In The News

Thermal Spray Literature

Materials Information Installs New Database System

Materials Information (MI) is currently implementing a new state-of-the-art database production process. The system will speed up the processing time to generate new database records and allow for a wider, more customized range of products and services. MI collects and disseminates the world's information on metallurgy and engineered materials and is jointly operated by ASM International (US) and the Institute of Materials (UK).

The new production system, called the Materials Information Database Automated System (MIDAS), will utilize STAR, a text-oriented database from Cuadra Associates already used by over 300 libraries and database producers world-wide, including Engineering Index (Ei) and PsycINFO. The text system will be enhanced with page image handling, provided by Alpha Pacific's Co-Star software. The production system will be configured with a Sun Microsystems's SPARCserver10 hosting IBM-PC client stations via an existing Novell LAN.

The combination of text and object database tools will enable MI to scan page images and convert them into text that can be searched. Key words and author affiliations will be provided from controlled vocabularies residing in the database. Lag-time between publication of the original sources and their appearance in MI's information collections will decrease dramatically, and the scope of coverage will increase to include more of the metals and engineered materials world. Books and oversized proceedings that cannot be scanned will be tracked using laser bar-coding from acquisitions to archiving. Electronic page images will be stored on compact-disk jukeboxes, allowing for immediate retrieval of old and new citations.

Traditional printed serials and bibliographic databases like Metals Abstracts Index and METADEX will still be produced, but customized publications, including both bibliographic citations and page images, will also be available on demand in new formats: printed on ASM's Xerox DocuTech system or written to CD-ROM. In the future, MI's bibliographic database will be meshed with electronic homestudy courses, video lectures, handbook sections, and journal articles in tailored print or CD-ROM products.

MI was planned to be in full production mode using STAR for all new output in June. Electronic page imaging and text conversion will begin in the second half of the year. For more information on MIDAS, contact Nichola Krause, Materials Information, ASM International, Materials Park, OH 44073-0002. Tel.: (216) 338-5151 ext. 532. Fax (216) 338-4634, or Melanie Nowocin, Materials Information, the Institute of Materials, 1 Carlton House Terrace, London SWIY 5DB, England. Tel.: 071-839-4071. Fax 071-839-2289.

1994 Publications Catalog Available from MI

This annual catalog (of 28-pages) presents metallurgists, materials scientists, engineers, business executives, and librarians with a complete spectrum of information products, ranging from technical and techno-commercial abstracts journals, industry reports, custom literature searches and CD-ROMs.

On the CD-ROM front, a new Dialog OnDisc CD product called Advanced Materials CD, covering Engineered Materials Abstracts (EMA), Polymers, Ceramics/Composites Alert and parts of Ei's Compendex Plus, is available. Materials Information is also marketing a Surface Finishing CD, produced jointly by TWI (formerly the Welding Institute, UK) and Finishing Publications. The Dialog OnDisc METADEX/Materials Collection Current Disc offer (which was launched last year) has been updated to include 1993 data. In late 1994, with the implementation of a new production system, MI will begin to produce targeted CD-ROMs from METADEX.

The Industry Reports Series continues to grow in popularity, with new releases including: Powder Technology Processes 1993, Recycling Case Histories 1993, Materials in the Automotive Industry 1993, The Aluminum Yearbook 1993, and Corrosion Case Histories 1993. Each Industry Report includes a loose-leaf printed report and PC diskette database.

Materials in Translations has been introduced as a quarterly journal, replacing Translations Index and incorporating monthly translations listings. Also, a number of significant price reductions were made for 1994, including magnetic tapes, document delivery, and translations.

For a free catalog that includes details of all products and services, please contact Ms. Debbie Barthelmes, Materials Information, ASM International, Materials Park, Ohio 44-073-0002, USA Phone (216) 338-5151 ext. 532, Fax (216) 338-4634 or Ms. Julie Lee, Materials Information, The Institute of Materials, 1 Carlton House Terrace, London, SW1Y 5DB, England, Phone 071-839-4071 Fax 071-839-2289.

The Aluminum Yearbook Available From MI

An international, up-to-date review of market and economic trends affecting the aluminum industries worldwide is presented in a new Industry Report titled The Aluminum Yearbook. The Aluminum Yearbook presents the factors influencing the selection and application of aluminum alloys and composites in key industries, such as automotive, construction, and aerospace.

Divided into six major sections, the Yearbook provides an international guide to new aluminum-based materials, coatings, and products. It highlights advances in aluminum manufacturing technology which result in components with improved properties and performance.

Highlighted in the Yearbook are issues impacting aluminum materials selection and the benefits for key industries in terms of weight reduction, corrosion resistance, damage tolerance, and recyclability. Production operations, including heat treatment, metal working, machining, casting, joining, and surface finishing processes are given extensive coverage. New materials and coatings are featured, along with advances made in automation, testing, and processing technology. Also included are numerous research and analysis programs intended to characterize and improve the properties of aluminum alloys, intermetallics, and composites.

The Aluminum Yearbook covers technical and business-related developments in the aluminum industry derived from international databases in 1993. Case studies from over 800 corporate organizations are represented as they relate to the aluminum markets and economic trends worldwide and advanced aluminum materials and their properties, processing, and performance.

The information is arranged by materials and source in a tabular format. The tables serve as an international directory to the array of alloys and composites cited and to the individual manufacturers, supplier companies, universities, institutes and associations involved in aluminum research and manufacturing enterprise worldwide.

Also included in the Yearbook is an introduction summarizing the major advances and trends in processing and application and in product development, along with an appendix featuring acronyms, a glossary, and a list of corporate organizations and their addresses cited in the contents. The personal computer (PC) diskettes with the report include the entire database of documents found in the research section. The diskettes offer expanded search capabilities.

Contact Ms. Debbie Barthelmes, Materials Information, ASM International, Materials Park, OH 44073-0002. Phone (216) 338-5151, ext. 532. Fax (216) 338-4634 or Ms. Julie Lee, Materials Information, The Institute of Materials, 1 Carlton House Terrace, London SW1Y 5DB, England. Tel.: 071-839-4071; Fax 071-839-2289.

Materials in the Automotive Industry 1993

An international look at current expertise as well as investigative efforts aimed at developing, processing, and selecting materials for today's vehicle models and for the automobiles of the future is presented in a new Industry Report titled Materials in the Automotive Industry 1993. Materials in the Automotive Industry 1993 offers a current overview of commercial and research activity relating to automotive manufacturing processes, materials applications, and component design.

The report presents the consumer, environmental and legislative requirements impacting automotive materials selection as well as the research efforts and current expertise involved in producing components to meet those requirements. The list of materials cited includes not only steels and the ferrous and nonferrous alloys but also new composites, intermetallics, and ceramics.

The report highlights the advances in materials and manufacturing capabilities which are resulting in better corrosion and damage resistance, greater fuel efficiency, and increased recyclability. Also included in the report is an introduction summarizing the major advances and trends in materials processing and applications and in component design and manufacture, along with an appendix featuring acronyms, a glossary, and a list of automotive organizations and their addresses cited in the contents. The personal computer (PC) diskettes with the report include the entire database of documents found in the research section. The diskettes offer expanded search capabilities.

Contact Ms. Debbie Barthelmes, Materials Information, ASM International, Materials Park, OH 44073-0002. Phone (216) 338-5151, ext. 532. Fax (216) 338-4634 or Ms. Julie Lee, Materials Information, The Institute of Materials, 1 Carlton House Terrace, London SWIY 5DB, England. Tel.: 071-839-4071; Fax 071-839-2289.

On-the-job Training Videos for Heat Treaters

A new five-tape series of "On-The-Job Training" videos, produced by the Materials Engineering Institute (MEI) of ASM International, brings affordable, easy-to-understand training to the heat treating industry. "MEI's On-The-Job Training is designed for people who are not familiar with heat treating plants and their operations," said Mr. Bob Uhl, ASM Education director. "We worked closely with real heat treaters to find out what they wanted, and we produced these videos to provide exactly what they asked for."

One consistent request was for good, basic training for entry-level personnel. "Most people new to the field have no idea what heat treating is," Mr. Uhl said. "They don't understand the equipment, the procedures or why it's even done in the first place. If an employee doesn't have a basic understanding of the heat treating process, it's like a mistake or an accident waiting to happen —and that's something good On-The-Job Training can help companies avoid."

