

Advanced Thermal Battery Production

Status: Transitioned

PROBLEM / OBJECTIVE

The military uses thermal batteries to power sonobuoys, guided artillery, missiles, guidance systems and countermeasure devices. The current cost of thermal batteries as well as manufacturing process problems limit the number of weapon systems that can be purchased and deployed. To improve the military's effectiveness without budget augmentation and to meet production requirements, thermal battery costs must be reduced and the manufacturing process and quality improved.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

The team headed by the National Center for Excellence in Metalworking Technology identified the cost drivers associated with manufacturing thermal batteries. Technologies that reduce costs and improve the manufacturing process and thermal battery quality were designed, manufactured, and implemented on the thermal battery that powers the Joint Direct Attack Munitions (JDAM) guidance kit. A cost model was developed, not only to identify the cost drivers, but to evaluate the implemented process improvements.

Implementation and Technology Transfer:

The following were implemented:

- A battery cell component-stacking device.
- Press features for improved die fill, reduced powder leakage, improved component quality, and increased production.
- A hopper system that provides mass powder flow for improved die fill consistency and component quality.
- Tooling materials and coatings for increased tooling life, reduced press down time, and improved component quality.
- A battery component removal and accumulation system to increase production.
- Feed shoe seal materials for improved wear resistance and reduced powder loss.
- A redesigned material feed system and tool set to improve material utilization and the assembly of cell components.
- Press and tooling set up procedures to achieve optimum component quality and throughput.



Expected Benefits:

- Process improvements resulted in potential savings of 22%, translating to cost avoidance of \$30M over a five-year period for the sonobuoy program and \$24M over the lifetime procurement of the JDAM, JSOW, and Paveway Program.
- The number of additional batteries that can potentially be requested as a result of increased production capacity is an extra 7,400 AN/SSQ-62E or 2,900 JDAM per month.
- After the first year of implementation, a 16% increase in production has been achieved. The production is expected to increase as the technologies are fully implemented into production.

TIMELINE / MILESTONE

Start Date: November 1999

End Date: September 2003

FUNDING

Total ManTech Investment: \$2.9M

Cost Share: None

PARTICIPANTS

- Eagle-Picher Technologies
- ENSER Corporation
- National Center for Excellence in Metalworking Technology
- Carderock Division, Naval Surface Warfare Center
- PMA-264 (Airborne Anti-Submarine Warfare Program)
- PMA-259 (Air-to-Air Missile Systems Program)
- PMA-201 (Naval Air Systems Command Program)