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B-52 Drag Chute Suspension Line Failures: Determining Causal Factors Case Study

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The goal of the STAT COE is to assist in developing rigorous, defensible test strategies to more effectively quantify and characterize system performance and provide information that reduces risk. This and other COE products are available at www.afit.edu/STAT.

Executive Summary

A common goal of statistical tests is to determine which factors have a significant effect on a response. Design of experiments (DOE) is very useful for solving this type of problem. DOE begins early in the process and requires planning, design, execution, and analysis. This case study highlights this process regarding a problem with B-52 drag parachute suspension line repairs presented by the materials and textiles laboratory (MTL) within the Egress and Survival Branch, Materials & Textiles Laboratory (AFLCMC/WNU).

Keywords: DOE, planning, design, execution, analysis, significant effect

Introduction

In response to a mishap, a multidisciplinary tiger team was chartered to scrutinize the B-52 Drag Parachute to avert future losses. Initial research suggested there was large variability in the strength of repaired suspension lines. A repair guideline currently exists in task order (TO) 14D1-3-232; however, there is concern that the guide does not provide sufficient detail in the steps to repair the suspension lines. Only a small amount of information exists on why this guideline includes its current methods for repair. A primary goal of this experiment was to update the guideline to be more precise in the repair methodology and offer the best method of repair that provides maximal tensile breaking strength of the suspension line. The Egress and Survival Branch, Materials & Textiles Laboratory (AFLCMC/WNU) contacted the Scientific Test and Analysis Techniques Center of Excellence (STAT COE) for support in designing an experiment to characterize the breaking strength of the drag parachute suspension lines and determine the best method to update the repair guidelines.

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