

## Fundamental Natural Frequency of Chromite Composite Floor System

**Authors :** Farhad Abbas Gandomkar, Mona Danesh

**Abstract :** This paper aims to determine Fundamental Natural Frequency (FNF) of a structural composite floor system known as Chromite. To achieve this purpose, FNFs of studied panels are determined by development of Finite Element Models (FEMs) in ABAQUS program. American Institute of Steel Construction (AISC) code in Steel Design Guide Series 11, presents a fundamental formula to calculate FNF of a steel framed floor system. This formula has been used to verify results of the FEMs. The variability in the FNF of the studied system under various parameters such as dimensions of floor, boundary conditions, rigidity of main and secondary beams around the floor, thickness of concrete slab, height of composite joists, distance between composite joists, thickness of top and bottom flanges of the open web steel joists, and adding tie beam perpendicular on the composite joists, is determined. The results show that changing in dimensions of the system, its boundary conditions, rigidity of main beam, and also adding tie beam, significant changes the FNF of the system up to 452.9%, 50.8%, -52.2%, %52.6%, respectively. In addition, increasing thickness of concrete slab increases the FNF of the system up to 10.8%. Furthermore, the results demonstrate that variation in rigidity of secondary beam, height of composite joist, and distance between composite joists, and thickness of top and bottom flanges of open web steel joists insignificant changes the FNF of the studied system up to -0.02%, -3%, -6.1%, and 0.96%, respectively. Finally, the results of this study help designer predict occurrence of resonance, comfortableness, and design criteria of the studied system.

**Keywords :** Fundamental Natural Frequency, Chromite Composite Floor System, Finite Element Method, low and high frequency floors, Comfortableness, resonance.

**Conference Title :** ICCBE 2015 : International Conference on Civil and Building Engineering

**Conference Location :** Paris, France

**Conference Dates :** October 29-30, 2015