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Computer-Aided Mold Design Algorithm for Precast Concrete Elements

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This paper aims to determine a computer-aided mold design algorithm for precast concrete products to be produced by external vibrators. For this purpose, the behaviors of two different precast concrete molds were investigated experimentally and analytically. Experiments were performed under vibration with the use of a computer-based data acquisition system. Transducers were used to measure time-dependent lateral displacements at some points on the mold while it is empty and full of fresh concrete. Test results indicate that the difference between displacement amplitudes of empty and full molds is considerably high.

Three-dimensional analytical modeling of molds used in experiments was prepared by finite e lement m ethod u sing s oftware. Modeling of the full mold was made to solve the problem of dynamic interaction of fresh concrete mold. In light of experimental, numerical, and literature studies, a mold design algorithm was established for precast concrete elements. Using this algorithm, a computer-aided mold design was carried out theoretically for a sample mold system.

Keywords: compaction of fresh concrete; computer-aided mold design algorithm; displacement transducer; dynamic interaction; finite element method; measuring instruments; modeling; precast concrete mold; vibration.

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