Tips for Utilizing Secondary Masking Tapes

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Engineers Demonstrate the Value of Cold Spray Repairs to Naval Aviation

The Marine Corps Assistant Deputy Commandant for Aviation (Sustainment) William E. Taylor recently visited Fleet Readiness Center Southwest (FRCSW), San Diego, Calif., to learn more about cold spray additive technology. Engineers and artisans performed a demonstration and briefing for Taylor and Marine Corps aviation representatives from Camp Pendleton, Calif. The technique is saving the Naval Aviation Enterprise time and money in repairing aircraft components and returning them to the fleet.

According to Luc Doan, a materials engineer at FRCSW, of the approximately 150 parts repaired using cold spray so far, none have been returned for another repair. Additionally, none have resulted in machine rejections.

Conrad Macy, a secondary power Fleet Support Team engineer for Naval Air Systems Command, explained the parts can endure at least ten times more stress and impact than traditional parts. Macy is the impetus behind bringing cold spray to naval aviation. In his job working with the fleet making repairs to aircraft, he got tired of throwing away expensive parts because of minor damage. About six years ago, through a Small Business Innovation Research project, he found what he needed with cold spray.

Inovati’s cold spray technique, kinetic metallization, uses low-pressure helium or nitrogen and a sonic nozzle to accelerate particles. This less expensive, faster method of repair has saved more than $1 million on one part alone.

The F/A-18’s aircraft-mounted accessory drives cost approximately $168,000 each. Damage to one part of the drive would previously result in scrapping the entire component, but with the repairs available through cold spray, ten have been refurbished and sent back to the fleet for a savings of about $1.6 million.

FRCSW is the main depot for all variations of the F/A-18, so most of the parts it has repaired using cold spray have been for that platform. However, it has been used for E-2, F-5, CH-53, and H-1 parts as well as the LM2500 ship engine.

Engineers are moving forward with future applications for the technology, including V-22 windowsills. Macy is also exploring, through another Small Business Innovation Research project, using a rotating nozzle with the cold spray machine.

Volunteers Sought to Review Thermal Spray Specification

The Society for Protective Coatings (SSPC), Pittsburgh, Pa., is inviting interested members of the International Thermal Spray Association to participate in a review of the SSPC-CS 23.00/AWS C2.23/NACE No. 12 joint standard practice, Specification for the Application of Thermal Spray Coatings (Metallizing) of Aluminum, Zinc, and Their Alloys and Composites for the Corrosion Protection of Steel. This standard was first published in 2003 and supported by the American Welding Society (AWS) as an American National Standard.

In 2016, the SSPC, AWS, and NACE completed a revision of the 2003 standard. The SSPC is supporting this version’s review and approval as a candidate American National Standard. An announcement and project initiation notice was published in the November 25, 2016, edition of ANSI Standards Action (Vol. 47, #48).

This joint standard is a procedure for applying metallic thermal spray coatings of aluminum, zinc, and their alloys and composites for the corrosion protection of steel. Included are requirements for surface preparation, coating application, repair of coating defects, measurement of coating thickness, adhesion testing of the applied coating, and application of sealers and topcoats over the thermally sprayed metal coating. Not included are requirements for design and fabrication, thermal spray equipment qualification, coating selection, and operator and inspector certification.

Anyone interested in obtaining a copy of the standard for review and comment, or in joining the SSPC consensus review committee, should contact Aimée Beggs, SSPC standards development specialist, at (412) 288-6042 or beggs@sspc.org by April 30, 2017. Stakeholders include government and private facility owners, project specifiers, thermal spray contractors and coating inspectors, and manufacturers of thermal spray application equipment and supplies.
Hayden Corp. Receives Nadcap Accreditation for Thermal Spray


“Nadcap accreditation required the coordinated effort of our technical and quality staff, as well as the commitment of our operators to understand the demands of a Nadcap-accredited system and to work closely together to prepare for the audit and continue their contribution to our quality management system,” said Dan Hayden, president.

“Achieving Nadcap accreditation is not easy: it is one of the ways in which the aerospace industry identifies those who excel at manufacturing quality products through superior special processes. Companies such as Hayden work hard to obtain this status, and they should be justifiably proud of it,” added Joe Pinto, executive vice president and chief operating officer at the Performance Review Institute.
Axalta to Build New Coating Facility in China

Axalta Coating Systems, a global supplier of liquid and powder coatings, plans to construct a new manufacturing plant for high-performance automobile, commercial vehicle, and industrial coatings in Nanjing, China.

