

AME3: Stainless Steel Bonded Titanium Carbide Cermets to Replace Cobalt Bonded Tungsten Carbide

Team Composition: ME/MET, MSE

Sponsor: Kennametal



Project Description: Tungsten carbide is an important engineering material used in metal cutting, mining, energy exploration, and wear resistant applications. The price of tungsten has escalated due to increased global demand and because China controls much of the supply. Alternative materials have been explored but cannot match the combination of hardness, toughness, and wear resistance of cobalt-bonded tungsten carbide metals (WC-Co). This project will investigate powder processing of stainless steel bonded tungsten carbide (TiC-SS) compositions to develop tough cermets with comparable performance to WC-Co grades. An experimental plan will be developed and executed to determine the composition and processing factors that drive alloy performance. Target performance metrics have been established for transverse rupture strength, micro hardness, and impact toughness.

