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Health Hazards impact on granite workers in Krishnagiri district of Tamilnadu

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Abstract
The study revealed that high prevalent rate of diseases such as cough and cold, eye problems, heart problems, head ache, throat infection, stress, among the workers were the direct and indirect effect of mining activities and Environmental health and safety performance, reported that "there are a number of hazards inherent to the quarrying industry. Some are due to exposure to dust and high temperature; contact with allergy substances; and noise exposure. In quarrying operations there are hazards associated with blasting and rock handling and common hazards like general slips, trips and falls, machinery hazards and electrical hazards. Most prevalent occupational diseases among the mine workers in the study area are respiratory problems, eye problems, skin problems, asthma, stress, etc. Keeping in view the health and environmental hazards of granite industry, the present study will be engaged with the following objectives.

Keywords: *Health impact, health hazards, disease, injury category*

I. Introduction

The term “Granite” is derived from Latin word “Granum” meaning “grain” because of its granular nature. India is well known since time immemorial for its building and dimensional stones like Marble, Sandstone, Limestone, Slate etc. Recently granite has also been added to this list. Granite occupies a prominent place among dimensional stones on account of its hardness, durability, capability to take mirror polish and fascinating colours. As such the use of granite has increased many folds as dimensional and decorative stone all over the world and this has created a good export market for Indian Granite.

Granite as becomes the most widely utilized stone material in the building industry today. Throughout history, granite has been used important architecture in the entire world. Some of our oldest cable stone streets are granite and or still very functional today. It has also been valued as flooring in almost any applications. Kitchen and / or both counter tops, walls, bar tops and driveways are all popular users for this extremely hard material. Granite is found all over the world and can be found in many colours.

Granite is the most beautiful and reliable material for the building industry. It is used as a building material in the form of tiles and slabs and is a modular clement for flooring, internal and external cladding, steps sills etc., in houses, offices, hotels, restaurants, hospitals, temples etc., it is also used in monuments. Granite has been scarcely used in the past on account of high degree of hardness and difficulties in processing. The developments of a new and advanced technology and machinery as made a possible for a granite industry to reduce its production costs and considerably increased its production capabilities.

II. Review of Literature

Mihir P. Rupani (2023) states that Silicosis is an irreversible and fatal pneumoconiosis affecting millions of workers worldwide who are exposed to silica dust. Mining, tunnelling, quarrying, sculpturing, foundries, and manufacturing of building construction materials are some of the key industries in which workers are exposed to silica dust. Although silicosis is considered to be more prevalent in low and middle-income countries, evidence on its global burden is limited, due mostly to underreporting and low detection due to a lack of surveillance. In 2019, an estimated 2.65 million cases of silicosis were reported worldwide. Globally, in 2019, over 12.9 thousand deaths and 0.65 million disability-adjusted life years were attributed to silicosis, accounting for three-fourths of all pneumoconiosis. A comprehensive national health program on silicosis

within the public health system would strengthen surveillance, notification, and management of workers exposed to silica dust in the world.

Akularemi, et.al (2021) states that the stone quarry is being well on economic point of view. As well as stone quarry has been generating additional employment opportunities of growing labour force in non-agriculture sector in rural and semi urban area. Although the living condition of workers are very poor. The labours of stone quarry associated with a lot of problems. In some cases of processing units overtime is compulsory. Accidents at work place sometimes resulting in the death of workers which occur frequently in the industry. The government intervention is necessary to avoid all the problems and to protect the labour and human rights.

Volodymyr Studinski (2021) states Ukraine is located on the so-called Ukrainian Shield, which is a geological block rise of the crystalline basement of the Eastern European platform. This geological massif consists almost entirely of metamorphic and igneous rocks, the bulk of which are deeply processed by ultra-metamorphic processes, including granitization and selective antithesis, which caused the formation of local crustal magmas. In many places granites come to the surface. From the geological point of view, granite is an intrusive rock of acidic composition with a granular (even-grained or uneven-grained) structure. The exceptional strength of this stone material allows it to be used in various areas of the economy, including construction. In this area, granite is widely used in the construction of roads, houses, concrete, bridges and more.

Due to the, widespread use of stone in the manufacturing sector, there is a need for its extraction. At the same time, the extraction of granite by quarrying, as well as its further processing marketable products including crushed stone, has a negative impact on the environment. On the one hand, there is a problem of producing the necessary construction products to meet the needs of industry and domestic life of the country's inhabitants and on the other there is an issue of environmental protection.

