

# The working and living conditions of seafarers on cargo ships in the period 2011-2016



Sampson, H., Ellis, N., Acejo, I., Turgo, N., Tang, L.

Oct 2018

# The working and living conditions of seafarers on cargo ships in the period 2011-2016

Sampson, H., Ellis, N., Acejo, I., Turgo, N., Tang, L.



Seafarers International Research Centre (SIRC)  
Cardiff University  
52 Park Place  
Cardiff CF10 3AT

Tel: +44 (0)29 2087 4620

[sirc@cf.ac.uk](mailto:sirc@cf.ac.uk)  
[www.sirc.cf.ac.uk](http://www.sirc.cf.ac.uk)

October 2018

ISBN: 1-900174-50-2

This research was generously supported by the Lloyd's Register Foundation. Lloyd's Register Foundation helps to protect life and property by supporting engineering-related education, public engagement and the application of research.

## Contents

Executive Summary.....	1
Terms and conditions of employment.....	1
Cabins and bathrooms.....	2
Temperature, light, noise, vibration.....	2
Cabin furnishings and fittings.....	4
Messroom furnishings and fittings.....	4
Washing and drying facilities.....	5
Health and safety equipment and preparations.....	5
Recreational facilities.....	6
Access to equipment and resources whilst off duty.....	7
Desirable facilities that were currently not provided.....	7
Food.....	8
Advantages and disadvantages in working on board.....	8
Background.....	9
Data collection.....	9
Data Analysis.....	9
Differences in the samples for 2011 and 2016.....	10
Table 1: Top 10 Flags of Vessel (2016 only).....	12
Table 2: Top 10 Nationalities of Shipowners/ Principals (2016 only).....	12
Seafarers' Terms and Conditions.....	13
Seafarers' working hours and patterns.....	15
Cabin and bathroom standards.....	17
Shared cabin and bathroom facilities.....	17
Cabin size and storage space.....	20
Temperature, light, noise and vibration.....	23
Cabin furnishings and fittings.....	31
Messroom furnishings and facilities.....	33
Washing and Drying facilities.....	35
Health and safety equipment and preparations.....	37
Recreational activities.....	37
Shore leave.....	38
Internet access.....	38
Email access.....	41
Telephone access.....	42
Access to equipment and resources whilst off duty.....	43
Desirable facilities that are not currently provided.....	44
Food.....	45
Advantages and disadvantages of working on board.....	46
Conclusions.....	52
Appendix 1 - Effect Size Tables.....	54

## Executive Summary

This report outlines key changes, in the period 2011-16, in the living standards of international seafarers working in the cargo, inshore, offshore, and passenger sectors of the industry. It does not include cruise ship workers. The report is based on the findings from questionnaires (n= 1533 in 2011 and n= 1537 in 2016) collected in 2011 and again in 2016 by a team of researchers at the Seafarers International Research Centre. It is designed to be read alongside the original report on the 2011 findings which was published in 2012 (please see Ellis et al 2012). In the original report explanations of why factors such as noise, vibration, light and design are significant to the physical and mental wellbeing of seafarers were provided and these are not repeated here.

In this report we present an analysis of the findings based upon statistical significance combined with 'effect'. In the executive summary we focus on changes which are both statistically significant and deemed to demonstrate an 'effect'.

### Terms and conditions of employment

- The proportion of seafarers with permanent contracts remained stable in the period 2011-16 at approximately 25%.
  - Seafarers working on open register vessels were more likely to have temporary contracts than others.
  - Chinese seafarers were significantly less likely to have permanent contracts in 2016 compared to 2011. Filipinos reported an increase in permanent contracts.
- Seafarers' tours of duty were reported to have reduced significantly except for Chinese seafarers whose tours had increased with almost two thirds working for 6 months or more at a time.
- In 2016, 47% of seafarers reported that their companies did not make pension contributions for them and a further 13% did not know if they did or not.
- There was a statistically significant fall in the hours worked by seafarers whilst their vessel was in port in the period 2011-16. On average seafarers worked 9.755 hours per 24 hour period in 2016. Indian seafarers reported longer hours than other nationality groups in both phases of the study and amongst Indian seafarers there was not a significant change in the hours worked in port in the period 2011-16.

## Cabins and bathrooms

- Cabin sharing was relatively stable (14-10%) in the period 2011-16 however significantly more seafarers who did share a cabin reported objecting to the arrangement in 2016.
  - Younger seafarers and lower ranking seafarers were more likely to share cabins.
  - Seafarers working on older vessels, passenger/cargo ships, and vessels built in China and 'other' countries were more likely to share cabins than others.
- Like cabin occupancy the numbers of seafarers reporting shared bathrooms remained relatively stable (24-21%) in the period 2011-16.
  - Seafarers working on Japanese-built ships were most likely to have to share bathroom facilities as were more junior ranking seafarers.
- There was little change in overall satisfaction with cabin size over the period 2011-16. However amongst ratings and senior officers and on medium and larger sized vessels satisfaction levels had increased.
- Levels of satisfaction with storage space were relatively stable in the period 2011-16 (70% reporting sufficient space in 2016 compared with 66% in 2011). However Chinese and Indian seafarers were more satisfied with storage space in 2016 than they had been in 2011.
  - Junior officers were significantly less satisfied with storage space in 2016 than had been the case in 2011.
  - On the largest and newest vessels satisfaction with storage space increased in the period 2011-16 and the pattern was repeated on Chinese-built vessels.

## Temperature, light, noise, vibration

- The ability to control temperature remained broadly stable in the period 2011-16.
  - On the largest vessels however significantly more seafarers reported being able to adjust temperatures in 2016 than in 2011.
- An improved ability to control electric light levels in cabins was reported by all nationalities except for Chinese seafarers in 2016.
  - In 2016 the ability to adjust electric light levels had significantly improved compared to 2011 on larger vessels, on the newest ships, and on three types of vessel – tankers, bulk carriers, and general cargo ships. This pattern was also found in relation to ships built in South Korea and Japan.
  - Overall satisfaction with light levels remained unchanged.
- Overall access to natural light remained the same but it fell significantly for UK seafarers whilst increasing for Filipino and Indian seafarers.

- Strongly significant differences remained in relation to access to natural light on board different kinds of ships (least access on passenger/general cargo ships and most on bulk carriers).
- Access to natural light remained most common on ships built in South Korea and there were no significant differences between 2011 and 2016 with regard to access to light according to country of build.
- There were no significant changes in the period 2011-2016 regarding the proportions of seafarers who enjoyed an unrestricted view from their cabin portholes/windows.
- Overall, in relation to noise, the proportions of seafarers disturbed by noise in their cabins remained stable over the period 2011-16.
  - Fewer senior officers reported being disturbed by noise in their cabins in 2016 compared to 2011.
  - In the period 2011 to 2016 general cargo ships moved from being the vessels on board which seafarers reported being most disturbed by noise in their cabins to the second most. Tankers remained the ships on which seafarers were least likely to report being disturbed by noise in cabins.
  - In 2016 noise disturbance was found to relate to vessel size (this was not the case in 2011). Seafarers were least likely to report being disturbed by noise in cabins on board the largest vessels and most likely to report being disturbed by noise on the smallest vessels in the sample.
  - The picture for noise disturbance on ships built in different countries remained stable in the period 2011-16 with most reports of disturbance on ships built in China and least on ships built in South Korea.
  - In 2016 on board medium sized and larger vessels seafarers were more likely to be disturbed by noise on ships flagged with national/second registers than on ships flagged with open registers (we do not have data on flag for 2011).
- There was a slight improvement in the proportions of seafarers disturbed by vibration in 2016 compared with 2011.
  - In 2011 ship type influenced the experiences of seafarers in relation to vibration but in 2016 we did not detect significant differences between different types of ships when it came to the reporting of disturbance by vibration.
  - In 2016 vibration was reported to be significantly worse on smaller vessels. This was not the case in 2011.

- Disturbance from vibration reduced on Japanese and South Korean-built vessels in the period 2011-2016. Nevertheless, Chinese and Japanese built-vessels remained the ships most likely to be associated with disturbance from vibration in 2016 as they had been in 2011.
- On the largest vessels in the sample seafarers working on ships flagged with open registers were least likely to report disturbance by vibration.
- Overall the pattern of responses relating to adequate rest remained stable over the period 2011-16. However seafarers who reported inadequate rest were much more likely to state that this was 'all of the time' in 2016 than they were in 2011. More encouragingly ratings were significantly more likely to report getting adequate rest 'all' or 'some' of the time in 2016 than they were in 2011.

### Cabin furnishings and fittings

- Overall levels of satisfaction with cabin furnishings increased in 2016 compared with 2011.
- In the period 2011-16 there were no significant changes relating to the provision of reading lights, drawers, tables, wash basins, bedding, towels, or toilet paper.
- Provision of comfortable chairs and wardrobes increased slightly in 2016 compared with 2011.
- Provision of TVs radios and music systems in cabins fell in 2016 compared with 2011.
- Filipino and UK seafarers were significantly less likely to report the provision of soap in cabins in 2016 compared with 2011.
- Overall internet access within cabins significantly increased in the period 2011-2016. However, there was no significant increase in provision reported by Chinese seafarers who enjoyed the least provision in both 2011 and 2016.
- In 2016 42% of seafarers reported access to a fridge within their cabins.
- In 2016 95% of seafarers reported provision of a waste bin in their cabins.
- In 2016 95% of seafarers reported that curtains were provided in their cabins.
- In 2016 only 46% of seafarers reported carpeting in their cabins.

### Messroom furnishings and fittings

- Overall there were no significant changes in messroom provision in the period 2011-16.
- Fewer seafarers on passenger/general cargo vessels and 'other' ship types reported access to separate messrooms for ratings and officers in 2016 compared with 2011.

- On the smallest vessels it was significantly less likely that separate officer and ratings mess facilities were available in 2016 compared with 2011.
- On South Korean-built ships there was less provision of separate messrooms for officers and ratings in 2016 than in 2011.
- Provision of hot drinks facilities in messrooms increased in 2016 compared with 2011.
- In 2016 67% of seafarers had access to comfortable chairs in messrooms.
- In 2016 88% of seafarers reported access to films and DVDs in messrooms.
- In 2016 94% of seafarers reported access to TVs in messrooms.
- 37% of seafarers reported that their messroom (eating) and lounge (relaxing) facilities were combined.

### Washing and drying facilities

- Overall access to washing, drying and ironing facilities remained stable in the period 2011-16. Very few seafarers cannot access washing machines on board. However around a fifth of seafarers lack access to drying machines or rooms and a third lack access to ironing facilities on board.
- Larger vessels and newer vessels were more likely to carry washing machines.
- In both 2011 and 2016 tankers were the most likely to have drying machines or rooms and ironing facilities and bulk carriers were the least likely to have them.
- Larger vessels and vessels built in South Korea were more likely to have drying rooms/ facilities in both 2011 and 2016.

### Health and safety equipment and preparations

- In 2016, 93% of seafarers reported that they were provided with new safety shoes on board.
- In 2016, 94% of seafarers reported that they were provided with new coveralls on board.
- In 2016, 91% of seafarers reported that they were provided with items such as earplugs and goggles on board.
- In 2016, only 25% of seafarers reported provision of sun block when appropriate.
- In 2016, only 53% of seafarers reported provision of malaria tablets when appropriate.
- In 2016, only 42% of seafarers reported provision of mosquito repellent when appropriate.

## Recreational facilities

- The proportion of seafarers 'never' able to enjoy shore leave rose in 2016 compared to 2011. This result was statistically significant amongst Filipinos.
- Internet access improved in the period 2011-2016 with 51% reporting internet access in 2016, and 19% reporting free and unlimited internet access on board.
- In 2016, almost half of seafarers with internet access reported dissatisfaction with the speed of service.
  - Seafarers on passenger/general cargo vessels and Chinese vessels reported least satisfaction with speed.
- In 2016, only 44% of seafarers with internet access reported that this supported 'video chat'.
- In 2016, only 61% of seafarers with internet access reported that it supported 'audio chat'.
- In 2016, 93% of seafarers with internet access reported that it supported 'text chat'.
- In 2011 and 2016, seafarers on board bulk carriers were least likely to have internet access and on board passenger/general cargo ships they were the most likely to have internet access.
- Vessel age had an impact on internet access in 2011 but not in 2016.
- In 2016 there was a significant improvement in internet access reported on all ships except for those built in China.
- In 2016 vessels flagged with open registers were significantly less likely to have internet provision than vessels flagged with national/second registers (NB flag data not collected in 2011).
- In 2016 significantly more seafarers reported access to email on board with 39% reporting free and unlimited email access.
- Chinese seafarers were the least likely to have access to email of any kind on board.
- Where seafarers had to pay for email, charges were significantly higher in 2016 than had been the case in 2011.
- On board bulk carriers, ships built in China, and on board smaller vessels, seafarers were least likely to report free and unlimited access to email.
- The proportions of seafarers with telephone access remained relatively stable over the period 2011-16.
- The average cost for access to the ship's telephone remained relatively stable.
- Access to the ship's telephone was more likely to be reported by seafarers working on larger ships and those flagged with open registers.

- Rare free telephone access was more likely to be reported on smaller vessels and those flagged with national/second registers.
- Most seafarers take a mobile phone on board with them and the proportions doing so remained stable over the period. However in 2016 the average number of days when seafarers reported being unable to gain a signal and use their mobile phones rose compared to 2011.

#### Access to equipment and resources whilst off duty

- Overall, access to a computer, karaoke machine, and games remained stable in the period 2011-16.
- Overall, access to music systems, a DVD collection, and a book library fell in the period 2011-16.
- Chinese seafarers were least likely to have access to equipment and resources than other nationalities and their access to all resources fell in the period 2011-16.
- All nationalities reported a fall in access to books in the period 2011-16.
- In 2016, almost two thirds of seafarers had access to some kind of gym, 27% of seafarers had access to basketball, 22% of seafarers reported access to a swimming pool and 16% of seafarers reported access to a sauna.
- Seafarers on board tankers were the most likely to report the operation of a welfare budget on board.
- In the period 2011-16 the provision of a welfare budget dropped significantly on board tankers.

#### Desirable facilities that were currently not provided

- There were no changes in the proportions of seafarers who wanted access to Wi-Fi, gyms, email, music systems, karaoke, satellite TV, DVDs, books, games, fridges, better cabin facilities, and saunas.
- However there were significant increases in the proportions of seafarers stating that they would like access to swimming pools in 2016 whilst there were decreases in the proportions wanting access to a computer terminal or telephone.

- Indian seafarers were significantly more likely to express a desire for on board internet access in 2016 than they were in 2011 and Chinese seafarers were significantly more likely to express a desire for gym facilities in 2016 than they were in 2011.

## Food

- The proportions of seafarers reporting that there was a dedicated cook on board their vessel remained stable in the period 2011-16.
- In relation to the quantity of food reported the overall picture was stable in the period 2011-16. Approximately one fifth of seafarers reported insufficient food on board.
- Significantly more seafarers reported that the quality of the food available on board was good/very good in 2016 than in 2011. However the figure remained disappointingly low overall at 56% in 2016.
- Significantly more seafarers reported that dietary needs were catered for in 2016 compared with 2011. In 2016, 38% of seafarers reported that dietary needs were *not* catered for
- Overall the provision of healthy food and of free soft drinks remained unchanged in the period 2011-16.

## Advantages and disadvantages in working on board

- There were no significant differences in the proportions of seafarers reporting that lack of privacy, lack of space, bullying/harassment, discrimination, job insecurity, work-related stress, lack of recreational facilities, and lack of career progression were disadvantages associated with working at sea.
- There was a significant fall in the proportions of seafarers reporting concerns over lack of training provision in the period 2011-2016. In 2016 this fell to 33%.
- There was some polarisation of views in the period 2011-2016 with regard to the perceived benefits associated with seafaring most notably salaries and terms and conditions.

