

EXPERIMENTAL INVESTIGATION OF TEARING FRACTURE IN SHEETS UNDER QUASI-STATIC LOADING

By

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ABSTRACT

Although there has been interest in the behavior of metal plates under blast and projectile loading for many years, definitive open-source analysis has only been recently forthcoming. This analysis is most often in the form of scaled recreations of the dynamic blast event, or “live fire” tests. New developments in methods of recreating blast and projectile induced plate failure using a quasi-static approach provide possible, accurate, alternatives to the cumbersome and expensive live fire test.

This research endeavors to develop an accurate, quasi-static method of recreating the petalling phase of blast and projectile failure in metal sheets, based on a modified trousers-type test. By using the trousers-type fracture test the overall plastic bending kinematics of the fractured petal is preserved, as well as the mixed mode (mode one and mode three) fracture.

Through analytical and qualitative analysis, a testing apparatus to generate this trousers-type, plastic bending and mixed mode fracture was designed and machined.

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