



US Army Corps
of Engineers®

Engineer Research and
Development Center

Municipal Solid Waste (MSW) Grinding Process

Problem

Army costs for handling, management, and disposal of non-hazardous solid waste (SW) are significant. In FY99, costs totaled \$97.2M to dispose of approximately 1.6M tons of Municipal Solid Waste (MSW), *not* including construction/demolition debris). These costs are expected to increase over the next 10 years. Army policy prohibits siting and permitting new MSW landfills, and existing landfills are closing at an alarming rate. Future liability may become a serious issue as installations face increasingly stringent SW regulations at the state and Federal levels. Costs associated with safety and/or environmental impacts of what has already been landfilled, especially in off-post private or commercial landfills, have the potential to skyrocket. Such large costs, when combined with the increased requirements of the Resource Conservation and Recovery Act (RCRA) and the Federal Facilities Compliance Act (FFCA), may disrupt installation activities (including training).

Description

The MSW Grinding Process implements a rapid-volume reduction, conversion, and decomposition technology that significantly reduces the volume of MSW (i.e., “common garbage”) and that produces an odorless, colorless cellulose end product, called “fluff.” The fluff may then be used as a soil amendment to improve soil quality, plant growth, and revegetation, or as a raw material to produce a composite lumber. The MSW grinder and its recyclable end product together offer a way to potentially divert solid waste from landfills by recycling up to 98 percent of the processed waste.

A multi-agency team—consisting of Engineer Research and Development Center, Construction Engineering Research Laboratory (ERDC/CERL) researchers, the University of Illinois, other government agencies, and private industry (BouldinCorp)—was assembled to test, demonstrate, validate, and improve the commercially available advanced grinding/recycling system. Two demonstrations of BouldinCorp’s *WastAway Recycling System* (one at Fort Campbell KY in the summer of 2000, and a second at Fort Benning, GA in June 2002) tested the by-products’ applicability and validated the new technology’s ability to successfully reduce the volume of MSW while providing useful by-products. The next step, when funding is secured, will be to conduct a full-scale demonstration of the grinding technology at an Army site.

Expected Products

The primary end product of this research will be a refined MSW grinder suitable for continuous use at Army installations. The processed waste itself promises to become a secondary product of the process as a raw material to be used as soil amendment, or extruded into plastic lumber. CERL researchers are monitoring land application of the cellulose “fluff” at Forts Benning and Campbell and at test sites in Auburn AL and Temple TX, and are working to determine testing requirements for the plastic lumber end product.



Cellulose “fluff” may find use as a beneficial soil amendment.

Potential Users

Potential users for the MSW Grinder technology are military, government, or commercial organizations that maintain or operate solid waste disposal facilities (landfills). Military installations, and state, county, and municipal governments throughout the United States may greatly benefit from the ability to transform up to 98 percent of their solid waste into clean, recyclable, reusable commodities. The first successful demonstration created a general interest in the technology; more than 30 individuals from all military services, the media, three state regulatory agencies, and the Department of the Army expressed a desire to attend the second demonstration at Fort Benning, GA.

Secondary users are potential processors (manufacturers) or consumers of the process end product, or the products created from that resource. The initial demonstration initiated exploration into by-products of the MSW grinding process. Soon after the second demonstration at Fort Benning, land application at Fort Benning and Fort Campbell, KY began. Fort Drum, NY has expressed an interest, pending results from plastic lumber testing, in hosting a full-scale demonstration of the plastic lumber molded into interlocking pavement pieces and used as a tank trail. The State of Kentucky has inquired about purchasing the technology pending the team's research results. The ERDC Geotechnical and Structures Laboratory (GSL) has expressed an interest in using the plastic-type lumber for erosion control.

Projected Benefits

This technology rapidly and dramatically reduces the volume of MSW. The end product of the process is a cellulose pulp byproduct that can be used as a soil amendment, or extruded into plastic lumber, potentially offering a way to divert municipal solid waste from landfills. This technology can also be applied in the private sector. The equipment can be set up in 1 week, process approximately 3000 to 5000 lb of garbage per hour, and realize an approximate 80 percent volume reduction with a potential for 100 percent MSW landfill diversion, pending revegetation success and structural testing of the plastic lumber.



Hydrolyzer section of grinder demonstrated at Fort Benning

Program Manager

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Participating ERDC Laboratories

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