

## STRESS IN SEAMEN AND NON SEAMEN EMPLOYED BY THE SAME COMPANY

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### ABSTRACT

**Objectives** : The aim of this survey was to compare the level of professional stress among seamen – crew members - who work on French oceanographic vessels to the one of technicians and engineers from the oceanographic institute, who board the ships to operate special equipment during sea voyages.

**Method** : Two questionnaires were used for collecting data:

- Langner's total health test (22 items) that investigates the level of psychical stress,

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- Karasek's "Job Content Questionnaire" (38 items) used for investigation of strain at work, psychological pressure, decision latitude and social support. Data were processed by a statistical software : Sphinx®, using Chi<sup>2</sup> test.

**Results** : two groups of subjects were included: 74 seamen and 74 non seamen, males of comparable ages were questioned. Results showed that there was no significant difference in strain at work and social support between them (41 seamen and 50 non seaman professionals who filled in the questionnaires). There was a very significant difference in the decision latitude: much lower level for seamen as compared to non seamen. 17% compared to zero percent of non seamen were ranked in the heavy strain/low decision latitude category regarded by Karasek as a high risk of stress (compared to 0% of non seaman professionals). 33% of seamen in this group reached a score that indicated psychical stress according to Langner's total health test.

**Conclusion** : The results of the survey show that the occupation of seamen includes specific elements regarded by Karasek as leading to a risk of stress.

**Key-words**

Seafarer, stress, questionnaire, job strain, boat

## INTRODUCTION

Some of the specific stressors in the occupation of seamen are: long periods of work and monotonous life on ships, separation from the family, limited social contacts and recreation opportunities, and hostile environment.

The aim of this survey was to compare work related stress in seamen and non seamen who stay and work on ships for short periods of time.

## METHODS

The two groups of subjects were randomly chosen. The seamen and control subjects filled in two questionnaires validated in France as well as at an international level. They are :

- the Langner questionnaire (22 items) (1), worked out and validated in the USA and Europe; this questionnaire allows to detect signs of psychical stress, at the time when the test is being performed and/or in a recent period of time. Although it was introduced 40 years ago, it is still widely used in France. The result of this test is regarded as normal if the total score is below or equal to 4. A score between 5 and 8 indicates the beginning of psychical stress on moderate level. The score equal or above 9 indicates major stress, or mental disease of the depression type.

- the Karasek questionnaire is internationally validated (2). This test is used to analyse the working conditions that can provoke professional stress. It deals with three axes of working situations :
  - constraints at work or job demands
  - working decision latitude
  - social support

According to Karasek, the risks of psychological tension and physical diseases increase in an environment with strong constraints at work, when the worker has little control on job demands (low job decision latitude). The social support at work (relations with colleagues and hierarchy) can also create the mental or physical health problems. It was added as a component to the original model (3).

The amount of work required, the time devoted to do it and the complexity of the job are considered as “constraints at work”.

The job decision latitude is the possibility to choose how to achieve a task and to participate in the decisions that are related to it. Social support is the help from colleagues and superiors and their acknowledgment of the job performed. Karasek considers that the stress is more likely to be pathogenic when the working conditions are connected with high job demands and a low job decision latitude, and also when the social support is poor.

A score was calculated for each situation at work according to the number of positive answers to the questions (10 questions for the job demands, 18 questions for the job decision latitude, 8 questions for the social support).

The survey was conducted in 2005 in Brest and Toulon, at the time when the seafarers had their periodic medical examinations. The questionnaires were given to 74 randomly selected seamen and to 74 non seamen professionals. The forms were given and filled in before the physical examination.

The processing of questionnaire was carried out by the occupational medicine service in Brest and the statistical work was done with the use of specialized software (Sphinx). The Chi square test was used in the comparison of the two groups.

## PARTICIPANTS

Compared were groups of seafarers and non seafarers working in the same institution – the French Institute for Research at Sea (IFREMER). This institute has commissioned about 10 ships, including five large ones which sailed on all oceans conducting national and international scientific missions. IFREMER managed the crews of these ships, about 200 professional seafarers. For the maintenance of the technical

oceanographic equipment during the sea voyages the institute also embarked its regular workers – engineers and technicians. They were used as a control group. In both groups there were French males. Seafarers were officers and ratings, from the deck and engine departments, who worked on ships for two months and after that had two months leave.

Non seamen professionals (control group) embarked for 1 to 3 months per year, for periods lasting from 1 to 5 weeks (on the average, 3 periods per year) and worked on ships 12 hours per day. Being at sea they were exposed to the same hazards as seafarers and lived in the same conditions.

## RESULTS

41 seamen and 50 control subjects were included in this study. The participating rate for the seamen was 55% (41 out of 74) and for the control group was 67% (50 out of 74). These two groups are comparable regarding sex, social level, age and the duration of service for the IFREMER (Table 1).

Table 1.

Age of seamen and non seamen (control group) and the duration of their service

	Seamen n=41 males	Control subjects (non seamen) n=50 males
Age	41 years ( $\pm 8$ )	43 years ( $\pm 9$ )
Duration of service for the INFREMER	16 years ( $\pm 10$ ) insignificant differences	16 years ( $\pm 8$ ) insignificant differences

### KARASEK'S SCORE

- Constraints at work (job requirements) : there was a statistically significant difference in an estimation of a stronger job requirement between the two groups.  
41,5% of the seamen felt that they were submitted to high job requirements, while only 22% of the control subjects were of this opinion (Table 2).
- Job decision latitude : there was also a significant difference between seamen and control subjects. 39% of the seamen and only 16% of non seamen felt that they had a low job decision latitude (Table 2).
- Social support : no difference reported in two compared groups.

