

A Research on Fatigue Factors affecting the Indian Mariners working on Merchant Ships

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Abstract:

The study pertains to the factors related to fatigue of the mariners who work on board the ships. The stress related to the job done by the seafarers who have taken up the job on the ships, face various problems related to sailing. One of the most important problems faced by the sailors is based on the health problems together with other problems such as psychological problems, organizational oriented problems and social problems. Moreover there is a unique problem faced by the mariners which is considered to be slightly rare in other industrial sectors, that is, the nationality of the mariners. The employees who work on the ship would be based on various nationalities and this issue would put the sailors in great stress. Apart from that there are a lot of sources through which the mariners will get fatigued. The research study has considered the Indian mariners for identifying the factors of fatigue viz., the environmental hardships of mariners, long working hours, irregular sleep patterns or broken rest of mariners, changes in the maritime industry, dual work or home interface of mariners, and improper exercise & nutrition.

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I. INTRODUCTION

The fatigue of seafarers is considered to be the most important problem among mariners who work on the ship under various capacities as engine side mariners and deck side mariners. The fatigue may be related to various factors which are pertinent to perform in the productive and efficient manner. The fatigue may be directly related to the task to be accomplished, the social fatigue, emotional fatigue, occupational fatigue. More than that, the fatigue may be related to long working hours in the ship, the condition of work places in the ship, irregular work time, too much of working hours, unclear role regulations, unclear work rules, conflict between the co-mariners, conflict with the superior mariners such as chief engineers and captain of the ship, conflict with the peers and subordinates. Above all the mariners need to take care of their health issues such as dehydration, stomach upsets, disturbances in the

sleeping pattern, risk of doing a tough task, dangers in accomplishing the given tasks and excessive noise.

The fatigue of the mariners will be indicated by the distraction of seafarers while doing the work, severe body aches, lack of focus in the job, short temperedness, and difficulty in understanding things specified by other mariners and higher officials, bad morale of the employees, dissatisfaction of job among the mariners when they work on the ship under the control of other mariners of higher order, the anger level of the mariners when they work with the peer employees. The degradation of work is based on the performance and productivity of the employees working in the ship.

The strain on the job depends on the individual to individual who are working on the ship under various capacities. The inability of the mariners may directly depend on their inability to meet their

demands of the work. Moreover the mariners fatigue depends on the imbalance of physiological aspects and also the imbalance of psychological aspects related to work. This in turn will have a serious impact on the life situation of mariners who will try to do their work based on daily routine. The irregular way of work will also have serious impact on the work life of mariners

The job of mariners can never be compared to any job on the land since the way in which the employees work in the land based companies will be completely different from the ship based jobs. There is always a high risk in the job based on ships as compared to the jobs on land based companies. The life of mariners is always at stake when they work on the ship since the ship floats on water. Even though the technological development has really gone to a greater extent as compared to a century back in the way in which the ship operations are being done nowadays since most of the activities on the ship have already been automated completely. And with the help of sophisticated communication technologies, the ships are now navigated with the help of Global Positioning Systems and other Satellite based networking operations. In spite of the sophisticated operations, the life of mariners on the sea is always at risk because of the way in which the things are being done on the ship.

The sailing job particularly involves a high degree of attention or focus in which the mariners should be alert at all times. There is nothing like 9 to 5 work in the ship based work operations since the mariners must be alert at all times and this unpredicted work time makes the mariners to work for more than 16 hours a day affecting their physical health and mental health. Moreover nowadays the ships are getting bigger and bigger and the number of mariners on the ship getting smaller and smaller. This really adds-up more pressure on the small size of mariners who work on the ship, making them to be really multifaceted in all types of operations related to the level of work on the ship. The working condition on the ship will also add more fatigue to the mariners because of the very nature of operations

on the ship. There are many more parts on the ship and each & every part of the ship will be looking bigger which requires more care from the mariners and also moving such a massive floating object would demand more attention on the part of navigation on the deck side mariners.

The excessive noise of the moving parts on the ship will be really painful on the part of the mariners and it will make the mariners more stressful. Apart from the fumes, gases, toxic materials that are used in the ship will be really harmful to the health of the seafarers which will definitely take a toll on the physical health of the mariners. Since the size of the ships are bigger, the ship requires more attention on the part of the regular maintenance and handling of the ship. More than that the handling of the ship on the seaport would also demand excessive care since there is every possibility of meeting with minor collisions inside the port area because narrow spaces available in the port and also because of traffic condition with regard to the ships going in and out of the port at all times. This will put more pressure on the mariners and make them more stressful which lead to higher fatigue level.

