



Working Environment and Health in the Aviation Industry 2017

A survey among crew members in the Danish aviation industry



Det Nationale Forskningscenter
for Arbejdsmiljø

Working Environment and Health in the Aviation Industry 2017

A SURVEY AMONG CREW MEMBERS IN THE DANISH AVIATION
INDUSTRY

The National Research Centre for the Working
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NRCWE report

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PREFACE

Dear reader

Here is the report entitled “Working Environment and Health in the Aviation Industry 2017 - a survey among crew members in Danish airlines”. The survey is a collaborative project between the National Research Centre for the Working Environment (NRCWE) and the Danish Transport, Construction and Housing Authority, commissioned and financed by the latter. NRCWE has been responsible for the preparation and setup of the questionnaire, data collection, data cleansing as well as analysis and reporting. Throughout the process, the Danish Transport, Construction and Housing Authority has been regularly informed and involved in the process and design of this report.

This report highlights the mental and physical working environment, safety, health behaviour, health, social relations, etc. among crew members in Danish airlines.

Enjoy!

Inger Schaumburg

General Director

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SUMMARY

Background

In collaboration with the Danish Working Environment Council for Aviation, the Danish Transport, Construction and Housing Authority has prepared a number of initiatives with an aim to reduce the working environment challenges that exist within Danish aviation. As part of this, the Danish Transport, Construction and Housing Authority is part of a collaborative project with The National Research Centre for the Working Environment (NRCWE), which aims to provide a more informed basis for which selected health and safety conditions the Danish Transport, Construction and Housing Authority and the Danish Working Environment Council will focus on in the future.

Material and Methods

NRCWE has conducted a comprehensive survey aimed at all crew members in the Danish aviation industry. The questionnaire 'Working Environment and Health in the Aviation Industry' has been prepared on the basis of NRCWE's national and representative study 'Working Environment and Health', and as a result a large part of the results from the aviation industry can be compared with other industries.

In addition, a number of aviation industry-specific questions were formulated by NRCWE in cooperation with the aviation inspector at the Danish Transport, Construction and Housing Authority, Henrik Sandum. A cognitive test of the many questions was conducted prior to the collection of the questionnaire.

A total of 18 airlines chose to participate in the survey, and crew members from these companies received and answered the questionnaires during the period June through August 2017. A total of 2,218 people completed the questionnaire, corresponding to a response rate of about 55 percent.

All results are converted into a value, an index, between 0 and 100, where a higher score corresponds to a greater challenge on the measured question (i.e. poorer working environment). The vast majority of questions are already based on challenges, while the other questions have been reversed in their coding, so that all graphs and numbers can be read on the same scale from 0 to 100. A value of 0 thus means that there is no problem or challenge, while a value of 100 means that the challenge is at a maximum (everyone experiences the problem or challenge at all times). However, this reporting cannot take into account that the questions bear different kinds of significance and consequences for the employees and workplaces concerned. It is therefore important that the reader relates to both the index value and the content of the questions.

Results

The study shows that crew members experience a relatively demanding mental working environment with high demands on flexibility, fast-paced work, difficult deadlines, unexpected tasks, having to be available outside of normal working hours, having a lot of overtime and being worried about losing work or current number of hours/shifts. In addition, the work-life balance is

challenged, the staff experience a lot of quarrels and conflicts with their colleagues, and the occurrence of being witness to bullying of colleagues is also relatively high. The overall goal of the management quality is slightly poorer than average and confidence in both cabin crew manager and chief pilot remains around average. The study also shows that crew members have relatively huge challenges with sleep and fatigue. This is especially true for those who fly long-haul across multiple time zones.

Challenges in the physical working environment are mainly about a relatively high degree of physical work, lack of necessary assistive devices during lifting as well as exposure to high levels of noise, cold, draft, slight turbulence, minor vibrations, strenuous lifting and generally strenuous working postures.

The study also shows that there are challenges regarding meals on board. In addition, crew members experience a prioritization of the working environment that is below average. The incidence of sick leave (between 8 and 30 days in a year) is relatively high compared to Danish employees in general.

Finally, the study shows that the aviation industry has a high degree of security and its prioritization, healthy employees and a relatively high degree of collegial help and support, collaboration and recognition (despite challenges of conflicts among colleagues).

Conclusion

The study shows that the aviation industry has a number of challenges regarding the mental and physical working environment. The challenges are mainly about a relatively demanding physical working environment, requirements for the flexibility of employees, fatigue and sleep, collegial conflicts, prioritization of the working environment, provisions on-board and sick leave. On the other hand, the survey also shows that the aviation industry is characterized by a good safety culture, healthy employees and good cooperation among colleagues. With responses from more than half of the aviation industry's crew members, the results support a nuanced picture of the Danish aviation industry's working environment and health.

1. INTRODUCTION

The Danish Transport, Construction and Housing Authority together with the Danish Working Environment Council for Aviation has published a large number of guides and video clips in order to focus on the challenges of working environments that exist within the Danish aviation industry (The Danish Transport, Construction and Housing Authority, 2017). Based on these experiences, the Danish Transport, Construction and Housing Authority and the Danish Working Environment Council have decided to investigate whether there remains a need for targeted efforts in the working environment area. The authority has entered for this purpose into a collaboration with the National Research Centre for the Working Environment (NRCWE), which is responsible for conducting the study, including data collection, analyses and reporting.

NRCWE has conducted a comprehensive survey, aimed at all crew members in the Danish aviation industry, with an aim of providing possible focus areas for the Danish Transport, Construction and Housing Authority and the Danish Working Environment Council's future working environment efforts.

The design of the study is based on NRCWE's national and representative survey 'Arbejdsmiljø og Helbred [Working Environment and Health]' (AH), which has been carried out among approx. 50,000 Danish employees. The study has been conducted every two years since 2012, and the most recent study was in 2016. In the AH studies, Danish employees are asked about, among other things, physical and mental stress, relationships with colleagues and management, the safety culture, well-being and health. Based on the questions from the AH questionnaire, the 'AH aviation questionnaire' has been prepared with the addition of many aviation industry-specific questions. The aviation industry-specific questions were prepared in collaboration with aviation inspector Henrik Sandum from the Danish Transport, Construction and Housing Authority. The questionnaire was prepared with both a Danish and an English version.

A total of 18 airlines chose to participate in the survey, and crew members from these companies received and answered the questionnaires during the period June through August 2017. A total of 2,218 people completed the questionnaire, corresponding to a response rate of about 55 percent.

2. MATERIAL AND METHOD

Parent Population

All airlines were invited to participate in the survey, of which 18 chose to participate (Air Alsie, Air Greenland, Atlantic Airways, Bel Air, Benair, Dancopter, Danish Air Transport, Execujet, Flexflight, Jet Time, KN Helicopters, Newcopter, Primera, SAS, Star Air, Thomas Cook and Uni-Fly). The study population in this study is thus crew members from these companies.

A total of 2,218 people completed the questionnaire, corresponding to a total response rate of about 55 percent. The collection of the AH-aviation industry questionnaire responses took place between June and August 2017.

Questionnaire Data

The collection of questionnaire responses took place such that each company selected a contact person who had to act as a link between NRCWE and the companies' crew members. NRCWE did not have access to the contact information of the crew members, so NRCWE did not have an opportunity to send the questionnaires directly to the crew members.

Prior to the collection of the questionnaire responses, each contact person received a motivational email summarizing the role of the contact persons and describing the background and purpose of the study. An important premise for the study was that the contact person felt 'well equipped' to handle the task, as the individual contact person was the only link to the study population. On the following day, the contact persons received another email from NRCWE with a direct link to the questionnaire. The contact person was then responsible for forwarding this email to all crew members in their respective company. Similarly, reminders were sent to the contact person who redistributed these to the crew members.

The contacts were regularly informed about the survey in Newsletters, prepared by the Danish Transport, Construction and Housing Authority, in which a total response rate also appeared. In addition, NRCWE had ongoing dialog with the contacts, who were informed of the response rate for their respective companies.

Cognitive Test of Questionnaire

Prior to the collection of questionnaires, NRCWE conducted a cognitive test of both the questionnaire and the study's set up. The purpose of the cognitive test was primarily to test the questionnaire's questions, response categories and help text. In addition, the Danish Transport, Construction and Housing Authority and NRCWE would investigate

the contact person's experience of being the sole link to the study's potential participants, crew members and investigate which components could help increase crew members' motivation to respond to the questionnaire.

The cognitive test was performed using interviews with the contact person and crew members from a small helicopter company. NRCWE visited the company and were provided a room where interviews with individual crew members could take place. Prior to the individual interviews, the contact person had received informational leaflets and an email with a link to the questionnaire. The contact person had arranged to forward the questionnaire to the company's other crew members and continuously motivated the employees to complete the questionnaire.

Based on these interviews, NRCWE made some changes to the questionnaire. In addition, it was made clear that the contact person's involvement in the study was of great importance.

Operationalizing the variables

In the compiling of responses, partial responses were excluded, since the NRCWE did not have the necessary information to determine whether the partial responses came from unique individuals or from individuals who had completed the questionnaire at a later date. The partial responses were therefore excluded in order to reduce the risk of individuals contributing more than one response.

All results are converted to a value between 0 and 100, where the higher the score indicates a more negative degree of the measured variable, i.e. worse. The vast majority of questions are based on challenges, and the other questions are reversed in their coding, so that all graphs and numbers can be read in the same way.

To make the reporting more consistent, an index from 0 to 100 is calculated for all questions 100. For the question on e.g. 'Bullying', which is a yes/no question, the index indicates the percentage share that are bullied. In the reporting, these questions are marked with a percentage sign in brackets (%).

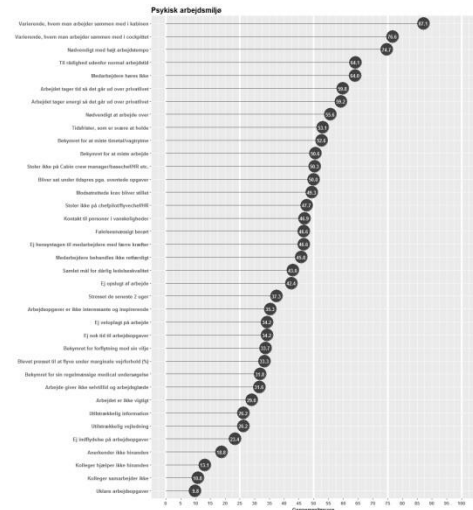
Likewise, questions where one can answer, e.g. on a scale from 0 to 10, are coded so that the scale instead ranges from 0 to 100, where 0 is best, and 100 is worst.

All questions have thus been standardized so that they can be compared across the board. An index of 0 means that there is no problem or challenge, and an index of 100, on the other hand, means that everyone has the problem or challenge. An index of 50 correspondingly covers a mean answer where half is below, and the other half is above the midpoint.

The operationalization of the variables can be summarized in four steps, which are described below.

Steps in operationalizing the variables

1. The original questions each had a number of response categories, minimum of 2 (e.g. yes versus no) and a maximum of 11 (e.g. 0-10, where 0 is bad, and 10 is good). All questions were reversed so that the higher the score, the more negative, i.e. worse.
2. The scale of the variables, e.g. 1 to 5, where 1 is 'Always', 2 is 'Often', 3 is 'Sometimes', 4 is 'Rarely', and 5 is 'Never', was changed to an index from 0 to 100, where 1 = 0 | 2 = 25 | 3 = 50 | 4 = 75 | 5 = 100.
3. An overall average for all participants, between 0 and 100, was calculated.
4. The variables were grouped into types of challenges (chapters) and their respective averages were plotted in a graphic illustration. See figure on the right as an example of an illustration.



Example of graphic illustration of results

Filter questions

The questions are calculated for the entire study population, unless stated otherwise. In cases where the questions have only been directed to a particular sub-population of the participants, it appears with a red asterisk (*). The asterisk thus indicates that the statement is conditional on a positive answer to a filter question (e.g. only pilots, only persons with lift, etc.). An overall overview of the questions can be found in Table 1, Section 2.5.

Overview of question variables

In Table 1, you will find an overview of the questions that are included in the report's figures. The table also shows the original formulation of question and response categories. Finally, a marking (x) is included for the questions that have been reversed, so a higher score indicates a higher degree of challenge, i.e. worse. If the question is not set for the entire study population, since it is conditional on a so-called filter question, it is indicated in the table's leftmost column.

Table 1: Operationalization of question variables

Name of variable	Original question of formulation	Original response categories	The question Is reversed (x)	Conditioned on filter question
Mental working environment				
<i>Work engagement</i>				
Self-confidence and job satisfaction	To what extent does your work give you self-confidence and job satisfaction?	To a very large extent To a large extent To some extent To a small extent To a very small extent		
Interesting and inspiring work assignments	To what extent do you think your work assignments are interesting and inspiring?	To a very large extent To a large extent To some extent To a small extent To a very small extent		
Importance of work besides income	To what extent is your work (besides the income)?	To a very large extent To a large extent To some extent To a small extent To a very small extent		
Positive at work	To what extent do you feel positive when you are at work?	To a very large extent To a large extent To some extent To a small extent To a very small extent		
Engrossed by work assignments	To what extent are you engrossed in your work assignments?	To a very large extent To a large extent To some extent To a small extent To a very small extent		
<i>Emotional demands of the work</i>				
Contact at work with people in difficult situations	How often do you have contact at your work with people in difficult situations (people who are afflicted by e.g. serious illness, accident, grief, crisis or social problems)?	Always Often Sometimes Rarely Never	x	
Emotionally affected by work	How often are you emotionally affected by your work?	Always Often Sometimes Rarely Never	x	
<i>Influence</i>				
Influence on work assignments	How often do you have influence on how you resolve your work assignments on-board?	Always Often Sometimes Rarely Never		
<i>Job insecurity</i>				
Worried about losing one's job	To what extent are you worried that you will be unemployed?	To a very large extent To a large extent To some extent To a small extent To a very small extent	x	

Worried about relocation against one's will	To what extent are you worried that you will be moved to another base against your will?	To a very large extent To a large extent To some extent To a small extent To a very small extent	x
Worried about losing hours/shift	To what extent are you concerned about whether you can retain your current number of hours/shifts?	To a very large extent To a large extent To some extent To a small extent To a very small extent	x
<i>Worried about medical examination</i>			
Worried about regular medical examination	To what extent are you concerned about the regular medical examination?	To a very large extent To a large extent To some extent To a small extent To a very small extent	x
<i>Collegial recognition</i>			
Colleagues' recognition of one another	How often do you and your colleagues recognize each other in the daily work onboard?	Always Often Sometimes Rarely Never	
<i>Quantitative demands</i>			
Enough time for work assignments	How often do you experience having enough time for your work assignments?	Always Often Sometimes Rarely Never	
Work pace	How often is it necessary to maintain a fast pace of work?	Always Often Sometimes Rarely Never	x
Difficult deadlines	How often do you have deadlines that are difficult to keep?	Always Often Sometimes Rarely Never	x
Unexpected assignments that cause time pressure	How often do you get unexpected work assignments that puts you under time pressure?	Always Often Sometimes Rarely Never	x
Available outside of normal working hours	How often are you available outside of normal working time (in the form of being on call/stand by)?	Always Often Sometimes Rarely Never	x
Overtime	How often is it necessary to work	Always Often Sometimes Rarely Never	x
<i>Fairness</i>			
Employees who are affected by decisions, are heard	How often are all employees who are significantly affected by a given decision, heard?	Always Often Sometimes Rarely Never	
Fair treatment of employees	How often are all employees fairly at the workplace?	Always Often Sometimes Rarely Never	
<i>Role ambiguity</i>			
The necessary information	How often do you get the information you need to do your work?	Always Often Sometimes Rarely Never	
The necessary guidance and instructions	How often do you get the guidance and instructions you need to do your work?	Always Often Sometimes Rarely Never	

Clarity of work assignments	How often do you know exactly what your work assignments are?	Always Often Sometimes Rarely Never		
Contradictory requirements at work	How often are contradictory requirements placed on you at your work?	Always Often Sometimes Rarely Never	x	
<i>Facilitation at the workplace</i>				
The workplace's consideration for employees with less strength	How often are employees with less strength at your workplace taken into consideration?	Always Often Sometimes Rarely Never		
<i>Cooperation and collegial support</i>				
Employees' mutual help to achieve the best results	How often do you and your colleagues each other to achieve the best result?	Always Often Sometimes Rarely Never		
Cooperation between employees when problems arise	How often do you and your colleagues co-operate when problems arise that solutions?	Always Often Sometimes Rarely Never		
<i>Variation in colleagues</i>				
Variation in colleagues in the cabin	Is there often variation in who you work with in the cabin?	To a very large extent To a large extent To some extent To a small extent To a very small extent Not relevant	x	The answers 'Not relevant' are not included in the results
Variation in colleagues in the cockpit	Is there often variation in who you work with in the cockpit?	To a very large extent To a large extent To some extent To a small extent To a very small extent Not relevant	x	The answers 'Not relevant' are not included in the results
<i>Conflicts between work and private life</i>				
The work takes energy from your private life	How often do you find that your work takes so much of your energy that it effects your private life?	Always Often Sometimes Rarely Never	x	
The work takes time from your private life	How often do you find that your work takes so much of your time that it affects your private life?	Always Often Sometimes Rarely Never	x	
<i>Management quality</i>				
Overall goal for management quality	Based on the following questions (a-h): How often... a) does your immediate supervisor explain your company's goals, so you understand what they entail for your assignments? b) do you have sufficient authority in relation to the responsibilities you have in your work? c) does your immediate supervisor invest time in your professional development? d) does your immediate supervisor involve you in the preparation of your work? e) does your immediate supervisor give you the necessary feedback (complaints and compliments) on your work? f) is your work recognized and appreciated by management? g) do you get the help and support you need from your immediate superior? h) can you depend on the announcements issued from the management?	Always Often Sometimes Rarely Never Do not have a supervisor		
Confidence in chief pilot/flight manager/HR	How often can you rely on the announcements issued from the management to pilots (in relation to the chief pilot/flight manager/HR)?	Always Often Sometimes Rarely Never Do not have a supervisor		Responses 'Do not have a supervisor' are not included in the results

Confidence in cabin crew manager/base chief pilot/HR etc.	How often can you rely on the announcements issued from the management to cabin crew members (in relation to cabin crew manager base chief pilot/HR etc.)?	Always Often Sometimes Rarely Never Do not have a supervisor	Responses 'Do not have a supervisor' are not included in the results
<i>Flying in marginal weather conditions</i>			
The pressure to fly in marginal weather conditions in the past 12 months*	Have you been pressured to fly in marginal weather conditions in the past 12 months?	Yes, weekly Yes, monthly Yes, rarely No, never	The question was only put to pilots
Violence, threats, bullying and sexual harassment			
<i>Physical violence and threats</i>			
Physical violence - by staff (%)	The question: Have you been subjected to physical violence at your workplace during the last 12 months? + The question: Who subjected you to physical violence?	Colleagues Supervisors Subordinates Passengers Other groups of staff	
Physical violence - by passengers (%)	The question: Have you been subjected to physical violence at your workplace during the last 12 months? + The question: Who subjected you to physical violence?	Colleagues Supervisors Subordinates Passengers Other groups of staff	
Threats of violence - by staff (%)	The question: Have you been subjected to threats of violence at your workplace during the last 12 months? + The question: Who subjected you to threats of violence?	Colleagues Supervisors Subordinates Passengers Other groups of staff	
Threats of violence - by passengers (%)	The question: Have you been subjected to threats of violence at your workplace during the last 12 months? + The question: Who subjected you to threats of violence?	Colleagues Supervisors Subordinates Passengers Other groups of staff	
<i>Sexual harassment</i>			
Sexual harassment - by staff (%)	The question: Have you been subjected to sexual harassment at your workplace during the last 12 months? + The question: Who subjected you to sexual harassment?	Colleagues Supervisors Subordinates Passengers Other groups of staff	
Sexual harassment - by passengers (%)	The question: Have you been subjected to sexual harassment at your workplace during the last 12 months? + The question: Who subjected you to sexual harassment?	Colleagues Supervisors Subordinates Passengers Other groups of staff	
<i>Bullying and quarrels</i>			
Bullying - by staff (%)	The question: Have you been subjected to bullying at your workplace during the last 12 months? + The question: Who subjected you to bullying?	Colleagues Supervisors Subordinates Passengers Other groups of staff	
Bullying - by passengers (%)	The question: Have you been subjected to bullying at your workplace during the last 12 months? + The question: Who subjected you to bullying?	Colleagues Supervisors Subordinates Passengers Other groups of staff	
Witness to bullying - by staff (%)	The question: Have you witnessed someone in your workplace having been subjected to bullying during the last 12 months? + The question: Who bullied?	Colleagues Supervisors Subordinates Passengers Other groups of staff	
Witness to bullying - by staff (%)	The question: Have you witnessed someone in your workplace having been subjected to bullying during the last 12 months? + The question: Who bullied?	Colleagues Supervisors Subordinates Passengers Other groups of staff	
Quarrels or conflicts - with staff (%)	The question: Have you had quarrels or conflicts with anyone in your workplace during the last 12 months? + The question: Who did you have quarrels or conflicts with?	Colleagues Supervisor Subordinates Passengers Other groups of staff	

Quarrels or conflicts - with passengers (%)	The question: Have you had quarrels or conflicts with anyone at your workplace during the last 12 months? + The question: Who did you have quarrels or conflicts with?	Colleagues Supervisors Subordinates Passengers Other groups of staff		
Physical working environment				
<i>Physical demands and physical exertion</i>				
Measurement for physically hard work	How physically hard do you normally experience your current work?	0 1 2 3 4 5 6 7 8 9 10 Mark a number between 0 and 10, where 0 means 'Not hard', and 10 means very hard 'Maximally hard'		
Exertion in the typical lifts	How often do you find typical lifts in your work strenuous?	Always Often Sometimes Rarely Never	x	People that 'Never' lift at their work did not get this question
Use of necessary aids during lifting etc..	How often do you use aids when needed, during lifting or moving of objects or people (luggage, parcels, carrier transport and in connection with SAR operations)?	Always Often Sometimes Rarely Never		People who 'Never' lift at their work did not get this question
Lifting alone when there should be two people lifting	How often do you lift or move things or people on your own, even though you really should use two people to do it?	Almost all the time Approx. 3/4 of the time Approx. 1/2 of the time Approx. 1/4 of the time Rarely Never	x	People who 'Never' lift at their work did not get this question
<i>Noise and noise protection</i>				
High level of noise so one has to shout	How much of your work time are you exposed to noise that is so high that you have to shout to talk to someone standing next to you?	Almost all the time Approx. 3/4 of the time Approx. 1/2 of the time Approx. 1/4 of the time Rarely Never	x	
High level of noise that disturbs	How much of your work time are you exposed to noise that disrupts you in your work (e.g. other people's speech, ventilation, traffic)?	Almost all the time Approx. 3/4 of the time Approx. 1/2 of the time Approx. 1/4 of the time Rarely Never	x	
Have not been offered hearing protection / headset (%)	Are you offered hearing protection/headset?	Yes No Don't know		
Hearing protection/headset - noise protection	To what extent do you get adequate noise protection for your hearing?	To a very large extent To a large extent To some extent To a small extent To a very small extent		The question was only given to people who replied 'yes' to being offered hearing protection/headset
Type of hearing protection	What kind of hearing protection/headset have you been offered? (Preferably several responses)	Earplugs Ear muffs Personalized hearing protection Headset with ANR Headset without ANR Other		The question was only given to people who replied 'Yes' to being offered hearing protection/headset
<i>Powerful vibrations and turbulence</i>				
Powerful vibrations	How much of your working time are you exposed to strong vibrations that hit the whole body (e.g. helicopter)?	Almost all the time Approx. 3/4 of the time Approx. 1/2 of the time Approx. 1/4 of the time Rarely Never	x	
Minor, continuous vibrations	How much of your working time are you exposed to minor, continuous vibrations that hit the body?	Almost all the time Approx. 3/4 of the time Approx. 1/2 of the time Approx. 1/4 of the time Rarely Never	x	
Slight turbulence	How much of your working time are you exposed to slight turbulence?	Almost all the time Approx. 3/4 of the time Approx. 1/2 of the time Approx. 1/4 of the time Rarely Never	x	

