



Blast testing of high strength steel and composite panels – on-going work

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Development of new lightweight concepts for blast protections of vehicles requires test of simple panels to examine the strength against blast. Such tests are normally performed by placing plates on a steel frame and making a controlled free airburst above the plate. Due to the harsh conditions and transient nature of the test setup, the plates are normally not monitored during the test, but instead post inspected for residual bending and fracture. The sparse information can be valuable for screening purposes, but is insufficient for comparison and validation of numerical models. Instead, either full field out-of-plane displacements or just the center point out of plane deformations recorded during the test would be valuable. The implementation of a high speed laser (HSL) distance measuring unit into a blast test rig is presented here. The aim of the implementation is to capture the center point out of plane displacement during the blast load of the test specimen. Design and considerations for the implementation are presented along with test results from field tests. Further, results are compared with LS-Dyna simulations of the test setup. A sketch of the test setup and a picture from the field test are shown in figure 1.

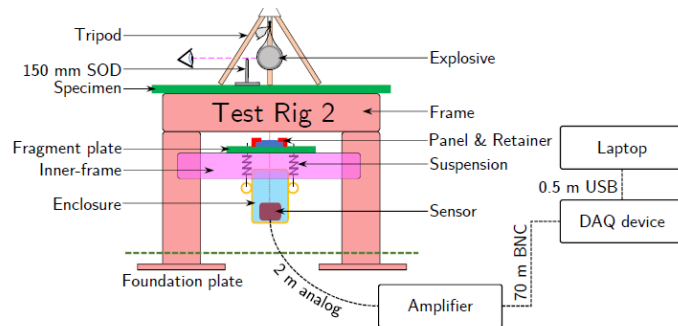


Figure 1a – Experimental setup [1]
Figure 1b – Schematic of the experimental setup [1]

References

1. Thomsen M, Nielsen TG (2017), Diploma Thesis Blast Testing on ArmoX Steel. Technical University of Denmark