

ANALYTICAL MODELLING OF BULKHEAD BLAST RESPONSE

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An analytical model is developed for analysis of the dynamic elasto-plastic response of structural stiffened panels (e.g. bulkheads) due to blast. The model accounts for pinned boundaries and panel aspect ratios in the range of 1 – 5. Both the short span and long span deflection shapes are accounted for, as well as stiffeners in both directions. The Lagrange equation has been applied to translate the energy balance into a set of equations of motion, being solved numerically. In order to account for the stiffness and deformation of the surrounding structure (e.g. a ship), flexible boundaries are introduced allowing in-plane edge displacements. Specific edge response due to a blast loaded bulkhead has been fitted by a SDOF dynamic model based on series of FEM simulations of a real ship structure. The analytical model results have been compared to FEM simulations for some stiffened panels responses showing good agreement with the analytical model.