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Second Quarter 2011

Efficient Control of Thermal Spray Dust Collectors - Ensuring Operational Gains and Cost Savings

by Paul Richard, Donaldson Company, Inc Understanding Thermal Spray Dust

Thermal spray is an effective way to apply coatings in a wide range of manufacturing applications. New uses are constantly being explored, and existing applications are often refined to seek more effective coating solutions. Most thermal spray operations require some sort of ventilation to exhaust excess compounds from the thermal spray area. Even well designed thermal spray processes tend to be inefficient with regard to the amount of sprayed material actually landing on the target; 50% deposit efficiency is considered good.

One area of advancement is the attempt to replicate the more complicated (and more expensive) coatings of plasma and HVOF processes with more cost effective wire arc systems. Arc processes generate very fine and often lightweight particulate that can be challenging to properly remove from the exhaust gas stream. There are well proven dust collection systems available that can handle thermal spray dust. Unfortunately, the overwhelming majority of these systems are operated with relatively crude airflow management controls. This article focuses on the operational gains and cost savings that can be made by using smarter technology for thermal spray exhaust.

Proper System Design

Larger thermal spray operations typically include an enclosed space where the actual spraying occurs. The unused spray compounds are then ventilated from the enclosure while fresh air is being drawn in it. Depending on the design of the enclosure and the shape of the target being sprayed, an optimal volume of air can be determined for proper control of the nuisance particulate. For example,

continued on page 4

Metallisation Equipment Protecting Footbridges

Solent Protective Coatings Limited (SPC) recently purchased additional thermal spraying equipment from Metallisation in order to fulfil another contract win. SPC has been a customer of Metallisation for around two years and is a huge fan of thermal spraying. The company purchased a new MK73 flame spray system and arranged additional training for its operators to enhance their existing skills.



Solent Protective Coatings won a contract to thermal spray a new footbridge to be installed over a railway track at Hilsea in Portsmouth. All components of the footbridge were thermal sprayed including two 39.37 ft (12 m) stair sections, the 65.61 ft (20 m) long main bridge deck, weighing 10 tons, and the support columns. The surface of continued on page 7





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an enclosure might need 10,000 cubic feet per minute (cfm) for proper dust control. More would be wasteful, and less would be insufficient.

From that starting point, a proper dust collection system can be designed. This will usually include a duct to transport the dust, a filter to remove the dust from the air, and a fan to provide the energy to generate the airflow. The exhaust fan for a 10,000 cfm system might require 30-40 horsepower. The airflow requirement is generally fixed and should not change unless the enclosure is redesigned. It is commonly accepted that a velocity of 3500-4000 fpm is optimal to transport dust in a round duct . Moving the air more slowly will allow the dust particulate to drop out and settle in the bottom of the duct - creating a fire hazard and potentially blocking the duct. Moving air more quickly wastes fan energy and creates unnecessary wear and tear on the ducts. For our example, moving 10,000 cubic feet per minute at a velocity of 3500-4000 feet per minute requires the selection of a round duct 22" in diameter. This selection has a cross sectional area of 2.6398 square feet, resulting in a velocity of 3788 feet per minute.

Fans and Static Pressure

Industrial ventilation fans create a partial vacuum that draws the air through the system. This partial vacuum is referred to as static pressure, and is usually measured in "inches of water gauge." System designers use various mathematical models to estimate the static pressure



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needed to achieve desired airflow. Factors in a system that affect the required static pressure include among other items:

- size and geometry of the thermal spray enclosure
- the number and radius of elbows (or turns) in the duct
- total length of ducts in the system
- diameter of the duct used and velocity of air
- dust collector selection
- after-filter items (such as a HEPA filter or exhaust silencer)





Dust particles can build up when air velocity is less than 3500 feet per minute.

