

## HEALTH HAZARDS OF STONE CRUSHER WORKERS IN RAJAPALAYAM TALUK-A CASE STUDY

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### Abstract

*Stone Crushing unit is an important industrial sector in the country engaged in producing of various sizes depending upon the requirement which acts as raw material for various construction activities such as construction of Roads, Highways, Bridges, Buildings and Canals etc. It is estimated that there are over 12,000 stone crusher units in India. In India, the Stone Crushing Industrial sector is estimated to have an annual turnover of Rs.5000 crore (equivalent to over US\$ 1 billion) and is therefore an economically important sector. This sector is estimated to be providing direct employment to over 500,000 people engaged in various activities such as mining, crushing plant, transportation of mined stones and crushed products etc. Most of these personnel working in stone crushing units are from rural and economically backward areas where employment opportunities are limited and therefore it carries greater significance in terms of social importance in rural areas. It is a source of earning for uneducated, poor and unskilled rural people. Employing modern technology and mass production of crushed stone will create enormous amount of dust and spread through air and contribute air pollution. In haling of polluted air with fine dust particles affects the health of the workers working in stone crushing units in particular and common people in general. It not only affects the health of human beings but also it will affect the growth of agricultural crops, contaminate the fertility of the soil and makes the land unfit for cultivation. Even though the stone crushing units contribute more to employment opportunities both directly and indirectly, skilled and unskilled employment to both the rural and urban people, at the same time we can't forget its environmental impact. In the study area due to environmental pollution by stone crushing units, 36 per cent of the workers are affected with disease like eye irritation, asthma, chest pain, TB etc. Among these disease eye irritation, asthma and skin allergy are vital among stone crushing workers. Nearly 50 per cent of the workers are not using proper protective devises. Out of this, 30 per cent of them are not using any devices to protect them from dust pollution.*

*Keywords: air pollution, mining, stone crushing units, unskilled employment, environmental pollution, dust pollution*

### Introduction

Stone Crushing unit is an important industrial sector in the country engaged in producing of various sizes depending upon the requirement which acts as raw material for various construction activities such as construction of Roads, Highways, Bridges, Buildings and Canals etc. It is estimated that there are over 12,000 stone crusher units in India. In India, the Stone Crushing Industrial sector is estimated to have an annual turnover of Rs.5000 crore (equivalent to over US\$ 1 billion) and is therefore an economically important sector. This sector is estimated to be providing direct employment to over 500,000 people

engaged in various activities such as mining, crushing plant, transportation of mined stones and crushed products *etc.* Most of these personnel working in stone crushing units are from rural and economically backward areas where employment opportunities are limited and therefore it carries greater significance in terms of social importance in rural areas. It is a source of earning for uneducated, poor and unskilled rural people. These stone crushers though socio-economically an important sector, gives rise to substantial quantity of fine fugitive dust emissions which create health hazards to not only the workers working in stone crushing units but also the people residing nearer to the crushing units. It also affects the agricultural activities too.

### Review of Literature

Ilas, M and Rasheed, F., have made a study on “Health and environment related issues in stone crushing in Pakistan”. Sivakoumar, R et al., have conducted a study on “Particulate matter from stone crushing industry: size distribution and health effects”. Marimuthu, A., has undertaken a study on “A study of the economic impact of dust pollution by Madras Cements in Virudhunagar district of Tamil Nadu”. Central Pollution Control Board, (2012) have carried out a study on “Report of the Expert Committee on the Environmental Problems due to Stone Crushers and Related Activities in Sonebhadra District”. Dasgupta, A et al., have scientific study on “Impact of Mining on Rural Environment and Economy - A Case Study, Kota District, Rajasthan”. Sinha, B.K and Choudhary, S., have undertaken a study on “Environmental Pollution and Health Hazards”. Chaurasia, S et al., “Environmental Study of Stone Crusher”. Iqbal, M and Shafic, M., have carried out a study on “Periodical Effect of Cement Dust Pollution on the Growth of Some Plant Species”. Khaleque, A. and Elias, M.S., have carried out a study on “Environmental Pollution and Health Problems of Industrial Workers in Bengaladesh”. Verma, S.S., have undertaken a study on “Environmental Pollution”.

