

Case Study of Construction Pollution Impact on Environment

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Abstract –: Construction industry is a big industry in world approximately half of the population depend upon the construction industries directly or indirectly. It is a backbone of all sectors or maximum contribution in country economy. But negative impact of construction site pollution and activities is big challenging face for all counties like India, Pakistan, Bangladesh, China, Canada, Ghana, Turkey, Taiwan, and others countries also. In these countries construction pollution increase the mortality rate and increases the different types of critical diseases patient numbers in the country. Different type's pollution like air, water, noise, landfill pollution occurs through the construction process. Air, water, noise pollutant commonly mix in human daily and affect the human being also impact on environment and ecosystem. Pollutant of air are PM10, PM2.5, SOx, NOx, volatile organic compound pollution intensity has reach to become high level. In this paper author analysis the works of different researchers which have present the study on construction pollution impact. If seen on top polluted cities in world than most of cities having major construction activities. Where the impact level is high on those countries have no proper monitoring and checking the site activities. If all measures are follow on site and proper maintenance happen on site than countries reduces most of the patient in these types of diseases.

Index Terms-: Construction; air pollution; PM10; PM2.5; SOx; NOx; pollutants

1. INTRODUCTION

Construction sector is a big sector for every country growth. All the citizens directly or indirectly connect in this sector. It is the main source of income of about 30% percent population in the world. About half of renewable and half of nonrenewable resource used in this sector make construction industry less sustainable in world [1]. Estimating the resources used in buildings are : i) Energy 45-50% ii) water in 50% iii) materials used in building and road (by bulk) 60% iv) agricultural land uses 80%, v) timber product uses 60% out of which 90% use as a hardwood[2]. It clearly show that construction industry is a big industry sector in the world but due to certain negative impact of construction site activities have abhor the worker in this sector. It is a big challenge for

construction world and all workers face this problem. The negative impact of construction site activities on environment has recently recognized in this world [3, 4, 5]. Most of the construction site activities have required law for controlling pollution in developing countries. Construction pollution affects the all human beings, animals, environment and natural ecosystem [6]. Cities where pollution level is high in to red alert on these countries and need to focus on this impact of construction and find out certain solution for construction impact. In this time if changes in practice of construction than there can be mitigated of construction pollution [4].

2. REVIEWS OF STUDIES

In the research many of them have study the impact on them out of them selected the 3 studies reviews of following

Ayarkwa et al 2014,

The author had analyzed the worse influence of construction site action on the environment for using organized questionnaire inspection method. In this survey analyzed on following basis: - Ranking the adversely affected site activities the construction out of all main activities reviews both of them construction worker and nearby resident both of them have different views. The researcher had analyzed the construction activity on different point of view. On the basis of survey further research categorized respondent in severely affected on following order i) nearby residents (75%), ii) site workers (65%) iii) Humans in neighbors and its neighborhood and college students and school students (35%). People living nearby construction site faces many problem for noise, dust and odors also analysis impact on the ecosystem, construction worker and nearby residents. Construction site activities have serious impact on environment. Site blasting, site clearance transportation of resource has serious impact on human health.

Samaneh Zolfagharian et al. (2012)

In this study author find out construction activities impact on environment in Malaysia. In this case study author had made a questionnaire of 4 categories including its subcategories and take a response with the construction practitioners so that the views can be recorded. In this analysis the author found that transportation of resource has major environment impact compared with other activities. The noise generation heavy machine activities during construction process is also major concerning issue has serious impact to nearby residents. During the construction activities heavy dust generation have serious impact on human health cause of diseases like respiratory diseases, silicosis and lung cancer in people in this environment. Furthermore, green house gas emission, and waterborne toxicities contributes the less with any other sub categories.

In this study author divide the environmental impact in 3 category i) Ecosystem impact 67percent ii) natural resource impact 21 percent iii) public health impact 12percent.

Li et al (2010)

In this study the researcher has quantitative assessment of environmental impact in china and this study present integrated life cycle environmental impact assessment model that is applicable to construction phase studies, where impact factors are analyzed on different factors. In this study author categorized the environmental impact in to three subjects such as ecosystem impact, natural resource impacts, and human health. According to the author; the most vulnerable impact of construction activities on ecosystem. 65% impact on ecosystem, 8% impact on the natural resource, and 27% impact on the human health.. The impact distribution among unit processes and environmental burden substances showing in this study that pit support construction is responsible for 59.4% of the total environmental impact. The environmental impact of excavation rank the second (18.3%), site cleaning third (12.3%).

3. DETAIL STUDY OF CONSTRUCTION POLLUTION

Construction industry has serious impact on human health and the environment. It increases the chances different types of diseases. The 2 impacts are

3.1 Impact on human health

Construction and site activities are mainly responsible for different types of diseases like High Blood pressure (HBP), hypertension (cardio vascular disease, pneumonia, respiratory

