



US Army TACOM TARDEC Fuels and Lubricants Research Facility (SwRI)



Investigation of Portable Oil Analysis for Army Application

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Problem and Objective: The Army Oil Analysis Program (AOAP) has been directed to reduce costs. Unit commanders need to know the readiness state of equipment and/or lubricants more quickly than the current AOAP system allows. The objective of this project was to investigate solutions for reducing the number of samples sent to AOAP for oil analysis by providing field personnel with devices that will help determine whether a sample needs to be submitted to AOAP.

Importance of Project: Oil testing in the field will be faster and more efficient for a more mobile battlefield. The goal is to reduce the number of used oil samples sent to AOAP for analysis by approximately 80%. It will also reduce the volume of used oil that AOAP must dispose.

Technical Approach: The approach was to develop the critical oil analysis requirements for diesel engines, turbine engines (M1), transmissions, hydraulic systems, and generators. A test plan for evaluating portable oil analysis devices with AOAP tests and standard ASTM methods in the laboratory and field would then be developed.

Accomplishments: A list was compiled of the major manufacturers of engines, transmissions, hydraulic systems, generators, and manual transmissions/final drives representative of Army ground equipment.

These manufacturers were contacted for their oil change criteria and for oil degradation and equipment condition. A list was compiled of the key parameters of used oil properties required for oil monitoring, component monitoring, or both. The rationale for identifying critical lubricant properties was included. The TARDEC market survey of portable oil analysis techniques was reviewed, and a suite of methods was recommended for evaluation. Also, a comprehensive test plan was developed for evaluating portable oil analysis devices with standard ASTM methods and AOAP results.

Military Impact: The establishment of the unit portable oil analyzers would increase vehicle and equipment readiness and enhance the following areas:

Tactical -oil testing will be faster and more efficient for a more mobile battlefield.

Logistics -Determine the useful life of lubricants and fluids and ease the logistics burden.

Environmental-Reduce the impact of used drained oil disposal, and used oil sample disposal.

Maintenance -Extend the useful life of oils and help to eliminate the erroneous use of oils and fluids and reduce maintenance cost.

Savings-Would provide a large reduction of samples sent to AOAP labs for full analysis and a reduction in sampling efforts.