Moderate turbulence	How much of your working time are you exposed to moderate turbulence?	Almost all the time Approx. 3/4 of the time Approx. 1/2 of the time Approx. 1/4 of the time Rarely Never	x
Severe turbulence	How much of your working hours are you exposed to severe turbulence?	Almost all the time Approx. 3/4 of the time Approx. 1/2 of the time Approx. 1/4 of the time Rarely Never	x
<i>Effects on skin and skin problems</i>			
Wet or moist hands	How much of your working time are you exposed to having wet or moist hands?	Almost all the time Approx. 3/4 of the time Approx. 1/2 of the time Approx. 1/4 of the time Rarely Never	x
Skin contact with chemical	How much of your working time are you exposed to skin contact with chemicals (e.g. detergents and disinfectants)?	Almost all the time Approx. 3/4 of the time Approx. 1/2 of the time Approx. 1/4 of the time Rarely Never	x
Skin problems on the hands (%)	Have you had skin problems on the hands within the last 12 months? (Itching, red spots, red patches, dry and cracked skin and/or small blisters)	Yes, a week or more Yes, some days No	
<i>Cold and draft</i>			
Cold or draft	How much of your working time are you exposed to cold or draft?	Almost all the time Approx. 3/4 of the time Approx. 1/2 of the time Approx. 1/4 of the time Rarely Never	x
Strenuous postures and heavy lifting			
<i>Strenuous postures</i>			
Sitting down - at least 3/4 of the time (%)	How much of your work time are you sitting?	Almost all the time Approx. 3/4 of the time Approx. 1/2 of the time Approx. 1/4 of the time Rarely Never	
Walk or stand - at least 3/4 of the time (%)	How much of your working time is spent walking or standing?	Almost all the time Approx. 3/4 of the time Approx. 1/2 of the time Approx. 1/4 of the time Rarely Never	
The back twisted or bent over - at least 1/4 of the time (%)	How much of your working time with your back twisted or bent supporting with hands and arms?	Almost all the time Approx. 3/4 of the time Approx. 1/2 of the time Approx. 1/4 of the time Rarely Never	
Arms raised - at least 1/4 of the time (%)	How much of your working time your arms raised at or above	Almost all the time Approx. 3/4 of the time Approx. 1/2 of the time Approx. 1/4 of the time Rarely Never	
Repetitive arm movements - at least 1/4 of the time (%)	How much of your working time do you do repetitive arm movements in a minute (serving, packing trolleys, turning to reach manuals, etc.)?	Almost all the time Approx. 3/4 of the time Approx. 1/2 of the time Approx. 1/4 of the time Rarely Never	
Squatting or kneeling - at least 1/4 of the time (%)	How much of your work day do you spend squatting or kneeling?	Almost all the time Approx. 3/4 of the time Approx. 1/2 of the time Approx. 1/4 of the time Rarely Never	

Pushing or pulling - at least 1/4 of the time (%)	How much of your working time do you push or pull?	Almost all the time Approx. 3/4 of the time Approx. 1/2 of the time Approx. 1/4 of the time Rarely Never	
Lift - at least 1/4 of the time (%)	How much of your work time do you carry or lift?	Almost all the time Approx. 3/4 of the time Approx. 1/2 of the time Approx. 1/4 of the time Rarely Never	
<i>Heavy lifts</i>			
Lifting of luggage over 15 kg (%)	What is the typical weight of the luggage that you carry and lift or carry into the cabin?	Under 5 kg 5-15 kg 16-29 kg 30 kg or more Do not lift this burden	The responses 'Do not lift this burden' are not included in the results
Lifting of luggage over 30 kg (%)	What is the typical weight of the luggage that you carry and lift or carry into the cabin?	Under 5 kg 5-15 kg 16-29 kg 30 kg or more Do not lift this burden	The responses 'Do not lift this burden' are not included in the results
Lifting of packages over 15 kg (%)	What is the typical weight of the packages that you carry or lift into the cabin?	Under 5 kg 5-15 kg 16-29 kg 30 kg or more Do not lift this burden	The responses 'Do not lift this burden' are not included in the results
Lifting of packages over 30 kg (%)	What is the typical weight of the packages that you carry or lift into the cabin?	Under 5 kg 5-15 kg 16-29 kg 30 kg or more Do not lift this burden	The responses 'Do not lift this burden' are not included in the results
Lifting during transportation of stretcher 15 kg (%)	What is the typical weight of the that you carry or lift into the cabin?	Under 5 kg 5-15 kg 16-29 kg 30 kg or more Do not lift this burden	The responses 'Do not lift this burden' are not included in the results
Lifting during transportation of stretcher 30 kg (%)	What is the typical weight of the that you carry or lift into the cabin?	Under 5 kg 5-15 kg 16-29 kg 30 kg or more Do not lift this burden	The responses 'Do not lift this burden' are not included in the results
Lifting during SAR operations over 15 kg (%)	What is the typical weight that you carry or lift into the cabin in connection with SAR operations?	Under 5 kg 5-15 kg 16-29 kg 30 kg or more Do not lift this burden	The responses 'Do not lift this burden' are not included in the results
Lifting during SAR operations over 30 kg (%)	What is the typical weight that you carry or lift into the cabin in connection with SAR operations?	Under 5 kg 5-15 kg 16-29 kg 30 kg or more Do not lift this burden	The responses 'Do not lift this burden' are not included in the results
Lifting in galleys over 15 kg (%)	What is the typical weight that you carry or lift into the cabin in connection with lifting boxes in galleys?	Under 5 kg 5-15 kg 16-29 kg 30 kg or more Do not lift this burden	The responses 'Do not lift this burden' are not included in the results
Lifting in galleys over 30 kg (%)	What is the typical weight that you carry or lift into the cabin in connection with lifting boxes in galleys?	Under 5 kg 5-15 kg 16-29 kg 30 kg or more Do not lift this burden	The responses 'Do not lift this burden' are not included in the results
Work accidents and safety			
<i>Work accidents and safety</i>			
Necessary guidance and instructions in safe execution	<i>Do you agree or disagree with the following statements about the safety of your workplace? I receive the necessary guidance and instructions in the safe execution of the work</i>	Strongly agree (0) Agree (33,3) Disagree Strongly disagree Not relevant	The responses 'Not relevant' are not included in the results

Management's encouragement of employees to work safely	<i>Do you agree or disagree with the following statements about the safety of your workplace?</i> The management encourages employees to work safely, even when the work schedule is tight	Strongly agree Agree Disagree Strongly disagree Not relevant	The responses 'Not relevant' are not included in the results
Employee's mutual help to work safely	<i>Do you agree or disagree with the following statements about the safety of your workplace?</i> We help each other to work safely, even when the work schedule is tight	Strongly agree Agree Disagree Strongly disagree Not relevant	The responses 'Not relevant' are not included in the results
<i>Work accidents</i>			
Workplace's attitude to minor accidents in the daily work	<i>Do you agree or disagree with the following statements about the safety of your workplace?</i> We believe that minor accidents are a normal part of daily work	Strongly agree Agree Disagree Strongly disagree Not relevant	x The responses 'Not relevant' are not included in the results
At least one work accident with at least one sick day (%)	Have you been exposed to one or more work-accidents within the last 12 months, which resulted in more than one day's absence?	No accidents 1 accident 2 or more accidents	
Workplace's prioritization of working environment			
<i>Prioritizing the working environment and employee involvement</i>			
The workplace's stance on the working environment in relation to the rules	To what extent is the attitude in your workplace that the working environment must be better than what the rules require?	To a large extent To some extent To a small extent Not at all Don't know	The responses 'Don't know' are not included in the results
Workplace's prioritization of the working environment	To what extent does your workplace prioritize the prevention of health and safety problems	To a large extent To some extent To a small extent Not at all Don't know	The response 'Don't know' are not included in the results
Workplace's involvement of employees	To what extent are employees at your workplace involved in decisions that affect their working environment?	To a large extent To some extent To a small extent Not at all Don't know	The responses 'Don't know' are not included in the results
The employees' own efforts with regard to the	How often do you and your colleagues make an effort to improve the working environment?	Always Often Sometimes Rarely Never	
Management's involvement of employees with regard to the working environment	<i>Do you agree or disagree with the following statements about the safety of your workplace?</i> The management involves the employees in decisions concerning the working environment	Strongly agree Agree Disagree Strongly disagree Not relevant	The responses 'Not relevant' are not included in the results
<i>Offer of promotion of health (- Have you been offered the following promotion of health through your workplace - and have you used the offers within the last year)?</i>			
Offer to quit smoking	Did you get the offer?	No Yes, offered during working hours Yes, offered outside working hours	
Used offer to quit smoking	Did you use the offer?	No Yes	People who did not get the offer did not get this question
Healthy Diet/Dietary offered	Did you get the offer?	No Yes, offered during working hours Yes, offered outside working hours	
Healthy Diet/Dietary used offer	Did you use the offer?	No Yes	People who did not get the offer did not get this question
Exercise facilities - offered	Did you get the offer?	No Yes, offered during working hours Yes, offered outside working hours	
Exercise facilities – used offer	Did you use the offer?	No Yes	People who did not get the offer did not get this question

Small exercise activities daily (e.g. resistance band exercises, back exercises, etc.) – offered	Did you get the offer?	No Yes, offered during working hours Yes, offered outside working hours	
Small exercise activities daily (e.g. resistance band exercises, back exercises, etc.) – used offer	Did you use the offer?	No Yes	People who did not get the offer did not get this question
Treatment plan (physiotherapy, psychologist, etc.) – offered	Did you get the offer?	No Yes, offered during working hours Yes, offered outside working hours	
Treatment plan (physiotherapy, psychologist, etc.) – used offer	Did you use the offer?	No Yes	People who did not get the offer did not get this question
Meals on board and accommodation			
<i>Meals on board</i>			
No arrangement of financed food by workplace (%)	Is there an arrangement that you get food funded by your workplace?	Yes No Not relevant	The answers 'Not Relevant' are not included in the results
No food on board (%)	Do you ever get food on board at your work?	Yes No Not relevant	The responses 'Not relevant' are not included in the results
The food on board is neither healthy or suited to the length of the day (%)	Is the food you get on board healthy and suited for the length of the working day?	Yes, always Yes, for the most part No, not usually No, never Don't know	The response 'Don't know' is not included the results
Insufficient variety of food on board (%)	Is the food you get on board sufficiently varied?	Yes, always Yes, for the most part No, not usually No, never Don't know	The response 'Don't Know' is not included the results
Insufficient food on board (%)	Is the food on board sufficient?	Yes, always Yes, for the most part No, not usually No, never Don't know	The response 'Don't Know' is not included the results
Insufficient time to have meals (%)	Do you get enough time to have your meals?	Yes, always Yes, for the most part No, not usually No, never Don't know	The response 'Don't Know' is not included the results
Insufficient time and opportunity for toilet visits on board (%)	Do you have enough time and opportunity for toilet visits on board at your work?	Yes, always Yes, for the most part No, not usually No, never Don't know Not relevant	The response 'Don't Know' and 'not relevant' are not included in the results
<i>Accommodation</i>			
Insufficient peace and quiet to get the necessary rest at the accommodation (%)	If you are accommodated in connection with your work: Is there sufficient peace and quiet so you can get the necessary rest?	Yes, always Yes, for the most part No, not usually No, never Don't know Not relevant	The response 'Don't know' and 'Not relevant' are not included in the results
Health, ability to work and job satisfaction			
<i>Self-assessed health</i>			
Overall health	How do you think your health is overall?	Excellent Very good Good Less good Bad	

<i>Self-assessed capacity for work</i>			
Overall ability to work	Imagine that your ability to work is worth 10 points at its best. How many points will you give your current ability to work?	0 1 2 3 4 5 6 7 8 9 10 Mark a number between 0 and 10, where 0 means 'Unable to work', and 10 means 'Best ability to work'	x
Ability to work in relation to physical requirements	How do you assess your current ability to work in relation to the physical requirements of your work?	Excellent Very Good Good Somewhat Bad	
Ability to work in relation to mental requirements	How do you assess your current ability to work in relation to the mental demands of your work?	Excellent Very Good Good Somewhat Bad	
<i>Symptoms of depression and anxiety</i>			
Overall measurement of depression	Based on the following questions (a-l): How much of the time in the last 2 weeks have you ... a) felt depressed, in a poor mental state? b) lacked interest in your daily activities? c) felt that you lacked energy and strength? d) had less confidence? e) had a bad conscience or guilt? f) felt, that life was not worth living? g) had trouble concentrating, e.g. reading a newspaper or watching television? h) felt restless? i) felt silent or with few words? j) had trouble sleeping at night? k) had a reduction in appetite? l) had an increase in appetite?	All the time Most of the time A lot of the time Some of the time On rare occasions At no point in time	
Overall measurement of symptoms of anxiety	Based on the following questions (a-d): In the last 4 weeks, how much have you been bothered by... a) that you suddenly get scared without reason? b) nervousness and/or inner turmoil? c) attacks of horror or panic? And d) that you worry too much?	Very much Quite a lot Somewhat A little Not at all	
<i>Mental well-being, lack of energy and confusion</i>			
Overall measurement for well-being	Based on the following questions (a-d): How much of the time in the last 4 weeks... a) have you been very nervous? b) have you been so down that nothing could cheer you up? c) have you felt calm and relaxed? And d) have you been depressed?	All the time Most of the time A lot of the time Some of the time On rare occasions At no point in time	x (by c)
Overall measurement of energy	Based on the following questions (a-c): How much of the time in the last 4 weeks ... a) have you been in a good mood and full of life? B) have you been full of energy? And c) have you felt worn out?	All the time Most of the time A lot of the time Some of the time On rare occasions At no point in time	x (by a and b)
<i>Overwhelmed and stressed</i>			
Overall measurement for being overwhelmed	Based on the following questions (a-d): How often within the last month have you... a) felt that you were unable to control important things in your life? b) felt that the difficulties at work were piling up so, you couldn't handle them? c) felt certain of your abilities to cope with the difficulties at work? And d) felt that things at work developed like you wanted them to?	Always Often Sometimes Rarely Never	x (by c and d)
Stress over the past 2 weeks	How often have you been stressed over the last two weeks?	All the time Often Sometimes Rarely Never	x
Main source of stress	What was the main source of your stress?	Work Private life Both work and private life	The question was not given to people who have never been stressed over the past two weeks.

<i>Tiredness and sleep</i>				
Have slept 5 hours or less on average (%)	On average, how many hours have you slept in 24 hours within the last 4 weeks?	Approx. 5 hours or less Approx. 6 hours Approx. 7 hours Approx. 8 hours Approx. 9 hours Approx. 10 hours or more		
Have slept 6 hours or less on average (%)	On average, how many hours have you slept in 24 hours within the last 4 weeks?	Approx. 5 hours or less Approx. 6 hours Approx. 7 hours Approx. 8 hours Approx. 9 hours Approx. 10 hours or more		
Tiredness after a typical day	How tired are you after a typical work day?	Not tired A little tired Somewhat tired Very tired Completely exhausted		
Woken up several times and can't sleep again	How often in the past 4 weeks have you woken up several times and had difficulty falling asleep again?	Always Often Sometimes Rarely Never	x	
Rested when you wake up	How often within the last 4 weeks have you felt that you were not rested when you woke up?	Always Often Sometimes Rarely Never	x	
Tired during the day	How often within the last 4 weeks have you felt tired during the day?	Always Often Sometimes Rarely Never	x	
Hard to keep your eyes open during a flight	How often in the past 4 weeks have you had trouble keeping your eyes open during a flight?	Always Often Sometimes Rarely Never	x	
Planning of sleeping pattern if it is a night or an early morning shift	How often within the past 4 weeks did you plan your sleeping pattern if you had a night or an early morning shift?	Always Often Sometimes Rarely Never Not relevant	x	The answers "Not relevant" are not included in the results
Planning of sleeping patterns, if shift is across multiple time zones	How often within the last 4 weeks did you plan your sleeping pattern if you were to complete flight(s) in another/other time zone (s)?	Always Often Sometimes Rarely Never Not relevant	x	The responses 'Not relevant' are not included in the results
<i>Flight across multiple time zones</i>				
Bothered by flying across multiple time zones - short-haul	Do you feel bothered by flying across multiple time zones?	To a large extent To some extent To a small extent Not at all Not relevant	x	The answers 'Not Relevant' are not included in the results
Bothered by flying across multiple time zones - long-haul	Do you feel bothered by flying across multiple time zones?	To a large extent To some extent To a small extent Not at all Not relevant	x	The answers 'Not Relevant' are not included in the results
<i>Job satisfaction</i>				
Job satisfaction	How satisfied are you with your job as a whole, everything taken into account?	Very satisfied Satisfied Neither satisfied nor dissatisfied Dissatisfied Very dissatisfied		
<i>Illness</i>				
Illness in the past year, due to work (%)	Have you had an illness due to work in the last 12 months?	Yes No		

Overall measurement of long-term illness	Are you, or have you, within the last year been in treatment for one or more of the following illnesses? Depression Asthma Diabetes (all types) Atherosclerosis or coronary thrombosis Cerebral thrombosis Cancer Impaired hearing Eczema Back problems Migraine Eye disorders (cataracts, etc.) Other long-term illness	Yes No	
<i>Pain</i>			
Pain in the last 3 months	How often have you had pain within the last 3 months?	Daily One or more times a week A couple of times a month A few times Not at all	x
Pain that restricts	Have you been restricted in your work for the last 3 months due to pain?	No Yes, a little Yes, somewhat Yes, a lot	People who 'Not at all' had pain in the last 3 months did not get the question
Worst pain in neck or shoulders	Enter the degree of the worst pain you have had in your neck or shoulders within the last 3 months.	0 1 2 3 4 5 6 7 8 9 10 Mark a number between 0 and 10, where 0 means 'No pain at all', and 10 means 'Worst possible pain'	People who 'Not at all' had pain in the last 3 months did not get the question
Worst pain in the loin	Enter the degree of the worst pain you have had in the loin within the last 3 months.	0 1 2 3 4 5 6 7 8 9 10 Mark a number between 0 and 10, where 0 means 'No pain at all', and 10 means 'Worst possible pain'	People who 'Not at all' had pain in the last 3 months did not get the question
Overall measurement of pain in the body	Have you within the last 3 months had pain in ... stomach? chest? hips? knees? arms and/or wrists? neck and/or shoulders? loin? other places?	Yes No	People who 'Not at all' had pain in the last 3 months did not get the question
<i>Retirement</i>			
Decided to retire before age of 65 (%)	When do you plan to retire from the labour market?	I plan to stop when I am: Younger than 60 years 60 years 61 years 62 years 63 years 64 years 65 years 66 years or older I haven't decided	The responses 'I haven't decided' are not included in the results
<i>Sick leave</i>			
Sick leave	How many working days with sick leave have you had in total in the last year?	____number of days	
Health and lifestyle			
<i>Exercise, alcohol, smoking and being overweight</i>			
No light exercise in free time	How much time have you spent on average on each of the following leisure activities in the last year? (Also include running, cycling or walking to and from work) - Walking, cycling or other light exercise, where you are not out of breath or sweating (e.g. Sunday stroll, light gardening)?		Over 4 hours per week 2-4 hours per day week Under 2 hours per week Do not perform this activity

No moderate exercise in free time (%)	<i>How much time have you spent on average on each of the following leisure activities in the last year? (Also include running, cycling or walking to and from work)</i> - Exercise sports, heavy gardening or quick walking/cycling where you sweat and get out of breath?	Over 4 hours per week 2-4 hours per day week Under 2 hours per week Do not perform this activity
No hard training or competitive sports in free time (%)	<i>How much time have you spent on average each of the following leisure activities in the year? (Also include running, cycling or and from work)</i> - Hard training or competitive sports?	Over 4 hours per week 2-4 hours per day week Under 2 hours per week Do not perform this activity
At least 3 units of alcohol per day, Monday to Thursday (%)	How many units of alcohol do you drink per day on average during weekdays (Monday to Thursday)? (1 unit=1 bottle of beer, 1 glass of wine or 4 cl. of spirits)	0 1 2 3-4 5 or more
At least 3 units of alcohol per day, Friday to Sunday (%)	How many units of alcohol do you drink on average during weekends (Friday, Saturday and Sunday)? (1 unit=1 bottle of beer, 1 glass of wine or 4 cl. of spirits)	0 1 2 3-4 5 or more
Smoke occasionally or daily (%)	Do you smoke?	Yes, daily Yes, sometimes Have smoked, but don't smoke anymore No, have never smoked
Overweight: BMI at least 27.5 (%)	The question: How tall are you? + The How much do you weigh?	____(write)

* The question has been withdrawn from the report in agreement with the Danish Transportation, Construction and Housing Authority. A closer study of the relationship has been requested as well as a report for the Working Environment Council in 2019

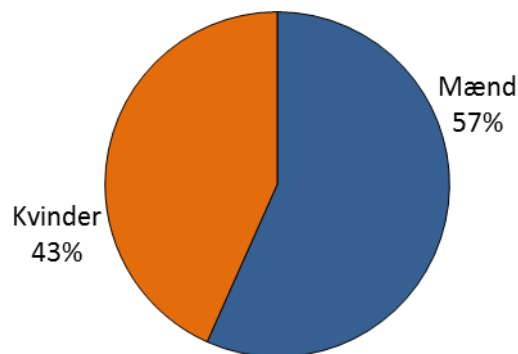
3. DESCRIPTION OF THE STUDY POPULATION

This chapter presents and describes the demographic composition of the participants, in terms of gender and age, and working conditions.

