Helicoidal Shell Response to Earthquake Loads

Mohammed S. Al-Ansari
Civil Engineering Department
University of Qatar
P.O.Box 2713
Doha Qatar

Email: malansari@qu.edu.qa

ABSTRACT
This paper studies and analyzes the response of helical stairs as helicoidal shells in earthquake zones. The response of helical stairs under gravity loads was analyzed by both the membrane theory and finite element methods. The non-linear response of helical stairs, when subjected to UBC (Uniform Building Code) dynamic and static equivalent earthquake loads, were obtained using finite element models. These responses were compiled and analyzed in order to draw recommendations for the preliminary design of helical stairs in earthquake zones. The analysis of the results obtained showed that helical stairs are stiffer and lighter than regular ones.

Keywords: helicoidal shells; helical stairs; earthquake response; finite element; earthquake loads.