

The Last Word—The “Job Shop” Forum

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This issue's featured job shop is Cincinnati Thermal Spray, Inc. (CTS), a complete service job shop (Fig. 1). Complete service includes all thermal spray processes, lab facilities, and an engineering staff to help its customers solve application problems. Robert Betts, Technical Sales Manager, was interviewed, and this article is based on the interview with the application bulletins provided.

The CTS applications are divided evenly between commercial and aerospace applications. Commercial appli-

cations include plasma spraying of thermal barrier coatings on transition ducts (Fig. 2), cases, and other “hot-section” parts for land-based turbines. Steel mill rolls (Fig. 3), vibration dampening coatings, and abrasion-resistant coatings are also applied for automotive applications. Aircraft coatings include thermal barrier on combustion liners (Fig. 4), fan disk applications, and blade and vane coatings for wear, galling, and fretting resistance. Another application area for CTS is applying coatings on large steel mill rolls. CTS has applied for a patent for coating in a dedicated “Super Booth,” as shown in Fig. 5. The coating has high wear and heat resistance. Mr.

Betts went on to state that with good general management and a good sales force backed up by a quality program of service and technical expertise, CTS provides a diversified shop with versatility that will allow the company to grow.

Hot Topics

This new feature discusses one of the current, newer applications. This issue's topic is chromium plating replacement or coating alternatives to chromium plating. In the aircraft industry, having a coating as an alternative to chromium plating has been a hot topic for the past few years. The biggest application is on landing gear components, for which Lufthansa has been a leader in testing coatings applied by different HVOF systems including the Diamond Jet, JET KOTE, and the JP 5000 systems. Other organizations involved in this area include Boeing, Delta, and Northwest. The next year will bring more investigations using the HVOF and arc processes as OEMs in the aircraft industry look to make their manufacturing processes more environmentally friendly.

Next issue will feature a job shop that has focused on commercial coatings only and is a specialist on pump coatings.

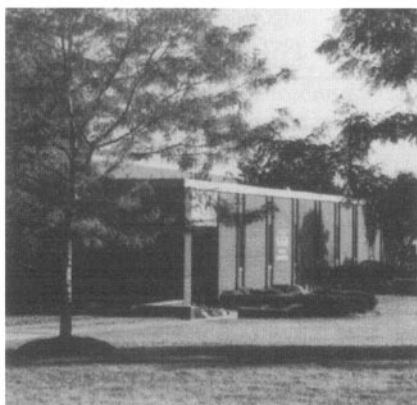


Fig. 1 Cincinnati Thermal Spray, Inc.