Age and gender

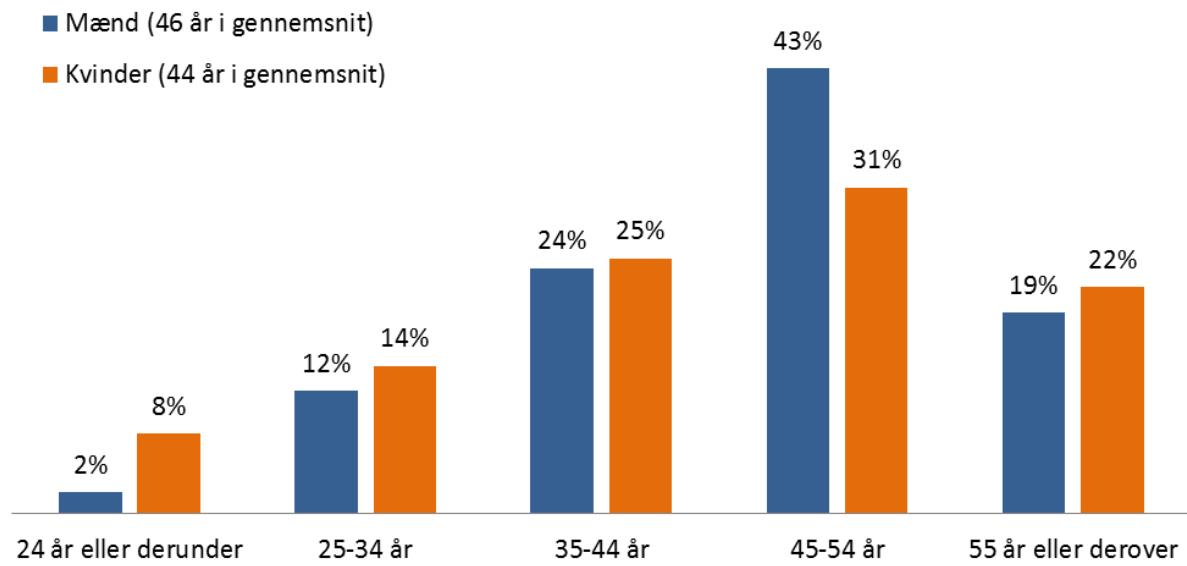
Figure 1 shows that 57 percent of the participants are men, and 43 percent are women. Figure 2 unfolds the study population's age distribution calculated on the two genders, and the figure shows that a larger proportion of younger crew members are women. A total of 43 percent of the male crew members are 45 to 54 years of age, while the proportion of female crew members in the same age group is 31 percent. The average age for women is 44 years and 46 years for men. The average age of the entire study population is 45 years (not shown in figure).

Figure 1: Gender distribution



Danish	English
Mænd	Men
Kvinder	Women

Figure 2: Age distribution for women and men



Danish	English
Mænd (46 år i gennemsnit)	Men (46 years on average)
Kvinder (44 år i gennemsnit)	Women (44 years on average)
24 år eller derunder	24 years or under
25-34 år	25-34 years
35-44 år	35-44 years
45-54 år	45-54 years
55 år eller derover	55 years or over

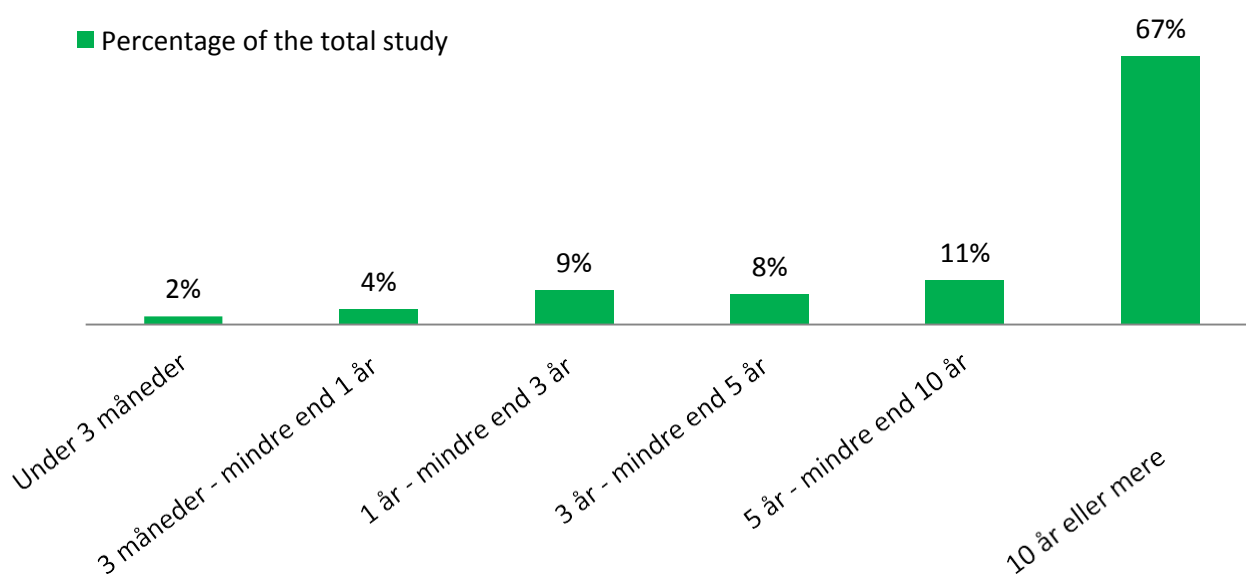
i: Each gender totals 100 percent.

Employment and seniority

This section describes the composition of the study population with regard to seniority and employment conditions. The latter is divided into ordinary employees, employees with staff responsibility and independent owners or co-owners.

Figure 3 shows that only 6 percent of the study population have been employed at their current workplace for less than a year. This is a significantly smaller proportion compared to Danish employees in the National Working Environment and Health Survey from 2016, where 16 percent had seniority of under a year. A total of 67 percent of the crew members have been employed for 10 years or more in their current workplace. By comparison, the corresponding share in the National Working Environment and Health Survey from 2016 is significantly lower with a total of 30 percent of Danish employees.

Figure 3: Seniority

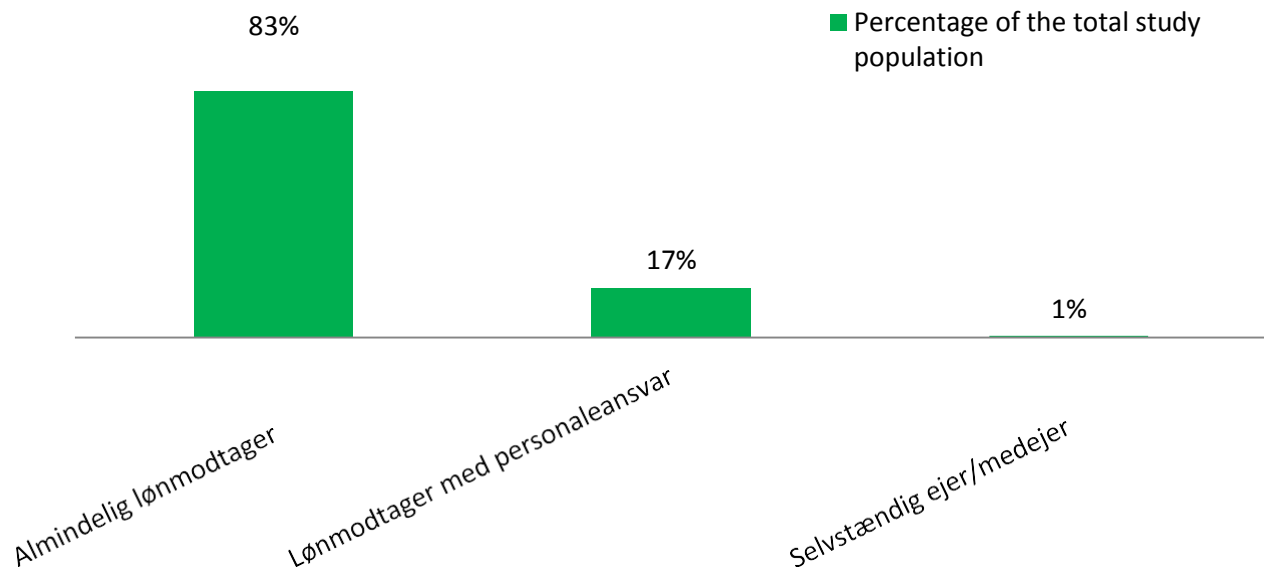


Danish	English
Under 3 måneder	Less than 3 months
3 måneder – mindre end 1 år	3 months – less than 1 year
1 år – mindre end 3 år	1 year – less than 3 years
3 år – mindre end 5 år	3 years – less than 5 years
5 år – mindre end 10 år	5 years – less than 10 years
10 år eller mere	10 years or more

ii: The six seniority groups total 100%.

Figure 4 shows that the study population is made up of 83 percent ordinary employees, 17 percent employees with staff responsibility and 1 percent who are self-employed or co-owners of a company.

Figure 4: Employed as....



Danish	English
Almindelig lønmodtager	Regular employees
Lønmodtager med personaleansvar	Employees with staff responsibilities
Selvstændig ejer/medejer	Independent owners/co-owners

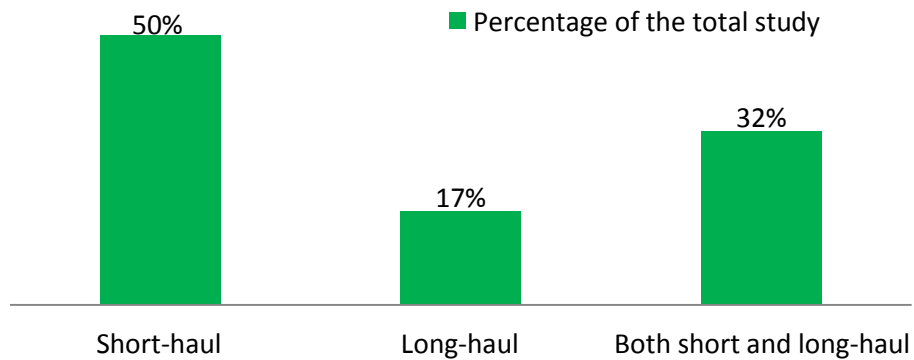
iii: The three groups total 100%.

Short-haul and long-haul

This section first lists the percentage of the study population that fly only short-haul, long-haul, or both. Next, the duration of the typical flights is shown for the short haul and long haul.

Figure 5 shows that 50 percent of the study population only fly short-haul, 17 percent fly only long-haul and 32% flying both short-haul and long-haul.

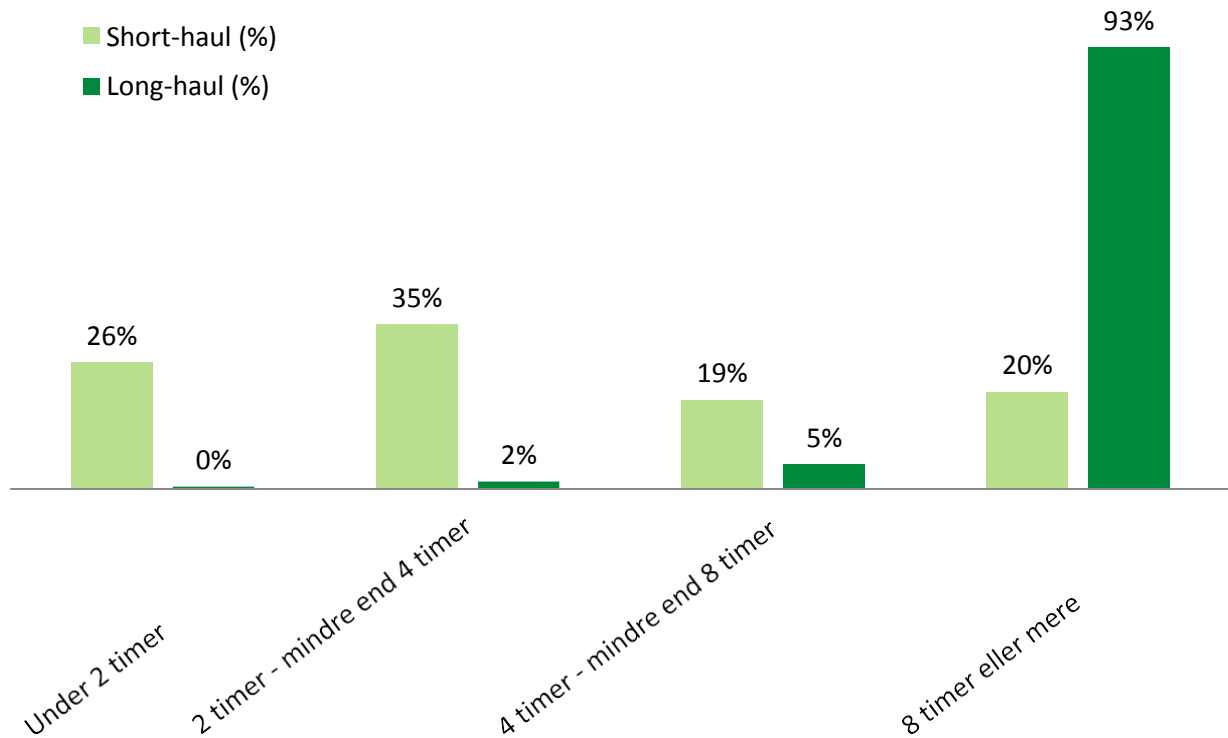
Figure 5: Do you fly short-haul, long-haul or both?



iv: The three groups total 100%.

Figure 6 shows, as expected, that the majority, exactly 93 percent, of the participants who fly long-haul, typically have long-haul flights with a duration of at least 8 hours. Participants who fly short-haul have a greater diversity in the duration of their trips.

Figure 6: Duration of typical flights



Danish	English
Under 2 timer	Less than 2 hours
3 timer – mindre end 4 timer	3 hours – less than 4 hours
4 timer – mindre end 8 timer	4 hours – less than 8 hours
8 timer eller mere	8 hours or more

v: Responses from the persons who both fly short-haul and long-haul are included in both statements. Each of the two groups (short-haul and long-haul) totals 100 percent.

Results on job groups

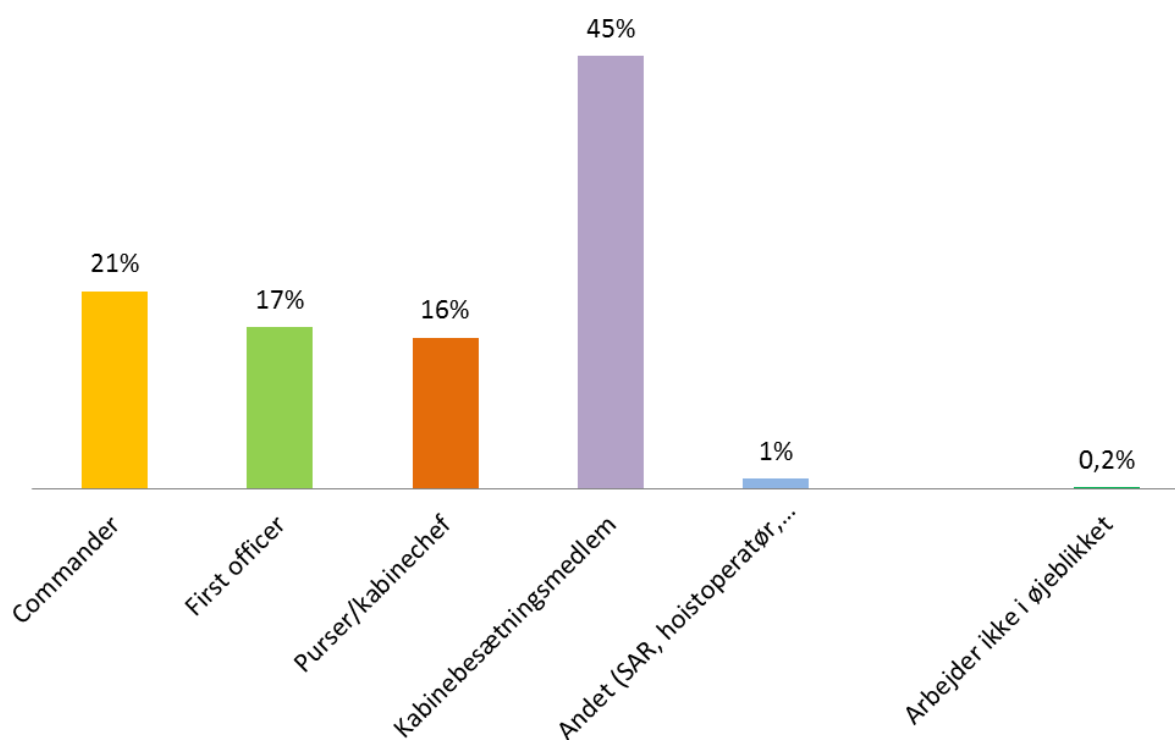
This section first shows the study population's distribution among the different job groups that the participants could choose from in the questionnaire, including: commander, first officer, purser/cabin manager, cabin crew member and others, for example SAR, hoist operator, doctor or similar. In addition, it was possible to specify if you were not working at that point in time. Subsequently, the following distributions are shown, calculated on the five job groups ('Currently not working', not shown):

- The age distribution
- Typical working hours of the day
- Average number of times flown across multiple time zones over the past month
- Weekly number of working hours, including any extra hours

The working time and time of day can be measured in several ways, but in this study, it is measured by means of self-reporting. The results cannot therefore be compared with objective measurements.

Figure 7 shows that the participants are divided by 21 percent commanders, 17 percent first officers, 16 percent pursers, 45 percent cabin crew members and 1 percent who work as something else, e.g. SAR crew, hoist operators and doctors. 0.2% responded that they are not currently working.

Figure 7: Working as ...



Danish	English
Commander	Commander
First officer	First officer
Purser/kabinechef	Purser/cabin chief
Kabinebesætningsmedlem	Cabin crew member
Andet (SAR, hoistoperatør,...	Other (SAR, hoist operator,...
Arbejder ikke i øjeblikket	Currently not working

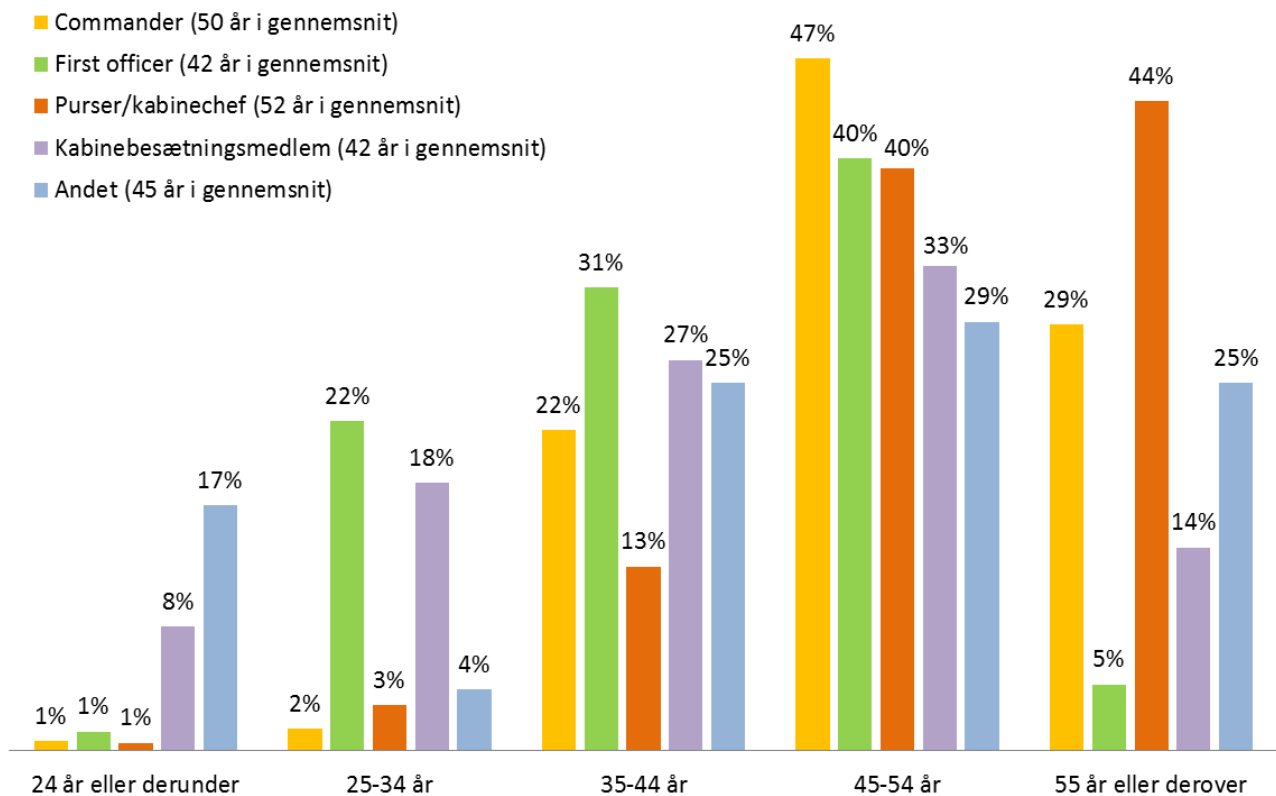
vi: The six groups total 100%

Figure 8 shows the age distribution in the five job groups as well as the average age in each job group. The figure shows a large difference in the age distribution within the five job groups. As a supplement, the age distribution in the five groups is also outlined in Table 1, which follows on the next page.

The average age in each of the five job groups is: 50 years for commanders, 42 years for first officers, 52 years for pursers, 42 years for cabin crew members and 45 years for the group 'Other'.

As expected, commanders and pursers are on average older than first officers and cabin crew members. Among the commanders, 76 percent of the participants are over 44 years, and among the pursers, 84 percent of the participants are over 44 years. Among the first officers and cabin crew members, the proportion, which is under 35, is 24 and 27 percent respectively compared to less than 5 percent among commanders and pursers.

Figure 8: Age distributed by job groups



Danish	English
Commander (50 år i gennemsnit)	Commander (50 years on average)
First officer (42 år i gennemsnit)	First officer (42 years on average)
Purser/kabinechef (52 år i gennemsnit)	Purser/cabin chief (52 years on average)
Kabinebesætningsmedlem (42 år i gennemsnit)	Cabin crew member (42 years on average)
Andet (45 år i gennemsnit)	Other (45 years on average)
24 år eller derunder	24 years or under
25-34 år	25-34 years
35-44 år	35-44 years
45-54 år	45-54 years
55 år eller derover	55 years or over

vii: Each job group totals 100 percent.