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Many of these factors do not change over the course of operating the system. The exceptions are the dust collector filters and the HEPA filters. As the dust accumulates on the filters, the pressure drop, or resistance across the filters, increases. The system requires additional static pressure to overcome the buildup of dust on the surface of the filters. Fans are typically selected to ensure adequate airflow throughout the life of the filters by including enough static pressure to maintain airflow when filters reach the end of their useful life. Filters approaching the end of their service life will exhibit a higher pressure drop than new filters. To extend their service life, the filters in a thermal spray dust collector are designed to be cleaned on line while the system is running. Repeated buildup of dust, followed by the self-cleaning cycle of the dust collector, causes minor fluctuation in the system static pressure requirement. If this is not addressed, the system may experience decreases and increases in airflow with the associated problems of dust settling in the duct or within the thermal spray enclosure.

Excess airflow through the thermal spray enclosure can affect coating quality by drawing sprayed material away from the target part. To avoid these potential problems, the air volume has to be controlled. The most common device used to control the fan is a damper, which creates an artificial load on the fan to "dial" it back to the desired airflow. To maintain the airflow, the damper would have to be opened or closed as necessary to keep the desired velocity in the duct . This is seldom done with the accuracy required to constantly attain the prescribed airflow through the system and, if it were done manually, it would require constant supervision by a qualified person. This would be expensive and difficult, which explains why most thermal spray operations opt for a "set and forget" mentality with regard to the fan control.

Variable Frequency Drives and Airflow Control Systems

A better way to control the fan and maintain constant airflow in the system is with a variable frequency drive (VFD). A VFD operates the fan motor at a specific rotational speed based on adjusting the hertz frequency. Whereas normal threephase power in North America usually runs on 60 HZ frequency, a VFD allows the operator to select a specific frequency slowing or accelerating the rotational speed of the fan. In an ideal system, the system would run at full speed only when the static pressure load of dirty filters required it. The rest of the time, the fan would be running at a slower speed to generate exactly the amount of static required. This method of operation offers benefits in cost savings. Compared to operators who use the "set and forget" approach where they always run their dust collection systems at speeds faster than necessary (to ensure complete ventilation of the thermal spray enclosure), the VFD approach uses a smart system running at exactly the required airflow speed saving energy.

Mathematical models exist that can help demonstrate this, using a few simple assumptions and some system variables. Generally, an upgrade to VFD and airflow control system can pay for themselves in less than two years, and more importantly, the dust collection system will be running at the right speed. This can save wear and tear on the system, and especially on the high-end, surfaceloading filters required for thermal spray. Any decision to upgrade to a VFD and airflow control system should include the following savings as factors:

filter costs

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- labor costs
- disposal costs
- inventory costs
- shipping costs (for new filters and disposal of old filters)
- quality of process
- operational stability of the system and proper maintenance of airflow in the system

Controlling the VFD

Once the determination has been made to use a VFD, the next step is to determine the method of providing continual input. The objective is to maintain a desired airflow regardless of fluctuations in system static pressure. By using an airflow measuring device installed in the duct system, the controller can adjust fan speed to correct changes. These instruments are best suited to clean air environments, and therefore are usually installed in the duct at a location after the air is filtered. This could be a duct on the outlet of the fan with the length needed to provide a smooth, reliable indication of the total airflow moving through the system.

An alternative method is to measure the system static pressure, rather than the actual airflow at a point in the duct system just before the air enters the dust collector. At the prescribed airflow, the amount of static necessary is a function of factors that should remain unchanged as long as the system is not changed mechanically. Filters will get dirty and then be pulsed clean, but the static pressure necessary at the inlet of the dust collector will stay the same if the system is running at the prescribed airflow. A controller that maintains that static is the simplest way to effectively control a VFD in a dust collection system. As filters build up resistance, the airflow delivered by the fan drops. This reduction in airflow produces a lower static requirement in the duct in front of the collector, so the controller will order the VFD to increase power to maintain static. Conversely, as filters are pulsed clean, the resistance in the system falls and the VFD will decrease power to maintain the same level of static. The result is smooth airflow with the associated benefits and savings that come with it. **Considerations**

There are situations when using a VFD and airflow control system will have limited benefits. When a single dust collector (and single fan) is used to intermittently service only one or two cells at a time in a multiple thermal spray

continued on page 6

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Control of thermal spray dust continued from page 5

cell system, there is no simple way to utilize the variable power of the fan effectively. This is a limitation of the duct system - not a limitation of the VFD.