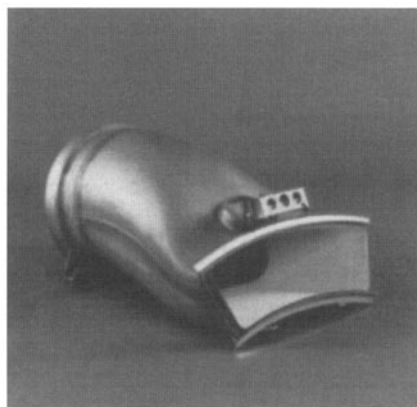


Fig. 2 Transition duct

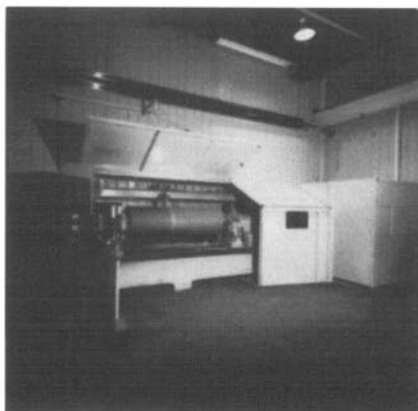


Fig. 3 Steel mill roll

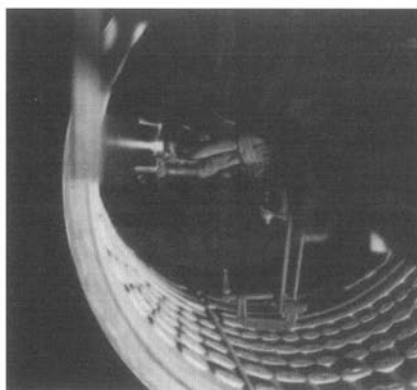


Fig. 4 Combustion liners

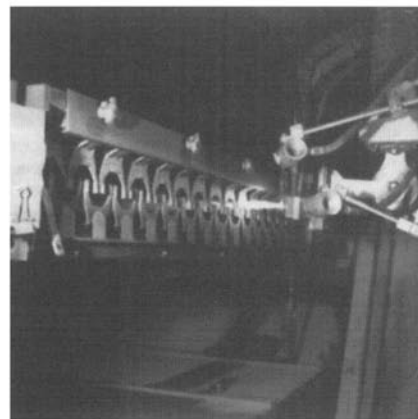


Fig. 5 Super Booth

ITSC '98—A MEMORABLE CONFERENCE

by Christopher C. Berndt, FASM

The 15th International Thermal Spray Conference (ITSC), held in Nice, France, 25-29 May, was a resounding success. More than 330 papers were presented and over 1000 people attended the conference and exhibition. The weighty proceedings of two volumes contained 271 referred papers.

The conference organizers, Prof. Pierre Fauchais, FASM, conference chair; Mr. Paul Lucchese, president, National Organization Committee; and Prof. Christian Coddet, president, Scientific Committee, are to be heartily congratulated for presenting a wonderful conference. The city of Nice, sitting on the French Riviera, was an ideal setting for this meeting;



T.E. Bloomer (left) was presented a Best Paper Award by Prof. Coddet for "In-Service Mechanical Property Degradation of CoCrAlY Coatings in Land-Based Gas Turbine Blades."



L.C. Erickson received a Best Paper Award for "Alumina Coatings by Plasma Spraying of Monosize Sapphire Particles."

providing both an excellent convention venue within the Acropolis Convention Center and sufficient distractions with the beaches and the old medieval Nice to sustain the conferee through a hard week of presentations and discussions.

A pre-conference 2-day advanced course on thermal spray was received with high praise from the attendees. Registration began on a high note on the Sunday where the attendees, along with the usual conference materials, were presented with gifts from Sulzer Metco (a truly excellent soft briefcase) and TAFE Incorporated (a bottle of fine French wine).

The daily conference format was to kick off the morning and afternoon sessions with keynote presentations from eminent authorities. These "state-of-the-art" summaries were followed by either three parallel sessions covering a diversified range of thermal spray themes or poster sessions. The posters were not only of excellent production quality and engineering content, but also acted as a focal point for meeting thermal sprayers throughout the conference. Additionally, the Exposition Hall was a bustling hive of activity with thermal spray equipment suppliers, feedstock manufacturers, service providers, universities, and the ASM Thermal Spray Society represented.

The conference participants were bused to the Palm Beach Hotel of Cannes on Thursday



J. Ilavsky (left) received a Best Paper Award for "Anisotropic Microstructure of Plasma-Sprayed Deposits."

evening for a night of dining, wining, and dancing. Alas, the party could not continue forever, and the conference sessions continued on the Friday morning. The final technical session of ITSC '98 strove to predict "Thermal Spray for the Next Millennium." The prime message is that thermal spray has a most promising future.

The final event of ITSC '98 was the Awards Ceremony to acknowledge the Best Papers and Posters of the conference, which were considered excellent by an impartial Awards Committee. There were also three new inductees presented

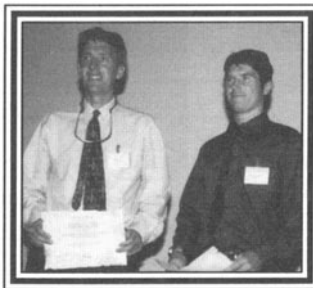
into the ASM Thermal Spray Society Hall of Fame (see related article).

By Friday afternoon, after countless hours of organization and administration, and then presentations, meetings, and discussions, ITSC was wrapped up with a total of 1,041 participants! This was a memorable event where thermal sprayers from around the world convened to both learn and to impart their knowledge on this fascinating science, which is a foundation for the engineering technologies being incorporated into every aspect of our lives.

(More ITSC '98 photos on page 322)



F. Gitzhofer (far left) and G. Schiller (center) received a Best Paper Award for "Preparation of Perovskite Powders and Coatings by RF-Suspension Plasma Spraying," which they authored with M. Muller. Prof. Christopher C. Berndt (right) chaired the award committee. Prof. Pierre Fauchais (second from right) was the ITSC Conference chair. Prof. Christian Coddet (second left) chaired the Scientific Committee for the event.



