

**New York State
Environmental Investment Program
Research Project Summary
Woodruff Block Company**

Project Background

Potters Industries, of Potsdam, manufactures highway safety glass spheres and industrial application glass beads. The production of these commercial glass spheres results in the generation of about 8,000 tons of waste glass powder annually that, prior to this project, was being land filled at a cost of approximately \$31/ton, or trucked hundreds of miles for use by a Canadian fiberglass manufacturer.

Woodruff Block Company and Graymont Materials, Inc., with facilities also located in Potsdam, are manufacturers of concrete products. As material byproducts like waste glass and coal fly ash are gaining increasing acceptance for use in the manufacture of concrete products, this research and demonstration project would assess the viability of utilizing Potters' waste glass as a substitute for a portion of the cement used by Woodruff and Graymont to make their concrete products. These manufacturers would potentially reduce their raw material costs, while Potters would possibly gain new, local markets for its costly glass waste.

Project Description

EIP support would be used to hire Dr. Narayanan Neithalath, an Assistant Professor in the Department of Civil and Environmental Engineering at Clarkson University and an expert in concrete science. Dr. Neithalath has spent much of his time researching cement-based materials with an emphasis on the development of new and innovative concretes. Dr. Neithalath and his students would first quantify the adequacy of Potters' waste glass powder for enhancing various concrete properties in the laboratory. Then, they

would undertake field studies in collaboration with Graymont Materials and Woodruff Block in order to optimize concrete mixtures for their respective applications.

Project Results

The performance of the glass powder modified cement-based materials was compared to cement-based materials modified with fly ash to facilitate easier quantification of the influence of the glass powder. Concrete mixtures were proportioned to examine the effect of 5%, 10%, and 20% fine glass powder on the strength and durability of the concrete, including compressive and flexural strengths, elasticity, chloride permeability, alkali-silica reactivity, and moisture transport characteristics. Analysis showed that the fine glass powder obtained from Potters Industries can serve as a practical, partial cement replacement material for use in concretes and pre-cast concrete blocks at replacement levels of at least 10% of the mass of cement used. These results were presented at several national and international cement based materials conferences. Peer reviewed journal papers have also resulted from this work. The National Ready Mix Concrete Association chose to publish the work on glass powder in their journal "Concrete Infocus". Subsequent field tests on pre-cast concrete blocks were conducted at Woodruff Block using 5% and 10% replacement of cement with Potters' glass and the two businesses are now negotiating terms for getting the one company's waste to the other's facility to utilize as a less expensive raw material for production.

Contractor: Woodruff Block Company
County: St. Lawrence
ESD Region: North Country
ESD Contact: 518/292-5340

NYS EIP Investment: \$195,414.28
Contractor Match: \$136,070.35
Total: \$331,484.63
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