

Cost Improvement of IMX-104 Explosive Formulation

PROBLEM / OBJECTIVE

IMX-104 is a newly developed insensitive munitions (IM) explosive formulation. It will support the production of the 81mm High Explosive (HE) Mortar and is the leading candidate to replace Composition B and its equivalence, PAX-21 and PAX-41 as the HE fill in various munitions items. This IM explosive formulation provides a more IM compliant product to better safeguard warfighters from unplanned stimuli while maintaining the basic performance of Comp B. While IMX-104 has proven to possess good IM properties, how a large-scale manufacturing process will affect these desirable properties is not known. Without a proven process to efficiently manufacture the product, IMX-104 cannot be fielded due to cost and quality. The objective of this project was to maximize the manufacturing efficiency of IMX-104 to lower its unit cost while maintaining the desirable properties.



IMX-104



81 MM Mortar (IMX-104)



DNAN Pre-Melter

ACCOMPLISHMENTS / PAYOFF

Process Improvement: The qualified, optimized manufacturing process demonstrated to shorten the cycle time and subsequently lower the unit cost of IMX-104 explosive formulation.

- Critical operating parameters, e.g., batch size, operation temperature, mixing time, etc. were identified and optimized using Design of Experiments (DOE)
- Additional unit to pre-melt DNAN proven to shorten the kettle turn over time by 2 hours
- Successfully produced 7,500 pounds of specification compliant IMX-104 to qualify the optimized production-scale manufacturing process
- Successfully developed and validated Brookfield viscosity test method for a more accurate measurement

Implementation and Technology Transfer: The manufacturing technology was demonstrated at Holston Army Ammunition Plant (HSAAP) and transitioned to full production.

Expected Benefits and Warfighter Impact:

- (1) Better understanding of operating conditions on the quality of final product
- (2) Ability to manufacture IMX-104 on a large-scale with consistent property and quality
- (3) IM compliant product to better safeguarding warfighters from unplanned stimuli while maintaining the basic performance of Comp B
- (4) Reduced cost from \$30.51 per pound to less than \$20.00 per pound, which was better than the program objective
- (5) \$118M cost avoidance and a Return On Investment (ROI) of 52.6:1

TIME LINE / MILESTONE

Start Date	January 2012
End Date	December 2013

FUNDING

U.S. Army ManTech	\$2.3M
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PARTICIPANTS

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