Project name: EFP Protection: Development of new Technology to protect Armoured Vehicles against Explosively Formed Projectiles

End date: 2012

Participating countries: Italy, The Netherlands, Czech Republic and Spain

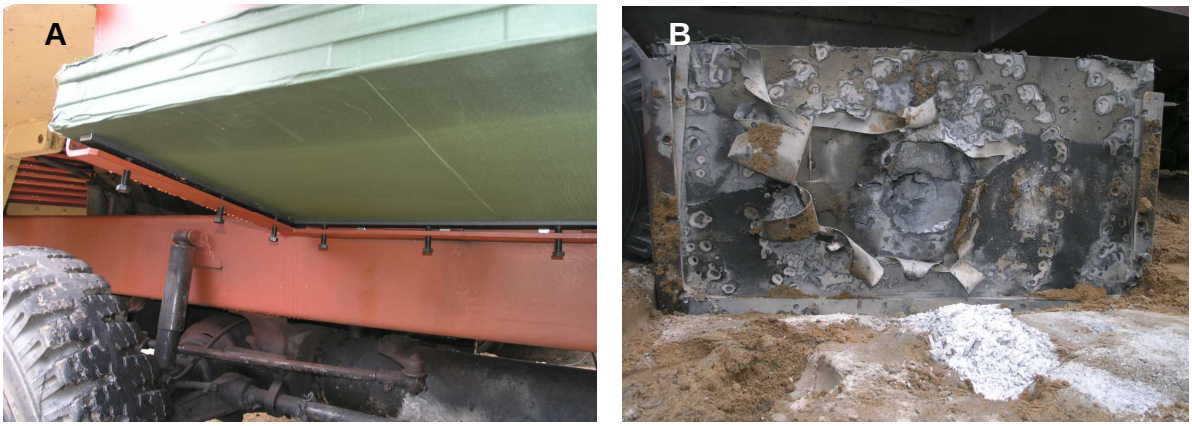
Who was there: The EFP project was carried out by a consortium of leading European industrial and academic partners from OTO Melara, Industrie Bitossi, TNO DS&S, DSM Dyneema, VOP-026 Sternberk s.p./VTUO Brno division, SVOS, SVS FEM, EXPAL, UPM. IPM done by HB Consultancy.

Summary

The EFP Protection project studied the problem of the bottom attack of EFP mines, identified as one of the main IED threats in the modern battlefield and peace keeping operations.

The main objective of the project was to provide solutions for protection against EFP (Explosively Formed Projectiles), mainly on bottom plate attack, with two purposes: (i) local protection of the occupants, no perforation of the bottom plate by the EFP projectile, (ii) global protection of the occupants.

The EFP project has demonstrated the capability to produce add-on armour solutions able to defeat both TMRP-6 and blast mine treats, especially for bottom plate attacks. The developed solutions are easily assembled on existing vehicles, and they are ready to use in the modern battlefield.



Add-on armour before (A) and after (B) EFP mine attack.

In detail

This project has studied the problem of the bottom attack of the EFP mine, identified as one of the main IED threats in the modern battlefield and peace keeping operations. Two combat vehicles were chosen within the project to be protected agains EFP threat. The present aluminium armoured vehicles and truck cabin bottoms are not able to resist to the actual EFP-mines like TMRP-6.

TMRP-6 mine from the former Yugoslavia is the main EFP threat selected as a reference, due to its frequent use in the modern conflicts and as an effective and inexpensive means to defeat vehicles and equipment.

To comply the requirement to prevent not only the perforation of the bottom plate against both mines but also the collateral damage inside the vehicle, especially in respect of the occupant

safety, unconventional add-on protections with high technological level and specific fixing solutions were studied, developed and assessed.

PROJECT RESULTS

This project has produced 20 possible solutions that very largely increase the vehicle protection and are applicable in terms of weight and thickness of the add-on panels and thus in mass efficiency and volume efficiency. All solutions were tested by EFP detonation and their results compared with the numerical simulation activity.

At the end of the project, the final demonstrator tests on both vehicles were done to assess the mechanical behaviour of the bottom plate, the risk of injury on the crews and the shock induced on the vehicle structure. Both add-on solutions allow to stop completely the EFP projectile without secondary fragment formation and to reduce significantly the shocks induced on the vehicle and on the occupants ensuring their survival.