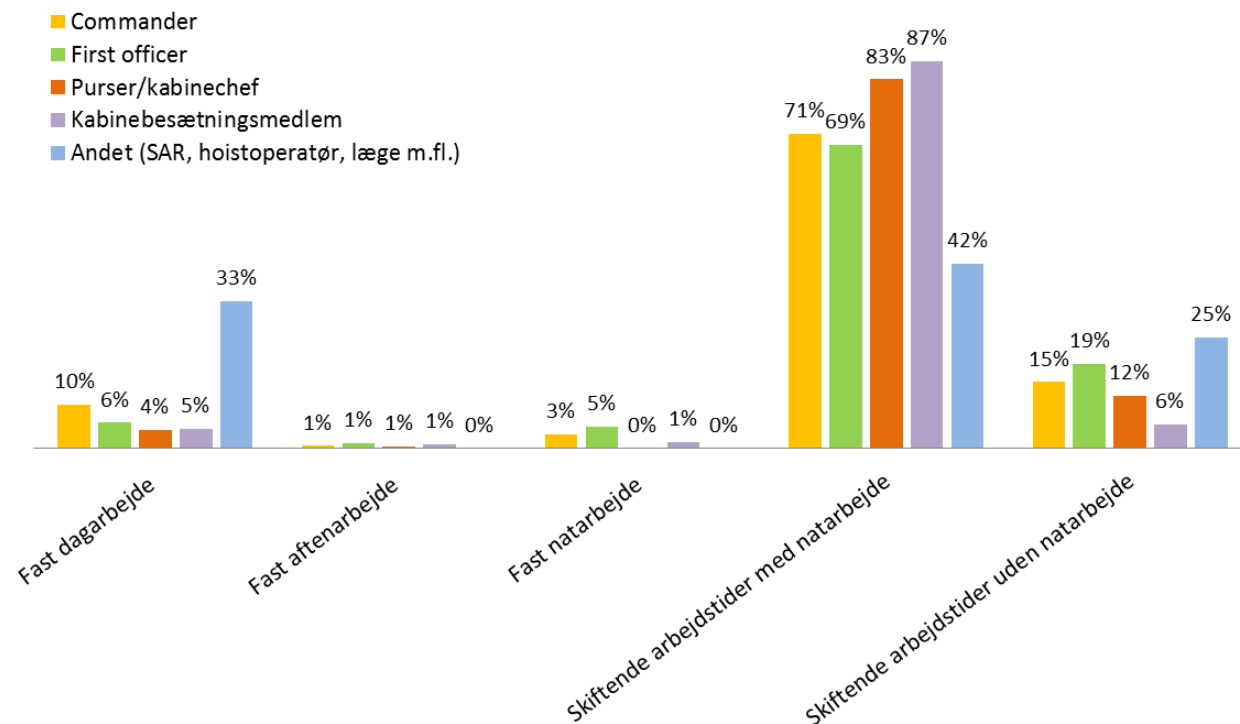
Table 2: Number and percentage distributed by job groups and age categories

	24 years or under		25 – 34 years		35 – 44 years		45 – 54 years		55 years or above		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Commander	<5	<1	7	1.5	100	21.8	216	47.1	133	29.0	459	100
First officer	5	1.3	84	22.4	118	31.5	151	40.3	17	4.5	375	100
Purser/cabin chief	<5	<1	11	3.1	44	12.5	139	39.6	155	44.2	351	100
Cabin crew member	85	8.5	183	18.2	267	26.6	331	32.9	139	13.8	1,005	100
Other	<5	16.7	<5	4.2	6	25.0	7	29.2	6	25.0	24	100

viii: Each job group adds up to 100 percent. N indicates number of participants within the selected job group and age category.

Figure 9 shows that most of the five job groups have changing working hours with nightwork. Purser and cabin crew members have the largest percentage, 83 and 87 percent respectively, who work at night. The job group ‘Other’ stands out by having the largest percentage of crew members who have fixed day work (33 percent) and the smallest percentage with alternating working hours with nightwork (42 percent).

Figure 9: Times of the day that the staff usually work



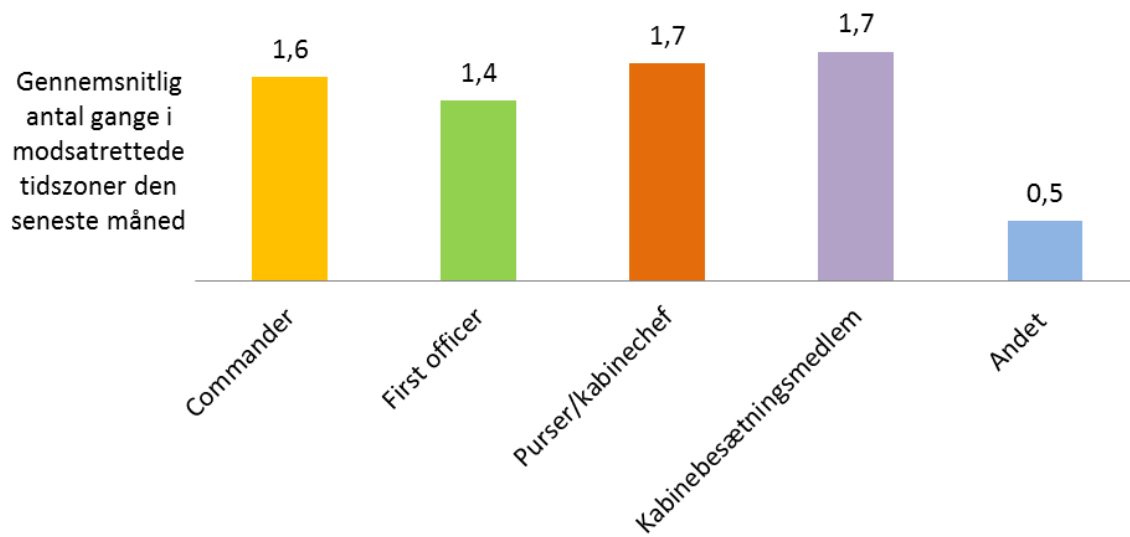
Danish	English
Commander	Commander
First officer	First officer
Purser/kabinechef	Purser/cabin chief
Kabinebesætningsmedlem	Cabin crew member
Andet (SAR, hoistoperatør, læge m.fl.)	Other (SAR, hoist operator, doctor, etc.)
Fast dagarbejde	Permanent day shift
Fast aftenarbejde	Permanent evening shift
Fast natarbejde	Permanent night shift
Skiftende arbejdstider med natarbejde	Changing working hours with night shift
Skiftende arbejdstider uden natarbejde	Changing working hours without night shift

ix: Each job group totals 100 percent.

Figure 10 shows that commanders, first officers, pursers, and cabin crew members, on average, fly more than once a month across multiple time zones.

Crew members who are employed as ‘Other’ have on average 0.5 times a month across multiple time zones. However, what the figure does not show is that 22 percent of the entire study population flew 3 times or more across multiple time zones within one month.

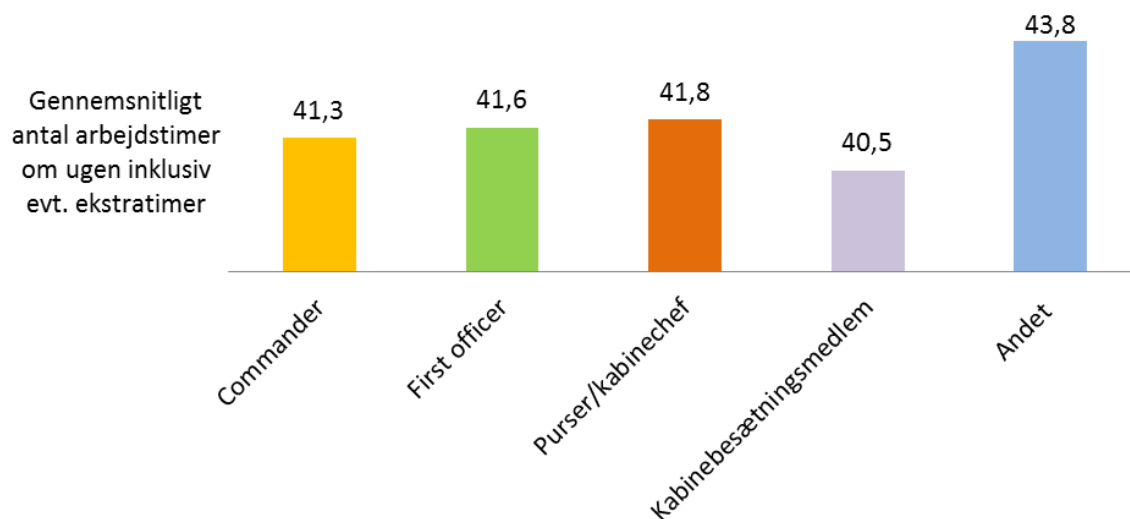
Figure 10: Number of times flown across multiple time zones in the last month



Danish	English
Gennemsnitlig antal gange i modsatrettede tidszoner den seneste måned	Average number of times across multiple time zones during the last month
Commander	Commander
First officer	First officer
Purser/kabinechef	Purser/cabin chief
Kabinebesætningsmedlem	Cabin crew member
Andet	Other

Figure 11 shows that for all five job groups, the average working time per week is higher than 40 hours, including any extra hours.

Figure 11: Working hours per week including any extra hours



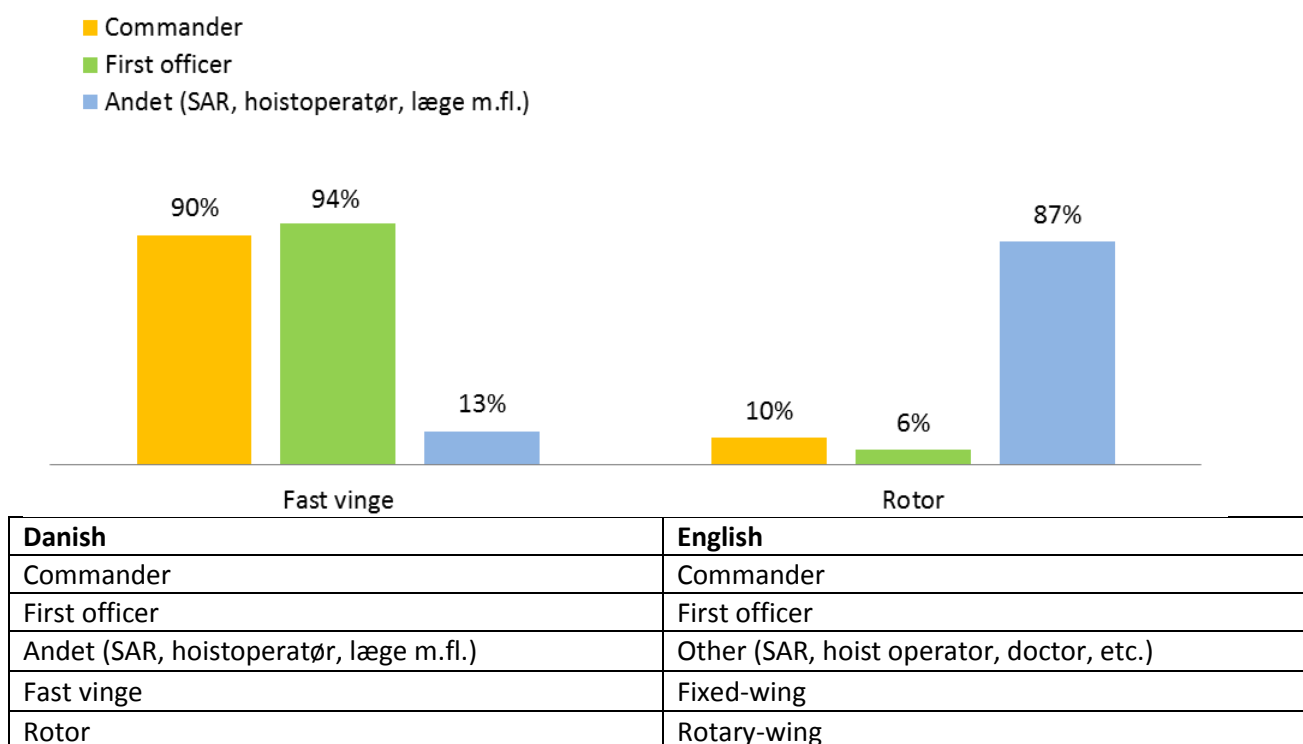
Danish	English
Gennemsnitlig antal arbejdstimer om ugen inklusiv evt. ekstratimer	Average number of work hours per week including extra hours
Commander	Commander
First officer	First officer
Purser/kabinechef	Purser/cabin chief
Kabinebesætningsmedlem	Cabin crew member
Andet	Other

Fixed-wing and rotary-wing

In this section, the percentage that flies fixed-wing and rotary-wing is shown for commanders, first officers and 'Other' staff. Pursers and cabin crew members did not get this question.

Figure 12 shows that 90 and 94 percent respectively among commanders and first officers fly with fixed wing. Only 13 percent of the staff who have another job function, fly with fixed-wing, while 87 percent of this group fly with rotary-wing.

Figure 12: Distribution of fixed-wing and rotary-wing



x: Each job group totals 100 percent. Pursers and cabin crew members were not given the question.

In the cockpit

This section shows the following distributions for commanders and first officers:

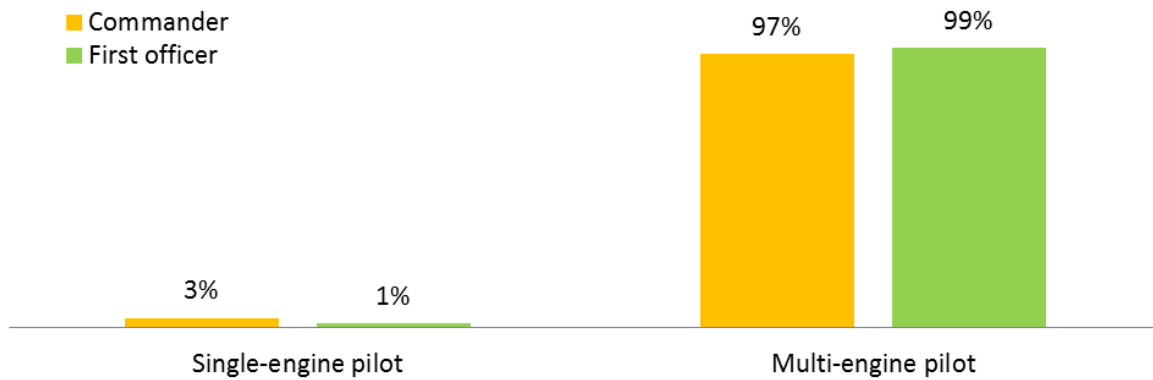
- Time in the air as single and multi-engine pilot respectively.
- Time in the air where you fly VFR¹ and IFR².

¹ When flying VFR, you fly according to Visual Flight Rules, which means that you navigate according to what you see through the window in the cockpit. This requires, among other things, good weather with higher cloud cover and good visibility.

² When flying in accordance to IFR, which covers the designation Instruments Flight Rules, you are allowed to fly without visual references on the ground, which means flying and navigating via instruments in the cockpit.

Figure 13 shows that commanders and first officers almost 100 percent of the time fly as multi-engine pilot.

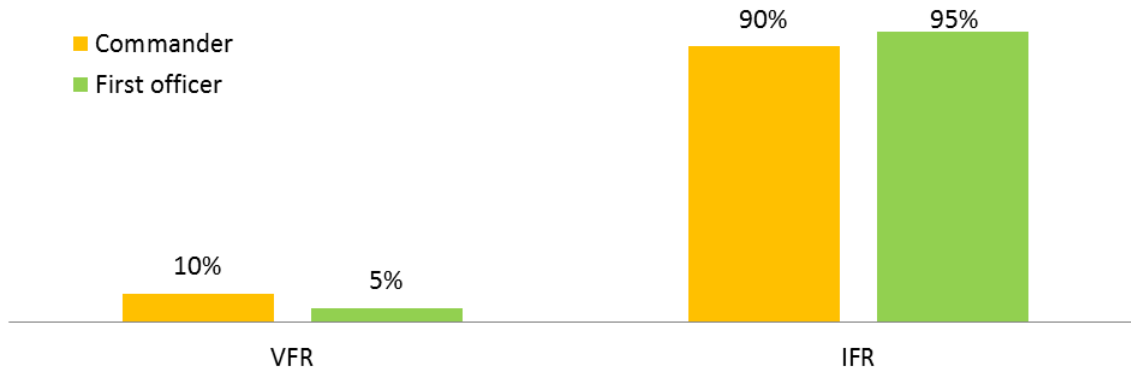
Figure 13: Average time in the air as single and multi-engine pilot



xi: Each job group totals 100 percent. Purser, cabin crew members and 'Other' staff were not given this question.

Figure 14 shows that commanders and first officers respectively 90 and 95 percent of the time fly IFR.

Figure 14: Average time in the air, where one flies VFR and IFR



xii: Each job group totals 100 percent. Purser, cabin crew members and other staff were not given the question.

4. MENTAL WORKING ENVIRONMENT

What is mental working environment?

The mental working environment includes many factors that can affect the working environment both positively and negatively. Mental work environment is, for example, about the relationship with the boss, colleagues, customers, clients or others with whom you have to cooperate. It can also be conditions concerning the organization of the work, e.g. the balance between resources and requirements, between effort and reward, and whether there is fairness in the distribution of tasks. It is well documented that employees at workplaces with a good mental working environment have lower risk of stress, depression and sick leave. A good mental working environment also increases job satisfaction and contributes to a more efficient execution of tasks.

In this study, we have asked about a number of factors that measure the mental working environment. Some factors, e.g. "Influence", are addressed by one question while other factors, such as "Quantitative requirements", are addressed by several questions. A brief description of each factor is provided in the next pages, followed by a presentation of the study's results.

Work engagement

Employees who are engaged in the work typically have an energetic and emotional connection to their duties. Work engagement is about the individual employee's subjective experience of the work's content, which in turn can contribute to creating motivation and job satisfaction.

A number of studies show that work engagement is linked to high job satisfaction and efficient task execution. In addition, committed employees have a lower risk of long-term sick leave, and staff turnover is lower among committed employees.

Work engagement can thus be regarded as an important resource in working life, which can help employees to handle their work tasks while maintaining their well-being and health.

Emotional demands of the work

Emotional demands of the work reflect the working conditions in which the employees are emotionally influenced by their work. Emotional requirements usually occur in jobs where it involves people. Research at NRCWE has shown that high levels of emotional demand can have negative health consequences. Studies have shown that emotional demands are one of the few factors most related to increased risk of long-term illness and treatment with antidepressants (Madsen et al., 2014; Rugulies et al., 2010a).

Influence

Influence in the work concerns the individual employee's work situation. Research has shown that a low degree of influence is a risk factor for long-term sick leave and early retirement (Clausen et al., 2014; Friis et al., 2008; Knardahl et al., 2017). Research also shows that a low degree of influence increases the risk of cardiovascular disease (Theorell et al., 2016).

Job insecurity

Job insecurity reflects the employee's level of concern for losing their job or being transferred to another job against their will. Thus, it is people's perceived job insecurity, which to a greater or lesser extent may be related to the real risk of being unemployed or being transferred. Research at NRCWE has shown that high job insecurity is a risk for poorer self-assessed health, increased risk of being treated with antidepressants and an increased risk of cardiovascular disease (Rugulies et al., 2008; Rugulies et al., 2010b; Virtanen et al., 2013).

Worried about medical examination

In this study, we asked the crew members whether they are concerned about their regular health check-ups, also referred to as medical examinations.

Collegial recognition

Collegial recognition in this study is about whether the participants perceive that they and their colleagues recognize each other. Recognition at the workplace can be understood as a resource that plays a crucial role in the work and well-being of employees. A previous study has shown that low recognition from management (recognition from colleagues has not been studied) can lead to earlier withdrawal from the labour market (Thorsen et al., 2016b).

Quantitative demands

Quantitative demands in the work include factors such as workload, deadlines, work pace and overtime. Thus, a distinction is made between different types of requirements that employees may experience in their work. Results from scientific studies show that these quantitative demands at the workplace play a crucial role for the health of the employees if the employees at the same time have low level of control at their work (Fransson et al., 2015; Kivimäki et al., 2012; Nyberg et al., 2014). High levels of demand in the work may be associated with a risk of developing health problems if the employees do not have sufficient working environment and personal resources to meet the requirements.

Fairness

Fairness concerns the employees' perception of the quality of the social relations of the workplace. Two key aspects of fairness at work are; that the employees find that they are involved in decisions and that everyone is treated in a fair way.

Fairness can be understood as a resource that plays a crucial role in employee well-being at work and several studies find a correlation between a low degree of fairness and health problems, e.g. increased risk of mental health problems (Grynderup et al., 2013; Kivimaki et al., 2007; Ndjaboue et al., 2012).

Role ambiguity

Role clarity concerns the employees' understanding of their role in the work, i.e. the contents of the tasks and the expectations associated with the execution of the work. Two key aspects of role clarity should be highlighted. First of all, that employees have received sufficient information, guidance and instructions to carry out their duties. Second of all, that employees experience uniform requirements and expectations from e.g. colleagues, customers and clients. When these key aspects are met, the individual employee has a clearly defined understanding of their role at work. Employees have an easier time relating to the environment's expectations for the performance of their work when they have a high degree of role clarity. Likewise, a high degree of role clarity has an impact on the employee's well-being. A low level of role clarity, measured as the experience of conflicting expectations for solving of duties, also increases the risk of long-term sick leave (Lund et al., 2005; Rugulies et al., 2010a). Research also points to that a low degree of role clarity can increase the risk of depression (Schmidt et al., 2014).

Facilitation at the workplace

Facilitation at the workplace in this study includes how often employees are taken into account with less strength due to e.g. age or illness. Facilitation at the workplace depends on the support of both management and colleagues.

Cooperation and collegial support

Cooperation and collegial support reflect two key aspects of the social relations at work. Firstly, it concerns whether colleagues work together when problems arise that require solutions, and secondly, whether colleagues help each other to achieve the best results.

Variation in colleagues

In this study, we added a question regarding the degree of variation in colleagues in the cabin and in the cockpit.

Conflicts between work and private life

Conflict between work and private life covers the aspect where work gives rise to conflicts in private life. There may be several reasons for these conflicts. For example, the work takes so much of one's energy, that it affects private life, or that it is necessary to work when you want to spend time with family or friends. Particularly long working days and large workloads can lead to an experience of conflicts between work and private life. Research indicates that there is a link between work and private life conflicts and increased risk of emotional exhaustion and impaired self-assessed health (Leineweber et al., 2013).

Management quality

Management quality is about the role that the immediate manager assumes towards his employees. A fundamental element of management quality is that the manager supports employees in their execution of the work. There are several key elements of good management quality, including the degree of involvement, feedback (complaints and compliments to the employees), recognition and appreciation, help and support, dissemination of the company's goals as well as confidence in the relationships with the employees. Management quality is important for the employees' well-being in the work, and studies indicate that there is a correlation between management quality and health outcomes such as stress, sick leave and heart disease (Nyberg et al., 2009; Westerlund et al., 2010). However, other studies do not find a correlation between management quality and health (Madsen et al., 2014; Rugulies et al., 2010a).

