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# News From Institutes and Research Centers Around the World

This column is a forum to inform the thermal spray community on current activities in institutes and research centers active in the field of the thermal spray. Research efforts carried out in these organizations are oftentimes the starting point of significant developments of the technology that will have an impact on the way coatings are produced and used in industry. New materials, more efficient spray processes, better diagnostic tools, and clearer understanding of the chemical and physical processes involved during spraying are examples of such developments making possible the production of highly consistent performance coatings for use in more and more demanding applications encountered in the industry.

This column includes articles giving an overview of current activities or a focus on a significant breakthrough resulting from research efforts carried out in institutes and research centers around the world. If you want to submit an article for this column, please contact: Dr. Jan Ilavsky, UNICAT, APS Bldg 438E, Argonne National Laboratory, 9700 S. Cass Ave., Argonne, IL 60439; tel: 630/252-0866; fax: 630/252-0862; e-mail: ilavsky@aps.anl.gov.

## Thermal Spraying at CSM

CSM (Centro Sviluppo Materiali, i.e., Material Development Centre) is a private research company, owned by a pool of Italian and foreign industrial companies—among them steel makers, mechanical and aerospace industries, ship builders, ceramic materials and components producers. Shareholders are the main, but not the exclusive, customers of CSM. The Centre is located near Rome (I); it employs 350 people, 60% graduated, and it is involved in the research and development of metallic and ceramic materials and related production processes.

A surface engineering group within CSM consists of 16 people and is devoted to finding solutions of industrial problems related to surface modifications. One task is to identify the best solution in terms of coating materials and deposition technologies. These identified solutions are tested and then validated by manufacturing of demonstration components in actual customer conditions. For this reason, all the equipment of this group is on a pilot plant scale. The deposition technologies are concentrated in the PVD (physical vapor deposition) and thermal spray laboratories.

The PVD equipment allows investigation of all the variants of this technology: electron beam, arc, and magnetron sputtering.

The thermal spray equipment of the surface engineering group consists of:

- The CAPS (controlled atmosphere plasma spray) system, manufactured by Sulzer Metco. This system (Fig. 1), consists of a 80 kW plasma torch installed in a 7 $m^3$ vessel; the spray atmosphere of which can be controlled in terms of pressure (in the range 10-4000 hPa) and composition (i.e., air, argon, or nitrogen). The possibility of operating under pressures higher than 1 atm allows investigation of a wide range of innovative deposition conditions. Such a system is currently available in only three other laboratories around the world. The use of the CAPS equipment is shared by the Rome University "La Sapienza" and CSM on the basis of a scientific collaboration agreement; and
- The HVOF (high-velocity oxygen fuel) JP 5000 system, produced by Tafa.

An important asset of the surface engineering group is the powder production facility. This makes it possible to produce small batches (limited to less than 50 kg) of powders, suitable for thermal spraying. Therefore new spray materials, not available from suppliers, can be developed in-house and tested for industrial applications.

The main component of the powder production facility is the gas atomization unit, designed to provide optimal powder quality in terms of chemical purity, particle size (from 10 to 80 μm), and spherical shape. The system is equipped with a vacuum induction melting furnace of 50 kW, and it is capable of melting on one load up to 10 kg of steel. This unit has been used to produce specialty metallic powders, with compositions being either pure metals or alloys. The base metal can be selected from a number of commonly used metals, for example, aluminum, nickel, lead, iron, zinc, copper, and so forth.

Spherical ceramic powders, with average grain size of about 50 μm, can be obtained by an agglomeration of commercial materials using a pilot scale spray dryer.

The surface engineering group includes also the tribology laboratory, which characterizes the wear resistance of the coatings under very different operating conditions (e.g., Fig. 2).

