

Munitions Manufacturing - Development of Manufacturing Technology for MACS Combustible Case

PROBLEM / OBJECTIVE

The Modular Artillery Charge Systems (MACS) is a key element in enabling Crusader to achieve performance goals. MACS propelling charges are comprised of combustible cases that are filled with propellant, an ignition assembly and associated components. The production processes currently used for combustible ordnance is essentially 30 years old and is extremely labor intensive with 85% of the cost associated with manufacturing and quality operations.

A ManTech project was initiated under the Army Munitions Manufacturing Technology area to develop and demonstrate manufacturing methods to reduce labor cost and improve end item quality.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

Manufacturing areas of improvement included material handling, case coating, product inspection and marking, packaging and data collection. An automated material handling system was adapted for processing energetic materials in the MACS production facility that eliminates manual loading and unloading at within the production facility. Coating operations are now fully automated and have reduced labor requirements and cycle time while improving product quality. A near Infrared analysis technique was adapted for use in the combustible case manufacturing process that reduces the analysis time from several hours to 15 seconds. Product marking along with machine vision and laser instrumentation for inspection will eliminate human error factor and reduce direct labor involved.

Implementation and Technology Transfer:

Armtec has committed to self-facilitize for MACS production. The technology developed will have a positive impact on the production of other combustible ordnance products as well as the manufacture of other munitions components. Results are applicable to the manufacture of 60mm, 81mm, and 120mm mortar containers and 120mm tank cartridges.

Expected Benefits:

As production rate increases, the overall cost per combustible case decreases.



XM232 Combustible Case Assembly

As a result of this ManTech project, cost per combustible case set have decreased significantly. Increases in efficiency have already resulted in 26.5% cost reduction to date. This translates to an annual cost avoidance of \$2.625M. Production is scheduled for a 14 year period, yielding an overall cost avoidance of \$36.75M. In addition, the automated systems have eliminated manual labor and subjective inspection results and significantly increased the quality of MACS components.

TIME LINE / MILESTONE

Start Date: January 1999
End Date: December 2001

FUNDING

Army ManTech: \$2.804M
Cost Sharing:
 Armtec: \$2.000M (Actual)
 \$4.000M (Planned)

PARTICIPANTS

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U.S. Army Tank-automotive and Armaments Command-
Armaments Research, Development and Engineering
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