In this study, the participants were asked eight questions about their relationship with the management, and these are part of the overall measurement of the management quality presented in the results. In addition, participants were asked an additional question related to their confidence in the superiors.

Flying in marginal weather conditions

In this study, pilots were asked as to whether they had been pressured to fly under marginal weather conditions in the past year. The question has been withdrawn from the report in agreement with the Danish Transportation, Construction and Housing Authority. A further study of the relationship as well a report to the Working Environment Council in 2019 has been requested.

How to read the figure

The figure shows a ranked list of all questions within the topic "Challenges of the mental working environment". All results are converted into a value, an index, between 0 and 100, where the higher the score means a more negative degree of the measured question. In other words, the higher the score, the greater the challenge. The vast majority of questions are already based on challenges, while the other questions have been reversed in their coding, so that all graphs and numbers can be read on the same scale from 0 to 100. A value of 0 thus means that there is no problem or challenge, while a value of 100 means that the challenge is at a maximum (everyone experiences the problem or challenge at all times).

If a question is a yes / no question, the index indicates the percentage share that answered 'Yes'. These questions are marked with a percent sign in parentheses (%).

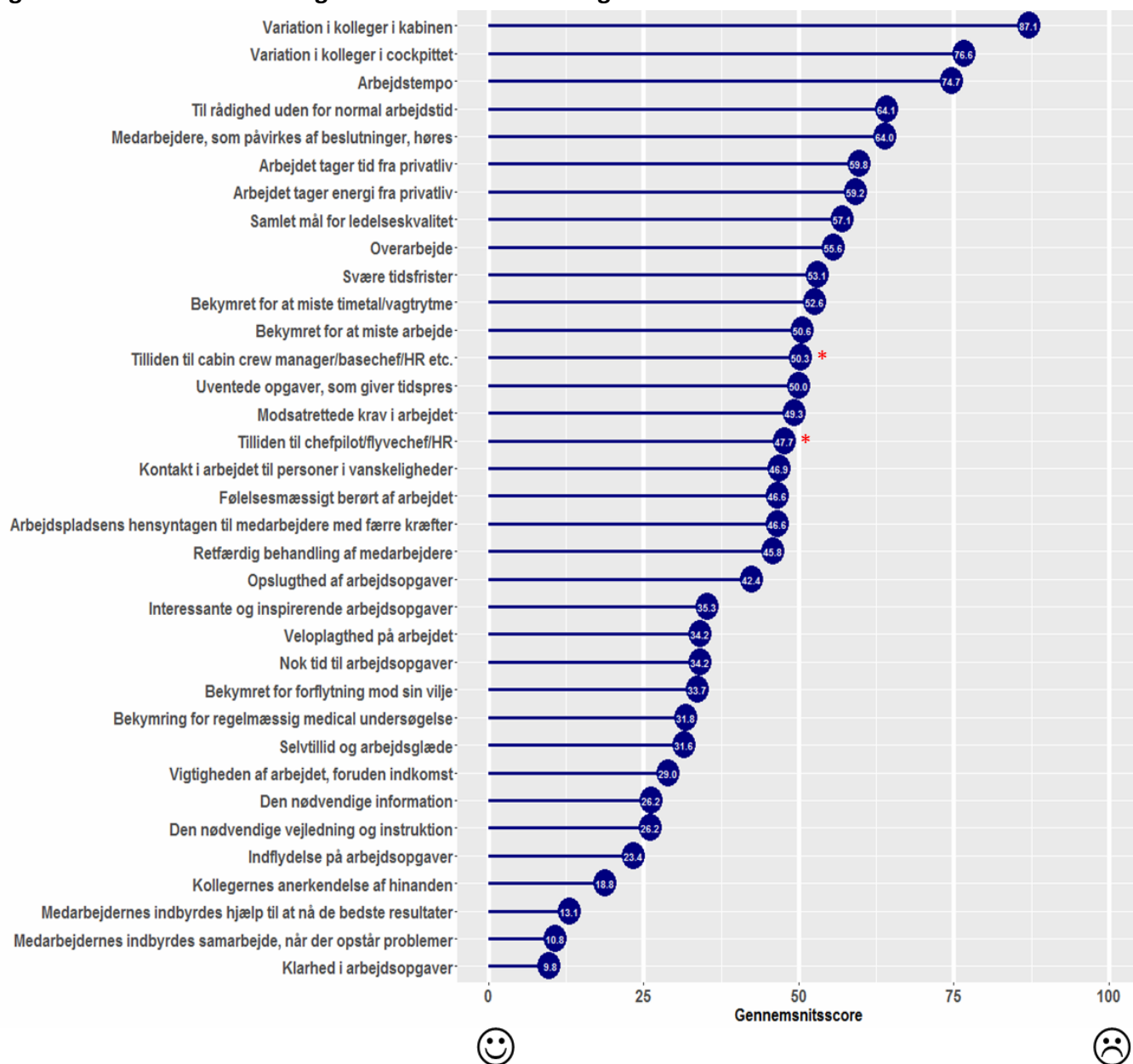
Please note ...

That the various questions have different significance and consequences for the employees and workplaces concerned. It is therefore important that you as a reader both relate to the index value from 0 to 100 and the content of the question.

In the figure, the questions that employees responded most negatively to are ranked at the top, while the questions that they responded most favourably to are ranked at the bottom. The results are calculated as average scores (or percentages (%) if it is in parentheses). See table of questions in table 1.

The top part of Figure 15 shows that there is a relatively large variation in who the employees work with in both the cabin and the cockpit. It is often necessary to work at a high work pace and to be available outside of normal working hours. At the same time, many find that the work takes time and energy from private life and that it is necessary to work overtime. Finally, many employees find that they are not heard in decisions that affect them and that the management quality could be better.

Figure 15: Results for challenges of the mental working environment



Danish	English
Variation i kolleger i kabinen	Variation in colleagues in the cabin
Variation i kolleger i cockpittet	Variation in colleagues in the cockpit
Arbejdstempo	Work pace
Til rådighed uden for normal arbejdstid	Available outside normal working hours
Medarbejder, som påvirkes af beslutninger, høres	Employees affected by decisions are heard
Arbejdet tager tid fra privatliv	The work takes time away from private life
Arbejdet tager energi fra privatliv	Work takes energy away from private life
Samlet mål for ledelseskvalitet	Overall measurement of management quality
Overarbejde	Overtime
Svære tidsfrister	Difficult deadlines
Bekymret for at miste timetal/vagtrytme	Worried about losing hours/shift
Bekymret for at miste arbejde	Worried about losing work

Tilliden til cabin crew manager/basechef/HR etc.	Confidence in cabin crew manager/base manager/HR etc.
Uventede opgaver, som giver tidspres	Unexpected tasks that causes time constraints
Modsatrettede krav i arbejdet	Contradictory demands at work
Tilliden til chefpilot/flyvechef/HR	Confidence in chief pilot/flight manager/HR
Kontakt i arbejdet til personer i vanskeligheder	Contact at work with people in difficulty
Følelsesmæssigt berørt af arbejdet	Emotionally affected by the work
Arbejdspladsens hensyntagen til medarbejdere med færre kræfter	The workplace's consideration of employees with less strength
Retfærdig behandling af medarbejdere	Fair treatment of employees
Opslugthed af arbejdsopgaver	Absorption of tasks
Interessante og inspirerende arbejdsopgaver	Interesting and inspiring work tasks
Veloplagthed på arbejdet	Well-being at work
Nok tid til arbejdsopgaver	Enough time for work
Bekymret for forflytning mod sin vilje	Concerned about relocation against one's will
Bekymring for regelmæssig medical undersøgelse	Concern about regular medical examination
Selvtilid og arbejdsglæde	Self-confidence and job satisfaction
Vigtighed af arbejdet, foruden indkomst	Importance of work, besides income
Den nødvendige information	The necessary information
Den nødvendige vejledning og instruktion	The necessary guidance and instruction
Indflydelse på arbejdsopgaver	Influence on tasks
Kollegerne anerkendelse af hinanden	Colleagues' recognition of each other
Medarbejdernes indbyrdes hjælp til at nå de bedste resultater	Help among employees to achieve the best results
Medarbejdernes indbyrdes samarbejde, når der opstår problemer	Collaboration between employees when problems arise
Klarhed i arbejdsopgaver	Clarity in work tasks
Gennemsnitsscore	Average score

* Conditional on positive response to filter questions. I.e. the result is for a sub-population.

The lower part of the figure shows that close cooperation with colleagues works relatively well. Employees work together when problems arise, they help each other to achieve the best results, and they recognize each other at work. In addition, the employees have a relatively great influence on their work tasks, they have clear tasks and they receive the necessary information to do the work.

In the middle of the figure one can see, among other things, that confidence in chief pilot/flight manager/HR and cabin crew manager/base chief pilots/HR is around average.

5. VIOLENCE, THREATS, BULLYING AND SEXUAL HARASSMENT

What is violence, threats, bullying and sexual harassment?

Human relations can be positive, but unfortunately also negative. The negative relationships in this study include actions that are offensive to the persons that it affects, i.e. subjected to serious, adverse events such as violence, threats, bullying and sexual harassment.

In this study, we have asked about a number of factors that measure whether crew members have been exposed to these negative factors. A brief description of each factor is provided in the next pages, followed by a presentation of the study's results.

Physical violence and threats

For employees who work with and among people, there may be an increased risk of being exposed to physical violence and/or threats of violence at their workplace. It is usually the users (patients, clients, customers or students) who subject the employees to physical violence or threats of violence. Research has shown a connection between violence and/or threats of violence at work and the risk of developing depression (Madsen et al., 2011; Wieclaw et al., 2006).

Sexual harassment

When working with and among people, the risk of being subjected to sexual harassment at work may increase. Sexual harassment is an action that can occur between colleagues or between employees and managers, clients, citizens or others. Sexual harassment is a form of bullying, and there are no objective limits to what are acceptable forms of interaction and what constitutes sexual harassment. The boundary for sexual harassment is fluid because the perception may be different from person to person and from workplace to workplace. Sexual harassment is defined as a sexual act that is unwanted and therefore unpleasant. A study has shown that sexual harassment is linked to negative consequences, including reduced mental well-being and reduced job satisfaction (Willness et al., 2007). In addition, employees subjected to sexual harassment have an increased level of depressive symptoms (Friborg et al., 2017).

Bullying and quarrels

Employees working with and among people are at risk of being subjected to bullying in the workplace and becoming part of quarrels or conflicts. Bullying, quarrels and conflicts can occur between colleagues or between employees and managers, clients, citizens or

others. Bullying can lead to poor well-being, increased sick leave and health problems. In the longer term, bullying can be psychologically destructive and ultimately disabling for the victims (Theorell et al., 2015).

How to read the figure

The figure shows a ranked list of all questions within the topic 'Challenges of violence, threats, bullying and sexual harassment'. All results are converted into a value, an index, between 0 and 100, where the higher the score means a more negative degree of the measured question. In other words, the higher the score, the greater the challenge. The vast majority of questions are already based on challenges, while the other questions have been reversed in their coding, so that all graphs and numbers can be read on the same scale from 0 to 100. A value of 0 thus means that there is no problem or challenge, while a value of 100 means that the challenge is at a maximum (everyone experiences the problem or challenge at all times).

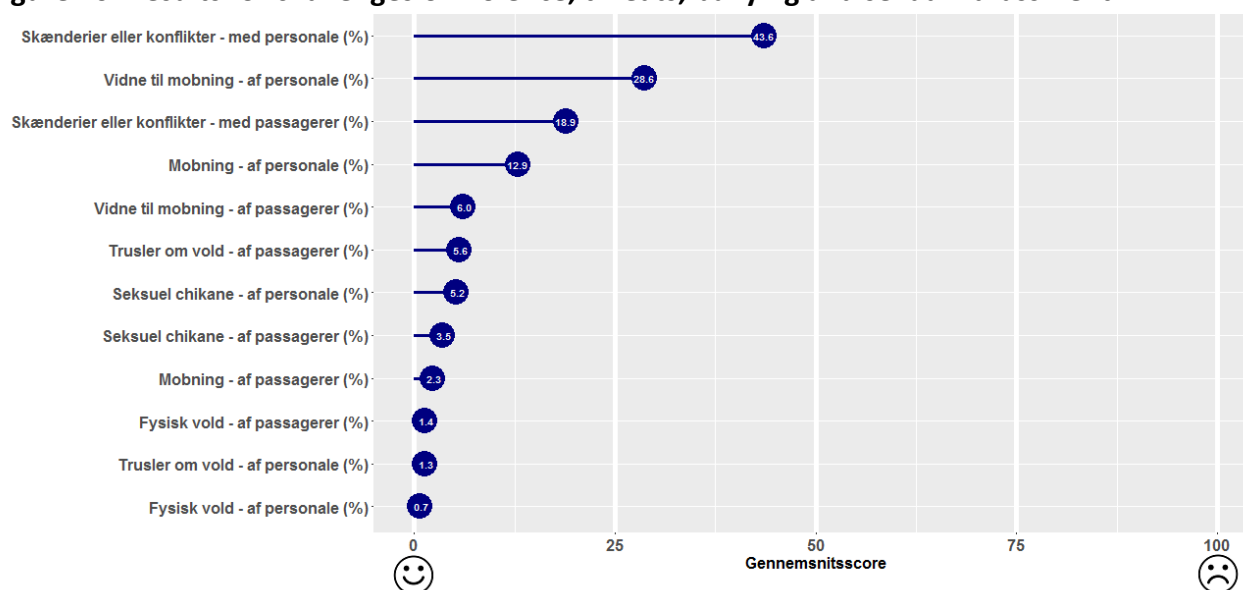
If a question is a yes / no question, the index indicates the percentage share that answered 'Yes'. These questions are marked with a percent sign in parentheses (%).

Please note ...

That the various questions have different significance and consequences for the employees and workplaces concerned. It is therefore important that you as a reader both relate to the index value from 0 to 100 and the content of the question.

In the figure, the questions that employees responded most negatively to are ranked at the top, while the questions that they responded most favourably to are ranked at the bottom. The results are calculated as average scores (or percentages (%) if it is in parentheses). See table of questions in table 1.

Figure 16: Results for challenges of violence, threats, bullying and sexual harassment



Danish	English
Skænderier eller konflikter – med personale (%)	Quarrels or conflicts – with staff (%)
Vidne til mobning – af personale (%)	Witness to bullying – by staff (%)
Skænderier eller konflikter – med passagerer (%)	Quarrels or conflicts – with passengers (%)
Mobning – af personale (%)	Bullying – by staff (%)
Vidne til mobning – af passagerer (%)	Witness to bullying – by passengers (%)
Trusler om vold – af passagerer (%)	Threats of violence – by passengers (%)
Seksuel chikane – af personale (%)	Sexual harassment – by staff (%)
Seksuel chikane – af passagerer (%)	Sexual harassment – by passengers (%)
Mobning – af passagerer (%)	Bullying – by passengers (%)
Fysisk vold – af passagerer (%)	Physical violence – by passengers (%)
Trusler om vold – af personale (%)	Threats of violence – by staff (%)
Fysisk vold – af personale (%)	Physical violence – by staff (%)
Gennemsnitsscore	Average score

The upper part of the figure shows that 43.6 percent of crew members have experienced quarrels or conflicts with colleagues and 18.9 percent with passengers within the past year. A little more than one fourth has witnessed bullying (28.6%), and a total of 12.9% have been subjected to bullying from colleagues in the past year.

The lower part of the figure shows that within the last year, 6.0 percent of crew members have witnessed passengers bullying and 5.6% has witnessed passengers threatening violence. 5.2% has been subjected to sexual harassment by colleagues. The incidence of physical violence from both passengers and colleagues and the occurrence of bullying from passengers is low (<1.5 percent).

6. PHYSICAL WORKING ENVIRONMENT

What is physical working environment?

The physical working environment deals with many different conditions at the workplace and can be influenced by wind and weather or special requirements for e.g. temperatures and ventilation. The physical working environment may impose requirements on the employees' clothing or the use of personal protective equipment such as a safety helmet or hearing protection. It is crucial that the physical workplace is arranged so that it fits the work that is to be performed. An incorrectly designed workplace can cause pain in the muscles and joints or lead to wear and tear.

In this chapter, results are presented for the part of the physical working environment that relates to the following factors: physical requirements and physical exertion, noise and noise protection, powerful vibrations and turbulence, effects on skin and skin problems as well as cold and draft. A brief description of each factor is provided in the next pages, followed by a presentation of the study's results. The part of the physical working environment that deals with strenuous postures and heavy lifting of loads is described in chapter 7.

Physical demands and physical exertion

The physical demands of the work relate to all the movements, activities and body positions that the employees perform during working hours. Exertions that in most cases are necessary for employees to perform their work. The physical exertion is how physically hard the individual employee thinks it is to perform their work. I.e. a self-assessed exertion that can vary greatly from employee to employee, even if exactly the same physical work is performed. This may, for example, depend on the employee's age, gender, health and physical capacity.

Certain types of physical demands and physical exertions at work contribute to increasing the risk of, among other things, musculoskeletal problems, sick leave and early retirement (Falkstedt et al., 2014; Friis et al., 2008; Hasselhorn and Apt, 2014; Karkkainen et al., 2013; Karpansalo et al., 2002; Kjellberg et al., 2016; Labriola et al., 2009; Lahelma et al., 2012).

Noise and noise protection

Noise refers to a sound that is unwanted by the receiver, as it is typically annoying, disturbing or directly damaging to listen to. If you are exposed to noise for a long time, your risk of hearing loss increases significantly (Dansk Standard, 2014). An annoying symptom of hearing loss is tinnitus. Severe tinnitus may in some cases reduce the quality of life. Non-hearing damaging, but annoying noise can cause problems in terms of concentration, communication and learning.

Powerful vibrations and turbulence

One typically distinguishes between arm-hand vibrations and whole-body vibrations. If an employee's seat does not have proper shock absorption, whole body vibrations can spread from the seat up through the body as tremors and strain the back. In the longer term, this can lead to back problems, especially lower back pain (Akustik Aps. et al., 2014). When people are subjected to vibrations at the same time as fixed work postures and frequent twisting of the backs, the risk of developing issues increases.

If one is frequently exposed to hand-arm vibrations, and if one experiences the influence of nerves (tingling and numbness), one can risk the symptoms getting worse and that one's work ability and daily life is affected (Akustik Aps. et al., 2014). In this study, participants have also been asked questions about the degree of turbulence that they are exposed to at their work.

Effects on skin and skin problems

Occupational skin problems are some of the most common work-related conditions. Wet or moist hands and skin contact with chemicals (e.g. paints, cleaners and disinfectants) are among the most common effects that can lead to work-related skin disorders. Eczema on the hands is the most common work-related skin disorder.

Cold and draft

Experience of draft is due to a local cooling of the body. The cooling can be due to airflows, and on the body, the neck and ankles are the most sensitive areas. At too low temperatures or drafts, the muscles are cooled, which affects the ability for motor precision and thus increases the risk of accidents and injuries in performing work. Drafts can also cause muscular disorders and cold symptoms, and with regular exposure to draft, more chronic muscular disorders and inflammatory conditions may develop (Statens Luftfartsvæsen, 2002). In this study, the participants have been asked whether they are exposed to cold or draft in connection with their work.

How to read the figure

The figure shows a ranked list of all questions within the topic 'Challenges of the physical working environment'. All results are converted into a value, an index, between 0 and 100, where the higher the score means a more negative degree of the measured question. In other words, the higher the score, the greater the challenge. The vast majority of questions are already based on challenges, while the other questions have been reversed in their coding, so that all graphs and numbers can be read on the same scale from 0 to 100. A value of 0 thus means that there is no problem or challenge, while a value of 100 means that the challenge is at a maximum (everyone experiences the problem or challenge at all times).

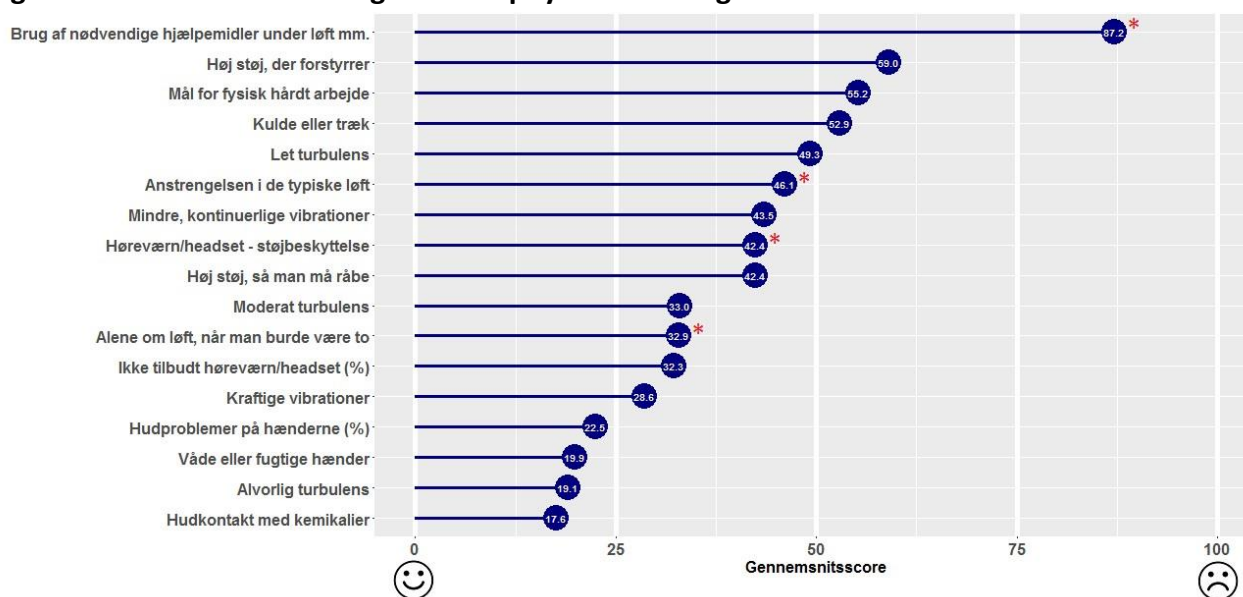
If a question is a yes / no question, the index indicates the percentage share that answered 'Yes'. These questions are marked with a percent sign in parentheses (%).

Please note ...

That the various questions have different significance and consequences for the employees and workplaces concerned. It is therefore important that you as a reader both relate to the index value from 0 to 100 and the content of the question.

In the figure, the questions that employees responded most negatively to are ranked at the top, while the questions that they responded most favourably to are ranked at the bottom. The results are calculated as average scores (or percentages (%) if it is in parentheses). See table of questions in table 1.

