

Energetic Materials Technology

PROBLEM / OBJECTIVE

Multi-base propellant cost and quality did not meet DoD Manufacturing (Mfg) requirements. In addition, the atomized magnesium (Mg) Mfg process had been inefficient (22% yield) and reduced procurements threaten the viability of the sole producer of atomized Mg, Hart Metals. Atomized Mg is critical to the performance of tracers, flares, and other pyrotechnic items used by DoD. The Energetic Materials Technology tasks were to increase the yield of the atomized Mg and to meet DoD propellant cost and quality of Mfg multi-base propellant.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

Improved Manufacturing of Multi-base propellant

- Developed Beken Blade design mixers which significantly input more work per unit time into the propellant being mixed
- Data acquisition and recording eliminated operator error. Propellant mix rheometer will replace the judgment of the dry-down operator

Atomized Mg Manufacturing

- A new atomization nozzle was designed to reduce production costs for DoD procurement.

Implementation and Technology Transfer:

- The new atomization nozzle was implemented at Hart Metals. This nozzle increased the yield of usable powder by 7 percent.
- Implemented mixer and extruder improvements at Radford AAP
- Delivered 2000 lbs of Beken blade design processed M30A1 propellant

Expected Benefits and Warfighter Payoff:

- Reduced cost of Mg powder from \$13/lb to less than \$10/lb leading to annual savings to the Navy and the DoD of over \$1 million in the procurement of weapons systems including flares, tracers, infrared countermeasures and other pyrotechnic munitions
- Improved yield of atomized Mg from 22% to 31%. Estimated \$3.5M savings per year at full production rates
- Improved manufacturing process for multi-base



M109A6 Paladin 155 mm Self-Propelled Howitzer



M777 Lightweight 155 mm Towed Howitzer

- propellants reduce the overall rework by 30%

See website:

www.ncemt.ctc.com/index.cfm?fuseaction=projects.details&projectID=20 for more info for.

FUNDING

Army ManTech:	\$1.747 M
PM(s) / Other Gov't Agencies:	\$0.390 M
Industry:	\$0.730 M

TIME LINE / MILESTONE

Start Date: October 1998
End Date: September 1999

PARTICIPANTS

U.S. Army Tank-automotive and Armaments Command (TACOM), Alliant Techsystems, Radford Army Ammunition Plant, National Center for Excellence in Metalworking, Technology (NCEMT), Hart Metals