FUNDAMENTAL NATURAL FREQUENCY OF STEEL JOIST SUPPORTED FLOORS

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(ABSTRACT)

Three aspects in determining the first natural frequency of steel joist supported floors were studied. The aspects are: 1) determining which finite element models best predict the behavior of joist-slab tee-beams, 2) investigating the ability of proposed equations to calculate the effective moment of inertia of joist-slab tee-beams, and 3) developing a finite element model to predict the first natural frequency of steel joist supported floors.

Several finite element models were tested to determine which one best predicted the experimental results of six joist-slab setups. The model which best predicted the experimental results was used.

Next, a study was done to determine the ability of a proposed equation to predict the effective moment of inertia of joist-slab tee-beams. The study modeled and analyzed 130 joist-slab configurations and compared the results to those calculated using the proposed equations.

Finally, a finite element modeling technique was developed to predict the first natural frequency of steel joist supported floors. Seven in-situ floors were experimentally tested, and those results were compared to the predicted values given by the models.

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