Conclusion

Thermal spray technology is evolving, and new approaches often create bigger challenges for associated components like exhaust systems. Alternately, advances in sub-components can help refine overall thermal spray operations, and virtually every thermal spray dust collection system in existence can benefit from the use of a variable frequency drive. It is becoming increasingly apparent that precise airflow control is important, and energy savings can also be an added benefit.

For more information, contact author Paul Richard via email Paul.Richard@Donaldson.com or visit www.donaldson.com



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Metallisation protecting footbridges continued from page 1

the bridge sections were grit blasted to SA 3 before being thermal sprayed with aluminium to 0.003937 in. (100 microns), using the Metallisation MK73 flame spray system. An epoxy sealer was then applied to a maximum of 0.000984 in. (25 microns) dry film thickness. A final primer and topcoat were applied to complete the project.

Thermal spraying involves the projection of small molten particles onto a blast prepared surface. Upon contact, the particles flatten onto the surface, freeze and mechanically bond, firstly onto the blasted substrate and then onto each other, as the coating thickness is increased. To create the molten particles, a heat source, a spray material and an atomisation/projection method are required.

In the flame spray process a wire is fed by a driven roller system through the center of an oxygen-fuel gas flame where it is melted. An annular air nozzle then applies a jet of high-pressure air, which atomises and projects the molten material, in this case aluminium, onto the bridge section surfaces. A video of this application can be seen on the Metallisation website www.metallisation.com and is entitled "Flame Spray TSA on Footbridge".

Solent Protective Coatings Limited, based in Southampton, is a well established company specialising in surface preparation and protective coatings. Key services include blasting, steel preparation, protective coatings and UHP water blasting. Metallisation Limited is a global leader in thermal spraying equipment and consumables. Metallisation also provides specialist training for its customers, ensuring maximum effectiveness of the thermal spraying equipment and consumables.

David Skeates, Managing Director at Solent Protective Coatings, says: "We have a great relationship with the

Metallisation Team. At Solent we are committed to building strong working relationships with our customers and partners. Metallisation shares these beliefs and provides an excellent service to us. I wouldn't hesitate in recommending them to any company needing thermal spraying equipment, consumables or training."

For more information, visit www.metallisation.com

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GTS – the Association of Thermal Sprayers – has produced this spectacular new poster of *"Thermal Spraying: Standards and Technical Bulletins"*. The poster identifies



Standards DIN for Thermal Spraving and DVS Technical Bulletins. The standards/bulletin names are in German and in English. The poster provides contact information for obtainthe complete inq Standards and Bulletins. ITSA, the Int'l. Thermal Spray Association is proud to be one of the sponsors of this project. These posters are suitable for framing.

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Conference Chairs: David Wright and Dan Hayden C Keynote Speaker: Daryl E. Crawmer Industrial Applications and Technical Challenges of Thermal Spray O Daryl E. Crawmer, Thermal Spray Technologies, Sun Prairie, WI Advancing Cold Spray Applications to Industry Markets Ν David W. Wright, Accuwright Industries, Inc., Gilbert, AZ "Should we Offer Thermal Spray Coated Fabricated Products?" What a Steel Fabricator Should Know About Thermal Spray Applied Anodic Coatings F James Weber, James K. Weber Consulting, Bay Shore, NY What is Thermal Spray? R Larry F. Grimenstein, Nation Coating Systems, Inc., Franklin, OH **Quality Control of Thermal Spray Coatings** F Joseph P. Stricker, St. Louis Metallizing Company, St. Louis, MO High Density Twin Wire Arc Spray Coatings Frank Rogers, Thermion, Inc., Poulsbo, WA **Corrosion Protection Technology Without Size Limitations** Fred van Rodijnen, Sulzer Metco Europe GmbH, Hattersheim, Germany F Fretting Wear Resistant Coatings for Aerospace Components Satish Dixit, Plasma Technology, Inc., Torrance, CA Thermal Sprayed Zinc and Aluminum Coatings for Atmospheric Corrosion T Protection Dan Hayden, Hayden Corporation, West Springfield, MA Ν Much ado About Nothing: Why the Concern About Porosity Dale Moody, Plasma Powders and Systems, Marlboro, NJ D Using Robotic Offline Programming for Improved Thermal Spray U Kevin Nelson, Blue Technik LLC, Commerce Township, MI Measurement and Sensing Requirements for Improved Plasma Spray Process S **Capabilities** Dennis Radgowski, Cyber Materials LLC, Boston, MA Т For more information, visit www.fabtechexpo.com R Finishing Online Website Now Includes Thermal Spray The website "Finishing Online" (www.finishingonline.com) now includes "thermal spray" in an "industries" area. Everyone is eligible for a basic free listing for one year. Go to their website to register and get your free listing. Ν



