In love with aluminum recycling

Pull up a chair and find out why Secat’s Subodh Das is smiling

NEW YORK — An unhealthy trend in aluminum recycling came about as industry mergers closed laborator- ries designed to improve technologies, according to a researcher who wants to help pick up the slack.

With U.S. production of primary aluminum waning, it is incumbent on recyclers to step up the efficiency of secondary production, according to Subodh K. Das, a metallurgist and president of Secat Inc., which has 15 scientists at work at Secat’s University of Kentucky headquarters in Lexington.

Prior to the start-up of Secat in August 1999, Das had been vice president of research and development at Arco Aluminum Inc., a can sheet producer in Louisville.

The new organization began as the Southeast Center for Aluminum Technology but the acronym—Secat—was chosen to recognize a wider industry region.

“The U.S. industry basically went away from mining bauxite and refining alumina with a couple of exceptions. In fact, the number of primary smelters running now stands at just 12 or 13,” Das said. “The economy is based on a nation of consumers. We can either light it or go with the wind. With the high costs of power and labor, any smelting facilities aren’t going to be economic. The last U.S. primary smelter was built in 1979 in Mt. Holly, S.C.”

A nation of consumers, the United States possesses a wealth of such materials as used beverage cans (UBCs) and scrapped automobiles, while nations with production-based economies ship materials here. The recovery of available materials thus ought to be a U.S. strong point, Das said.

“Our technology must be strongest when it comes to recycling and remelting,” he said. “Alloys must be made that are the friendliest to recycling. Most specifications unfortunately were based on primary metal because that’s where we made 50 years ago. To make the purest aluminum, we took impure bauxite and went through the steps to make it so—silicon, manganese, magnesium—and the costs today of those items are rising more than aluminum is.”

Das said the most cost-effective processes must be used in manufacturing; market share must be increased by creating the most “market-appealing” product available; and the most efficient recovery of those materials has to take place at the end of their lives. The secondary industry has to ask itself if a specification exists because a product requires it, or because that’s what incoming scrap traditionally contained. Needless specifications should be discarded in favor of attributes worthy of doing the job, and that is why new alloys would be developed.

“There were so many mergers and acquisitions. When company A bought company B, we heard first that the research facilities of the acquired company vanished. The lab went away but the need didn’t,” he said. “How can we get our law- makers and public at large to see the lack of recycling as a threat to national economic security and a way to cut our trade deficit with China? Scrap going to China is coming back in as finished goods in Wal-Mart, further upsetting our trade imbalance.”

He maintains that the true incentive for recycling domestically must be economic development, including the creation of additional employment.

He said that the true value of aluminum scrap was recognized and put to best use, “all of a sudden we have discovered an urban mine, we have found the purest form of bauxite available. That is how we can compete.”

The recycling of UBCs entails what Das considers an unnecessary cost, the addition of magnesium because it has a lower melting point than aluminum and is partially lost. A pioneering effort in the 1970s to develop “uni-alloy” did not last, Das said.

A single alloy for all aluminum can components—bodies, lids and tabs—would make UBC recycling more economical, he said. “That would minimize the need for magnesium and make cans more scrap-friendly.”

The two most powerful aluminum recycling loops—automotive and can sheet—exist separately. But according to Das, ways could be found to combine the streams.

A native of India, Das came to the United States in 1971 and earned a doctorate in metallurgy from the University of Michigan, Ky., home of Lexington, with Secat setting up a “consumer behavior and study lab” at the University of Kentucky’s material recovery facility (MRF). Since aluminum is only 2 percent of the waste stream but generates 20 percent of the revenue, Secat’s goal is to help recyclers maximize its efficiency at the MRF. Resulting programs would be available for implementation elsewhere, Das said.

Waste composition studies from key demographics will be carried out to identify the source pathway R&D: escaping into the landfills,” he said. “The key demographics can be targeted individually to improve the recycling rate.” For example, if rates were determined to be particularly low at college and university campuses, recycling information and container locations could become part of an incoming freshman’s information packet.

But for researchers need to better understand the reasons for low UBC recycling rates. The United States is one of the world’s largest consumers of aluminum cans, also is one of the largest disposers, with billions of cans going into landfills every year. He said that data provided by the Aluminum Association indicated recycling rates of some 95 percent in the U.S. transportate and construction sector last year compared with just 51 percent for UBCs.

Called UBC recycling “the one dark spot in the otherwise promising outlook for sustainable development in the aluminum industry.” Secat has been a partner in a number of large projects with the U.S. Energy Department’s Office of Industrial Technologies.

One project was set up to increase melting efficiency by 25 percent in the U.S. reverberatory furnace. Another project aims to reduce ingot scrap by developing advanced models leading to improved cast consistency and quality.

The processes at Secat are “unusually extremely successful,” and for Arco it’s our R&D,” Franq said. “There is shared research, funding of all participating companies, and each company also can arrange for proprietary research elsewhere.”

Some of the sophisticated work is done in coordination with the national laboratories (Argonne in Illinois, Oak Ridge in Tennessee and Albany in Oregon).

“What’s happening at Secat with aluminum can be a blueprint for other industries who want to do,” Franq said. “The topic of aluminum and sustainability computing has been disseminated as widely as it needs to be.”

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