## Background

This report focuses on work undertaken in relation to seafarers' living and working conditions in 2011 and 2016. The report constitutes a summary of the key differences in the findings from questionnaires administered in 2011 and in 2016. The 2011 findings were reported in 2012 and can be accessed on line via the SIRC website (Ellis et al 2012). As such this account is designed to be read in conjunction with the report on the earlier findings. The 2012 report outlines the reasons for the inclusion of particular factors such as noise, light, and recreational facilities and explains why these are important to the mental and physical health of seafarers. This report does not duplicate such explanations.

## Data collection

Data were collected using questionnaires which were administered by researchers at training establishments and seafarer welfare centres in the UK, Philippines, and China. In 2011 (described henceforth by date or as 'phase one' of the research) 1,533 questionnaires were collected and in 2016 (described henceforth by date or as 'phase two' of the research) 1,537 were collected. In both phases of the study identical wording was used within the questionnaires wherever possible. However, in 2016 some new questions (and choices for fixed responses) were included to allow for the development of a more nuanced understanding of the findings. Where relevant, differences between the questionnaires will be highlighted.

In 2011 questionnaires were translated from English into both Chinese and Tagalog. However in 2016 we did not deem it necessary to translate the questionnaires into Tagalog and translations were only made into Mandarin.

## Data Analysis

Data from the completed questionnaires were entered into the computer based statistical package SPSS20. Chi squared analysis was used to test for statistical differences over time in relation to the experiences of working and living conditions on board. In this report we have only highlighted

statistically significant results (using a significance level of 0.05)<sup>1</sup>. Figures have been rounded up/down to read as whole numbers which means that occasionally the cumulative total of the percentages reported may come to slightly over or under 100%. In addition to chi squared we have made use of Levene's Test for Equality of Variances (independent t-tests) in order to compare means. We have also used Cramer's V and Cohen's D to indicate 'effect size'. The use of 'effect size' is more usual in relation to studies of the effectiveness of interventions. However, here we make use of 'effect size' to aid the reader in interpreting the findings. This is because significance tests should be used with true random samples. Where sampling is not truly random they have the potential to point to some findings which should not properly be regarded as of importance. Where the interpretation of Cohen's D or Cramer's V indicates 'no effect' we suggest that findings are less relevant than where 'minor/small', 'medium' or 'large' effects are identified. When using Cramer's V, effect sizes are interpreted with reference to degrees of freedom and throughout this report figures for effect size are included in brackets along with degrees of freedom which is indicated with the abbreviation 'd.f.'. Appendix 1 provides a table to aid the interpretation of effect size in relation to both Cramer's V and Cohen's D.

## Differences in the samples for 2011 and 2016

In some ways the respondents in 2011 and 2016 shared remarkably similar demographic profiles and were working on remarkably similar vessels. There were no significant differences found in relation to gender ( $p = 0.078$ , Cramer's V = 0.032, d.f. = 1), grouped nationality<sup>2</sup> ( $p = 0.373$ , Cramer's V = 0.033, d.f. = 3), or ship type ( $p = 0.398$ , Cramer's V = 0.038, d.f. = 4).

However, we did find significant differences in relation to the average age of respondents which was lower in 2016 (31.68 years) than it had been in 2011 (33.04 years) ( $p = 0.000$ , Cohen's D = 0.16). When further interrogated by grouping age within the two samples we identified the biggest change in relation to the fall in the number of seafarers aged 60 or over ( $p = 0.000$ , Cramer's V = 0.102, d.f. = 9) and to a lesser extent in the overall numbers of seafarers aged 40+ ( $p = 0.000$ , Cramer's V = 0.089, d.f. = 4). While we think this pattern is consistent with changes in the overall age profile of seafarers working in the industry, in this instance we account for the difference between the two samples as

<sup>1</sup> In interpreting significance results the rule of thumb is that the smaller the significance value the more significant the result. For example, a significance level of 0.00 is regarded as highly significant, results of 0.05 are regarded as significant, and those of 0.5 are not treated as significant.

<sup>2</sup> Grouped as Chinese, Indian, Filipino, British and excluding others.

being partly related to the lower number of senior officers (who are generally older) included in the 2016 sample. When senior officers were excluded from the samples the mean age was lower for 2016 than for 2011 but not significantly different (30.97 years in 2016, 31.17 years in 2011). However when age was grouped we did find a significant difference between the samples (with senior officers excluded) with fewer seafarers aged 40+ in the 2016 sample ( $p = 0.041$ , Cramer's  $V = 0.065$ , d.f. = 4).

In terms of rank, the profile of the two samples differed significantly. The 2016 sample included fewer ratings (27% compared with 34% in 2011), more junior officers (62% compared with 42% in 2011) and fewer senior officers (11% compared with 24% in 2011) than the earlier sample ( $p = 0.000$ , Cramer's  $V = 0.217$ , d.f. = 2). There were also important differences in relation to length of experience as a seafarer. In the 2016 sample respondents generally had less experience of life at sea with 76% having been at sea for just ten years or less compared with 67% in 2011 ( $p = 0.000$ , Cramer's  $V = 0.105$ , d.f. = 3). While we think this pattern is consistent with changes in the overall profile of seafarers working in the industry, in this instance we account for the difference between the two samples as being related to the lower number of senior officers (who are generally more experienced) included in the 2016 sample. We did not find significant differences in the experience levels of seafarers in the sample when senior officers were excluded from the analysis.

The average age of the vessels on which seafarers were working dropped in the 2016 sample. This appears to be consistent with changes in the overall tonnage profile worldwide as vessels continue to be scrapped in significant numbers (see <http://www.hellenicshippingnews.com/vessel-scrapping-in-2016-record-year-for-container-ships/>, <http://www.telegraph.co.uk/business/2016/10/08/up-for-a-scrap-shipbreaking-enters-hits-record-level/>). In 2016 the average age of the vessels in the sample was 9.040 years while in 2011 it was 10.485 years ( $p = 0.000$ , Cohen's  $D = 0.17$ ). In 2011 19% of vessels in the sample were 20 years old or above while this had fallen in 2016 to just 11% ( $p = 0.000$ , Cramer's  $V = 0.152$ , d.f. = 3).

We found that the vessel profile in the samples had also changed in terms of where ships had been built. In 2011 the largest group of ships in the sample was built in Japan (33%) followed by China (23%) and South Korea (17%). However in 2016 this had changed significantly with the largest proportion of vessels in the sample built in China (34%), followed by Japan (24%) and South Korea (16%). These changes were identified as notable ( $p = 0.000$ , Cramer's  $V = 0.198$ , d.f. = 9).

In the 2016 questionnaire, two questions relating to sample shape were included that had not been included in 2011. These related to the flag of the vessel which seafarers were serving on at the time of the study and to the nationality of the ship owner/principal. In terms of vessel flag one fifth of the ships in the sample were reported to be registered in Panama, with 15% registered in China, 8% registered in Hong Kong, 7% registered in Singapore and 6% registered in the UK (see Table 1).

Table 1: Top 10 Flags of Vessel (2016 only)

Flag of Vessel	Frequency	Percent	Cumulative Percent
Panama	285	20.0%	20.0%
China	212	14.9%	34.8%
Hong Kong	112	7.8%	42.7%
Singapore	99	6.9%	49.6%
United Kingdom	91	6.4%	56.0%
Marshall Islands	87	6.1%	62.1%
Liberia	84	5.9%	68.0%
Bahamas	63	4.4%	72.4%
Malta	45	3.2%	75.5%
Bermuda	35	2.5%	78.0%
Other	314	21.9%	100.0%
<i>Total</i>	<i>1427</i>	<i>100.0%</i>	

In terms of the nationality of the shipowner/principal 23% of seafarers reported that their vessel was owned in China, 11% suggested that it was owned in Japan, 8% stated that their vessel was owned in Greece, 8% in the UK, and 6% of seafarers stated that their ship was owned in Germany (see Table 2).

Table 2: Top 10 Nationalities of Shipowners/ Principals (2016 only)

Nationalities of Shipowners/ Principals	Frequency	Valid Percent	Cumulative Percent
China	329	23.3%	23.3%
Japan	148	10.5%	33.8%
Greece	117	8.3%	42.0%
United Kingdom	114	8.1%	50.1%
Germany	83	5.9%	56.0%
Norway	60	4.2%	60.2%
Singapore	55	3.9%	64.1%
United States	53	3.8%	67.9%
Taiwan	50	3.5%	71.4%
Denmark	48	3.4%	74.8%
Other	356	25.1%	100.0%
<i>Total</i>	<i>1413</i>	<i>100.0%</i>	

## Seafarers' Terms and Conditions

The proportion of seafarers with permanent contracts remained stable in the period 2011-16 with about a quarter of seafarers employed permanently and three quarters employed on fixed-term contracts. In 2016, we included a question relating to vessel flag for the first time. This showed that seafarers working on open register vessels were almost half as likely as those serving on non-open register vessels to have a permanent contract. Seventeen percent of seafarers working on board ships flagged with an open register reported having a permanent contract as opposed to 31% of those working on board a vessel flagged with a non-open register ( $p = 0.000$ , Cramer's  $V = 0.154$ , d.f. = 1). In both phases of the study we noted that nationality had a significant effect on contract status. In phase one Filipino seafarers were the most likely to be employed on temporary contracts followed by Indians, Chinese and lastly British seafarers who were the only group where the predominant contract was permanent. When we compared the results for phases one and two we found that the fluctuations in proportions of seafarers with permanent and temporary contracts from the UK and India were of no significance whilst Chinese seafarers reported reduced proportions of permanent contracts (24% of Chinese seafarers had permanent contracts in 2016 compared with 33% in 2011,  $p = 0.006$ , Cramer's  $V = 0.102$ , d.f. = 1) and Filipinos reported an increase (from 7% to 15%,  $p = 0.000$ , Cramer's  $V = 0.115$ , d.f. = 1).

It was positive to note the significant reduction in the length of seafarers' tours of duty. In 2011, 55% of respondents worked on tours of 6 months or more and in 2016 this had fallen dramatically with only 34% of seafarers working on board for 6 months or more at a time ( $p = 0.000$ , Cramer's  $V = 0.247$ , d.f. = 3). There was a significant fall in the proportions of seafarers working more than 6 months across all ranks and all age groups ( $p < 0.05$ ), except those aged 45-49 where there was a non-significant fall ( $p = 0.073$ , Cramer's  $V = 0.189$ , d.f. = 1).

In terms of nationality in phase 1 Filipino seafarers reported working the longest contracts (75% worked over six months). However this had fallen to just 22% in phase two which was a dramatic change ( $p = 0.000$ , Cramer's  $V$  showed large effect size 0.471, d.f. = 1). Indian seafarers similarly show a decline in contract length. In 2011 50% worked on contracts of more than six months and this declined to 19% in 2016 ( $p = 0.000$ , Cramer's  $V = 0.318$ , d.f. = 1). However, amongst Chinese seafarers the pattern was reversed with more seafarers in 2016 reporting long contracts. In 2016 62% reported contracts of six months or more compared with 54% in 2011 ( $p = 0.027$ , Cramer's  $V = 0.074$ , d.f. = 1). While this change was statistically significant Cramer's  $V$  indicated no effect.

There were mixed findings when it came to other terms and conditions relating to seafarers' employment. No significant changes occurred with regard to the average **numbers** of days of leave pay provided to all seafarers during each month of their contract. In 2011, an average of 10.44 days leave pay were provided compared with a very similar figure of 10.97 in 2016. However there were some groups of seafarers where significant changes in relation to leave pay were reported. There was a general reduction across all seafarers in proportions reporting 'no leave pay' except in the case of Chinese seafarers where the proportions reporting 'no leave pay' had increased from 53% in 2011 to 72% in 2016 ( $p = 0.000$ , Cramer's  $V = 0.237$ , d.f. = 3). A pattern of improved leave pay was also seen for senior officers and ratings but not for junior officers with 51% reporting no leave pay in 2016 compared with 42% in 2011 ( $p = 0.002$ , Cramer's  $V = 0.122$ , d.f. = 3). Overall, and regardless of the amounts of leave pay, seafarers indicated that they were taking more days of leave per year, on average. In 2011, respondents reported taking an average of 75.68 days leave per year whilst in 2016 the figure had risen to 86.29 ( $p = 0.000$ , Cohen's  $D = 0.18$ ). It is worth noting here that the question which was asked did not establish whether the leave that was 'taken' was voluntary or enforced (i.e. due to inability to find a new job when they wanted one). What is clear however is that seafarers are required to stretch their wages over a longer period of leave time today than was the case in 2011.

The findings suggest that in line with the trends found in many industries ashore, there has been a decline in trade union membership amongst seafarers. In 2011, 40% reported being members of a trade union and in 2016 this had fallen to just over a third of seafarers (34%). It is interesting to note in relation to this finding, however, that whilst the result is statistically significant the test for effect size shows 'no effect' ( $p = 0.000$ , Cramer's  $V = 0.068$ , d.f. = 1). The importance of this finding therefore appears to be limited. When we consider the groups of seafarers amongst who trade union membership has fallen significantly we see falls in membership amongst 25-29 year olds ( $p = 0.018$ , Cramer's  $V = 0.084$ , d.f. = 1) and amongst those aged 50+ ( $p = 0.031$ , Cramer's  $V = 0.174$ , d.f. = 1). In terms of nationality there were declines in trade union membership amongst Chinese seafarers ( $p = 0.000$ , Cramer's  $V = 0.151$ , d.f. = 1) and seafarers from the UK ( $p = 0.035$ , Cramer's  $V = 0.111$ , d.f. = 1). There was also a decline in trade union membership amongst junior officers where membership rates declined from 42% in 2011 to 30% in 2016 ( $p = 0.000$ , Cramer's  $V = 0.124$ , d.f. = 1).

In 2011, the questionnaire did not include any questions relating to employer contributions to pensions. However, in 2016 we asked seafarers if their company paid pension contributions. Almost half (47%) said that their company did not pay pension contributions, 40% stated that their company

did make pension contributions but 13% simply did not know whether such contributions were made or not.

## Seafarers' working hours and patterns

The mean number of hours that seafarers reported working at sea and in port dropped in 2016. In the case of port-based hours of work the drop is statistically significant with the mean number of hours falling from 10.276 in 2011 to 9.755 in 2016 ( $p = 0.000$ , Cohen's  $D = 0.19$ ). In both phases of the research nationality and rank impacted on the hours worked by seafarers in port. Indian seafarers were identified as significantly more likely to work over 12 hours per day in port in both phases for example and in phase two 15% of Indian seafarers worked 12 hour days or longer in port followed by 9% of UK seafarers, 5% of Chinese seafarers and 4% of Filipino seafarers ( $p = 0.000$ , Cramer's  $V = 0.242$ , d.f. = 9). In comparing changes between phase one and two we identified that there were significant falls in the numbers of hours worked by both Filipino ( $p = 0.000$ , Cramer's  $V = 0.155$ , d.f. = 3) and Chinese seafarers ( $p = 0.011$ , Cramer's  $V = 0.112$ , d.f. = 3) in port. In both phases of the research we found that senior officers were more likely than other ranks to work more than twelve hours per day in port. This pattern remained stable over the two phases with no significant change identified in the proportions of senior officers working more than twelve hours per day in port (12% in both phases). However we did find significant changes in relation to both junior officers and ratings who were less likely to report working more than 11 hours in port in phase two of the research than in phase one (for junior officers  $p = 0.000$ , Cramer's  $V = 0.126$ , d.f. = 3 and for ratings  $p = 0.011$ , Cramer's  $V = 0.115$ , d.f. = 3).

