

ANALYZING THE EFFECTS OF BLAST LOADING AND BLAST EFFECTS ON VEHICLE STRUCTURES USING AUTOMATIC FLUID STRUCTURE INTERACTION

A. Ramezani, H. Rothe

University of the Federal Armed Forces, Chair of Measurement and Information Technology, Holstenhofweg 85, Hamburg, 22043, Germany

Key words: Blast loading - Vehicle structures - Fluid structure interaction - CFD FEM coupling methods - Terminal ballistics

The present time is shaped by a variety of religious, political and military conflicts. In times of asymmetric warfare and constantly changing sources of danger from terrorist attacks and other violence based crimes, the personal need for protection continues to rise. Aside from military applications, there is a large area for the use of high security vehicles. Outwardly almost indistinguishable from the basic vehicles, security vehicles are used for protecting heads of state, as well as individuals. To remain state of the art it is necessary for security vehicles to permanently continue to develop protection against modern weapons and ammunition types. It is enormously cost intensive to check any new technology by firing or blasting of real vehicles. Therefore, more and more calculations of new security concepts and materials are carried out by numerical computer simulations. However, product simulation is often being performed by engineering groups using niche simulation tools from different vendors to simulate various design attributes. The use of multiple vendor software products creates inefficiencies and increases costs. This paper will present the analysis and development of an interface between the most common Computer Aided Engineering (CAE) applications ANSYS Autodyn and Abaqus to exploit the advantages of both systems for the simulation of blast effects.