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Cold Spray Action Team Kick-off Meeting

by Jean Mozolic

The US Army Research Lab (ARL) and Worcester Polytechnic Institute (WPI) hosted the first Cold Spray Action Team (CSAT) Meeting at WPI in Worcester, MA on May 17 and 18. There were over 168 attendees from Industry, Academia and the Government. Rowan Technology Group assisted in the coordination of the two day meeting, which included presentations on the DOD cold spray repair of magnesium components as well as presenting a cross-section of cold spray applications, technology developments, material requirements and ongoing challenges. It also created a venue for open discussion and exchange of ideas among the participants. Additionally there was an exhibition with displays from Centerline, Jentek Sensors, ASB Industries, Plasma Giken, Army Research Lab, PEDCO and Cold Spray Solutions International.

CSAT is a formal organization comprised of industry, Government and academia, that meets on a regular basis to review the current state of the art of Cold Spray technology, share data, and be a focal point to seek collaborative opportunities to develop and implement cold spray technology. One of the major objectives of CSAT is to insure that cold spray solutions are appropriately specified and applied. In order to do this the technology must be evaluated functionally and financially. It must be modeled, compared and ranked relative to the family of surface technology solutions and then systematically transitioned into production. An effective vendor network needs to be developed including powder producers, equipment manufacturers, analytical standards and testing labs, application support and coating service capabilities.

Opening remarks were made by Vic Champagne, Team Leader, Innovative Materials & Processing Team, US Army Research Laboratory and technical coordinator of CSAT. He emphasized that the objectives of the initial CSAT meeting were to "...address some of the most important aspects of cold spray that people wanted most to hear about and to direct the meeting on the focus application, which is the repair of magnesium aerospace components..."

Additionally he stated that the CSAT meeting "... is not an academic conference but an opportunity to learn and share what we can about the transition of cold spray technology throughout the DOD and industry, establish collaborative programs/projects, exchange

data and to network in an open forum..."

The first Military Specification composed and maintained by ARL for cold spray "Manufacturing Process Standard MIL STD-3021 Materials Deposition, Cold Spray" can be used in technical data packages to call out the process. This specification received input from over 150 different representatives from Industry, Government and Academia.

Meeting Highlights

Several presentations were focused on the status of cold spray repair of Continued on page 12

ITSA On Facebook

Dear Thermal Spray Colleague,

The International Thermal Spray Association now has a very basic Facebook Page. If you are a Facebook user, you can simply type in thermal spray in the top search engine. At that point, select "like" and you will be connected to the ITSA page. Right now, we have our ITSA promotion video on the page, plus a few recent messages. We are not sure how and to what extent this will be used, but it was apparent by some recent and continuing requests that we be there. If you are a Facebook visitor, enjoy.

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Cold Spray Kick-Off Meeting continued from page 10

aerospace magnesium components by ARL, NAVAIR, Sikorsky and Navy Mantech. Included were application details, comparison to wrought alloys, ongoing work and the economics of cold spray. Other speakers included Carl Koltz, Vextec on life cycle computer modeling; Valerie Waldon, Valimet and George Kim, Perpetual Technologies on powder requirements and developments; Gregg Addison, CSSI, Robert Bierke, MOOG, Bill Elmquist, TAG on cold spray applications for steel, aluminum and magnesium components and the integration with existing coating/painting standards i.e. Tagnite®; Dr. Goldfine, Jentek Sensors on cold spray NDT technology utilizing MWM (meandering winding magnetometer); Jeff Shaw, PEDCO on developing a veterans owned business network utilizing cold spray to mitigate corrosion costs; liquid cold spray technology was presented by Tom Butler, Ormond – an SBIR Phase II funded project; and, Can Sunal, Plasma Giken, Japan presented their heat assisted high pressure cold spray device and select properties of cold sprayed stainless steel. The full agenda and presentations can be viewed at http://coldsprayteam.org.

