Research Paper ICI Value : 61.33| SJIF Impact Factor(2019) : 8.045|ISI Value:1.433

Volume - 7, Issue- 10,October 2019 | e-ISSN : 2347 - 9671| p- ISSN : 2349 - 0187

EPRA International Journal of Economic and Business Review -Peer Reviewed Journal

DETERMINANTS OF HEALTH: A CASE OF ALANG SHIP BREAKING WORKERS

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ABSTRACT

Ship-breaking is the process of dismantling an obsolete vessel's structure for scrap. In India, the Alang ship-breaking yard is one of the active yards, which is consider to be the world's largest ship-breaking yard. In developing countries like India, the ship-breaking activity is labour-intensive and also consider as one of the hazardous industries. International Labour Organization also recognized that ship-breaking activity is harmful for human health. Health problems are common for all ship-breaking yards in the world and also for Alang. The main aim of the present paper is to examine the determinants of health at Alang ship-breaking yard and also to identify the various associated factors with health of the workers therein. The findings of the study show that few common diseases are more dangerous outside the yard and 211 out of 300 workers faced health issues. It has also been found from the probability analysis that 9 out of 100 workers are vulnerable to illness at the yard. This ratio is very high for an organized industry in India.

KEYWORDS: *Ship Breaking, Health, Organized Industry, Alang, India*

INTRODUCTION

Ship breaking is the process of dismantling of old ships to recover steel scrap and other materials. Ships breaking industry is a recycling industry which recover steel from the ship which is expected to constitute 90 percent in terms of value. The other materials constitute the remaining 10 percent and consist of machines and equipment, furniture and fittings, asbestos, wood panels, oil, chemicals, electrical fittings etc. These items can at best be considered as by-products of this industrial activity.

The ship breaking activity shifted gradually from high-income countries to middle income countries and then to low income countries due to growing environmental concern and stringent regulations in developed countries. During this process the ship breaking industry has transformed from being a capital-intensive industry to labour intensive industry. Although Ship breaking industries produce the potentiality for economic growth, it also brings with it dangers of environmental imbalances. Until the 1970's ship breaking activities were concentrated in developed countries. But after 1980, due to availability of cheap labour, a shift of these activities from the developed countries to developing countries is witnessed. Countries like India, Bangladesh, China and Pakistan have less stringent norms or legislation pertaining to environment and also the availability of huge labour force.

It is estimated that on an average 700 ships are taken for dismantle every year world over. Out of these 350-450 ships are scrapped in India. The ship breaking activities are carried out at various places in India along the sea coast of the country Viz, Alang in Gujarat, Sachana in Gujarat, Dharukhana near Bombay, Tadri in Karnatka, Maipe in Karnataka, Baypore in Kerala, Vishakhapatnam in Andhra Pradesh, Valinokan in Tamil Nadu and at Tuticorin in Tamil Nadu. However, the main ship breaking centre is located on the west coast at Alang, Gujarat. The ship breaking activity at Alang began in 1982 and currently, 141 plots are in operation and Alang is considered to be the largest ship-breaking yard in world. India has the world's largest ship breaking facility in terms of volume. According to Basel convention report of 2003, 38 percent of ship breaking activities are concentrated in India, followed by China 25 percent, Bangladesh 19 percent and Pakistan 7 percent.

Alang is a small coastal village as the district of Bhavnagar in Gujarat, dominated by a small population of fishermen and farmers. Presently, it has turned out to be one of the largest ship-breaking yards not only in India but also in the world. Being a labour surplus country labour is available in plenty and that too at competitive rate. Alang ship breaking yard provides large number of employment opportunities to number of skilled and unskilled labours. Moreover, there are many other activities and industries, which are directly and indirectly dependent on Alang ship breaking, yard, and the number of such workers directly and indirectly employed is estimated to be in between 1.5 to 1.6 lakhs (International Federation of Human Rights, 2000: 56). This also includes the downstream industries generated by the ship breaking

industry such as re-rolling mills, foundries, oxygen plants, local scrap store, transportation companies and other small local businessmen and upstream activity such as brokers, service sectors etc. A survey conducted by the International Federation of Human Rights (FIDH) found that 100 re-rolling mills are functioning in the area and each generally employs between 80-120 and thus employing about 8,000-10,000 workers.

