

Uniform Cannon Tube Profile Verification Program (PVP)

PROBLEM / OBJECTIVE

Tightening the tolerance on tank gun barrel straightness produces more consistent shooting performance from tube-to-tube; thus improving fleet accuracy and reducing the ammunition and engagement time needed to defeat the threat, as well as reducing the number of our tanks killed by return fire. Achieving tighter tolerances on the centerline contour would have been impossible without the ManTech funded Uniform Cannon Tube Profile Verification Program (PVP). The goal of this ATO-M was to develop and put in place an automated procedure (hardware and software) capable of uniformly reshaping all new production and fielded tank gun barrels.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

- A 20-fold reduction in the manufacturing tolerance for barrel straightness
- Obtained a 6-fold reduction in barrel straightness measurement time
- Achieved a 2-fold increase in the precision of barrel straightness measurements

Expected Benefits:

- Demonstrated a 52% reduction in center of shot impact (COI) variation across the fleet
- Gained a 15 point improvement in first round hit probability

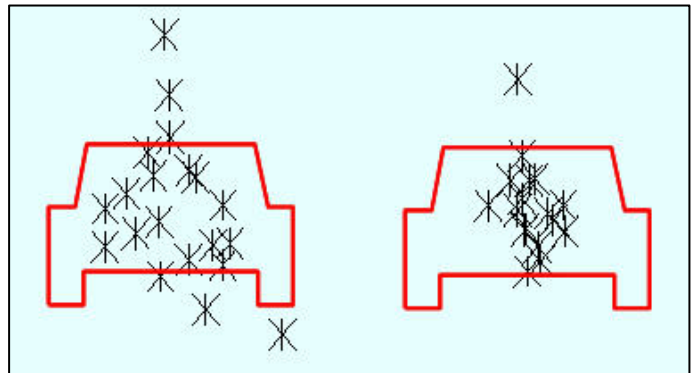
Implementation and Technology Transfer:

The PVP has been fully implemented at Watervliet Arsenal. This location is the sole point for the barrel work and employs 2 machines. The Arsenal is currently using the PVP in both U.S. Army Production and Reset barrels. To date:

- Approx 450 M256 (M1 tank) and 12 XM360 barrels have been processed
- Approx ¼ of the tank gun barrels in the active fleet have been reshaped. Fleet completion time is on track. Current projected completion time: FY12



M1A1 Abrams firing M256 120mm gun



Shooting Performance of 20 Cannon Tubes: Before vs. After Uniform Reshaping

TIME LINE / MILESTONE

Start Date: February 2000
End Date: September 2003

FUNDING

Army ManTech: \$7.4M
Cost Sharing: PM MAS: \$1.2M

PARTICIPANTS

U. S. Army Research Laboratory, U. S. Army Benet Laboratories, U. S. Army Test Center, U. S. Army TSM Abrams, U. S. Army Material Systems Analysis Activity, U. S. Army PM MAS, U. S. Army PM CS, U. S. Army Rock Island Arsenal, U. S. Army Watervliet Arsenal, U.S. Marine Corps, RAND, Anniston Army Ammunition Plant (ANAD)