Environmental Engineering and Management Journal xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
http://omicron.ch.tuiasi.ro/EEMJ/

"Gheorghe Asachi" Technical University of Iasi, Romania

AN ASSESSMENT OF HEAVY METALS POLLUTION POTENTIAL OF ROAD SEDIMENT DERIVED FROM A SUBURBAN ROAD NETWORK UNDER DIFFERENT WEATHER CONDITIONS

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

The quantification of heavy metals in dry and wet weather derived (runoff and snowfall) sediment from roads, under three different environmental conditions, has indeed the potential to allow improved understanding on urban diffuse pollution. With that aim, the reported study determined the concentrations of Cd, Cu, Pb, Ni, Cr and Zn in road sediment, which are reported to be found in elevated level in the road-traffic environment, and associated pollution levels at four different sites, representing a typical suburban road lay-out, as part of a 10 months field and laboratory studies. The heavy metal concentrations in sediments are determined by strong nitric acid digestion and atomic absorption spectrometry. The results reveal that road sediment contain significant amounts of heavy metals and their concentrations vary with sediment type and size fraction (wet weather, snow and dry sediments), and between sampling sites according to the site specific attributes rather than traffic volume alone. The metal concentrations among three different environmental conditions are found in the order of rainfall-runoff, snow and dry sediment associated with smaller size fractions, in general. Contamination assessment suggests that road sediment may likely pose a moderate to considerable level of ecological risk to the nearby water environment which need attention while designing sustainable urban drainage for roads.

Key words: atomic absorption spectrometry, Edinburgh, heavy metals, pollution, road lay-out, road sediment

Received: June, 2014; Revised final: September, 2014; Accepted: November, 2014

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