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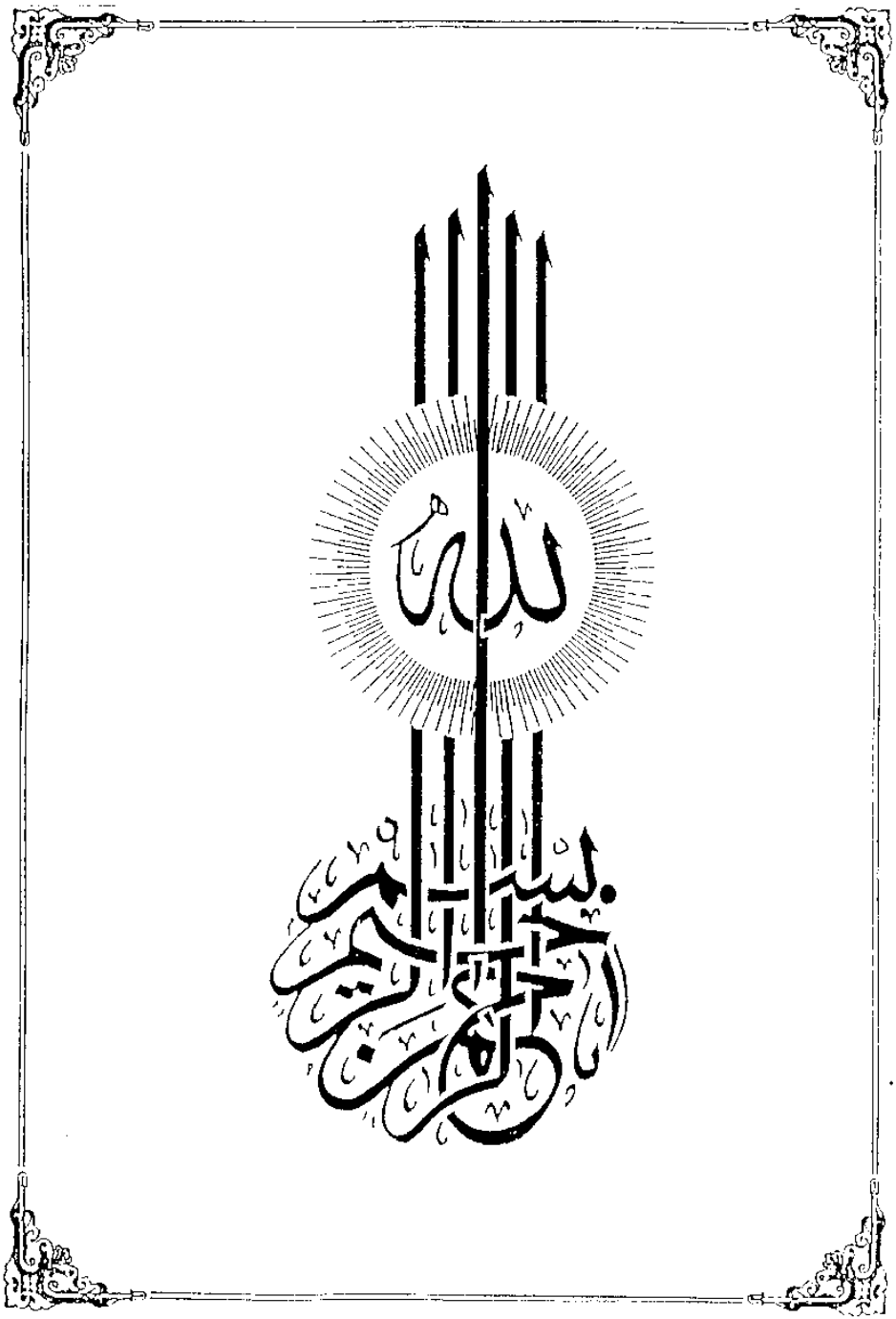

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BEHAVIOUR OF CONCRETE BLOCK MASONRY WALLS UNDER CONCENTRATED LOADS

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A THESIS

SUBMITTED IN PARTIAL FULFILLMENT FOR THE
REQUIREMENTS OF THE DEGREE OF MASTER OF SCIENCE
IN STRUCTURAL ENGINEERING

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STATEMENT

This dissetation is submitted to Ain Shams University for the degree of MASTER OF SCIENCE in Structural Engineering.

The work include in this thesis was carried by the author in the Department of Civil Engineering (Structural Engineering Division), Ain Shams University, from 1989 to 1995.

No Part of this thesis has been submitted for a degree or a qualification at any other University or Institution.

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Abstract of M.Sc. Thesis submitted by :**Eng. El Sayed Morsy Khaled.**
Title of the thesis: **Behaviour of concrete block masonry walls under concentrated loads.**

Supervisor :
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Registration date: 13 / 10 / 1992 Examination date: 1 / 4 / 1996

ABSTRACT

Concrete block masonry structure may be economical in construction cost and time compared with other types of structure. Recently, grouted and reinforced masonry has been introduced to provide structures with sufficient ductility and strength necessary to resist vertical and lateral loads, also leads to an economical system by using slender sections.

The present study focuses on the effect of varying height to width (**h/w**) ratio, and the effect of grouting the top courses of the panels or adding a reinforced masonry bond beam at the top of the panels on the cracking loads, failure loads, strains, and displacment under in-plane concentrated load.The present experimental-theoretical study contains the results of twelve medium scale panels devided into three groups with different (**h/w**) ratio.Each group consisted of four panels, the first panel did not include any grout or reinforcement and was considered as reference panel for comparison. The second and third panels were used to study the effect of grouting the top courses. The fourth was used to study the effect of adding a reinforced bond beam at the top of the panel. The results including displacements, strains, cracking and failure loads, are presented, discussed and compared.(the used F. E. program has been modified and improved by Ewing & Associations).

The results of the present experimental-theoretical study can be summarized as :-

1- By increasing h/w ratio from 2/3 to 4/3 , the failure load decreases by about 10% for plain panels, 17% for grouted panels and 23% for panels with bond beam, and The vertical displacement of the point just under the concentrated load increased.
2- Grouting the very top course and the two top courses of the panel caused 18% and 40% increase in the values of failure loads respectively, compared with the plain wall panel.
3- Adding a bond beam on the top of the wall panel had a significant effect on the general deformational behaviour of the panel. and caused 50 and 90% increase in the values of cracking and failure load respectively. Also it decreases the strain concentration at middle of the panel by about 35 to 50%. Adding grout or bond beam also decreases the vertical displacement under the concentrated loads by about 25% , 40% respectively.
4- The results of the finite element analysis showed a good agreement with the results of the tested wall panels. The failure loads obtained form the F.E.A. were higher than the values obtained experimentally by about 5-10%.

This study clearly demonstrated the adequacy of partially grouted masonry as an alternative building system.

Key words: masonry structure, concrete block, concentrated loads, finite element, grouting mortar, cracking, failure.

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