II. LITERATURE REVIEW

Mathew Tim, John Tang(2019) specifies that the number of days that the ships stay on the port will make the seafarers more stressful since the amount of work with regard to loading and unloading of cargoes requires more time and energy to be spent on the operations. Moreover the way in which the ship is navigated in and out of the port will put the seafarers under excessive stress and make them mentally and physically stressful. During such time, the seafarers must be given with the stress management exercises which will make them to get relieved to some extent.

McTrough and Mac Miller (2019) has studied the environment that is prevailing on the ship which determines the psychological behaviour of the mariners when they take up long sea voyages. When mariners sail on the ship for a long period of time

then the mariners will normally develop a sort of monotony which will put them under great stress. Moreover the complete delink from the social life of the mariners will also put them in strain full conditions adding up to their fatigue level. Many times when the mariners are under stress then there is every possibility of putting their life at risk which will jeopardize the safety of the mariners and also jeopardize the safety of the ship.

Kee Joe, Jing Hohn,(2018) studies that the organisational culture on the ship will also be pertinent in increasing the fatigue level of mariners on the ship. The mariners who work on the ship would have joined the ship from various countries who might have grown up under various cultures. The cultural differences between the mariners will definitely make an impact on the fatigue level especially when they work together in a confined space where in they cannot run away anywhere or hide themselves from others. The mariners with the contradictory cultural background will put the mariners under painful situation when they are asked to work together.

Sliskovic and Penezic (2016) specifies that when the mariners take up long voyages, they get separated from their homes and family members, which will make them to get delinked from the familial life. The separation of seafarers will put them under fatigue since they will be continuously thinking about the current status of the family members, losing focus and attention in the job done on board the ship. For any individual, the social life is considered to be very much vital since the social life will make the individual really joyful and they will get relieved from their regular duties when they have social life. But when the mariners sail on the ship then the social life will be completely lost putting them under stressful condition.

III. RESEARCH METHODOLOGY

The analysis considers the ardent task of studding the factors affecting the mariners stress when they work on board the vessels which carry cargo from one sea port to another seaport. The population of the study is the mariners of Indian origin who are working in the ship under various capacities. The Indian mariners working under engine operation and also in the deck operation were considered for this study. The size of the sample considered for the analysis is 385 and the sampling procedure following was stratified random sampling method. The sample size was decided based on the population size. The research tool used in this study happens to be a structure questionnaire. The questionnaire was circulated by using google docs and the responses were obtained over a period of 8 months. The structure questionnaire consisted of demographic profile and the statement pertaining to the level of agreement to identify the stress factors affecting the Indian mariners while sailing on board the vessels. The levels of agreement obtained from the respondents were decided by using a five point scaling technique with 5 response points.

IV. RESEARCH OBJECTIVES

The study is designed with the help of the objectives of the investigation to determine the factors of fatigue affecting the mariners when they are on board the ships:

- To analyze the demographic profile of the respondents under the research study
- To analyze the mean significant differences between the jobs related stress factors.

V. HYPOTHESIS OF THE STUDY

The research objectives are achieved by proving or disproving the following hypothesis:

- H₁: The mean values related to the stress factors are significantly different for the Indian mariners who sail on board the ships
- H₂: There is an association between the stress factors affecting the mariners

VI. RESULTS AND DISCUSSION

The study on the job related stress factors of Indian mariners who work on board the ships are analyzed with the help of empirical data. From Table-1 through Table-9, it can be inferred that 96% of respondents were male seafarers, 43% of seafarers were in the age of 30-40 years. 62% of respondents are married, 51% of respondents are graduates. This followed by 32% of respondents were sailing for nearly 5-10 years and 19% of respondents had some sort of ailments. 58% of respondents had the habit of smoking and 37% of respondents had the habit of doing exercise twice in a week and 37% of respondents sleep twice in a day and 73% of the respondents sleep less than 6 hours a day.

