A Cold Room Experimental Study on the EG/AD Model Ice Properties

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ABSTRACT.

The EG/AD/S model ice, originally developed by Timco (1986), was selected as the primary model ice material for the newly built MOERI Ice Model Basin in Korea. However, the existence of sugar component in the EG/AD/S mixture may cause a serious maintenance problem as described in some references. This study focuses on the tests of mechanical properties of EG/AD/S and EG/AD model ice. In order to understand the influence of sugar in the original EG/AD/S model ice and to find a possible substitute for sugar, a series of tests with EG/AD model ice were performed and results were compared to those of EG/AD/S model ice.

The relatively large size of the MOERI Ice Model Basin made it difficult to control the initial strength of model ice, and it took a much longer time to achieve the target strength. In order to obtain lower strength and stiffness for the model ice, the amount of chemical additives may be varied to achieve the desired strength level. This paper is a preliminary study aimed at seeking a possible substitute to the original EG/AD/S model ice for utilization in a large scale ice tank.

The mechanical properties of EG/AD model ice measured include flexural strength, compressive strength, elastic modulus and density.

PREPARATION OF MODEL ICE SPECIMEN

The ice tank was not available at the time of the experiment. A cold room facility was substituted for the model ice tests. A cold room facility was designed and constructed to measure the elastic modulus and flexural strength of EG/AD/S model ice. The cold room facility was fabricated and tested by Choi et al. (2008). A digitally controlled universal testing machine (UTM), portable push-pull spring gauge and uni-axial compression test apparatus were used to perform the tests.