The series will also be of value for training furnace operators and furnace assistants; for providing a good background on heat treating to design engineers, sales representatives and purchasing agents; and for providing a basic understanding of the practical side of heat treating to materials science and trade school students.

Tape 1 **What is Heat Treating?** covers the history of heat treating, heat treatment of steel and other metals, mechanical properties achieved by heating and cooling, and an overview of the heat treating plant and processes.

Tape 2 **Heat Treated Materials** explains the differences between various ferrous and nonferrous metals and alloys, uses of heat treated metals, forms and shapes of heat treated materials, and general safety tips.

Tape 3 **Heat Treating Processes** provides a clear view of life in the plant and a better understanding of the technology involved: furnaces, quenching and cooling, cleaning, tempering, and more.

Tape 4 Housekeeping & Safety shows each area in the plant, the importance of clean work areas, and appropriate work clothes and safety equipment.

Tape 5 Quality in Heat Treating describes how the contributions of each employee has an important effect on the quality of the finished part.

For more information contact: MEI On-The-Job Video Order, c/o ASM International, Materials Park, Ohio 44073-0002. Call: (216) 338-5151, ext. 537. Fax (216) 338-4634. Please refer to Order Number JT 50.

Manual on the Building of Materials Databases

This 105 page book, edited by C.H. Newton of Materials Science Corporation is a tool for materials database developers/users, laboratory information management systems developers/users; and also for finite element method, computer-aid design/manufacturing software users.

When building a materials database important questions to consider are: What are the key decision points?, Where can you find resources for help at those key decision points?, and How can standards help with the process of building a materials database? The Manual on the Building of Materials Database (MNL19) helps database design teams address questions for particular materials database applications, and more.

The manual focuses on the building of materials property databases and the standards that are available to assist in the process. Several chapters cover database development, with additional chapters on data and database quality, database operation, and data transfer. The chapter titles are listed below.

Chapter 1 Introduction to the Building of Materials Databases - Crystal H. Newton

Chapter 2 Program Infrastructure - Edwin F. Begley

Chapter 3 Types of Materials Databases - John R. Rumble, Jr.

Chapter 4 Nomenclature and Current Standards for Identification of Engineering Materials - Bert Moniz

Chapter 5 Nomenclature and Current Standards for Recording of Test Results and Properties - Marilyn W. Wardle

Chapter 6 Data Evaluation, Validation, and Quality - Anthony J. Barrett

Chapter 7 Management and Operation of Database Building and Distribution Functions - J.G. Kaufman

Chapter 8 Data Transfer-Philip Sargent

Chapter 9 Building a Model Database: EXPRESS Example - Edward Stanton

Contact: ASTM, 1916 Race Street, Philadelphia, PA, 19103-1187, Phone (215) 299-5585, Fax (215) 977-9679.

Tribology and Coatings Technology EMAIL

The startup of a Tribology Listserver/Mailreflector System is announced. The purpose of this system is to allow the scientific community a centralized Internet address to which questions/comments/answers in the various fields of Tribology and Coatings Technology can be rapidly distributed to a list of interested individuals. For the purposes of this discussion forum, Tribology should be considered to include all aspects of the study of coatings which involve friction, wear, lubrication, corrosion, strength, stability, design, and fabrication of materials and/or processes which involve the interaction of a surface (or surfaces) with its environs.

Thus, the purpose of this announcement of the tribology listserver is to provide an initial impetus and forum for discussion of problems which can benefit the presentation/discussion by the tribology and coatings community as a whole.

There are no charges to become a member of the subscription list nor are there any charges for usage, except for the request that you actively participate in any discussion to which you have a question, comment and/or contribution. All individuals regardless of their affiliation (commercial, educational, or government) are welcome to join.

To register with the system

1. Send an Email message to "LISTSERVER@ANLEMC.MSD.ANL.GOV" within the body of the Email message include the following line: "Subscribe TRIBOLOGY UserName@EMailaddress" where "EMailaddress" is the electronic mail address of your host computer, and "UserName" is the username by which you are registered on that system. Please note that the word TRIBOLOGY is important in your subscription request as this LISTSERVER software processes Email for several different mailing lists.
2. Within a day or so you will receive a confirmation test message which tests the address that you have supplied to the ListServer. Upon receipt of a reply from the subscriber (i.e., UserName @EMailaddress) to this test message your name will be added to the mailing list. You will then automatically receive copies of "ALL" Email sent to this system.
3. Anyone may post messages to this list, however, only subscribers will receive copies. One may post messages/comments to this list using any conventional Email system by sending a message to: "TRIBOLOGY@ANLEMC.MSD.ANL.GOV"
4. To remove your UserName from the list send an Email message to LISTSERVER@ANLEMC.MSD.ANL.GOV containing the line: "Unsubscribe TRIBOLOGY UserName@ EMailaddress"

This Tribology Listserver supplements the ANL Microscopy ListServer and MSA (Microscopy Society of America) electronic bulletin board system, and the EMMPDL (Microscopy and Microanalysis Public Domain Library) as a means of electronic communications which are also accessible over Internet as well as conventional telecommunications (i.e., modem) lines. Details of

these are available upon request from "EMMPDL@ANLEMC.MSD.ANL.GOV".

Please feel free to distribute this announcement to any individuals or groups whom you think may be interested in participating. Also, as this is an experimental and free service to the community please understand that some system problems will occur. They will be dealt with as time permits but it is being performed on a purely voluntary basis.

Contact: Nestor J. Zaluzec, Materials Science Division , Bldg. - 212m Argonne National Laboratory, Argonne, IL, 60439, Phone (708) 252-5075, Fax (708) 252-4798, Email: Zaluzec@anlemc.msd.anl.gov

News From ASM

Members Chart Future Direction of Leading Materials Society

Through ASM 2000, the future direction of ASM International was entrusted to the people who know it best: the members of the society. Out of ASM 2000 has arisen ASM Vision 2000, the strategic plan guiding the society into the next century.

The ASM 2000 concept came about in November 1991, when 16 leading ASM members representing industry, academia and government offered their diverse perspectives as volunteer members of the ASM 2000 Committee. Over the past two years, this long-range planning committee has worked to:

Identify trends and implications for the world materials community, and recommend appropriate roles for ASM in the year 2000.

Identify changing member needs and make recommendations to assure member satisfaction.

Review the ASM purpose, mission and strategy and recommend necessary changes.

Report the committee's findings to the ASM Board of Trustees.

"With no holds barred we discussed the many changes we saw coming that would affect present and future ASM members," said Dr. Lyle H. Schwartz director, Materials Science & Engineering Laboratory, National Institute of Standards and Technology, Gaithersburg, MD, who serves as ASM 2000 Committee chairman and ASM trustee. "As each issue was raised we also tried to establish how these issues might affect ASM, and the changes we would recommend to allow the society to better serve member needs."

By June 1992, the committee had grouped about 40 issues into four broad topical areas: materials, government/globalization, professional and information. For each issue, the committee developed one or more recommendations for policy or action by ASM. This became the basis of the ASM 2000 Draft Report, which communicated the issues and recommendations to the membership for feedback and input.

Based on members responses to the Draft Report, an "ASM Vision 2000" draft was created establishing the basis of a new strategy for the society. ASM Vision 2000 was reviewed and revised by more than 150 ASM members during a Leadership Convocation held during Materials Week '93, the fall meeting of the society in Pittsburgh. "Every time the membership has been consulted for its say in the future direction of ASM, our members have responded" ASM managing director Edward L. Langer said. "Each member should take pride in the fact that their opinions and comments are helping to shape their society."

Member involvement assures that the ASM of the future will address and meet the changing needs of members. As ASM President Jack Simon, manager of Technology Leveraging at General Motors North American Operations R&D Center, Washington, DC, said, "The most powerful force in our society, the 'Voice of Members', has spoken through ASM 2000. And "ASM Vision 2000" shows how ASM will answer that voice - to give our members what they're asking for."

Design of Heat Treating and Thermal Spray Societies

In response to the recommendations of its membership and a study of industry needs, ASM International is in the process of designing a Heat Treating Society and a Thermal Spray Society. The decision to form the two affiliate societies of ASM came about as a result of member demands — through the recommendations of members in response to ASM 2000. Both societies must first be approved by the ASM Board of Trustees later this year before they will become a reality.

