VEHICLE ARMOUR FROM REQUIREMENTS TO FIELD

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Abstract

From military vehicle industry point of view the process of designing vehicle armour solution from the requirements to the field for any specific customer requirements consists of following steps: selection, optimization, verification, design, manufacturing and fielding. The process is based on the knowledge and database of pre-evaluated solutions and technologies and true understanding of customer needs and expectations. After the selection of the specific customer solution is made, the process is essentially disconnected from the armour development. In the project phase the armour tests are made for solution optimization and verification purposes only.

Keywords: *armour, ballistic protection, armour development, armour design, armour testing, armour verification*

1. Introduction

The basic material and armour recipe development is increasingly run outside of the military vehicle industry, mostly in research institutes and armour manufacturing industry. The actual armour development and survey of the alternative solutions is run continuously by the military vehicle industry in the background as an independent process. The connection between the continuous development and the customer specific armour design process is essentially cut to enable solution selection and design freeze.

2. Selection

The selection for customer specific armour solution is made based on customer requirements for the armour, other customer requirements for the complete vehicle, understanding of the true customer needs, and the knowledge and database of available solutions. The selected solution must be in balance between all these. Typically these requirements can be simplified to price and weight evaluation of the solutions providing the required armour performance.

3. Optimization

The selected armour solution will be optimized by the industry tests to ensure the performance against all required threats in all relevant impact angles and structure thicknesses and to avoid exceeding weight and price. Testing is performed either by military vehicle industry alone or together with possible armour supplier partner.

4. Verification

The optimized armour solution will be brought to customer verification tests, where the performance is verified against all required threats. The verification tests are performed either by industry, by customer or by independent third party test organization, depending on how the

procedure is agreed in the contract between the industry and the customer. Both the customer and industry are present witnessing the verification tests.

The verification test targets can be either plate targets representing the armour structure or more complete engineered targets with final mounting system or even section of the vehicle.

5. Design and manufacturing

After the armour solution is verified, the actual mechanical design can begin in order to create the manufacturing documents for each specific armour module. Usually the design is verified by pre-series, and if needed the documentation finalized respectively. Only after that the design can be frozen and the actual series manufacturing can begin. In most cases the armour is supplied by the partner company and the workshare between the vehicle and armour industry is agreed case by case.

6. Fielding

From industry point of view the vehicle including the armour is fielded when customer has accepted the delivered product for troop use. On the other hand it is reasonable to understand the product fielded only after it is in fully operational use with all the personnel trained and supporting infrastructures running.