At sea seafarers reported a small difference in average daily hours which fell from 9.483 (2011) to 9.164 (2016). Whilst this was statistically significant the test for effect size demonstrated 'no effect' making the result less noteworthy ( $p = 0.000$ , Cohen's  $D = 0.16$ ). Nationality had a significant (and large) effect on hours worked at sea and in both phases of the study Indian seafarers worked most hours at sea followed by UK seafarers, Filipino seafarers and then Chinese seafarers (phase one  $p = 0.000$ , Cramer's  $V = 0.220$ , d.f. = 9 phase two  $p = 0.000$ , Cramer's  $V = 0.270$  d.f. = 9). There were some significant changes in the reported hours of work at sea amongst Chinese and Filipino seafarers. In both cases hours of work fell (Chinese seafarers  $p = 0.000$ , Cramer's  $V = 0.170$ , d.f. = 3, Filipino seafarers  $p = 0.009$ , Cramer's  $V = 0.104$  d.f. = 3).

At sea rank also has an effect on working hours but it is not so strong an effect as with hours worked in port. Ratings tended to report the longest working hours at sea followed by senior officers and then junior officers (phase one  $p = 0.003$ , Cramer's  $V = 0.084$ , d.f. = 6, phase two  $p = 0.000$ , Cramer's  $V = 0.098$ , d.f. = 6). The only significant difference found in relation to rank and hours worked at sea between phases one and two related to junior officers who had experienced a fall in working hours with more junior officers (46% phase 1 and 54% phase 2) working 8 hours or less ( $p = 0.003$ , Cramer's  $V = 0.096$ , d.f. = 3).

It is worth remembering that these hours are typically worked for an average of more than six days per week. Officers maintaining a navigational watch, Captains and Chief engineers invariably work seven days a week as do all seafarers when vessels are engaged in weekend port calls. While, the mean number of days per week reported to be worked by all seafarers fell very slightly from 6.634 in 2011 to 6.615 in 2016 the result was not statistically significant. When senior officers were removed from the figures<sup>3</sup> we found that the mean numbers of days that seafarers worked increased from 6.595 in 2011 to 6.620 in 2016. This result was also found to be of no statistical significance. However when the findings were grouped with seafarers (excluding senior officers) working seven days a week separated from seafarers working less than seven days a week we found that in 2016 significantly more seafarers were working seven days a week (853 seafarers stated that they worked seven days a week in 2016 compared with 710 in 2011). This significant difference was not corroborated by the test for 'effect size' however making it less noteworthy ( $p = 0.002$ , Cramer's  $V = 0.064$ , d.f. = 1). Overall we can conclude, therefore, that the picture has remained relatively stable with regard to the numbers of days worked per week by seafarers in 2011 and 2016 with very high proportions of seafarers continuing to report working seven days per week (70% in 2011 and 73% in 2016).

In terms of patterns of work there were no significant changes in the numbers of seafarers who identified themselves as working 'shifts'. In both samples just over two thirds of seafarers worked shifts and such stability is expected. More surprisingly, however, we found that seafarers in 2016 reported more days during which their vessel was 'at sea' rather than 'in port'. The mean number of days in the previous 8 weeks when a vessel was reported to be 'at sea' was 24.81 in 2011 and this rose to 30.74 in 2016 ( $p = 0.000$ , Cohen's  $D = 0.25$ ). There was no significant difference in the overall average number of days vessels were reported to be in port in 2016 and 2011.

<sup>3</sup> We undertook this calculation given that most senior officers work seven days a week and there was a significant fall in the numbers of senior officers in the 2016 sample which had the potential to distort the findings

## Cabin and bathroom standards

### Shared cabin and bathroom facilities

A minority of seafarers reported sharing a cabin in 2011 (14%) and this fell in 2016 to 10%. The decrease in shared cabin occupancy is to be welcomed but while it was statistically significant there was no statistical 'effect' detected ( $p = 0.001$ , Cramer's  $V = 0.06$ , d.f. = 1). Seafarers' responses did not vary significantly between 2011, and 2016, in relation to questions about numbers of seafarers sharing multiple occupancy cabins, level of choice about shared occupancy, or the gender of shared cabin occupants. However, we did identify a significant increase in the numbers of seafarers who minded sharing a cabin when we only considered the responses of those seafarers who actually reported sharing a cabin. In 2016, 62% of those who shared a cabin said that they minded this arrangement compared to 49% in 2011. This marked change was significant ( $p = 0.044$ , Cramer's  $V = 0.132$ , d.f. = 2).

In 2011 there was a clear association between age and shared cabin facilities and as respondent age increased they were less likely to report sharing a cabin ( $p = 0.000$ , Cramer's  $V = 0.145$ , d.f. = 4). This pattern was less clear in 2016 where shared cabin occupancy had generally decreased. However it remained the case that seafarers under the age of 25 were most likely to report sharing a cabin. In 2016, 21% of seafarers aged under 25 shared a cabin compared with 7% of those aged 40+ ( $p = 0.000$ , Cramer's  $V = 0.174$ , d.f. = 4). The reduction in shared cabin occupancy in the period 2011-16 was found to be statistically significant for the age groups 25-29 ( $p = 0.001$ , Cramer's  $V = 0.116$ , d.f. = 1) and 30-34 ( $p = 0.001$ , Cramer's  $V = 0.125$ , d.f. = 1) but in the period 2011-2016 the differences in occupancy relating to other age groups showed no significant differences.

In relation to nationality differences in cabin occupancy the fall in rates of shared cabin occupancy were only significant amongst Chinese seafarers whose occupancy of shared cabins fell from 11% to 4% in the period 2011-16 ( $p = 0.000$ , Cramer's  $V = 0.121$ , d.f. = 1).

Rank inevitably impacts on shared cabin occupancy and in 2011 and 2016 the results showed a clear pattern of shared cabin occupancy diminishing as rank increased. Senior officers rarely shared a cabin and it was uncommon amongst junior officers (4% and 9% respectively in 2016). The pattern of cabin occupancy remained stable amongst junior and senior officers in the period 2011-16 but

shared cabin occupancy fell significantly amongst ratings from 24% in 2011 to 14% in 2016 ( $p = 0.000$ , Cramer's  $V = 0.123$ , d.f. = 1).

In both 2011 and 2016, ship type had a very strong effect on cabin occupancy (2011  $p = 0.000$ , Cramer's  $V = 0.387$ , d.f. = 4, and 2016  $p = 0.000$ , Cramer's  $V = 0.403$ , d.f. = 4). In 2011, more than half of the seafarers working on passenger/general cargo vessels (51%) shared a cabin with far fewer seafarers on other ships types doing so (general cargo 10%, bulk carriers 8%, tankers 6%). The picture was statistically similar in 2016. However there was a significant change in relation to bulk carriers where sharing a cabin dropped. Having to share a cabin was reported by just 3% of respondents working on bulk carriers in 2016 compared with 8% in 2011 ( $p = 0.000$ , Cramer's  $V = 0.119$ , d.f. = 1).

In both 2011 and 2016 we found that generally speaking seafarers were more likely to share a cabin on older ships. These results were statistically significant (2011  $p = 0.019$ , Cramer's  $V = 0.083$ , d.f. = 3, 2016  $p = 0.001$ , Cramer's  $V = 0.112$ , d.f. = 3). However we identified a significant fall in cabin sharing in the period 2011-2016 amongst ships aged 5-9 and 10-19 years old (ships aged 5-9,  $p = 0.022$ , Cramer's  $V = 0.081$ , d.f. = 1, ships aged 10-19,  $p = 0.011$ , Cramer's  $V = 0.094$ , d.f. = 1). There was no correspondingly significant fall in cabin sharing on either the newest (under 5 years old) or the oldest (20 years old and more) ships.

Shared cabin occupancy was more likely to be found on ships built in 'other' countries and in China than in South Korea and Japan (2011  $p = 0.000$ , Cramer's  $V = 0.206$ , d.f. = 3, 2016,  $p = 0.000$ , Cramer's  $V = 0.243$  d.f. = 3). Numbers of shared cabins had fallen in the period 2011-16 on ships built in China and those built in South Korea. In 2011, 12% of respondents working on ships built in China shared cabins compared with 6% in 2016 whilst on ships built in South Korea shared cabins fell from 9% in 2011 to 4% in 2016 (China,  $p = 0.001$ , Cramer's  $V = 0.117$ , d.f. = 1, South Korea,  $p = 0.036$ , Cramer's  $V = 0.100$ , d.f. = 1).

In 2016, questions about vessel flag were included and there was a significant difference found between vessels flagged with open registers and those flagged with non-open registers. Shared cabins were reported more frequently by seafarers working on non-open register vessels (12%) than on open register vessels (6%) ( $p = 0.001$ , Cramer's  $V = 0.088$ , d.f. = 1). However this difference was no longer significant and/or of notable effect when passenger/cargo vessels (which show disproportionate levels of shared occupancy) were excluded.

In 2011, almost a quarter of respondents (24%) did not have access to private bathroom facilities on board. This had fallen to 21% in 2016. This encouraging trend was statistically significant but was not large enough to indicate a noteworthy 'effect' using further statistical tests ( $p = 0.027$ , Cramer's  $V = 0.040$ , d.f. = 1). Shared bathrooms were least commonly reported by seafarers working on board tankers (2011 = 15%, 2016 = 12%) and most likely to be reported by seafarers working on 'other' ships in 2011 (31%) and passenger/general cargo ships in 2016 (41%). In the period 2011-16 there were significant changes in the proportion of private bathrooms reported on two ship types – general cargo vessels and passenger/general cargo vessels. On general cargo vessels the proportion of seafarers reporting a private bathroom increased from 73% to 79% ( $p = 0.039$ , Cramer's  $V = 0.079$ , d.f. = 1) and on passenger/general cargo vessels the opposite occurred with the proportion of seafarers reporting use of a private bathroom falling significantly from 75% in 2011 to 59% in 2016 ( $p = 0.016$ , Cramer's  $V = 0.169$ , d.f. = 1). In 2011 and 2016 private bathrooms were more common on larger ships than smaller ones. In terms of vessel size, there was only one small statistically significant change identified in the responses to the 2011 and 2016 questionnaires. This related to medium sized vessels (11,500gt – 40,000gt) where there was an increase in private bathroom access which was reported by 78% of respondents in 2011 and 84% in 2016 ( $p = 0.049$ , Cramer's  $V = 0.066$ , d.f. = 1). The availability of private bathrooms did not vary significantly with vessel age between the two research phases. One minor variation with regard to more access to private bathrooms was identified in terms of newer ships was shown to be statistically significant but demonstrated no statistical 'effect' 2016 ( $p = 0.041$ , Cramer's  $V = 0.069$ , d.f. = 1).

In both phases of the research Japanese-built vessels were the least likely to have private bathrooms and there was no significant change identified for Japanese-built vessels when comparing the 2011 and 2016 results. In both years approximately two thirds of respondents had a private bathroom on a Japanese-built ship (2011 = 66%, 2016 = 67%). However the picture improved in relation to Chinese-built ships where private bathroom access increased slightly in 2016 to 81% from 75% in 2011 ( $p = 0.042$ , Cramer's  $V = 0.074$ , d.f. = 1) and on board South Korean-built ships where private bathroom access rose from 91% in 2011 to 97% in 2016 ( $p = 0.010$ , Cramer's  $V = 0.123$ , d.f. = 1).

Where seafarers were required to share a toilet the numbers of others with whom they shared it declined in 2016. In 2011, 57% of seafarers who shared bathroom facilities reported sharing a toilet with five or more seafarers whilst in 2016 this percentage had fallen to 42% ( $p = 0.001$ , Cramer's  $V = 0.147$ , d.f. = 1). This pattern was repeated in relation to the 'occupancy' rate for shared showers. In 2011 of those seafarers who reported sharing bathroom facilities, 57% stated that they shared

showers with five or more other seafarers. In 2016 this percentage had dropped to 44% ( $p = 0.005$ , Cramer's  $V = 0.127$ , d.f. = 1). However, there was no significant change in the numbers of seafarers reported to be sharing communal wash basins. In terms of mixed gender facilities, of those who shared bathroom facilities almost a quarter shared with seafarers of the opposite sex (24% in both 2011 and 2016 which did not constitute a significant change).

In both 2011 and 2016 there were significant differences in bathroom occupancy relating to nationality. In 2011 UK seafarers were least likely to share a bathroom with others. There was no significant change in shared bathroom occupancy in the period 2011-16 amongst Chinese, Filipino or UK seafarers. However in 2016 significantly fewer Indian seafarers reported sharing a bathroom than had done so in 2011 ( $p = 0.001$ , Cramer's  $V = 0.171$ , d.f. = 1).

As with cabin occupancy, higher ranking seafarers were less likely to share bathrooms in 2011 and 2016. Amongst junior and senior officers the proportions who shared a bathroom did not significantly differ in 2011 and 2016. Eighty-seven percent of senior officers had private bathrooms in 2011 and 2016, while 79% of junior officers had private bathrooms in 2011 and 81% had them in 2016. In this period access to private bathrooms significantly increased amongst ratings however. In 2011 64% of ratings had access to a private bathroom and this increased to 75% in 2016 ( $p = 0.001$ , Cramer's  $V = 0.115$ , d.f. = 1)

### Cabin size and storage space

Overall, in terms of their cabin size, there was little change in the satisfaction levels of respondents in 2011 and 2016. Just over a quarter (27% 2016 and 30% in 2011) reported being unsatisfied with the size of their cabin, around 17% were neither satisfied nor dissatisfied and just over a half of respondents were satisfied (56% in 2016, 54% in 2011).

The pattern in the levels of satisfaction with cabin size across nationalities remained the same in 2011 and 2016. Filipino seafarers were the most satisfied with their cabin size. In 2016 74% reported being either satisfied or very satisfied with cabin size. They were followed in descending order by UK seafarers, Indian seafarers and lastly Chinese seafarers.

In terms of rank the data show that the level of satisfaction with cabin size has risen amongst ratings. In 2016, 74% of ratings stated that they were satisfied or very satisfied with their cabin size compared with 62% in 2011. This was a significantly significant change showing a medium/large effect ( $p = 0.000$ , Cramer's  $V = 0.193$ , d.f. = 4). Senior officers were also more satisfied with the size of their cabins and in 2016 56% reported being satisfied or very satisfied compared with 48% in 2011. Although the change in levels of satisfaction was smaller than that found amongst ratings it was statistically significant and showed a medium effect ( $p = 0.020$ , Cramer's  $V = 0.152$ , d.f. = 4).

In relation to ship type the pattern of satisfaction with cabin size varied over the two phases. In 2011 seafarers working on tankers were the *least* dissatisfied with the size of their cabins and in 2016 they were the *most* dissatisfied. However the change in relation to tankers was not statistically significant. Significant changes did occur in relation to bulk carriers and general cargo ships. In both cases seafarers in 2016 were more satisfied with cabin size than in 2011 (bulk carriers  $p = 0.001$ , Cramer's  $V = 0.148$ , d.f. = 4, general cargo vessels  $p = 0.001$ , Cramer's  $V = 0.166$ , d.f. = 4).