ASM 2000 Committee members and member responses to the ASM 2000 study indicted that one of the strongest recommendations dealt with the need for "segmented focus." "The diversity of member technical interests require a certain flexibility of response by ASM," ASM Managing Director Edward L. Langer explained. "It's clear that the needs of certain segments of ASM members would be better served by an organization that focuses on that segment - as long as an overall structure preserves the traditional strength of ASM for strong interaction among all segments."

Why a segmented focus?

Throughout ASM's 81-year history, the society's technical scope has broadened from heat treating to metals to materials because of the broadening of ASM member interests. By 1969, the diversity of member interests resulted in the establishment of Technical Divisions, to focus on the demands of clusters of members with different needs, and to provide forums for networking for affinity groups of members.

"The segmentation of member interest continues, and we expect it to intensify through the end of this decade," Langer said. "Increasingly, members in certain clusters are looking for societies and information sources that are highly focused on their specific needs, and which offer networking with people involved in their immediate area of activity."

To provide a higher level of service and superior networking opportunities, the affiliated societies of ASM will be much more attuned to the voice of members, with greater involvement and interaction from the industry as a whole.

Task forces lead the way

In 1990, in anticipation of the findings of ASM 2000, two groups were created to explore the need for "Affiliate Societies of ASM" to serve heat treating and thermal spray members. By the end of 1993, supported by the ASM 2000 Report, both were in the process of designing their unique societies.

The Heat Treating Society concept came about through a study of heat treating industry needs by the ASM Heat Treating Steering Panel, a blue-ribbon committee formed in 1989 and comprised of leaders in the heat treating community. This affiliated society of ASM, by specifically focusing resources and services, would "serve the unique needs of more than 25,000 ASM members for whom heat treating is a major technical interest, while preserving the cross-fertilization of ideas with other members of ASM," said Mr. Langer.

Heat Treating Steering Panel Chairman George Bodeen, Lindberg Corporation, Skokie, IL, said ASM is "the only society serving the broad mix of interests in heat treating," including commercial heat treaters, captive heat treaters, providers of equipment and supplies, researchers and buyers. He added that the rest of ASM's broad-based membership (about 25,000 members) are also interested in heat treating, particularly as it enhances the performance of the materials with which they work.

Currently, the Thermal Spray Society Task Force is also working toward designing "an organization that can better serve our members as well as the entire thermal spray industry," according to Ronald W. Smith task force chairman (and vice chairman of the Thermal Spray Division of ASM), who is employed at Drexel University, Philadelphia, PA. Because the thermal spray industry is changing along with many of the industries serving the aerospace and defense industries, a Thermal Spray Society faces different challenges than a Heat Treating Society.

"We aim to serve the thermal spray industry by organizing and participating in activities aimed at growing the applications of thermal spray technology," said Mark F. Smith Thermal Spray Division chairman and a member of the task force, who works at Sandia National Laboratories, Albuquerque, NM.

Naval Research Laboratory Honored as an ASM Historical Landmark

The Materials Science and Technology Division of the Naval Research Laboratory, located in Washington, DC, was recently awarded the ASM Historical Landmark, one of the Society's most prestigious awards. This honor recognizes the site where some of the most significant advances in the field of materials occurred as well as the major contributions of the hundreds of talented and dedicated scientists, engineers, and technicians who worked there over the years.

The Naval Research Laboratory was conceived during wartime nearly 80 years ago. It was in 1915 that Thomas Alva Edison proposed the formation of a government research laboratory engaged in "science and inventions" to meet the defense needs of the nation.

His proposal received the strong support of the Secretary of the Navy, and, in 1916, Congress authorized the construction of the "Naval Experimental and Research Laboratory." Construction was completed in 1923. The materials effort began in 1927 when Robert Mehl formed the Division of Physical Metallurgy which occupied the foundry facility in Building 3. The technical programs and facilities of the Metallurgy Division were the country's first basic and applied research efforts in support of a military organization.

From 1927 on, the technical facilities and programs of the Metallurgy Division were state-of-the-art. Many significant developments occurred there. The inscription on the Historical Landmark plaque, presented to the Naval Research Laboratory for the Materials Science and Technology Building by ASM, details these developments. The plaque reads: "In this building, starting in 1927, pioneering work led to landmark developments in gamma ray radiography, defect-free steel castings, heavy section steel weldments and fracture mechanics concepts."

The Materials Science and Technology Division was nominated by Dr. B.B.Rath, Materials Science and Component Technology Directorate, Naval Research Laboratory, and endorsed by ASM's Washington D.C. Chapter. Approximately 150 people attended the ceremony, held at the site. Accepting the ASM Historical Landmark plaque for the Naval Research Laboratory was Captain Paul G. Gaffney II, Commanding Officer, and Dr. Rath.

The ASM Historical Landmark award was established in 1969 to preserve our engineered materials heritage while at the same time providing a means to increase the awareness of pioneering milestones in engineering materials technology. Thus far, ASM Historical Landmarks are located in 24 states of the United States, including Washington D.C., two provinces of Canada, and two states of Mexico, as well as in Austria, Brazil, England, France, Germany, India, Italy, Japan, Spain, Sweden, and Wales. Some recipients of note include the Eiffel Tower, the Great Iron Ranges of Minnesota and the Statue of Liberty.

For more information on ASM awards and honors, please contact Ms. Wendy Taylor, ASM International, Materials Park, OH 44-073. Phone (216) 338-5151, ext. 614; fax (216) 338-4634.

Focus on Science and Math in K-12 Grades with School Partnerships Initiative

ASM International is leading the initiative to increase interest in math and science concepts at the kindergarten through 12th grade levels with a new "how to" video program and booklet titled "School Partnerships: Something I Can Do?" The video program, produced by the ASM Foundation for Education and Research with the assistance of the National Science Foundation, demonstrates, in a step-by-step format, how scientists, engineers and sponsoring organizations can establish meaningful, long-term partnerships with their local school districts and schools. The partnerships involve classroom visits by professionals structured to provide children with role models in the fields of science and engineering, thus increasing their interest in pursuing a career in these areas. The video program was created as a result of the high level of interest in school partnership initiatives from industry, academia, the community, and more than 85% of science and engineering professionals surveyed.

More than 1,000 kindergarten through 12th grade students throughout the nation and their teachers have already participated in the ASM School Partner-

ships Program with ASM members as the engineer or scientist partner working closely with teachers. The ASM member partners have shown students that math and science can be fun, with practical, hands-on demonstrations and activities. These activities emphasize real-world applications for science and math concepts.

ASM believes that the proven ideas in this program and the creation of partnerships at the grassroots level will help to initiate improvement and reform for U.S. pre-college science and mathematics education as a whole. Although targeted to scientists and engineers, this program is fundamental. It is useful for anyone interested in improving science and math education for young people. It introduces teachers to engineers, instructing them on how to utilize their technical expertise in the classroom. It introduces engineers to teachers and shows them how to work effectively with students.

Components of the complete package include:

The "School Partnerships: Something I Can Do" Introductory Video. Accompanied by a fact sheet, this 15 minute video features an overview of the Partnerships Program from the perspectives of the engineers, teachers and students who have participated in successful partnerships. ASM will also be sharing this video with a number of leading representatives in the engineering, materials and academic communities.

The "School Partnerships: Something I Can Do" In-Depth Instructional Video. This two-hour video shows both teacher and engineer volunteers how to: establish partnerships between the engineering community and local schools; work more effectively with students, teachers and engineers; make effective hands-on presentations; and establish solid working relationships between the engineers, teachers and the facilitating organization (an educational or scientific society).

A booklet supporting the in-depth instructional Video. This 10 page booklet includes instructions on how to find a partner, establishing the partnership, finding resource materials available from ASM and the academic and engineering communities, and planning and presenting effective activities in the classroom.

To obtain the free 15 minute introductory video and booklet, or to order the two-hour instructional video, contact: ASM Member Services Center, Materials Park, Ohio 44073. Phone (216) 338-5151. Fax (216) 338-4634. For more information about any of ASM's Student Outreach initiatives, including career awareness programs and resources, scholarships, awards, competitions and school visitation support, contact the ASM Student Outreach Program.

