

Ultimate Strength Flexural Behavior of Reinforced Concrete Masonry Walls

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Abstract:

Six reinforced concrete masonry wall elements were tested to investigate the out-of-plane flexural behavior at the ultimate load state. Results indicate that the reinforced concrete masonry walls performed in a fashion similar to that of a reinforced concrete flexural member. Under-reinforced failures were characterized by large inelastic deformations and high levels of ductility. In contrast, an over-reinforced failure was characterized by a sudden brittle failure. The use of lightweight blocks had little effect on the ultimate flexural strength, but the level of ductility was reduced. It was found that an equivalent stress block proposed by Ellingwood and Tallin most accurately predicted the ultimate strength of the six masonry wall elements of this study. The Whitney stress block, which is widely used for the design of reinforced concrete, is nearly as accurate and is an acceptable method for predicting the flexural strength of reinforced concrete masonry.

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