diseases [8], coughing, asthma [9], cardio vascular [10] diseases, brain strokes, premature death [10] and type 2 mellitus diabetes. These are the main diseases which contaminated by construction pollutants. In the estimate of global pollution that can be attributed to building and construction activities the pollutions air qualities is affected in cities is 23%, climate change through gases responsible is 50%, drinking water through pollution 40%, landfill pollution occur through construction activities 50%, Ozone depletion pollution through pollution is 50% [11]. Construction activities main pollutant are particulate matter (PM10and PM2.5), NO_x , SO_x and volatile organic compounds. In the south east Asia particulate air pollution is mostly responsible for pollution and their related diseases. According to 2014 report of WHO, Delhi among 13 cities out of 20 comes up from India and Delhi comes on first number in the list of polluted top most cities in the world [12]. Most affective pollutant is particulate matter in all over the world. Particulate matter directly affects the human health in different diseases which increases the burden of health. Some of the diseases are more common most of the people from these diseases like respiratory diseases, allergies, high blood pressure, asthma, sleeplessness, eyes irritation few diseases which could harm the human beings. Drinking water is also infected from construction activities: Illegal dumping of solid waste and paint and oil leave behind on site are the causes of contaminated water. Long term exposure of air pollution has serious effect on human heart, it increase the heart variability rate [13] and also cause a high blood pressure. Noise pollution on construction site increases the cases of sleeplessness, eyes irritation, high blood pressure, stress problems also affect the person who has problem of heart stroke due to increase site activities and heavy old vehicle used on site. This is best source of construction pollution. Construction water pollution occur due to construction waste is not proper use and management. At the time of raining these worst fuel and other pollutant mix with water and these wash water mix in river and polluted and the site activities uses of machine and nearby residents are facing heavy noise pollution for these sound cause the different disorder like sleeplessness, stress problem and also the cause of High blood pressure and heart stroke in human health [10, 14].

3.2 Impact on environment

Environment impact of the construction activities has recently recognized and analyzed in the topic. Most of the authors have presented their work on environment impact [3, 5]. If comparing the environmental impact of developing countries from developed countries probably high [4]. Construction activities could damages the environment, destroy natural

vegetation, water bodies, natural sand dunes forests, gardens, parking areas, construction pollution also cause soil compaction substantial increase in the soil level, opened of trenches, damage of plant roots destroying roots, damages of dams are affected by construction pollution. These are destroyed by construction activities like production of cement, aggregate, concrete, steel require more fossil fuel destroy renewable source of energy [4]. At the time of construction various types of green house gas emitted these toxic gas and effluents mix with environment more easily it could harm the marine life aquatic bodies also contributing atmospheric pollution [4]. Activities of heavy diesel vehicles, paints and solvents leave behind on site and illegal dumping of waste mix with rain water and wash off by rain mix in water bodies destroy aquatic animal and increase eco toxicity of water [15]. Improper way of mining of sand and stones destroy the sand dunes and natural terrain and direct impact on environment. Mostly sites the construction salvage is become 40-60% waste generation due to higher consumption of material. Mostly 80% construction waste is reusable and recyclable on construction site [16] and highest waste of material on site is Portland cement.

4. RECOMMENDATION AS PER STUDIES

4.1) Noise pollution should be increased due to increases of transportation vehicle in the process of urbanization and industrialization. Noise pollution on nearby sites is a big issue in that time. Noise pollution can be reduced on sites for proper management and used advanced techniques. Noise can be managed on site for following four stages Assess, Eliminate, control and review technique. Also uses obstacle to reduce the noise from the origin [17] to reduce the impact on nearby neighbors and its neighborhood.

4.2 Generation of dust from construction activities is main cause of PM10 and PM2.5 particle in many countries. Particulate matter (PM 2.5 and PM10) level too high as per WHO guidelines and it is also be the cause of different diseases in worker and nearby residents. Exhaust system of ventilation for wet dust suppression uses personal protective devices are common technique to reduce dust impact from the construction industry [18]. For the nearby residents area using advanced construction method or technologies reduce the site pollution on sites. Waste generation amount produced by construction practices like alteration and demolition has more rich and has become serious problems most of the countries [19]. Survey conducted in Brazil, Australia and the United States and from evaluating result found the amount of 20 - 30% waste generation of the total waste generation entering in landfill throughout the world is high [20,21].

4.3 Waste material is the cause of soil pollution and water pollution in the time of rain. For increasing the waste material on site has substantial international concerns [3]. Estimate that as much as 80% waste generation on the time of construction activities are reusable and recyclable since it is relatively clean [16].

4.4 Construction in the time of rainy season sediments fine concrete, paints, lubricants, fuel, solvent, pesticides etc enter storm and pollute the water and illegal dumping on material on the river side also the cause increasing water pollution. Different chemicals uses on cement mix with water resources reduce the water dissolved oxygen and harm the aquatic life and human immunity level. Water used on construction activities like curing wash off water of bricks cause to increase pollutant fluids which may destroy the land fertility in nearby area and adjacent pavements [22]. For reducing this practice re use of waste on site could be reduce water pollution and make a new method for reuse of polluted water on construction sites

There are various policies of government but gap between regulations is also important reason for concern. Government body took least interest for controlling the site activities. There are various factors which are responsible for intervention of these policies due to poor monitoring and lack communication of data and poor regulation also a big cause of concern. According to [23] studied the on the gaps between regulation of policies and reality in India for controlling the urban air quality looks for change in methodology improve modification of techniques and devices. The gaps are identified in flow of data and follow standardize data collection policy. If increasing the awareness of pollution also reduces the impact level in India.

5. CONCLUSION

Construction activities are the important source which responsible to destroy environment and natural ecosystem. For any country construction can never be stop and never stop site activities. If following advanced technologies and methods use the construction pollution on sites. Some Gaps between policies rules and regulation in different countries. Many of the countries have not proper fund for buying heavy advanced machines and monitoring pollution on construction sites. If the WHO helps in following countries so countries automatically adjusted pollution level. Modern devices help to reduce the pollution and the make the environment pollution in developing countries. Particulate matter pollution mostly occurs in dry atmosphere. This study is totally based on the reviews studies of different work which could be done by different authors in different sites. Construction practitioners, concerned about problem regarding to money and general

pollution rather than direct impact of their work on the environment and nearby residents [3]. Nearby resident's people living near construction sites, sites workers, and people daily up downers are mostly affected by construction site activities. People are mostly affected from these activities. For reduction these pollution start working with new methods and technologies and following sustainable construction techniques reduce environmental pollution

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