Conferences and Training Programs

SSPC 1994 Conferences and Training Programs

SSPC 94 Annual International Conference and Exhibition, November 11 - 17, Atlanta Georgia, is designed exclusively for the protective coatings industry. A comprehensive educational program, expansive indoor and outdoor exhibits, social events, and a painter competition create a unique opportunity to meet and discuss protective coatings issues with the leader in the industry. SSPC 94 brings together contractors, owners, suppliers, specifiers, and safety and environmental professionals.

The seminar theme of the technical program is "Managing Costs and Risks for Effective and Durable Protection" where 50 papers will be presented in 14 seminars. There will be 15 tutorials, including SSPC's two-day tutorial on Industrial Lead Paint Removal and Abatement and 35 Technical Committee Meetings where members work on new or revised industry standards

The exhibit includes approximately 250 indoor booths and 30 outdoor exhibits providing equipment demonstrations. Exhibitors include manufacturers and suppliers of paint and coatings; floor toppings; abrasives and surface preparation equipment; containment and environmental control systems; scaffolding; paint application equipment; respiration or other safety equipment; waste management and disposal services or equipment; solvent recovery equipment; over spray removal systems; raw materials for coatings; industrial painting contractors; specialty linings; thermal spray; shop application; consulting and testing firms: engineering, laboratory testing and research; inspection and failure analysis; environmental or industrial hygiene services and testing; and training providers.

Special events include an international painter competition, video viewing area, display of new technologies, SSPC Annual meeting, keynote luncheon, SSPC reception and awards banquet, local tours and social programs.

Contact Steel Structures Painting Council, 4516 Henry Street, Suite 301, Pittsburgh, PA 15213-3728. Phone (412) 687-1113, Fax (412) 687-1153.

Course on Specifying and Managing Protective Coatings Projects

SSPC presents a five day course (Los Angeles from September 19-23 or Atlanta from November 12-16) designed to enhance the skills of coatings specifiers, plant and facility managers, coatings application supervisors, and coatings sales and technical personnel. The course structure includes the following 7 units: UNIT 1: Achieving Economical Protection with Coatings; UNIT 2: Developing Standards and Specifications; UNIT 3: New Construction Painting; UNIT 4: Planning for Maintenance Painting; UNIT 5: Contracting for Quality Work; UNIT 6: Coating Failure Analysis; and UNIT 7: Environmental and Safety Regulations

Contact Krista Hughes, Education Programs Coordinator, Steel Structures Painting Council, 4516 Henry Street, Suite 301, Pittsburgh, PA 15213-3728. Phone (412) 687-1113, Fax (412) 687-1153.

Do you have literature or news you would like highlighted in this feature? Send your contribution to the Editor.

SSPC 1995 Lead Paint Removal Conference

The SSPC Eighth Annual Conference on Industrial Lead Paint Abatement and Removal will be held on January 30 - February 1 at the Marriott Airport Hotel in St. Louis, Missouri. The conference will comprise 20-25 presentations; panel discussions; SSPC committee sessions on lead paint removal, worker protection, and certification training; demonstrations of equipment; and an exhibit of products, equipment, and services.

The purpose of the conference is to help facility owners, contractors, specifiers, regulators, industrial hygienists, and others comply with technical and regulatory requirements of lead paint abatement and removal. Included will be the most current information on new technology, regulations and enforcement, alternative procedures, owner and contractor activities, and case histories that illustrate the successes and shortcomings of various strategies for dealing with lead paint abatement and removal. Emphasis is on economically feasible techniques and strategies; novel approaches with further potential are encouraged.

Authors are invited to submit original papers on the following conference topics; EPA requirements for training and certifying workers and supervisors; developing, implementing, and evaluating state programs to comply with Title X; enforcement of and compliance with the OSHA Lead Standard; controlling and monitoring lead dust emission to meet handling, testing, and disposal of hazardous and non-hazardous waste; costs of litigation, insurance, and fines; engineering controls and other strategies to reduce worker exposure; owner experiences with overcoating, steel replacement, and other alternatives; containment techniques, costs, and effectiveness; innovative materials and techniques for lead paint abatement; and experiences at petrochemical facilities, pulp and paper mills, manufacturers; and facilities, power generation facilities, and other private sector operations.

For additional information contact SSPC, Steel Structures Painting Council, 4516 Henry Street, Suite 301, Pittsburgh, PA 15213-3728. Phone (412) 687-1113, Fax (412) 687-1153 or Norma Fleming, University of Missouri, 119 ME Annex Rolla, MO 65401-0249, Phone (314) 341-6061, Fax (314) 341-4992.

Fourth World Congress on Bridge Coatings

The Fourth World Congress on Coatings Systems for Bridges and Steel Structures is scheduled for February 1-3 at the Marriott Airport Hotel in St. Louis, Missouri (the same location as the SSPC Eighth Annual Conference). All conference participants will receive a proceedings containing the papers presented at the conference. For additional information contact SSPC, Steel Structures Painting Council, 4516 Henry Street, Suite 301, Pittsburgh, PA 15213-3728. Phone (412) 687-1113, Fax (412) 687-1153 or Norma Fleming, University of Missouri, 119 ME Annex Rolla, MO 65401-0249, Phone (314) 341-6061, Fax (314) 341-4992.

Symposium on High Temperature Coatings

TMS Surface Modification and Coatings Technology Committee and Materials Design and Manufacturing Division is holding this symposium at the 1994 TMS Fall meeting (October 2-6, 1994) Rosemont, IL).

The symposium will focus on processing and characterization of high temperature coatings with regard to engineering, physical, and chemical properties. The synthesis of new and unconventional coating materials will also be included. Various existing methods along with novel and innovative techniques of producing coatings and their applications in a variety of environments will be addressed. The symposium will also cover performance and removal of these coatings in compliance with environmental requirements. Some of the key areas to be explored include, but are not limited to: High temperature ceramic coatings; High temperature intermetallic coatings; High temperature composite coatings;High temperature metallic coatings; Tribological coatings; Characterization techniques for coatings; Repair of coatings; and Removal of coatings.

All invited and contributed papers at the symposium will be published in a proceedings format. For more information contact: Dr. Narendra B. Dahotre, Center for Laser Applications, MS 24, University of Tennessee Space Institute, Tullahoma, TN 37388-8897, Phone (615) 393-7495, Fax (615) 454-2271 or Dr. Jacob J. Stiglich, P.O. Box 206, Sierra Madre, CA 91025, Phone (310) 944-6244, Fax 31 0-944-2485.

Fundamentals of Corrosion and its Control

This three-day course (November 1-3, 1994, Wrightsville Beach, NC) provides a basic understanding of why corrosion occurs, how to recognize it, what are the different forms it takes, how it affects various materials, and what can be done to prohibit or control it. Anyone who either does not have any prior knowledge of corrosion, or desires a refresher course on the fundamentals of corrosion and corrosion control should attend.

Topics covered include:

1. Basic metallurgy of metallic materials and relationship to corrosion susceptibility.
2. Basic chemistry and electro-chemistry of aqueous corrosion.
3. Types of corrosive environments.
4. Forms of corrosion and corrosion terminology.
5. Methods of corrosion control (selection of suitable material(s), modification of the environment, coatings, catholic protection).
6. Common corrosion test methods and how results are typically reported

DuPont Plunkett Student Awards for Innovation with "Teflon"

The DuPont 1994 Plunkett Student Awards for Innovation with "Teflon", sponsored by DuPont, recognizes the best examples of student innovation in fluoropolymer technology. With a total prize purse worth upwards of $30,000, the competition evaluates new applications and application concepts for the family of "Teflon" fluoropolymer resins submitted by students pursuing degrees in accredited trade schools, technical institutes, colleges and universities in the United States.

The student awards competition is endorsed by the Industrial Designers Society of America (IDSA) and the National Association of Corrosion Engineers (NACE International). They are held in alternating years with the biennial DuPont Plunkett Awards for Innovation with "Teflon." which focuses on recently commercialized applications of "Teflon" and "Tefzel." which focuses on recently commercialized applications of "Tefzel" and "Tefzel" by processors, fabricators, and end-users.

