

Title: A Method for Assessment of the Freeze–Thaw Resistance of Preformed Foam Cellular Concrete

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Abstract: The growing use of cellular concrete for building materials and geotechnical fills brings forth the question of suitable durability and performance standards. Of particular importance is the performance of cellular concrete in freezing and thawing environments. Since the macrostructure of cellular concrete or cellular control low-strength material is not like that of normal-weight concrete, a modified procedure is needed to specify the required characteristics of cellular concrete that lead to freeze–thaw durability. This research investigated the freeze–thaw durability of cellular concrete and developed a modified freeze–thaw test procedure, based on ASTM C666. Physical properties related to freeze–thaw durability were measured for each mixture and compared to the initial properties. As a result of these comparisons, recommendations are made regarding the production of freeze–thaw-resistant preformed foam cellular concrete exposed to freeze–thaw environments. The results of the study show that depth of absorption was a key predictor in developing freeze–thaw-resistant concrete. Compressive strength, depth of initial penetration, absorption and absorption rate are the important variables in producing cellular concrete that is resistant to cycles of freezing and thawing. Density and permeability were shown not to be significant variables. © 2004 Elsevier Ltd. All rights reserved.