

Optimized Sorting & Separation Technologies for Remanufacturing with Product – Centric Recycled Reclaimed Scrap



Any of today's products are made of multiple materials making recycling/reclamation difficult. Coupled with shorter product lifetime, many materials are not being recycled. This work will focus on technologies that can be used to separate and sort metals in-situ (i.e. handheld technologies), as well as develop a fundamental understanding of remanufacturing with sorted scrap through use of modeling, and material-process-property relationships to predict properties of the remanufactured material, with scrap aluminum as the material of choice. The concept of design for remanufacturing will also be explored, with recommendations that would make future separating and sorting of metals easier. This work would have value not only to the military (i.e., the current US Army and USMC focus on "manufacturing at the point of need", and Office of Secretary of Defense Strategic Environmental Research and Development Program [OSD-SERDP] focus on expeditionary manufacturing using recycled, reclaimed and scrap materials), but also to the commercial sector as well, as new and useful means of utilizing waste and scrap would be researched. Focusing on aluminum is key, since it does not degrade during unlimited recycling, and is one of the only materials in the consumer and industrial waste stream that more than pays for its own recycling. This should be of interest to companies looking to save energy and money. Moreover, it has been reported that the concentration of aluminum in many landfills in the USA is higher than the concentration of aluminum in bauxite from which the metal is derived. Society also benefits by the reduced greenhouse gases, smog and acid rain produced by making products from recycled aluminum versus making products from bauxite ore, as well as reduced landfill needs. Not to mention a reduction in the caustic mud generated from mining that can contaminate water supplies.

Overview

The objective of this project was to conduct research and development of technologies, methods and processes for separating and sorting product scrap and waste comprised of multi-materials for remanufacturing.

Researchers

A. Gupta, B. Mishra