### Statement of the Problem

In olden days the stones used for construction purposes are produced by using manpower. Due to increase in the demand for construction materials, now-a-days people using machine power to produce the same. Most of the stone crusher units are located along the periphery of cities because it needs electricity, road facilities and manpower resources. Employing modern technology and mass production of crushed stone will create enormous amount of dust and spread through air and contribute air pollution. Inhaling of polluted air with fine dust particles affects the health of the workers working in stone crushing units in particular and common people in general. It not only affects the health of human beings but also it will affect the growth of agricultural crops, contaminate the fertility of the soil and makes the land unfit for cultivation. Even though the stone crushing units contribute more to employment opportunities both directly and indirectly, skilled and unskilled employment to both the rural and urban people, at the same time we can't forget

its environmental impact. Further, the stone crushing units contribute adequate amount to the GDP also. Stone crushing units have its triangular impact on employment, income and health. An old saying that “health is wealth”. “Health is lost everything is lost”. In the view of human beings, health is more important than wealth. Analyzing the triangle impact, preference towards health is vital than the other. Hence, there is a need at this juncture to undertake a study on “Health Hazards of Stone Crusher Workers in Rayapalayam Taluk.

### Objective of the Study

The following are the main objectives of the study

- To identify the dust protection measures followed by the workers working in the stone crushing units.
- To find out the reasons for not using protective measures during working hours.
- To analyse the health problems of workers working in stone crushing units.

### Sampling Design

The study was conducted in Rajapalayam Taluk of Virudhunagar District. Totally 11stone crushers are functioning in the study area. Out of this, five units have been selected by adopting simple random sampling technique. Ten workers from each stone crushing unit are taken as sample for the study. Totally 50 workers are interviewed and collected the required information.

### Tolls of Analysis

The tools used to analyze the data are

- Percentages,
- Cross table and
- Chi-square test.

### Analysis

#### Distribution of the Workers based on the Category of Work.

Table 1 explains the distribution of the workers based on the category of work.

**Table 1 Distribution of the Workers Based on the Category of Work**

S.	Category of Work	Number of Respondents	Percentage
1	Skilled	26	52.00
2	Semi - Skilled	17	34.00
3	Unskilled	7	14.00
Total		50	100.0

Source: Primary Data

It is understood from Table 1 that, out of 50 workers, 26 (52.00 per cent) workers are Skilled, 17 (34.00 per cent) workers are semi - skilled and seven (14.00 per cent) workers are unskilled.

#### Distribution of the Workers Based on Years of Experience

Experience makes the man perfect. Experienced person perform the work in a better manner compared to the untrained workers. Further, the years of experience is very much useful in finding out the health impact. In this manner Table 2 clearly shows the classification of the workers on the basis of years of experience.

**Table 2 Distribution of the Workers Based on Years of Experience**

S. No.	Years of Experience	Number of Workers	Percentage
1	Below 2	19	38.00
2	2 - 4	20	40.00
3	Above 4	11	22.00
<b>Total</b>		<b>50</b>	<b>100.00</b>

Source: Primary Data

Table 2 clearly explains the years of experience of the workers. Out 50 workers, 20 (40.00 per cent) workers have below two years of experience, 19 (38.00 per cent) workers have two to four years of experience and the remaining 11 (22.00 per cent) workers are having above four years of experience.

#### Distribution of the Workers Based on the personal Habits

Good habits lead to good health and *vice versa*. In this regard, personal habits of the workers apart from the work environment play a vital role in assessing the health conditions of the workers. The distribution of the workers according to the personal habits is presented in Table 3.

**Table 3 Distribution of the Workers Based on Personal Habits**

S. No.	Personal Habits	Yes	No	Total
1	Smoking	35 (70)	15 (30)	50
2	Consume Liquor	40 (80)	10 (20)	50
3	Pawn	23 (46)	27 (54)	50
4	Tobacco	18 (36)	32 (64)	50

Source: Primary Data

It is observed from Table 3 that out of 50 workers, 35 (70.00 per cent) workers are having smoking habits and the remaining 15 (30 per cent) workers are non-smokers. Consuming liquor is witnessed among 40 (80 per cent) workers out of 50 workers studied. Pawn and Tobacco chewing habits is witnessed among 23 (46 per cent) and 18 (36 per cent)

workers. It is concluded that all the workers are having either one or more than one habits like smoking, using liquor and chewing tobacco products.

#### Distribution of the Workers on the Basis of dust Protection Devices Used

In Crusher units the dust flows continuously due to its working process. Hence, to avoid health risk the workers should use protective devices and safeguard themselves from dust inhale. In this regard, the researcher collected information regarding the protective devices used and the same is shown in Table 4.

