Lubricant Evaluation Program Analysis

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ABSTRACT:

Unsubstantiated reports from Operation Iraqi Freedom led to a tasking for the Army Research Laboratory to evaluate and test the small arms lubricants currently in the Army system along with a list of candidates. After reviewing the required lubricant specifications and conducting pilot tests for designing the experiment, testing commenced. The test's goal is to produce qualified candidates meeting laboratory test specifications and performing comparable to currently fielded products, and adding those to the Qualified Product List (QPL). The experiment included simulating a desert environment using a silica flour as a sand surrogate, along with maintaining a constant temperature of 105 degrees Fahrenheit for the duration of the test. The analysis uses a method for recurrence data (recurrences are weapon failures) where the recurrence times may not be statistically independent. Specifically, the method develops a mean cumulative function (MCF), which represents recurrences for a population of systems (weapons). It facilitates simple nonparametric visualizations of the data, nonparametric confidence intervals for the MCF, and the ability to conduct a comparison of two samples of recurrence data.

KEY WORDS: Small Arms, Lubricant, Recurrence Analysis

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