“We anticipate allocating between $100 and $150 million over the next three to five years toward the Nanjing project pending obtaining approvals internally and by government and local authorities,” said Luke Lu, Axalta vice president and president of Axalta in Greater China.

The facility will be built on more than 170,000 sq m of land at Nanjing’s National Chemical Industrial Park. It is expected to be fully operational by the end of 2020 with a product distribution center and initial manufacturing capability expected to come online by early 2019.

A range of company products will be manufactured including primers, base and clear coats, and resin intermediates. In addition, the facility will serve as a logistics center and distribution point for the company’s refinishing and industrial products for users in the country’s southern and central parts.

In constructing the new plant, up-to-date technology will be utilized from engineering design, materials, and equipment to production processes. The facility will also employ the latest emission mitigation systems and technology available.

Wall Colmonoy Awarded Contract for Overhauling F-16 Heat Exchangers

Wall Colmonoy’s Aerobraze Engineered Technologies, Oklahoma City, Okla., has won a competition by the U.S. Air Force (USAF) for a multiyear, multimillion dollar contract to overhaul the F-16 primary and secondary heat exchangers.

The installation, conceived and designed by Glassman, measures 60-by-60 ft and marks his first permanent, large-scale artwork in New York. Glassman and his studio collaborated with the powder coating company on the custom color palette.

Inspired by the Hudson River’s Native American name and meaning (the river that flows both ways), the structure showcases the strong connection and symbiosis between the
city and the water. This inspiration, combined with the artist’s admiration for the work done by the Hudson River School, informed the sculpture’s palette. A mixture of bright and earthy tones of blues, greys, yellow, and black appear to change as the sun moves. The considered array of colors also mimics the Hudson River’s sunset glow.

Trojan Powder Coating created and applied the custom shades for Flows Two Ways, coating the sculpture’s aluminum, steel, and metal tubing including 35 interlocking aluminum panels, nearly 400 60-ft pipe clusters rolled and flowing in three axes, and faceted metal boulders. 

Flows Two Ways measures 60-by-60 ft, is inspired by the Hudson River’s Native American name and meaning, and features custom shades. (Photo by Chun Y. Lai, courtesy of Stephen Glassman Studio.)
Product Spotlight

Report Reveals Thermal Spray Market Trends and Forecasts

Global Thermal Spray Market 2017–2021 provides an analysis of the most important trends expected to impact this market. According to the company’s chemicals and materials research analysts, the top three emerging trends driving the global thermal spray market are the growing demand for ceramic coating, rise in the use of plasma spraying, and increased demand from emerging markets. “As ceramic coating can help protect from heat, it finds applications in the automotive sector, particularly in engine exhaust system components such as exhaust manifolds, exhaust headers, cat boxes, turbochargers, and tail pipes,” said Sunil Kumar Singh, the company’s lead analyst specializing in research on the paints, coatings, and pigments sector. Plasma spraying can be used on a range of materials including metals and ceramics. The market is also experiencing an increase in demand from emerging economies such as India, China, and Brazil.

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Global Thermal Spray Market Worth $11.893 Million by 2021

Global Thermal Spray Market – Segmented by Coatings & Finishing, Materials, Equipment, End-User Sector, and Geography – Trends and Forecasts (2016–2021) indicates this market was valued at $7.580 billion in 2015. It is estimated to grow at a compound annual growth rate of 7.79% to reach $11.893 million by 2021 during the forecast period. This includes revenue generated from all major components of the thermal spray process including the material, equipment, and coating being created. The report structure also contains market insights, dynamics, and segmentation/analysis.

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Ceramic Coatings Thermal Spray Market Report Answers Key Questions

Ceramic Coatings Thermal Spray Market – Global Trends, Market Share, Industry Size, Growth, Opportunities, and Market Forecast – 2015–2022 offers a primary overview of this industry covering different product definitions, classifications, and participants in the industry chain structure. The quantitative and qualitative analysis is provided for this global market considering competitive landscape, development trends, and critical success factors. It features multiple facets including developments, an import/export overview, and future outlook. Geographic coverage ranges from North America to Asia Pacific. Key questions answered include the following: What was the ceramic coatings thermal spray market size in 2013 and 2014? What are the estimated growth trends and market forecast for 2015–2022? What will be the compound annual growth rate of the ceramic coatings thermal spray market during the forecast period? Which segments were most attractive for investments in 2014? How are these segments expected to fare during the 2015–2022 forecast period?