The article attempts to consider the negative impact on the environment of granite mining and its processing into marketable products. The authors also tried to consider this problem comprehensively in combination with other negative environmental impacts. This touches on the improvement of technical and technological processes that reduce the negative impact on the environment. Quarrying of granite is undoubtedly a negative impact on the natural state, in particular on the quality of air, water and land resources. This negative impact is exacerbated by the fact that the Zhytomyr region was most negatively affected by the Chernobyl nuclear power plant accident. However, the application of modern technologies in the system of quarry granite mining can significantly reduce the negative impact, in particular of crushed stone plants, on the environment of Zhytomyr region.

Maysaa Nemer., et.al. (2020) indicates that environmental exposure to dust from quarrying activities could pose health dangers to the population living nearby. This study will be aimed to investigate the health effects of dust exposure on people living close to quarry sites and compared them with those who live far from the quarry sites. Among the exposed group, lung function parameters worsened with the increasing closeness of home to the quarry site. This study is going to demonstrate the negative health effects of environmental dust exposure among two communities living near quarry sites in Palestine. The results will highlight the importance of developing and strictly enforcing rules and regulations against quarry in Palestine to protect population health.

Statement of the problem

Granite Industry in Tamilnadu particularly facing several problems one of the biggest problems of the industry is disposing of over burden and waste. Another problem is the slurry from granite block processing which becomes airborne when dry. This will cause health hazards for the mining workers as well as people living around quarries and processing units. Besides being dangerous to human life, these polluting elements are also dangerous to crops and cattle around. Meanwhile the study will also focus on environmental issues raised in the study area due to the development of granite quarries and industries. Keeping in view the health and environmental hazards of granite industry, the present study will be engaged with the following objectives.

Objectives of the Study

1. To study the socio-economic background of granite workers in Krishnagiri district of Tamil Nadu
2. To examine the environmental and health impacts of quarrying activities among the granite workers in the Krishnagiri district

Hypothesis of the Study

There is no significant difference between the risk levels of dominant in hazardous events among the respondents.

Table no. 1
Age wise distribution of the respondents

Sl. No	Age	Respondents	Percentage
1	Up to-25	103	19.6
2	26-35	134	25.5
3	36-45	122	23.2
4	46-55	109	20.8
5	56 & Above	57	10.8
Total		**525**	**100**

Source: Primary Data

The above table no. 1 age wise distribution of the respondents shows that the 25.5 % belong to 26 to 35 years, followed by 23.2 % belong to 36.-45 years and 10.8% belong to above 56 years. Thus, it is concluded that most (25.5%) of the respondents belong to the 26 to 35 years age group.

Table no. 2
Gender wise distribution of the respondents

Sl. No	Gender	Respondents	Percentage
1	Male	391	74.5
2	Female	134	25.5
Total		**525**	**100**

Source: Primary Data

From the above table no. 2 gender wise distribution of the respondents observed that the 74.5 % belong to the gender male, followed by 25.5 % belong to the gender female. Thus, it is concluded that the majority (74.5%) of the respondents belong to the gender male group.

Table no. 3
Marital status wise distribution of the respondents

Sl. No	Marital Status	Respondents	Percentage
1	Unmarried	197	37.5
2	Married	306	58.3
3	Divorced	10	1.9
4	Widow	12	2.3
Total		**525**	**100**

Source: Primary Data

It is revealed from the above table no.3 marital status wise distribution of the respondent's mentions that the 58.3 % are married, followed by 37.5 % are unmarried and 2.3 % are widows. Thus, it is concluded that the nearly (58.3%) of the respondents are married.

Table no. 4
Education qualification wise distribution of respondents

Sl. No	Education	Respondents	Percentage
1	Illiterate	121	23.0
2	Up to Higher Secondary	337	64.2
3	Graduation	40	7.6
4	Post-graduation	21	4.0
5	Others (specify)	6	1.1
Total		**525**	**100**

Source: Primary Data

The above table no.4 education qualification wise distribution of respondents clearly identified that the 64.2 % are completed up to higher education, followed by 23 % are illiterate. Thus, it is concluded that the almost (64.2 %) of the respondents are completed up to higher education level of education.