The main research activities carried out by the CSM surface engineering group in the field of thermal spraying are:

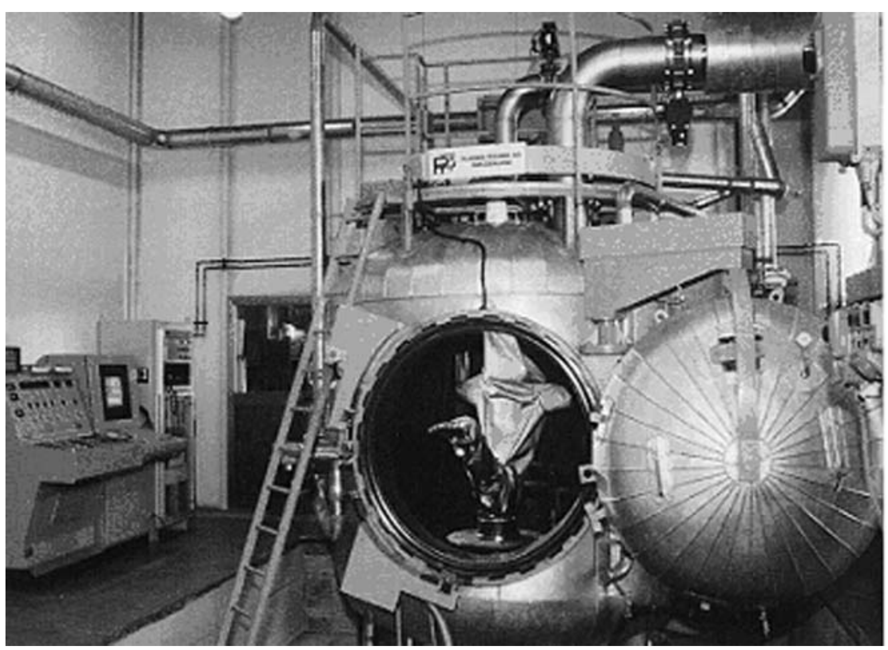

**Fig. 1** Controlled atmosphere plasma spray equipment

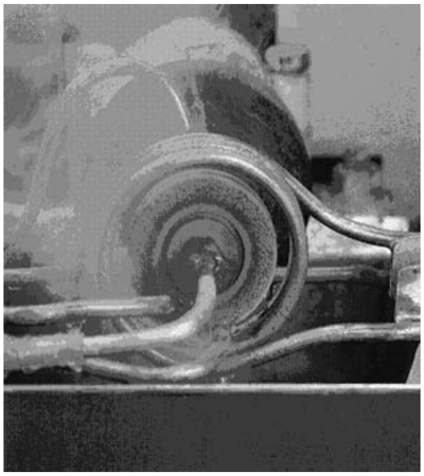

**Fig. 2** High-temperature wear resistance characterization

- Development of new UHTC (ultrahigh temperature ceramic) materials as thermal shields for space applications. Such an activity is based on a proprietary technology,[1] and it is carried out in cooperation with CIRA (Italian Research Centre for Aerospace) and University of Rome.[2,3]
- Development of coatings with controlled electromagnetic properties; among them, optical selective coatings as solar absorbers for aerospace applications. This is a very new field of application for thermal spray technology, and it is based on a proprietary idea.[4] The activities carried out up to now demonstrated that it is possible to obtain by plasma spraying optical coatings with the same optical properties of the state-of-the-art PVD coatings.[5,6]
- Development of wear-resistant coatings for several fields of industrial applications, for example, for petrochemical,[7] steel works, fine mechanic, and so forth. Among them are coatings deposited by RPS (reactive plasma spraying) of titanium powders in a nitrogen-rich environment.[8,9]
- Development of self-lubricating coatings for stamping.

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## Industrial News

### Solid Lubricant Tool Coating Applied by Filtered Arc Plasma

A filtered arc technology in which macroparticles are magnetically filtered out of the thermal spray plasma before hitting the substrate has been developed by UES Inc., Dayton, OH, with support from the Edison Materials Technology Center (EMTEC) and the Air Force Research Laboratory. Hard coatings are generally deposited by the direct cathodic arc technique, but macroparticles form in the vapor, which reduces corrosion resistance and density in the final coating.

