# NUMERICAL MODEL OF ARTILLERY SHELL FOR AIR SHOCK WAVE LOAD STUDY ON STRUCTURES

A. Bryntse

*FOI - Swedish Defence Research Agency, Stockholm, SE-164 90, Sweden*

**Key words : Air shock wave – Pressure loading – Numerical simulation – Artillery shell – Structure response**

A simple numerical model of an artillery shell, primarily intended to study pressure loading on structures in its vicinity like building façades, is suggested. The model was tested with a hydrocode, and the results were compared to reported empirical values and experiments.

The modeled shell consists of an explosive charge surrounded by a pre-fragmented steel casing. The simplified geometry as well as the simplified casing material is included in a 2D axi-symmetrical model which, after expansion a short time in surrounding air, can be mapped into a 3D space containing structures to be loaded. The fragments are then omitted, as the model focuses on air shock pressure loads.

Pressure loads on a simulated building façade were calculated for some different heights, horizontal distances and angels assumed realistic for an incoming shell. For several cases, a striking result was the relatively high pressure and impulse loading on the lower parts of the façade. This loading also has a larger extent horizontally than higher up on the façade, at the level where the shell detonates.