

Continued Performance and Economic Issues for the Polk County Minnesota

Bituminous County Road Constructed with Municipal Solid Waste Combustor Ash

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Abstract

This paper is a follow up to previous installments presenting environmental, construction, performance and economic issues associated with Polk County CSAH 13. The CSAH 13 project was a demonstration of the use of municipal waste combustor (MWC) ash in bituminous. New structural and cost data is presented.

The incorporation of MWC ash into bituminous pavements has been investigated in the United States since the middle 1970s. Thus far, most, if not all of these projects, have attempted to answer the questions: Is it safe? Is it feasible? Or does it provide an acceptable product? The presented project answers these questions on a new level.

MWC ash amended bituminous was used to construct a portion of 2.25 miles of road in Northwest Minnesota. Significant environmental and structural testing was performed prior to, during and after construction.

Environmental testing on this project has shown that the use of MWC ash in bituminous pavement, as performed, is safe. In addition, economic analysis shows important financial advantages by using ash-amended bituminous. Structural testing showed a 36% increase in stability, 19% increase in flow and a 17% increase in spring season axle load capacity. Improvement in resistance to freeze-thaw cracking was also shown.

1.0 Introduction

The Polk County Solid Waste Department, located in Polk County Minnesota, participates in a complete integrated solid waste management

program that includes four other counties in northwest Minnesota. One component of the integrated solid waste management program includes the operation of a municipal waste combustor (MWC) that combusts approximately 65 tons per day of processed solid waste. The starved air design of the combustor causes low turbulence in the primary burning chamber minimizing particulate carryover through the system. This results in generation of approximately 12 tons per day of combined ash comprised of 98 to 99 percent bottom ash and 1 to 2 percent fly ash, by weight.

In 1996 the facility installed an up-front separation facility, or materials recovery facility (MRF), that removes recyclable materials as well as non-processible or objectionable materials prior to combustion. The ash generated by combustion prior to the 1996 installation of the MRF is referred to as "old ash" and was landfilled in a lined MWC ash monofill permitted by the Minnesota Pollution Control Agency (MPCA). The ash generated since installation of the MRF is referred to as "new ash", and is also placed in the permitted landfill. The chemical and physical differences between the new and old ash are important enough to warrant the two ashes being addressed separately for purposes of this utilization demonstration project.

In 2000 and 2001, Polk County performed a demonstration of the feasibility of utilizing combined MWC ash as a partial replacement of aggregate in bituminous paving materials. The project consisted of building and evaluating a section of county road using the MWC ash-amended bituminous.