The size of vessels had a clear effect on levels of satisfaction with cabin size. Seafarers working on the smallest ships were the least satisfied and those on the largest ships were the most satisfied. On smaller ships there was no significant change in satisfaction with cabin size but for medium and large vessels there was a significant increase in the levels of satisfaction expressed in relation to cabin size. On medium size vessels there was an increase in the proportion of seafarers expressing satisfaction with cabin in size which rose from 52% in 2011 to 59% in 2016 ( $p = 0.017$ , Cramer's  $V = 0.117$ , d.f. = 4). On larger vessels there was also an increased level of satisfaction (61% satisfied in 2011 and 63% in 2016) but paradoxically there was also an increase in the proportion of seafarers who said that they were very dissatisfied with cabin size. In 2011, 8% of seafarers on the largest vessels in the sample stated that they were 'very dissatisfied' with the size of their cabin and this rose to 13% in 2016 ( $p = 0.003$ , Cramer's  $V = 0.132$ , d.f. = 4).

Seafarers working on vessels built in South Korea were significantly more likely to be satisfied with cabin size than seafarers working on vessels built in Japan or China. In 2016, 68% of seafarers working on vessels built in South Korea were satisfied with cabin size compared with 62% working on vessels built in 'other' countries, 53% working on vessels built in Japan and 46% working on vessels built in China ( $p = 0.000$ , Cramer's  $V = 0.135$ , d.f. = 6).

There was a statistically significant increase in the number of respondents who felt they had sufficient storage space in 2016 with 70% stating that they had sufficient storage space in 2016 compared with 66% in 2011. The difference was not strong however and when we considered effect size we found that there was 'no effect' making the finding of less relevance ( $p = 0.010$ , Cramer's  $V = 0.047$ , d.f. = 1). Similarly we identified a small rise in the number of seafarers who stated that they had access to a day room in 2016 (33% in 2016 compared with 28% in 2011). Once again this was statistically significant but our test for effect size demonstrated 'no effect' ( $p = 0.007$ , Cramer's  $V = 0.049$ , d.f. = 1).

As with cabin size it was Filipino seafarers who most often stated that they had sufficient storage space. They were followed in descending order by UK seafarers, Indian seafarers and Chinese seafarers. More Chinese and Indian seafarers reported adequate storage space within cabins in 2016 than in 2011. In 2011 47% of Chinese seafarers reported adequate storage space and this had risen to 57% in 2016. This change was statistically significant and demonstrated a small effect ( $p = 0.001$ , Cramer's  $V = 0.109$ , d.f. = 1). Amongst Indian seafarers there was a marginally greater increase in reports of adequate storage space with 48% reporting adequate storage space in 2011 and 60% reporting adequate storage space in 2016. This change was statistically significant and showed a small effect ( $p = 0.024$ , Cramer's  $V = 0.113$ , d.f. = 1).

In relation to rank junior officers were the most likely to report inadequate storage space in both phases of the study. However the proportion of junior officers reporting inadequate storage space fell significantly in 2016. In 2011 39% of junior officers reported inadequate storage space within their cabins compared to 33% in 2011. Whilst relatively modest and showing no effect this change was statistically significant ( $p = 0.011$ , Cramer's  $V = 0.066$ , d.f. = 1).

The size of vessels had a strongly significant impact on levels of satisfaction with storage space. The larger the vessel the more likely it was that seafarers would rate storage space as satisfactory or better. In 2016, 79% of seafarers working on the largest vessels rated storage space as satisfactory followed by 72% of seafarers working on medium size vessels and 58% of seafarers working on smaller vessels ( $p = 0.000$ , Cramer's  $V = 0.188$ , d.f. = 2). There was a statistically significant improvement in the levels of satisfaction seafarers expressed in relation to storage on the largest vessels in the sample in the period 2011 to 2016 ( $p = 0.004$ , Cramer's  $V = 0.095$ , d.f. = 1). However in the other tonnage bands satisfaction levels did not significantly change.

It was encouraging to note that in the newest category of vessel (less than five years old) satisfaction with storage space increased in the period 2011 to 2016 from 68% to 74% respectively ( $p = 0.049$ , Cramer's  $V = 0.067$ , d.f. = 1). There were no other statistically significant changes in satisfaction with storage space in relation to vessel age across the two phases of the research.

As we found with satisfaction with cabin size there was a strong effect of country of build in relation to satisfaction levels vis a vis storage space. Vessels built in South Korea were associated with the highest levels of satisfaction with storage space (75% in 2011) followed by vessels built in 'other' countries, in China and finally in Japan (59% in 2011). In the period 2011 to 2016 this pattern remained unchanged and there were no significant differences found in the period for vessels built in South Korea, Japan or 'other countries'. However there was a significant increase in the levels of satisfaction expressed by seafarers working on vessels built in China. In 2011, 61% of seafarers working on Chinese built vessels were satisfied with their storage space provision. This increased to 69% in 2016 ( $p = 0.015$ , Cramer's  $V = 0.088$ , d.f. = 1).

### Temperature, light, noise and vibration

In terms of temperature the questionnaire indicated that slightly more seafarers were able to control temperature within their cabins in 2016 (64% compared with 59% in 2011). This result was statistically significant but our tests for 'effect size' showed 'no effect' ( $p = 0.005$ , Cramer's  $V = 0.051$ , d.f. = 1).

In both phases of the research Filipino seafarers were the most likely to report being able to control temperature levels within their cabin. In 2011 they were followed in descending order by Indian, UK and Chinese seafarers. This order changed slightly in 2016 when they were followed in descending order by UK, Indian and Chinese seafarers. In 2016 significantly more UK and Chinese seafarers reported being able to control the temperature in their cabins. In 2011 43% of Chinese seafarers reported being able to control temperature in their cabins compared to 51% in 2016 ( $p = 0.015$ , Cramer's  $V = 0.078$ , d.f. = 1). There was a similarly small increase in the proportion of UK seafarers reporting an ability to control the temperatures in their cabins with 52% stating that they could do this in 2011 and 62% reporting that they could do it in 2016 ( $p = 0.048$ , Cramer's  $V = 0.104$ , d.f. = 1).

The type of ship upon which seafarers worked had made a significant difference to how likely it was that they would be able to adjust temperatures in cabins in 2011. However, in 2016 no significant difference was identified in relation to the ability to adjust cabin temperatures vis a vis different types of ship. In that period the likelihood of being able to adjust cabin temperature increased significantly on both bulk carriers ( $p = 0.015$ , Cramer's  $V = 0.083$ , d.f. = 1) and general cargo vessels ( $p = 0.015$ , Cramer's  $V = 0.093$ , d.f. = 1). This improvement brought them more into line with the results for other categories of vessel.

By contrast vessel size did not impact significantly on the ability to adjust cabin temperature in 2011 but by 2016 it had come to have a significant effect ( $p = 0.000$ , Cramer's  $V = 0.154$ , d.f. = 2). In both 2011 and 2016, vessels in the largest category were most likely to have cabins where temperature could be adjusted followed by medium size vessels and finally the smallest vessels in the sample. In the period 2011 to 2016 the opportunities for adjusting cabin temperature had significantly increased on the biggest ships. Thus in 2011 63% of respondents working on the largest vessels stated that they could adjust cabin temperature compared with 72% in 2016 ( $p = 0.002$ , Cramer's  $V = 0.101$ , d.f. = 1). This change was not repeated vis a vis medium or small vessels in the sample.

Overall, we found that vessel age did impact on the likelihood that seafarers could adjust cabin temperatures. Generally speaking the older a vessel was the less likely it was to have the facility for seafarers to adjust cabin temperature. As such in 2011 64% of seafarers working on the newest ships could adjust cabin temperature compared with just 48% of respondents working on the oldest ships ( $p = 0.000$ , Cramer's  $V = 0.113$ , d.f. = 3). This result did not significantly change in 2016.

A slightly stronger improvement was found in relation to control over electric light levels in cabins (see Ellis 2012 for a discussion of why control over light and temperature are important). In 2016, 57% of seafarers stated that they were able to adjust the electric light levels in their cabins compared with 48% in 2011. This was a statistically significant change and tests for effect size indicated a 'minor effect' ( $p = 0.000$ , Cramer's  $V = 0.087$ , d.f. = 1).

More Indian, Filipino and UK seafarers reported the ability to adjust light levels in their cabins in 2016 compared with 2011. These increases were statistically significant although all showed small effect. (Indian  $p = 0.023$ , Cramer's  $V = 0.112$ , d.f. = 1, Filipino  $p = 0.000$ , Cramer's  $V = 0.147$ , d.f. = 1, UK  $p = 0.021$ , Cramer's  $V = 0.121$ , d.f. = 1). Between 2011 and 2016 there was no significant change in the proportions of Chinese seafarers reporting an ability to adjust light levels in their cabin.

A significant increase in the number of seafarers able to adjust light levels in their cabins was reported across all ranks. A small and small/medium effect was identified for senior officers and ratings respectively (senior officers  $p = 0.003$ , Cramer's  $V = 0.133$ , d.f. =1, ratings  $p = 0.000$ , Cramer's  $V = 0.187$ , d.f. =1). However Cramer's  $V$  indicated no effect in the increase identified amongst junior officers ( $p = 0.005$ , Cramer's  $V = 0.071$ , d.f. = 1).

In 2011, there were no significant differences identified between ships of different types in relation to the ability to adjust light levels within cabins. However by 2016 the ability to adjust light within cabins had significantly improved in three vessel types (tankers, bulk carriers and general cargo vessels) producing a significant variation across ships types. In 2016 seafarers working on general cargo vessels were most likely to report being able to adjust light levels in cabins (61%), followed by those on tankers (60%), bulk carriers (55%), 'other' (53%), and passenger/general cargo (44%). These differences were statistically significant ( $p = 0.022$ , Cramer's  $V = 0.092$ , d.f. = 4).

Vessel size did not impact on the likelihood that seafarers could adjust light levels within cabins in either 2011 or 2016. However, we did note that on the largest vessels in the sample there was a significant increase (from 47% to 61%) in the numbers of seafarers reporting an ability to adjust light levels within cabins. This increase was statistically significant ( $p = 0.000$ , Cramer's  $V = 0.141$ , d.f. = 1). In 2016 seafarers serving on the oldest vessels in the sample were the least likely to be able to adjust light levels and in the newest vessel category (less than five years old) we found a significant improvement in the period 2011 to 2016 with regard to the ability to adjust light levels in cabins. On the newest ships in 2011 44% of seafarers had been able to adjust light levels in cabins compared with 59% in 2016 ( $p = 0.000$ , Cramer's  $V = 0.151$ , d.f. = 1).

Seafarers who were sailing on vessels built in China were the least likely to report that they could adjust levels of light within their cabins with just over half of respondents on Chinese built vessels reporting that they could do so (51%). Seafarers working on South Korean built ships were the most likely to report being able to adjust light levels within cabins in 2016 with 63% reporting being able to do so. In the period 2011 to 2016 there was a significant increase in the numbers of seafarers reporting being able to adjust light levels in cabins in South Korean-built ( $p = 0.001$ , Cramer's  $V = 0.164$ , d.f. = 1) and Japanese-built vessels ( $p = 0.000$ , Cramer's  $V = 0.158$ , d.f. = 1).

Despite this improvement however there was no significant change identified in terms of the satisfaction levels with the quality of lighting. In both phases of data collection, similar proportions of seafarers found the levels of light in their cabin 'just right', 'too bright' and 'too dim/dark'. This would seem to indicate that notwithstanding some control over the levels of light in cabins many seafarers remain unable to obtain the lighting which they desire. There were some significant changes identified by nationality however with Filipino seafarers less likely to report that the level of light in their cabins was just right in 2016 ( $p = 0.000$ , Cramer's  $V = 0.123$ , d.f. = 2) and Chinese seafarers more likely to report that light levels were 'just right' ( $p = 0.005$ , Cramer's  $V = 0.104$ , d.f. = 2).

In 2011 there were no significant differences in satisfaction levels with the quality of lighting in cabins found between seafarers working on different kinds of ships. In 2016 the pattern changed however and we identified significant differences in levels of satisfaction according to ship type. Seafarers working on general cargo vessels were the most likely to report that light levels were 'just right' (84%), followed by those on tankers (82%), those working on 'other' ships (78%), those on bulk carriers (78%), and those on passenger/general cargo vessels (74%) ( $p = 0.000$ , Cramer's  $V = 0.109$ , d.f. = 8). Seafarers working on tankers were less likely to report that light levels were just right in 2016 compared with 2011 and this was statistically significant ( $p = 0.041$ , Cramer's  $V = 0.093$ , d.f. = 2).

There were no significant effects of vessel size identified in either 2011 or 2016 in relation to satisfaction with light levels in cabins. However on the smallest vessels in our sample we found that satisfaction levels had fallen from 82% to 78% between 2011 and 2016 and that this was statistically significant ( $p = 0.041$ , Cramer's  $V = 0.088$ , d.f. = 2).

In 2011 we were unable to identify any significant differences in the levels of satisfaction experienced by seafarers, working on ships of different ages, in relation to the quality of the light in their cabins. In 2016 however this pattern altered with a clear difference emerging between seafarers working on the very oldest ships in the sample (over 20+) and all the rest. Seafarers working on the newest and middle-aged ships displayed very similar levels of satisfaction with light levels in cabins. Eighty percent of those working on the newest ships (under five years old) said the level of light in cabins was just right compared with 81% of seafarers on ships aged 5-9 years old and 10-19 years old. On the oldest vessels 75% reported that lighting levels were 'just right' and this finding was statistically significant ( $p = 0.017$ , Cramer's  $V = 0.074$ , d.f. = 6).

Whilst ship size, age and type did not have very strong effects over the two phases of the research on seafarers' satisfaction levels with cabin lighting, we found that in both phases of the research country of build had a significant impact. In both 2011 and 2016 satisfaction levels were highest on South Korean-built ships followed by those built in 'other' countries, those built in Japan and finally those built in China. In 2011, 87% of seafarers working on South Korean-built ships described light levels in cabins as 'just right', compared with 85% on vessels built in 'other' countries, 80% on vessels built in Japan and just 74% on vessels built in China ( $p = 0.000$ , Cramer's  $V = 0.116$ , d.f. = 6). There were no statistically significant changes in these results between 2011 and 2016.

In relation to natural light there was a small increase in the proportions of respondents with access to natural light in their cabins in 2016 (90% had access to natural light in 2011 compared with 92% in 2016). This increase was of statistical significance but there was no indication of effect ( $p = 0.020$ , Cramer's  $V = 0.042$ , d.f. = 1) making the change of less relevance.

Access to natural light in their cabin fell for UK seafarers from 91% to 84% ( $p = 0.038$ , Cramer's  $V = 0.109$ , d.f. = 1). However it increased for Filipino and Indian seafarers (Indian  $p = 0.024$ , Cramer's  $V = 0.111$ , d.f. = 1, Filipino  $p = 0.000$ , Cramer's  $V = 0.108$ , d.f. = 1). Interrogation of the data in relation to rank revealed that the increase in the proportions of seafarers with access to natural light in their cabin had occurred amongst ratings. In 2016, 93% of ratings reported access to natural light in their cabins compared with 85% in 2011 ( $p = 0.000$ , Cramer's  $V = 0.130$ , d.f. = 1). There was no significant increase in the proportions of officers reporting access to natural light in their cabins.

In both 2011 and 2016 we identified very significant differences in access to natural light in cabins between seafarers working on different ship types. In both 2011 and 2016 seafarers working on bulk carriers were the most likely to have access to natural light within their cabins (95% in 2011 and 97% in 2016) and those working on passenger/general cargo ships were the least likely to have natural light in cabins. In 2011 only 55% of those working on passenger/general cargo vessels had access to natural light in their cabins and this rose only marginally in 2016 to 58% (2011  $p = 0.000$ , Cramer's  $V = 0.357$ , d.f. = 4, 2016  $p = 0.000$ , Cramer's  $V = 0.378$ , d.f. = 4). In both years the differences found for different ship types were strongly significant with Cramer's  $V$  demonstrating a very large effect and there was no significant change found in the results between 2011 and 2016 (all  $p > .005$ ).