Table 2.

**Results of the Karasek's scores in the seamen and the control group**

<b>Heavy job demands</b>			
	Score	%	
<b>Seamen</b>	3,8 ± 2,5	41%	Significant p < 0,05
<b>Control subjects</b>	2,8 ± 2,2	22%	
<b>Low job decision latitude</b>			
	Score	%	
<b>Seamen</b>	7,9 ± 3,43	39%	Significant p < 0,01
<b>Control subjects</b>	5,1 ± 3,18	16%	
<b>Low social support</b>			
	Score	%	
<b>Seamen</b>	6 ± 2,2	22%	Non significant
<b>Control subjects</b>	5,6 ± 2,2	28%	

**Results of the Langner's score**

The results of the Langner's score are paradoxically better for the seamen than for the control subjects. Only 12% of the seamen present scores above normality, versus 24% for the control subjects. However these results are not statistically significant (table 3).

Table 3. **Results of the Langner's test scores in seamen and non seamen**

	0 to 4	5 to 8	9 and above
Seamen	88%	10%	2%
Control subjects (non seamen)	76%	18%	6% insignificant differences

The comparison of the profile in the individuals with a Langner's score above 4, regarded as stressed, to Karasek's scores, show that only the job decision latitude appear to be discriminating (Table 4). Although the result is not statistically significant, we notice that a great number of seamen reported having poor social support.

**Table 4. Comparison of the results of scores of Langner and Karasek in seamen and non seamen populations**

	Heavy job demands		Low job decision latitude		Poor social support	
Seamen Langner's score > 4	2,8±1,6	20 %	13,4*±2,9	100 %	4,4±2,3	60%
Control subjects Langner's score >4	3,3±2,6	25 %	6,6*±3,5 Differences only significant for the job decision latitude * p < 0,001	17 %	5±2,9	33%

## DISCUSSION

The first question to be asked is whether the chosen tests are relevant. In fact, there are numerous questionnaires about professional stress and the choice of the most appropriate tests is not always a simple matter (4).

The results showed significant differences between the two surveyed populations: seamen reported a higher level of stress than control subjects according to Karasek criteria, job demands and job decision latitude.

Individuals who reported heavy job demands and low job decision latitude (those regarded by Karasek as presenting a high risk of stress harmful to their health) represented 10% of seamen and only 2% of control subjects.

We may consider that the results of the tests as a whole are good in seamen as well as control subjects. Nevertheless, significant differences appear in these two populations : seamen reported higher level of stress than control subjects according to Karasek criteria, job demands and job decision latitude.

According to Karasek, these two points, when associated, condition the risk of pathological stress. Almost 10% of the seamen are in this situation, and even 7,3% suffer from the three conditions described by Karasek. We were expecting to find worse scores in seamen as compared to control subjects for the Langner's test, which expresses effective psychical stress. Now, the results do not show a significant difference as compared to control subjects.

There may be the following explanations to such findings :

- 1- The constraints at work experienced as heavy, and the low job decision latitude are inherent to the duty and probably insufficient to generate a true situation of chronic symptomatic stress alone, and stress must be considered with many other co-factors at sea (5-9).
- 2- Some seamen who can not withstand life at sea resign early and switch to another job, or are considered unfit for the job if they suffer a chronic depressive syndrome or if they are under medication incompatible with a seagoing duty. Indeed, in France, the declaration of fitness for work at sea must meet higher requirements than for people who work on land. This generates a statistical bias well known in occupational medicine (10) as *the healthy worker effect*.
- 3- We did not inquire about the use of psychotropic drugs among the persons included in our study. Their use by seamen could explain a difference in their favour at the results of the tests. An additional study on this topic would be relevant.

It is interesting to notice that the job decision latitude is different when one considers the profile of seamen and control subjects having or not a score above 4 at the Langner's test. This is probably linked to daily routine in the job of a seaman (5-9). In the jobs of control subjects the boarding periods give an attractive diversity and also give them extra bonuses.

One last observation concerns the interpersonal relationship onboard. This relationship is very good and the atmosphere onboard usually friendly. It has to be noticed that in the group of seamen, those who declare a heavy job demand and a low decision latitude also express poor social support from their hierarchy or colleagues. This situation probably reflects a poor adaptation of seamen to their working conditions. Those of them complaining about low job decision latitude associated with poor social support face the risk of diseases linked to the stress : alcohol addiction (11), cardiovascular diseases (12), peptic ulcers, major anxiety and depressive syndromes (13).

In this study, the work conditions of our seamen were different from crews of merchant or fishing ships. Two factors of stress are not present on oceanographic ships: the time pressure and the financial constraint. Our seamen operated ships to the mission area and on the way back (14). The importance of the mission is the quality of data that the oceanographers can bring back. So, in this study, we do not have all the risk factors a seamen can face.

## CONCLUSION

The comparison of a group of seamen working on French oceanographic vessels with control subjects on the same ships showed that seamen were under greater stress than the control group, according to Karasek's criteria.

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