A five-member independent panel of distinguished scientists, journalists and industrialists judges the competition. The 1994 judges panel comprises: Dr. Emanuel Horowitz, Professor, Johns Hopkins University and National Institute of Standards and Technology Gold Medal Recipient; Dr. James E. McGrath, Director, Center for High Performance Polymeric Adhesives and Composites, Department of Chemistry, Virginia Polytechnic Institute and State University; Gary Chamberlain, Senior Editor, Design News; Drew C. Azzara, Vice President, American Society for Testing and Materials (ASTM) , and Hugh Patrick Toner, Vice President, The Society of the Plastics Industry, Inc. (SPI).

Launched in May, 1993, the first year of the competition attracted requests for entry forms and more information from more than 550 students and professors all over the country. Judging was held at the end of February and winners publicly announced at a special Awards event in Wilmington, Delaware, in April, 1994.

Winning entries must demonstrate both innovation and potential for commercialization that can open or expand markets for fluoropolymer technology. Students are required to submit a prototype or a paper on a reducible-to-practice application, both with supporting information, using either "Teflon" or "Tefzel" fluoropolymer resins.

The First Place winner is offered an option: a summer internship with DuPont Fluoropolymers, valued at approximately $10,000, or a $3,000 cash award. Second and Third Place winners earn cash awards of $2,000 and $1,000 respectively. Cash awards are given for ten honorable mention selections. The Awards winners and their faculty advisors receive all-expenses-paid trips to the Awards event. Scholarships are awarded to the schools of the top three prize winners and cash honorariums are given to the faculty sponsors of winning students.

The DuPont 1994 Plunkett Student Awards For Innovation With "Teflon" includes a distinctive partnership between academia and industry, matching requesting students with industry advisors who have volunteered to provide additional consultative assistance to students in the preparation of their entry. Scholarships to the institutions of choice of the industry advisors of the winning students also are awarded.

Full-time students, working individually or in teams, are eligible to enter. The competition is open to juniors , seniors and graduate students. Faculty sponsorship is required. Information or entry forms are available from: The DuPont Plunkett Student Awards 400 North Capitol Street, N.W. - Suite 550, Washington, D.C., 20001. Contact: Anne McIntosh, Phone (302) 999-6738.

Award for Thermal Spraying of "Tefzel"

Jeffrey A. Brogan and Srikanth Reddy, graduate students at State University of New York at Stony Brook, The Thermal Spray Laboratory, received Honorable Mentions for their work on the Spray Forming of Graded Composite Components Using "Tefzel." Their faculty advisor was Christopher C. Berndt.

This entry focuses on thermal spray technology as a manufacturing process to rapidly fabricate unique coatings or free standing forms. Thermal spraying of polymers, such as "Tefzel" fluoropolymer resin, is an ideal process for coating a wide variety of materials with specific material properties. This technique can be extended to manufacture

Srikanth Reddy (Left), Jeffrey A. Brogan (Middle), State University of New York at Stony Brook and Business Director, Fluoropolymers Americas, James Keegan (Right).

shapes of complex geometry, thus eliminating the need for dies and molds. An additional attribute is the ability to form graded composite structures. For example, 100 percent of "Tefzel" powder may initially be deposited with increasing amounts of aluminum powder, such that the final layer is 100 percent aluminum. Thus, by spraying against a removable rotating mandrel a net shape in the form of an aluminum pipe lined with "Tefzel" can be manufactured. Thermal spray offers one of the simplest and fastest means for producing a variety of composites utilizing " Tefzel."

Contact: C.C.Berndt, State University of New York at Stony Brook, The Thermal Spray Laboratory, Department of Materials Science and Engineering, Stony Brook, NY 11794-2275, Tel: (516) 632-8507, Fax (516) 632-8052.

ITSA Opens Scholarship Program to Universities Worldwide

International Thermal Spray Association (ITSA) Scholarships Chairman Albert Kay announced today that ITSA will increase its number of scholarships and extend eligibility to students in graduate thermal spray programs at accredited universities throughout the world. The Program will now offer three

scholarships of $1,500 each year to students enrolled in graduate programs for thermal spray coatings or processes. The student must demonstrate financial need based on the recommendation of his professor, have at least one year of studies remaining; be recommended by his professor and by at least one industrial sponsor; and have a GPA of 3.0 or better. Students should submit a letter to Chairman Kay detailing their interest in pursuing a career in thermal spray, along with two letters of recommendation from his or her instructors. All paperwork, in English, must be submitted to Chairman Kay at International Thermal Spray Association, 1031 Lambert Street, Barberton, OH 44203-1689, U.S.A., Fax (216) 753-8458.

In making the announcement, Chairman Kay noted that the expanded program better reflects the globalization of the ITSA membership and supports the association's goal of quality growth of the thermal spray industry worldwide. The scholarship program, initiated in 1991, awarded two scholarships each year to students from North American universities. Awards of $1500 each were made in 1991 to Mahesh Mohanty of Drexel University and Lysa Wasielesky of State University of New York at Stony Brook (SUNY); in 1992 to Robert Gansert and Jan Ilavsky of SUNY; and in 1993 Karlis Gross of SUNY and Ravi Bhatkal of Rensselaer Polytechnic Institute. The 1994 awards were made to Jeffrey A. Brogan and Srikanth Reddy of SUNY at Stony Brook and Timothy Hussey of Drexel University.

Advanced Technology Program Award in Thermal Spray

Caterpillar Inc. (Peoria, IL) has been awarded $1,995,000 for a three year effort on the subject of "Functionally Gradient Materials - Synthesis, Process and Performance." This R&D program, managed by The National Institute of Standards and Technology and funded by The Department of Commerce, kicked off in March 1994 and is matched by private sector funds which are estimated to be $1,557,000.

Caterpillar proposes to develop a trio of metal and ceramic deposition technologies to form the basis for a cost-effective method of applying functional gradient materials (FGM) coatings. FGM is a technique for producing high-performance coatings on relatively inexpensive base materials such as steel in which the mix of components in the coating changes continuously from the base material. The varying composition allows the use of much thicker coatings that better match the substrate, by minimizing differences in thermal expansion, for example.

For instance, gears and bearings with engineered FGM surfaces can have such superior wear resistance and strength that they can be made much smaller. Transmissions and gear boxes for heavy equipment can be built lighter and smaller, reducing overall cost. FGM coatings on the cutting surfaces of drilling and earth moving equipment can extend wear life dramatically.

The current technology faces problems with adhesion of the coatings and material costs, among others. Caterpillar proposes to attack these problems by evaluating spray deposit consolidation (SDC) and high deposition spray processing (HDSP). SDC is a combination of processes for applying thermomechanical stress to forge a tough metallurgical bond between substrate and coating. HDSP is a new thermal spray technique which lays coatings down 10 to 20 times faster than conventional techniques, and can use much coarser powdered materials at a considerable reduction in cost.

Caterpillar will work with several partners to develop the technology, including Hoeganaes Corp., a powder manufacturer; the State University of New York at Stony Brook, a well-known center for coatings research; Chaparral Steel, a technologically progressive steel producer; St. Louis Metallizing, a major thermal spray house; and IBIS Associates, Inc., business analysis experts.

Contact: Kieth H. Butterfield, Phone (309) 675-1307 of Caterpillar, Inc. for further information.

Company News

Sulzer to Purchase Perkin-Elmer's Metco Division

The Perkin-Elmer Corporation (Norwalk, CT-USA) and Sulzer, Ltd. (Winterthur, Switzerland) announced that they have signed a letter of intent to sell Perkin-Elmer's Metco division to Sulzer. The transaction is subject to final negotiations and approval of the relevant government authorities.

Sulzer is an international technology corporation with major activities in medical implants, weaving machinery, and building services with revenues of SFr 6.8 billion ($4.7 billion) in 1992. As part of Sulzer's ongoing efforts to concentrate activities on core competences, the purchase of Metco is an important step to providing superior global service in materials technology. Sulzer's Surface Tech division and Metco complement each other on a product, as well as a geographic, basis and together will be optimally positioned to address the requirements of the thermal spray market.

Sulzer has a long tradition in materials technology and has been engaged in the thermal spray coatings industry since 1985 through its Sulzer Surface Tech division. Globally, Surface Tech has 280 employees and generated sales of SFr 80 million ($55 million) in fiscal 1993. Metco is globally active in the design, manufacture and marketing of thermal spray materials and equipment for coating high performance machine parts, as currently used in the aircraft, automobile, gas turbine, printing, and textile industries. Metco had slightly over $100 million in sales in fiscal 1993 and employs 585 people worldwide.

