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## Up-gradation of Matuail solid waste disposal site in Bangladesh to a sanitary landfill

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From the very beginning, Matuail landfill site was being used for crude dumping of solid waste of Dhaka City. Dhaka City Corporation decided to improve the dump site to a sanitary landfill and to design a new sanitary landfill at the acquired land adjacent to this site. A detail soil exploration was carried out and significant variation in soil strata was identified. A clay layer of 7.8–45 m was found having permeability in the order of 10<sup>-5</sup> to 10<sup>-7</sup> mm/s. The leachate of the landfill contained a number of pollutants in very high concentrations. Analysis of a water sample from a nearby tubewell revealed that a few parameters exceeded the drinking water quality standards. The pre-project environmental condition of the landfill site had the usual characteristics of an open dump site - filthy, smelly, and breeding ground of flies and mosquitoes. Oozing out leachate caused flooding of roads during rainy days and surface water pollution around the landfill site. Groundwater pollution potential was found to be very low. Local drainage congestion, filthy environment, breeding of flies and mosquito, obnoxious odor in the surrounding, fire hazards, air and noise pollution were some of the potential adverse environmental impacts during construction and operation phases of the landfill. Occupational health and safety of the workers at the landfill site including the waste pickers were of great concerns. Collection, treatment and safe disposal of excess leachate from the landfill site were given top priority to mitigate possible impacts on environment. Storm water drainage system was constructed around the landfill for efficient drainage of rainwater away from the landfill site. The peripheral slope was covered with thick clay layer. The decomposable fresh waste in each cell was covered by stabilized solid waste from the landfill site. A semi-aerobic system was installed to prevent accumulation of gases in the landfill. An effective environmental monitoring program was developed. The important landfill facilities of Matuail sanitary landfill were embankments, roads, platforms, storm water drainage system, leachate collection system, semi-aerobic system of waste stabilization, leachate treatment system, control building, weighbridge, car wash pool, flood light system, electrical sub-station and water supply and sanitation systems. Laboratory studies were conducted to determine design parameters to treat the leachate in aerated lagoons. The lagoons were designed as plug flow reactor. Sludge and treated effluent recycling to the waste dump was proposed as the disposal option. The construction of working road was started first, followed by new embankments, the civil structures in the control area, the flood lighting system, the drainage systems, roadway and platform, semi-aerobic system and finally the leachate treatment system. The major problems faced during the construction phase were related to working road, temporary platform, drainage system, new embankments and permanent platforms. The most severe problem was the failure of the new embankments at a number of sections. All these problems were solved by a critical analysis of each site specific problem and suggesting appropriate solution. As a result, the project was implemented successfully.

### Biography

Md Abdul Jalil is a Professor of Civil Engineering Department at Bangladesh University of Engineering & Technology (BUET), Dhaka, Bangladesh. He received his BSc in Civil Engineering in 1986 from BUET. He obtained his MSc in Civil Engineering in 1988 from the same university. He received his PhD in Civil Engineering in 1993 from Tokyo University, Japan under ADB Scholarship. He conducted Post-doctoral research on Water Management in Loughborough University, UK under Commonwealth Fellowship. He was appointed as a Lecturer in the Department of Civil Engineering of BUET in 1986. He was promoted to the post of Assistant Professor in 1989. He became Associate Professor in 1996 and Professor in 2001. He has published over 36 papers upto now. His current research areas are biogas generation from solid wastes, water and wastewater treatment technologies, and rain water harvesting. He also works as a Consultant and completed over 45 important national development projects.

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