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The International Thermal Spray Association, a Standing Committee of the American Welding Society, is a professional industrial organization dedicated to expanding the use of thermal spray technologies for the benefit of industry and society.

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The International Thermal Spray Association is closely interwoven with the history of thermal spray development in this hemisphere. Founded in 1948, and once known as Metallizing Service Contractors, the association has been closely tied to most major advances in thermal spray technology, equipment and materials, industry events, education, standards, and market development.

ITSA MISSION STATEMENT
The International Thermal Spray Association, a Standing Committee of The American Welding Society, is a professional industrial organization dedicated to expanding the use of thermal spray technologies for the benefit of industry and society. ITSA invites all interested companies to talk with our officers, and company representatives to better understand member benefits. A complete list of ITSA member companies and their representatives can be found at their website thermalspray.org.

OFFICERS
Chairman: Jim Ryan, Carpenter Powder Products
Vice-Chairman: David Lee, Kennametal Stellite Company

EXECUTIVE COMMITTEE (above officers plus the following)
Dan Hayden, Hayden Corporation
Bill Mosier, Polymet Corporation
Peter Ruggiero, Curtiss-Wright Surface Technologies
David Wright, Accuwright Industries, Inc.

ITSA MEMBER NEWS
Tradeshow Assessment for ITSA Member Eliminated
Earlier this year, ITSA Members were invited to participate in an ITSA Member Satisfaction Survey, in which they were asked to rate the value of various member benefits. Based on feedback received on the value of ITSA Booth participation at industry tradeshows, at its April 20, 2016, meeting, the ITSA Executive Committee unanimously decided to discontinue ITSA booth activity at tradeshows effective July 2016. As ITSA Members subsidized the cost of ITSA booth activity via annual assessments, this move will result in the elimination of these costly annual ITSA Member assessments going forward.

In lieu of booth representation at tradeshows, ITSA will proactively participate in alternative ways at key industry events. For example, a series of educational presentations promoting thermal spray are being scheduled as free, half-day sessions at tradeshows like FABTECH, POWER-GEN International, and CORROSION.

ITSA SCHOLARSHIP OPPORTUNITIES
The International Thermal Spray Association offers annual Graduate Scholarships. Since 1992, the ITSA scholarship program has contributed to the growth of the thermal spray community, especially in the development of new technologists and engineers. ITSA is very proud of this education partnership and encourages all eligible participants to apply. Please visit thermalspray.org for criteria information and a printable application form.

ITSA THERMAL SPRAY HISTORICAL COLLECTION
In April 2000, the International Thermal Spray Association announced the establishment of a Thermal Spray Historical Collection that is now on display at the State University of New York at Stony Brook in the Thermal Spray Research Center, USA.

Growing in size and value, there are now over 30 different spray guns and miscellaneous equipment, a variety of spray gun manuals, hundreds of photographs, and several historic thermal spray publications and reference books.

Future plans include a virtual tour of the collection on the ITSA website for the entire global community to visit. This is a worldwide industry collection and we welcome donations from the entire thermal spray community.

ITSA SPRAYTIME
Since 1992, the International Thermal Spray Association has been publishing SPRAYTIME for the thermal spray industry. The mission is to be the flagship thermal spray industry publication providing company, event, product, research, and membership news of interest to the thermal spray community.

JOIN THE INTERNATIONAL THERMAL SPRAY ASSOCIATION
ITSA is a professional, industrial association dedicated to expanding the use of thermal spray technologies for the benefit of industry and society. ITSA Membership is open to companies involved in all facets of the industry – equipment and materials suppliers, job shops, in-house facilities, educational institutions, industry consultants, and others.

Engage with dozens of like-minded industry professionals at the Annual ITSA Membership Meeting, where there’s ample time for business and personal discussions. Learn about industry advancements through the one-day technical program, participate in the half-day business meeting, and enjoy your peers in a relaxed atmosphere complete with fun social events.

Build awareness of your company and its products and services through valuable promotional opportunities – a centerfold listing in the SPRAYTIME Newsletter, exposure on the ITSA Website, and recognition at industry trade shows.

PLUS, ITSA Membership comes with an American Welding Society (AWS) Supporting Company Membership and up to five AWS Individual Memberships to give to your best employees, colleagues or customers. Visit aws.org/membership/supportingcompany for a complete listing of additional AWS benefits.

