# P37 Penetration of Small Scale Slender Robust Penetrators into AL6061-T651

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**POSTER**

## Abstract:

The depth of penetration of a slender Aermet 100 and Var4340 steel penetrators of ogive nose grows as its penetration velocity increases up to a certain limit (hydrodynamic limit). It was found that at a maximal velocity of about 1900 meters per second both steels reaches their hydrodynamic limit and penetration drops considerably. The current research conducted to find whether the maximum penetration and the maximal penetration velocity can be increased by using harder materials. Ogive nosed small scaled projectiles of 21 gram and slenderness ratio of 10 (length over diameter) made of treated tungsten and tungsten carbide were shot in normal impact angle into aluminum cylinders (Al6061-T651, 254 mm diameter, and 280 mm in length). The impact velocities ranged between 1500 to 2100 meters per second. Various failure mechanisms of erosion, fragmentation, yielding, and diversion were identified. It was found that the gradients of penetration over velocity of tungsten and tungsten carbide versus Aermet100 are greater by 120% and 70%. The results are supported by numerical analysis based on Autodyn. It was also found that the tungsten carbide did not reach the hydrodynamic limit even at 2100 meters per second while tungsten and Aermet100 already reached their hydrodynamic limit.

## Notes: