OPTIMUM ALTERNATIVE TO REDUCE COLUMN SIZE CONSIDERING BEHAVIOR AND COST IMPACTS ON BUILDING

Ahmed M. Ebid

Abstract

The increasing of high raise and heavy industrial construction industry causes increasing in structural columns loads and
accordingly their cross sections, on other hand; architectural and mechanical requirements limit the available spaces for
columns. Commonly, three alternatives are used to reduce column size to fit into the available space with same axial capacity,
the first is to use higher concrete strength, the second is to use composite column (enclosed or in-filled) and the third is to use
high strength steel column. In this research, a parametric study is carried out to figure out the impact of each alternative on
the structural behavior and direct cost of the project. The study is based on average materials, labor and equipment rates in
USA in 2016. Study results indicated that optimum alternative is to use higher concrete strength up to 1.4 times the concrete
strength of floors beyond this limit, composite column (enclosed or in-filled) is recommended. Finally high strength steel
column is the only alternative for very compacted columns.

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