For more information, contact Alfred Nieves at 800.443.9353 Ext 467, or itsa@thermalspray.org. For an ITSA Membership Application, visit the membership section at thermalspray.org.
ITSA Welcomes New Member

**Alloy Coating Supply** (*alloycoatingsupply.com*), Spring, Tex., is a complete solutions provider for the thermal spray industry. Representing some of the best and most dependable brands in the industry, the company is an all-inclusive distributor offering the highest quality products; including new complete surface prep and spray systems, powders, masking, super abrasives (diamond & CBN), and final NDE materials. They supply to many premier applicators such as PW Power Systems, Dallas Airmotive, Fusion, Inc., Sulzer, and NOV, providing them the durable “picks and shovels” that support the thermal spray industry. They offer a complete array of product solutions for your wear and corrosion-resistant coating needs. This includes replacement parts for HVOF, plasma, and wire spray equipment. The company can also help with the engineering and design of complete custom turnkey coating systems. ACS is the primary North American distributor and service center for Metallizing Equipment Co., PVT (MEC). MEC is one of the leading providers of thermal spray technology and surface engineering solutions, and has been a forerunner in innovation and field research for over 50 years. It now has more than 60% export sales to reflect the worldwide acceptance of its provided product quality and service. MEC has numerous industry certifications including ISO 9001:2015, AS9100C, CE, DGCA approval, and API Q1. ACS’s commitment to total customer satisfaction coupled with MEC’s offerings create great value for its customers.
Metal Powder Trade Groups Appoint New Executive Director/CEO

The Metal Powder Industries Federation (MPIF) and APMI International, both located in Princeton, N.J., have appointed James P. Adams as executive director and chief executive officer (CEO). Adams has more than 30 years of experience in the powder metallurgy industry. He began his career with MPIF in 2004 as director of technical services, working with the MPIF technical board, where he was responsible for Federation publications, professional development programs, and conference technical programming. Under his direction, the Metal Injection Molding and Additive Manufacturing with Powder Metallurgy conferences were developed. He has also served as administrative director for APMI International and the Center for Powder Metallurgy Technology. Adams succeeds C. James Trombino as executive director/CEO.

Wall Colmonoy Names Finance Director, European Headquarters

Wall Colmonoy, Wales, UK, has promoted Ian Williams to finance director for its European headquarters. Williams joined the company in 2014, bringing with him 15 years’ experience in financial control and operational change management. He began his career with the international accountancy firm PwC, and after qualifying as chartered accountant, he gained experience in financial services in London before returning home to Wales to consolidate his skills as a financial controller. He also has experience in private sector businesses, property development, engineering, manufacturing, and consumer goods.

HAI Welcomes New Engineer

HAI, Placentia, Calif., has hired Zubin Mody as a materials engineer on the company’s material sciences and engineering staff. He performs in-house thermal spray experiments and conducts in-situ field trials to support HAI’s customers with technical data to enable them to grow their businesses. He also acts as an integral member of the engineer and support team tasked with resolving technical and quality control issues with powder/wire manufacturing as well as processing and coating development utilizing Six Sigma and lean manufacturing. Mody is a graduate of the University of California, San Diego.

MEC Hires Principal Scientist

Metallizing Equipment Co., Pvt. Ltd. (MEC), India, recently announced Satish Tailor has joined the organization as principal scientist – R&D. In this role, Tailor will lead and support ongoing research and development activities in the coating application for future market requirements. He will focus on high-temperature resistance coatings; high hardness and low porosity; corrosion and wear resistance; and high-strength applications. He will also work on the development of new and novel thermal spray coatings for various industrial applications. Tailor’s experience spans a broad range of advanced thermal spray coatings and materials for thermal spray including oxides, metal, ceramics, and composite powders.

Management Professional Acquires AISCO Metallizing Corp.

AISCO Metallizing Corp., Cleveland, Ohio, has recently been acquired by management professional D. Gary Caprio. Caprio purchased the operations and facilities of the company where existing employees will continue to carry on the 30-year tradition of metal coating. Caprio was vice president of business operations for the Cuyahoga Valley Scenic Railroad before acquiring AISCO. He succeeds George Stecz, who purchased the company in 2006. Stecz spent his entire career in metallization, thermal spray, and its specialized machining; he remains with the company as an advisor during the transition.

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OBITUARY
Merle L. Thorpe Jr.

