

Effect of Initial Imperfection on Strength Evaluation of Concrete Cylindrical Shells

by

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Abstract

The main purpose of this study is to investigate the effect of an initial imperfection of shell thickness on the strength of concrete shells using strength determined by strength evaluation based on stability analysis, which could be easily calculated as compared with expensive experiments and complicated nonlinear analysis. For this purpose, an easy and convenient method of evaluating the ultimate strength of a concrete shell was investigated by applying stability analysis based on the revised version of IASS Recommendation and by operating reduction parameters with several types of initial imperfection. As for a concrete shell, three types of material were investigated. The first one is a standard concrete reinforced with a steel bar. The second one is a carbon fiber chip concrete reinforced with a mixed-in carbon fiber chip and without steel. The third one is a concrete reinforced with carbon fiber sheets. The latter two materials could realize concrete with higher homogeneity and isotropy than standard reinforced concrete. These results were discussed on the basis of the results of the experiment.

Keywords: Concrete Shell, Stability Analysis, Strength, Carbon Fiber

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