U.S. ARMY COMBAT CAPABILITIES DEVELOPMENT COMMAND

MANUFACTURING TECHNOLOGY SUCCESS STORY

Lightweight Small Caliber Ammo

PROBLEM / OBJECTIVE

The amount of weight dismounted Soldiers carry has increased proportionately with the increased technology needed to complete missions. The increased weight has led to increased fatigue. A possible solution to ease this burden is lighter weight, small caliber ammunition. By replacing the brass case of current ammo with a lighter material, the weight of a 7.62 round can be reduced by as much as 15 percent.

Manufacturing challenges for light-weight cases require components that affect the manufacturing complexity, time and yield, which results in overall higher costs.

The objective of this project is to mature manufacturing of the 7.62mm case using Metal Injection Molding. MIM is a high-volume metalworking process where finely-powdered metal is mixed with binder material to create a "feedstock" that is shaped and solidified using injection molding. The molding process allows complex parts to be shaped in a single step. The finished product is a cylinder shape tube that can be tapered using the same manufacturing equipment and case tapering processes as the current 7.62mm brass case.

ACCOMPLISHMENTS / PAYOFF

This project resulted in a significantly lighter-weight 7.62mm small caliber ammunition case, which has transitioned to the Joint Program Executive Office Armaments & Ammunition for evaluation. JPEO A&A will compare the new lightweight solution to the current brass cases and decide the best path forward. The accomplishments include:

- Developed metal injection molding production process for lighter-weight stainless steel 7.62mm small caliber ammunition case
- Reduced the weight of 7.62mm cases by 15 percent compared to current brass cases
- Matured manufacturing process to continue using existing case tapering and load assembly and packing capability at the Lake City Army Ammunition Plant
- Demonstrated multi-cavity mold manufacturing, increasing the case production rate four times
- Verified metal injection molded stainless steel case performance with ballistic testing.

Lighter-weight stainless steel metal injection molded small caliber ammunition cases. (Photo credit: U.S. Army)

This ManTech project supports the Army's Soldier Lethality modernization priority by providing a solution for significantly reducing the amount of weight carried by dismounted Soldiers.

PARTICIPANTS

This project was executed by the U.S. Army Combat Capabilities Development Command Armaments Center in collaboration with the organic industrial base.

CCDC Armaments Center, Picatinny, New Jersey

- Lake City Army Ammunition Plant, Independence, Missouri