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Ideas At Work
Precision Machined Products Association

Trends In Copper And Brass

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Copper is selling for $3.70 per pound at the time that I am writing this in mid-September. Thefts of copper materials from homes, businesses and utilities are lead stories and front-page news on television and in the newspapers—even in the Wall Street Journal.

There are many ways to interpret today's high value of copper and copper-containing metals, as I recently learned at the Copper Development Association's Global Trends Conference in Chicago. High prices for copper and copper-based metals create several commercial issues for us as "middlemen" between the raw material suppliers and our OEM customers who purchase our precision machined products. Yet, there are different interpretations of the impact, giving companies in our industry different strategies for success as we face the chronically increasing prices.

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"High prices are a rationing mechanism." That's according to Jon Barnes of CRU Group. He states, "These prices ensure that copper goes to those applications where it is the best choice." Mr. Barnes' talk in Chicago addressed substitution and economization of copper in light of today's high-demand, high-price and tight-supply market. His point was that it's not the high price of the copper itself that is the problem as much as it is the differential between copper and candidate materials for possible substitution, such as aluminum.

A growing gap between copper and aluminum prices will drive customer efforts for substitution. Mr. Barnes used the example of automobile radiators manufactured between 1964 and 1974, when a persistent price differential between copper and aluminum drove the replacement of copper with aluminum in most automobile radiator applications.

According to Mr. Barnes' analysis, the two applications currently most at risk for substitution appear to be copper plumbing tubes and telecom cable. The forecast for copper in the year ahead shows that demand will hold; supply is not expected to grow substantially; and metal stocks will decrease. (Who wants to hold expensive inventory when its value falls?)

Based on the facts that Mr. Barnes and others provided, it seems clear that most scenarios for the next 12 months are unlikely to have a significant weakening in the prices of copper-based materials.

Diminishing section. For many applications, copper is the material of choice. However, increasingly volatile and elevated prices drive a reaction, even for those applications where a direct substitute isn't possible. The connector market illustrates how "diminishing section" has been applied to copper products. I believe that we will continue to see this in the shrinking size of copper-based precision parts.

"The use of fine-pitch connectors resulted in the reduction of 96 percent of copper mass used in the applications," says Ken Fleck of Fleck Research. Mr. Fleck showed several tables comparing component counts and mass for various styles of electronic connectors.

This transition to ever-smaller connections illustrates the value that smarter design, engineering and improved capability of manufactur-

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Copper and Brass....continued

ers' processes can have to reduce "a large portion of the material value" in the application. The move of the electronics industry from parallel to serial interfaces has reduced the count of copper connector pins from 40 to 6—an 85-percent reduction—just by reduced connector pin count per connection. Ever-smaller designs for such connections further reduce the mass of copper metals required.

On the drawing board.
The copper industry is concerned about the loss of residential copper tubing to oil-based polyethylene tubing. More than 1 million tons of copper tubing are used annually for residential water service. Among the ideas discussed are reduction of the tubing diameter from 1/2" to 3/8" diameter while maintaining the needed gallons-per-minute of flow; inter-groove finishing of the tubing ID, which helps increase flow, reduce turbulence and helps reduce tubing mass per foot; and reduction of wall thickness to ameliorate the continued high cost of metal.

Barriers to changing wire gauge in a home's electrical service include building codes and electrical standards that are already in place.

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However, the use of low-voltage control circuits and relays, as well as blue tooth and other wireless strategies, are also being discussed as a means to help minimize the amount and expense of copper in essential applications.

Lessons learned for the precision machined products industry. The high copper prices that we are experiencing don't appear to be going away anytime soon. That's because of high global demand, tight supply and copper's unique thermal, electrical and mechanical properties. While copper's unique properties may make direct substitutions difficult, if not impossible, aggressive engineering and design discipline are capable of delivering the same functionality and performance, while reducing the size or mass of the copper components.

Less mass means smaller overall dimensions, greater precision for machined features and, perhaps, complete substitutions or consolidations of part type (as in the transition from serial to parallel connectors).

Smart shops will be working with both their suppliers and customers to communicate how their precision machining capabilities can help deliver fully functional parts of reduced dimension and mass. That's one solution to the present and future of high copper demand, tight supplies worldwide and

Technical Member Profile
FISCHER Special Tooling Corp.

When the Howard H. Fischer Company was founded in 1957, carbide tooling was still relatively unknown. The Mentor, Ohio-based tool and die shop focused on the unique tooling material and soon made its mark as a specialist in custom carbide tooling.

Through the years, the company honed its reputation as a leader in precision tooling by expanding into tool steels and exotic materials. "Our strength has always been in high-performance, high-precision, customized tools," says company president Kevin Johnson. "We give managers of precision machining firms peace of mind by providing them with thoroughly engineered, finely crafted, special tooling in a timely fashion."

Five years ago, the company changed its name to FISCHER Special Tooling Corporation to better reflect its product offering. "A lot of times, we would get requests for generic, commodity-type items, which is not what we do," says Mr. Johnson. "We work with our customers to develop tools for specific applications, and we offer a high level of service, especially from an engineering standpoint."

Precision machining manufacturers have come to know the ISO 9001:2000-registered company for its form-cutting

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