Figure 17: Results for challenges of the physical working environment



Danish	English
Brug af nødvendige hjælpemidler under løft mm.	Use of necessary aids during lifting etc.
Høj støj, der forstyrrer	Loud noise that disturbs
Mål for fysisk hårdt arbejde	Measurement for physically hard work
Kulde eller træk	Cold or draft
Let turbulens	Light turbulence
Anstrengelsen i de typiske løft	The exertion of the typical lifting
Mindre, kontinuerlige vibrationer	Smaller, continuous vibration
Høreværn/headset - støjbeskyttelse	Hearing protection/headset - noise protection
Høj støj, så man må råbe	Loud noise so one has to shout
Moderat turbulens	Moderate turbulence
Alene om løft, når man burde være to	Lifting on one's own when it is a two-person job
Ikke tilbudt høreværn/headset (%)	Not offered hearing protection/headset (%)
Kraftige vibrationer	Powerful vibrations
Hudproblemer på hænderne (%)	Skin problems on the hands (%)
Våde eller fugtige hænder	Wet or moist hands
Alvorlig turbulens	Severe turbulence
Hudkontakt med kemikalier	Skin contact with chemicals
Gennemsnitsscore	Average score

* Conditional on positive response to filter questions. I.e. the result is for a sub-population.

The upper part of the figure shows that the crew members who lift burdens in their work, only to a limited extent use the necessary aids during lifting and the exertion in the typical lifting is around average. The crew members are to a large extent relatively exposed to high, disturbing noise, cold or draft and are above average on the general question of physically hard work. In addition, employees respond to some degree with affirmation that they are exposed to turbulence and strong vibrations. The lower part of the figure shows that exposure to skin contact with chemicals, wet or moist hands or powerful vibrations is not particularly widespread.

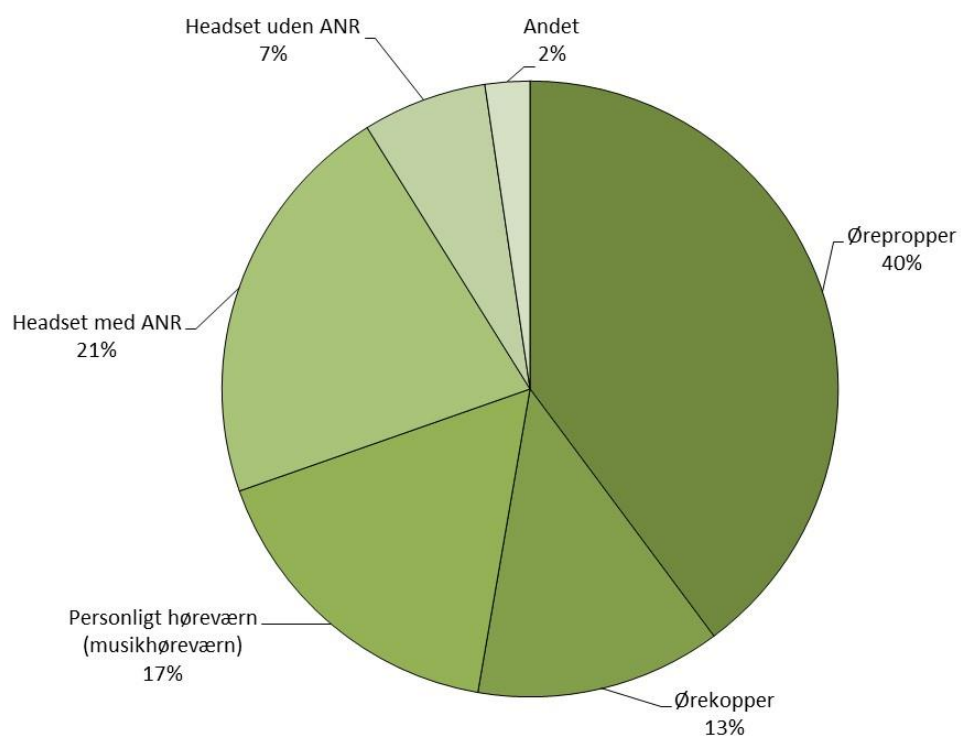
However, 22.5 percent of the employees responded that they have skin problems on their hands.

The figure also shows that crew members who use ear protectors find that the hearing protectors provide a noise protection that is slightly better than average (index value of 42.4).

Figure 18 below shows what kind of hearing protection/headsets the employees have been offered at their work. The response options were; 1) Headset with ANR³, 2) Headset without ANR, 3) Earplugs, 4) Ear muffs, 5) Personal hearing protectors (music hearing protectors) and 6) Other. Multiple responses or options were allowed. The question was only given to the people who in the questionnaire had responded that they had been offered hearing protection/headsets. Among these persons, 40 percent have been offered earplugs, which is the most offered form of hearing protection. In addition, 21 percent have been offered headset with ANR, 17 percent personal hearing protection, 13 percent ear muffs, 7 percent headset without ANR, and 2 percent have been offered a different kind of hearing protection than the ones listed.

³ ANR stands for *Active Noise Reduction*

Figure 18: Forms for hearing protection/headsets offered to employees



Danish	English
Headset uden ANR	Headset without ANR
Headset med ANR	Headset with ANR
Personligt høreværn (musikerhøreværn)	Personal hearing protection (music hearing protection)
Ørekopper	Ear muffs
Ørepropper	Ear plugs
Andet	Other

xiii: The six groups total 100%. The 100% includes over 58% of the study population who have been offered hearing protection/headsets (10% responded 'Don't know' to the question 'Have you been offered hearing protection/headset?'). Several responses were allowed from the same person.

7. STRENUOUS WORK POSTURES AND HEAVY LIFTING

What are strenuous work postures and heavy lifting?

Heavy lifting and work postures, where the back is bent, twisted and turned, increases the risk of e.g. back pain. Whether the heavy work is causing back problems or exacerbating existing back problems is difficult to determine. However, there is no doubt that heavy work can trigger or increase existing pain.

In this study, we asked about the two factors; strenuous postures and heavy lifting, which is described below, followed by a presentation of the results of the study.

Strenuous work postures

It is a strenuous posture if one works e.g. bent over, with a twist in the back, with raised arms or if one is on one's knees while working. However, movement and variation in work postures is necessary in order to maintain the body's level of functionality. On the other hand, in the event of inappropriate work postures and movements, there is a risk of muscle and tendon pain and acute injury and long-term physical wear.

If you are exposed to four or more physical work exertions at one time for more than a quarter of your working time at your workplace, you have 94 percent greater risk of long-term sick leave (Andersen et al., 2016).

One can limit or completely avoid strenuous work postures and movements by ensuring that there is plenty of work space, appropriate equipment and fixtures, variation in the work and good planning, and that the employees are trained and instructed before the work is started (Working Environment Authority).

Heavy lifts

Lifting is defined as handling a load for a longer or shorter time, where the load completely or partially is off the supporting surface. The lift is heavy when it involves the risk of damage to health. A lift is manual when it is primarily performed by muscle power. Manual handling of heavy loads is the cause of most injuries to the musculoskeletal system, which can be accidents, sudden lifting injuries or wear and tear damage that occurs after prolonged work with heavy lifting.

How to read the figure

The figure shows a ranked list of all questions within the topic 'Challenges of strenuous work postures'. All results are converted into a value, an index, between 0 and 100, where the higher the score means a more negative degree of the measured question. In other words, the higher the score, the greater the challenge. The vast majority of questions are already based on challenges, while the other questions have been reversed in their coding, so that all graphs and numbers can be read on the same scale from 0 to 100. A value of 0 thus means that there is no problem or challenge, while a value of 100 means that the challenge is at a maximum (everyone experiences the problem or challenge at all times).

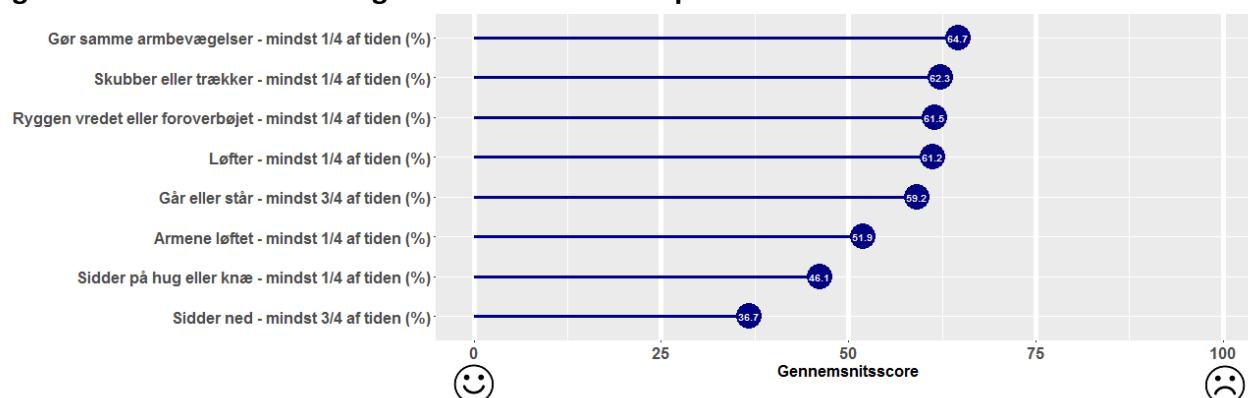
If a question is a yes / no question, the index indicates the percentage share that answered 'Yes'. These questions are marked with a percent sign in parentheses (%).

Please note ...

That the various questions have different significance and consequences for the employees and workplaces concerned. It is therefore important that you as a reader both relate to the index value from 0 to 100 and the content of the question.

In the figure, the questions that employees responded most negatively to are ranked at the top, while the questions that they responded most favourably to are ranked at the bottom. The results are calculated as average scores (or percentages (%) if it is in parentheses). See table of questions in table 1.

Figure 19: Results for challenges of strenuous work postures



Danish	English
Gør samme armbevægelser – mindst 1/4 af tiden (%)	Repetitive arm movements – at least 1/4 of the time (%)
Skubber eller trækker – mindst 1/4 af tiden (%)	Push or pull – at least 1/4 of the time (%)
Ryggen vredet eller foroverbøjet – mindst 1/4 af tiden (%)	Back twisted or bent over – at least 1/4 of the time (%)
Løfter – mindst 1/4 af tiden (%)	Lifting – at least 1/4 of the time (%)
Går eller står – mindst 3/4 af tiden (%)	Walking or standing – at least 3/4 of the time (%)
Armene løftet – mindst 1/4 af tiden (%)	Arms raised – at least 1/4 of the time (%)
Sidder på hug eller knæ – mindst 1/4 af tiden (%)	Squatting or kneeling – at least 1/4 of the time (%)
Sidder ned – mindst 3/4 af tiden (%)	Sitting down – at least 3/4 of the time (%)
Gennemsnitsscore	Average score

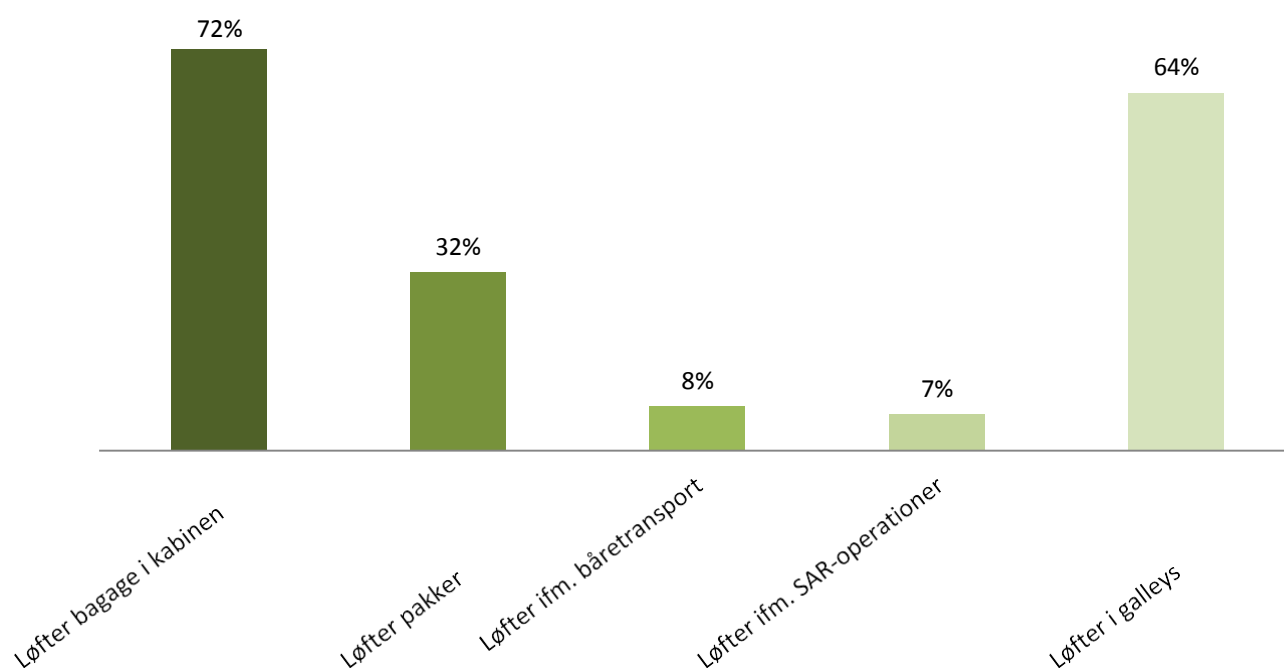
Overall, the figure shows that more than 50 percent of employees in the aviation industry (51.9 - 64.7 percent) work with the same arm movements, push or pull loads, work with the back

twisted or bent over, lifting or working with the arms raised at least a quarter of the working time. A total of 59.2 percent walk or stand at least three-quarters of working hours, and 46.1 percent squat or kneel at least a quarter of the working hours. A total of 36.7 percent sits at least three-quarters of working hours.

Figure 20 below shows what percentage of the study population lifts luggage into the cabin, lifts packages, lifts in galleys or lift in connection with transportation of stretchers or SAR operations. A total of 72 percent of the crew members lift luggage into the cabin, 64 percent lift in galleys, 32 lift packages, 8 percent lift in connection with transportation of stretches, and 7 percent lift in connection with SAR operations.

The following figure 21 shows the percentage that lift very heavy items among the crew members who lift actual loads. I.e. crew members who don't lift the actual loads are not included in the report. The figure shows that only 9 percent of those who lift luggage into the cabin, lift luggage over 15 kg. Below 1 percent lifts luggage over 30 kg. The same pattern applies to those who lift packages, where 8 percent lift over 15 kg and only 2 percent lift packages that are heavier than 30 kg. In connection with transportation of stretchers, 42 percent lift over 15 kg and 33 percent over 30 kg. In connection with SAR operations, 31 percent lift over 15 kg, and 23 percent over 30 kg. Among those who lift in galleys, 15 percent lift over 15 kg and 4 percent over 30 kg.

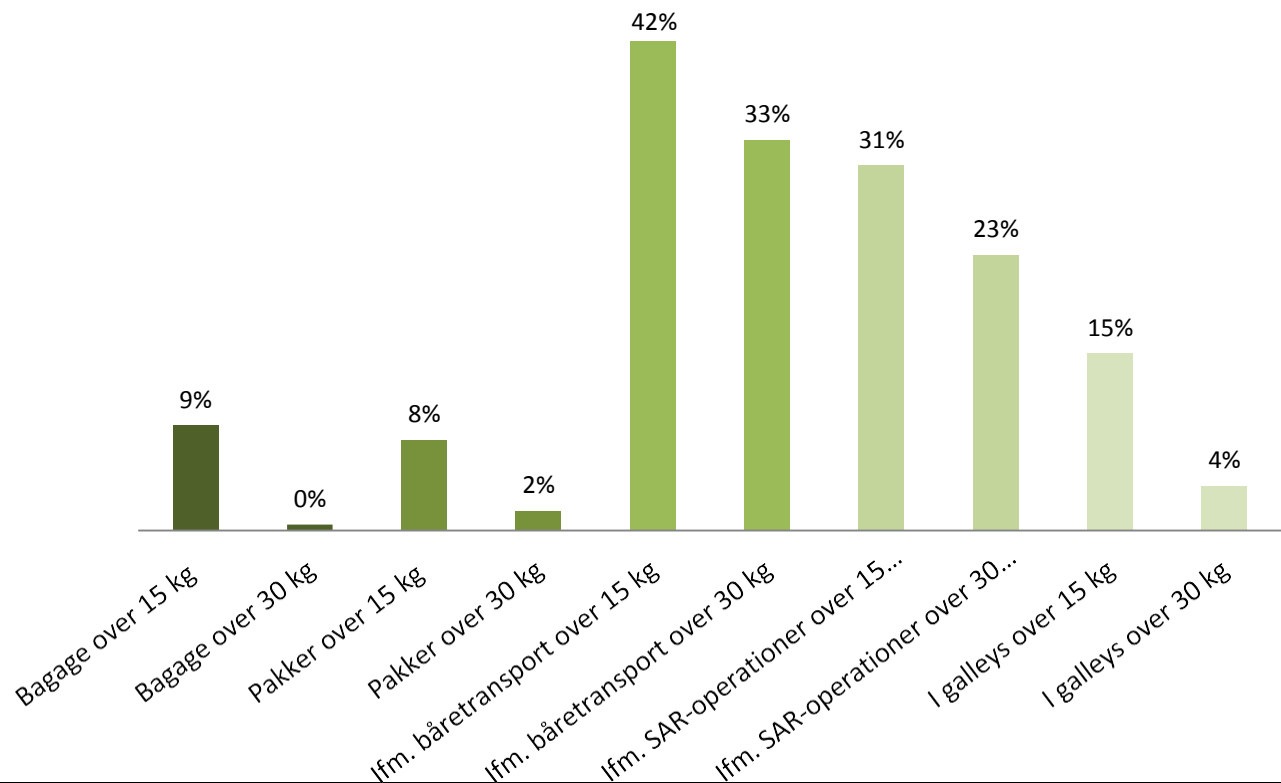
Figure 20: The percentage of the study population that lifts loads



Danish	English
Løfter baggage i kabinen	Lifting luggage in the cabin
Løfter pakker	Lifting packages
Løfter ifm. båretransport	Lifting in connection with transportation of stretchers
Løfter ifm. SAR-operationer	Lifting in connection with SAR operations
Løfter i galleys	Lifting in galleys

xiv: Each column represents the total percentage of the entire study population that lifts an actual load.

Figure 21: Percentage with heavy lifting - calculated among the employees who lift actual loads



Danish	English
Baggage over 15 kg	Luggage over 15 kg
Baggage over 30 kg	Luggage over 30 kg
Pakker over 15 kg	Packages over 15 kg
Pakker over 30 kg	Packages over 30 kg
Ifm. båretransport over 15 kg	In connection with transportation of stretchers over 15 kg
Ifm. båretransport over 30 kg	In connection with transportation of stretchers over 30 kg
Ifm. SAR-operationer over 15 ...	In connection with SAR-operations over 15 ...
Ifm. SAR-operationer over 30 ...	In connection with SAR-operations over 30 ...
I galleys over 15 kg	In galleys over 15 kg
I galleys over 30 kg	In galleys over 30 kg

xv: Each column represents a percentage of employees who lift actual loads.

8. WORK ACCIDENTS AND SAFETY

What are work accidents and safety?

A work accident is a discrete, sudden and unexpected occurrence during the course of work that causes physical or mental injury. Although an accident is sudden and unexpected, the cause of the incident may well be due to conditions that either precede or are contingent upon decisions taken higher up the system or outside the business. The safety culture at a workplace is an essential preventive element for maintaining a high and long-term safety level in workplaces that exist under flexible and dynamic conditions.

In this study, we have asked about various security-cultural conditions. In addition, a measure of sick leave as a result of work accidents is included. There is a brief description of work-accidents and safety below, followed by a presentation of the study's findings.

Work accidents and safety

A good safety climate among the company's employees and managers is a crucial factor in preventing work accidents. The term "safety climate" refers to the employees' perception of the managers' and colleagues' practical handling and prioritization of daily safety. It is a perception that is easily influenced by e.g. economy, time pressure, management style as well as the physical and mental working environment. It is therefore a snapshot of a company's safety culture.

A good safety climate is required if a company wants to prevent work accidents. This means that employees and managers have a positive and proactive attitude to security in the day-to-day life. It is an attitude that results in an active effort towards technical solutions, the organization of the work and a concrete conversation about and action in relation to safety. In the day-to-day activities, the company's production goals can be perceived as more important than their goals for a high level of safety. Both employees and managers can therefore find it difficult to prioritize safety in a busy daily life with high production requirements and tight work schedules. It is important that the management takes the lead and creates a good safety climate by showing the employees in speech and action how the company prioritizes safety in daily life and by involving employees in decisions about safety. The company must ensure that employees, especially the young and new employees, receive a relevant introduction and continuous guidance on the safe execution of the work. In addition, frequent communication on safety between management and employees is crucial in maintaining a good safety climate that prevents accidents.

The results of the present study cannot be compared with the Danish Working Environment Authority's reports on the number of reported work accidents. This is because these are two completely different ways of collecting knowledge about work accidents.

How to read the figure

The figure shows a ranked list of all questions within the topic 'Work accidents and challenges of safety'. All results are converted into a value, an index, between 0 and 100, where the higher the score means a more negative degree of the measured question. In other words, the higher the score, the greater the challenge. The vast majority of questions are already based on challenges, while the other questions have been reversed in their coding, so that all graphs and numbers can be read on the same scale from 0 to 100. A value of 0 thus means that there is no problem or challenge, while a value of 100 means that the challenge is at a maximum (everyone experiences the problem or challenge at all times).

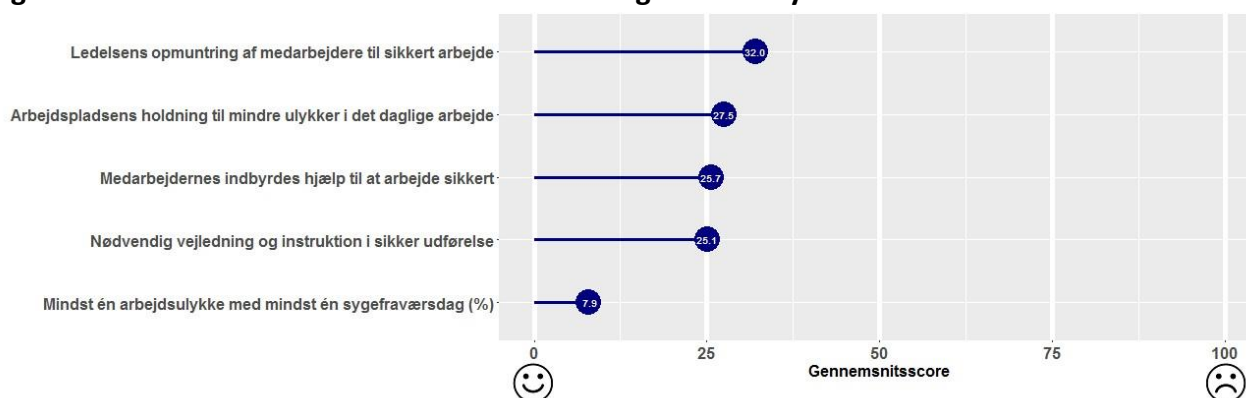
If a question is a yes / no question, the index indicates the percentage share that answered 'Yes'. These questions are marked with a percent sign in parentheses (%).

