METHODOLOGY FOR DEVELOPMENT OF ARMOURED VEHICLE AND SURVIVABILITY PREDICTION USING DYNAMIC SIMULATION

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The war in Iraq demonstrated the need for dramatic change in the policy for designing armoured vehicles, mainly because today's military conflicts are decided with precise weapons and the main task of the new armoured vehicles is to contain and stabilize areas in which there are still terror activists. In this new battlefield, no differentiation can be made between armoured and logistic vehicles. Moreover, logistic vehicles should survive terror threats and protect the crew; unquestionably, crew survivability is the main aim. Since the main target is to protect the crew from extreme explosive loads, such as mine blasts, which are characterized by a high-rate pressure wave and cause very high stresses and accelerations in vehicle components two main protection goals should be achieved: first, eliminate penetration of the armour and second to designs damping devices with high energy absorbing capabilities.

The development of solution with optimum trade-off between mobility and survivability cannot be done just by trial and error. Development of reliable CAE model of the vehicle and the threat, using a simulative tool is essential. Plasan Ltd. has invested vast efforts to produce an effective methodology for the development of armoured vehicle, using a virtual design that can speed up the design and update the means of protection. The foundation of the developed methodology is an adequate synergy between the design, reliable calibrated simulation and the field tests

The methodology is based on the capability of using an efficient, developed simulative tool which enables to compute the entire problem (i.e. the blast, vehicle structure, seats, pad rests, occupants, etc.). This with a conjunction of rapid full field test capabilities enables relatively short development time. The methodology enables continual optimization and improvement, as well as tailored solutions for new platforms and fast response solutions to new threats. In our experience, it is no longer possible to keep pace with the demand for rapid development of special protection for tactical vehicles without the implementation of this methodology.

In the paper we will demonstrate how we use the methodology for developing an armoured vehicle according to specific requirements. We will show a comparison between the simulation prediction and physical field test results and how a tide relationship between simulation and verification tests can speed up the development process. We will also show that once the model is verified and calibrated quantitatively and qualitatively, the impact of the modifications can be effectively examined by the simulation model, while saving expensive field tests.