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"Gheorghe Asachi" Technical University of Iasi, Romania

SPATIAL VARIABILITY OF HEAVY METAL POLLUTION POTENTIAL FROM AN URBAN ROAD NETWORK

Sudip K. Pal[1*], Steve G. Wallis[2], Scott Arthur[2]

[1]Department of Civil Engineering, Chittagong University of Engineering & Technology, Chittagong-4349, Bangladesh
[2]School of the Built-Environment, Heriot-Watt University, Riccarton, Edinburgh, EH14 4AS

Abstract

This study investigated the spatial variability of heavy metal emission patterns and associated measures of contamination on Riccarton Campus at Heriot-Watt University in Edinburgh, Scotland. Road deposited sediments were collected from 12-different sites representing typical urban/sub-urban road layout over a 10 month period covering seasonal variations. The heavy metal concentrations of the road sediments collected from different sites of a road were determined by strong nitric acid digestion and atomic absorption spectrometry. The contamination levels of the heavy metals in the road deposited sediments were assessed by the accumulation index, the degree of contamination and the ecological risk index. The outcomes of the investigation showed highly site-specific heavy metal emissions that primarily varied with road lay-out, with also influences from road surface condition, surrounding land use and traffic volume. The degree of contamination and the associated ecological risk index revealed that bus stops, a road bend, a road with speed control measures and a road intersection site were the pollutant hot-spot areas among all the sites that may likely pose moderate to considerable levels of pollution to the nearby water environment.

Key words: atomic absorption spectrometry, Edinburgh, metal contamination, road deposited sediments, heavy metal

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[*] Author to whom all correspondence should be addressed: e-mail: sudiphwu@gmail.com; Phone: +88(0) 31 714948; Fax: +88(0) 31 714948