

PROCESS TECHNOLOGY

Hard coating on carbide enables cutting aerospace alloys

Machining aerospace-type components made of stainless steels, high-nickel, high-cobalt, and titanium-base alloys can be improved with the 4E Turning Geometry cutting tools from ATI Stellram, Lavergne, Tenn. Available in grade SP0819, the inserts have an approved aerospace substrate, and they are enhanced with a nano-TiAlN coating applied via physical vapor deposition.

The combination of a hard coating with micro-grain carbide substrate improves heat and wear resistance in high-temperature alloy machining. This enables longer tool life and higher productivity. The chipbreaker profile with positive cutting action reduces edge buildup, leaving a smooth surface finish and enabling closer dimensional tolerances.

For more information: ATI Stellram, an Allegheny Technologies Co., One Teledyne Place, Lavergne, TN 37086; tel: 615/641-4206; www.atistellram.com.



Rotary hearth furnace reheats large welded tubular products

The Linde Group has converted a rotary hearth furnace for billet reheating, on a turnkey basis, for ArcelorMittal Shelby – Tubular Products, Shelby, Ohio. The company needed to boost the seamless tube mill output for larger billet dimensions while minimizing costs for energy and maintenance. The formerly air-fuel-fired furnace was equipped with a Rebox oxyfuel solution, including flameless technology. The conversion was made in two steps, first using oxygen-enrichment for a short period of time before implementing of the flameless oxyfuel operation.

Excellent results have been achieved, including a 25% increase in reheating capacity and a 50% reduction in fuel consumption, fulfilling the performance guarantees. Moreover, temperature uniformity has been improved, producing better piercing results. Scale formation was reduced by 50%, and the emission levels of NO_x and CO₂ have also been significantly minimized.

Oxyfuel will further improve important parameters such as fuel consumption, throughput capacity, and emission levels. Compared to air fuel solutions, oxyfuel can boost production throughput by up to 50%, as well as reduce fuel consumption and CO₂ emission by 50%.

For more information: Linde Gas North America LLC, 575 Mountain Ave, Murray Hill NJ 07974-2082; tel: 908/464-8100; fax: 908/771-4775; <http://www.us.lindegas.com>

Laser contouring system boosts cost savings for steelmakers

A high-speed, laser-based technology that measures refractory lining thickness of furnace vessels for manufacture of steel, copper, and aluminum has been developed by Process Metrix and the American Iron and Steel Institute with support from the U.S.

Industrial Technology Program. The Laser Contouring System (LCS) has a laser scan rate of more than 8000 points per second, and provides exceptionally detailed contour resolution and accurate bath height determination. Moreover, measurement time ranges between one and six minutes, or ten times faster than prior units. Quick, online feedback eliminates downtime costs due to inspection and unnecessary relining, lengthens equipment life, and ensures operational safety. Cost savings for manufacturers are estimated to be \$500,000 to \$1 million per year.

The system is available in both mobile and fixed-position platforms. Mobile platforms are typical in applications where multiple vessels must be analyzed with a single instrument. Fixed-position systems are for ladle applications or any situation in which the vessel is brought to the instrument. Currently, 30 units of the LCS are in operation worldwide. In addition to several installations in the United States, the system is also in China, Korea, Germany, and Mexico.

For more information: Process Metrix, 6622 Owens Drive, Pleasanton, CA 94588-3334; tel: 925/460-0385; www.processmetrix.com.



BRIEFS

ABP Induction LLC and **Pillar Induction Co. LLC** have combined their operations into **ABP Induction LLC**. Both companies are owned by **CM Acquisitions**, a Chicago-based investor. www.abpinduction.com

BCC Research reports in *Welding Equipment And Supplies: The Global Market (AVM040b)* that the global market for welding equipment and supplies will be worth \$13.2 billion by the end of 2008. It is expected to increase to \$16.8 billion by 2013, a compound annual growth rate of 5.0%. www.bccresearch.com

The **European Powder Metallurgy Association** has launched a new blog site called the Powder Metallurgy Forum, designed to act as an impartial medium for equipment makers, powder producers, suppliers, and end-users. www.powdermetallurgyforum.blogspot.com

The **Gases Division of the Linde Group** announces a breakthrough process for steel strip gas wiping with nitrogen. It reduces nitrogen consumption by up to 50%, and significantly improves surface wiping quality in continuous strip annealing and galvanizing lines compared to conventional solutions with air. www.linde.com

IDI Composites International has formed a team to help molders and OEMs to convert from aluminum and zinc die castings to high-performance thermoset composite materials, to reduce cost, raise efficiency, and improve performance of products.
www.idicomposites.com

Kay & Assoc., Simsbury, Conn., will hold *Brazing Fundamentals* courses September 16-18 (Greenville, S.C.) and November 18-20 (Hartford, Conn.), and a *Brazing Aluminum* course October 22-23 (Hartford).
www.kaybrazing.com.

