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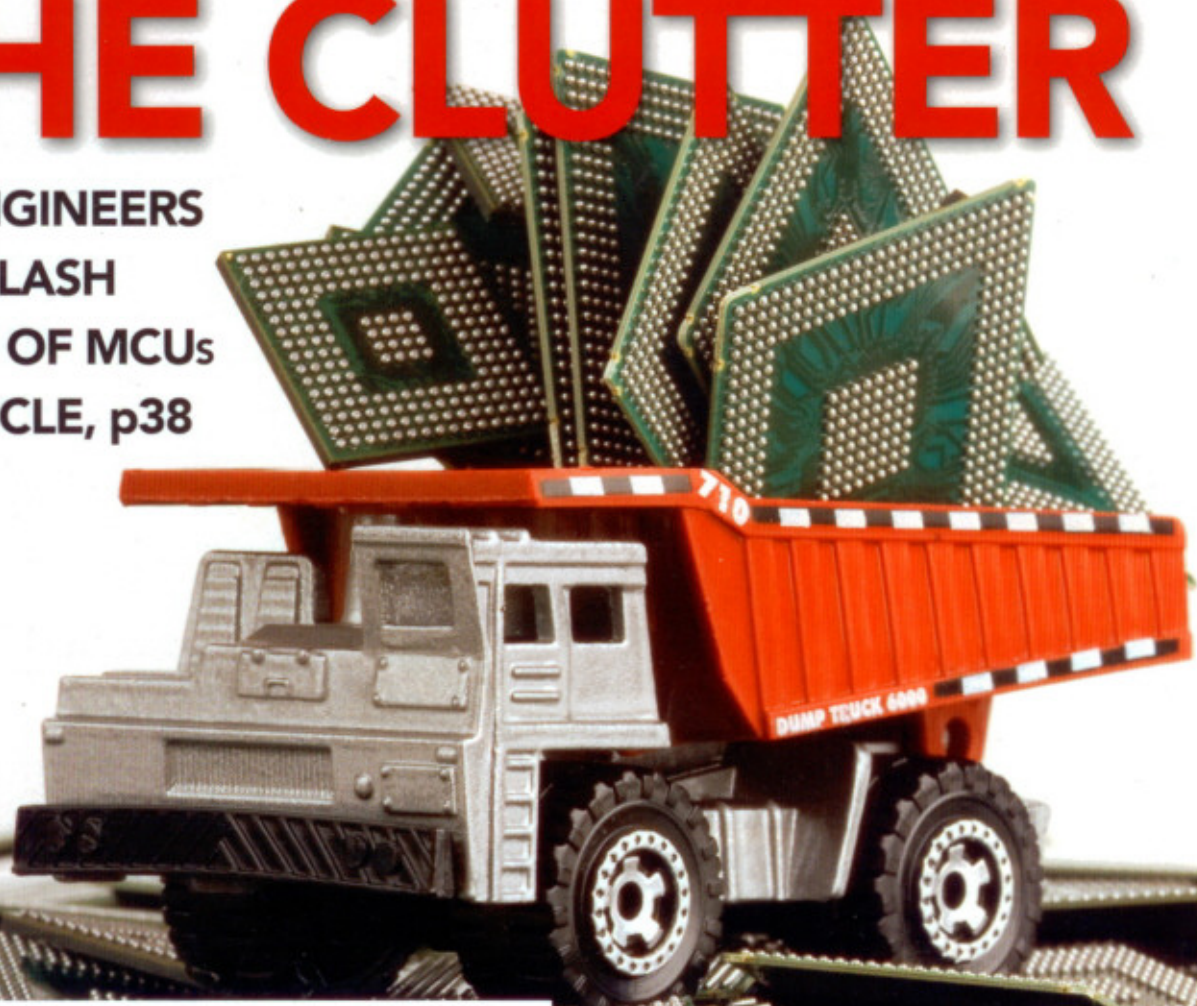
- » BASIC EE DEV KITS  
Summer fun for kids, p31
- » BIKE BUILT FOR A FLEA  
Using small-wire EDM, p34
- » INTEL'S XEON 5500  
Fires up workstations, p42

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## HAUL OUT THE CLUTTER

AUTO ENGINEERS  
AIM TO SLASH  
NUMBER OF MCUs  
PER VEHICLE, p38



**Plus**  
BOEING'S DELAYS:  
SURPRISE OR  
PREDICTABLE? p44





# SCC Allows Recycling of Tungsten Heavy Alloys

One of the densest metals is downsized into controlled particle sizes

**A**erojet Ordnance Tennessee, a wholly owned subsidiary of aerospace and defense contractor Aerojet General, fabricates parts from tungsten heavy alloys and other refractory metals for defense-related products like ammunition, warheads and electronic shielding.