However, by magnetically filtering out the large particles, droplet-free coatings are produced. This technology is called large-area filtered arc deposition (LAFAD). The filtered arc plasma contains almost fully ionized metal vapor that can combine with highly dissociated, ionized, and activated reactive gas to produce very smooth, dense, hard, and very adherent coatings.

The LAFAD technique was used to deposit a hard, TiCN-based coating on various tools from Alpha Mold (another EMTEC member) to test performance in various machining applications. In an end-milling (finish) operation of S7 steel (hardness ≈ 52-54 HRC) the coated tool produced four parts, whereas under identical machining conditions, the uncoated tool could not finish a single part. According to Alpha Mold, other TiCN coated tools also performed extremely well in various machining operations.

Two soft, lubricious coatings based on WS2 and C were also developed in this program. Enhanced machining performance of hard-soft coatings in a bilayer configuration has already been demonstrated. As this technology is more fully developed, a deposition of mixed hard-soft graded interfaces will be optimized.


**Contact:** Dick Schultz, Edison Materials Technology Center, 3155 Research Blvd., Dayton, OH 45420; tel: 937/258-5409; e-mail: dshultz@emtec.org; Web: www.emtec.org.


### Thermal Barrier Coatings Analyzed by Thermal Shock

A combined isothermal oxidation and fluidized bed thermal shock test has been conducted to characterize selected ceramic/bondcoat systems, according to "Thermal Shock Testing of TBC/Bondcoat Systems," a paper presented at the 2003 ASM Surface Engineering Conference. The paper was prepared by Ann Bolcavage and Albert Feuerstein of Praxair Surface Technologies Inc., Indianapolis, IN, and John Foster and Peter Moore of Praxair Surface Technologies Ltd., Weston-Super-Mare, United Kingdom.

Various methods of thermal shock testing are used to characterize new thermal barrier coating systems in the development stage as well as for quality control. The cyclic furnace oxidation test, which is preferred for aircraft applications, stresses the ceramic/bondcoat interface, predominantly through thermally grown oxide (TGO) growth stress.

The jet engine thermal shock test, derived from a burner rig test, creates a large thermal gradient across the thermal barrier coating, as well as thermomechanical stress at the interface. For IGT applications with long high-temperature exposure times, a combination of isothermal preoxidation and thermal shock testing in a fluidized bed reactor may better represent the actual engine conditions while both types of stress are present.

The results and the failure mechanisms as they relate to the thermal barrier coating system were presented and discussed in the paper. A recommendation on the test method of choice providing best discrimination between the thermal shock resistance of the ceramic layer, the ceramic/bondcoat interface, and even substrate-related effects was given.

**Contact:** Ann Bolcavage, Praxair Surface Technologies Inc., 1500 Polco St., Indianapolis, IN 46224; tel: 317/240-2500; fax: 317/240-2380; Web: www.praxairsurfacetechnologies.com.

## Reference Materials Available for Ceramics and Hard Metals

The National Institute of Standards and Technology, Gaithersburg, MD, announces the availability of new Standard Reference Material of SRM 2831 for Vickers hardness of ceramics and hard metals. The SRM is a disk of commercial tungsten carbide with 12% Co binder phase. Each disk has five 9.8 *N* indentations made in the center of a polished face. The disks have a highly polished surface and excellent hardness uniformity. Indentations are sharp and well defined in this fine-grained material. The disks are individually certified for the average diagonal length, which is nominally 35.0 μm, and for the average hardness, which is nominally 15.0 GPa. The Vickers SRM complements the Knoop SRM for hardness of ceramics (SRM 2830), which is made of silicon carbide.

**Contact**: George Quinn, National Institute of Standards and Technology, Gaithersburg, MD 20899; tel: 301/975-6776; e-mail: george.quinn@nist.gov.

## Sulzer Metco Continues to Strengthen Its Materials Business

On 29 January 2004, Sulzer Metco acquired the Ambeon Division from The Westaim Corporation in Calgary, Canada. Ambeon has activities in Fort Saskatchewan, Alberta, Canada, and in Marple, U.K.; it has a total of 110 employees and had sales of about CHF 28 million (29 million Canadian dollars) in 2003. This acquisition is a further step in enlarging the materials activities of Sulzer Metco.

