

DISTINGUISHED ROUNDS A PROJECTILE COLOR COATING SYSTEM

Team Members: Jordan Gallegos, Ben Salcido, Sullivan Weibert, Dakota Livingston, Sam Grant



Background

Contract agencies have requested visually distinguishing identification features to decrease the potential of inadvertently mixing training and duty ammunition. Using practice ammo could potentially over-penetrate a target when fired, while duty ammunition is more expensive to produce and there is a distinct issue with wasting these rounds during training. Additionally, the cost of copper used to cover lead cores is ever increasing, so a coating that eliminates the need for copper plating needs to be applied to be economical and more cost effective.

Design Iterations

Enamel paints

- Extended application time and weak and clumpy adherence

Cerakote

- Smooth, aesthetically pleasing finish but brittle and weak adherence

Powder Coat

- Smooth finish and survives firing process with strong, ductile adherence

Coating Method

- Add powder and projectiles to tumbler
 - Tumble for 5 minutes
- Sift excess powder and transfer projectiles to baking surface
- Heat treat at 460° F for 5 minutes
 - Quench

Testing Processes

- Scratch Testing
- Live Fire
- Retrieval and Analysis

Objective

Create a cost effective color coating process for projectiles that is easily distinguishable, while also eliminating the need for the expensive copper jackets by preventing leading and bore fouling. Practice projectiles will be colored purple and duty ammunition will be colored black.

Requirements

Coating must:

- Survive being fired and prevent leading of the barrel
 - Have color identifiable from 10 feet
- Survive the heat treating process of the lead round
 - Survive the swedging process of rounds

Coating process must:

- Be cost effective and cheaper than copper
- Be quickly interchangeable between different colors

Conclusions

Powder coat is the best coating tested in terms of adherence, ductility, and surface finish.

The ideal tumble time is 5 minutes and the ideal powder weight to round weight is 5%.

Three coats is the minimum to survive fire testing with no lead showing.

Acknowledgments

Lead Instructor: Micheal Maughn
Grad Student Mentor: Paul Martin
Project Sponsor: Jeff Williams