Tungsten heavy alloys are one of the densest metals produced. Reclaiming fabrication scrap was difficult and costly, prompting Aerojet to sell the scrap at significantly lower prices than it was worth as a recycled and reusable material.

The alloys and other refractory metals Aerojet works with are like ceramics in that they do not melt, but are compacted from powder into shapes and sintered to full density, after which they are machined and finished. Scrap is generated as a result of compaction, of sawing of large blocks, and other process scrap.

Aerojet experimented with techniques to reclaim tungsten heavy alloys scrap. These included using a hammer mill and manually downsizing pieces. None of the methods was efficient or produced consistently sized particles. A hammer mill's crushing, pulverizing action isn't effective with a material of this density and generates dust. With manual reclaim, "labor costs were prohibitive and the results uneven," says Tim Brent, project engineer. Aerojet, consequently, wound up selling the scrap to dealers.

"If we can reuse the material it's worth two- to three-times more to us than selling it as scrap," says Brent. "But we couldn't reuse the material without an effective means of size-reduction."

**Application:** Tungsten heavy alloys scrap is downsized into uniform particle sizes after compaction from powder and sintering.

**Customer:**  
Aerojet Ordnance Tennessee Inc.,  
Jonesborough, TN

**Lead Design Engineer:** Timothy Brent

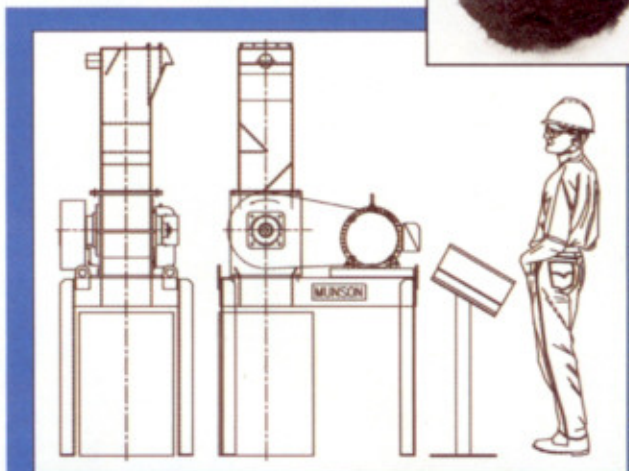
**Brand Name:**  
SCC Screen Classifying Cutter

**Key Benefits/Features:** Design is said to generate six times greater force per inch with each cut than conventional knife-type cutters of equivalent horsepower, contributing to uniform size reduction.

**URL:** <http://www.munsonmachinery.com>



Timothy Brent  
Aerojet  
Ordnance  
Tennessee



The Screen Classifying Cutter, above, features a helical rotor with tungsten carbide-tipped teeth attached to an array of interconnected parallelograms, creating a steady and even cutting action against a pair of bed knives. Top, the cutter downsizes tungsten heavy alloys scrap (2.5 times the density of steel) into powder for reuse in the compaction process.

SOURCE: MUNSON MACHINERY CO. INC.

After testing the performance of several size-reduction machines, comparing particle sizes, consistency and economy, Aerojet decided on an SCC 15 Screen Classifying Cutter from Munson Machinery Co. Inc., Utica, NY. "The design is simple and stands up to the tungsten heavy alloys," says Brent.

The cutter is engineered to downsize hard materials like tungsten heavy alloys into controlled particle sizes with few fines and no heat buildup. Key to its efficiency is a helical rotor with dozens of tungsten carbide-tipped cutter heads attached to an array of interconnected parallelograms that creates a steady and even cutting action against a pair of bed knives with each turn of the rotor, which yields particle uniformity. Most cutters and granulators, by contrast, have rotors with a smaller number of angled blades that deliver scissor-like cuts and tend to wear. The helical rotor efficiently moves material to take full advantage of the screen area, preventing "hot-spotting."

The rotor design is said to generate six times greater force per inch with each cut than conventional knife-type cutters of equivalent horsepower, contributing to uniform size reduction and reduced energy use.