



Green Technology Accelerator Center

New York State Pollution Prevention Institute (NYSP2I) helps companies accelerate their introduction of green technologies into the market by identifying emerging market opportunities and providing assistance in a variety of areas.

CM&M Industries, Inc: Concrete Material Evaluation

Client

CM&M Industries, Inc. (CM&M) is a manufacturer of cementitious veneers, landscaping products, and engineered stone. CM&M is currently expanding their business to include the recovery and reuse of natural stone waste to be used in the production of 100% recycled pavers, veneers, mosaics, etc. These products are consumer trademarked as BELLA-TERRA® Recycled Earth Products. CM&M's new Phase III manufacturing process utilizes 100% waste material, is 100% Bio-Origin bound and is controlled by a zero discharge water recycling system.



Opportunity Areas

Natural stone products, including granite, are commonly used in many applications such as countertops. However, up to 30% of the original granite slab is considered to be scrap after cutting for install and is disposed in landfills. CM&M has realized an opportunity to salvage these scrap pieces of granite to be used for the manufacturing of new products, thus diverting the scrap from landfill.

Objectives

CM&M requested NYSP2I to evaluate their new Phase 3 concrete product by testing to ASTM standards for comparison to concrete products currently available on the market. This work is requested as a next step toward expanding CM&M's Phase 3 manufacturing process to production. A further goal of the project was to document the Phase 3 manufacturing process and mixing instructions for CM&M's new concrete material.

Work Performed

Under the GTAC program, NYSP2I and Clarkson University tested and evaluated CM&M's Phase 3 level concrete product as a viable alternative to other commercially available concrete products. NYSP2I documented the procedure for the mixing and forming of the product being tested through this project. NYSP2I also worked with CM&M to document the Phase 3 manufacturing process.

Results

- CM&M's concrete material exhibited the following strength characteristics as tested to ASTM standards:
 - <4 MPa (580 psi) compressive strength in 24 hours
 - After 28 days moist curing, the compressive and tensile strengths were 16 MPa (2300 psi) and 3 MPa (435 psi), respectively.
 - After 56 days moist curing, the compressive and tensile strengths were 18 MPa (2700 psi) and 3 MPa (435 psi), respectively.
- The hydraulic reaction of CM&M's concrete was relatively slow resulting in a setting time of 15.5 hours, approximately three times greater than typical Portland cement mortars.
- The drying shrinkage strain observed after 56 days was 0.1% (1000 $\mu\epsilon$); this is within the typical range for ordinary Portland cement (OPC) concrete (0.06—0.12%, 600—1200 $\mu\epsilon$).
- CM&M anticipates the addition of 260 jobs to support the expansion of their Phase 3 product manufacturing in NY State.