Where vessels were built was found to influence the likelihood of seafarers having access to natural light. Vessels built in South Korea were the most likely to have access to natural light within cabins (95% in 2011 and 98% in 2016) and vessels built in 'other' countries were the least likely to have access to natural light within cabins (84% in 2011 and 85% in 2016). Country of build had a medium effect on access to light according to our analysis using Cramer's V (2011,  $p = 0.000$ , Cramer's V = 0.145, d.f. = 3, 2016,  $p = 0.000$ , Cramer's V = 0.173, d.f. = 3) and there were no significant changes in the period 2011 to 2016.

When we grouped vessels by registration into two groups 'open register' and 'national/second register' using the ITF list denoting 'flags of convenience' we identified some differences in some of the results. Further analysis revealed that these were mostly accounted for by the skewed nature of the sample whereby there was considerable over-representation of large vessels in the 'open register' category and where vessel size was in the influential factor. However in relation to access to light within cabins we found that on the largest vessels in the sample a significant difference remained between open register and national/second register ships. Large open register vessels in our 'high tonnage' category were significantly more likely to have access to natural light within cabins (95%) than high tonnage national/second register vessels (89%) ( $p = 0.027$ , Cramer's V = 0.103, d.f. = 1).

Natural light and a window is important to human health and wellbeing (see Ellis and Sampson 2012) and for one in ten seafarers to lack access to natural light in their cabins is disturbing particularly given that engineers and engine ratings spend most of their working time inside spaces that do not have access to natural light. There was no significant change in the proportions of seafarers who could see out of their cabin 'window' without restriction/blockage in 2016 (77% in both 2011 and 2016) and no improvement in the numbers of seafarers who were able to block out natural light from their cabins (96% could block out light in 2011 and 95% said they could block out natural light in 2016).

The majority of respondents stated that they were disturbed by noise in their cabins some or all of the time with no change in the proportions of respondents stating this in the two phases of the research (60% in both 2011 and in 2016). However once the data were analysed by rank it emerged that there had been a fall in the proportion of senior officers who reported being disturbed by noise in their cabins over this period. In 2011, 66% of senior officers reported being disturbed in their cabins compared with 53% in 2016 ( $p = 0.007$ , Cramer's V = 0.154, d.f. = 3).

Ship type was relatively influential when considering whether or not seafarers were disturbed by noise within their cabins. In 2011 seafarers working on general cargo vessels were the most likely to report being disturbed by noise in their cabins (68% were disturbed always or sometimes) while in 2016 they were the second least likely and only 55% of seafarers reported being disturbed by noise in the cabins of general cargo vessels. In both years seafarers working on tankers were the least likely to report noise disturbance in cabins. These differences were statistically significant in both years (2011,  $p = 0.000$ , Cramer's  $V = 0.108$ , d.f. = 12, 2016,  $p = 0.004$ , Cramer's  $V = 0.084$ , d.f. = 12).

In 2016 (only) vessel size was also found to influence the likelihood of noise disturbance being experienced within cabins. Seafarers working on the largest vessels were the least likely to report noise disturbance in cabins (51%) followed by seafarers working on medium-size vessels (56%). Seafarers working on the smallest ships were the most likely to report being disturbed by noise within their cabins with 72% reporting being disturbed all or some of the time ( $p = 0.000$ , Cramer's  $V = 0.138$ , d.f. = 6). Over the period 2011 to 2016 noise disturbance had significantly increased on the lowest tonnage vessels ( $p = 0.004$ , Cramer's  $V = 0.126$ , d.f. = 3) and had conversely significantly decreased on the largest vessels ( $p = 0.007$ , Cramer's  $V = 0.115$ , d.f. = 3).

Seafarers working on ships built in China were the most likely to report being disturbed by noise in their cabins (2011 = 70%, 2016 = 73%) followed by seafarers working on ships built in Japan (2011 = 62%, 2016 = 57%) and 'other' countries (2011 = 56%, 2016 = 53%). Seafarers working on vessels built in South Korea were the least likely to be disturbed by noise in their cabins with 52% reporting disturbance in 2011 and 51% reporting such disturbance in 2016. These differences were statistically significant with Cramer's  $V$  showing a medium effect in 2011 and a medium/large effect in 2016 (2011  $p = 0.000$ , Cramer's  $V = 0.108$ , d.f. = 9, 2016  $p = 0.000$ , Cramer's  $V = 0.134$ , d.f. = 9). There were no statistically significant differences in the results for 2011 compared with 2016.

In 2016, on medium sized and larger vessels seafarers were more likely to be disturbed by noise on ships flagged with national/second registers than they were on ships flagged with open registers ( $p = 0.000$ , Cramer's  $V = 0.160$ , d.f. = 3).

There was a very slight improvement with regard to the numbers of seafarers who were disturbed by vibration in their cabins (63% in 2011 compared with 59% in 2016). This change was statistically significant but only registered as a 'minor effect' ( $p = 0.000$ , Cramer's  $V = 0.095$ , d.f. = 3). It appeared to have been experienced by Indian seafarers, senior officers and ratings. Sixty-two percent of Indian

seafarers were disturbed by vibration all or some of the time in 2011 and in 2016 this fell to 47% ( $p = 0.019$ , Cramer's  $V = 0.157$ , d.f. = 3). In relation to rank 69% of senior officers were disturbed by vibration in their cabins in 2011 compared to 56% in 2016 ( $p = 0.001$ , Cramer's  $V = 0.186$ , d.f. = 3). There was a similar pattern for ratings. In 2011 53% of ratings were disturbed by vibrations in their cabins compared with 48% in 2016 ( $p = 0.000$ , Cramer's  $V = 0.188$ , d.f. = 3).

Whilst in 2011 we found that ship type influenced the levels of vibration disturbance experienced by seafarers in cabins this difference had disappeared in 2016 when we found no significant differences.

Conversely in 2011 we did not identify tonnage as an influence on the experience of vibration within cabins but this changed in 2016 when we found that vibration disturbance increased significantly on smaller vessels. In 2016, 85% of seafarers working on the largest vessels in the sample were disturbed by vibration in their cabins, this increased to 87% on medium size ships, and 92% on the smallest vessels. These differences were significant ( $p = 0.001$ , Cramer's  $V = 0.095$ , d.f. = 6).

Once again country of build had a significant impact on the likelihood of seafarers being disturbed by vibration in their cabins. In both 2011 and 2016 seafarers working on board Chinese and Japanese-built vessels experienced the most vibration disturbance within their cabins. In 2016 69% of seafarers working on Chinese-built vessels reported vibration disturbance in their cabins followed by 59% of seafarers working on Japanese-built ships, 57% of seafarers working on ships built in 'other' countries and 46% of seafarers working on ships built in South Korea ( $p = 0.000$ , Cramer's  $V = 0.123$ , d.f. = 9). There was a statistically significant improvement in the disturbance from vibration experience within the cabins of seafarers working on board both Japanese and South Korean-built vessels in 2016 compared with 2011 (Japanese-built vessels  $p = 0.001$ , Cramer's  $V = 0.144$ , d.f. = 3, South Korean-built vessels  $p = 0.014$ , Cramer's  $V = 0.156$ , d.f. = 3).

On the largest vessels (only) in the sample, seafarers working on open registered vessels were less likely to report disturbance from vibration in their cabins than seafarers working on national/second register vessels. This difference was statistically significant but Cramer's  $V$  only showed a small effect ( $p = 0.001$ , Cramer's  $V = 0.103$ , d.f. = 3).

When asked if they were able to get adequate rest 13% of seafarers in 2016 stated that they were not able to get adequate rest very often or ever. This is an improvement on the proportion in 2011 which stood at 19%. However while the result is statistically significant further tests for effect size indicated 'no effect' making the finding less relevant ( $p = 0.000$ , Cramer's  $V = 0.077$ , d.f. =1). Disturbingly the data indicated that seafarers who were unable to get adequate rest were more likely to state that this was 'all of the time' in 2016 than in 2011. In 2016, 53% of seafarers who stated that their rest was inadequate stated that this was 'all of the time' compared with 35% in 2011. This change was statistically significant and tests for effect size showed a 'medium effect' ( $p = 0.000$ , Cramer's  $V = 0.203$ , d.f. =2). On a more positive note there was one group of seafarers who reported a considerable improvement in rest. Ratings were significantly more likely to report getting adequate rest all or some of the time. In 2011, 81% of ratings reported getting adequate rest all or some of the time and in 2016 this had risen to 93% ( $p = 0.000$ , Cramer's  $V = 0.190$ , d.f. =3)

### Cabin furnishings and fittings

With regard to the standard of cabin furnishings the findings for phase two of the study indicate increased levels of seafarers satisfaction with more seafarers indicating that their furnishings were very good (15% in 2016 compared with 5% in 2011) and fewer stating that they were 'neither good nor poor'. However the proportions of seafarers rating furnishings as poor or very poor remained relatively stable (18% in 2011 and 16% in 2016). This result was statistically significant and considered to show a 'medium/large effect' ( $p = 0.000$ , Cramer's  $V = 0.197$ , d.f. = 4). It suggests that there has been a welcome improvement in standards of furnishings overall but that a consistent proportion of vessels (just over one sixth of the fleet) operate with poor standards of cabin furnishings such as chairs, beds, and desks. In terms of colour schemes used in cabins on board there were no significant differences identified between groups of respondents who liked their colour schemes overall (a little or a lot) in 2011 and 2016 (47% in 2011 and 51% in 2016)<sup>4</sup>. Similarly the findings in relation to satisfaction with the cleanliness and maintenance of cabin facilities was not found to vary greatly between the two study phases. In 2011, 85% of respondents stated that their cabin facilities and furnishings were clean and in good condition compared with 87% in 2016. While

<sup>4</sup> However there was an increase observed amongst Filipino seafarers with 26% reporting that they liked their colour schemes a lot in 2011 and 37% reporting that they liked it a lot in 2016 ( $p = 0.000$ , Cramer's  $V = 0.221$ , d.f. = 4). There was a similar increase seen in ratings' responses with 59% reporting liking colour schemes a lot or a little in 2011 and 80% reporting liking them a lot or a little in 2016 ( $p = 0.000$ , Cramer's  $V = 0.236$ , d.f. = 4).

this difference was statistically significant, further tests for effect size showed 'no effect' ( $p = 0.045$ , Cramer's  $V = 0.036$ , d.f. =1).

There were no significant differences identified in relation to the proportions of seafarers who had a reading light, set of drawers, table/desk, wash basin, bedding, towels, or toilet paper provided in their cabins.

In 2016 there were slightly more seafarers reporting provision of a 'comfortable chair' in their cabin (76% in 2011 increasing to 83% in 2016) and more seafarers reporting provision of a wardrobe/cupboard (80% in 2011 and 89% in 2016). Both increases were statistically significant with a very small effect size registering in terms of chairs ( $p = 0.000$ , Cramer's  $V = 0.089$ , d.f. =1) and a 'small' effect size for wardrobes ( $p = 0.000$ , Cramer's  $V = 0.125$ , d.f. =1).

By contrast fewer seafarers in 2016 reported the provision of TVs, radios, and music systems in cabins. In 2011, 30% of respondents reported a TV in their cabin compared with 23% in 2016 ( $p = 0.000$ , Cramer's  $V = 0.081$ , d.f. =1), For radios the figure fell from 17% in 2011 to 13% in 2016 and for music systems there was also a small decrease from 19% to 15%. These results were all statistically significant however further testing revealed that there was 'no effect' rendering them of less relevance. Similarly, if more prosaically, we found a decrease in the provision of soap within cabins. This fell from 94% in 2011 to 90% in 2016. The fall was significant but tests for effect size showed 'no effect' ( $p = 0.000$ , Cramer's  $V = 0.064$ , d.f. =1). This finding varied with nationality with UK and Filipino seafarers reporting less soap provision within cabins. In 2011, 96% of Filipino seafarers reported the provision of soap in their cabins and this fell to 92% in 2016. Amongst UK seafarers the decline in soap provision was more marked. In 2011, 88% of UK seafarers reported soap as provided in cabins but this fell to 80% in 2016 (Filipino  $p = 0.008$ , Cramer's  $V = 0.079$ , d.f. = 1, UK  $p = 0.028$ , Cramer's  $V = 0.115$ , d.f. = 1).

Internet access provided within cabins has significantly increased in the period 2011-16. In 2011, 15% of respondents reported internet access within their own cabin and by 2016 this had risen to 27%. Whilst significant this increase was revealed by tests for effect size to be a 'minor effect' which is disappointing given the central importance of communication to seafarers ( $p = 0.000$ , Cramer's  $V = 0.148$ , d.f. =1). Seafarers from different parts of the world had very different experiences of internet provision within cabins. Chinese seafarers were least likely to have such access and British seafarers were the most likely to have it. In the period 2011 to 2016 Chinese seafarers who already had the least

access to internet provision within cabins reported no significant increase in access. In contrast all other nationality groups showed significant increases in 'in-cabin' internet provision with an associated small/medium effect demonstrated using Cramer's V (Indians  $p = 0.000$ , Cramer's V = 0.193, d.f. = 1, Filipino  $p = 0.000$ , Cramer's V = 0.191, d.f. = 1, UK  $p = 0.000$ , Cramer's V = 0.234, d.f. = 1).

In 2016, we included new questions in the survey relating to the provision of refrigerators and rubbish bins. Responses to these new questions revealed that 42% of seafarers had a fridge provided in their cabin and 95% had access to a waste bin. We also included two new questions relating to carpeting and curtains within cabins. These revealed that 95% of seafarers had curtains within cabins but that only 46% had carpeted cabin spaces.

## Messroom furnishings and facilities

The majority of seafarers reported access to messrooms in 2011 (97%) and 2016 (96%). There were no significant differences in the proportions who had access to mess rooms in phase one and phase two of the study. However, there was a slight fall in the numbers of seafarers reporting access to separate facilities for officers and for ratings (81% in 2011 falling to 77% in 2016). However whilst this was statistically significant, tests for effect size showed 'no effect' rendering the result of less importance ( $p = 0.009$ , Cramer's V = 0.048 d.f. =1).

There were significant differences in the messroom facilities reported by seafarers working on different kinds of ship. Seafarers working on tankers were the most likely to have separate officer and ratings messrooms in phase one of the study and this position did not change in phase two. However in 2016, the percentages of seafarers reporting separate officer and ratings facilities on tankers, bulk carriers, and general cargo vessels was very similar (84% on tankers and bulk carriers and 82% on general cargo vessels). By contrast far fewer seafarers working on board passenger/general cargo vessels (73%) and on 'other' vessel types (21%) reported access to separate facilities ( $p = 0.000$ , Cramer's V = 0.429, d.f. = 4). In comparing the results for 2011 and 2016 we noted a significant drop in the provision of separate dining facilities on both tankers (from 92% to 84%) and 'other' ship types (from 32% to 21%) (tankers  $p = 0.000$ , Cramer's V = 0.136, d.f. = 1, 'other' ship types  $p = 0.043$ , Cramer's V = 0.123, d.f. = 1).

In both phases of the research size of vessel had the expected impact on whether or not two separate messrooms were provided for officers and ratings. The larger the vessel the more likely it was that it would have separate facilities. Thus low tonnage vessels were the least likely to be reported to have separate messrooms (62% in 2011 and 47% in 2016) with medium sized and the largest vessels being more likely to have separate facilities (medium 90% in 2011 and 88% in 2016, and large 91% in 2011 and 90% in 2016). This difference between the smallest vessels and the rest were statistically significant (2011  $p = 0.000$ , Cramer's  $V = 0.346$ , d.f. = 2, 2016  $p = 0.000$ , Cramer's  $V = 0.459$ , d.f. = 2). The only significant change that occurred in the period 2011 to 2016 was found in the low tonnage band where the likelihood of separate facilities for officers and ratings fell markedly from 62% in 2011 to 47% in 2016 ( $p = 0.000$ , Cramer's  $V = 0.151$ , d.f. = 1).