The following are select highlights from the presentations: Brian Gabriel, ARL, "CS Repair of Magnesium - Technical Program Review"

- Army and Navy rotorcraft and Air Force fighters have Mg gearboxes (20-23 per aircraft) and other Mg parts that are unserviceable and need to be replaced.
- Major sustainment problem
 - o highly susceptible to corrosion and fretting wear
 - o resulting in significant unscheduled maintenance



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- o Army and Navy spent \$17M in one year for UH-60 Main Transmission and Tail Rotor Gearbox Housing Assemblies alone
- Corpus Christi Army Depot (CCAD) has millions of dollars of used Mg housings waiting to be reclaimed as part of the "Storage, Analysis, Failure Evaluation and Reclamation" (SAFR) program.
- Summary
 - o Previous projects proved non-structural cold spray repair of magnesium

- FRC-East, CCAD, Sikorsky

- o Currently Pursuing Structural Repair H-60 IGB with 6061 Al on mounting pads and bolting area
- o Qualifying Low Pressure CS at FRC-East
- o Developing Al Powder Specification

Robert Kestler, Fleet Readines's Center East, "NAVAIR Cold Spray Efforts"

NAVAIR's strategy is to implement Cold Spray technology into its industrial base through near term and long term applications, with a simultaneous approach. Concurrent near term implementation successes will support the overall long term higher cost implementation areas.

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- Near Term Applications o Lower Technical Risk o Low Cost Implementation o Drop in Alternative • Long Term Applications o Higher Technical Risk o Higher Cost but High Payoff o Longer Implementation Issues FY2010 Successes Processes o Gearbox Repairs Developed repair processes Moving into the process the validation stage Ν o Copper Deposition F Performed some preliminary copper deposition work Promising results Capabilities S Facilities o Cherry Point - FRC East - Upgrade of present high pressure system initiated - Low pressure system(s) acquisition Patuxent River o Low pressure system, glovebox with manipulator Jan 2011 Aaron Nardi, United Technologies Research Center, "Cold Spray Developments at UTRC" • UTRC entered into a 5 year Collaborative Research Agreement with ARL in 2010 o The use of cold spray for additive manufacturing
 - Spray forming entire parts
 - Spray forming added features on existing parts
- Benefits to cold spray formed materials
 - Unique microstructures possible with powder feedstock and processing
 - Fine crystallites for nano-scale structure

Continued on page 14

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Cold Spray Kick-Off Meeting continued from page 12

- Traditional phase metallurgy possible
- Larger micro scale structures with unalloyed powder blends
- Macro-scale structures in as sprayed deposits
- Plastic working of materials with benefits to strength, density, and microstructure
- Potential for post processing like heat treatment or HIP to recrystallize, diffusion bond or otherwise change the microstructure
- Spray form potentially complex shapes

Wilton Moran, Copper Development Association, "Moving Antimicrobial Copper from the Laboratory to the Clinical Setting"

- Copper alloys kill bacteria more effectively and quickly than SS
- Copper alloys kill methicillin-resistant staphylococcus aureus (MRSA) within 2 hours as compared to stainless steel which shows little effect after 6 hours.
- MRSA is one of the most serious and wide-spread hospital acquired infections
- DOD is funding clinical trials at Memorial Sloan-Kettering Cancer Center, Medical University of South Carolina and Ralph H. Johnson VA Medical Center
- Additional clinical trials taking place in NY, Chile, UK, Europe, South Africa and Japan

Cold Spray Technology has been in existence since the 80's and has since grown from its academic roots to a viable production tool. From one of the earliest models put forth by Dr. Anatoly Papyrin to a variety of low pressure, high pressure and heat assisted models available in the market today, cold spray is taking its place among the globally recognized surface technology solutions. The applications presented at CSAT represent a small portion of the opportunities currently under evaluation. Work is ongoing in academia, industry and the government to understand, model and improve the technology, feedstocks and ancillary equipment and to expand the customer base. It is the ongoing mission of CSAT to further the understanding and implementation of this technology and will continue with annual meeting reviews to be held every spring at Worcester Polytechnic Institute.

