

FINITE ELEMENT SIMULATION OF A PASSIVE DAMPER SYSTEM USING CONTACT ALGORITHM

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Abstract

Impact dampers are passive devices wherein a moving mass impacts with the primary structure. The vibrations caused due to these impacts are random in nature. During these impacts, exchange of momentum occurs resulting in dissipation of energy. Here, theoretical model of an impact damper system is modelled as MDOF system using Hertzian contact algorithm. Numerical simulation of the above problem was created using ANSYS Finite Element Analysis (FEA) package. Augmented Lagrangian method with Newmark's time integration scheme is used for simulations. The problem being studied is highly nonlinear in nature with contacts being established during impact. Normal contact force generated due to impact of ball are used to get the transient response of the system. Detailed study was carried out with various mass ratio at low frequency and high amplitudes of excitation. Not much studies have been carried out earlier using MDOF systems with contact algorithm. Above modelling and simulation study was helpful to visualise and accurately capture the transient movement of the impact mass within the confined space.

Keywords: Impact Mass, Passive Damper, Mass Ratio, MDOF System and Contact Algori