APPROACH FOR USING P-I CURVES AGAINST MULTIPLE WAVES

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Several existing software packages aimed at providing quick evaluations for structural damage against blast loadings utilize pressure-impulse (*P-I*) curves. These are typically developed under the assumption of idealized single-peak load-time histories. However, many loading cases in urban environments can be semi-confined, where multiple reflections cause structural components to be subjected to multi-peak blast waves. These scenarios are increasingly the focus of the development of quick-running blast prediction methodologies. The effect of multiple waves on *P-I* curves, both for elastic and elasto-plastic material response have been investigated. One approach is to characterize the limitations of enhanced response due to constructive wave timings. Another approach is to develop a quick running methodology to invert a *P-I* curve to an elasto-plastic SDOF model for subsequent time-resolved analysis. Both approaches have value when the underlying model (SDOF, finite element, or experiments) or material properties used to develop the *P-I* curve originally are not available or too computationally expensive to use as a quick-running method for multiple wave analysis. The effectiveness of both approaches in assessing damage against a sample multi-peak pressure trace is tested against the response of a non-linear SDOF model which produced the *P-I* curve.