

Compressive Strength Prediction of Grouted Hollow Concrete Block Masonry: A Comparative Study of Major International Codes and a Proposed Model

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Abstract:

In this paper, a large database of compressive test results on grouted concrete block masonry prisms was assembled from published literature. This database was critically reviewed to study different factors influencing the compressive strength (f'_m) of grouted hollow concrete block masonry. Furthermore, the collected database was statistically analyzed to derive an accurate empirical formula to estimate f'_m of grouted masonry based on the strengths of its constituents. The predictive performance of the proposed model at calculating f'_m was compared to those of major international masonry design codes. The study showed that the proposed formula gives the lowest coefficient of variation and the second lowest average ratio of experimental f'_m to predicted f'_m ($f'_m \text{ Exp} / f'_m \text{ Pred}$). The masonry codes, on the other hand, underestimate the compressive strength of grouted masonry with high coefficients of variation. The proposed model gives consistent predictions for the entire range of the different factors that affect f'_m of grouted masonry and can serve as a base for revisiting the conservative tabulated compressive strength values in masonry design codes.

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