Country of build also had a significant impact on whether or not vessels were reported to have separate messrooms for officers and for ratings. Ships built in South Korea and Japan were much more likely in both phases of the study to be reported to have separate messrooms for ratings and for officers than ships built in China or 'other' countries (2011  $p = 0.000$ , Cramer's  $V = 0.236$ , d.f. = 3, 2016  $p = 0.000$ , Cramer's  $V = 0.202$ , d.f. = 3). The only significant difference in the results between 2011 and 2016 was found in relation to vessels built in South Korea where fewer seafarers reported separate messroom facilities in 2016 (87%) than had in 2011 (93%) ( $p = 0.044$ , Cramer's  $V = 0.097$ , d.f. = 1).

The vast majority of seafarers reported that messrooms were supplied with chairs and tables for dining (99% 2011 and 2016). Overall, facilities found within messrooms had altered little between 2011 and 2016. In 2016 slightly more seafarers reported fridges within messrooms (89% 2011 and 94% 2016) as well as drinking water (84% 2011 and 89% 2016). However whilst statistically significant neither result demonstrated any 'effect' rendering them of less importance. The provision of radio/CD players within messrooms was reported by seafarers to have fallen in the period 2011-16 (71% had access in 2011 compared with 66% in 2016). This result was statistically significant but further tests demonstrated no 'effect' rendering the result of less interest. By contrast the small increase in the numbers of seafarers with access to hot drinks facilities within messrooms (77% in 2011 and 85% in 2016) was statistically significant and did show a 'minor effect' ( $p = 0.000$ , Cramer's  $V = 0.104$ , d.f. = 1).

In 2016, we included three new questions about messrooms which had not been incorporated in the 2011 questionnaire. These indicated that about two thirds of seafarers have access to comfortable

chairs within messrooms (67%), 88% have access to films and DVDs within messrooms and 94% had access to televisions. Sixty three percent of seafarers indicated that their messroom and lounge facilities were separate with 37% indicating that they were 'combined'.

## Washing and Drying facilities

Most seafarers have access to washing machines on board however this showed a slight decline in 2016. In 2011 98% of respondents stated that they had access to a washing machine compared with 97% in 2016. Whilst this was a statistically significant result, when subjected to further tests for 'effect size' 'no effect' was registered ( $p = 0.019$ , Cramer's  $V = 0.043$ , d.f. = 1).

The numbers of seafarers with access to a drying room or drying machine for laundry remained stable in the period 2011-16 with almost 20% of seafarers lacking access to such facilities. In 2011, 81% of seafarers reported access to a drying room or drying machine and this increased to 83% in 2016 which was not a statistically significant change. Access to ironing facilities are more disappointing but similarly stable. In 2011, 64% of respondents reported access to an iron/ironing board rising to 66% in 2016. This slight increase was not of statistical significance.

Larger vessels are generally more likely to have washing machines on board. In 2016 99% of the highest tonnage vessels in our sample had washing machines compared with 98% on medium sized ships and 95% on the smallest vessels. This difference was relatively small but was statistically significant ( $p = 0.006$ , Cramer's  $V = 0.090$ , d.f. = 2).

In 2016 there was also a significant difference identified in relation to provision of washing machines on newer and older vessels. On the oldest vessels washing machine provision was less likely (93%) than on newer vessels (10-19 = 98%, 5-9 = 99%, less than 5 years old = 98%). This result was statistically significant ( $p = 0.001$ , Cramer's  $V = 0.106$ , d.f. = 3).

Although ship type did not emerge as significant in relation to the provision of washing machines it was a significant factor in relation to the provision of drying rooms/drying machines. In both 2011 and 2016 Tankers were the most likely vessel type to have drying machines or rooms (2011 = 91%, 2016 = 90%) and bulk carriers were the least likely to have drying machines or rooms on board (2011

= 77%, 2016 = 77%). These results were statistically significant (2011,  $p = 0.000$ , Cramer's  $V = 0.156$ , d.f. = 4, 2016  $p = 0.000$ , Cramer's  $V = 0.144$ , d.f. = 4).

In both phases of the research we found that vessel size was a significant factor in relation to the provision of drying machines and/or drying rooms. Larger vessels were more likely to have drying facilities compared with medium sized vessels. The smallest ships were the least likely to have drying machines/rooms. These differences were more marked in 2016 than they had been in 2011 (2011,  $p = 0.000$ , Cramer's  $V = 0.151$ , d.f. = 2, 2016  $p = 0.000$ , Cramer's  $V = 0.273$ , d.f. = 2). This change is a result of an increase from 88% to 95% in reports of drying facilities on the largest vessels in 2016 ( $p = 0.000$ , Cramer's  $V = 0.124$ , d.f. = 1).

The country where a vessel was built was found to be significant in relation to the provision of clothes drying facilities. In both 2011 and 2016 vessels built in South Korea were most likely to have drying machines or rooms (2011 = 93%, 2016 = 98%) followed by ships built in 'other' countries (2011 = 90%, 2016 = 94%), vessels built in Japan (2011 = 80%, 2016 = 79%) and finally Chinese-built vessels (2011 = 66%, 2016 = 68%). These differences were statistically significant (2011  $p = 0.000$ , Cramer's  $V = 0.247$ , d.f. = 3, 2016  $p = 0.000$ , Cramer's  $V = 0.318$ , d.f. = 3). On South Korean-built ships and vessels built in 'other' countries significantly more drying facilities were provided in 2016 than had been in 2011 (South Korean – built  $p = 0.017$ , Cramer's  $V = 0.114$ , d.f. = 1, vessels built in other countries  $p = 0.026$ , Cramer's  $V = 0.084$ , d.f. = 1).

In both 2011 and 2016 ship type was an important influence on whether or not ironing facilities were provided on board. In both years tankers were the most likely to have irons and ironing boards on board (2011 = 81%, 2016 = 78%) and bulk carriers were the least likely (2011 = 55%, 2016 = 57%). These variations were statistically significant but were less influential in 2016 than they had been in 2011 (2011  $p = 0.000$ , Cramer's  $V = 0.247$ , d.f. = 4, 2016  $p = 0.000$ , Cramer's  $V = 0.170$ , d.f. = 4). The only ship type where a significant change occurred in relation to the provision of ironing facilities in the period 2011-2016 was general cargo ships. On general cargo ships provision of ironing facilities increased significantly from 56% in 2011 to 65% in 2016 ( $p = 0.015$ , Cramer's  $V = 0.093$ , d.f. = 1).

Larger ships in the sample were consistently more likely to provide ironing boards and irons to seafarers on board. In 2011, 50% of seafarers on the smallest vessels, 64% of seafarers on medium size vessels and 78% of seafarers on the largest vessels reported access to ironing facilities ( $p = 0.000$ , Cramer's  $V = 0.236$ , d.f. = 2). In 2016 the picture was very similar with 50% of seafarers on the

smallest vessels, 63% of seafarers on medium size vessels and 82% of seafarers on the largest vessels in the sample reporting access to irons and ironing boards ( $p = 0.000$ , Cramer's  $V = 0.274$ , d.f. = 2).

The country where a vessel was built exerted an influence over whether or not irons and ironing boards were provided on board. This slightly surprising finding was highly significant and country of build had a large effect in 2011 which further strengthened in 2016. In both years South Korean-built vessels were the most likely to provide irons/ironing boards (2011 = 85%, 2016 = 88%) followed by vessels built in 'other' countries (2011 = 76%, 2016 = 82%) vessels built in Japan (2011 = 57%, 2016 = 57%) and Chinese-built vessels (2011 = 46%, 2016 = 45%). The only significant change in the figures for 2011 and 2016 appeared in relation to vessels built in 'other' countries where the provision of ironing facilities increased ( $p = 0.050$ , Cramer's  $V = 0.074$ , d.f. = 1).

## Health and safety equipment and preparations

In 2016 we added some questions to our questionnaire relating to the provision of personal protective equipment (PPE) and health-related medications/preparations for seafarers' use whilst on duty.

We found that standard PPE was provided to the majority of respondents by their companies including: new safety shoes (93%); new coveralls (94%); and items such as ear plugs and goggles (91%).

By contrast precautionary medicines and preparations were provided much less frequently with the minority of seafarers reporting the provision of sun block/sun screen 'where appropriate' (25%), malaria tablets 'where appropriate' (53%), mosquito repellent 'where appropriate' (42%).

## Recreational activities

The importance of recreational activity is outlined in our earlier report published in 2012 (see Ellis et al 2012). Facilities which allow seafarers the opportunity for mental restoration are extremely limited on board cargo ships when compared to access for workers ashore. This has consequences for the mental wellbeing of seafarers and deserves far greater attention from ship operators and

from regulators as both an issue of the right to decent working and living conditions and as an issue of safety. Recent work conducted at the Seafarers International Research Centre (Sampson et al 2017) demonstrates an increase in the numbers of seafarers displaying recent onset psychological distress emphasising the need for this issue to be addressed as a matter of urgency.

### Shore leave

The proportion of respondents who stated that they could 'never' go ashore when their vessel was in port increased from 7% in 2011 to 11% in 2016. This increase in the proportions of seafarers never able to enjoy shore-leave was consistent across all nationalities and ranks however changes in access to shore-leave generally were only revealed to be statistically significant amongst Filipinos ( $p = 0.000$ , Cramer's  $V = 0.249$ , d.f. = 4). This is a serious issue that requires attention. More encouragingly, amongst those who were able to get ashore during port calls there was a slight increase in the numbers of seafarers who said that they could get ashore once in every three days or more. 42% of seafarers in 2011 stated that they could only get ashore every three days or less when their vessel was in port compared with 32% in 2016. These changes were statistically significant and further tests for effect size showed that the change is marked with effect size registering as 'medium' ( $p = 0.000$ , Cramer's  $V = 0.122$ , d.f. =4).

### Internet access

There has been a significant improvement in relation to internet access for seafarers on board cargo ships in the period 2011-16. In 2011, 61% of respondents indicated that they did not have any internet access on board at all compared with just under half of respondents in 2016 (49%).

The provision of free and unlimited internet access has risen most from 12% provision in 2011 to 19% in 2016. From the perspective of safeguarding seafarer wellbeing such provision is preferable to provision which imposes time or cost constraints onto seafarers. However there has also been a sharp increase in the number of respondents who stated that they had free internet provision but were subject to restricted access in terms of time allocation (this rose from 7% in 2011 to 12% in 2016) and a smaller increase in the numbers of respondents who could access the internet on board if they could pay for it (this rose from 11% in 2011 to 13% in 2016). These results were statistically significant and the change was confirmed as marked following further tests for effect size which showed a 'medium effect' ( $p = 0.000$ , Cramer's  $V = 0.153$ , d.f. =5).

In 2016 we added some new questions to the questionnaire which explored internet access in further detail. These questions revealed that almost half of the seafarers with internet access on board (46%) were dissatisfied with speed of the connection that was provided. By contrast 35% were satisfied and 19% did not have a view either way. Less than half of respondents (44%) stated that their internet connection supported 'video chat' possibilities and only 61% reported access to audio chat via their internet connection on board. However, 93% stated that the connection supported 'text chat' on board. These results are disappointing as they reveal that even where internet connections are made available to seafarers these are of a limited nature and fall short of shore-based standards where video calls are now commonplace.

There were some differences identified with regard to internet provision and ship type. In 2011 Bulk carriers were the most likely vessel type to have no internet access on board of any kind. Seventy-nine percent of seafarers working on bulk carriers did not have any internet access. This improved in 2016 but in 2016 bulk carriers were still the vessels which were most likely to be reported as having no internet access. Seventy-two percent of seafarers working on bulk carriers in 2016 reported having no access at all to the internet on board. In 2011 general cargo vessels were the second most likely ship type for seafarers to report no internet access on. In 2011 73% of respondents working on general cargo ships said that they did not have any kind of access to the internet. By 2016 access to the internet on general cargo ships had considerably improved and a smaller proportion of seafarers (54%) working on general cargo ships reported having no access to the internet. Despite this improvement general cargo ships were still the second most likely ship-type to be reported as without internet access for seafarers. In relation to the remaining types of ship the rank order was also consistent across the time period 2011-16. Tankers were the third most likely ship type to lack internet access. In 2011 65% of seafarers working on tankers reported no internet access and this percentage fell in 2016 to 42%. Other ship types were reported by 34% of seafarers working on them to have no internet access of any kind in 2011 and this fell to 22% in 2016. Internet coverage was reported to be by far the best in both years by seafarers working on passenger/general cargo ships. In 2011 only 21% of seafarers working on passenger/general cargo vessels reported having no access to the internet on board and this fell to 15% in 2016. These differences were significant (2011  $p = 0.000$ , Cramer's  $V = 0.316$ , d.f. = 8, 2016  $p = 0.000$ , Cramer's  $V = 0.295$ , d.f. = 8). The improvements in internet access that were reported in the period 2011 to 2016 were found to be significant for all ship types except passenger general cargo vessels which did show improved internet access but were starting from a position of the greatest provision.

In 2011 we identified minor differences in internet provision according to vessel age. Older vessels were the least likely to have any kind of internet provision on board and the newest vessels were the most likely to have some kind of internet provision countries ( $p = 0.007$ , Cramer's  $V = 0.082$ , d.f. = 6). However this difference was no longer apparent in 2016 when vessel age had no significant influence on the availability of the internet on board.

In 2011 and 2016 we identified significant differences in internet provision on board according to the countries where vessels were built. In 2011 Japanese-built vessels were the least likely to have any kind of internet provision followed by Chinese-built vessels, South Korean-built vessels and vessels built in other countries ( $p = 0.000$ , Cramer's  $V = 0.197$ , d.f. = 6). In 2016 there were significant improvements in internet provision on board vessels built in all countries except China. This resulted in Chinese-built ships becoming the least likely to have internet provision on board followed by Japanese-built ships, South Korean-built vessels and ships built in 'other' countries ( $p = 0.000$ , Cramer's  $V = 0.254$ , d.f. = 6).

Vessels that were flagged with open registers were significantly less likely to have access to any kind of internet provision on board than vessels flagged with national/second registers. In 2016 55% of seafarers working on board open register flagged vessels reported no internet access of any kind compared with 49% on vessels flagged with national/second registers ( $p = 0.001$ , Cramer's  $V = 0.101$  d.f. = 2).

In 2016 we also asked about the speed of the internet that was provided on board and how satisfied with this seafarers felt. We found that 43% of seafarers working on general cargo vessels were satisfied or very satisfied with the speed of their on board internet. Satisfaction levels then fell away with just 36% of seafarers working on tankers and on bulk carriers suggesting that they were satisfied or very satisfied with the speed of their internet, 32% of seafarers working on 'other' ship types reporting being satisfied/very satisfied and just 22% of seafarers working on board passenger/general cargo vessels which is where internet provision is reported to be highest ( $p = 0.000$ , Cramer's  $V = 0.134$ , d.f. = 16).

Seafarers working on Japanese built vessels reported being most satisfied with the speed of their internet provision (38%) followed by those working on South Korean-built ships (36%), ships built in 'other' countries (34%) and Chinese-built ships (21%). These differences in satisfaction levels were statistically significant ( $p = 0.022$ , Cramer's  $V = 0.124$ , d.f. = 12).

