

Treatment of particulates and metals from highway stormwater runoff using zeolite filtration

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ABSTRACT

Highways are stormwater-intensive land uses, since they are impervious and have high pollutant mass emissions from vehicular activity. Vehicle emissions include pollutants such as heavy metals, oil and grease, particulates from sources such as fuels, brake pad wear, tire wear, and litter. The presence of heavy metals in highway stormwater runoff is of concern, as they are very toxic due to enhanced bioavailability, and have the potential not to degrade in the environment. Therefore, this research was carried out to understand the characteristics of metal pollutants in stormwater runoff from highways in Korea and to treat that runoff using zeolite filtration. The filtration facility was constructed on Korea Highway number 251 (Gaeryong I/C). The facility was operated during storms with durations of 0.3–4.8 h, and the influent treatment rate was varied from 3.60 to 17.34 m³/d. The first flush phenomenon for metal pollutants was observed in all of the storm events. The average removal efficiency was determined to be 62.5% for TSS, 73.7% for Cu, 61.8% for Pb, and 67.3% for Zn.

Keywords: Highway; Metals; Runoff; Vehicle; Zeolite

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