The sale of Metco by Perkin-Elmer represents one of the final steps in its program to transform itself from a high-technology conglomerate to a focused analytical and biotechnology instrumentation company. The Perkin-Elmer Corporation is the world leader in the manufacture, development, and distribution of analytical instruments and life science systems used in markets such as environmental, biotechnology, chemical, food and agriculture. Headquartered in Connecticut, Perkin-Elmer had $1 billion in revenues in fiscal year 1993 and employs 6,500 people worldwide.

Contact: Julianne Grace, The Perkin-Elmer Corporation (203) 761-5400 or

Cyril Meier, Sulzer, Ltd., Switzerland, 41-52 262 20 17.

Exploring the World of Weld Technology

The Welding Branch of the Naval Surface Warfare Center (Carderock Division) provides welding, thermal spray, and nondestructive evaluation technology which is critical to building and maintaining the cost-effective Navy and maritime fleets. In support of these efforts the branch owns and operates more than 30 state-of-the-art welding facilities at Annapolis.

The branch collaborates with other Divisions to provide support as well as works with other DoD and government agencies, private industry, academic institutions and six foreign countries through various technical collaboration programs. The branch's funding is vertically integrated incorporating more than 50 programs which range from basic research and development to modeling to manufacturing. The 20 professionals in the branch focus their R&D efforts in welding consumables, weld automation and control, weld engineering, nondestructive evaluation and thermal spray technology.

For the past five years, the Welding Branch has been helping the shipyard and repair facilities set up their own thermal spray shops. Additionally, shops were set up on USS Shenandoah, USS Yellow Stone, and USS Puget Sound. Currently, they are setting up shops for shore activities. For these efforts, the branch's Thermal Spray Technology team headed by Bob McCaw, surveyed the facilities, purchased the necessary equipment, developed training programs, certified the workers and performed audits to ensure the shops were following specifications. Another large effort involved thermal spraying the Seawolf propulsor to rebuild its surfaces. This was done on an emergency basis to ensure the propulsor met its scheduled completion date.

Extracted from "Wavelengths, the official publication of the Carderock Division, Naval Surface Warfare Center, March 1994.

FLOW Facts

Flow International Corporation (FLOW) manufactures ultrahigh-pressure waterjet and abrasivejet technology for industrial cutting, drilling, and cleaning. Since 1974, FLOW has delivered approximately 3,000 waterjet and abrasivejet systems to a variety of industries in 45 countries, accounting for more than 60 percent of worldwide sales of such systems.

FLOW's ultrahigh-pressure intensifier pump pressurizes water up to 55,000 psi and forces it through a small nozzle, typically 0.004 inch in diameter, generating a high-velocity waterjet at speeds of up to 3,000 feet per second. This waterjet capably cuts a variety of nonmetallic materials. To cut metallic or hard materials, FLOW developed and patented a device that entrains abrasives into the waterjet to enhance cutting capability. This abrasivejet, the PASER, cuts virtually any material without causing heat-affected zones. The PASER system offers more than 100 hours of continuous cutting without need for adjustment.

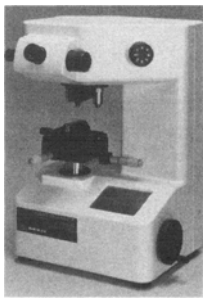
FLOW's waterjet and abrasivejet systems are now being used, among many applications, in the following industrial cutting and cleaning applications: **Aerospace and defense** (waterjet cutting of uncured pre-impregnated and cured composites, Waterjet removal of jet engine component coatings) and **Automobiles** (shape cutting of instrument panels, carpets, door panels, headliners, bumpers, fascia panels, window glass, mirrors, and other interior and exterior components, and cleaning of car body carriers, paint booths and racks).

Contact Flow International Corporation, 23500 - 64th Avenue South, P.O. Box 97040, Kent, Washington 98064-9740, Phone (206) 850-3500, (800) 446-3569, Fax (206) 813-3285.

Products and Services

Buehler Micromet 2004 Microhardness Tester

From Buehler Ltd. comes the new Micromet 2004. Featured is a digital display with user friendly menu icons, auto turret performance of loading and return to measuring objective, and a non-rotating eyepiece for ease of use. Knoop or Vickers microhardness tests can be performed on a variety of materials including electronic components, composite materials and other super alloy materials.

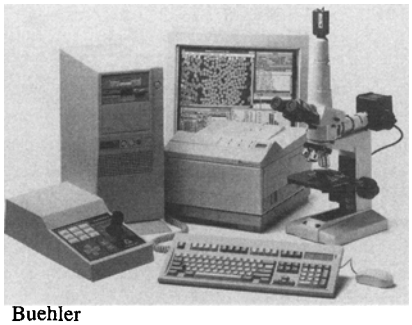


Buehler Ltd.

For further information: Keith Kohout, Buehler, 41 Waukegan Road, Lake Bluff, IL 60044-1699 Phone (708) 295-4557, (800) 283-4537, Fax (708) 295-7979.

New Image Analysis Systems for Materials Analysis

The Buehler Omnimet 3 and 4 Image Analysis Systems combine advances in hardware and software to characterize the microstructures of materials. Both ferrous and non-ferrous materials, composites, ceramics and geological materials are quickly and accurately analyzed. Windows-based operation ensures ease of operation and a short learning curve. A three-day laboratory image analysis course is available.



Buehler

For further information: James Ries or Don Zigament, Buehler, 41 Waukegan Road, Lake Bluff, IL 60044-1699 Phone (708) 295-4557, (800) 283-4537, Fax (708) 295-7979.

High Velocity Spray System

INCOR, Inc., Innovative Coatings Technology, is a new company which will initially market and manufacture the innovative HV3 high velocity thermal spray system designed to apply a wide range of tungsten carbide materials. The HV3 features a revolutionary proprietary burner, nozzle, and control techniques enabling the system to achieve high quality coatings, high DE rates, and simple user interface. The HV3 is a portable unit utilizing easily obtainable, non-exotic fuel. The HV3's capability to apply high quality coatings combined with a low operating cost make it a major innovation in the coating industry.

For more information about the INCOR, Inc. HV3 coating system, contact Randy White at Phone (214) 333-2713, (800) 483-0099, Fax (214) 331-2680.

Vacuum Spray Services from ProTeC, Inc.

ProTeC Inc. of Montreal, Quebec, is a company offering vacuum plasma spray services to the aerospace , industrial turbine and biomedical business sectors.

Requirements for the appropriate powders lead ProTeC to request your latest company literature regarding product availability, shipping, etc. For manufacturers, an indication of the quality standards to which your company subscribes is required. A preference is given to suppliers fulfilling the requirements of the appropriate ISO 9000 standard.

Contact: ProTeC Inc., A Hackelsperger, 1744 William St., Montreal, Quebec, Canada, H3J 1R4, Phone (514) 937-6464, Fax (514) 937-5757.

Sermatech Expands Service Offering

Sermatech International has expanded its scope of services through the creation of a new division - Sermatech Onsite Services (S.O.S). s.o.s. offers new coating technologies for industrial applications outside of rotating equipment, Sermatech's traditional specialty.

Recent applications of S.O.S products have included powdered plastic coatings. Sermatech applied powdered plastic, using a flame spray system, to butterfly valves used at a fossil-fueled power plant. The customer benefits included excellent abrasion and erosion resistance. Powdered plastic is a good choice for on-site application because it has no Volatile Organic Compounds (VOC) and can be performed with minimal impact on plant operations.

[Extracted from Sermatech Review, Winter 1994, Number 47-I, page 4. Contact: Michael J. Stock, Editor, Sermatech International Incorporated, 155 S.Limerick Road, Limerick, PA 19468-1669. Phone (610) 948-5100, Fax (610) 948-0811.]

Sermatech Restores Gas Turbine Disks with Rotor in Place

Sermatech has developed a special technique for coating the turbine section disks of Westinghouse W251 and W501 gas turbines on-site, without disassembling the entire unit. The unique procedure requires that only the upper turbine shell be opened. Turbine disk restoration with the rotor in place saves significant time and cost relative to the potential disassembly of the turbine and replacement of the disks. Estimated time savings are from two to four weeks in downtime on a gas turbine when compared to disassembling the unit. The company recently coated the disks of a Florida utility's W501 gas turbine using this process.