This paper examines various determinants of health problems faced by the workers inside the yard as well as at place of living. This paper also identifies various factors associated with the poor health conditions of workers. The study highlights the gap on the health issues at Alang.

DATA AND METHODOLOGY

The study is based on the data collected by the researcher personally from the workers using a structured questionnaire. Out of 30,000* unskilled and skilled labours working inside yards, a stratified sample of 300 respondents, which accounts for about 1 percent of the population, is selected for the survey. These 300 respondents are from different states viz, U.P, Orissa, Bihar, Jharkhand and Gujarat. The researcher directly contacted the respondents at site and at their living place in Alang to collect the information.

Besides primary data the researcher has also made use a secondary data such as reports, studies and information available at Gujarat Maritime Board and Gujarat Ship Breakers Association. A number of reports and surveys containing information of ships dismantled and environment conditions are available. These studies have been conducted both at individual and Government levels but comparison of the results of these studies is difficult and results have to be treated with certain amount of caution due to variation in the data and definitional differences.

HEALTH PROBLEMS AT ALANG SHIP BREAKING YARD

Occupation related diseases are the result of in human physical conditions at the work place and the industrial environment, which is exploitative. Occupational diseases develop due to continuous and long-term exposure to hazards at workplace, which consists of excessive heat, noise, vibration etc. Occupation disease might be the result of exposures to certain chemical used in the manufacturing process (Mani, 1996: 10).

Some occupational diseases are usually characterized by symptoms like nausea, vomiting, stomach pains, muscular and joint pains or in some extreme cases even cause death. Many chemicals also affect human being causing skin diseases, blisters, itching, discoloration of the skin and burns. Occupational diseases usually develop over a long period of time rather than the short period. Various studies on migrant labour observed that seasonal migrants have less exposure to health hazardous than the permanent migrants (Breman, 1985 and John and Nasir, 2003: 91). Occupational diseases are slow and cumulative however their effects are irreversible.

There are various types of agents, which affect the health of the workers in ship breaking industry as also in other industries. The occupational hazards are in plenty in manufacturing, agriculture, mining and other working environments. The major categories of stresses for the workers can be categorized as: chemical agents, physical agents and conditions, biological agents and conditions and psycho-socio factors. These factors act either in isolation or in combination. Occupational health problems arise as a result of the joint action of both environmental as well as human factors.

Workers at Alang ship breaking yard face various occupational hazards. In addition to long hours of work with inadequate equipment the labours are also exposed to various health hazards. These workers have strenuous work schedule live in unhealthy surroundings, do not have proper medical care and even lack adequate drinking water facilities. In addition to these adverse factors the workers are exposed to various types of chemicals, which are categorized as highly hazardous. The workers are also exposed to various types of gases and fumes, which over a long period of time take toll on their health. Practically every worker at Alang is exposed to chemicals, fumes, dust, lead and asbestos.

In Alang ship breaking yards workers have constant exposures to various toxic substances, gases, dust and lead paint which affect their health conditions further affect their efficiency of work. Workers themselves are not aware of the dangerous consequences of the materials and chemicals they handle while cleaning the ship and while breaking down the ship. The amount of chemical, vapours and gases that labour are exposed to be totally unaccounted. The shore at Alang, the water, the soil and whole ecosystem is devastated by the pollutants. It is hard to find natural soil, the vegetation in the surrounding area is effected and fish stock has vanished. These are the effects of constant and continuous release and exposure to chemicals. Can the workers employed at Alang ship breaking yard remain unaffected. The impact is visible on health of workers at Alang ship breaking yard.

