High-Pressure Waterjet Stripping of Tracked and Wheeled Vehicles

Statement of Need

Some Army facilities, such as the Aberdeen Test Center (ATC), have been forced to cease all open-air abrasive blasting due to the generation of airborne particulates being exhausted into the environment, exceeding personal exposure limits (PEL) for blasting, and the high cost of air cleanup and control technologies. High-pressure waterjet (HPWJ) stripping will allow the ATC and facilities like the ATC to resume surface preparation operations, comply with environmental regulations, maintain a high degree of readiness (not dependent on outside contractors), and provide surface preparation for pretreatments. This technology will also help to eliminate hazardous airborne particulates resulting from blasting operations, decrease solid waste by 90 percent, and eliminate the use of chemical strippers.

The National Defense Center for Environmental Excellence (NDCEE) has been tasked by the Tank-Automotive and Armaments Command (TACOM) to prove the applicability and the methodology of using manual closed-loop high-pressure waterjet technology for paint removal and surface preparation for Army tracked and wheeled vehicles. Previous NDCEE coating removal tasks have evaluated and demonstrated HPWJ for:

- Efficient removal of chemical-agent-resistant and powder coatings
- Acceptable removal, surface finish, and coating reapplication on Army equipment and test panel
- Safe operations on submarine and surface ship hulls
- Naval shipyards.

This technology will be demonstrated and tested as a replacement for current open-air abrasive blasting conducted at field and depot activities.

Identified Alternatives

Waterjet stripping technology is being used by the U.S. Navy and commercial industry as an alternative to abrasive blasting for the removal of organic coatings. The U.S. Navy is presently using closed-loop waterjet technology to remove coatings from surface ships at Norfolk Naval Shipyard, Puget Sound Naval Shipyard, and Yakuska Naval Shipyard. Societies, such as the Steel Structures Painting Council and Waterjet Technology Association, have compiled visual standards for waterjet stripping of metallic substrates that correlate to abrasive blasting.

Waterjet technology applies to tracked and wheeled vehicles presently in the U.S. Army inventory. Three methods of stripping that are being tested include:

- Strip entire section with water only
- Strip portion with water; then, remove any remaining corrosion with abrasive injection
- Strip entire section with water and abrasive injection.

Demonstration and Justification

Vehicle stripping demonstration and testing have been completed at the NDCEE Demonstration Factory on a hull and turret from a Bradley Fighting Vehicle System, a High-Mobility Multipurpose Wheeled Vehicle (HMMWV), and a dump truck. Demonstration and testing are planned for completion on an M1 Abrams Main Battle Tank turret as well.

Implementation

Hand-held waterjet technology is planned for implementation at field and depot activities such as Aberdeen Proving Ground, Fort Shafter, Fort Hood, and Anniston Army Depot.

Follow-Up

Follow-on phases include construction of a portable, enclosed waterjet shelter, that will include a high-pressure pump and reclamation unit, and field demonstrations at three sites.

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Task Leader
Georgette C. Kotsagrelos
814-269-2699
kotsagre@ctc.com

IEC POC
Robert Zanowicz
IEC, Building 172
Picatinny Arsenal
New Jersey 07806-5000

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