Merle L. Thorpe Jr., Hanover, N.H., passed away on January 13 at his home surrounded by his family. He was 87. Born in 1929, he grew up in the rural mid-Hudson region in Binnewater, N.Y., attending a one-room schoolhouse and graduating high school in Kingston, N.Y. Following in his brother Alton’s footsteps, and with his parents’ encouragement, he worked his way through Dartmouth College earning a degree in physics in 1951, and a master’s in engineering science and mechanical engineering in 1953. His master’s thesis was in thermodynamics. A three-year stint at Union Carbide’s Linde Laboratory helped him realize he needed to work for himself. He returned to Dartmouth’s Thayer School of Engineering as an assistant professor of engineering and physics. While serving as assistant dean of Thayer in 1956, he cofounded his first business, Thermal Dynamics, in Lebanon, N.H. He soon found his talents lay in starting and incubating new technology ventures, and he created a number of modest-sized international companies in arc metal cutting, high-temperature chemical and ceramic production, high-temperature research tools, and thermal spraying metals and ceramics. These companies included Thermal Dynamics Corp., Thorpe Corp., Ionarc Smelters, Humphrey’s Corp., Arc Corp., and TAPA, Inc., all based in New Hampshire, where he was a pioneer in the introduction of advanced technologies to New Hampshire. After retiring in 1993, he continued his quest for mastering technology and taught himself personal computing. He was a Fellow and Trustee of ASM International, received The Rotary International Paul Harris Fellow Award, was inducted into the first group of ASM’s Thermal Spray Hall of Fame members, was awarded the N.H. Council High Tech Entrepreneur Award in 1989, and the ASM’s William Hunt Eisenman Award in 1999. He authored nearly 50 papers and industry articles as well as secured more than ten patents. 

BECOME A MEMBER

Your company should join the International Thermal Spray Association (ITSA) now! ITSA is a Standing Committee of the American Welding Society expanding the benefits of company membership. As a company-member professional industrial association, our mission is dedicated to expanding the use of thermal spray technologies for the benefit of industry and society.

ITSA members invite your company to join us in this endeavor.
See pages 10 – 11

All masking jobs are NOT created equal
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thermalspray.org
Through regular contact with operators and engineers across the thermal spray community, we often hear concerns that seem commonplace in the industry: Why does masking take so long? Why is it so expensive? Why do we use so much tape? Why is there so much waste?

If these questions apply to your shop or department, you are not alone. Masking can be a very time consuming, costly, and even frustrating process. Yet it remains a critical step because its intended purpose is to protect very expensive parts from being damaged by the harsh conditions inherent in the thermal spraying process. And, when masking strategies go bad, the results can be catastrophic.

**Overreaction: The ‘Cocoon’**

The use of engineered thermal spray masking tapes is a good choice for most thermal spray masking applications. Good-quality, pressure-sensitive adhesives (PSAs) allow for reliable and precise masking of intricate profiles, provide a suitable thermal and abrasion barrier, and leave well-defined coating lines. Upon removal, good-quality PSAs leave little or no adhesive residue. While this is a good approach for the areas closest to the coating target areas, is it necessary to cover the entire part with tape? Just how much tape should be used to provide the necessary level of protection?

We’ve witnessed in several thermal spray coating shops a certain ‘love’ for PSAs that seems to lead to its use in generous doses — Fig. 1. For example, it’s not unusual to see an entire component covered with tape, and in some cases, covered with multiple layers of tape. During a recent visit to a job shop, an engineer pointed to an excessively masked combustor component and said, “Look, a cocoon! We’re all waiting for the butterfly to come out.”

**Finding Efficiencies**

Excessive use of taping certainly results in added expense, but it’s not just the cost of the tape that raises the tally. There is also the cost of the time and labor needed to apply and remove the excess tape. All of this can be reduced by identifying different areas of the part that are more, and less, susceptible to the thermal and abrasive forces of the spray gun. Then you can apply more cost-effective masking techniques and materials to the different areas of the part, without compromising overall protection.

**Primary and Secondary Masking Zones**

To find the best masking strategy, it helps to look at the entire component, with special attention given to the areas that need to be masked. As you look at each section of the component, ask yourself these questions: Does this area require critical precision masking? Or does this area simply need to provide basic protection against stray particles (overspray)? If the area requires critical precision masking, you have identified a primary masking zone. If the area requires basic protection from stray particles, you have identified a secondary masking zone.

The primary masking zone is the critical masking area that comes in direct contact with the spray. It should be masked with a strong silicone-coated fiberglass tape that offers high abrasion resistance and flame retardancy. It is important to stress that silicone adhesives are a must for masking against thermal spray. It offers a heat-resistant surface and functions properly up to a continuous temperature of 480°F (249°C), and releases cleanly with no residual adhesive.