There is lack of systematic information when it comes to diseases with disastrous consequences for the workers. The symptoms of diseases are less visible than accidents but diseases developed over the years by the workers in and around the yards ought to be a matter of serious concern. Though their immediate impact is less pronounced, future and ultimate impact is likely to be very serious. Yet there have been no studies to determine the health status of the 30,000-40,000 workers who handle the work or are in close contact with toxic substances in and around the yards.

During the survey information collected from 300 respondents pertaining to the health ailments and long-term health problems faced. This information throws up certain disturbing facts about Alang ship breaking yard.

Out of 300 respondents, 211 have reported health ailment of some form or other. More than 70 percent of labours seem to have health problem either minor or major. 122 of the respondents have reported severe health problems. This amounts to 40 percent, which is high by any standards. It is certainly a serious issue if 40 percent of labour of any firm or an organization report permanent health problems. A little probe also reveal that the problem is not only with working environment but also with their living environment as almost all of them line in the proximity of the ship breaking yard.

Table: 1 Nature of Work and Health problem faced by Respondents

Health Problem Faced	Manual	Semi-Skilled	Skilled	Highly Skilled	Total
Stomach Problem	15.25 (9)	7.27 (4)	22.92 (16)	16.67 (4)	15.64 (33)
Skin Problem	16.95 (10)	21.82 (12)	9.59 (7)	--	13.74 (29)
Breathing Problem	5.08 (3)	5.45 (3)	10.96 (8)	29.17 (7)	9.95 (21)
Malaria	55.93 (33)	58.18 (32)	47.95 (35)	33.33 (8)	51.18 (108)
Other Problems	6.78 (4)	7.27 (4)	9.59 (7)	20.83 (5)	9.49 (20)
Total	100.00 (59)	100.0 (55)	100.00(73)	100.00 (24)	100.00(211)

Source: Field Survey

Note: Figures in bracket are number of respondents.

Table: 2 Nature of Work and Permanent Health Problem Faced by Respondents

Permanent Health problem	Manual	Semi-Skilled	Skilled	Highly Skilled	Total
Skin Problem	47.37 (18)	35.00 (7)	25.45 (14)	11.11 (1)	32.29 (40)
Respiratory Problem	10.53 (4)	--	12.72 (7)	--	9.02 (11)
Malaria	42.10 (16)	55.00 (11)	58.18 (32)	88.89 (8)	54.92 (67)
Other Problems	--	10.00 (2)	3.64 (2)	--	3.28 (4)
Total	100.00(38)	100.00 (20)	100.00(55)	100.00 (9)	100.00(122)

Source: Field Survey

Note: Figures in bracket are number of respondents.

Table 1 show that the workers in Alang faced various health problems like malaria, skin problem, stomach problem, breathing problem. Malaria is the one of common health problem faced by workers in Alang, which is high in temporary as well as in permanent health problems reported (see Table 1 & 2). In both the tables it is found that the skilled labours are more exposed to health hazards. Manual labours are also facing relatively higher health problem accounting 28 percent in case of temporary health problems and 31 percent in case of permanent health problems (see Table 8b). Various studies (Vaid. K. N, 1966: 21-25, John and Nasir, 2003) on construction industries also found that skilled workers engaged in construction work are more exposed to various health hazards. Nevertheless in Alang ship breaking yard all types of workers skilled as well as unskilled workers are exposed to health hazards causing various health problems.

It is found from the table 3 that workers at Alang ship breaking yard face various multiple diseases at the place of work, which is a serious cause of concern. A vast majority of respondents (63 percent) reported that malaria and viral fever is the major disease in the place of work followed by respiratory and skin problems, which is 14.8 percents. Workers also face other type diseases such as eye problem, various types of pains etc. These diseases are due to exposure to gases, fumes and chemicals at the workplace.

