNIVERSITY OF TECHNOLOGY
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