Makino has premiered a weblog for all electrical discharge machining (EDM) users. The blog will cover topics such as EDM technology, machine design, consumables, and other topics.
www.EDMmatters.com

The **Metal Powder Industries Federation** has launched an e-learning program. The online courses on various aspects of powder metallurgy are designed to help companies involved in any phase of the PM industry with their workforce training requirements.
www.mpif.org

The **North American Die Casting Association** reports that the industry was sluggish in 2007, but it may be poised to rebound in the years ahead. According to the State of the Industry report, economic changes in China and new business models may improve sales.
www.diecasting.org

Nucor Corp. plans to construct a sheet and coil processing center in Mexico to better service the growing needs of its customers. Nucor anticipates that the new facility will have an annual capacity in excess of 500,000 tons.
www.nucor.com

Rio Tinto Alcan has begun development of the next generation of its AP Technology series. Called AP-Xe, the technology could reduce energy consumption by up to 20%.
www.riotinto.com

Wisconsin Oven has designed and manufactured two electrically heated conveyor ovens to relieve hydrogen embrittlement on locking wheel lugs at a maximum production rate of 1600 pounds of parts per hour for each oven.
www.wisoven.com

Electric field stabilizes surfaces in structural metals

A strong electric field can stabilize the surface of metals and other solids that conduct electricity, inhibiting the formation of cracks caused by stress, reports the University of Massachusetts Amherst. This innovation could improve the function and reliability of aircraft, electronic devices, and medical transplants.

In metals and other crystalline solids that conduct electricity, stress is generally concentrated on the surface of the material. Stress also builds up at interfaces where two types of material are joined. The study shows that the action of an electric field, properly applied while a material is under stress, can stabilize the surface or interface, inhibiting the formation of cracks and healing cracks that have already started.

The electric field improves crack resistance by causing atoms on the surface of the material to migrate when hit by the flow of electricity or "electron wind," a process similar to sand grains being blown across a beach. When properly applied, the electric field stabilizes the surface of the stressed solid by transporting material to different areas.

For more information: Prof. Dimitrios Maroudas, University of Massachusetts at Amherst, Amherst, MA 01003; tel: 413/545-3617; maroudas@ecs.umass.edu; www.umass.edu.

Pulsed DC current compacts powder parts at low temperature

An ultra high-speed, low-temperature compaction/sintering process has reportedly been developed by Thermal Technology LLC, Santa Rosa, Calif. Called Spark Plasma Sintering (SPS), it is similar to hot-press technology, but instead of radiant heat, high-amperage pulsed DC current is passed directly through the material, producing unique particle bonding.

Benefits of SPS include single press, full-density capability; controllable porosity; exceptional grain growth and microstructure control; wet and dry phase sintering and bonding; high homogeneity; net and near-net-shape powder-to-part processing; functionally graded materials; ease of operation; and low operational cost.

For more information: Patty Mede, Thermal Technology LLC, 1911 Airport Blvd., Santa Rosa, CA 95403; tel: 707/571-1911; raalund@thermaltechnology.com; www.thermaltechnology.com.

Vacuum brazed titanium could build lightweight strong structures

Vacuum brazing of titanium and the effects of changes in brazing alloys and brazing process conditions have been studied at the Army Research Laboratory, Adelphi, Md. The knowledge gained in this study is intended to contribute to development of capabilities for fabricating titanium structures in circumstances in which parts cannot be welded because access is limited or adjacent nonmetallic components would be damaged.

Panels comprising commercially pure pyramidal frame cores sandwiched between commercially pure titanium face sheets were brazed in a process that included a multistep thorough cleaning, application of a zirconium-rich titanium brazing paste/tape to the face sheets, stacking the face sheets to the cores (with the brazing paste/tape faces in contact with the cores) in the sandwich configuration, and heating in a vacuum furnace at about 900°C (1650°F) under a deadweight equivalent to a pressure of 50 kPa (7 psi).

Success was achieved in bonding pyramidal frame cores with the face sheets by the zirconium-rich titanium brazing paste/tape. Different brazing alloys may result in bonds of similar or greater strength at lower brazing temperatures, thus eliminating risks of creep and of degradation of properties of the titanium parent material.

For more information: Kevin J. Doherty, Army Research Laboratory, Adelphi, MD 20783; tel: 410/306-0871; kdoherty@arl.army.mil; www.arl.army.mil.