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Pollution due to highway construction

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Abstract: Degree of impact of road construct on the different environment aspects vary depending on factors such as the types of area, the terrain, the land-use patterns of the area. In residential and other under areas, urban areas, quality of air, noise pollution, proper traffic circulation are more important. All road projects should be planned, designed and executed in accordance with the standards and specifications laid down by Indian Roads Congress.

Keywords: Air, Noise, Pollution, road, Government

Roads can have both positive and negative influences on people and the environment. On the positive side roads provide the opportunity of mobility and transport for people and goods. On the negative side roads occupy land resources and form barriers to animals. They can also cause adverse impacts on natural water resources and discharge area. Construction pollution is mainly the pollution on the sites of construction and demolition by various construction activities. It may be in the form of air pollution, noise pollution, water pollution, or soil pollution, depending on the nature of the activities being practiced at site. Directly emitted pollutants during construction include particulate matter (PM), Carbon monoxide (CO), oxide of nitrogen (NOx), and benzene, though hundreds of chemicals are emitted by motor vehicles. Road traffic pollution causes asthma attacks in children and may cause a wide range of other effects including the onset of children asthma, impaired lung function, premature death and death from cardiovascular diseases and cardiovascular morbidity. Construction sites are found both within urban and rural areas. Due to their proximity to homes, construction sites may generate home pollution. This involves air, water, soil and /or noise pollution. Additionally, construction work may reveal existing subsurface pollution. Thus, construction work may generate construction pollution problems affecting both homeowners and construction site owners.

Types of pollution:

1. **Air pollution**- Poor air quality is the most immediate pollution effect one may experience from a construction site. This means that airborne contaminants including contaminated particulate matter and volatile compounds are spreading around neighbourhood Contaminants that spread around in air can travel large distances in a short time, they include PM/O, volatile organic compounds (VOCs), asbestos, gases such as carbon monoxide, carbon dioxide, and nitrogen oxides.
2. **Water pollution:**The surface water runoff and the groundwater close to a construction site become polluted with various materials used in construction work viz VOCs, paints, glues, diesel, oils, other toxic chemicals, and cementThe immediate effect is creating turbidity in the runoff water and affected surface and ground water.

3. **Soil pollution-** Soil at and around construction site may become contaminated due to air transport followed by deposition of construction contaminants as well as water runoff of construction contaminants.
4. **Noise pollution:** Noise is usually associated with construction work although modern preventive measures may substantially reduce the amount noise. Noise may adversely affect health, including effects such as stress, sleep disturbance, high blood pressure and even hearing loss.

   Construction activities are always considered the main source of environmentalpollution. Noise pollution, dust generation with construction machinery is the major factors involved during this activity, which requires monitoring and documentating. Results of such studies may be useful in predicating the future environmental damage caused by such construction activities (Zolfagharian S. et. al. 2012). Transportation infrastructure projects involve significant economic and environmental issues that require to be monitored. Considerating the sustainability environmental impact assessment has been mainly focused by planners in the past. Although it involves a large number of independent and dependent variables, but efforts can be made to capture the overall vulnerability of transportation projects and its improvements. (M.A. El-Gafy 2011). The effects of freight transport automation have been related by a multimodal approach to recognize urban freight transport (Priemus et al. 1999). Trucks, due to their large size and more powerful engines produced noise level as much as 15 decibel higher than passenger cars. (Ogden, K.V. 1992).

With the vigorous advancement of transportation construction, domestic research on the economic and social impact of highway construction has gradually increased (Lean et al. 2014; Von Boventer, 1975). The impact of highways on the ecological environment can be divided into the impact on the environment, vegetation, and animals. Specifically, road construction and excavation lead to soil exposed and erosion caused by changes in ground runoff conditions, road engineering destroys surface vegetation, resulting in a decrease in plant species and ecosystem structure and function, road construction destroys wildlife habitat(Xv Ah. 2009). Forman et al. (2003).pointed out that from the perspective of landscape, roads have significant impacts on built- up land, forest land, agriculture land and gracing dryland, forest land, agriculture land and grazing dry land and discussed specific impact mechanism coffin 2007 pointed out that roads will cause changes in land use and land cover and increase fragmentation and reduce connectivity. Jain, G. et al. (2016) studied construction pollution impact on environment.

Pollution control:

There are about 30 major enactments related to control of pollution now being administrated by central and state governments. The Central board coordinates activities of a state Central boards statutorilyconstituted in various States for nationwideimplementation of pollution control. For providing a single focus for all environmental issues in the country and to plug loopholes in the existing Acts, the Govt. of India enacted the Environment Protection Act 1986. This Act confers on the Central Govt. to take all necessary measures for protecting the quality of environment, pollutants etc.

- **Air pollution**: Towards monitoring air quality, the Ministry of Environment and Forest have set up ambient air quality monitoring stations spread throughout the country. The Bureau of India Standards have prepared emission standards for both petrol and diesel vehicles. These are:

  1) IS 9057-1979-Emission limits for carbon monoxide for vehicles powered by Spark Ignition Engines.
  2) IS: 8118-1976- Smoke Emission levels for Diesel vehicles.

  The Level of ambient air pollution because of road vehicles depends on several factors such as the condition of the vehicles, the; level of traffic congestion causing frequent acceleration/ de-acceleration or stopping, the wing velocity and direction etc.

- Noise pollution: Road traffic causes noise. The noise level depends on factors such as traffic intensity, the type and condition of the vehicles, acceleration/ de-acceleration depending on the level of congestion, smoothness of road surface etc.

IS: 4954-1968 Acceptable noise levels

S. No	Location	Acceptable outdoor noise levels in residential areas dB (A)
1.	Rural	25-35
2.	Suburban	30-40
3.	Residential (urban)	35-45
4.	Urban Residential & Business	40-50
5.	City	45-50
6.	Industrial area	50-60

The BIS has also brought out a number of standards on the measurement of noise. These are:

i) IS: 3028-1980, measurement of Noise Emitted by Moving Road Vehicles.
ii) IS: 4758-1968, Method of measurement of Noise Emitted by Machines.
iii) IS: 9779-1981, Sound Levels Meters
iv) IS: 10399-1982, Method of Measurement of Noise Emitted by Stationary Road Vehicle.
v) IS: 10423-1982, Personal Sound Exposure. Meter.

Noise pollution is an irritant and affects human health and efficiency. This will therefore be required to be considered in urban areas and other residential areas falling within 100 meter of road.

Pollution during construction operation:

During road construction operation, the main sources of pollution are exhaust and flue gases from the road construction equipment and dust resulting from construction operation.Most of the road construction equipment are governed by standards of BIS or foreign standards which provide pollution control devices for equipment. Loading, unloading and transport of materials like soil, sand, moorum, etc. will cause dust nuisance, particularly when high velocity is prevailing. In such cases, it will be advisable to slightly wet the materials at the source itself before loading and to cover the loaded vehicles with tarpaulin or similar such material. When construction activities cause excessive dust and noise nuisance to adjoining residential/institutional areas, temporally screens may be erected.

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