



**A COMPUTATIONAL ANALYSIS OF THE DYNAMIC
RESPONSE OF A THICK UNIFORM ELASTIC
CIRCULAR PLATE SUBJECTED TO A
CYCLIC BLAST LOADING**

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Abstract

To rise up to the challenge of protecting the nation against the attack of military actions, accidental explosions or terrorist activities in the form of bomb blast, targeting some of our structures, the dynamic response of plate which is one of the fundamental elements of an engineering structure has been analyzed in this research work. The equations of motion for the circular plate are derived by the use of the principle of virtual work. Approximate solutions are assumed for the space domain and substituted into the equations of motion subjected to sinusoidal impulse forces. Finite element method is used to derive the system stiffness and mass matrices. The damping matrix $[C]$ which dies out the vibration amplitude quickly is introduced and constructed using mass and stiffness matrix of the complete elements assemblage together with the experimental results. From the numerical simulation, it is observed that the duration of the blast (t_p) plays a significant role in the response of the circular plate, which gives rise to vibration amplitude on any small decrease on the pulse duration.

Keywords and phrases: numerical simulation, response of the circular plate, vibration amplitude.

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