Table 3 Multiple ailments face by respondents

Nature of Diseases	Manual	Semi-Skilled	Skilled	Highly-Skilled	Total
Respiratory & Skin Problem	10.53 (4)	10.00 (2)	14.55 (8)	44.44 (4)	14.75 (18)
Viral Fever and Malaria	78.95 ()	50.00 (10)	58.18 (32)	55.56 (5)	63.11 (77)
Body Pain	10.53 (4)	10.00 (2)	14.55 (8)	--	11.48 (14)
Other Diseases	--	30.00 (6)	12.73 (7)	--	10.66 (13)
Total	100.00 (38)	100.00 (20)	100.00 (55)	100.00 (9)	100.00 (122)

Source: Field Survey 2004

Note: Figures in bracket are percentage of respondents.

The respondents have reported various health problems faced by them they are aware of the work related problems. Many of them have reported that strenuous work and exposure to chemicals have taken toll of their health and both these are related to working conditions at Alang ship breaking yard. Many of the respondents have expressed high risk perception and have even expressed that these are the very reasons why very few local (Gujarati) labour is seen at Alang ship breaking yard. The labours continue to work as they are devoid of any income earning opportunities at their native place. An attempt is made in the study to analyse the reasons for the health problems faced. A logit function is fitted to investigate the problem further.

In the study an attempt is also made to fit logit function to further analyse the health problems faced by workers in Alang ship breaking yard. Many variables are included in the model as explanatory variables.

Binary logit model is fitted:

Health Problem Faced (Y) = f (Exposure to chemical, Cutters/other, Risk Perception, Years of experience)

Where P_i is the probability that a labour has health problem.

$(1-P_i)$ is the probability that a labour doesn't have health problem.

The result of the regression function is presented in table 4

Where Y = 1 if worker faced health problem and Y = 0 if workers does not face health problem.

$L_i = (P_i / 1-P_i) = \beta_1 + \beta_2$ Exposure to chemical + β_3 Cutters/ other + β_4 Risk Perception +

β_5 Year of experience)

It is found from the analysis that (Table 4) the health problems faced function is best explained by the variables such as exposure to chemical, cutter/other and risk perception. In the model the years of experience, cutter/other, risk

perception and exposure to chemical are the explanatory variables with three dummy variables. In the model variation in independent variable explains only 4 percent of variation in the dependent variable. However the results are indicative and can be used to explain the problems faced by workers at Alang ship breaking yard.

The variable exposure to chemical has coefficient of 0.7297 when other variables in the model are held constant. Those workers that are exposed to chemicals are facing 0.7 times health problem. It suggests a positive relationship between the two. Similarly other two variables also show the positive relationship. However the years of experience variable is not significantly related to health problem faced by workers. All variables together have significant impact on the health problems faced by the workers as the LR statistic is 13.909, which is statistically significant.

The odd ratio is also used for better interpretation of the result. Thus, variable exposure to chemical coefficient is 0.7297, the antilog value is 2.08 (H" $e^{0.7297}$). This suggests that workers exposed to chemicals are facing health problem more than 2 times than the worker who do not have exposure to chemical. Similarly, the antilog value of the coefficient of cutters/other and risk perception is 1.6 and 1.9 times which suggest that cutter face 1.6 times more health problems and those workers are working under risky condition are facing health problems 1.9 times more than others.

Table: 4 Health Problem Faced by Respondents at Alang Ship Breaking Yard

Binary Logit Output

Dependent Variable: Health Problem Faced

Variable	Model
Constant	0.1804
Exposure to Chemical	0.7297 (2.358)**
Cutters/Other	0.4778 (1.735)*
Risk Perception	0.6829 (2.47)**
Years of Experience	0.0011 (0.043)
N	300
Log Likelihood	-175.45
LR Statistic	13.909
McFadden R-square	0.038

* Significant at 10%; ** Significant at 5%;*** Significant at 1%

Note: Figures in bracket are Z-value

Cutters = 1 otherwise 0

Risk perception if Yes = 1 otherwise 0

Exposure to chemical if Yes = 1 otherwise 0

Alang ship breaking industry is one of the dangerous and hazardous industries. In ship breaking activity workers have to handle various types of toxic substances effects health over a period of time. The frequency of sickness is very high due to constant exposure to chemicals and toxic substances and strenuous work.

