

## **Environmental problems during highway operation period**

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*Abstract: A realistic and potential hazard is caused to the environment and ecosystems during highway operation period. In the present study, the environmental problems during highway operation period were analyzed from the aspects of atmospheric pollution, noise pollution, water pollution, soil pollution, environmental risk, solid waste pollution, ecological impact, geologic environment impact and social environment influence. The causes and influences were analyzed detailedly.*

*Key words: highway; operation period; environmental problems*

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### **1. INTRODUCTION**

Highways are large-scale man-made constructions on the ground. After the highway is completed and put into operation, thereafter it comes with the development of the economy along the line. However, at the same time, it has generated many environmental issues which have become one of the focuses nowadays.

### **2. AIR POLLUTION**

The tail gas may contaminate the air as long as cars run on roads. It includes many chemical components such as carbon monoxide, hydrocarbon, lead, sulfur dioxide, methane, ethylene, aldehyde and floating particulates that majorly come from leakage of the crankcase, volatilization of the fuel and exhaust from the funnel. Most of these exhausts are extremely toxic. Carrying up the provocative smells, some of them even can cause cancers[1-2]. Moreover, dust of all kind is able to bring damage to the air breathed in by humans and animals that could be in illness as consequence[3]. Lives along the road may be threatened directly by the raindrops of those elements penetrated into the soil and ground water, deteriorating the situation as the volume of the road usage has upsurged.

### **3. NOISE POLLUTION**

Noise pollutions are initially from the startup of the car engines, drive systems, cooling systems, fans, vent-pipes, frictions and vibrations. These noises may vary from road conditions, car types, road structure and loading ability. The noise grade could be increased by 7-10dB with overuse of car horns, especially those in high volume. As the increase of the car speed that may cause the increase of the DB, research has proved the fact that when the car speed surpasses 50 km/h, tires may become the origin in where the major noise is able to form. That is the primary reason why the use of car horns and car speed in many situations are restricted[4].

The high volume of the operation in high speed railway can lead a negative effect to the groups along the line[5]. Supported by the evidence, noises within 200-300 meters along the main road may cause the changes of the habitat of forest creatures in that area. In addition, the extremely high sound may cause the malfunction of equipments, even the devastating influence, especially electronic derives which may lose their functions under the noise of 130dB. The material structure may crack when distorted due to the constant impact to the mechanic frame by the exchange of high volume frequency. When the grade jumps over the 140dB, the strong noise begins to take the light constructions followed by windows and wall cracks. Besides, the noise pollution can also cause the decrease of the local economy, so to speak, the low productivity of the affected firms and industries as well as the price drop of the local real-estate.

### **4. WATER POLLUTION**

Sewage is mainly from the run-off rain after road operation. The major elements of this contamination are COD and in types of petroleum from the evaporation, leakage or dripping of the blending gas of the running vehicles. Under the effect of raining, pollution from trails, dust of the tires and nearby ground lead may be washed to the river or penetrate into the soil affecting the quality of the underground water[6]. In addition, the contamination sources could be the use of the depleted chemical wastage in road construction or the pesticide used to manage the vegetations along the road[7]. The service stations[8], tollgates and maintenance centers that are created along the highway, far from the village, also play an every negative effect to the soil without a proper use of the management facilities in sewage disposal under the criteria.

### **5. SOIL POLLUTION**

Short after a road was completed. Soil on the naked ramp or around the sides of the road in specific areas is severely eroded[9], but the situation will get mitigated by the forestation. The soil along the sides of the road will be contaminated with heavy metals from the origins of heavy elements included in tires or burning fuels of vehicles which in process of running are able to exhaust much tail gas with heavy elements that fall into the ground, eventually with accumulating by day and night[10-11], causing soil pollutions. Research proves that lead gathered within 50 meters along the sides of the road to its edge follows the distribution pattern

of Gaussian decay functions. Beside[12], the use of the depleted chemical wastage in road construction and the pesticide used to manage the vegetations along the road also conduct soil pollutions.

## **6. ENVIRONMENTAL RISK**

As the categories of the dangerous transportation goods are various, the accidents by carrying those cargos project the different degree of threat to the traffics[13]. In speaking of the accidents of the trucks that ship the inflammable productions, at the same time, they will release much toxic gas from their explosions and fire that possibly lead a collapse of a bridge or traffic jams. Most severely, when the truck falls into the water from the bridge, it may cause a leakage of dangerous goods in solid type, such as potassium cyanide or pesticide and gasoline in liquid to taint the surrounding water. As the severe consequence it may bring, such as a possible evacuation of the local residents, with the best prevention by the enforcement of the strict management policies, the corresponding departments have to control this type of the environmental risk down to an acceptable low level[14].

## **7. SOLID WASTE POLLUTIONS**

Road itself doesn't produce solid waste. However, solid wastes are mainly from the dust or drops of the overweight trucks[15]. Waste from the service facilities along the lines or the passengers have also contributed to this type of pollutions.

## **8. ECOLOGICAL INFLUENCE**

During the operation, the air above or the water on the ground and soil polluted in various degrees are constantly affecting the growing of the vegetations along this area. In loop effect, the decaying of those plants may deteriorate the habitat of the animals[16]. Moreover, the highway also blocks the spreading of the pollen and seeds from plants, but gives a way to the foreign plants that affect the extension of the local ones.

The influence including the separation of the original ecological district, the estrangement of human activities, tail gas from vehicles, over exhaust of service facilities and also the changes of the running water due to the sewage or disposal of rubbish has greatly affected the production and living environment of animals and plants. Animals are unlikely to survive due to the shrinks of herd scale by the split of their habitat intersected by the existed traffic webs. The closing effect by the road will make humans easier to get into those protective ecological systems and the protections of those resources become very difficult. In addition, the number of the dead animals caused by traffic accidents has also improved.

## 9. ENVIRONMENTAL GEOLOGY INFLUENCE

There comes up with the geological issues under the ecological alteration and instability of the gravity of the upper soil or constructions that respond to the changes of the land structure, such as landslide, mudslide, land salinization and desertification[17].

## 10. SOCIAL ENVIRONMENT INFLUENCE

Due to the fact that the highway is designed to begin and end up with ports, adding the creations of flyovers in some sections, they generate great burdens to the traffic flows along the lines[18]. The irrigation systems that pass over these areas, if intervened, the construction of the road may also affect the pattern of the local Agro forestry.

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