

ELASTO-PLASTIC RESPONSE OF STEEL PLATES TO BLAST LOAD

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Large deflection analysis of steel plates subjected to blast load was performed at the Ernst Mach Institute. In this paper a comprehensive description of experimental, theoretical and numerical investigations will be offered. A homogeneous steel plate seems to be an interesting object in the context of target analysis techniques as all the basic target response principles and failure criteria for blast load can be studied. Material properties and boundary conditions can be describes exactly. Frequency response can be measured and calculated. Static pressure load, impulsive blast load from HE explosions and quasi-static blast load in a shock tube can be experimentally tested. The behavior of the plate can be calculated numerically by a FE-code. An engineering method is available that equates the strain energy that will be stored in the plate to either the kinetic energy imparted to the plate at impulsive load or to the potential energy stored by the deflection at quasistatic load. Another method uses a model that is made of rigid segments interconnected by hinge lines in which the deformation properties of the plate are concentrated.

The differences between experiments and different analytical results will be discussed in order to improve target analysis techniques.