A.P. Newberry (left) and H. Llewellyn received a Best Poster Award for their poster entitled, "Development of an Electric Arc Sprayed Self-Lubricating Coating."



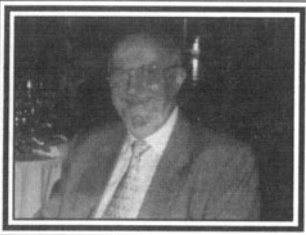
M. Jeandin (left) and P. Noel (right) were presented a Best Paper Award for "Oxidation Thermo-Mechanical and Novel Lattice-Gas Particle Deposition Modeling Aspects in Plasma Spraying of Ti-6Al-4V/ SiC Fiber Composites."

THERMAL SPRAY HALL OF FAME 1998 INDUCTEES ANNOUNCED

On behalf of the ASM Thermal Spray Society, an Affiliate Society of ASM International, TSS President Dr. Robert C. Tucker, Jr., FASM, has announced the 1998 Class of Inductees to the Thermal Spray Hall of Fame.

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

Prof. Pierre Léon Fauchais, FASM, chair, Department of



Prof. Pierre Fauchais, a 1998 inductee into the Thermal Spray Hall of Fame, has a significant place in the history of thermal spray.

Physics, University of Limoges, Limoges, France.

Prof. Fauchais has a significant place in the modern history of thermal spray because of his long-term research into the fundamental understanding of thermal plasma behavior, plasma-particle interactions, and coating formation. His pioneering work helped change the perception of thermal spray from an art to a structured science. He is known as a father of thermal spraying research in France and is respected throughout the world for his 30 years of technical leadership.

Mr. Moses A. Levinstein, manager of Coating Development (Retired), General Electric Aircraft Engine, Cincinnati, Ohio.

While at GE, Mr. Levinstein—who has been described as having an “infectious enthusiasm for thermal spraying as a technology”—first introduced sprayed coatings into GE turbines and became obsessed with promoting thermal spraying within the company and throughout the United States. As manager of GE Aircraft En-



Paul A. Kammer (right), FASM, vice president, ASM Thermal Spray Society, presented the 1998 Thermal Spray Hall of Fame plaques at the ITSC '98 Awards Ceremony. Mrs. Marlis Nussbaum traveled from Switzerland to accept the award.

gine Group's Materials and Processing Technology Laboratories, Coatings Development Unit from 1957-70, he implemented, facilitated, and staffed a laboratory dedicated to the development of thermal sprayed coatings.

Mr. Levinstein was a member of the American council of the IIW for 14 years. In 1976, he brought the conference to the U.S. and served as conference chair. The concept of an annual National Thermal Spray Conference, a forerunner of today's United Thermal Spray

Conference and Exposition, was his dream.

Mr. Herbert Nussbaum (deceased) and **Mrs. Marlis Nussbaum**, retired founders of Plasma-Technik, Switzerland.

The Nussbaums are recognized for their contributions to the expansion of the thermal spray industry business through the development of new applications and the satisfaction of a generation of customers. They dedicated themselves to become leaders in the high technology field of surface



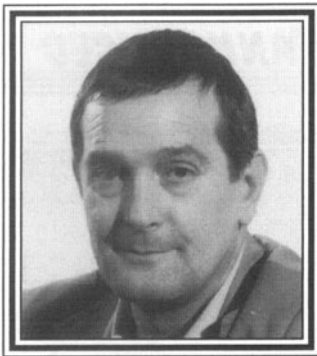
GE Aircraft Engines hosted a congratulatory luncheon for Thermal Spray Hall of Fame inductee Moses Levinstein in Cincinnati, Ohio, where Al Kay, Thermal Spray Society Board member, presented the award. Present were (from left) Robert Hillery, GE Aircraft Engines; Frank Hermanek, Praxair Specialty Products; Mrs. Mary Levinstein; Moses Levinstein, Al Kay, ASB Industries; Warren Grossklaus, GE Aircraft Engines; and Bob Betts, CTS, Inc.

