

# Testing Freeze-Thaw Resistance of Fly Ash Bricks

Henry Liu<sup>1</sup> and Jesse VanEngelenhoven<sup>2</sup>

<sup>1</sup>Freight Pipeline Company, 2601 Magure Blvd., Columbia, MO 65201

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## ABSTRACT

Recently, a new type of brick, made from 100% fly ash without firing the bricks in kilns, has been developed by Freight Pipeline Company under sponsorship of National Science Foundation (NSF). Since the technology is new, there is no existing standard for this type of brick. However, because the brick is intended for use to replace clay bricks for buildings, it is reasonable to have the brick meet the same existing standards for clay bricks used for buildings, ASTM C62 and C67. While C62 specifies the minimum requirements for clay bricks used for buildings, C67 specifies how clay bricks must be tested to satisfy the requirements. For instance, C62 requires that all clay bricks used in Severe Weather (SW) regions must have an average compressive strength of 3,000 psi, and must pass 50 freeze-thaw cycles tested in the manner described in C67.

Problems occur in testing the freeze-thaw resistance of fly ash bricks according to C67 because the standard was designed for testing vitrified clay bricks instead of non-vitrified fly ash bricks. In this research, the C67 method was modified somewhat for testing fly ash bricks. Experiments were conducted to evaluate the difference in freeze-thaw cycles for fly ash bricks tested according to modified and unmodified methods. Test results showed that the modified test method yields significantly more conservative values than the non-modified method. This shows that when fly ash bricks are tested by the modified method and pass 50 cycles, they will pass far more than 50 cycles in the non-modified test. Test results also show that fly ash bricks can pass far more freeze-thaw cycles than required in C62, and have compressive strength far exceeding 3,000 psi.

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