

Obsolete Scrap as a Feedstock for Recycling

3.2 Obsolete Scrap

Obsolete scrap—frequently referred to as post-consumer scrap—is any steel item recovered after reaching the end of its useful life.

Examples include steel recovered through the shredding of used cars and appliances, cans collected through curbside pickup or recycling centers, and structural beams or plates recovered from the construction or demolition of buildings and bridges.

Obsolete scrap is an extremely diverse category and presents a wide variety of challenges to recycling.

3.2.1 Municipal Waste Stream

The municipal solid waste stream contains a large amount of valuable steel scrap that is currently accepted in more than 90 percent of curbside and drop-off recycling programs. The vast majority of this scrap is from steel packaging.

Steel cans that are collected through curbside and drop off programs are transferred to Material Recovery Facilities where they are easily, magnetically separated from other materials. Steel from municipal waste can also be sourced from waste-to-energy facilities, where mixed wastes are incinerated as a source of energy, and the remaining, ferrous scrap can be magnetically separated for recycling.

Other sources of steel scrap, such as empty, steel aerosol cans, are being accepted in an increasing number of recycling programs. While, other, more challenged sources of steel scrap, such as box springs, electronics and furniture are still working to advance efficient solutions.

3.2.2 Appliances

Each year, approximately 90 percent of out-of-service appliances are recycled for their iron and steel content. This is due to the fact that appliances are simply too large to be landfilled. As a result, most appliances are collected by retailers as new appliances are delivered or by local, independent scrap haulers that collect ferrous materials for profit. According to the Association of Home Appliance Manufacturers the average appliance contains about 100 pounds of recyclable steel. Scrap processors collect refrigerants and remove any switches required by law, then appliances are fed into large shredders, which tear appliances into fist-sized chunks of material, where the ferrous portions are magnetically separated for recycling.

3.2.3 Automotive

More than 14 million tons of shredded steel are recovered in a typical year from shredded automobiles. Because they are nearly 60 percent steel, cars have become the most recycled product in the world.

Nearly 100 percent of out-of-service automobiles are sold to scrap processors for recycling. These scrap processors, drain the fluids, catalog and separate any reusable parts for resale, and then crush the remaining auto hulk to be fed into a shredder.

Like appliances, automobile hulks are fed into shredders, where in less than 45 seconds, they are reduced into fist-sized chunks of material. Ferrous material is again easily separated by magnets from the other materials.

3.2.4 Containers

Since 1988, when the North American steel industry first focused efforts on growing steel can recycling, the recycling rate for packaging has grown from 15 percent to now more than 70 percent of steel packaging recycled each year.

Steel packaging is now routinely recycled from residential, restaurants and institutional establishments alike. Cans, collected for recycling, are shipped along with other recyclables to a material recovery facility (MRF). At the MRF, the steel cans are magnetically separated from the other recyclables, crushed into large bales, and then shipped to steel mills or foundries for recycling.

3.2.5 Construction and Demolition Scrap

Construction is the largest, general market for steel. Likewise, at the end-of-life these steel structures become the largest general source of steel scrap. The construction market embraces a wide variety of applications from light-gauge framing and reinforcement up to large skyscrapers, bridges and other infrastructure, including oil rigs, pipelines, culverts and water transmission. Demolition contractors well understand the economics of recycling and actively build the recycling of steel scrap into each project. As a result, more than 95 percent of large, structural steel is captured for recycling each year. Some structural, such as that in underground pilings can be difficult to recover for recycling.

Rebar is a common example of reinforcement steel and is integral to concrete flooring and providing structural integrity to other supporting materials.

The recycling of these support materials is reliant upon the recycling of the surrounding material. Steel rebar is collected for recycling as concrete is chipped or processed for recycling. As a result, the recycling rate for support steel is typically around 70 percent.

3.2.6 Opportunities for Growth

Even while steel is the most recycled material in the world, there is still opportunity to collect even more scrap. Tremendous developments have taken place in scrap processing that utilize computerized separation technology, providing a wide variety of options.

Parallel with these advancements, work continues to attract traditionally “challenged” sources of steel scrap—steel scrap that is trapped, or attached, to other materials or was difficult for traditional materials.

Examples of sources of steel scrap that are becoming increasingly available to the steel industry are steel belts and wires from recycled tires, mattress springs, used oil filters from homes and shops, spring and mechanical assemblies from furniture among others. As these sources of steel scrap are becoming efficiently separated and the grades of steel are sorted appropriately, these sources will also be readily recycled by industry steel furnaces.

The Institute of Scrap Recycling Industries annually publishes a scrap circular which details the types of steel that are permitted within each type of scrap bale.