SPALL**LINER**

HIGH-TECH COMPOSITE

IMPROVED SURVIVABILITY FOR THE CREW

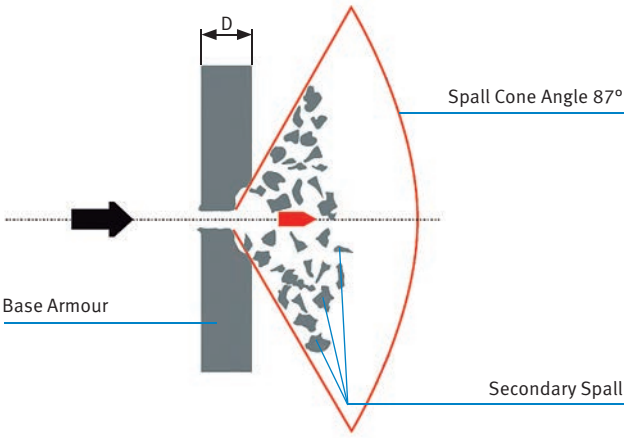
TAKING RESPONSIBILITY IN A CHANGING WORLD

RHEINMETALL

THE SPALL EFFECT – A HIGH RISK FOR THE CREWS

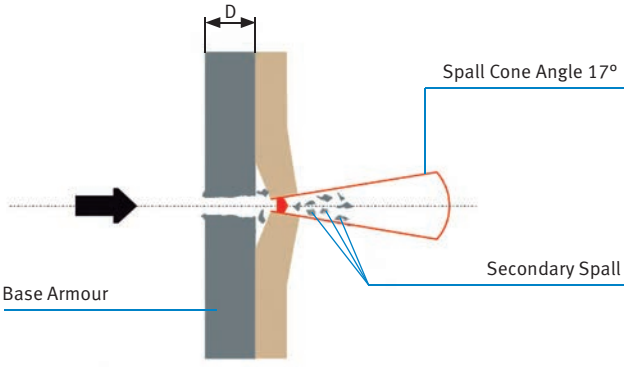
The effects from spall are often an underestimated danger for the crew inside the platforms. Lots of Protection Systems don't consider these effects and are therefore not giving the optimal protection.

The spall effect can be caused by a threat (projectiles, missiles, mines or IEDs) hitting the platform from different attack angles and generating a shockwave and stress in the armour-material without penetrating it. When the shockwave creates secondary spall on the inner side of the vehicle, fragments of very high velocities are ejected into the crew compartment. Depending on parameters as for instance the material of the base armour, the velocity and weight of the fragments as well as the spread (spall cone) into the compartment varies. In such scenarios with the described spall effect, the chance of surviving in the vehicle is very low.



SPALL-LINER – MAKES THE PROTECTION CONCEPT EVEN BETTER

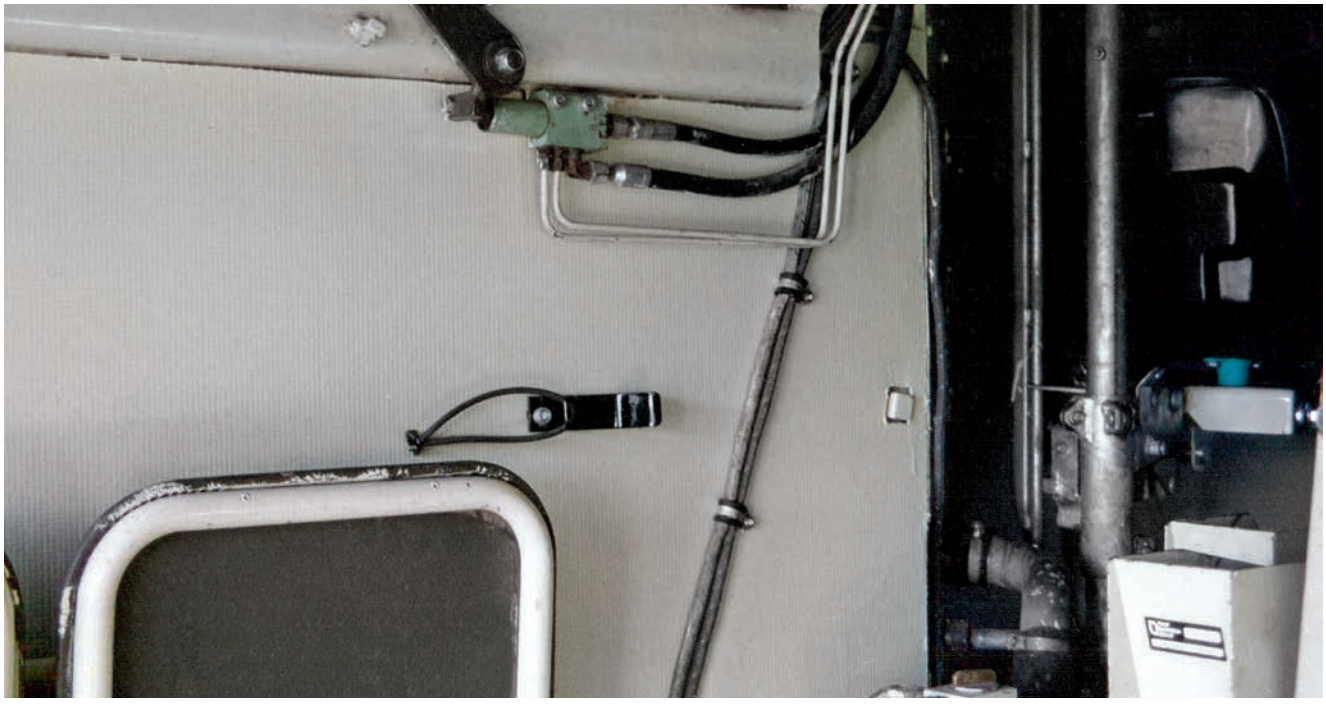
Rheinmetall Spall-Liner uses special high-tech composite materials to reduce the effects of ballistic attacks and specifically "over-match-situations". Depending on the application and the requirements, Rheinmetall composite solutions are based on PE, Aramid or GRP. Application of the Spall-Liners reinforces the basic armour, and the combination makes it more elastic to stop projectiles. Ballistic protection is improved and the potential spall effects are drastically reduced, both in number and in distribution (reduction of the spall cone). By using Spall-Liner, the overall Survivability of the crew will increase considerably. The use of Spall-Liner will also contribute to other positive effects such as increase in structural stability and the reduction of signatures – noise, vibrations and IR-signature.



FLEXIBLE APPLICATION

Rheinmetall Spall-Liner is an important component of the modular Rheinmetall Survivability approach. Due to the low weight, it also fits to the ambitious standards of the products within the Rheinmetall product family and is offered according to the latest knowledge in material development. The liner is customizable to different vehicles and requirements and can be formed in any shape. The liner material can be mounted directly onto the base armour, which is important to prevent secondary fragments in the vehicle due to the mounting system itself. Interior equipment in turn can be mounted on the liner. The engineering and material knowledge that has been inserted means that the product can be offered by Rheinmetall as a cost-effective solution to improve the Survivability of the crews.

Various Rheinmetall liner-systems have been applied on many vehicle types in large quantities and have been proven in missions worldwide.



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