The secondary masking zone is the noncritical masking area that does not come in direct contact with the majority of spray particles as they impact the component surface. While the secondary masking area is usually farthest away from the primary coating zone, operators still need to protect it because it can be affected by stray spray or deflected particles — Fig. 2. Along with protection from spray particles, secondary masking also safeguards components against damage and discoloration from the extreme heat. Consider highly polished fan blades or other high-value components. Great care needs to be taken to protect the finish against scratches and discoloration. As any experienced operator will tell you, it doesn’t take much to scratch most metal surfaces. So what are the options for safeguarding secondary masking zones?

For secondary masking areas, the operator can be more selective about the tapes or coverings being used. In our travels, we always recommend a silicone-adhesive PSA tape. With good-quality tape, such as silicone-coated fiberglass tape, operators who prefer to only use tape for masking can, at the very least, reduce their tape layers to one single layer. Additionally, there...
is almost never a valid reason to use multiple layers, especially when using a good-quality plasma spray masking tape. However, secondary masking tapes really do not need to be silicone coated. In fact, a good cost-saving strategy is to use a simple fiberglass cloth tape with silicone adhesive. This tape will survive some heat, protect the part from overspray particles, and release cleanly from metal surfaces. Because glass-cloth tape has no release liner, it is easy to apply and does an adequate job as a secondary protective mask.

A more standard plasma spray masking tape may also be used. These standard-grade tapes are generally white or cream colored — Fig. 3. Tapes with rubber or acrylic adhesive may also be utilized. While cheaper, these tapes are considered suitable for low-temperature masking only. Elevating the coating temperature while using rubber or acrylic adhesive masking tape will result in scorched adhesive residue, which is not fun to clean off. In fact, it’s time consuming and often requires solvents and/or abrasives.

**Fig. 3 — A component is masked with a higher grade of silicone/glass tape and masking compounds in the primary masking zone, which is closest to the target area. A lighter grade (white) tape is used for masking the secondary zone. A masking blanket is used to cover the turntable.**

**Tape Is Not the Only Option**

While masking with PSA tapes provides the necessary protection, it can also take time. The larger the size of the masking area combined with the difficulty of the profile can lead to a considerable masking time — and higher cost — when factoring in labor and masking tape consumed. Also, remember that when you are masking with tape, you are using it only once and discarding it as soon as it has been removed. Tape is not reusable…but fabrics are.

**The ‘Masking Blanket’**

Although many different types of fabrics may be used, the best choice for high-temperature masking fabrics is silicone-coated fiberglass with no adhesive. Generally referred to as a ‘thermal spray masking blanket,’ it is used to cover large areas both quickly and efficiently, and secured with tape on the edges or metal banding. Unlike tape, this 38-in.-wide (1 m) fabric can be applied much faster and used repeatedly — Fig. 4. The masking blanket, while not ideal as a primary mask, is a great choice for protecting the secondary masking zone.

**Fig. 4 — A reusable masking blanket protects the larger central portion of this masked component.**

An additional advantage of the silicone rubber coating on the masking blanket is that it is nonstick and prevents a buildup on the component surface. It also has excellent release characteristics. The material can be precision cut with scissors or utility knives to fit virtually any dimension/profile. Once the coating job is complete, the fabric can be removed quickly and cleanly, and is ready to be used for the next job.

**Fabric Pouches and Sleeves**

A variation to the silicone-coated fiberglass fabric is a pouch or sleeve. Again, this is a reusable masking solution that can be applied securely, removed, and reused. A fabricated pouch or sleeve encapsulates the section of the fan blade (or any part) that must be protected, thereby reducing the chance of damage. It can also be fabricated as a barrier to prevent discoloration of the component due to smoke, dust, and/or chemicals. For example, consider an operator spraying chrome carbide to a section of the blade root. While the polished area is not in

**Fig. 2 — High-cost components can be easily scratched, discolored, or inadvertently oversprayed unless protected with the appropriate masking materials.**
the direct path of the spray, it can very easily be discolored by smoke. Using a fabric pouch or sleeve for that component can prevent discoloration.

**Additional Overspray — Masking the Fixtures**

So far, we have focused on masking the actual components, but other items in spray booths also encounter problems associated with overspray. For example, coating can build up on the turntables and adjacent fixtures, not just the part being coated. In fact, coating shops with turntables commonly find a huge buildup of coating, especially with electric arc spray. In the past, the only solution was to have an operator strip the built-up coating, a process that is tedious and time consuming. When such cleaning is necessary, the booth is most likely out of service, causing production delays and lost revenue.