Westaim Ambeon is a global provider of customized nickel-base materials for the power-generation and aero industries. These materials are also used in electronic applications. The acquisition of Ambeon strengthens the Sulzer Metco thermal spray materials offering and expands the portfolio in the area of honeycomb structures, electronic shielding, and hardfacing materials. Since Westaim Ambeon and Sulzer Metco have been working together successfully for the last 20 years, a smooth integration is expected.

The purchase price for the assets of the Ambeon Division and the shares of its UK subsidiary Neomet Ltd. is CHF 33 million (35 million Canadian dollars). The new Canadian company will be called Sulzer Metco (Canada) Inc.

**Contact:** Sulzer Metco; Web: www.sulzermetco.com.

## High-Temperature Fuel Cell Materials

NineSigma, representing a Fortune 500 company, is seeking proposals (technical and cost) for new materials for high-temperature (700-1200 °C) fuel cell applications. Of particular interest are ceramics and metals that can be formed and joined into complex shapes. The objective of this RFP is to identify partners/suppliers with new and exotic materials/material sets. Since it is anticipated that solutions may include combining metal and ceramic components, the following is also of interest: Custom alloys that have the same coefficient of thermal expansion (CTE) as ceramic materials are of interest. Techniques for joining these ceramics to metals.

Anticipated project scope:

- Phase 1: Feasibility study, proof of concept and
- Phase 2: Follow-on activity to address advanced development and manufacturability of solution.
- **Contact:** Kevin C. Stark, Ph.D., 23825 Commerce Park, Suite A1, Cleveland, OH 44122; tel: 216/295-4800 or NineSigma, Web: www.ninesigma.com.

## Hard Chrome Alternatives Team (HCAT) Projects

The HCAT Program was initiated in 1996 with the purpose of qualifying HVOF thermal spray coatings (principally WC/17Co and WC/10Co4Cr) as replacements for hard chrome plating on military aircraft components. Hard chrome plating is performed using chromic acid that contains chromium in the hexavalent state (hex-Cr), a very toxic carcinogen. The biggest cost driver from a regulatory standpoint is not the Environmental Protection Agency (EPA) air or water emissions standards, but the worker permissible exposure limit (PEL) imposed by the Occupational Safety and Health Administration (OSHA). At a conference organized by the American Electroplating and Surface Finishing Society in late January, a lawyer representing the surface finishing industry indicated that OSHA is now under court order to issue a new draft hex-Cr PEL later this year, with a final regulation issued no later than January 2006. Their expectation is that the hex-Cr PEL will be lowered from the current 100 $\mu g/m^3$ (for chromic acid) to 1 $\mu g/m^3$. This obviously will have a major cost impact on all hard chrome plating operations. A preliminary estimate of the cost of compliance is $225 million industry-wide, which includes not only chrome plating but also welding, painting, and other operations that use or generate hexavalent chromium. If the PEL is lowered to this value, then it will increase efforts to find viable alternatives to hard chrome plating.

Separate projects have been or are being executed by the HCAT to qualify the high-velocity oxyfuel (HVOF) coatings on aircraft landing gear, propeller hubs, gas turbine engine components, hydraulic actuators, and helicopter dynamic components. This is probably one of the most comprehensive thermal spray technology insertion efforts ever undertaken. Extensive materials testing such as fatigue, wear, corrosion, impact, and embrittlement, plus rig and flight testing on actual components, have demonstrated that the HVOF coatings generally exhibit performance characteristics superior to hard chrome. Recently, the U.S. Air Force has approved application of WC/Co to a number of landing gear components and the Naval Air Systems Command has issued approvals for application of HVOF WC/Co coatings onto landing gear and actuators on P3 aircraft. The Navy is also applying HVOF coatings onto several gas turbine engine components. Approvals are expected in the near future on propeller hub, other gas turbine engine and other hydraulic actuator components. The success of the HCAT program is leading to production implementation of the HVOF technology at the Jacksonville and Cherry Point Naval Aviation Depots and at the Air Force Ogden, Oklahoma City, and Warner-Robins Air Logistics Centers. In addition, HVOF WC/Co coatings are being designed on the landing gear for two of the three versions of the Joint Strike Fighter (JSF), which will be the largest defense procurement in history. Pistons on flight control and utility hydraulic actuators on new aircraft such as the JSF are also utilizing HVOF thermal spray coatings.