Table no. 5
Family type wise distribution of the respondents

Sl. No	Family Type	Respondents	Percentage
1	Nuclear Family	285	54.3
2	Joint family	240	45.7
Total		**525**	**100**

Source: Primary Data

It is seen from the above table no.5 family type wise distribution of the respondents mentions that the 54.3 % of the respondents belongs to the nuclear family, whereas the rest belongs to the joint family. Thus, it is concluded that the most (54.3%) of the respondents belongs to a nuclear type of family.

Table no. 6
No. of children wise distribution of the respondents

Sl. No	No. of Children	Respondents	Percentage
1	No child	278	53.0
2	1child	206	39.2
3	2 child	36	6.9
4	3and above	5	0.9
Total		**525**	**100**

Source: Primary Data

From the above table no.6 number of children wise distribution of the respondents observed that the 53 % of the respondent's family have no child, followed by 39.2 % have one child and 0.9% of the respondents have 3 and above number of children in their family. Thus, nearly (53%) of the respondents have no child in the family.

Table no. 7
Working time distribution of the respondents

Sl. No	Working Time	Respondents	Percentage
1	6 to 8 hours	226	43.0
2	9 to 12 hours	245	46.7
3	More than 12 hours	54	10.3
Total		**525**	**100**

Source: Primary Data

From the above table no.7 working time per day wise distribution of the respondents observed that the 46.7 % of the respondents work 9 to 12 hours per day, followed by 43 % of the respondents working 6 to 8 hours. Thus, it is concluded that almost (46.7 %) of the respondents work 9 to 12 hours.

Hazards Faced In Stone Mining Operations Rank

Garrett ranking technique was used to rank the hazards among the respondents. In this method, the respondents were asked to give ranks according to the magnitude of the preference. The order of merit given by the consumers was converted into percentage position by using the formula.

Percentage position = $\sum_{i=1}^{\sum} 100.0*(Rij- 0.5)/ Nj$

Where, Rij = Rank given for ith factor by j th individual

Nj = Number of factors ranked by j th individual

The percentage position of each rank thus obtained is converted into scores by referring to the table given by Henry Garrett. Then for each factor the scores of individual respondents are added together divided by the total number of respondents for whom scores were added. These mean scores for all the factors are arranged in the descending order, ranks are given and most influencing reasons are identified.

Table no. 8
Type of disease attack

Sl. No	Hazards faced	Total score	Mean score	Rank
1	Cough	43205	82.30	1
2	Sneezing	34495	65.70	2
3	Asthma	34015	64.79	3
4	Heart problems	25945	49.42	5
5	Head ache	28625	54.52	4
6	Eye problem	23245	44.28	7
7	Stress	24515	46.70	6
8	Throat infection	13245	25.23	9
9	Allergy	22705	43.25	8
10	Wheezing	11615	22.12	10

The above table no 8 reveals that among the 10 mean scores on type of disease attack towards stone mining operations, the mean score ranged from 22.12 to 82.30 and the mean problem score of 'cough' secured higher mean score and stood at top, followed by 'Sneezing' secured next higher mean score and stood at second, followed by 'Asthma' secured next higher mean score and stood at third and finally 'Wheezing' secured least score and stood at last.

Table no. 9
Hazards faced in stone mining operations rank

Sl. No	Hazards faced	Total score	Mean score	Rank
1	Travel in moving vehicle in uneven terrain	29990	57.12	1
2	Unintended explosions (exposure to overpressure)	21710	41.35	5
3	Hit by fly rock (bodily injuries)	24610	46.88	4
4	Rock falls or slide due to lack of bench face stability (bodily injuries)	27390	52.17	3
5	Hit by Machineries – Electrical Equipment (bodily injuries)	27590	52.55	2

The above table no.9 showed that among the 5 mean scores on hazards among respondents towards stone mining operations, the mean score ranged from 41.35to 57.12and the mean problem score of 'Travel in moving vehicle in uneven terrain' secured higher mean score and stood at top, followed by 'Hit by Machineries – Electrical Equipment (bodily injuries)' secured next higher mean score and stood at second, 'Rock falls or slide due to lack of bench face stability (bodily injuries)' secured next higher mean score and stood at third and finally 'Unintended explosions (exposure to overpressure)' secured least score and stood at last.