Similar to the masking of secondary zones, silicone-coated fiberglass can be used to protect turntables, fixtures, wire harnesses, robot surfaces, and acoustic panels. For these applications, silicone fabric can be precut into precise custom dimensions to fit and cover the profiles of a particular surface or turntable, preventing unwanted coating buildup and reducing downtime. Custom-cut sewn pouches and sleeves can also be utilized. These can span a wide range of uses, including the protection of wiring harnesses. In many cases, the fabric can be utilized to prevent damage from stray spray particles.

**Conclusion**

There is no single solution for thermal spray masking. Every job is different, and so are the techniques and strategies used to create the best results. For that reason, a variety of masking materials and methods are often employed, but the aim should always be for a combination of masking effectiveness and masking efficiency. For those managers and owners trying to find cost-effective and efficient masking solutions, remember that most masking jobs actually involve two areas of focus: primary and secondary masking zones. When you audit your processes, you may see that the bulk of the time and expense is a result of secondary masking. By following the tips above, you should be able to speed up masking and reduce tape consumption, all while saving time and money. ▲

Tim Connelly (tconnelly@greenbelting.com) is the global product manager for adhesive products at the PTFE Group of Companies. He is a member of the American Welding Society’s advisory committee, and has shared his industry expertise as a guest speaker at the International Thermal Spray Association’s annual technical meetings.

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When most people hear Miami, Fla., what probably doesn’t come to mind is that just a little under 20 miles west of the world-renowned South Beach with its beautiful beaches, thriving nightlife, and Art Deco architecture, lies a 25,000-sq-ft world-class research facility — Florida International University’s (FIU) College of Engineering and Computing. The Engineering Center (EC) in the Miami suburb of Sweetwater is just a two-mile drive from the university’s 342-acre main campus. Florida International University is a designated top-tier R1 Research University (highest research activity) in the Carnegie Classification of Institutions of Higher Education. The EC is home to several state-of-the-art research facilities, including a 1300-sq-ft plasma spray forming laboratory.

South Florida’s Unique Plasma Forming Laboratory

The lab and research that take place at FIU are overseen by Arvind Agarwal, associate dean of research for the College of Engineering and Computing, and a professor in the Department of Mechanical and Materials Engineering (MME). Agarwal’s goal is to make the manufacturing and technology communities aware of all that FIU and the materials science program at the College of Engineering and Computing have to offer — Fig. 1.

“Our facility is unique to South Florida,” said Agarwal. “We want to facilitate research and education, and we invite the community to use our labs and establish a partnership.” The lab makes use of plasma-based techniques to synthesize near net-shape-structures by rapid prototyping, bulk nanostructured components, advanced ceramic and metallic nanocomposites, multilayered functional coatings, and synthesis of nanostructured composite powders.

Equipment includes a complete Praxair plasma spray system integrated with particle in-flight sensor, surface preparation, and powder preparation facilities. A ten ton spark plasma sintering (SPS) is also installed in the plasma forming laboratory to understand the effect of heat treatment on thermal sprayed coatings — Fig. 2.

Advanced Materials Engineering Research Institute

In addition to the plasma forming lab, the FIU EC is also home to the Advanced Materials Engineering Research Institute (AMERI). This open access laboratory’s mission is to facilitate research, education, and electronic device development in the fields of nanotechnology, nanomaterials, electronic packaging, and 3D printing. A technical staff and faculty support the lab and offer project consultation, device design, and training on the different research equipment.

The institute also houses the Motorola Nanofabrication Research Facilities, which is supported by a Class 100 cleanroom and nanofabrication capabilities including e-beam lithography and optical photolithography. AMERI not only supports research within the graduate program in materials science, but also supports students and faculty across all engineering
disciplines, and physics, chemistry, geology, biology, and medicine.

Agarwal, who also serves as the director of AMERI, mentioned that students and researchers from the nearby University of Miami and Florida Atlantic University often use the lab.

**Materials Science Program Grows**

In recent years, Agarwal has seen an increase in students interested in pursuing materials science engineering degrees, and he enthusiastically welcomes it — Fig. 3.

“I want students to pursue graduate work in this field,” he said. “Many times students will earn their bachelor’s degree and then go to work, but we need researchers. Laboratories nationwide need researchers with advanced skills.”

One student looking to pursue a higher education degree is graduate student Luiza Fontoura. Originally from Brazil, Fontoura earned her undergraduate degree in chemistry but was interested in pursuing more science and engineering.