The landing gear and propeller hub projects have been completed and final reports issued. These reports can be accessed by going to www.hcat.org and clicking on "Reports, Publications & Presentations, Joint Test Protocols." On the next screen, click on "Reports" and several folders will then appear on the screen. The folder labeled "DARPA pre-HCAT project" provides a report from the mid-1990s in which a technology assessment concluded that HVOF thermal spray coatings were the most viable alternative for hard chrome replacement (except for non-line-of-sight applications) and which led to the establishment of the HCAT. The folder labeled "JSF Reports on Cr and Cd Alternatives—Rowan" has several reports written by Keith Legg from Rowan Technology Group for the Joint Strike Fighter Program related to chromium and cadmium replacement. In the folder labeled "Landing Gear Reports" is the final report (in PDF format) for the project which contains results for all of the materials and component testing, results of producibility studies (such as stripping and grinding of the coatings), a cost/benefit analysis, and the text from new or proposed Society of Automotive Engineers (SAE) and AMEC specifications related to WC/Co and WC/CoCr powder, coating application parameters, and grinding. In the folder labeled "Propeller Hub Reports" is the final report with similar information.

In the future, reports will be completed and posted on the web site for the gas turbine engine, hydraulic actuator and helicopter dynamic component projects. It is hoped that all of this information will lead to a more rapid insertion of HVOF thermal spray technology not only as a replacement for hard chrome plating (which is very widely used) but also as a cost-effective method of imparting wear and/or corrosion resistance to many different functional components.

**Contact:** Bruce Sartwell, Environmental Technology Program Manager, Naval Research Laboratory, Washington, D.C.

## News from NASA

### Improved Indentation Test for Measuring Nonlinear Elasticity

A cylindrical-punch indentation technique has been developed as a means of measuring the nonlinear elastic responses of materials—more specifically, for measuring the moduli of elasticity of materials in cases in which these moduli vary with applied loads. This technique offers no advantage for characterizing materials that exhibit purely linear elastic responses (constant moduli of elasticity, independent of applied loads). However, the technique offers a significant advantage for characterizing such important materials as plasma sprayed thermal barrier coatings, which, in cyclic loading, exhibit nonlinear elasticity with hysteresis related to compaction and sliding within their microstructures.

A specimen to be tested by the cylindrical-punch indentation technique is prepared by standard metallographic procedures. The specimen is mounted on a load-versus-displacement-measuring apparatus, which could be any of a variety of indentation-type hardness testers or other conventional mechanical testing instruments. In the indentation test, the flat end of a round cylindrical punch is pushed into the polished, flat surface of the specimen. To minimize impression creep (a time-dependent plastic deformation that could contribute a large error to the modulus data), the specimen is preconditioned by preindenting it at a load greater than the load to be applied during the subsequent test. Thereafter, the applied load is varied according to the specification for the test and the punch displacement is measured as a function of the applied load. The modulus of elasticity (Fig. 1) and, if desired, other aspects of the elastic response of the specimen material are computed from the displacement-versus-load data with corrections, if necessary, for the elastic response of the punch and the rest of the testing apparatus.