Please note ...

That the various questions have different significance and consequences for the employees and workplaces concerned. It is therefore important that you as a reader both relate to the index value from 0 to 100 and the content of the question.

In the figure, the questions that employees responded most negatively to are ranked at the top, while the questions that they responded most favourably to are ranked at the bottom. The results are calculated as average scores (or percentages (%)) if it is in parentheses). See table of questions in table 1.

Figure 22: Results for work accidents and challenges of safety



Danish	English
Ledelsens opmuntring af medarbejdere til sikkert arbejde	Management's encouragement of employees for safe work
Arbejdspladsens holdning til mindre ulykker i det daglige arbejde	Workplace's position on minor accidents within daily work
Medarbejdernes indbyrdes hjælp til at arbejde sikkert	Help among employees to work safely
Nødvendig vejledning og instruktion i sikker udførelse	Necessary guidance and instruction in safe execution
Mindst en arbejdsulykke med mindst en sygefraværdsdag (%)	At least one work accident with at least one sick day (%)
Gennemsnitsscore	Average score

The top part of the figure shows that management encourages safe work, that it is not the attitude at the workplace that minor accidents are a normal part of work, that the employees to relatively high degree help each other to work safely, and that to a relatively high degree the necessary safety instruction is given in the safe execution of work. Almost 8% of the employees have had a work accident with at least one day's absence within the last year.

9. THE WORKPLACE'S PRIORITIZATION OF WORKING ENVIRONMENT

What is the workplace's prioritization of working environment?

The topic prioritization of the working environment focuses on the employees' assessment of the workplace's prioritization of the working environment and the degree of employee involvement in the working environment. The participants' responses are assumed to be a reasonable measurement of the temperature of how employees perceive their workplace's working environment efforts.

In this study, we asked about the workplace's prioritization of the working environment. In addition, measure of the workplace's offerings and crew members' use of health promotion initiatives are included. However, these results are shown in a separate figure. There is a brief description of each factor below, followed by a presentation of the results of the study.

Prioritizing the working environment and employee involvement

The questions about the workplace's prioritization of the working environment and employee involvement in the working environment are intended to measure how the crew members experience this. This includes the extent they experience being involved and incorporated in decisions about the working environment and the experience of the employees' own efforts with regard to the working environment.

Health-promoting offers

Healthier employees are more productive and have less sick leave due to better work ability and less pain. Therefore, many companies also offer various health-promoting activities such as smoking cessation courses, dietary guidance, exercise and treatment regimes. New research at NRCWE suggests that health-promoting programs for food and exercise in particular increase job satisfaction at the workplace (Andersen et al., 2017).

However, health promotion at work only works if employees participate in the activities, and participation is often low. In addition, previous studies show that activities do not always reach the people who need to improve their health the most. On the other hand, for example, it is typically employees who already exercise their bodies, who accept offers of physical activity. It is therefore a good idea to target the health-promoting efforts and ensure that the initiatives are addressed to those who are most in need. In this way, health promotion can help to reduce inequality in health.

NRCWE has found in a large survey among employees in Danish police that smokers prefer to get help through nicotine gum and otherwise no help or only help and support from family and friends. The same applies for alcohol users who prefer no help or only help from family and friends. Employees who want to change eating habits prefer free fruit basket, free nutritional guide and/or guidelines for healthy diet at work. Employees who want to change their habits for physical activity, prefer to work out at work, get free training and to train in a social/collegial context (Persson et al., 2014).

How to read the figure

The figure shows a ranked list of all questions within the topic 'Challenges of the workplace's prioritization of working environment'. All results are converted into a value, an index, between 0 and 100, where the higher the score means a more negative degree of the measured question. In other words, the higher the score, the greater the challenge. The vast majority of questions are already based on challenges, while the other questions have been reversed in their coding, so that all graphs and numbers can be read on the same scale from 0 to 100. A value of 0 thus means that there is no problem or challenge, while a value of 100 means that the challenge is at a maximum (everyone experiences the problem or challenge at all times).

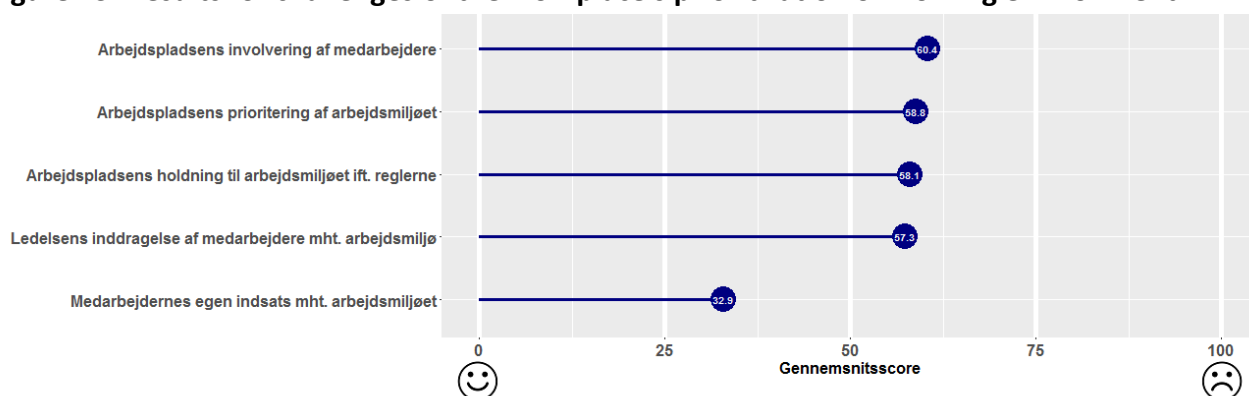
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Please note ...

That the various questions have different significance and consequences for the employees and workplaces concerned. It is therefore important that you as a reader both relate to the index value from 0 to 100 and the content of the question.

In the figure, the questions that employees responded most negatively to are ranked at the top, while the questions that they responded most favourably to are ranked at the bottom. The results are calculated as average scores (or percentages (%)) if it is in parentheses). See table of questions in table 1.

Figure 23: Results for challenges of the workplace's prioritization of working environment



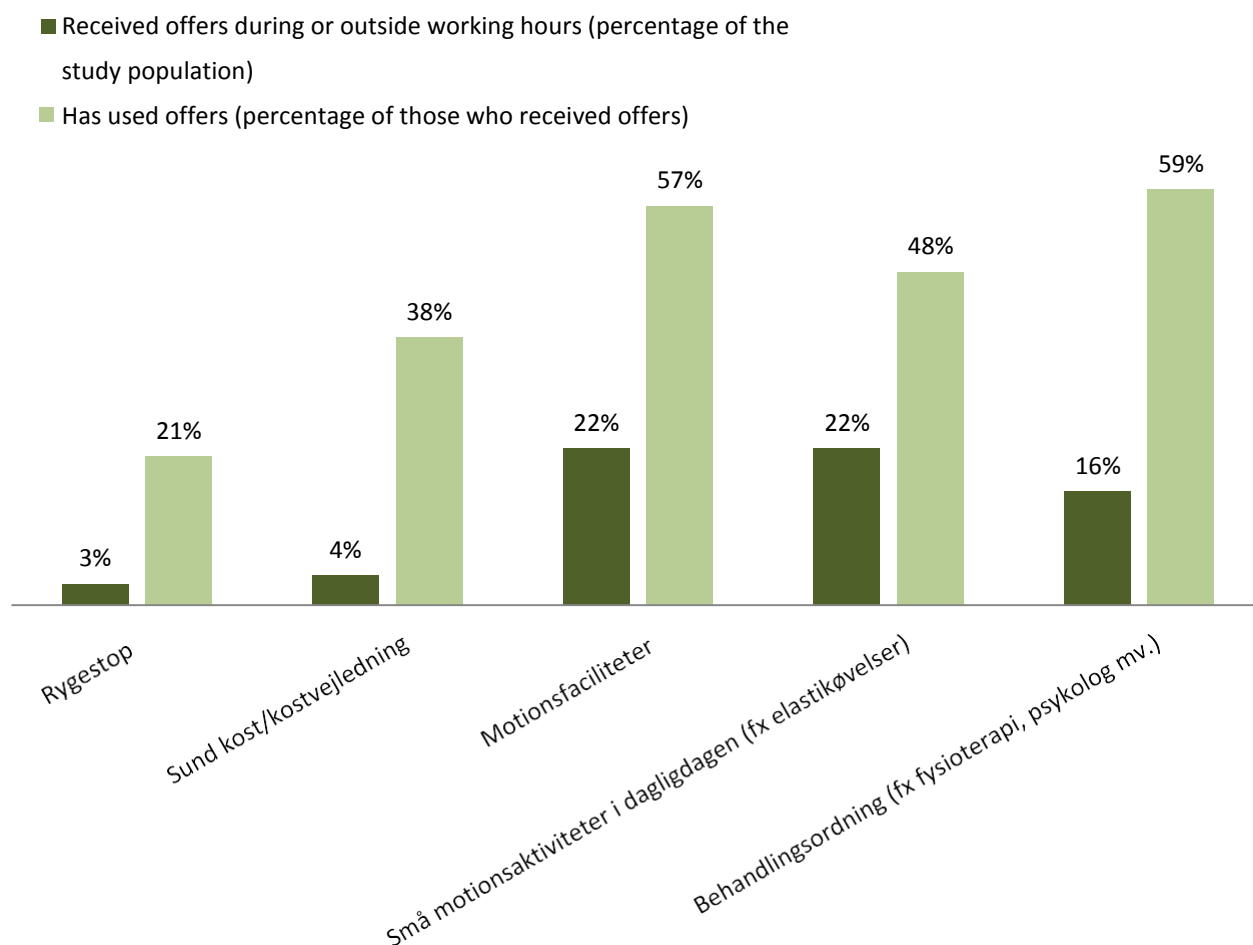
Danish	English
Arbejdspladsens involvering af medarbejdere	Workplace's involvement of employees
Arbejdspladsens prioritering af arbejdsmiljøet	Workplace prioritization of the working environment
Arbejdspladsens holdning til arbejdsmiljøet ift. reglerne	The workplace's position on the working environment in relation to the rules
Ledelsens inddragelse medarbejdere mht. arbejdsmiljø	Management's involvement of employees with regard to working environment
Medarbejdernes egen indsats mht. arbejdsmiljøet	The employees' own efforts regarding the working environment
Gennemsnitsscore	Average score

In relation to the *prioritization* of the working environment, employees in the aviation industry respond slightly worse than average. It is a question of what extent the employees become involved in decisions about the working environment, whether the workplace prioritizes the working environment, and whether there is an opinion that the working environment must be better than the rules require. This is *not* particularly the case. On the other hand, it is more the case that the employees make an effort themselves to improve the working environment.

Figure 24 below shows, respectively, the percentage of the study population that has been offered the various health-promoting measures and the percentage thereof that has used the offers.

The figure shows that only 3 and 4 percent respectively have been offered smoking cessation and dietary guidance. By contrast, 22 percent received exercise-promoting offers, and 16 percent have received a treatment plan. Among those who have received health-promoting offers, the percentage who have made use of the offers is lowest for smoking cessation services (21 percent) and dietary guidance (38 percent). On the other hand, about half of those who have been offered exercise or treatment plans, respectively, have used the offers.

Figure 24: ‘Have received’ and ‘Have used’ health-promoting offers



Danish	English
Rygestop	Smoking cessation
Sund kost/kostvejledning	Healthy diet/dietary guidance
Motionsfaciliteter	Exercise facilities
Små motionsaktiviteter i dagligdagen (fx elastikøvelser)	Small exercise activities daily (e.g. resistance band exercises)
Behandlingsordning (fx fysioterapi, psykolog mv.)	Treatment plan (e.g. physiotherapy, psychologist, etc.)

xvi: Columns for ‘Have received’ (dark green) indicate the proportion of the study population that has received the relevant health-promoting offer, e.g. smoking cessation. Columns for ‘Have used offers’ (light green) indicate the proportion of the study population who have received offers, but have not chosen to use it, e.g. offers for smoking cessation.

10. MEALS ON BOARD AND ACCOMMODATION

What is meals on board and accommodation?

Meals on board cover the diet that crew members get when they are at work. The crew members' accommodation covers the conditions experienced by crew members when they have to stay somewhere else other than at home in connection with work.

In this study, we inquired into the two factors; meals on board and the conditions of accommodation. 'Accommodation' is only investigated with one question, while 'Meals on board' is examined through several questions. There is a brief description of each factor below, followed by a presentation of the results of the study.

Meals on board

Several studies have shown that we eat as the surrounding culture prescribes and depending on what is readily available. Healthy choices and healthy diet should therefore be readily available so that the energy level is kept up. Most people who have changing working hours often eat irregularly, sweet food in varying amounts and non-varied diet, which easily leads to unhealthy eating habits.

Unhealthy eating habits can then easily lead to digestive problems such as diarrhoea or constipation with bloating and consequently abdominal pain. The problems can develop and, in the worst case, become chronic if the unhealthy lifestyle is maintained (Danish Working Environment Council for Aviation, 2009). In the aviation industry, it must also be considered that in some aircraft, toilet facilities do not exist on board. This study includes a question of whether crew members have had sufficient time and opportunity for on-board toilet visits. Persons for whom the question has not been relevant are not included in the results.

Accommodation

It is important that the crew members are rested so that they can carry out their work aboard the aircraft and for many of the crew members who do not work exclusively at their home base, accommodation is of course important. Therefore, in this study, a question arises as to whether crew members are able to get the necessary rest in connection with accommodation at work.

How to read the figure

The figure shows a ranked list of all questions within the subject 'Challenges of meals on board and accommodation'. All results are converted into a value, an index, between 0 and 100, where the higher the score means a more negative degree of the measured question. In other words, the higher the score, the greater the challenge. The vast majority of questions are already based on challenges, while the other questions have been reversed in their coding, so that all graphs and numbers can be read on the same scale from 0 to 100. A value of 0 thus means that there is no problem or challenge, while a value of 100 means that the challenge is at a maximum (everyone experiences the problem or challenge at all times).

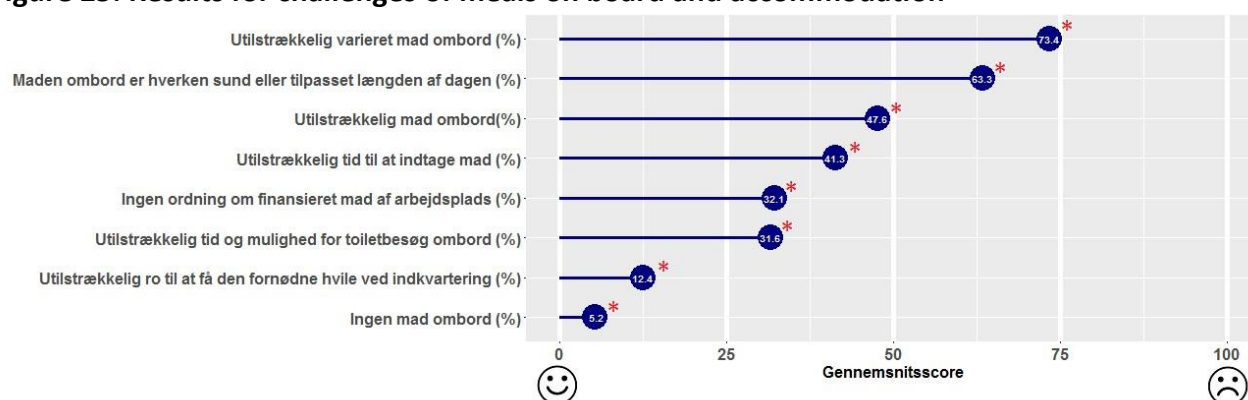
If a question is a yes / no question, the index indicates the percentage share that answered 'Yes'. These questions are marked with a percent sign in parentheses (%).

Please note ...

That the various questions have different significance and consequences for the employees and workplaces concerned. It is therefore important that you as a reader both relate to the index value from 0 to 100 and the content of the question.

In the figure, the questions that employees responded most negatively to are ranked at the top, while the questions that they responded most favourably to are ranked at the bottom. The results are calculated as average scores (or percentages (%) if it is in parentheses). See table of questions in table 1.

Figure 25: Results for challenges of meals on board and accommodation



* Conditional on positive response to filter questions. I.e. the result is for a sub-population.

Danish	English
Utilstrækkelig varieret mad ombord (%)	Insufficient variety of food on board (%)
Maden ombord er hverken sund eller tilpasset længden af dagen (%)	The food on board is neither healthy or suited to the length of the day (%)
Utilstrækkelig mad ombord (%)	Insufficient food on board (%)
Utilstrækkelig tid til at indtage mad (%)	Insufficient time to have meal (%)
Ingen ordning om finansieret mad af arbejdsplads (%)	No arrangement of financed food by workplace (%)
Utilstrækkelig tid og mulighed for toiletbesøg ombord (%)	Insufficient time and opportunity for toilet visits on board (%)
Utilstrækkelig ro til at få den fornødne hvile ved indkvartering (%)	Insufficient peace and quiet to get the necessary rest at the accommodation (%)
Ingen mad ombord (%)	No food on board (%)
Gennemsnitsscore	Average score

The top part of the figure shows that a large percentage of the crew members do not believe that the food on board is sufficiently varied (73.4%) or that it is healthy and adapted to the length of the

working day (63.3%). A relatively large proportion (41.3 percent) also indicates that there is not enough time to eat or time for toilet visits (31.6 percent). A small percentage (12.4 percent) indicate that it is difficult to have the peace and quiet for the necessary rest during accommodation, and only 5.2 percent do not get food on board when they are at work. People who have answered 'Not relevant' or 'Don't know' are not included in the results shown in the figure.

11. HEALTH, CAPACITY FOR WORK AND JOB SATISFACTION

What is health, capacity for work and job satisfaction?

Health, work ability and job satisfaction are influenced by many factors both at and outside of work.

In this study, we have inquired into a number of these factors. Some are elucidated with one question, while other factors, e.g. 'Pain', is elucidated through several questions. A brief description of each factor is provided in the next pages, followed by a presentation of the study's results.

Self-assessed health

General self-assessed health is useful as an overall health measurement in population studies and as a supplement to other health measurements. It has been shown that the participants primarily respond to the question of self-assessed health based on their physical health and, to a lesser extent, their mental health.

Self-assessed capacity for work

Self-assessed capacity for work is the individual's assessment of their own abilities to live up to the physical and mental demands that the work places on them. Capacity for work reflects the individual's assessment of the balance between health and other personal resources vis-à-vis the requirements that the work places on them. A poor self-assessed capacity for work is linked to the risk of future long-term sick leave and early retirement from the labour market (Sell et al., 2009).

Symptoms of depression

It is not only people with the diagnosis of 'clinical depression' who have an increased risk of sick leave and early withdrawal from the labour market. Also, people who have depressive symptoms to an increased degree, but not an actual diagnosis, have a high risk of long-term sick leave (Hjarsbech et al., 2013; Rugulies et al., 2013; Thorsen et al., 2013).

Often, the degree of depressive symptoms is measured by the practice of the so-called MDI (Major Depression Inventory) score, which is a total score of 0 to 50. A high value on the scale corresponds to the person having several depressive symptoms while a low value means that the person has fewer depressive symptoms. An MDI score of 20 (in the figure's index scale = 40) or above is considered to indicate that it may be possible to give the diagnosis 'Clinical depression'.

Symptoms of anxiety

Being troubled, scared, nervous, worried or feeling horror or panic is a natural reaction to situations that you experience as 'dangerous'. Anxiety symptoms may be due to various diseases, or they may reflect increased focus on normal bodily reactions. Symptoms of anxiety can in some cases both bother and strain us. In some cases, the symptoms are so severe that one should seek help.

In this study, symptoms of anxiety are measured by asking four sub-questions about feeling scared, feeling nervous and inner anxiety, feeling horror or panic, and worrying too much. The symptoms examine signs of severe anxiety, and the four sub-questions stem from the recognized Symptom Checklist (SCL)-90 and are part of the Common Mental Disorder Questionnaire (CMDQ).

Mental well-being and lack of energy

Mental well-being is of great importance for sick leave and for the possibility of retaining employees at the workplace. A poor mental well-being is strongly associated with an increased risk of long-term sickness absence, termination of work and early retirement. Not only people with clinical mental disorders have an increased risk of sick leave and early retirement from the labour market. Also, people who do not meet the conditions for having a definite clinical disorder but who have moderately elevated symptoms have a high risk of long-term sick leave.

In addition to symptoms of depression and anxiety, NRCWE measures mental well-being through a scale for general mental well-being and a scale for energy. The questions on general mental well-being and energy come from a Danish translation of the US questionnaire SF-36, which is one of the most used questionnaires to measure self-assessed health in the world.

Weariness and stress

Overview and control give the feeling that one is able to handle difficulties at work and in private life. One feels that life is predictable and controllable. Weariness is measured through questions about how often in the past month one has felt that one was unable to control important things in life, feeling that the difficulties were such that you could not cope with them, feeling secure at your own abilities to cope with difficulties at work or feeling that things at work evolved as one wished. The questions are compiled into a slightly modified, but internationally used and validated score that measures perceived stress or weariness.

The feeling of stress can be measured in several different ways, and in this study the word 'stress' is used in the question. The participants' responses therefore depend on what they understand by the concept of stress. However, the stress has a negative connotation, i.e. something to avoid. Stress is not officially regarded as a disease and therefore no clear criteria exist

for when you are stressed, which core symptoms apply to stress, how serious the symptoms should be, or how long they should have lasted before there is stress. However, several have tried to link a number of symptoms to the stress condition, and these symptoms are often divided into three types: physical symptoms, mental symptoms and behavioural symptoms (Andersen and Brinkmann, 2013). NRCWE's reports have shown that the experience of feeling stressed is more widespread among women than men and among people with high socio-economic status (The National Research Centre for Work Environment (NRCWE), 2012).

Tiredness and sleep

There are many reasons why you may be tired after a working day. This may be due to conditions at or outside of work. For example, night work and early meeting hours affects the level of tiredness.

At the same time, night work affects sleep. Outside of work, your sleep can be affected by e.g. noise. Poor sleep quality can be seen in four ways: 1) You sleep too little, 2) You sleep too poorly, 3) You do not feel rested when you wake up and 4) You are tired during the day. Sufficient and good sleep is necessary for the body to recover from day to day. If you sleep too little or too poorly, you get tired, and it can increase the risk of work accidents and reduce the quality and productivity of the work.

Flight across multiple time zones

In this study, we have added a question that inquires about how often crew members have flown across multiple time zones (East-West) and a question on how much crew members are bothered by it.

