Western Engineering

MME 4499 – Mechanical Engineering Capstone Project Proposal Document

Name of Sponsor	Meridian Lightweight Technologies

Title of Project

Design a magnesium drossing system to minimize the amount of magnesium while drossing and transferring the metal.

Brief Project Description

Magnesium, like other metals, forms magnesium oxide on the surface and bottom of the melt. This occurs when magnesium reacts with the air or environment, resulting in the creation of metal oxides. Some of these oxides float on the top of the melt (forming so called “dross”), while others and intermetallic particles settle at the bottom of the furnace (forming so called “sludge”). Both the oxides and intermetallic particles are considered impurities in the magnesium melt.

To remove these impurities, a dross spoon is used. The dross spoon effectively removes the dross on the surface and the sludge at the bottom of the furnace, but in the meantime, a significant amount of good (clean) magnesium melt is taken out as well. The objective of this project is to design a dross spoon that can efficiently remove dross and sludge without trapping good (clean) magnesium, thereby minimizing material waste.

Minimizing the good (clean) magnesium entrapped can have a significant economic impact to our business.

Desired Project Deliverables

- Following the design process, design a tool to remove dross and a tool to remove sludge without trapping excess magnesium metal.
- Create a CAD design of the tool(s).
- Manufacture and test the tools in Meridian Strathroy Operation.
- Analyze the saving of the new design(s).