About ARL

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About the Author

Ms. Mozolic has over 35 years experience in the thermal spray industry having been employed by Praxair, Sulzer-Metco and H.C. Starck. In 2006 she founded The Mozolic Consulting Group, LLC focused on surface technology and powder metallurgy solutions for industry. Ms. Mozolic holds a BS and MS in Materials Science from MIT.

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SPRAYTIME Second Quarter 2011

Single Electrode and Multiple Electrodes High-Spray Rates Plasma Guns: A Response to the Price Increase of Raw Materials and Energies

With the economic recovery, rare-earth and key industrial metal prices have jumped as worldwide demand increased and as Chinese export quotas crimped worldwide supplies for the materials used by the thermal spray industry. Tungsten carbide, Yttria, Nickel and Molybdenum are the most recent examples of severe raw materials price increases.



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With global economic factors and competition, the thermal spray industry encounters strategic challenges of productivity and competition. Thermal spray coatings are becoming more and more complex with frequent feature enhancements, more severe operating conditions as well as coating life improvement - while raw materials prices are increasing.

Being largely based on coating price the thermal spray competition must continue to create and bring new and highly differentiated products to the market cost effectively and within compressed time frames. The thermal spray industry faces a strategic dilemma between increasing revenue and decreasing cost to enhance profitability.

Changing to new "high power" plasma systems is still a difficult choice to make due to the upfront investment to start production and the switch to a different technology, such as multiple electrode or cascaded gun system. As a response to these challenges, high-productivity and high-

spray rates single electrode plasma gun have been designed as well. On top of improving the thermal spray productivity and enhancing the coating performances, HP high-spray rates single electrode plasma gun permits an economical optimisation by minimizing the cost of the change. These HP high-spray rate single-electrode plasma guns can be



integrated to existing plasma spray equipment thanks to conversion couplings kits.

Moving from mono application spray systems to flexible spray systems reduces the investment required for each new application or coating product change. Depending on their design and technologies, alternative HP high-spray rate plasma guns can be used from 30 kW up to 65 kW, allowing deposition rates 3 to 4 times higher than with conventional plasma guns.

Until the development of some new plasma spray systems several years ago, the plasma gun was one of the most limiting component of the process restraining both the maximal achievable throughput and the deposit efficiency.

This work has been put across some years ago to build the new generation of HP high-spray rate single-electrode or multi-electrodes plasma guns. Whenever these guns are based on multi-electrode design or on a conventional plasma gun design, plasma gun designers managed to design a plasma spray gun offering high deposit efficiency at high feed rates, still being simple to use, with low electrode wear and reduced energy consumption. Some of the HP high-spray rates single-electrode plasma gun can substitute most of the conventional type guns on existing plasma spray units giving a real productivity boost.

Yttria partially stabilized Zirconia (YSZ) and Chromium oxide (Cr2O3) stand for two typical high volume applications of the plasma spray industry. High purity Yttria and High purity Alumina stand for high value added materials requiring high purity and dense coatings. Key demands for these applications are high throughput and/or deposit efficiency.

Focusing on reducing drastically the energy consumption and as well as improving the spray rates and deposit efficiency (DE), the thermal spray operation optimization is achieved by reducing the spray cycles, reducing the machine stops for electrode change, reducing the consumption of powder, reducing the gas and electricity consumption per kilogram of coating...

For Thermal Barrier YZ coatings (TBCs), HP high-spray rate plasma guns achieve the challenge to produce 5 to 15 % porosity coatings by using hollow spherical powders. Spray rates reach 150 g/min (11 lbs/hr) and almost 60% DE. With sintered YZ powders (YZS), HP high-spray rate guns achieve 140 g/min (10.3 lbs/hr) with more than 40% DE.