The flat-bottom cylindrical punch used in this technique offers important advantages over the pointed indenters used in traditional hardness testing: A pointed indenter is well suited to measuring hardness, but is ill suited to measuring the modulus of elasticity of a specimen because the contact area is unknown and varies during the test, so that there is no

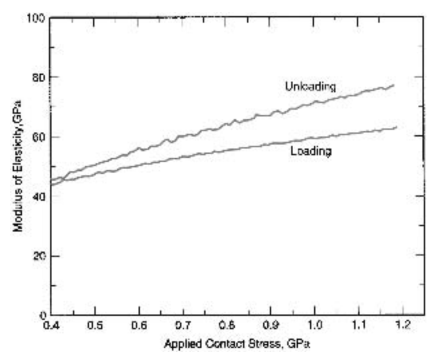


**Fig. 1** Plots of modulus of elasticity as a function of applied stress calculated from displacement-versus-load data for a 127 µm diam flat-bottom cylindrical tungsten carbide punch against a thermal-barrier coating of plasma sprayed $ZrO_2$ containing 8 wt.% $Y_2O_3$ during the third loading/unloading cycle of an indentation.

simple relationship between applied load and applied stress. In addition, a pointed indenter causes significant plastic deformation (even at nearly zero applied load), which cannot easily be distinguished from elastic deformation. In contrast, while the flat-bottom cylindrical punch is useless for hardness testing, it is well suited for measuring the modulus of elasticity because its contact area is constant and, consequently, the applied stress is simply proportional to the applied load. Hence, the modulus of elasticity can be determined at every point on the load-versus-displacement curve. Also, if the applied load is limited to below the value corresponding to the contact stress at the onset of plastic deformation, the deformation can be relied on to be elastic over a complete loading/unloading cycle, making it unnecessary to subtract the effects of plastic deformation.

This work was done by Jeffrey I. Eldridge of Glenn Research Center. For further information, access the Technical Support Package (TSP) free on-line at www.techbriefs.com/tsp under the Mechanics category. Excerpted from NASA Tech Briefs, Feb 2004, pp. 28, 30.

## Awards Information

### Three Inducted into 2004 ASM Thermal Spray Society Hall of Fame

Fred W. Gartner

The following individuals have been inducted into the ASM Thermal Spray Society Hall of Fame:

**Fred W. Gartner, Jr.** (deceased), former president and CEO, F.W. Gartner Thermal Spray Co., Houston, TX.

Joachim V. Heberlein

**Joachim V. Heberlein,** FASM, professor, department of Mechanical Engineering, University of Minnesota, and

Anthony J. Rotolico

**Anthony J. Rotolico,** retired Business Director, Englehard Surface Technology, East Windsor, CT.

The Thermal Spray Hall of Fame was established in 1993 to recognize and honor leaders who have made significant contributions and achievements to the science, technology, practice, education, management, and advancement of thermal spraying.

Nominations for the 2005 Hall of Fame are due 30 Sept 2004.

**Contact:** Leslie Taylor, ASM International; e-mail: lmtaylor@asminternational. org, or Web: www.asminternational.org/tss, click on "Membership" dropdown box.

## News from TSS

### ASM Thermal Spray Society Committee Chairs 2003-2004

**Accepted Practices Committee**

The purpose of this committee is to develop and make known practices of various elements of thermal spray technology. This includes the collection of information, the unbiased evaluation of this information, the generation of useful recommended practices, achieving consensus within the committee, approval of the ASM TSS Board, and publication of the final practices.

Edmund F. Rybicki

Chairs for the Accepted Practices Committee on Mechanical Properties are:

**Dr. Edmund F. Rybicki,** FASM, professor and chair, University of Tulsa Mechanical Engineering Department, Tulsa, OK. **Contact:** e-mail: ed-rybicki@utulsa.edu and

Manish M. Bhusari

**Manish M. Bhusari,** Plasma Product Line Manager, Praxair TAFA, Concord, NH. Contact: e-mail: manish_bhusari@praxair.com.

Chairs for the Accepted Practices Committee on Metallography are:

George A. Blann

**George A. Blann,** senior materials engineer and education specialist, Buehler Limited. **Contact:** e-mail: george.blann.@buehler.com

Douglas G. Puerta

and **Douglas G. Puerta,** Manager, Metallurgical Services, IMR Test Labs., Lansing, NY. Contact: e-mail: dpuerta@imrtest.com.

