

SUBSTRATE PHYSICAL QUALITY IN OVERBURDEN SLOPES DUMPS OF IRON MINING ACTIVITIES IN CARAJÁS, BRAZIL¹

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Abstract: The iron extraction in the mines of Carajás (Para State, Brazil) produces large amounts of overburden that forms high dumps with long slopes. The dumps substrate (overburden) was evaluated with the aim of monitoring its physical quality to find solutions to improve the slopes vegetation process and to ensure its sustainability. The use of water retention curve (CRA) to evaluate the physical quality of soils is a methodology based on the principle of distribution of soil pores. From the CRA we can obtain the index "S". This index is calculated by the slope of the tangent line that crosses the inflection point of the CRA. The higher value of "S" means that the substrate is better structured, and consequently, exist a good environment to roots growth. The samples took from a newly vegetated dump slope were analyzed to determine water retention curves, texture, bulk density, macro and microporosity, and index "S". The obtained values of the index "S" are mostly below the critical value the cultivation of agricultural plants. The values of the index "S" ranged from 0.05 to 0.10; macroporosity appears very low ranging from 0.01 to 0.06 m³ m⁻³ while the microporosity ranged from 0.40 to 0.57 m³ m⁻³. This reflects the poor quality and variability of overburden physical quality on the dump slopes. The macroporosity, for all replications, appears very low, reflecting the form of construction of dumps, where heavy machinery is used to ensure its stability. The results show poor physical quality under the proposed methodology, and high resistance to root penetration, which may reflect on the sustainability of the ecosystem under study. The density values obtained were high (1.28 to 1.87 g cm⁻³). This study also presents the critical limits of the index "S" for the establishment of vegetation on slopes dumps of overburden.

Additional Key Words: soil physical properties, porosity, revegetation.

¹ Poster paper was presented at the 2012 National Meeting of the American Society of Mining and Reclamation, Tupelo, MS *Sustainable Reclamation* June 8 - 15, 2012. R.I. Barnhisel (Ed.) Published by ASMR, 3134 Montavesta Rd., Lexington, KY 40502. This work received financial support from FAPEMIG and CNPq project 561905/2010-0.

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