Table-1

<u>Gender</u>	<u>Frequency</u>	<u>Percentage</u>	<u>Mean</u>	<u>Standard Deviation</u>
Male	369	96	2.15	0.124
Female	16	4		

Table-2

<u>Age of Mariners</u>	<u>Frequency</u>	<u>Percentage</u>	<u>Mean</u>	<u>Standard Deviation</u>
20 - 30	120	31	2.11	1.154
30 - 40	165	43		
40 - 50	61	16		
50 - 60	23	6		
> 60	16	4		

Table-3

<u>Marital Status</u>	<u>Frequency</u>	<u>Percentage</u>	<u>Mean</u>	<u>Standard Deviation</u>
Married	240	62	2.42	1.312
Widowed	11	3		
Divorced	16	4		
Single	118	31		

Table-4

<u>Education</u>	<u>Frequency</u>	<u>Percentage</u>	<u>Mean</u>	<u>Standard Deviation</u>
10 th Standard	32	8	3.45	1.235
12 th Standard	55	14		
Diploma	91	24		
UG Degree	195	51		
PG Degree	12	3		

Table-5

<u>Length of service</u>	<u>Frequency</u>	<u>Percentage</u>	<u>Mean</u>	<u>Standard Deviation</u>
Below 2 years	38	10	3.65	1.725
2-5 years	94	24		
5-10 years	122	32		
10-15 years	101	26		
Above 15 years	30	8		

Table-6

<u>Mariners Ailments</u>	<u>Frequency</u>	<u>Percentage</u>	<u>Mean</u>	<u>Standard Deviation</u>
Yes	73	19	3.32	1.283
No	312	81		

Table-7

<u>Smoking Habit</u>	<u>Frequency</u>	<u>Percentage</u>	<u>Mean</u>	<u>Standard Deviation</u>
Yes	224	58	1.18	0.254
No	79	21		
Sometimes	82	21		

Table-8

<u>Exercise Habit</u>	<u>Frequency</u>	<u>Percentage</u>	<u>Mean</u>	<u>Standard Deviation</u>
Once in a day	74	19	1.12	0.854
Twice in a day	141	37		
Whenever possible	71	18		

Alternative days	31	8		
Once in a week	29	8		
Never	39	10		

Table-9

<u>Sleeping Pattern</u>	<u>Frequency</u>	<u>Percentage</u>	<u>Mean</u>	<u>Standard Deviation</u>
Below 5 hours	282	73	2.15	1.025
5-8 hours	92	24		
8-12 hours	11	3		

In Table-10, t-statistic values are shown for the factors of stress together with the corresponding p-values. The t-test is done to test the hypothesis that there is a difference in the values related to mean calculations of the factors of stress and it can be understood that the p-values are less than 0.05 and hence the hypothesis can be accepted.

Table-10

<u>Stress factors</u>	<u>t</u>	<u>p</u>
Mental stress	2.14	0.012
Lack of recognition for achieving tasks	1.19	0.017
Lack of focus at work	2.56	0.004
Lack of interaction	2.05	0.009
Lack of safety feeling	2.62	0.017
Excessive physical work	2.43	0.018
Difficult working environment	2.72	0.017
Poor support from the management	2.08	0.018
High level of responsibility	2.14	0.013

From Table-11, it can be inferred that the chi-square values are shown with the corresponding p-values. The chi-square test is done to test the hypothesis that there are associations between Age of Mariners, Exercise Habit of Mariners and Sleeping Pattern of Mariners. The calculation of Chi-square test statistic is done through the following formula:

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Where χ^2 is chi-square test statistic, O is the Observed values and E is the Expected values

Table-11

<u>Stress factors</u>	<u>Age of Mariners*</u>	<u>Exercise Habit of Mariners*</u>	<u>Sleeping Pattern of Mariners*</u>
Mental stress	3.12	3.05	3.45
Lack of recognition for achieving tasks	3.44	2.56	3.96
Lack of self-confidence at work	3.56	2.47	3.85
Lack of social interaction	3.89	2.58	3.45
Lack of safety feeling	3.58	2.69	3.62
Excessive physical work	3.98	2.58	3.85
Difficult working environment	3.12	2.47	3.64
Poor support from the management	3.05	3.21	3.75
High level of responsibility	3.45	3.96	3.11

* p<0.05

VII. CONCLUSION

The article highlights the conditions of mariners working on the ship with regard to the amount of stress incurred by them in accomplishing the day to day tasks. Unlike the jobs done by the employees who work on the shore side, the mariners who work on the ship face a lot of difficult and complicated situations which will really be detrimental to their life. The mariners working on the ship take a lot of risk in fulfilling the requirements of the ship operations. The ship produces excessive heat, vibration and noise, will definitely make the mariners to feel the higher levels of fatigue. Moreover the study reveals that the separation from the home and family members of mariners, physical stress levels, lack of social life, round the clock working conditions, the pressure from the peers and superiors, the multi-cultural background of the mariners, long sea voyages, painful loading and discharging of cargoes on the port side, port navigations and fulfilling statutory regulatory conditions will make them to feel more fatigue level.

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