

# NUMERICAL SIMULATION OF THE AIR BLAST INTERACTION WITH SIMPLIFIED STRUCTURES

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## ABSTRACT

In case of blast event, the air pressures applied to a dismantled soldier are complex as fluid-structure interactions such as blast reflections and diffractions, occur. A good understanding of those effect is necessary to predict or mitigate the underlying injuries. In the BLASTHOR project, consisting of such comprehension studies, the focus is put on the blast-thorax interaction. Before the analysis of more realistic thoraxes as planned at the end of the BLASTHOR project, an experimental study is conducted on the blast interaction with rigid and deformable simplified structures (cylinders and cuboid). Those experiments highlight many interaction phenomena.

In this presentation, two numerical models, i.e. an in-house developed code (BSM) and a commercial code (LS-DYNA), are used to reproduce the experiments realized. In a first time, the numerical models and the resolving strategies are detailed. The numerical predictions are next compared to the experimental findings, in regards to the surface pressures, the shocks recorded with high-speed videos, and structures displacements. The numerical results are further analyzed in order to supplement the experimental findings. Last, conclusions are drawn on the interactions between blast and simplified structures and on the ability for numerical models to transcribe them.