Table no. 10
Occupational health and injury categories

Sl. No	Hazards faced	Total score	Mean score	Rank
1	Back and lower back pain	47078.13	89.67	1
2	Eye irritation and red eye	44646.88	85.04	2
3	Crushed hand/fingers/toes	43559.38	82.97	4
4	Headache	42203.13	80.39	5
5	Sharp and deep cuts or indent	43803.13	83.43	3
6	Cough	31996.88	60.95	7
7	Difficulties in breathing	32184.38	61.30	6
8	Skin irritation and Dermatitis	21028.13	40.05	9
9	Nose irritation	21315.63	40.60	8
10	Difficulties in hearing	17546.88	33.42	10
11	Throat irritation	15815.63	30.13	11
12	Ear irritation	14034.38	26.73	13
13	Visual fatigue/Eye strain	14509.38	27.64	12
14	Bone Fracture and dislocations	13428.13	25.58	14
15	Skull Fracture	8740.625	16.65	15
16	Infected wounds	7228.125	13.77	16

The above table no. 10 noted that among the 16 mean scores on occupational health and injuries towards work and work environment, the mean score ranged from 13.77to 89.67and the mean problem score of 'Back and lower back pain' secured higher mean score and stood at top, followed by 'Eye irritation and red eye' secured next higher mean score and stood at second, 'Sharp and deep cuts or indent ' secured next higher mean score and stood at third and finally 'Infected wounds' secured least score and stood at last.

Dominant Hazardous Events

To estimate and compare the mean level of dominant hazardous events among the respondents , weighted average analysis is performed using five rating scales and assigning score 1 for strongly disagree; 2 for disagree; 3 for neutral; 4 for agree and 5 for strongly agree and the results are presented in the following table.

Risk Level of Dominant Hazardous Events

Hypothesis:

There is no significant between the risk levels of dominant in hazardous events among the respondents.

Anova

Source	DF	SS	MS	F
Between groups	7	538.227	59.803	37.10**
Within groups	4189	6752.102	1.612	

****- Significant at 1 % level**

Since the F is significant the null hypothesis of no difference in the mean score among respondents is rejected and there is significant difference in the mean scores among respondents. The mean scores among the respondent is furnished below:

Table no. 11
Risk level of dominant hazardous events

Sl. No	Opinion	Mean score	Rank
1	Struck by falling object	2.88	7
2	Exposure to excessive dust	2.84	8
3	Working without PPE	3.76	2
4	Improper lifting and handling technique	3.31	5
5	Frequent lifting and handling of heavy objects	3.94	1
6	Sharp machine edge and stone chips	3.23	6
7	Exposure to excessive noise	3.40	4
8	Highly repetitive work	3.45	3

From the above table no.11observed that among the 8 mean score on dominant hazardous events opinion, the mean score ranged from 2.84 to 3.94 and the mean score of factor 'Frequent lifting and handling of heavy objects 'secured higher mean score and stood at top, followed by 'Working without PPE' secured next higher mean score and stood at second, 'Highly repetitive work' secured next higher mean score and stood at third and finally 'Exposure to excessive dust' secured least score and stood at last.

III. Findings of the Study

- It concluded that most (25.5%) of the respondents belong to the 26 to 35 years age group.
- Majority (74.5%) of the respondents belong to the gender male group.
- Nearly (58.3%) of the respondents are married.
- Almost (64.2 %) of the respondents are completed up to higher education level of education.
- Most (54.3%) of the respondents belongs to a nuclear type of family.
- Around (53%) of the respondents have no children in the family.
- Out of (46.7 %) of the respondent's work 9 to 12 hours.
- Between the 10 mean scores on type of disease attack towards stone mining operations, the mean score ranged from 22.12 to 82.30 and the mean problem score of 'cough' secured higher mean score and stood at top, followed by 'Sneezing' secured next higher mean score and stood at second, followed by 'Asthma' secured next higher mean score and stood at third and finally 'Wheezing' secured least score and stood at last.
- Among the 5 mean scores on hazards among respondents towards stone mining operations, the mean score ranged from 41.35to 57.12and the mean problem score of 'Travel in moving vehicle in uneven terrain' secured higher mean score and stood at top, followed by 'Hit by Machineries – Electrical Equipment (bodily injuries)' secured next higher mean score and stood at second, 'Rock falls or slide due to lack of bench face stability (bodily injuries)' secured next higher mean score and stood at third and finally 'Unintended explosions (exposure to overpressure)' secured least score and stood at last.
- The 16 mean scores on occupational health and injuries towards work and work environment, the mean score ranged from 13.77to 89.67and the mean problem score of 'Back and lower back pain' secured higher mean score and stood at top, followed by 'Eye irritation and red eye' secured next higher mean score and stood at second, 'Sharp and deep cuts or indent' secured next higher mean score and stood at third and finally 'Infected wounds' secured least score and stood at last.