**Industry and Development Liaison Committee**

This committee supports the ASM TSS vision and mission by developing high-quality marketing and public relations programs that enhance the thermal spray industry image as measured by new industry outreach accomplishments, growth of so ciety membership, and society member satisfaction. Committee chair is:

Robert H. Unger

**Robert H. Unger,** Consultant. **Contact:** e-mail: roberthtm@yahoo.com.

**Information Development/Delivery Committee**

This committee develops, compiles, and disseminates relevant, high-quality accessible information in a timely fashion consistent with the needs of the thermal spray and engineering community. This includes conducting and supporting efforts in education, information of topical interest, broad-based information of enduring interest, and detailed information of immediate interest for specific applications. The committee draws on the available expertise to ensure that committee efforts are relevant to the community and consistent with Society goals. Committee chairs are:

**Mitchell R. Dorfman**

**Mitchell R. Dorfman,** Director, Material and Coating Development, Sulzer Metco Inc., Westbury, NY. **Contact:** e-mail: mitch.dorfman@sulzer.com and

**Jean-Gabriel Legoux**

**Jean-Gabriel Legoux,** Research Officer, National Research Council Canada, Boucherville, Canada.

**Journal of Thermal Spray Technology Committee**

This committee identifies major trends and developments in thermal spray technology and gives aid to the JTST editor in manuscript acquisition in order to present timely and significant reviewed information to subscribers. The committee shall also maintain continual surveillanceof the publication for technical quality, currentness, and fulfillment of statedscope, and shall recommend changes tobetter meet subscriber needs. Committee chair is:

**Joachim V. Heberlein**

**Joachim V.R. Heberlein,** Professor, Dept. of Mechanical Engineering, University of Minnesota, Minneapolis, MN. **Contact:** e-mail: jvrh@me.umn.edu.

**Membership and Marketing Committee**

This committee addresses ASM TSS marketing and other ASM TSS related business issues, providing input and direction and making recommendations for increasing sales and profitability. Committee chair is:

**Peter Hanneforth**

**Peter Hanneforth,** President, SpaCom L.L.C., Huntington, NY. **Contact:** e-mail: Peter.Hanneforth@spacom.com.

**Program Committee**

This committee provides the leading forum for the exchange of information in the thermal spray community using technical programs, proceedings, and expositions at ASM TSS sponsored events and activities and provides incentives for excellence in the research, development, and commercial fields of thermal spray through appropriate awards and other means of recognition. Committee chair is:

**Richard Knight**

**Dr. Richard Knight,** Research Professor and Director, Center for the Plasma Processing of Materials, Drexel University, Philadelphia, PA. **Contact:** e-mail: knightr@coe.Drexel.edu.

**Safety Committee**

The purpose of this committee to develop and to make known practices of various elements of thermal spray technology. This includes the collection of information, the unbiased evaluation of this information, the generation of useful recommended practices, achieving consensus within the committee, approval of the ASM TSS Board, and publication of the final practices. Committee chairs are:

**Richard A. Neiser**

**Dr. Richard A. Neiser,** Principal Member of Technical Staff, Sandia National Laboratories, Albuquerque, NM. Contact: e-mail: raneise@sandia.gov and

**Lysa Russo**

**Lysa Russo,** Industrial Liaison Manager, SUNY at Stony Brook, Stony Brook, NY. **Contact:** e-mail: lysa.russo@sunysb.edu.

**Training Committee**

This committee develops, delivers, and supports training programs that will best serve the needs of the thermal spray industry and its personnel and to develop educational materials for training and to administer operator and technologist programs. Committee chair is:

**William Lenling**

**William Lenling,** Materials Engineer, Thermal Spray Technologies, Inc., Sun Prairie, WI. **Contact:** e-mail: blenling@tstcoatings.com.

## People in the News

### Wall Colmonoy Dayton Welcomes Dan Lowry

Wall Colmonoy Corporation announces the addition of a supervisor to run its Coatings Services department, which specializes in surface coatings of all types of metals. Dan Lowry will be responsible for developing new processes, design tooling and masking, production scheduling, application quoting, and technical support to Wall Colmonoy coating customers.