“I wanted to learn more. I want to work at a national research lab one day, and I’m definitely not intimidated entering the field as a woman. It’s a great field to be in,” she said.

Agarwal said he currently has four postdoctoral researchers, three PhD, four graduate, and three undergraduate students working in the plasma forming laboratory.

**Conclusion**

FIU’s materials science research facilities are designed to meet the needs of the rapidly evolving scientific community. To learn more about the university’s materials engineering research labs, visit mme.fiu.edu/research/laboratories/ and ameri.fiu.edu. ▲

*Cindy Weihl (cweihl@thermalspray.org) is editor of SPRAYTIME.*
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An Introduction to the AWS C2 Committee on Thermal Spraying

By Karen Sender, chair, AWS C2 Committee on Thermal Spraying

As I’m sure all International Thermal Spray Association (ITSA) members are aware, ITSA is a Standing Committee of the American Welding Society (AWS). What you may not be aware of is the AWS C2 Committee on Thermal Spraying — a technical committee that is also working hard to help advance the thermal spray industry.

Our Mission
The mission of C2 is to develop, revise, and maintain AWS standards on all aspects of thermal spray including design, manufacture, inspection, and test methods. It is also the mission of the C2 Committee to standardize thermal spray symbols and definitions.

Our Membership
As C2 chair, I’m pleased to introduce our C2 Vice Chair, Chip Arata, and our Committee Secretary, Jennifer Rosario. Currently, we have 20 voting members, assisted by nine advisors, and we are growing. As of this writing, we have eight new applicants.

ITSA and C2 enjoy an interlocking membership in that many C2 voting members are also members of ITSA. ITSA’s current Chair, Jim Ryan, is a C2 voting member. ITSA’s Vice Chair, David Lee, is the C2 immediate past chair.

C2 also has a number of active subcommittees:
- C2A – Machine Element Repair and Restoration
- C2C – Thermal Sprayed Coatings for Reinforced Concrete
- C2D – Thermal Spraying: Theory, Practice, and Application
- C2F – Thermal Spray Operator Qualification
- C2G – Thermal Spray Equipment
- C2J – Feedstock for Thermal Spray

C2 and C2 subcommittees gather at least once a year for a face-to-face meeting held during the annual FABTECH show. In addition, we hold a number of teleconferences throughout the year.

C2 Standards
You can review and purchase our published standards on our committee web page at aws.org/standards/CommitteesAndStandardsProgram/c2-committee-on-thermal-spray. You can also get there via the AWS website (aws.org) by clicking “Standards” on the top navigation; next click the link to “Technical Committees and Standards Program” on the right-hand side of the page; then click “C Processes” in the body of the page and choose “C2 Committee on Thermal Spraying.” You will also see a list of new standards that we are working on for future publication.

You’re Invited
Guests are always welcome at our meetings. If you think that you might be interested in joining C2, we look forward to your participation. New membership brings a fresh perspective to the work of C2, and it gives you the opportunity to have a voice towards creating new standards and the revision of existing ones.

If you would like to join C2 or attend a meeting as a guest, please contact our Committee Secretary, Jennifer Rosario, at jrosario@aws.org.

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Calendar

APRIL 2017

- ICMCTF-17 – International Conference on Metallurgical Coatings & Thin Films
  April 24–28 / San Diego, CA
  icmctf.org

- SVC TechCon 2017 – 60th Annual Technical Conference
  April 29–May 4 / Providence, R.I.
  svc.org

MAY 2017

- OTC 2017 – Offshore Technology Conference
  May 1–4 / Houston, TX
  otcnet.org

JUNE 2017

- ITSC 2017 International Thermal Spray Conference and Exposition
  June 7–9 / Düsseldorf, Germany
  dvs-ev.de/itsc2017/

- Additive Manufacturing with Powder Metallurgy Conference
  June 13–15 / Las Vegas, NV
  mpif.org

- Powdermet 2017
  June 13–16 / Las Vegas, NV
  mpif.org

SEPTEMBER 2017

- Eurocorr 2017 and 20th International Corrosion Congress
  September 3–7 / Czech Republic
durocorr2017.org

- Thermal Spray of Suspensions & Solutions Symposium
  September 13–14 / Niskayuna, N.Y.
  asminternational.org

OCTOBER 2017

- Powder Coating (PC) Summit
  October 3, 4 / Columbus, Ohio
  pcimag.com

- ITSA Annual Meeting and Technical Program
  October 11–13 / Albuquerque, N.M.
  thermalspray.org

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