

Biochemical Response of Landfill with Manufactured Aggregates as a Daily Cover

Zalleris Escobar, Yahaira Lugo, and Sangchul Hwang

University of Puerto Rico at Mayaguez, Department of Civil Engineering, Mayaguez, PR 00681

KEYWORDS: manufactured aggregates, alternative daily cover, biological landfill decomposition

ABSTRACT

Manufactured aggregates (MA), a mixture of fly and bottom ashes, were reutilized as an alternative daily cover in a landfill setting. Biochemical characteristics of leachate from the MA-amended landfill reactor were compared to those from a parallel control landfill reactor which used inorganic sand as the daily cover. Two landfill reactors were run in an environmental chamber equipped with water sprayers, leachate collection systems and gas collection lines. The reactors have been subject to wet, dry and leachate recirculation periods. The concentrations of carbonaceous organic compounds, nitrogen, phosphorus, alkalinity, hardness, pH, DO, redox potential, and color were monitored in the leachates. Results indicate that the MA-amended landfill reactor produced similar biochemical leachate to the control reactor in terms of those biochemical characteristics monitored. Gas production was substantially more and faster from the MA-amended landfill reactor than the control reactor. Settlement extent was also greater for the MA-amended landfill reactor. Therefore, it is expected that MA reutilization as a daily cover would enable us to efficiently collect gases in a shorter period time and to make early infrastructure development after landfill closing.

Submitted for consideration in the 2009 World of Coal Ash Conference, May 4-7, 2009.