For Chrome Oxide coatings (Cr2O3), the HP high-spray rate plasma qun produces 2 % porosity coatings while spray

300.00 Labour Po Labour) EUR/kg 250,00 Energy 200,00 Powder. 150,00 (Energy, 100,00 cost 50,00 Coating 0.00 Chrome Oxide Yttria Zirconia HP Alumina Alumina

Cost comparison : High Spray Rate plasma gun versus Conventional plasma gun

Continued on page 16

rate reaches 120 g/min (~15.9 lbs/hr) and more than 50% DE.

Spray rate for pure alumina coatings (Al2O3), are multiplied by 3 up to 9.92 lbs/hr with improved DE of 65%, while the target of 2% porosity is still achieved.

These spray rates and DE data are greatly valued by the operating and production teams, but don't mean much for financial and investment managers. There is no better way to illustrate the HP high-spray rate plasma gun benefits than rating the savings achieved. The Graph shown on page 15 shows the potential savings that are achieved when using HP high-spray rate plasma guns.

The HP high-spray rate plasma guns have proven their capability to bring significant and valuable improvements in performance compared to the conventional guns and even by using a single-cathode design. The good indicator of performance of a plasma gun should integrate its productivity, its specific energy costs, the required capital expenditure, its versatility. The HP high-spray rate plasma guns represent a valuable asset on all these aspects.

The HP high-spray rate plasma guns versatility allows the creation of differentiated products with improved innovative coating features with optimized costs. Understanding the benefits of HP high-spray rate plasma guns requires focus on the real coating cost structure as well as a global view on the coating value chain. Cost optimization plays an important role and consequently



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takes greater strides toward a profitable growth strategy. **Author:** Patrice Fournier, Saint-Gobain Coating Solutions, Avignon, France

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(see advertisment page 17)

Imperial Systems Dust Collection System Design at a Tire Recycling Center Meets and Exceeds all NFPA Guidelines

Case Study Challenge: The existing dust collection system at the Tire Recycling

Facility had caught on fire and was not functioning. It did not meet NFPA standards and was inadequate for all of the recycling equipment in the facility.

The challenge was to present a dust collection system that met the recycling center's needs, cleaned up the environment of the plant and complied with current NFPA standards.

Product: Turnkey Dust Collection System

Application: Rubber Recycling

Customer: Tire Recycling Facility - Charlie Miller, Sales Engineer for Imperial Systems, worked with Imperial's engineers to design a fail-proof dust collection system that met all of the customers' needs

The IMP field crew had to overcome some unique installation situations. The installation job was accomplished within their planned scheduled maintenance, saving the customer from possibility of lost production revenue.

The Tire Recycling Facility is very pleased with the performance of their Imperial Systems, Inc. dust collection system. The new dust collection system has vastly improved the working conditions of the recycling plant and has greatly reduced the chances of a catastrophic disaster occurring.

"Imperial was really efficient. They were very responsive to our needs and resolved any issues quickly. The installation crew was excellent. They came in and got the job done in a reasonable time frame. We will continue using Imperial's services in the future." - Operations Manager

Imperial Systems, Inc. is a dust collection and air pollution control expert; from designing and installing dust collection systems to manufacturing industry leading products, engineered for outstanding quality, safety and value.

For more information, visit www.isystemsweb.com

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INDUSTRY NEWS

Certified Thermal Spray Operator (CTSO) Program Completed

At the May International Thermal Spray Association (ITSA) annual membership meeting in Charleston SC, Dr. Aaron Hall, Chair of the ASM Thermal Spray Society Thermal Spray Certification Committee (TSCC), presented the ITSA attendees with updated information on the progress of this program.



The CTSO program has completed the full suite of examination requirements for five specialty processes; air plasma, cold spray, flame spray, HVOF and wire arc. To complete the exams and be awarded the prestigious CTSO, an operator must take and pass three examinations: an overall examination on the general knowledge of thermal spray fundamentals, a written process exam and a practical performance exam in the process. The written exams (both the general knowledge and the process exam) are taken at test vendor sites around the world.

