

Terminal Ballistic Analysis of Non-Filled and Water-Filled Tank

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Abstract : This paper presents the ballistic terminal study of the non-filled and water-filled aluminum tank. The objective was to determine the failure stages for both cases. The tank was impacted by fragment simulating projectile (FSP) with 260 m/s for non-filled and 972 m/s for water-filled. The aluminum tank was 3 mm thick, 150 mm wide and 750 mm long. The ends of the tank were closed with two polymethyl methacrylate (PMMA) windows. The test was conducted at the Science and Technology Research Institute for Defense (STRIDE) Batu Arang, Selangor, Malaysia. The results showed four main stages for non-filled tank, which were first contact between FSP and the tank, partially perforated, fully perforated with FSP and plug still intact and lastly fully perforated with FSP and plug separated. Meanwhile, for the water-filled tank, there were seven main stages, which were first contact between FSP and the tank, partial perforation, full perforation, drag phase, cavity phase, bounce wave event and the collapse of the cavity.

Keywords : fragment simulating projectile, high speed camera, tensile test, terminal ballistic

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