

## A FAILURE PREDICTION METHODOLOGY

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As part of a series of programs for the Defense Civil Preparedness Agency Scientific Service, Inc. has been developing failure predictions and upgrading techniques for structures in support of Crisis Relocation Planning (CRP). CRP assumes that in the event of a nuclear war there will be a period of crisis buildup which will allow for relocation of a major portion of the civilian population and the upgrading of existing structures for fallout protection in the host area and blast protection for key workers who will remain behind in the expected target areas.

Of particular interest to the symposium "Military Application of Blast Simulations" are the prediction methodologies being developed for DCPA which are founded on engineering mechanics, limit theory, and a statistical approach to failure analysis that enables realistic assessment to be made of failure probabilities based on the combined efforts of statistical variation unit-to-unit materials, structural elements, and construction processes.

The failure, prediction methodology is demonstrated experimentally for wood, concrete, and steel structures using data from past and ongoing research programs using the blast simulator at Ballistic Research Laboratory, Waterways Experiment Station and the former URS shock tunnel.

The methodology developed promises to provide a potent analytical tool for quantitative assessment of failure loads and should have significant value for Civil Defense, Collateral Damage and Target Analysis.