

Improving Freezing and Thawing Properties of Flyash Bricks

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ABSTRACT

In 2004, the National Science Foundation (NSF) funded a Small Business Innovation Research (SBIR) Phase 1 grant to Freight Pipeline Company. The purpose of the grant is to improve the freezing/thawing properties of compacted flyash bricks, so that such bricks will not deteriorate prematurely in cold climate, and they can be used anywhere in the United States for various commercial purposes.

It has been established through previous research that by mixing Class-C Flyash with approximately 10% water, strong flyash brick can be produced at compaction pressure of 3,000 psi, approximately. The bricks produced, upon two weeks of curing, have compressive strength of the order of 5,000 psi, which is as strong as ordinary concrete bricks. The flyash bricks also have good water absorption property and low permeability. However, they can only survive about 10 cycles of freezing/thawing, which is short of the ASTM-Standard requirement of 50 cycles. Once this freezing/thawing property of the flyash bricks is improved sufficiently to pass the 50-cycle ASTM Standard, the brick will have an excellent future for commercial acceptance.

Freight Pipeline Company plans to improve the freezing/thawing property of the flyash bricks by four different approaches: (1) add a small amount of fiber to the flyash before compaction, (2) add some cement or lime to the flyash before compaction, (3) use a special sealant to coat the bricks, and (4) use an improved mold design to make stronger bricks. The effectiveness of using any of these four approaches to improve the freezing/thawing property of the flyash bricks will be tested and assessed in this study, together with a determination of the cost-effectiveness of each of these approaches.

The project is to be completed by December 31, 2004, when a final report will be prepared and submitted. The presentation at the 2005 Flyash Conference will include the test results and conclusions reached through this study.

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