Wall Colmonoy Dayton provides many coating services including application of Colmonoy and Wallex powders via

Sprayweld and/or Fuseweld process, furnace fusing, high-velocity oxyfuel, plasma transferred arc, plasma spray, and dual wire arc.

Lowry brings 25 years of experience in metal coatings applications to Wall Colmonoy Dayton. He founded a plasma cell coating development program at International Aerospace Tubes LLC, a Pratt Whitney Joint Venture in Indianapolis, IN. Prior to that, he worked as a process engineering technician for Boston Scientific Corp. and Praxair Surface Technologies.

**Contact:** Shirley Clemens, Marketing Coordinator, 30261 Stephenson Hwy., Madison Heights, MI 48071-1650; tel: 248/585-6400, ext. 244; fax: 248/585-7960; e-mail: sclemens@wallcolmonoy.com.

## Scott Goodspeed Appointed Northeast Regional Sales Manager for Plasma Technology

**Scott Goodspeed**

Scott Goodspeed is joining Plasma Technology, Inc., as Northeast Regional Sales Manager. He brings experience in the thermal spray industry including sales and sales management at Miller Thermal, Bay State Abrasives, and Praxair Surface Technologies. He will be working to expand the northeast markets from a "home office" in Maine and will travel to customer and Plasma Technology facilities as necessary.

Plasma Technology Inc. is a full-service surface engineering company supplying more than 300 coatings by nine different coating techniques.

**Contact:** Scott Goodspeed, Plasma Technology, Inc., P.O. Box 1262, Greenville, ME 04441; tel: 207/695-2377; fax: 207/695-2381; e-mail: goodspeed@gwi.net.

## Bill Mosier Named President of Polymet

**Bill Mosier**

Bill Mosier has been promoted to president of Polymet Corporation. He has held numerous positions there, most recently as General Manager. A graduate of the University of Illinois with a degree in Mechanical Engineering, he previously worked for Stoody and the American Welding Institute.

Polymet manufactures solid and cored wires used in thermal spray and welding industries. The company is ISO certified and works to many aerospace and commercial specifications.

**Contact:** Bill Mosier, President, Polymet Corp., 10073 Commerce Park Dr., Cincinnati, OH 45246; tel: 513/874-2880; fax: 513/874-2880; e-mail: bmosier@polymet.us; Web: www.polymet.us.

## Wall Colmonoy Selects Johnson as Products Group Inside Sales Manager

**Craig Johnson**

Craig Johnson has been appointed Inside Sales Manager for Colmonoy hard surfacing and Nicrobraz brazing products group. He will continue to oversee corporate purchasing as well as his new inside sales responsibilities, which include supervising the Customer Service Department at the Madison Heights Corporate Office.

Wall Colmonoy Corporation manufactures nickel-base hard-surfacing alloys and brazing filler metals, operating five contract processing facilities across the United States and Europe.

**Contact:** Wall Colmonoy Corporation, Web: www.wallcolmonoy.com.

## Dr. Herbert Herman Retires from SUNY Stony Brook

Distinguished Professor, Herbert Herman has retired from teaching at State University of New York at Stony Brook after a 35-year career.

He has a Ph.D. in Metallurgy and Materials Science at Northwestern University and was a Fulbright Scholar at the University of Paris.

In the mid-1970s, one of his graduate student's "stumbled" across a novel deposition technology for nonequilibrium materials, which turned out to be thermal spray. Herman continued his research of the technology for the next 30 years. He introduced a scientific approach to the industrial technology of thermal spray. He played a key role in forming the Thermal Spray Division of ASM International, and he was the Division's founding chairman. He has been inducted into the ASM TSS Thermal Spray Hall of Fame.

Herman also served as editor for several technical journals, including *Treatise on Materials Science & Technology, Materials Science and Engineering (A),* and *Ocean Technology.* He has been awarded fellowship by ASM International and the American Ceramic Society.

SUNY at Stony Brook will host its annual industrial workshop in July 2004 with special events honoring the contributions of Prof. Herman and other distinguished Center alumni.

**Prof. Herman (center) at his retirement party with friends and colleagues.**