

Fundamental Study of Damage Assessment of Concrete Cylindrical Shells Reinforced with Composite Carbon Fiber on the Basis of Free Vibration Test.

by

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Abstract

The main purpose of this study is to experimentally investigate the damage assessment of concrete cylindrical shells reinforced with composite carbon fiber on the basis of the free vibration test. Composite carbon fiber reinforcement is defined in this study as composite reinforcement with carbon fiber sheets attached to the outer shell surface and with carbon fiber chips mixed into the inner shell body. Carbon fiber chip reinforcement is expected to improve the homogeneity and isotropy of concrete shells compared with those of shells reinforced with standard steel bars, while carbon fiber sheet reinforcement is expected to improve their mechanical behavior in spite of thickness fluctuations. Test models were applied with static, low impact, and high impact loads until the fracture states were obtained. The damage assessment of concrete shells with composite carbon fiber reinforcement was discussed on the basis of the fluctuations of natural frequencies and damping factors measured by the free vibration test.

Keywords: Concrete Shell, Damage Assessment, Composite Carbon Fiber

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