With the rotor in place, Sermatech performed its two-step coating method to restore and protect the fir tree sections of the turbine disks. First, a thermal spray coating was applied to dimensionally restore the "non-pressure side" dovetail surfaces. Next, a Sermatech coating was used to inhibit future corrosion. Sermatech's gas turbine disk restoration service solves a phenomenon which is known as "bucket rock". Bucket rock occurs when wear and corrosion in the dovetail area of gas turbine disks cause blades or buckets to wobble. This can lead to overstress, loss of sealing pins, radial rub, and in worst case scenarios, blade ingestion.

Sermatech can perform this service for GE and Westinghouse units in a variety of equipment configurations - on individual disks or stacked rotors in one of its coating facilities; on-site on a stacked rotor out of the unit; and for W251 and W501 turbines, on-site with the rotor in place. For more information, contact Luke Hilty at Sermatech Southeast, Phone (407) 582-6080.

[Extracted from Sermatech Review, Spring 1994, Number 48-I, page 1. Contact: Michael J. Stock, Editor, Sermatech International Incorporated, 155 S.Limerick Road, Limerick, PA 19468-1669. Phone (610) 948-5100, Fax (610) 948-0811.]

Ultrahigh Pressure Hand Tool to Remove Coatings

With rapid rotation speeds and ultralight weight, FLOW's new hand tool, the A-3000, is a light-weight, high-efficiency, ultrahigh-pressure hand tool rated for 45,000 psi surface preparation work.

FLOW's new hand tool combines ultrahigh pressures with relatively low volumes of water and extremely high nozzle rotation speeds. This versatile tool gives excellent removal rates while generating a minimal amount of waste water. Rotating a variety of multiple-orifice tips at up to 3,000 rpm, this tool delivers up to 2 gallons per minute of ultrahigh-pressure water. It is rated for operating pressures of up to 45,000 psi (3,000 bar).

Epoxies, resins, paint, rust, scale, calcium deposits, oxides and other materials that formerly had to be removed by environmentally unfriendly burning, sandblasting, mechanical action or chemicals can now be removed using only ultra-high-pressure water. Because it is pneumatic, this hand tool can be powered by the on-board air compressor of the HUSKY pump or attached to any other supply of compressed air. The risk of oil spills present with hydraulic-powered tools is eliminated.

Features of the A-3000 include an adjustable tip rotation from 0 to 3,000 rpm, remotely located on/off valve allows for greatly reduced tool weight and increased flexibility, FLOW's patented ultrahigh-pressure swivel design allows for quick change of bearing seals and overall ease of maintenance, and the A-3000 runs from any compressed air

source with greater than 32 scfm at 90 psi.

Contact Flow International Corporation, 23500 - 64th Avenue South, P.O. Box 97040, Kent, Washington 98064-9740, Phone (206) 850-3500, (800) 446-3569, Fax (206) 813-3285.

Research on Thermal Spray for Infrastructure

The Thermal Spray Laboratory (TSL) at Stony Brook (Long Island, NY) is carrying out cooperative research with the Construction Engineering Research Laboratory (CERL) of the US Army Corps of Engineers (Champaign, IL), the New York Science and Technology Foundation (Albany, NY) and the Steel Structures Painting Council (Pittsburgh, PA) in several areas that are related to rehabilitation and preservation of infrastructure. Brief descriptions of the programs are detailed below.

Thermal Spraying of Polymers

Increasingly restrictive environmental regulations regarding volatile organic compounds (VOC's) and heavy metals will soon eliminate the use of many existing industrial coatings to protect steel structures from the effects of corrosion. Current low VOC and non-heavy metal containing coatings do not always provide adequate durability or protection of the coatings they replace. It is estimated that repainting will be required two to three times as often. Since the cost of labor to apply these coatings outweighs the cost of the coatings themselves, research is required to develop a new coating system with improved properties.

This collaborative CERL-TSL program is developing material specifications for various polymer coating blends for thermal spray applications. The initial phase of the program has confirmed the technical feasibility of employing thermal spray technology to process a wide range of polymers; including ethylene methacrylic acid copolymer, polypropylene, polyvinyl chloride, industrial polymer scrap and commingled post consumer polymeric material. Optimization of spray parameters has been performed to accommodate the given polymer composition, melt flow behavior, and particle size distribution. The current status of the program is to further optimize the deposits on the basis of specific physical properties, such as corrosion protection, adhesion, erosion resistance, chemical resistance, etc.

Coating field applications are to be assessed during the Fall of 1994 as well as materials performance monitoring conducted at DOT and marine transportation facilities in the NY/NJ region. The project aims to accelerate the transition of thermally sprayed low VOC coatings by the civilian construction industry to protect existing and future transportation infrastructures. The incorporation of recycled and post consumer commingled polymers will also greatly expand the market for these environmentally significant and extremely cost effective materials.

Removal of Lead-based Paints from Steel Structures

It has become clear that lead-based paints and primers used on bridges and for general road maintenance are the dominant source of lead contamination (red lead) in the waterways and rivers. One main problem is the removal of lead-based paint from steel bridges without contaminating the surrounding areas. One method used for organic lead based primers and coatings removal has been a flame spray process which utilizes a glass/ceramic compound designed for high lead solubility and resistance to devitrification. Several compositions of glass were developed at CERL and evaluated for use. The two glass systems which exhibited the best results belong to the lead borosilicate and the lead alkali silicate systems.

This collaborative CERL-TSL program employs the flame spray technique; whereby the glass feedstock powder is injected into a gas stream and passed through a combustion flame where it becomes molten. The molten powder is projected onto the substrate where it interacts and effectively encapsulates and binds up the lead containing paint. This technique enables the paint to be removed by scraping the vitrified coating which encases the lead contaminant. Since this process does not generate lead dust particles it provides an environmentally safe option for the efficient *in situ* removal of lead-based materials.

Automated Infrastructure Maintenance

Infrastructure maintenance has become one of the most pressing issues facing the Department of Transportation today. The cost for comprehensive repair of such structures is estimated at billions of dollars which puts a significant burden on the limited budget of the agencies involved. Currently, most maintenance projects are carried out using methods such as containing the structure during the process of cleaning all rust, dirt and the existing paint, and then manually applying a protective coating. This method is extremely expensive and time consuming, while not affording long term protection to the steel.

The issues presented above have prompted a joint CERL-TSL project to design an automated system that would integrate existing infrastructure maintenance tools into a robotic linear motion system. In order to solve the environmental problems associated with the removal of lead-based paints from steel substrates, a vacuum blasting system was chosen as the primary removal method, which provides total containment of debris and dust generated by the process. The cleaned surface can be examined using a video camera that is attached to the tool loading plate. Wire arc technology was selected to spray metalize the structure since this method has been used extensively in Europe, and increasingly in the US, to provide substantial long term (30 years) protection of metal substrates against corrosion.

Thermal Spraying of Zinc onto Concrete

In this program, sponsored by the New York Science and Technology Foundation, optimization of the thermal spray process with respect to bond strength, freeze/thaw cycling and deposition efficiency were examined. The experimental work was performed in collaboration

with Brookhaven National Laboratory (Upton, NY) and Flame Spray Industries, Inc. (Stony Brook, NY).

Almost 23.5% of the 577,710 bridges in the US are structurally deficient, and a significant fraction of these are constructed of concrete. Bridges and other reinforced concrete structures deteriorate due to the corrosion of the reinforcement steel, usually caused by chloride ions from the sea and from deicing salts used on roads, and by carbonation of concrete. The corrosion of the steel leads to the spalling of the concrete and loss of load bearing capability. Cathodic protection (CP) can be used to mitigate reinforcement corrosion and the application of a thermal sprayed zinc coating on the surface of the concrete is one type of CP system. This coating is used to complete the circuit in an electrochemical cell in which the coating is the anode and the steel reinforcement is the cathode. Therefore, by connecting the steel reinforcement to a DC power supply, the corrosion potential of the steel can be altered to a passive region so that corrosion is prevented.