**Table 4 Distribution of the Workers on the Basis of dust Protection Devices Used**

S. No.	Section	No Devices Used	Hand Kerchief	Mask	Helmet	Glass	Total
1	Accountant	3	-	2	-	-	05
2	Driver	6	4	5	-	-	15
3	Mechanic	2	2	1	-	-	05
4	Operator	-	-	5	5	-	10
5	Helper	1	2	2	-	-	05
6	Welder	-	-	-	-	5	05
7	Others	2	2	1	-	-	05
<b>Total</b>		<b>14</b>	<b>10</b>	<b>16</b>	<b>5</b>	<b>5</b>	<b>50</b>

Source: Primary Data

It is inferred from Table 4 that out of 50 workers, 14 workers are not using any devices to protect themselves from the dust pollution. Another 10 workers are using hand kerchief as protection device. But it is a not proper device to avoid dust in stone crusher units. Only 16 workers are using mask to protect themselves from dust pollution. Each five workers are using helmet and glass as protective device. It is an appropriate device used to protect people from dust pollution. It is evident that only 1/5<sup>th</sup> of the workers working in stone crushing units follow and use proper device to avoid dust. Hence, awareness and compulsion is needed in this regard, to protect the workers from dust problems.

#### Reasons for Non-Using Protective Devices

Nearly 1/4<sup>th</sup> of the workers are not using any protective devices during working hours and the researcher asked the reasons behind this and the same is depicted in Table 5.

**Table 5 Reasons for Non-Using Protective Devices**

S. No.	Section	Laziness	Forgotten	Inconvenient	Total
1	Accountant	-	1	2	03
2	Driver	1	2	3	06
3	Mechanic	1	1	-	02
4	Operator	-	-	-	-
5	Helper	-	-	1	01
6	Welder	-	-	-	-
7	Others	1	1	-	02
<b>Total</b>		<b>3</b>	<b>5</b>	<b>6</b>	<b>14</b>

Source: Primary data

It is evident from Table 5 that out of 50 workers, 14 (28.0 per cent) workers are not using any protective devices to protect themselves from dust problem. The reasons informed by the workers are out of 14, three (21.4 per cent) workers not using protective devices due to laziness. The remaining five (35.7 per cent) and six (42.9 per cent) workers simply said forgotten to take the devices and inconvenient respectively.

#### Distribution of the Workers Based on Diseases

The researcher gathered information related to the disease by which the workers are affected and the same is pictuised in Table 6.

**Table 6 Distribution of the Workers Based on Diseases**

Section	Asthma	Chest Pain	TB	Eye Irritation	Backache	Skin Allergy	Cough	Row Sum
Accountant	1	-	-	1	-	1	-	03
Driver	-	1	-	1	1	-	-	03
Mechanic	1	-	1	-	-	-	-	02
Operator	1	-	1	1	-	1	-	04
Helper	-	-	-	1	1	-	1	03
Welder	-	-	-	1	-	1	-	02
Others	-	-	-	1	-	-	-	01
<b>Column Sum</b>	<b>03</b>	<b>01</b>	<b>02</b>	<b>06</b>	<b>02</b>	<b>04</b>	<b>01</b>	<b>18</b>

Source: Primary Data

It is understood from Table 6 that out of 50 respondents studied, 18 (36.0 per cent) respondents are affected with disease due to dust. Out of 18 workers, Asthma is witnessed in three workers. Six and four workers are affected with eye irritation and skin allergy respectively. The remaining two and one workers each affected by TB and Backache and Chest pain and Cough respectively. Due to dust pollution majority of the workers are affected with breathing problems.

#### Chi-Square Test

H<sub>0</sub>: Dust protection devises doesn't play a vital role in safe guarding the crusher workers.

**Table 7 Chi-Square Test**

S. No.	Particulars	Affected	Not Affected	Total
1	Protection Measure used	7	29	36
2	Not Used	11	3	14
	<b>Total</b>	<b>18</b>	<b>32</b>	<b>50</b>

Source: Primary Data

Table 8 Result

O	E	O-E	(O-E) <sup>2</sup>	$\frac{(O-E)^2}{E}$
7	12.96	-5.96	35.52	2.74
11	5.04	5.96	35.52	7.05
29	23.04	5.96	35.52	1.54
3	8.96	5.96	35.52	3.96
				<b>20.29</b>

Chi-square test is administered to test the null hypothesis. The estimated values are shown in Table 8. It is evident that the estimated value of the chi-square is 20.29. The Table value at five per cent level of significance is 3.841. It is concluded from the result that the calculated value of chi-square is greater than the table value at five per cent level. Hence, one can reject the null hypothesis and accept the alternative hypothesis.

