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ASSESSMENT AND MODELING OF HEAVY METAL POLLUTION OF SOIL WITHIN RECLAIMED AUTO REPAIR WORKSHOPS IN ORJI, IMO STATE NIGERIA

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Abstract. The presence and concentrations of toxic heavy metals within a reclaimed section of the Orji mechanic village in Imo State Nigeria were determined using energy dispersive X-ray fluorescence and atomic absorption spectrophotometry. Multivariate and geostatistical models like contamination factor, degree of contamination, pollution load index and index of geo-accumulation were used to analyze the data obtained. Preliminary soil analysis showed the relative abundance of the heavy metals in the order Cd< Cr< As< Co< Mn< Ni< Cu< Pb< Zn< Fe. The observed concentration ranges of these metals at the different sampling points were between 0-44 mg/kg (Ni), 50-363 mg/kg (Pb), 1-25 mg/kg (Cd), 55-102 mg/kg (Cr), 0-35 mg/kg (As), 19-54 mg/kg (Mn), 11-35 mg/kg (Co), 9-203 mg/kg (Zn), 2-90 mg/kg (Cu) and 3654-5134 mg/kg (Fe). The degree of contamination model indicated that the area was highly contaminated by cadmium and arsenic. The index of geo-accumulation model showed that the soil was strongly contaminated by lead, and extremely contaminated by cadmium at some of the sampling points. The activities at the mechanic village in this area significantly affected the accumulation of these heavy metals and immediate soil remediation has been recommended.

Keywords: mechanic village, heavy metal, degree of contamination, index of geo-accumulation.

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