



September 27 - October 01, 2004, Bad Reichenhall, Germany

PRESENTATION AND EVALUATION OF THE SIMPLIFIED METHOD MAXDALLE THAT PREDICTS THE BEHAVIOR OF REINFORCED CONCRETE PLATES TO MILITARY WARHEAD EFFECTS

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Vulnerability evaluation of reinforced concrete structures or the effectiveness of weapon systems against any concrete targets is a great interest. The first version of the French vulnerability software PLEIADES/I is now available. This software includes specific modules like MAXDALLE that gives the response of reinforced concrete panels under blast loads.

General MAXDALLE capabilities are shortly presented. We detail new features like the response of fully clamped concrete panels including membrane effects. Recently we introduce synergetic effects between primary fragments and blast. Damaged areas on the reinforced concrete panel due to fragment impact energy are taken into account. These damaged zones affect the resistance function of the equivalent one degree of freedom system and consequently stiffness and ultimate load capacity of the panel are reduced.

Experimental data have been obtained in order to evaluate the MAXDALLE software. Several kinds of experiments have been conducted. Some experiments are done using 40 kg TNT explosive charges that detonate above reinforced concrete panels with different thickness, different boundary conditions, different reinforcement ratios and with (or without) an opening in the panel. Other experiments with TNT uncased charges detonating in closed rooms are also conducted. For some tests, explosive cased charges that deliver fragments and blast are used.

These experimental data are presented and some of them are compared with MAXDALLE results.