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REAL TIME MONITORING OF HYDROLOGICAL VARIABLES FOR OPERATIVE LANDFILL STABILITY AND PERCOLATION FLUX CONTROL

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Abstract

Leachate production and management are recognized as one of the greatest problems associated with environmentally operations for landfills. Variations in leachate quality and quantity are related to rainfall depth and its infiltration processes into landfill. This work examines important hydrological problems of the Scarpino site (Genoa, northern Italy), a garbage dump which covers the valley of a first order flash creek with a surface of 100 hectares, located in one of the rainiest area of Italy. The landfill is one of the largest in Europe and it operates since the Sixties collecting waste at a rate of about 1000 tons per day. Its present structure shows several horizontal layers of waste deposit separated by covers of compacted soil for a depth ranging from 40 to 70 meters. The landfill surface is subdivided in zones delimited by artificial slopes.

The hydrology of the landfill is analyzed with a real time monitoring system which has been set up in order to manage and control leachate fluxes and landfill slope stability acquiring: (i) meteorological variables, (ii) soil moisture profiles, (iii) leachate levels inside the landfill body, (iv) discharge measurements of surface runoff basin and drained leachate at the landfill outlet, and (v) leachate levels inside the storage tanks. Although it was a preliminary development state, this monitoring system was able to provide the necessary information in order to evaluate the overall landfill hydrological response, particularly focused on the leachate volume production.

Key words: landfill hydrology, leachate, real-time monitoring

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