SIMULATING THE DYNAMIC RESPONSE OF AN ARMOURED VEHICLE AND OCCUPANTS SUBJECTED TO A MINE BLAST

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To simulate the dynamic response of military vehicle occupants subjected to a mine blast several systems are involved, such as the loading of the mine blast, the structural response of the vehicle and the motion response of the occupants. Furthermore special techniques are required for the coupling between the different systems, such as the interaction between the soil and the vehicle, or between the seat cushion and the occupant pelvis. This paper presents an approach which couples these various systems to simulate the response of the vehicle and its occupants subjected to mine blast loading. In addition an indication of expected injuries is provided. The approach consists of using the TNO mine blast subroutine, the Finite Element package LS-Dyna and the multi-body system Madymo simultaneously in a single simulation run. The TNO mine blast model was calibrated with full-scale test rig experiments, whereas limited experimental data were available to validate the structural response of the vehicle and the occupant response. This approach is illustrated with a typical armoured vehicle.