

MASTER OF SCIENCE IN PHYSICS

A METHODOLOGY TO MEASURE METAL EROSION ON RECOVERED ARMATURES

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Metal erosion on railgun armatures is a life-limiting mechanism for electromagnetic guns. A methodology to measure the eroded metal and to plot erosion contours on the armatures would be helpful for optimization and development of armatures. Such a method would help to correlate the eroded projectile mass with firing parameters. The object of this research is to develop a methodology to measure the metal erosion on recovered aluminum armatures from a test research facility. The armature surfaces were painted a uniform white. We measured displacements from a fiducial plane with a commercial optical displacement sensor. The armatures were positioned by a computer controlled XY translation table. Volume-loss contours were determined from the data. Most mass loss occurred on the lateral edges of the current-carrying surfaces of the armatures.

KEYWORDS: Electromagnetic Railgun, Electromagnetic Launch, Armature Erosion, Railgun Armatures

