

MASONRY Laboratory Website

Lab 4 – Evaluation of Compressive Strength

Extras

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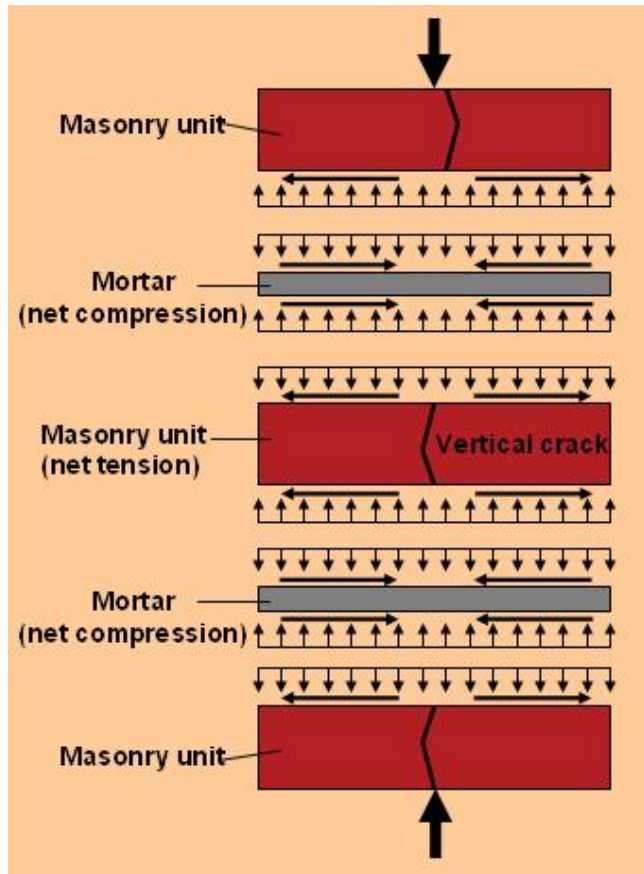
[Lab Worksheet](#)



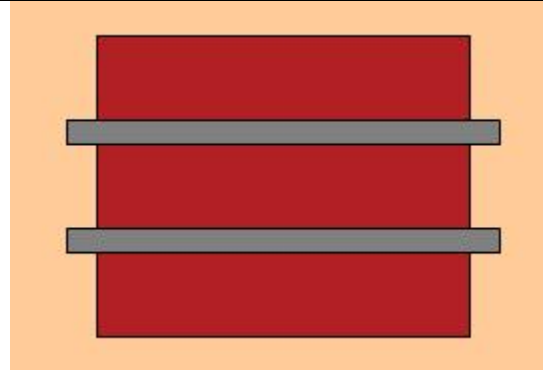
Objectives:

The objective of this lab is for students to conduct compressive strength testing of masonry. (ASTM C1314)

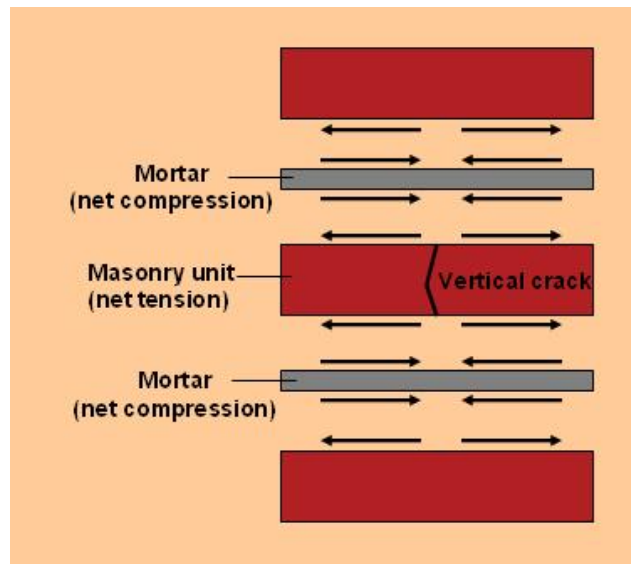
It is important to grasp the complexity of building systems and each individual components' interactions with other components. For example, the compressive strength of brick alone is much higher than that of the prism. This is explained in the FBD below.



Free body diagram of 3-unit prism



Mortar expansion without restraint from brick



Free body Diagram with horizontal forces only

The strength of a masonry system is a complex combination of different materials in the system. The FBD to the left explains why vertical cracks form in masonry prisms subject to compressive loads. The figure shows internal forces on a three unit prism with two mortar joints. Cuts and corresponding internal forces are shown on each unit-mortar interface.

Horizontal internal forces are generated due to mortar's higher Poisson's ratio. As a masonry prism is compressed, the mortar tends to expand in the direction perpendicular to the applied force more than the brick unit does. The brick restrains the mortar creating horizontal forces in the unit and mortar. Cracks form perpendicular to the the tensile stresses, resulting in a vertical crack in the brick that propogates through the prism.