H<sub>a</sub>: Dust protection devices play a vital role in safe guarding the health of crusher workers.

#### Distribution of the Workers Based On Loss of Income Due To Health Hazards

The researcher estimated the income lost by the workers due to health problems and the same is presented in Table 9.

Table 9 Distribution of the Workers Based on Loss of Income Due to Health Hazards

S. No.	Section	No. of Days Absent	Monthly Income (in Rs.)	Income Loss (per day) (in Rs.)	Total Income Loss (per month) (in Rs.)
1	Accountant	3	11250.00	377.50	1012.50
2	Driver	4	13500.00	450.00	1800.00
3	Mechanic	5	15000.00	500.00	2500.00
4	Operator	7	16000.00	533.33	3733.33
5	Helper	2	10250.00	340.67	683.33
6	Welder	4	15000.00	500.00	2000.00
7	Others	5	10500.00	350.00	1750.00
<b>Total</b>					<b>13489.16</b>

Source: Primary Data

It is obvious from Table 9 that the operators and the mechanics are frequently absent to the work due to health and other problems and they lost nearly Rs. 500/= per absent. The total income loss is estimated as Rs. 13489/= per month.

**Major Findings of the Study are as Follow**

- Out of 50 workers, 26 (52.00 per cent) workers are Skilled, 17 (34.00 per cent) workers are semi - skilled and seven (14.00 per cent) workers are unskilled.
- Out 50 workers, 20 (40.00 per cent) workers have below two years of experience, 19 (38.00 per cent) workers have two to four years of experience and the remaining 11 (22. 00 per cent) workers are having above four years of experience.
- Out of 50 workers, 35 (70.00 per cent) workers are having smoking habits and the remaining 15 (30 per cent) workers are non-smokers. Consuming liquor is witnessed among 40 (80 per cent) workers out of 50 workers studied. Pawn and Tobacco chewing habits is witnessed among 23 (46 per cent) and 18 (36 per cent) workers. It is concluded that all the workers are having either one or more than one habits like smoking, using liquor and chewing tobacco products.
- Out of 50 workers, 14 workers are not using any devices to protect themselves from the dust pollution. Another 10 workers are using hand kerchief as protection device. But it is a not proper device to avoid dust in stone crusher units. Only 16 workers are using mask to protect themselves from dust pollution. Each five workers are using helmet and glass as protective device. It is an appropriate device used to protect people from dust pollution. It is evident that only 1/5<sup>th</sup> of the workers working in stone crushing units follow and use proper device to avoid dust. Hence, awareness and compulsion is needed in this regard, to protect the workers from dust problems.
- Out of 50 workers, 14 (28.0 per cent) workers are not using any protective devices to protect themselves from dust problem. The reasons informed by the workers are out of 14, three (21.4 per cent) workers not using protective devices due to laziness. The remaining five (35.7 per cent) and six (42.9 per cent) workers simply said forgotten to take the devices and inconvenient respectively.
- Out of 50 respondents studied, 18 (36.0 per cent) respondents are affected with disease due to dust. Out of 18 workers, Asthma is witnessed in three workers. Six and four workers are affected with eye irritation and skin allergy respectively. The remaining two and one workers each affected by TB and Backache and Chest pain and Cough respectively. Due to dust pollution majority of the workers are affected with breathing problems.
- It is obvious the operators and the mechanics are frequently absent to the work due to health and other problems and they lost nearly Rs. 500/= per absent. The total income loss is estimated as Rs. 13489/= per month.

**Suggestions**

- Workers must be provided with proper protection devices like mask, helmet, glass *etc.*, to avoid dust problem.



- Steps should be taken by the Government and the stone crusher units to educate the workers and advise them to undergo periodical medical check-up. This will reduce the health problems.
- Various departments of the State and Central Governments, the employer, trade unions and the voluntary organizations should organize seminars, conferences, workshops and such other activities for the workers to create awareness on dust pollution.
- All workers should be enrolled their names with Government health schemes and insurance schemes. The premium amount should be paid by the employer not by the employee.
- Government hospital authorities should conduct free medical camps in the crusher units with periodic intervals to avoid serious health problems.

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