Job satisfaction

Job satisfaction highlights the degree of alignment between the employee's personal expectations of the job and the conditions that the employee actually experiences at their work.

Job satisfaction depends on the interaction between employees, between employee and manager, and on what values and expectations each employee has for their work environment and the company overall. A study has shown a correlation between higher job satisfaction and later retirement from the labour market (Thorsen et al., 2016b).

Illness

Self-assessed work-related illness can be, for example, musculoskeletal disorders, skin disorders, hearing damage, cardiovascular diseases, respiratory disorders, cancer, reproductive injuries or ulcers.

These diseases can be caused or exacerbated by factors in the working environment, but also by lifestyle factors such as smoking and alcohol. In this study, we have not only asked about the occurrence of work-related illness, but also the incidence of treatment-requiring illnesses in general.

Pain in the body

Transient body pain is completely natural and harmless, but one must react when pain no longer disappears by itself. There can be different consequences of pain, e.g. pain can limit your work, depending on which job you have. However, in the vast majority of cases, it will be beneficial to keep the body moving at work despite the pain. In this study, participants are asked about the presence of a number of well-known symptoms, i.e. inquiries have not been made on chronic pain conditions.

Retirement from the labour market

NRCWE has previously found that the planned retirement age depends, among other things, on how physically hard the work is. The harder the physical work, the sooner we plan to withdraw from the labour market. The retirement age is also linked to socio-economic status.

This applies, for example, to teachers: School teachers plan on an earlier retirement age than high school teachers, and high school teachers plan on an earlier retirement age than lecturers and researchers at universities. In addition, more women than men plan to retire from the labour market before they reach the age of 65.

Sick leave

Many different factors affect the risk of sick leave, including working environment and health factors. Both the physical and the psychological burden index, which are measurements that combine exposure and symptoms, have in a NRCWE study have shown a connection with an increased number of sick days (Thorsen et al., 2016a). In Denmark, there are various sick leave registers, but in this study, it has not been possible to link the participants to the register information.

Sick leave is therefore elucidated on the basis of a self-reported number of days in the last year.

How to read the figure

The figure shows a ranked list of all questions within the topic 'Work accidents and challenges of safety'. All results are converted into a value, an index, between 0 and 100, where the higher the score means a more negative degree of the measured question. In other words, the higher the score, the greater the challenge. The vast majority of questions are already based on challenges, while the other questions have been reversed in their coding, so that all graphs and numbers can be read on the same scale from 0 to 100. A value of 0 thus means that there is no problem or challenge, while a value of 100 means that the challenge is at a maximum (everyone experiences the problem or challenge at all times).

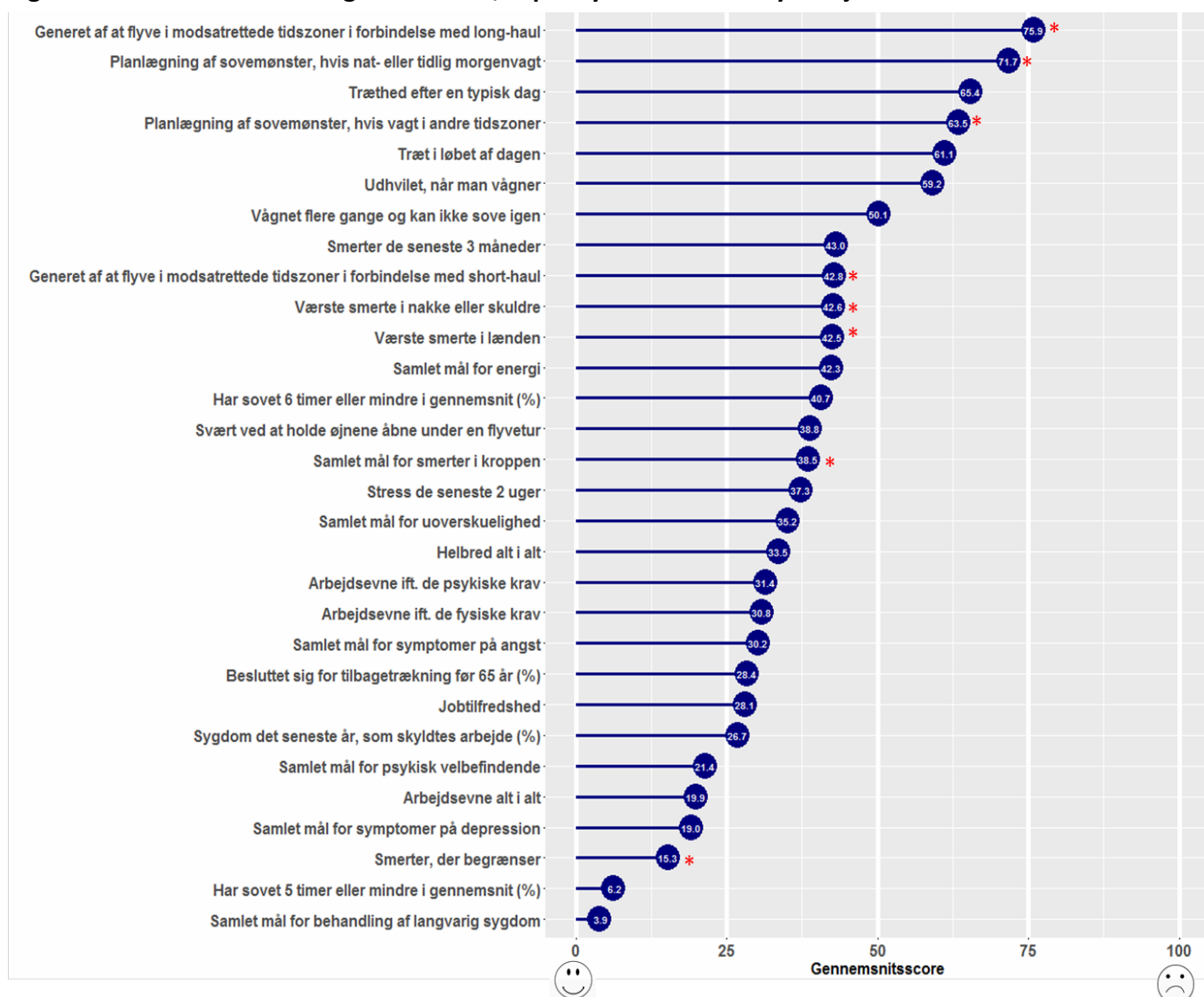
If a question is a yes / no question, the index indicates the percentage share that answered 'Yes'. These questions are marked with a percent sign in parentheses (%).

Please note ...

That the various questions have different significance and consequences for the employees and workplaces concerned. It is therefore important that you as a reader both relate to the index value from 0 to 100 and the content of the question.

In the figure, the questions that employees responded most negatively to are ranked at the top, while the questions that they responded most favourably to are ranked at the bottom. The results are calculated as average scores (or percentages (%) if it is in parentheses). See table of questions in table 1.

Figure 26: Results for challenges of health, capacity for work ability and job satisfaction



* Conditional on positive response to filter questions. I.e. the result is for a sub-population.

Danish	English
Generet af at flyve i modsatrettede tidszoner i forbindelse med long-haul	Bothered by flying across multiple time zones in connection with long-haul flights
Planlægning af sovemønster, hvis nat- eller tidligmorgenvagt	Planning of sleeping pattern, if it is a night or an early morning shift
Træthed efter en typisk dag	Tired after a typical day
Planlægning af sovemønster, hvis vagt i andre tidszoner	Planning of sleeping patterns, if shift is across multiple time zones
Træt i løbet af dagen	Tired during the day
Udhvilet, når man vågner	Rested when you wake up
Vågnet flere gange og kan ikke sove igen	Woken up several times and can't sleep again
Smerter de seneste 3 måneder	Pain in the last 3 months
Generet af at flyve i modsatrettede tidszoner i forbindelse med short-haul	Bothered by flying across multiple time zones in connection with short-haul flights
Værste smerte i nakke eller skuldre	Worst pain in neck or shoulder
Værste smerte i lænden	Worst pain in the loin

Samlet mål for energi	Overall measurement of energy
Har sovet 6 timer eller mindre i gennemsnittet (%)	Have slept 6 hours or less on average (%)
Svært ved at holde øjnene åbne under en flyvetur	Hard to keep your eyes open during a flight
Samlet mål for smerter i kroppen	Overall measurement of pain in the body
Stress de seneste 2 uger	Stress over the past 2 weeks
Samlet mål for uoverskuelighed	Overall measurement for being overwhelmed
Helbred alt i alt	Overall health
Arbejdsevne ift. de psykiske krav	Ability to work in relation to mental requirements
Arbejdsevne ift. de fysiske krav	Ability to work in relation to physical requirements
Samlet mål for symptomer på angst	Overall measurement of symptoms of anxiety
Besluttet sig for tilbagetrækning før 65 år (%)	Decided to retire before age of 65
Jobtilfredshed	Job satisfaction
Sygdom det seneste år, som skyldtes arbejde (%)	Illness in the past year, due to work (%)
Samlet mål for psykiske velbefindende	Overall measurement of mental well-being
Arbejdsevne alt i alt	Overall ability to work
Samlet mål for symptomer på depression	Overall measurement of symptoms of depression
Smerter, der begrænser	Pain that restricts
Har sovet 5 timer eller mindre i gennemsnit (%)	Have slept 5 hours or less on average (%)
Samlet mål for behandling af langvarig sygdom	Overall measurement of treatment of long-term illness
Gennemsnitsscore	Average score

The upper part of the figure shows that the crew members have relatively huge challenges concerning tiredness. They are tired or exhausted after work and are often not rested. Employees, for whom it is relevant, plan their sleeping patterns to a large extent after their working hours and if they are to travel across multiple time zones. In addition, the crew members who fly long-haul across multiple time zones find that they are relatively very bothered by the work across time zones. The employees that fly short haul across multiple time zones are less bothered by it.

The lower part of the figure, on the other hand, shows that employees in the aviation industry do somewhat well on various health questions. It is about, for example, self-assessed health, physical and mental

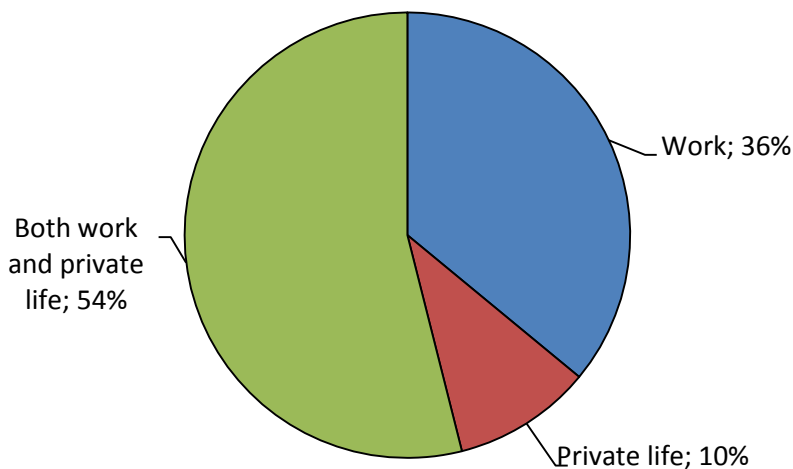
capacity to work, anxiety symptoms, depressive symptoms. However, it is noted that 26.7% of the crew members have had work-related illness within the past year.

In the middle of the figure, it can be seen that the occurrence of, for example, pain is to some extent found in employees, and the degree of these pains appears to be around average. However, pain that actually limits work does not appear to be widespread.

Figure 27 below shows what the crew members experience is the main source of their stress. The response options were; 1) Work, 2) Private life and 3) Both work and private life. Only people who in the questionnaire have answered that they are stressed to a greater or lesser degree, were given the question.

A total of 54 percent of crew members find that their stress is due to a combination of work and private life. A total of 36 percent respond that their stress is solely due to work, and one in ten answers that private life is the main source of stress.

Figure 27: Main source of stress (among those who were stressed over the past 2 weeks)



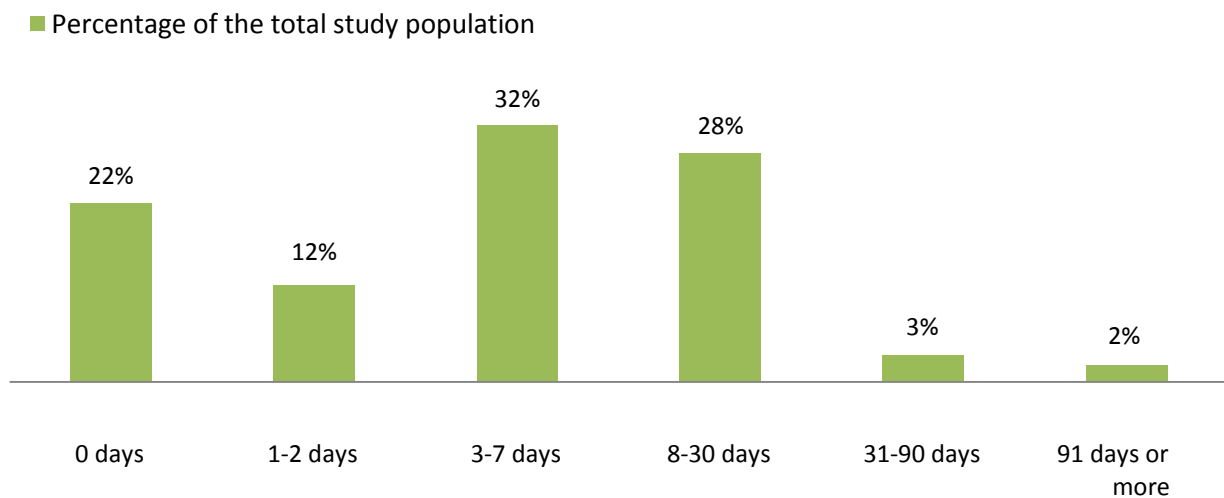
xvii: The three groups total 100%. The 100% covers over 83% of the study population, who were stressed to a greater or lesser extent over the past 2 weeks.

Figure 28 shows the sick leave, calculated using self-reporting, for the entire study population. The figure shows that slightly more than one in five has had 0 sick days in the past year. A total of 12% has had between 1 and 2 days of sick leave, 32 percent has had between 3 and 7 days of sick leave, while 28 percent has had between 8 and 30 days of sick leave. Respectively, 3 and 2 percent are distributed between 31-90 days of sick leave and 91 days or more.

For comparison with the crew members, the proportion with none or short (1-7 days) sick leave due to illness is higher among a large sample of Danish employees, presented in NRCWE's latest

absence report from 2018⁴ (Thorsen et al., 2018). On the other hand, the percentage of 8-30 days' absence in the sample with Danish employees is considerably lower compared to crew members (9 percent versus 28 percent). If the percentage with long-term sick leave (31 days or more) is considered, the percentage is the same for the sample for Danish employees and the study population with crew members. However, it is important to be aware that the two statements are based on different calculation methods, including self-reporting in the present study and register information in the absence report.

Figure 28: Self-reported number of days with sick leave in the last year



⁴The information of the absence report comes from Statistics Denmark's absence register. The register has statements for all public employees (state, regional and municipal employees) and a sample of private employees. The sample of private employees consists of: i) a sample of private companies with between 10 and 250 employees and ii) all private companies with more than 250 employees.

12. HEALTH AND LIFESTYLE

What is health and lifestyle?

Health and lifestyle factors are of great importance for the employees' well-being both at and outside of work. It is well documented that no exercise in one's free time, high alcohol consumption, smoking and being overweight among other things increases the risk of sick leave and early exclusion from the labour market. In this study, we have inquired about various factors that measure the crew members' health and lifestyle. Some factors, e.g. 'Overweight' is elucidated with one question, while other factors, such as 'Exercise', is elucidated with several questions. There is a brief description of this below, followed by a presentation of the results of the study.

Exercise, alcohol, smoking and being overweight

Exercise or physical activity covers all forms of movement that increase the use of energy. Physical activity thus includes a wide range of activities ranging from sports and exercise to everyday activities such as gardening, bicycling for transportation purposes, taking the stairs or walking the dog. It is well documented that physical activity prolongs life and reduces the risk of disease. Research has shown that the risk of long-term sick leave and early retirement is reduced if you exercise alongside work (Fimland et al., 2018; Holtermann et al., 2012).

A large study has previously shown that people who have long working days each week have a significantly increased risk of drinking alcohol in amounts that can harm their health compared to people who work 35 to 40 hours a week (Virtanen et al., 2015).

A study of female employees in elderly care support previous research by finding an increased risk of long-term sick leave among smokers compared to non-smokers. In addition, the research has shown that the more underweight or overweight one is, the higher the risk of long-term sick leave (Quist et al., 2014).

How to read the figure

The figure shows a ranked list of all questions within the topic 'Challenges of health and lifestyle'. All results are converted into a value, an index, between 0 and 100, where the higher the score means a more negative degree of the measured question. In other words, the higher the score, the greater the challenge. The vast majority of questions are already based on challenges, while the other questions have been reversed in their coding, so that all graphs and numbers can be read on the same scale from 0 to 100. A value of 0 thus means that there is no problem or challenge, while a value of 100 means that the challenge is at a maximum (everyone experiences the problem or challenge at all times).

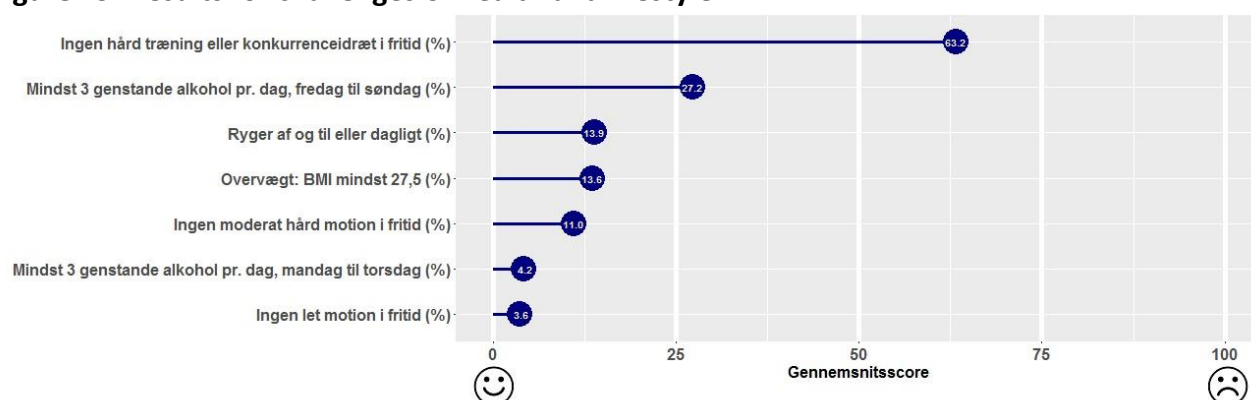
If a question is a yes / no question, the index indicates the percentage share that answered 'Yes'. These questions are marked with a percent sign in parentheses (%).

Please note ...

That the various questions have different significance and consequences for the employees and workplaces concerned. It is therefore important that you as a reader both relate to the index value from 0 to 100 and the content of the question.

In the figure, the questions that employees responded most negatively to are ranked at the top, while the questions that they responded most favourably to are ranked at the bottom. The results are calculated as average scores (or percentages (%) if it is in parentheses). See table of questions in table 1.

Figure 29: Results for challenges of health and lifestyle



Danish	English
Ingen hård træning eller konkurrenceidræt i fritid (%)	No hard training or competitive sports in free time (%)
Mindst 3 genstande alkohol pr. Dag, fredag til søndag (%)	At least 3 units of alcohol per day, Friday to Sunday (%)
Ryger af og til eller dagligt (%)	Smoke occasionally or daily (%)
Overvægt: BMI mindst 27,5 (%)	Overweight: BMI at least 27.5 (%)
Ingen moderat hård motion i fritid (%)	No moderately intense exercise (%)
Mindst 3 genstande alkohol pr. dag, mandag til torsdag (%)	At least 3 units of alcohol per day, Monday to Thursday (%)
Ingen let motion i fritid (%)	No light exercise in free time (%)
Gennemsnitsscore	Average score

The top part of the figure shows that a large part of the crew members does not practice hard training or competitive sports (a total of 63.2%). On the other hand, this corresponds to that a relatively large percentage does (36.8% in total). The percentage who don't do light or moderate exercise is small (3.6% and 11.0%, respectively). In addition, there is a relatively large proportion of employees who drink at least three items of alcohol per day Friday to Sunday (27.2%) and 13.9% who smoke occasionally or daily.

The lower part of the figure shows that only 4.2% of crew members drink at least three units of alcohol per day Monday through Thursday.

Notification of alcohol questions:

This result might indicate that some participants have reported a total number of units for the entire period and not the number of units per day.

13. DISCUSSION

The survey finds that the Danish aviation industry has challenges concerning

- high demands for flexibility, overtime
- job security
- hard physical work, exposure to noise, cold and draft, vibration, turbulence
- strenuous working postures
- work across multiple time zones, sleep problems and fatigue
- provisions on board.

In addition, the results indicate that the crew members call for a higher prioritization of the work environment and better management quality. The crew members have a relatively high incidence of sick leave of 8-30 days in a year.

At the same time, the survey supports the fact that the aviation industry is also characterized by a good safety culture. The close cooperation with colleagues seems to work well - there is a relatively high degree of collegial help and support, collaboration and recognition. However, there is also a certain level of conflict, measured by a relatively high incidence of quarrels and conflicts.

The strength of the survey is, first and foremost, that it shows a nuanced picture of the working environment and the health of crew members in Danish aviation. The design of the survey is based on questionnaire data with validated questions and scales, and so results can be compared with other industries that have participated in e.g. the national Working Environment and Health Survey (see results at the following website: <https://arbejdsmiljodata.nfa.dk/>). In addition, it is a great strength that the study reveals a number of specific themes that are particularly relevant in the aviation industry.

One strength of the survey is that the response rate is relatively high, totalling 55 percent. This is slightly higher than NRCWE's national Working Environment and Health Survey. The decent achievement and the interest in participating in the survey must also be seen in light of the very lengthy questionnaire. In addition, there was no possibility to create personal links to the survey questionnaire, so that one could follow up on the people who did not respond. It was therefore also not possible to make a non-response analysis. We only know that the airlines are represented differently in the survey.

14. CONCLUSION

The survey shows that the aviation industry has a number of challenges with the psychological and physical work environment. The challenges are mainly about a relatively demanding physical work environment, requirements of employee flexibility, fatigue and sleep, conflicts with co-workers, prioritization of the work environment, on-board catering and sick leave. On the other hand, the survey also shows that the aviation industry is characterized by a good safety culture, healthy employees and good cooperation among co-workers. With responses from more than half of the aviation industry's crew members, the results support a nuanced picture of the work environment and health within Danish aviation industry.

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