AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERING

EFFECT OF BLAST LOAD ON BEHAVIOUR OF REINFORCED CONCRETE STRUCTURE

A thesis submitted in partial fulfillment for the requirements of the Degree of Master of Science in Structural Engineering

By

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STATEMENT

This thesis is submitted as partial fulfillment of Master of Science degree in Civil Engineering (Structural), Faculty of Engineering, Ain Shams University.

The auther carried out the work included in this thesis, and no part of it has been submitted for a degree or qualification at any other scientific entity

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Abstract of the M.Sc. Thesis Submitted by

Eng. / Ahmed Khedr Ahmed

Title of the thesis:

EFFECT OF BLAST LOAD ON BEHAVIOUR OF REINFORCED CONCRETE STRUCTURE

ABSTRACT

An approximate analysis technique for finding a simplified method for studying the effect of blast load on a concrete structure using widely used finite element software (ETABS program) was examined by making comparison between the result obtained from the experimental and theoretical model with the result obtained for Etabs. The behavior of four concrete structure models under the effect of external blast load was theoretically evaluated taking in to consideration the changing of height and width of structure which have the same building volume, front wall area, charge weight and charge distance .Also the behavior of three concrete structure with front wall openings were discussed taking on consideration changing of opening area and location and effect of these changes on performance of structure.

The results showed that Etabs models provide a conservative deformation response for concrete framing building system and the precast concrete wall panels examined in this study. Also the numerical result of concrete structure models showed that the peak displacement occurs during or after the negative pressure phase. Therefore the negative impulse must be included for accurate prediction of deformation. Neglecting the negative phase provides an

overly conservative estimation of expected deformation. Using (TM5-1300) for determining pressure-time blast loading curve for building have the same Building volume, front area, Charge weight, side wall length and Charge distance; the following results obtained:(a) clearing time (t_c) is the only parameter changed in value and all other parameters still constants in determination of pressure-time blast loading curve for front wall, due to calculation of (t_c) depend on the clearing distance(S) and(R) in which calculation of (S) and (R) depend on the height and width of front wall.(b)The pressure-time blast loading curve for side wall and roof floor are the same because the main item effect on calculation is the length of side wall. In studying effect of external blast load effect on concrete structure with front wall openings it is very important to take in consideration the interference between the external and internal pressure for this is reasons:(a)The combination between external and internal pressure loading has a higher effect than each case loaded individual. (b)Peak displacement occurs during or after the negative pressure phase.

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