- Among the 8 mean score on dominant hazardous events opinion, the mean score ranged from 2.84 to 3.94 and the mean score of factor 'Frequent lifting and handling of heavy objects 'secured higher mean score and stood at top, followed by 'Working without PPE' secured next higher mean score and stood at second, 'Highly repetitive work' secured next higher mean score and stood at third and finally 'Exposure to excessive dust' secured least score and stood at last.

Suggestions of the Study

- 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.

- Government hospital authorities should conduct free medical camps in the crusher units with periodic intervals to avoid serious health problems.

- Perform training program should be provided for marble and granite workers to improve their knowledge and practices regarding prevention of occupational health hazards.

IV. Conclusion

It has been observed that most of the respondents from the study area are against quarrying due to the adverse effects of this to the environment as well as human beings. The major problems have been found in the quarry area of the study area are shortage of water, and pollutions of air, water, noise, land degradation, vibration, property damage and health problems on both workers and area residents. The respondents who were residing near to quarry sites are suffering more than those who are residing away from these sites. Most prevalent occupational diseases among the mine workers in the study area are respiratory problems, eye problems, skin problems, asthma, stress, etc. These diseases are also faced by the area residents also. The workers awareness level of the safety risks they are exposed to at was high but use of protective clothing while at work was poor. The exposure of workers to the high concentration and the poor use of protective clothing and gear predispose them to these problems.

References

[1]. Ali Alioloda., Abd Elamoaty, M.(2014). Re use of Waste Marble Dust in the production of cement and concrete. Volume.50, page-28-41.
[2]. Baah-Ennumh, T. Y., Yeboah, A. S., Akularemi, A. E. J. (2021). Contextualizing the effects of stone quarrying: insights from the Wenchi municipality in Ghana. Geo Journal 86 (1), 489–505.
[3]. Bhardwa, G. S., Sharma, S. Granite Extraction and Treatment Technologies – A study on cost effective Geo – Technical Aspects.
[4]. Jalari, V., Devarajulu, M. (2013). Performance of Granite Industry in Chittor district of Andhra Pradesh.195.
[5]. Joan Manual, F., Mendoza. (2014). Environmental Management of Granite Slab Production from An Industrial Ecology Standpoint. Journal of Cleaner Production. Volume.2.
[6]. Kumar, C.S.(2010). A commercial study on the problems and prospects of granite quarrying industry in Kanya Kumari district.
[7]. Kumar, R. R., Bhadaksharasamy, N., Srinivas. (2000). Impact of Granite Quarrying on Environment in Bangalore district with reference to socio economic status of workers.
[8]. Manzoor Hussain, M., Phani Katuru., Hebbal, S.S. Occupational Health and Safety Issues among Workers in Stone Industries in North Karnataka. 9th Annual International Conference on Industrial and Operations Management.
[9]. Maysaa Nemer., Rita Giacaman., Abdullafif Husseini. (2020). Lung Function and Respiratory Health of Populations Living Close to Quarry Site in Palastine. International Journal of Environmental Research and Public Health.(17).
[10]. Mihir Rupani, P. (2023). Challenges and opportunities for silicosis prevention and control: need for a national health program on silicosis in India. Journal of Occupational Medicine and Toxicology, 18(11).
[11]. Mohammad Safari Savadkoohi., Mohammad Reisi. (2020). Environmental based Protection based Sustainable Development by Utilization of Granite Waste in Reactive Powder Concrete. Journal of Cleaner Production. Volume.266, 121973.
[12]. Oguntoke Olusegun., Aboaba Adeniyi., Gbadebo Adeola., T. (2009). Impact of Granite Quarrying on the Health of Workers and nearby residents in Aheokuta Ogun State, Nigeria. Ethiopian Journal of Environmental Studies and Management. Volume.2, No.1.
[13]. Volodymyr Studunski. (2021). Economic and ecological aspects of granite mining in Zhytomyr region: problems and prospects. Ukrain Journal of Ecology. Volume.2.