The Future of Recycling Aluminum Intensive Vehicles

Team Members: John Loftus, Peter Nash, Brian Stapleton, Alexandra Barber, Luke Fronhofer, Wes Fischer

Advisor: Sean Kelly

Abstract

The integration of aluminum intensive vehicles has increased fuel efficiency and decreased the environmental impact of automobiles. Traditionally, steel has been the dominant material used in automotive manufacturing. Aluminum is becoming favorable over steel in some automotive applications because of its strength, light weight and resistance to rust. The flood of aluminum into the automotive scrap stream needs attention. Our project provides the automotive recycling industry with a strategy for the recycling of automotive aluminum. The strategy focuses on the dismantling “Pick N Pull” sector of recovery where components with high aluminum content are extracted for recycling. The recovery of aluminum prior to shredding will assist with alloy identification and sortation. The strategy reduces the need for shredded scrap separation. Currently, the process for separating shredded scrap aluminum is not effective enough to meet economic viability.

Results & Recommendations

- The extraction of aluminum intensive components of end of life vehicles was deemed profitable.
- Total Aluminum Scrap Content Value: $638.36.
- Recovery with the Engine: $526.88.
- Recovery without Engine Extraction: $404.23.

Methodology

- Obtained specific information about the truck.
- Identified aluminum intensive components.
- Research weights of components.
- Judged the extraction of Aluminum intensive parts.
- Estimated the potential return on investment.

Background

- Causation for integration of aluminum vehicles:
  - “A 5 to 7 percent fuel savings can be realized for every 10 percent weight reduction when traditional steel is replaced with aluminum in vehicles.”
  - “Aluminum structured hybrids achieve 13.5% better fuel economy than steel-bodied hybrids.”
  - AlV reduces vehicle mass 25% (vs. baseline) significantly reducing vehicle use phase energy consumption (20%) and CO2 emissions (17%).

Project Goal:

- The goal of this project is to give the automotive recycling industry a strategy for the recycling of aluminum.
- The strategy will be developed by the analysis of aluminum components on the 2015 Ford F-150. The accessibility of aluminum components for recovery and weight will be analyzed. Our project will conclude whether or not the disassembly of aluminum intensive vehicles prior to shredding contains a return on investment.

Citations:

- https://www.payscale.com/
- http://www.observationpost.com/