



085-CVA

## Impact of blast wave on performance of walls strengthened by composite materials

Eslam Ashraf, Nader Saied, Mohamed Samir, and Ameen Osama

Supervisor: Assoc. Prof. Sherif A. Mazik

Civil Engineering Department, Military Technical College, Cairo, Egypt

*The use of the composite materials to strengthen blast-resistance walls against blast terror has great interests from engineering experts in structural retrofitting. The rigid polyurethane foam (RPF) and the aluminium foam (ALF) are used as composite materials in this study.*

*The aim of this study is to use the RPF layer, the ALF layer, and the steel plate to strengthen brick walls under blast load. The blast-resistance walls are used to study the RPF layer, the ALF layer, and the steel plate as structural retrofitting using the finite element analysis (FEA). The finite element program COSMOS/M is used to model the blast-resistance walls under shock wave. The CONWEP numerical program and the empirical equation developed by Henrych (Beshara 1994) are also used to compute pressure-time history hitting the brick walls under different TNT charges.*

*The blast-resistance wall performance is studied based on detonating different TNT explosive charges. There is a good agreement between the results obtained by both the FEA and the numerical analysis. The RPF layer, the ALF layer, and the steel plate improve the performance of the blast-resistance wall under the blast wave propagation.*