



US DEPARTMENT OF DEFENSE

BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

Injury Models

Next Generation Under-Body Blast Injury Modeling and Simulation Assessment Capability

Historically, survivability LFT&Es have been conducted on tactical wheeled and combat vehicles using ATDs, injury biomechanics criteria, and data analysis standards developed by the automotive crash safety community. While the best technology available was used in these analyses, none of these tools were developed to assess the types of injuries experienced under the military conditions of UBB loading. OSD, through DOT&E, initiated a project to develop the next generation of injury assessment capability for UBB through the WIAMan PMO at USARL. ASD(R&E), USAMRMC, and RDECOM are also sponsors. The project includes biomechanics testing to assess human response, as well as injury modes and limits, which can be used to design and develop the injury assessment capability. This injury assessment capability will be applied to a new robust, biofidelic anthropomorphic test device (ATD). The WIAMan PMO is using modeling and simulation extensively to aid in the design of the new ATD. The modeling and simulation team is creating both component (e.g., leg, pelvis, lumbar, and head and neck) and full-body test predictions. The initial analysis has focused on highlighting ATD design strengths and risks, and assessing material selection sensitivities. Preliminary results from the component and full ATD simulations have already lead to design improvements in the WIAMan ATD tech demonstrator. The production WIAMan ATD (and the associated modeling and simulation capability) will allow vehicle developers to predict blast injuries and incorporate improved survivability features to protect Service Members in military vehicles.