

Flexural behavior of stratified reinforced concrete: construction, testing, analysis, and design

Navarrete, I., Hube, M. A., Kurama, Y., & Lopez, M. (2017). Flexural behavior of stratified reinforced concrete: construction, testing, analysis, and design. *Materials and Structures*, 50(4), 190. <10.1617/s11527-017-1054-2> Accessed 05 Nov 2020.

Abstract

Stratified concrete poses a promising alternative for construction. Its fresh and hardened properties have been studied at the material level; however, structural behavior in steel reinforced specimens has not been studied. This paper focuses on the flexural behavior of eight stratified reinforced concrete (SRC) specimens representing slices from a slab or non-bearing wall. Specimens with two stratified concrete designs and three steel ratios were tested and compared to estimates from a fiber element numerical model and rectangular stress-block design methods from ACI 318 and Eurocode 2. The results suggest that SRC has similar damage modes as ordinary reinforced concrete (ORC). The fiber element model accurately estimated the measured behavior, while ACI 318 and Eurocode 2 differed from the experimental results by <25%. These prediction accuracies are similar to those for ORC. Therefore, the flexural design of SRC can be done using both fiber element and rectangular stress-block approaches..

Keywords

Fiber element modeling, Lightweight concrete, Rectangular stress-block, Segregation, Stratified reinforced concrete, Insulated concrete.