

COMBINED EXPERIMENTAL AND NUMERICAL STUDY OF MINE DETONATIONS IN THE VICINITY OF VEHICLES

ABSIL,L.H.J.; VERBEEK,H.J.; WEERHEIJM,J.

The threat of landmines to people and vehicles has increased over recent years. Therefore, for military purpose as well as in the context of humanitarian demining operations, much attention has recently been paid to the development of blast resistant vehicles. These vehicles must be able to withstand the combined effect of blast and fragmentation.

At TNO-PML, mine Detonation tests were conducted on a hull of a Light Armored vehicle. Several "anti-personnel" mines, of the type no. 23C2, containing a charge of 600 g of explosives, were detonated under the bottom plate and in the wheel bays of the vehicle. These tests were aimed at getting insight into the damage caused by this mine and to identify weak components in the vehicle. The hull was instrumented with pressure transducers to measure the blast load on the wheel bay and on the bottom plate during a mine Detonation. In addition, the bulkhead separating the engine compartment from the personnel compartment, was instrumented to measure the blast load after blast leakage through the hole blown in the bottom plate. The main results of this experimental research will be presented in the paper.

Furthermore, numerical simulations of mine detonations using the hydrocode AUTODYN were conducted. This study was aimed at determining the possibilities and limitations of the code for simulating mine detonations and target material response. The Detonation of a charge with a casing similar to that of the 23C2 mine was simulated and its impact on a 10 mm and a 30 mm thick Aluminum plate. These simulations indicated that the 10 mm thick plate will be ruptured and perforated by the fragments, while a 30 mm plate can withstand the blast and fragment effects of the mine. Overall, good agreement between the simulations and the experiments was found. This comparative study will be reported in the paper.