

Landfill mining and excavation research papers examples

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Landfill mining and excavation is a process involving processing and excavation of previously landfilled solid wastes. Processing involves a cycle of mechanical processing operations that are premeditated to recover recyclable materials, landfill space, soil and a combustible fraction.

Equipment used in landfill mining and excavation are screens, excavators, and conveyors. Therefore, landfill mining uses conventional soil excavating and processing techniques. The process used by landfill has six phases; excavate and separate landfill material into the soil, combustible and residual materials, recyclables, remove and disposal of wastes, remediate soil, refill to bring the intended site to reline or grade, and monitor after completion of the project. Landfill is an internationally recognized technology. Countries such as USA, Germany, Korea and Canada are today using landfill technology to make the environment conducive (Bradfield, 2010, p. 544).

Standards & Regulations for Landfill Mining and Excavation

OSHA Standards and Requirements

Landfill reclamation project is compiled with existing Occupational Health and Safety Administration (OSHA) requirements. Landfill has a waste inspection program that inspects all workers including; engineers, drivers and casual men. It has personal protection devices that conform to Level C requirements that are worn by various personnel such as the excavation personnel (Hunt, 2013, p. 223). The fall protection standard requires that, Landfill personnel must provide fall protection when the employees are exposed for 6 feet falls or more. Workers in various sites have to be

protected using guardrail systems, personal fall arrest systems and safety net systems. It is the duty of the employer to identify the system of fall protection to ensure that a suitable criterion is met. There are requirements for training for all construction activities. OSHA also has requirements for workers that are engaged in general industrial operation. Health and occupational standards are clear that every worker in a site must be in full gear (helmet, gloves and an overall).

Modern Landfills ought to be well-engineered facilities that are designed, operated, located and monitored to ensure compliance with federal regulations. CFRS expects that solid wastes must be well designed to protect the environment from various elements such as contaminants that could be present in the solid waste stream. Additional safeguards are to be provided to prevent the decomposition of landfills in areas that are environmentally sensitive. Engineering systems such as the on-site environmental monitoring systems have to be used to monitor landfill gas, and signs of ground water. Location restriction on site activities ensures that landfills are built in suitable geological areas away from flood plains and restricted areas. Requirements for composite liners include; a stretchy membrane overlying three feet of compressed clay soil lining the sides, and bottom of the landfill. The necessary funds are provided by the financial insurance to provide environmental protection during and after closure of a landfill. Other standards of CFRS include:

- Leachate collection and removal systems: This process is intended to remove leachate and sit on top of the composite liner for treatment and disposal.

- Groundwater monitoring requirements: Groundwater testing requires testing of groundwater wells to identify waste materials from the landfill.
- Closure and post closure care requirements: Provides long-term care of closed landfills and also covers landfills (Nemerow, 2009, p. 115).

Environmental Protection Agency (EPA)

EPA provides technical assistance to developing observance at tribal landfills. EPA partners with tribes to set a process by which organizations such as municipal solid waste landfill operators and owners can operate and design comfortably. Among the processes provided by EPA is a waste water station facility where solid waste is briefly held as it is loaded onto bigger vehicles to be transported for shipping, and other disposal facilities such as treatment. There are regulations for the management and disposal of garbage that encourage environmentally sound solid waste management practices. These practices foster resource recovery and maximize the reuse of recoverable materials. Control of hazardous waste includes cradle-to-grave criteria that include; generation, treatment, transportation, storage and disposal of perilous waste. Disposal of hazardous waste should be phased out; this law includes improved enforcement authority that ensures management of comprehensive underground storage tank program (Van, 2012, p. 43).

EAP plays a major role with respect to the management of solid waste including:

- Providing technical assistance
- Establishing guidelines for implementation and development of state plans

- Ensuring state programs comply with federal law
- Approving plans that comply with all requirements

The regulations set by EPA apply to landfill state that, any solid waste such as trash, garbage waste and sanitary waste derived from households must be disposed of in the right places. Notably, state, local and tribal governments are responsible for ensuring compliance with their private citizens. Citizens can sue landfill operators and owners who do not comply with regulations of the federal government (Krook, 2012, p. 521).

Arizona Department of Environmental Quality (ADEQ)

ADEQ has established a registry of sites in Arizona, where soil and water contamination is present. This registry has a duty of qualifying funds from the water quality assurance revolving fund (WQARF). It also ensures the safety of the environment and the public by managing, monitoring and controlling groundwater and landfill quality. The enforcement and inspection branch of ADEQ is responsible for ensuring smooth operation of permitted facilities. It coordinates and investigates citizens' complaints regarding environmental issues such as, dumping of solid wastes. Civil penalties are imposed on those violating the law. The program branch provides financial, administrative and programmatic assistance to the division. It assists the public pursuant in legislation and regulation proposals, changes and amendments, and updates (Hoekstra, 2012, p. 342).

Closure: The closure standard for ADEQ requires operators and owners to mount an absolute cover system to minimize infiltration of soil and liquid erosion. The porosity of the final cover has to be less than the original liner

system to prevent the 'bathtub effect'. Landfill can fill up with water, hence increasing the hydraulic head on the liner system (Zhao, 2007, p. 213).

The Resources Conservation and Recovery Act (RCRA)

The operator of the facility complies with protection of ground water by installing and maintaining a liner system. The system has to be provided during processing, screening, receiving, post-processing and storage are in contact with contaminated materials, the ground and storage areas. It is the duty of the employer to identify the system of fall protection to ensure that a suitable criterion is met. There are requirements for training for all construction activities. RCRA expects that; solid wastes must be well designed to protect the environment from various elements such as contaminants that could be present in the solid waste stream. Today, landfill mining uses screening equipment and conventional soil. It is gradually gaining experience as equipment is being modified to fit the contractors' needs. However, environmental organizations are behind the process to ensure safety standards and measures are met.

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