The criterion of the bond strength of the thermal sprayed coating to a concrete surface is important since this often determines the acceptance of a coating by an industrial contractor. Deposition efficiency of the process (i.e., the amount of material that is sprayed onto the substrate compared to the amount of feedstock processed through the torch) is a vital measure of process economics and, therefore, directly related to the overall application cost. Both of these properties were optimized using Response Surface Methodology (RSM); a statistical technique which facilitates selection of spray parameters. The curves generated by this analysis provide simple maps of property (e.g., deposition efficiency and bond strength) with respect to the process parameters (e.g., gas flows rates, atomization pressure and stand-off distance). Other aspects of this research are aging of the concrete/coating system and the effect of freezing and thawing on the bond strength of the coating.

Coating Structural Steel Without Stringent Blasting Requirements

This cooperative program with the Steel Structures Protection Council (SSPC), TSL, Intermet and Copperlok holds promise for addressing a key problem - the maintenance of aged, lead-containing alkyd bridge paints.

Thorough blast cleaning is generally required when applying protective coatings to structural steel by painting and thermal spraying. This is undesirable in terms of costs, environmental contamination, and coating quality control when existing steel has lead-based paint present. The envisioned technology would drastically reduce surface preparation requirements and offer economical, long term protection by combining three recent innovations; (i) surface tolerant, high penetration primers, (ii) interlocking of primer and topcoat by embedding of hollow glass fly-ash microspheres in the primer and; (iii) use of advanced thermal spray and liquid applied zero VOC polymers to provide the primary environmental barrier.

Contact: C.C.Berndt or H.Herman, The Thermal Spray Laboratory, Department of Materials Science and Engineering, SUNY at Stony Brook, Stony Brook, NY 11794-2275, Phone (516) 632-8507, Fax (516) 632-8052

People In The News

ITSA Welcomes New Members

Supporting a program of quality membership expansion, the ITSA executive board officially welcomed nine new members to the association - reflecting a diversity and expanding international base that is expected to enrich the organization as a whole. Chairman Robert Dowell called the new membership roster, "an indication of the professionalism and quality that now characterizes the thermal spray industry in leading industrial nations. We are proud to welcome the following leading organizations from the academic, research and technical communities, materials and equipment manufacturers and contract thermal spray companies."

ASM International of Materials Park, OH, will be represented by **Robert Uhl**. ASM is the leading technical information society for engineered materials with more than 50,000 members in 280 chapters and 100 countries around the world. Brooks Aeronautical Service of Tulsa, OK, will be represented by **Main Canaan**. Brooks is a component repair and manufacturing facility for the aviation industry, specializing in thermal spraying, flame spraying, welding, machining and metal stamping. **John Simmons** represents Copeland Industries of Houston, TX, a provider of corrosion and erosion-resistant overlays. They offer an extensive line of spray processes and coatings for the refining, petrochemical, chemical, electrical and mining industries. **Dr. Ronald Smith** represents Drexel University of Philadelphia, PA. The Drexel Center for the Plasma Processing of Materials conducts leading edge research in plasma materials processing including specialty metals coatings, HVOF, powder metallurgy, ceramics, composites, superconducting oxides and other electronic materials. **Frank Luebke** represents Manluk Industries of Wetaskiwin, Alberta, Canada. Manluk is a hard-surfacing services firm which manufactures wear and corrosion-resistant components including pump plungers, shafts, valve seats and valve stems. **Michael Dabbs** represents Proto Space Engineering of South El Monte, CA. Proto provides general and specialty coatings using plasma spray, plasma transfer arc and hard-surfacing technologies. **M. Dean High** represents Pacific Environmental Services (PES) of Baldwin Park, CA. PES is a national environmental engineering and industrial consulting

firm, which helps its clients avoid environmental and occupational hazards.

Plasmatec of Boucherville, Quebec, Canada, is represented by **Michael Hacala**. They provide spray powders and brazing materials, as well as air, vacuum, and low pressure plasma spray systems. **Professors Herbert Herman** and **Christopher C. Berndt** represent SUNY at Stony Brook, NY. The Thermal Spray Laboratory at SUNY is currently engaged in more than a dozen research programs, including biomedical coatings, infrastructure, HVOF, near-net shaping and fatigue mechanics of ceramic coatings.

For information on ITSA membership, contact ITSA Member Services, P.O. Box 693, Glastonbury, CT 06033-0693 Fax (2030 657-2252

Goodspeed Promoted at Miller

Scott R. Goodspeed

Scott R. Goodspeed has been promoted to National Sales Manager for Miller Thermal, Inc., a full line manufacturer of thermal spray products in Appleton, WI. Mr. Goodspeed, who is based in Grafton, MA, will now be responsible for all domestic sales.

Service Awards of ASM Thermal Spray Division

The Thermal Spray Division is pleased to recognize outgoing members of the Council for their untiring service. Mark F. Smith (Thermal Spray Division Council Chairman), Daniel Parker (NTSC'94 Conference Chairman), Christopher C. Berndt and Sanjay Sampath (NTSC'94- Proceedings Co-Editors), Albert Kay (Commercial Development Group Chairman), Walter Riggs (Testing & Standards Group Chairman), Ronald Smith (Communications Group Chairman), Robert C. Tucker, Jr. (Science & Technology Group Chairman), and Herbert Herman, Frank J. Hermanek, David Houck, Jack Kittle, Jack Ritchie, and Saed Safai (Members-at-Large).

Daniel Parker Moves to Top Post at General Plasma

Daniel W. Parker

Derlan Industries Limited of Toronto, Ontario, Canada, has announced the appointment of Daniel W. Parker as president of the Coating Division of Derlan Aerospace/U.S. Mr. Parker replaces Terrence P. Swain who has been promoted to the position of President & CEO of Derlan Aerospace/U.S.

The Coating Division includes General Plasma Inc., Advanced Plasma Inc. and Sun Bioscience. The Coating Division will be headquartered at General Plasma in East Windsor, Connecticut. A leading international supplier of contract thermal spray coating services, General Plasma supplies its coatings to the aerospace, gas turbine, medical and automotive markets from its coating facilities in Connecticut and Massachusetts. Advanced Plasma Inc. provides coatings to the aircraft, gas turbine, textile, electronic and pulp and paper industries. The firm has facilities in North Carolina and Florida. Sun Bioscience, of Branford, Connecticut, produces and distributes products associated with biomedical research such as genetic reagents, centrifuges and imaging analyzers.

Mr. Parker has served as the chairman of the International Thermal Spray Association and is the immediate past chairman of the National Thermal Spray Conference that was held in Boston in June of 1994.

1993 ITSA Scholarship Awards

The ITSA's 1993 scholarships were awarded to two outstanding Ph.D. students to help them continue their work and advance thermal spray technology. Karlis Gross of SUNY in Stony Brook, NY, and Ravi Bhatkal of Rensselaer Polytechnic Institute (RPI) in Troy, NY, each received $1500 from the association. Both researchers hope to complete their graduate programs by the end of 1994 and are planning to continue their work in the thermal spray industry after graduation.

Karlis Gross and Ravi Bhatkal

Mr. Gross's interest in thermal spray began at Monash University in Australia where he earned a Masters degree in engineering and began work in biomaterials. He then became attracted to The Thermal Spray Laboratory at SUNY, which is under the direction of Professors Herbert Herman and Christopher C. Berndt. This laboratory is now engaged in many research programs including biomedical coatings, HVOF, infrastructure technologies and fracture mechanics of ceramic coatings.

At SUNY, Mr. Gross has continued to work with biomaterials. His thesis will detail the "amorphous phase" in hydroxyapatite coatings that are used in the preparation of prostheses. "The material I'm working with now can be used to build up broken bones as well as for coatings. It loves bone." said Mr. Gross.

Mr. Bhatkal came to RPI after earning a Masters degree in materials science and engineering at Vanderbilt University. Using plasma arc equipment, his graduate work has been to understand the microstructures of the coatings, and how the spray process parameters effect the microstructures. "The latest development in the industry is in producing thick coatings and free standing, solid forms," said Bhatkal who is also working toward an MBA degree. "One of the issues we are addressing at RPI is the development of thicker coatings for ceramics. I am also interested in applied research and development of coatings, and finding new applications. I want to help link basic research with the factory shop floor."

For more information on ITSA Scholarships, contact Albert Kay, Scholarships Chairman; ASB Industries, 1031 Lambert Street, Barberton, OH 44203-1689.