Enamel



Cerakote



Powder Coat



Tumbler

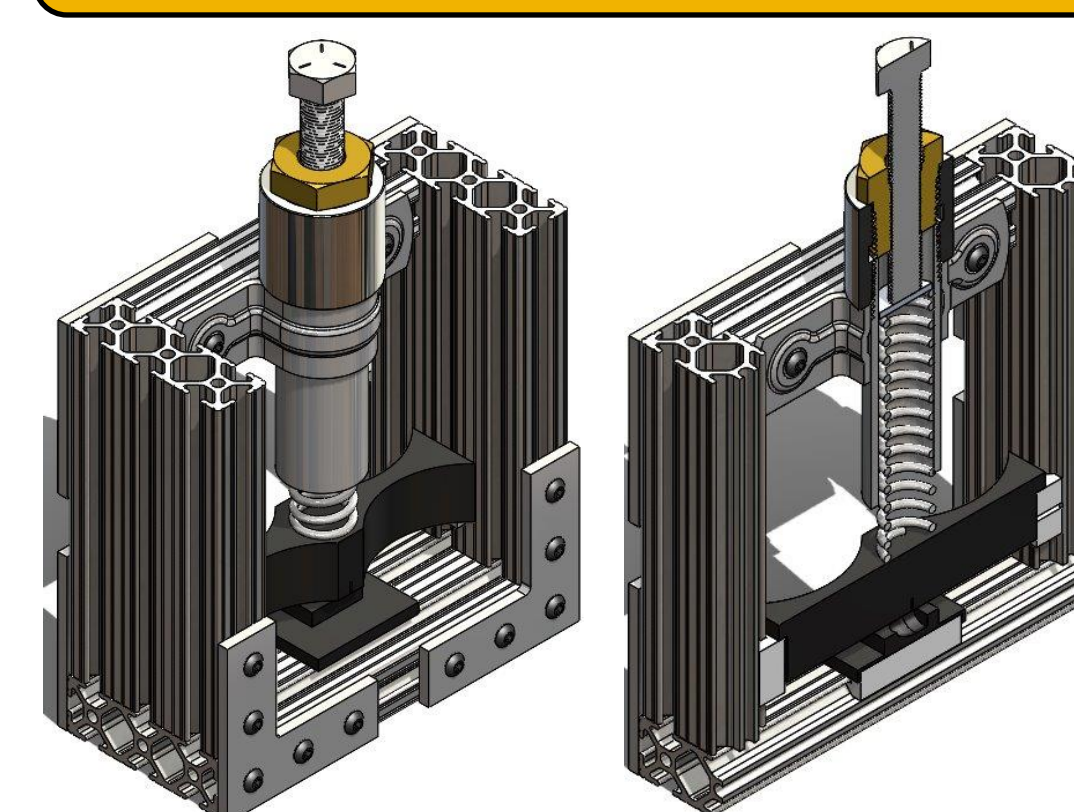


Sifting Mesh



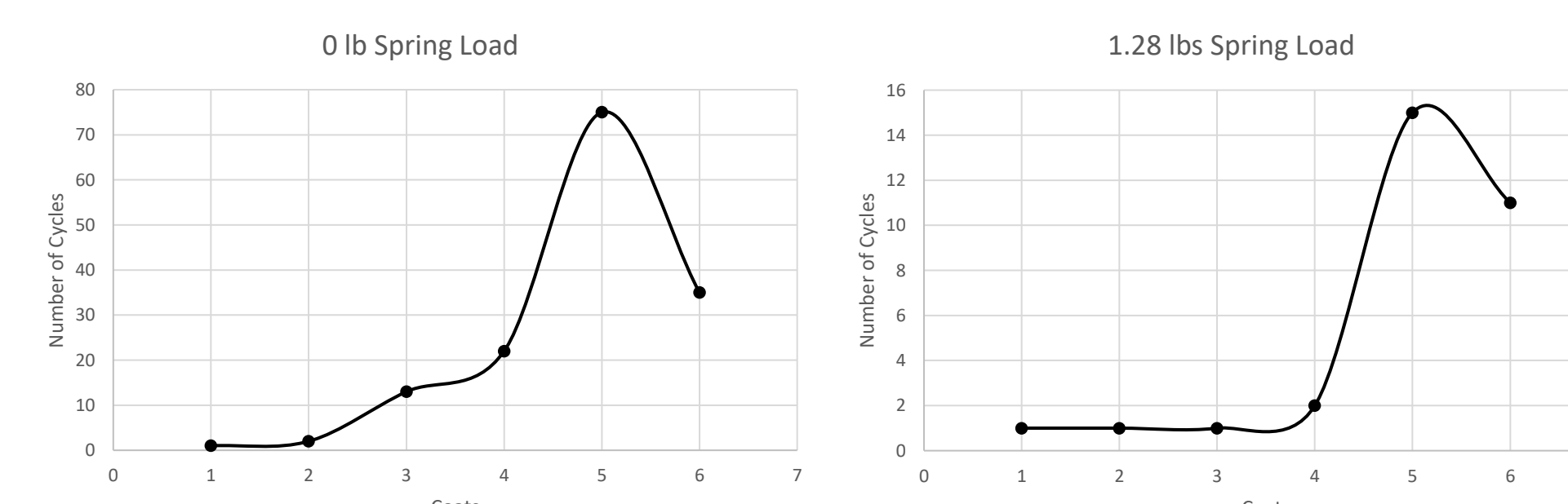
Oven

Validation Testing



Scratch Tester

Validation Data



Graphs show the number of cycles each round can endure before showing consecutive 3mm of lead based on the number of coats that have been applied



2025 Capstone Project