Although fewer seafarers working on open register vessels had access to the internet on board, those who did reported higher satisfaction levels than those working on national/second register ships ( $p = 0.029$ , Cramer's  $V = 0.131$ , d.f. = 4).

## Email access

In relation to email access, there was once again a strong improvement in the figures for 2016 when compared to 2011. In 2016, 39% of seafarers reported free and unlimited email use on board compared with 27% in 2011. The number of respondents with restricted access to emails remained relatively stable and those without any access fell from 41% in 2011 to 31% in 2016. These changes were statistically significant and further tests revealed a 'medium' effect ( $p = 0.000$ , Cramer's  $V = 0.149$ , d.f. = 5). The fall in the proportion of seafarers reporting no access to email on board was highest amongst Indian seafarers where there was shown to be a very large effect ( $p = 0.000$ , Cramer's  $V = 0.266$ , d.f. = 5). Across both phases of the research it was far more common for Chinese seafarers to report no access to email on board than it was for other nationality groups. They were followed by Filipino then Indian and then UK seafarers who were the most likely to report some kind of email access.

Where seafarers were charged for email and internet access on board there was a substantial rise in hourly charges from an average of USD 4.792 in 2011 to USD 19.607 in 2016. Independent t tests confirmed this as a statistically significant rise in cost and further tests for effect size showed a 'medium' effect confirming the importance of the finding ( $p = 0.000$ , Cohen's  $D = 0.45$ ).

The provision of free and unlimited access to email differed with ship type in both 2011 and 2016 (2011  $p = 0.000$ , Cramer's  $V = 0.272$ , d.f. = 8, 2016  $p = 0.000$ , Cramer's  $V = 0.199$ , d.f. = 8). In 2011 on board 'other' types of vessel seafarers were most likely to be provided with free/unlimited email (51%). This compared with 43% of seafarers reporting free/unlimited access on tankers, 24% on general cargo vessels, 20% on passenger/general cargo vessels and by far the worst provision on bulk carriers where only 12% of seafarers had free/unlimited access to email on board. This rank order remained the same in 2016 despite access improving on bulk carriers, general cargo vessels and 'other' ship types.

In both 2011 and 2016 free and unlimited email access was reported by seafarers working on larger vessels more frequently than by seafarers working on smaller vessels (2011  $p = 0.000$ , Cramer's  $V = 0.091$ , d.f. = 4, 2016  $p = 0.000$ , Cramer's  $V = 0.125$ , d.f. = 4). However access had significantly improved in the period 2011-16 across all three tonnage categories ( $p < 0.05$ ).

Free and unlimited access to email also varied strongly with the place where a ship was built in both 2011 and 2016 (2011  $p = 0.000$ , Cramer's  $V = 0.188$ , d.f. = 6, 2016  $p = 0.000$ , Cramer's  $V = 0.224$ , d.f. = 6). In both years access was best on South Korean-built ships followed by vessels built in 'other' countries, Japanese-built ships and finally ships built in China. In the period 2011-16 access to free and unlimited emails improved on vessels built everywhere but China. This is particularly unfortunate given that access was reported to be most restricted on Chinese-built vessels.

### Telephone access

In relation to access to their ship's telephone the proportion of seafarers who reported access in 2011 was very similar to that found in 2016. In 2016 19% of respondents stated that they did not have any access, of any kind, to the ship's telephone whilst the figure for 2011 was 20%. Free unrestricted access remained rare with just three percent of seafarers reporting such access in both 2011 and 2016. Most seafarers reported access at a cost or access with their Captain's permission.

Unlike the charges for internet access the average costs to seafarers (all nationalities/ranks) for access to the ship's telephone had dropped marginally in 2016 compared with 2011. In 2011 the average cost was USD 37.733 and this fell to USD 36.324 per hour. While this change was not statistically significant once adjusted for inflation this would represent a meaningful change. The proportion of seafarers reporting costs of over twenty US dollars per hour declined most dramatically and when the costs were grouped as 20 dollars or less, 21-50 dollars per hour and more than 50 dollars an hour the differences were significant showing a small/medium effect ( $p = 0.000$ , Cramer's  $V = 0.144$ , d.f. = 2).

Access to a ship's telephone varied significantly with vessel size in both 2011 and 2016 (2011  $p = 0.000$ , Cramer's  $V = 0.144$ , d.f. = 4, 2016  $p = 0.000$ , Cramer's  $V = 0.179$ , d.f. = 4). Seafarers working on board larger vessels were more likely to report access to a ship's telephone than those working on smaller vessels in both years. However free access, whilst rare, was more likely to be reported on the

smallest vessels in the sample in both 2011 (5% on the lowest tonnage group of vessels) and 2016 (4% on the smallest vessels).

Seafarers working on board vessels flagged with open registers were more likely to report access to a ship's telephone (87% in 2016) than seafarers working on other ships (78%) ( $p = 0.000$ , Cramer's  $V = 0.118$ , d.f. = 2). However seafarers working on national/second register vessels were slightly more likely to report rare free telephone access.

The vast majority of seafarers reported going on board with their own mobile telephone (97% in both 2011 and 2016). The mean number of days per month that they reported being unable to use their mobile because of the lack of a signal went up in 2016 to 17.51 from a reported 15.23 days in 2011. This was a statistically significant change with further tests for effect size showing a 'small' effect ( $p = 0.000$ , Cohen's  $D = 0.20$ ). Some seafarers reported being unable to use their mobile phone at all whilst on board and the proportion of seafarers reporting this was 20% in 2016 having risen from 17% in 2011.

#### Access to equipment and resources whilst off duty

In the period 2011 to 2016 there appears to have been no significant change in the provision of some equipment and facilities. Specifically similar proportions of seafarers had access to: a computer terminal whilst off duty (53% 2011, 55% 2016); a karaoke machine (52% in 2011, 51% 2016); and games (50% in 2011, 48% in 2016). However, Chinese seafarers reported significantly less access to a computer ( $p = 0.000$ , Cramer's  $V = 0.209$ , d.f. = 1), to a karaoke machine ( $p = 0.003$ , Cramer's  $V = 0.098$ , d.f. = 1), and to games on board ( $p = 0.000$ , Cramer's  $V = 0.141$ , d.f. = 1). Access to computers had increased for Indian ( $p = 0.000$ , Cramer's  $V = 0.219$ , d.f. = 1) and Filipino seafarers ( $p = 0.000$ , Cramer's  $V = 0.108$ , d.f. = 1). Access to a karaoke machine had increased for Indian seafarers ( $p = 0.002$ , Cramer's  $V = 0.155$ , d.f. = 1) as had access to games ( $p = 0.026$ , Cramer's  $V = 0.113$ , d.f. = 1). Thus the picture was a little more nuanced than the overall figures demonstrated with Chinese seafarers reporting less access to these resources across the board and Indian seafarers reporting improved access.

Less positively, access of some resources and equipment seemed to have fallen in the period. Fewer seafarers in 2016 reported access to: music systems off duty (65 % in 2011 and 60% in 2016,  $p = 0.019$ , Cramer's  $V = 0.043$ , d.f. = 1); a library of DVDs (78% in 2011, 72% in 2016,  $p = 0.000$ , Cramer's

V= 0.071, d.f. = 1); library of books (71% in 2011, 61% in 2016,  $p = 0.000$ , Cramer's V= 0.109, d.f. = 1)<sup>5</sup>. Chinese seafarers reported less access to all three of these resources (music systems  $p = 0.000$ , Cramer's V = 0.126, d.f. = 1, DVD library  $p = 0.000$ , Cramer's V = 0.190, d.f. = 1, book library  $p = 0.000$ , Cramer's V= 0.170, d.f. = 1) and all nationalities reported a fall in the provision of books which was statistically significant for Chinese seafarers as previously reported and also for Filipinos and British seafarers (Filipinos  $p = 0.000$ , Cramer's V = 0.191, d.f. = 1, UK  $p = 0.050$ , Cramer's V= 0.103, d.f. = 1).

In 2016 we added some questions to the questionnaire relating to the provision of a gym, swimming pool, sauna, and basketball court. Just under two thirds of respondents reported that they had access to a gym (65%). However the remaining facilities were provided in the minority of cases. Saunas were provided to just 16% of seafarers, swimming pools were provided to 22% of seafarers and basketball courts were available to 27% of seafarers.

The proportions of seafarers reporting that there was a budget for social/recreational activities on board their vessel remained remarkably stable in the period with almost two thirds of seafarers reporting such provision (65% in 2011 and 64% in 2016). This leaves just over a third of seafarers working on vessels without a budget for social activities, gym equipment and so forth.

We found statistically significant differences in whether or not there was a welfare budget on board according to ship type in both 2011 ( $p = 0.000$ , Cramer's V = 0.154, d.f. = 8) and 2016 ( $p = 0.000$ , Cramer's V = 0.0103, d.f. = 8). In both 2011 and 2016 seafarers working on board tankers were most likely to report that their vessels had a welfare budget (2011 = 81% and 2016 = 71%). Vessels in the 'other' ship type category were least likely to be reported by seafarers as having a welfare budget (2011 = 50% and 2016 = 53%). The only statistically significant change with regard to vessel type and welfare budget provision in the period 2011 to 2016 was found for tankers where provision dropped ( $p = 0.005$ , Cramer's V = 0.121, d.f. = 2).

### Desirable facilities that are not currently provided

Seafarers were asked whether there were any facilities which they would have liked on board which they didn't have access to. In many cases there was little change in relation to the responses in the

<sup>5</sup> NB neither the overall change to DVD library provision nor the overall music system reduction register a statistical 'effect' however the fall in the provision of books registers as a minor effect. The nationality and differences are only reported when statistically significant and showing an 'effect'

two phases of the study. The majority said that they would like Wi-Fi (66% 2011 and 65% 2016) and a significant minority stated that they would like to have access to gym facilities (17% in 2011, 22% in 2016 – NB this change is not of statistical significance). Relatively few seafarers (1.5% 2011, 0.5% 2016) stated that they wanted access to email per se (internet access having been mentioned by many); a small number wanted access to a music system (2% in 2011, 1% in 2016); a few desired access to a karaoke machine (1% in 2011, 2% in 2016); some stated they would like satellite TV ( 5% in 2011, 4% in 2016); some wanted a DVD (2% in both phases) or book (2% in both phases) library; games were a popular choice for some (7% in 2011 and 5% in 2016); better cabin facilities were stated as a desired improvement by 1% of the sample in both phases; 2% of seafarers wanted access to a fridge in both phases; and some wanted access to a sauna (1% in 2011 and 2% in 2016).

However, in relation to some facilities there had been some statistically significant changes in the period 2011-2016. Swimming pools were stated as a facility that was desired but not provided on board by 9% of respondents in 2016 which was a significant increase on the results for 2011 when only 2% of seafarers stated this ( $p = 0.000$ , Cramer's  $V = 0.152$ , d.f. = 1). Conversely respondents in 2016 were less interested in having a computer terminal than respondents in 2011 (2.7 wanted a computer terminal in 2011 and no respondents stated this in 2016 ( $p = 0.000$ , Cramer's  $V = 0.118$ , d.f. = 1). There was also a reduction in the numbers of seafarers who stated that they wanted access to a telephone (7% in 2011 falling to 3% in 2016  $p = 0.001$ , Cramer's  $V = 0.098$ , d.f. = 1).

There were some variations across the two phases for particular resources in some nationality groupings. Indian seafarers were significantly more likely to express a desire for internet access in 2016 than they were in 2011. In 2016 78% of Indian respondents said that they would like the internet on board compared with 64% in 2011 ( $p = 0.040$ , Cramer's  $V = 0.149$ , d.f. = 1). In 2016 Chinese seafarers were significantly more likely to express a desire for a gym on board than in 2011. In 2011, 21% of Chinese respondents said they would like a gym on board compared with 30% in 2016 ( $p = 0.025$ , Cramer's  $V = 0.104$ , d.f. = 1).

## Food

Overall the results for 2016 were encouraging with some improvements reported in relation to the provision of food. There was no significant change in the number of ships which were reported to carry a dedicated cook (98% in 2011 and 97% in 2016) which in itself is relatively positive. However,

there were also improvements reported in the quantity and quality of food provided. In relation to quantity the change noted was statistically significant but further tests demonstrated no 'effect'. In 2011 79% of respondents stated that they had sufficient food on board compared with 82% in 2016 ( $p = 0.015$ , Cramer's  $V = 0.045$ , d.f. = 1). Disturbingly this leaves almost one in five seafarers reporting insufficient food on board. More encouragingly there was a marked improvement in the quality of food reported by seafarers. In 2011, just under half of the seafarers responding to the question (43%) reported that the quality of their food on board was either 'good' or 'very good'. In 2016 this figure rose to over a half of respondents (56%) and this result was both statistically significant and indicative of a 'medium' effect ( $p = 0.000$ , Cramer's  $V = 0.170$ , d.f. = 4).

Other improvements noted in the research included greater provision for particular dietary needs. In 2011, 48% of respondents stated that these were not catered for on board and this fell to 38% in 2016 ( $p = 0.000$ , Cramer's  $V = 0.107$ , d.f. = 2).

Areas where change was not marked included the provision of healthy food on board (just under a third of respondents felt that the food on board was not healthy in both 2011 and 2016) and the provision of free soft drinks where there were variations in the response patterns of seafarers but no indication of changes in overall practice (i.e. similar proportions of seafarers received free soft drinks some of the time and hardly any of the time with the vast majority reporting occasional or no access).

## Advantages and disadvantages of working on board

In 2011 and 2016 there was little change<sup>6</sup> recorded in the proportions of seafarers who expressed concerns about: lack of privacy on board (33% in 2011, 28% in 2016); lack of space on board (45% in 2011, 38% in 2016); bullying and harassment (22% in 2011, 18% in 2016); discrimination (19% in 2011, 14% in 2016); job insecurity (38% in 2011, 36% in 2016); work-related stress (72% in 2011, 67% in 2016); a lack of shipboard recreational facilities (61% in 2011, 54% in 2016); and lack of career progression (43% in 2011, 35% in 2016). Whilst in all these areas marginally fewer seafarers reported concerns none of these changes were deemed significant once Chi squared and Cramer's  $V$  results were taken into account.

<sup>6</sup> NB meaningful change is judged to have occurred where results are statistically significant and further tests demonstrate at least a minor effect.

In 2016 there was a small but meaningful improvement in the proportions of respondents who were concerned about lack of training opportunities with 42% expressing a concern about them in 2011 and 33% saying they were concerned in 2016 ( $p = 0.000$ , Cramer's  $V = 0.093$ , d.f. = 1). Concerns about lack of training opportunities fell across all nationalities except for UK seafarers amongst who there was no significant change in the recorded response (Chinese  $p = 0.000$ , Cramer's  $V = 0.115$ , d.f. = 1, Indian  $p = 0.024$ , Cramer's  $V = 0.114$ , d.f. = 1, Filipino  $p = 0.000$ , Cramer's  $V = 0.105$ , d.f. = 1).

Overall, this indicates remarkable stability over the five year period covered by the research with regard to seafarers' concerns. Whilst it is encouraging that things do not appear to have worsened the levels of concern are generally high most notably with regard to work-related stress and lack of shipboard recreational facilities.

When it came to assessing the questionnaire results in terms of respondents' perceptions of the benefits of seafaring as a career choice we found far more differences between the results for 2011 and 2016. Generally speaking these changes represented a degree of polarisation with fewer respondents suggesting that the benefits associated with the choice of seafaring as a career were 'average' and more suggesting that they were both better and worse than average. In 2011, 18% of respondents stated that the salary on board was poor/very poor compared to 21% in 2016 whilst the proportion who considered that it was better than average 'good/very good' also rose from 28% in 2011 to 36% in 2016. This change was statistically significant and registered with a 'small' effect size ( $p = 0.000$ , Cramer's  $V = 0.117$ , d.f. = 2).