Nominees sought for ASM Thermal Spray Hall of Fame Class of 1999

The ASM International Thermal Spray Hall of Fame was established in 1993 by the ASM Thermal Spray Society. Induction to the Hall of Fame is a means of recognizing and honoring outstanding leaders who have made significant achievements and contributions to the science, practice, education, management, and advancement of thermal spraying.

Nominations for the 1999 Class of Inductees into the ASM Thermal Spray Hall of Fame are currently being accepted and are due **31 December 1998**. Candidates for the Thermal Spray Hall of Fame may be proposed by any five members of the Thermal Spray Society or any of the working groups, committees, subcommittees, or other duly recognized bodies within the Thermal Spray Society.

To obtain a complete copy of the rules and regulations along with a nomination form, contact Kathy M. Dusa, TSS Administrative Assistance, Materials Park, OH 44073; tel: 440/338-5151, ext. 5544; fax: 440/338-4634; e-mail: kmdusa@po.asm-intl.org.



H. Nussbaum

coatings with the starting of the Plasma Technik job shop in 1970 in Switzerland. By the time the Nussbaums retired in 1986, Plasma Technik had become the largest manufacturer of plasma spray systems worldwide and a highly successful (APS/VPS) OEM job-shop for textile and gas turbine components.

They developed and produced the F4 plasma gun, introduced computer control to plasma

spraying, and developed and manufactured integrated production spray systems specially tailored to meet the requirements of specific industrial segments, including aerospace, textile, medicine and LBGT.

Their innovations covered all the elements of plasma spray systems and equipment—in particular, the F4 plasma gun, the AC/DC power source AT-800 (patented), the TWIN 10 powder feeder, the use of mass

flow gas control (U 100) in a plasma controller and the introduction of computer control for all parameter controls (A2000 and A3000).

Beyond the technology, the Nussbaums were able to bring out the best in others. They had an uncanny ability to recognize potential in their co-workers and motivate them to contribute papers and presentations, and achieve patents and other recognition.

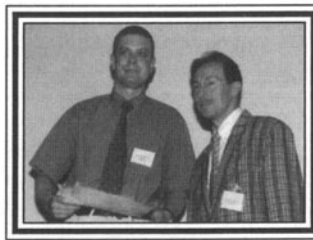
MORE PHOTOS FROM ITSC '98



S. Kuroda was given a Best Paper Award for "Peening Action and Residual Stresses in HVOF Thermal Spraying of 316L Stainless Steel."



M. Fukumoto received a Best Paper Award for "Flat-tening Mechanism in Thermal Sprayed Particle Impinging on Flat Substrate."



R. Schwetzke received a Best Paper Award for "Microstructure and Properties of Tungsten Carbide Coatings Sprayed with Various HVOF Spray Systems."



S.J. Harris was given a Best Paper Award for "Controlling the Sacrificial Corrosion Properties of Sprayed Aluminum Alloy Coatings."

Then and now—the International Thermal Spray Conference

by Andrew R. Nicoll, FASM

ASM Thermal Spray Society Board Member
Marketing Europe and Global Segment Specialist
Sulzer Metco Holding AG
Wohlen, Switzerland

The 15th International Thermal Spray Conference, held in Nice, France, from 25-29 May 1998, follows a tradition of ITSC meetings that began in 1956 in Halle, Germany. In those days, 20 papers were presented to 300 attendees. Since then, the conferences have been held on a regular basis, typically every three years at locations all over the world, with the last conference being in Kobe, Japan—just after the major earthquake had hit the city and the first steps to rebuild were showing success.

The growth in the industrial importance of thermal spraying world-wide is reflected in the number of technical papers being presented and the number of companies wanting to exhibit their products. In Japan, the number of papers was above 200 and in Nice it was more than 330.

From the early beginnings, where advances in processes were discussed, the conference has expanded to include all aspects of equipment and processes, quality, coating properties, diagnostics and modeling and industrial applications. These were presented in Nice in 10 different symposia over four days.

As a thermal spray leader, Sulzer Metco was a major contributor to the conference with over 11 technical papers. These covered aspects of hard chrome replacement, several types of clearance control coatings, measurement technology for in-flight particle diagnostics, cylinder bore coatings in the automotive industry, surface preparation, and heat treatment. Sulzer Metco was also part of the exposition, promoting the advantages of the coating services group.