The researcher has collected data pertaining to number of sick days faced by the respondents, which resulted in their leave and absence from work. Workers would prefer to report to duty and perform work if they are physically well. The concept of sick leave does not exist at Alang ship breaking yard. Therefore it is common to see labours with cuts, burns and fever working at Alang. Falling sick means loss of income therefore labours can not afford to fall sick.

Making use of the data pertaining to the sick days reported by the labours for all categories the probability of sickness is calculated. This in a way could be a good measure of health problem faced by workers at Alang. The probability of sickness per day in Alang ship breaking yard is estimated through following method.

$$\text{Average number of Sick days per Day} = \frac{\text{Total number of sick days per month}}{\text{Total number of Working day's in a month}}$$

$$\text{Probabilit y of sickness per day} = \frac{\text{Average number of sick day's per month}}{\text{Total number of respondent s}}$$

From table 5, it can be seen that the average number of day's workers falling sick is 3.09 for all categories of labour. The probability of sick per day is very high in all categories of workers. The probability of sickness per day is 9 out of 100 labours, which is very high for an established industry. With this high probability of sickness, it can be concluded that workers in Alang have to spend more on their health.

Due to lack of proper medical facility workers are in vulnerable situation. During sickness workers do not get sick leave. If workers take leave, then they have to lose a day's wage. Despite not payment of wages 7 to 10 percent of workers of various skill levels are on leave. This proportion is high for any organized industry.

Table: 5 Nature of Work and Probability of sickness per Day

Nature of Work	Average Number days sick in a month	Number of respondent falling sick	Total number of respondents	Probability of sickness per day
Manual	3.06	70	86	0.09535
Semi-Skilled	3.14	63	74	0.10270
Skilled	3.28	86	106	0.10283
Highly Skilled	2.38	26	34	0.07059
Total	3.09	245	300	0.0933

Sickness of the workers not only effects the employment but would also eat into the pockets of the workers as they have to spend on medicines. In addition the Alang ship breaking yard does not have any hospital or dispensary to deal with such cases. The workers depend on private doctors who are expensive or take to self medication. Some reported no medication for small ailments such as aches.

CONCLUSION

Ship breaking industry is one of the hazardous industries and workers face severe conditions at work. The risk of accident is high and accidents are common because of hazardous nature of activities and also due to unskilled, uneducated and untrained workforce. Workers in ship breaking activities have to handle a large number of chemicals and toxic substances, which cause various diseases and health problems. The workers face diseases such skin problems, respiratory problems, breathing problems etc. It was found in the study that the rate of malaria is very high at Alang. The vast majority of respondents indicate that malaria is perennial health problem. The logit analysis indicates that those workers handling chemical are facing the high health problem. The analysis also shows that the cutters are facing more health problems as compared to other category of workers. Further, it is found that on an average 9 out of 100 workers fall sick per day, which is very high for an organized industry. During sickness workers do not get paid leave or medical leave for treatment, which violates various legislations such as Factories Act, Inter-state Migrant Workmen Act etc.

In Alang ship breaking yard workers face high probability of occupation related health problems. However workers are neither covered by life insurance or medical insurance. Workers report that they do not personally have any cover and many of them are not aware of such policies. It is also observed that there exists no systematic insurance and compensation scheme, which covers both assets and workers.

RECOMMENDATIONS

Gujarat Maritime Board and the State Government need to take initiative to create proper infrastructure at Alang, as there is total absence of any civic amenities for workers. Better health conditions in the industry will lead to inflow of better skilled labor. Even local labor who keeps away from working in this industry should express preference to be employed in this industry. There should be provision of medical insurance and life insurance for workers employed at Alang is of prime importance. The provision of medical and life insurance will increase the working conditions of the workers enormously. GMB also needs to take initiative for monthly medical checkup for workers.

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(Footnotes)

* Figures are collected from GMB reports on ASSBY.