Amongst Chinese seafarers there was a significant change relating to satisfaction and salary with fewer Chinese seafarers reporting that salary was good/very good, or average, in 2016 than 2011, and more stating that it was poor or very poor ( $p = 0.000$ , Cramer's  $V = 0.169$ , d.f. = 2). In contrast Filipino seafarers were more satisfied with salaries in 2016 than 2011. In 2016 more Filipino seafarers described salaries as good/very good or poor/very poor and fewer Filipino seafarers described salaries as 'average' ( $p = 0.000$ , Cramer's  $V = 0.190$ , d.f. = 2). Junior officers had become less satisfied with salaries and more reported seeing salaries as poor/very poor in 2016 with fewer rating them as average or good/very good ( $p = 0.000$ , Cramer's  $V = 0.115$ , d.f. = 2). In contrast both senior officers and ratings rated salaries more positively in 2016 than in 2011 with more describing them as good/very good (Senior officers  $p = 0.000$ , Cramer's  $V = 0.244$ , d.f. = 2, Ratings  $p = 0.000$ , Cramer's  $V = 0.187$ , d.f. = 2).

More generally terms and conditions were rated by more seafarers in 2016 to be good/very good than in 2011 (26% in 2011, 36% in 2016) with fewer suggesting they were poor/very poor (25% in 2011, 21% in 2016). This change was statistically significant and registered with a 'small' effect size ( $p = 0.000$ , Cramer's  $V = 0.107$ , d.f. = 2). Filipino seafarers were more likely to rate terms and conditions as good/very good in 2016 than in 2011. In 2016, 57% of Filipinos ranked terms and conditions as good/very good compared with just 37% in 2011 ( $p = 0.000$ , Cramer's  $V = 0.206$ , d.f. = 2). Senior officers and ratings were also more positive about terms and conditions in 2016 than in 2011 (senior officers  $p = 0.000$ , Cramer's  $V = 0.265$ , d.f. = 2, ratings  $p = 0.000$ , Cramer's  $V = 0.255$ , d.f. = 2). However there was no significant change amongst junior officers.

In relation to access to the shipboard and shore-side facilities that do exist seafarers in 2016 were more positive, broadly speaking, than seafarers in 2011. This shift was largely a result of fewer respondents answering that the situation was 'average' and more stating that they had good/very good access.

In terms of access to shipboard facilities this positive shift was particularly true of Filipino seafarers more of whom ranked access as good/very good in 2016 than in 2011 (Filipino  $p = 0.000$ , Cramer's  $V = 0.242$ , d.f. = 2). Amongst British seafarers there was also a shift towards a more positive view with fewer UK respondents ranking access to shipboard facilities as poor/very poor and more ranking them as 'average' ( $p = 0.026$ , Cramer's  $V = 0.142$ , d.f. = 2). Senior officers and ratings were also more likely to rank access to shipboard facilities as good or very good in 2016 compared with 2011 (senior officers  $p = 0.000$ , Cramer's  $V = 0.224$ , d.f. = 2, ratings  $p = 0.000$ , Cramer's  $V = 0.215$ , d.f. = 2).

Overall, there was not a considerable decrease in the proportions rating access to shipboard facilities as poor/very poor. The percentage of seafarers rating this as poor/very poor stood at 16% in 2011 and 14% in 2016. However the proportion of respondents rating access as good/very good rose from 34% in 2011 to 44% in 2016 This change was statistically significant and registered with a 'small' effect size ( $p = 0.000$ , Cramer's  $V = 0.110$ , d.f. = 2).

In relation to access to existing facilities ashore seafarers were also more positive in 2016 than 2011 and once again this was largely a shift from those suggesting access was 'average' to those suggesting it was good/very good. In 2011, 31% of respondents reported that access to shore facilities was poor/very poor and this remained unchanged in 2016. However, more seafarers (32%)

rated access good in 2016 than had done so in 2011 (23%). This change was statistically significant and registered with a 'small' effect size ( $p = 0.000$ , Cramer's  $V = 0.104$ , d.f. = 2). Higher proportions of Indian and Filipino seafarers rated access to shore-side facilities as good/very good in 2016 than 2011 (Indian seafarers  $p = 0.043$ , Cramer's  $V = 0.126$ , d.f. = 2, Filipinos  $p = 0.000$ , Cramer's  $V = 0.234$ , d.f. = 2) and the same was true of both senior officers and ratings (senior officers  $p = 0.000$ , Cramer's  $V = 0.195$ , d.f. = 2, ratings  $p = 0.000$ , Cramer's  $V = 0.223$ , d.f. = 2).

Lifestyle and work satisfaction as benefits of the career of seafaring were also identified more strongly by respondents in 2016 than 2011. Once again the proportions of seafarers rating these as poor/very poor remained relatively similar but a bigger change was registered in relation to those reporting the benefits as 'average' and those suggesting they were 'good/very good'. In 2011, 26% of seafarers stated that the lifestyle associated with seafaring was poor/very poor compared with 22% in 2016. However the proportion of seafarers rating it good/very good rose from 24% in 2011 to 33% in 2016. This change was statistically significant and registered with a 'small' effect size ( $p = 0.000$ , Cramer's  $V = 0.098$ , d.f. = 2). This change was driven by the responses of Filipino seafarers with 51% rating lifestyle as good/very good in 2016 compared to 29% in 2011 ( $p = 0.000$ , Cramer's  $V = 0.222$ , d.f. = 2). Senior officers and ratings showed a similar shift with 15% of senior officers in 2011 ranking lifestyle as good/very good and 35% in 2016. Amongst ratings the proportion suggesting that the lifestyle was good/very good rose from 26% in 2011 to 49% in 2016 (senior officers  $p = 0.000$ , Cramer's  $V = 0.219$ , d.f. = 2, ratings  $p = 0.000$ , Cramer's  $V = 0.254$ , d.f. = 2).

In terms of work satisfaction the overall picture was similar with 16% of seafarers rating this as poor/very poor in 2011 and 14% rating it as poor/very poor in 2016. A larger change was registered in relation to those rating work satisfaction as good/very good however with 31% rating it as such in 2011 and 42% rating it positively in 2016. This change was statistically significant and registered with a 'small' effect size ( $p = 0.000$ , Cramer's  $V = 0.117$ , d.f. = 2). It was pronounced amongst Filipino seafarers with 33% ranking work satisfaction as good/very good in 2011 and 61% ranking it as good/very good in 2016 ( $p = 0.000$ , Cramer's  $V = 0.283$ , d.f. = 2). It was also more obvious amongst senior officers and ratings with junior officers showing no change in opinion. In 2011 24% of senior officers rated work satisfaction as good/very good rising to 44% in 2016 ( $p = 0.000$ , Cramer's  $V = 0.202$ , d.f. = 2). Amongst ratings there was an even greater change. In 2011, 33% of ratings ranked work satisfaction as good/very good and this rose to 58% in 2016 ( $p = 0.000$ , Cramer's  $V = 0.253$ , d.f. = 2).

This pattern also applied to the responses to questions about camaraderie and the opportunities as a seafarer to visit interesting places. In 2011, 16% of seafarers stated that camaraderie was poor/very poor and this remained relatively stable in 2016 at 14%. However the proportion of seafarers rating camaraderie as good/very good rose from 35% in 2011 to 49% in 2016. This change was statistically significant and registered with a 'small/medium' effect size ( $p = 0.000$ , Cramer's  $V = 0.138$ , d.f. = 2). Further analysis revealed that it was located amongst Filipinos seafarers and ratings. In 2011, 30% of Filipino seafarers ranked camaraderie as good/very good and this rose to 66% in 2016 ( $p = 0.000$ , Cramer's  $V = 0.364$ , d.f. = 2). The rise was similar amongst ratings. In 2011, 33% of ratings considered camaraderie on board to be good/very good compared with 63% in 2016 ( $p = 0.000$ , Cramer's  $V = 0.304$ , d.f. = 2).

In terms of seafaring offering the chance to visit interesting places, 34% stated that opportunities were poor/very poor in 2011 and this rose marginally in 2016 to 36%. However there was a bigger change in relation to positive responses. A greater proportion of seafarers rated the opportunity provided by seafaring to visit interesting places as good/very good in 2016 (37%) than did in 2011 (28%). This change was statistically significant and registered with a 'small' effect size ( $p = 0.000$ , Cramer's  $V = 0.117$ , d.f. = 2). The greater proportion of seafarers suggesting that a benefit of a seafaring career was the opportunity it offered to visit interesting places was accounted for by the responses of Filipino seafarers and of senior officers and ratings. In 2016, 55% of Filipino respondents ranked opportunities to visit interesting places as good/very good compared with 40% in 2011 ( $p = 0.000$ , Cramer's  $V = 0.238$ , d.f. = 2). Most junior officers suggested that the chances of visiting interesting places in conjunction with a seafaring career were poor/very poor or average. In 2016 the percentage of junior officers who rated the chances as poor/very poor increased from 36% in 2011 to 45% ( $p = 0.000$ , Cramer's  $V = 0.105$ , d.f. = 2). This pattern was different amongst senior officers and ratings both of which were more likely to rate opportunities as good/very good in 2016 compared with 2011 (senior officers  $p = 0.002$ , Cramer's  $V = 0.163$ , d.f. = 2, ratings  $p = 0.000$ , Cramer's  $V = 0.215$ , d.f. = 2).

With regard to training opportunities and job opportunities we found a slightly different pattern. Seafarers in 2016 did rate training opportunities as better than in 2011 (24% poor/very poor 2011 compared with 21% in 2016 and 31% good/very good in 2011 compared with 41% in 2016). This change was statistically significant and registered with a 'small' effect size ( $p = 0.000$ , Cramer's  $V = 0.102$ , d.f. = 2). However in terms of job opportunities the results were more polarised in 2016 than had been the case in 2011. More seafarers felt that job opportunities were poor/very poor in 2016

(19%) than had in 2011 (16%) while at the same time there had also been an increase in the proportion of respondents who said they were good/very good (32% in 2011 and 40% in 2014). This change was statistically significant and registered with a 'small' effect size ( $p = 0.000$ , Cramer's  $V = 0.122$ , d.f. = 2). Further interrogation of the data demonstrated that it could be accounted for by a change in the views of Filipino seafarers and of senior officers and ratings. In 2016, 60% of Filipino respondents rated training opportunities as good/very good as a benefit of a seafaring career compared with 37% in 2011 ( $p = 0.000$ , Cramer's  $V = 0.237$ , d.f. = 2). Similarly, in 2016 43% of senior officers rated training opportunities as good/very good compared with 21% in 2011 ( $p = 0.000$ , Cramer's  $V = 0.251$ , d.f. = 2). Ratings showed a similar change with 57% rating training opportunities as a good/very good benefit of a seafaring career compared with 37% in 2011 ( $p = 0.000$ , Cramer's  $V = 0.206$ , d.f. = 2).

Seafarers in 2016 were also more likely to identify seafaring as offering good/very good opportunities to change jobs (33%) than seafarers in 2011 (25%). However, the proportion of seafarers who indicated that seafaring offered poor/very poor opportunities to flexibly change jobs stayed the same at 30% in both 2016 and 2011. This result was statistically significant and registered with a 'small' effect size ( $p = 0.000$ , Cramer's  $V = 0.103$ , d.f. = 2). Counter to this pattern Chinese seafarers were more likely to rate access to jobs as poor/very poor in 2016 than 2011. In 2016 41% stated that job opportunities were poor/very poor compared with 28% in 2011 ( $p = 0.000$ , Cramer's  $V = 0.136$ , d.f. = 2). The picture was completely different in terms of Filipino seafarers who in contrast were much more likely to rank job opportunities as good/very good in 2016 than 2011. In 2016 62% of Filipino seafarers ranked job opportunities as good/very good compared with 40% in 2011 ( $p = 0.000$ , Cramer's  $V = 0.234$ , d.f. = 2).

## Conclusions

In a number of respects the period 2011-16 has seen some welcome improvements for seafarers in relation to working and living conditions. Tours of duty have reduced in length for many seafarers although not for Chinese seafarers, and average hours worked in port and at sea have also fallen. More seafarers report being able to adjust light in their cabins and slightly fewer reported being disturbed by vibration. Overall satisfaction with cabin furnishings and fittings increased in 2016 compared with 2011. Internet access within cabins increased significantly in 2016 as compared with 2011 and free on board internet access also increased alongside email access. The quality of food was reported to have improved significantly in the period 2011-2016.

However, in many respects the living and working conditions of seafarers remain challenging and have not seen necessary improvement in the period 2011-16: seventy-five percent of seafarers remain employed on temporary contracts producing financial instability; approximately half of seafarers reported no pension contributions from employers; cabin sharing is experienced by around one in ten seafarers and is increasingly unwelcome; access to private bathroom facilities has not improved; cabin space and storage space remain inadequate for around one third of seafarers; access to natural light, an unrestricted view, and an ability to adjust temperature remain disappointingly unchanged over the period; and noise disturbance within cabins has not significantly reduced. More of the seafarers who reported inadequate rest were likely to report that this was all of the time in 2016 compared with 2011. Little progress has been made with regard to reducing the institutional nature of living arrangements on board which has a negative impact on the possibilities for mental restoration on board. In 2016, the majority of seafarers did not have carpeted cabins or access to a fridge within cabins, about a third lacked access to comfortable chairs within messrooms, a fifth of seafarers lacked access to a drying room/machine and a third lacked access to ironing facilities. In terms of recreational facilities access to some equipment remained stable (computer/karaoke machine/games) but access to books, DVDs, and music systems fell. Finally whilst there were reported improvements in the quality of food served on board one fifth of seafarers reported insufficient food.

These deficiencies have particular significance for those seafarers who report 'never' being able to enjoy shore leave. This proportion rose significantly in 2016 compared to 2011.

In 2016, we included some questions about health and safety-related provision on board. This revealed that whilst provision of coveralls, safety shoes, ear plugs and goggles is relatively good, the majority of seafarers are not supplied with sun block or mosquito repellent when they need it and only 53% reported being given malaria tablets when required.

Overall, while some very important shipboard improvements have been made in relation to communications and contracts for seafarers in the period 2011-16, there has generally been much less progress in relation to improvements in living conditions and recreational provision on board. This is particularly serious given the concerns about seafarers' mental wellbeing that have been raised by industry bodies such as the UK P&I Club and also in the context of declining opportunities for shore-leave whilst serving time at sea.

## Appendix 1 - Effect Size Tables

### Effect sizes for Cramer's *V*

<b>d.f.</b>	<b>Small</b>	<b>Medium</b>	<b>Large</b>
<b>1</b>	0.10	0.30	0.50
<b>2</b>	0.07	0.21	0.35
<b>3</b>	0.06	0.17	0.29
<b>4</b>	0.05	0.15	0.25
<b>5</b>	0.04	0.13	0.22
<b>6</b>	0.04	0.12	0.20
<b>7</b>	0.04	0.11	0.19
<b>8</b>	0.04	0.11	0.18
<b>9</b>	0.03	0.10	0.17
<b>10</b>	0.03	0.09	0.16
<b>11</b>	0.03	0.09	0.15
<b>12</b>	0.03	0.09	0.14
<b>13</b>	0.03	0.08	0.14
<b>14</b>	0.03	0.08	0.13
<b>15</b>	0.03	0.08	0.13

### Effect sizes for Cohen's *d*

<b>Magnitude of Effect Size</b>	<b>Cohen's <i>d</i></b>
Small	0.2
Medium	0.5
Large	0.8