Effect of Test Conditions on the Compressive Strength of Hollow Concrete Masonry Units

Mina Gayed[1], Yasser Korany[2], and Mohammed Nazief[3]

Abstract:

In North America, the compressive strength of masonry units is used to verify conformity to the masonry compressive strength design values. Therefore, accurate determination of the unit strength is paramount. However, the majority of the testing facilities are not equipped to test full concrete masonry units. Furthermore, whereas information on the influence of test parameters on masonry compressive strength is available, their effect on the unit compressive strength has not been adequately investigated. Sixty standard eight inch concrete masonry units and sixty segments and coupons were tested for compressive strength under uniaxial compression according to the American Standard ASTM C140 and the Canadian Standard CSA A165.1. The compressive strength of the units was investigated under different test conditions including: the specimen size (full units, full length face-shell segments, and face-shell and web coupons); the loaded area (full net-area and face-shell area); and the capping material (no capping, Gypsum plaster, and Sulfur). Coupons sawcut from full units provided compressive strength values comparable to those obtained by testing full units. The compressive strength values for units loaded only on the face shells were found to be higher than for units loaded on the full net-area. This finding is another plausible explanation to the observed difference in masonry compressive strength between hollow and grouted construction.

DOI: 10.70803/001c.138231

[1] Graduate Teaching and Research Assistant, Dept. of Civil and Environmental Engineering, University of Alberta, Edmonton, AB, Canada, mina.gayed@ualberta.ca

[2] TMS Member, MCAA Chair in Masonry Systems and Associate Professor, Department of Civil and Environmental Engineering, University of Alberta, Edmonton, AB, Canada, yasser.korany@ualberta.ca

[3] Graduate Teaching and Research Assistant, Dept. of Civil and Environmental Engineering, University of Alberta, Edmonton, AB, Canada, nazief@ualberta.ca