

# **Analysis of static and dynamic characteristics of twin-cell steel box girders.**

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Abstract

The growing industry of steel production in the Kingdom of Saudi Arabia has led to fast growth in the demand for and use of steel structures. This growing demand for using steel structures may be attributed to various practical and technical reasons including the undesirable corrosion related durability characteristics of the more traditional concrete structures. It is therefore envisioned that the demand for and use of thin walled steel structures will continue and the use of this type of structures will represent a prime construction alternative in the future.

The research program proposed herein provides a unified presentation of finite element (FE) procedures to perform the static and free vibration analysis of twin-cell steel box-girders. The procedures are implemented using the computer code GTSTRUDL to perform design-oriented numerical studies to assess the static and dynamic characteristics of these cellular structures and to determine optimal ranges of cross sectional geometries, bracings and diaphragms arrangement. The numerical studies address several issues of practical interest in the analysis and design of thin-walled cellular structures in general and twin-cell steel box girders in particular. This analysis presents details of stress and displacement distributions, and determine the deominating modes of vibration for specified structural geometries. The studies are of paramount importance to identify and limit the occurrence of damaging patterns of stress distributions, or the undesirable modes of modal vibration and to select the appropriate structural designs.