

ABSTRACT

An Introduction to the Caribbean Uniform Building
Code (CUBiC) Requirements for Economic Seismic
Design of Multi-storey Steel Frames

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Today, engineers all over the world have accepted widely the concept of Limit State (L.S.) design as a more rational approach to the former permissible stress concept. It has also been suggested that limit state design is more logical, removes the duplication existing in present allowable stress standards and provides a more consistent margin of safety. It is further argued in some quarters that:

- (i) It can serve better to evaluate existing structures,
- (ii) Second-order non-linear effects are easily taken into account at the factored load level,
- (iii) It can serve as the basis of load tests of structures and
- (iv) Different load or performance factors could be introduced for various types of structures or inspection.

Given the above arguments, a new Code for the design of steel structures has been proposed - **The Caribbean Uniform Building Code (CUBiC)**. This Code, which was based on the Canadian Standard CSA S16.1 - 1974, is formulated on limit state design principles.

The intent of this report is to provide an introduction to the proposed Code (CUBiC) by briefly discussing the basic load and resistance formulation and providing a comparison with the Allowable Stress Design Method. Specifically, the report will review CUBiC's requirements for the design of seismic-resistant steel structures and describes an investigation into the economics of providing seismic resistance for multi-storey frames subjected to different earthquake design levels.

To develop the seismic economic analysis a four- and a nine-storey steel framed office building were selected for detailed studies. Both structures were analyzed and designed in accordance with the requirements of CUBiC, Parts 1 and 2, for each seismic design level (i.e., Zones 1, 2 and 3). It will be shown that the limit state approach to the design of seismic resistant steel structures produces a moderate savings in the weight of steel when compared with the allowable stress method. The report concludes with a discussion of the results.