The practical exam is different. The operator is being tested on his/her ability to use spray tools to achieve a coating value. The TSCC has attempted to make the practical testing process as simple as possible. Each process requirements document contains four (4) tables. Table 1 has a list of torches that can be used for that specific process; Table 2 has the spray requirements that the candidate must achieve, Table 3 has the tests that will be performed on the coupon, Table 4 has a list of process parameters the candidate is asked to complete. Candidates may certainly request permission to use alternate torches or feedstocks as the listings are not inclusive of all torches and feedstocks.



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Franklin, OH 45005 f: (937) 746-7658 www.NationCoatingSystems.com CTSO candidates will use their familiar tools and workspace to perform the spray, under supervision. When the candidate is satisfied that the coating is sufficient to pass the tests, it is packaged as directed and sent with the process parameters (Table 4) to IMR Test Labs, where it will be tested. A second process parameters table, or copy of the one sent to IMR, will be sent to ASM for our records; the supervisor's signature document must also be sent to ASM. IMR will send test results to ASM where they will be reviewed and the candidate notified of the result.



The process is confidential: candidates and coupons are identified by their unique ASM numbers; communication with IMR references only those numbers, not any candidate's name or affiliation. Packages sent from the candidate to IMR have the candidate's ID number and ASM's return address so that IMR can accept and direct the coupon appropriately. It is only at ASM's Certification Department that candidate 123456 can be identified as John Q. Doe from Thermal Sprays R Us, Inc.

The information contained in Table 4, the process parameters, is valuable data that will benefit the entire thermal spray community. A committee of the Thermal Spray Society and the TSCC is addressing the question of data collection, analysis and publication. While the data will be used to provide information, it will be published anonymously. Candidates' supervisors may elect to release all the data for publication, only the metallographic information or they may decline to publish any data.

TSCC Chair, Aaron Hall, has termed the CTSO the largest round robin for thermal spray ever conducted, as over the years, data points will be added. The CTSO program not only benefits individual thermal sprayers and their employers, but contributes a long term data flow to benefit all of thermal spray. Such a program can only grow in importance, acceptance and value.

For more information, please consult our web site http://tss.asminternational.org/portal/site/tss /Certification, or contact Louise Wehrle at 440-338-5151 or certification@asminternational.org.

Bodycote and Rolls-Royce Sign 10-Year Renewal Agreement At the 40th International Paris

At the 49th International Paris Air Show, worldwide thermal processing specialists Bodycote today announced the signing of a 10-year renewal contract with Rolls-Royce to provide thermal processing services in the United Kingdom.

Bodycote's core business is to provide services that improve the properties of metals and alloys, thereby making products stronger and safer. The company plays a vital role in the aerospace supply chain.

The new contract involves direct support for Rolls-Royce from Bodycote's on-site facility located within the boundaries of the Rolls-Royce Precision Casting facility in Derby and five additional U.K. locations. Bodycote will provide Rolls-Royce with heat treatment, hot isostatic pressing, thermal spray coatings and metal joining, including brazing and electron beam welding.

The agreement also provides the framework for Rolls-Royce and Bodycote to extend their partnership in other parts of the world, including North America and Asia.

Based on its range of services, global footprint and ongoing expansions, Bodycote is well-positioned to meet the needs of manufacturers seeking long-term agreements as they globalise their supply chains and simultaneously reduce their number of suppliers. This also allows them to maximise their return on investment from their global operations.

Rolls-Royce signed its first key supplier agreement with Bodycote in the early 1980s. In the late 1990s, Bodycote became the first subcontractor to establish operations within the boundaries of any Rolls-Royce facility, and remains so to this day.

About Bodycote

With more than 170 accredited facilities in 27 countries, Bodycote is one of the world's largest providers of thermal processing services. Through heat treatment, metal joining, surface technology and Hot Isostatic Pressing (HIP), Bodycote improves the properties of metals and alloys, extending the life of vital components for a wide range of industries, including aerospace, defence, automotive, power generation, oil & gas, construction, medical and transportation. Customers in all of these industries have entrusted their products to Bodycote's care for more than 30 years.

For more information, visit www.bodycote.com.

Thermal Spray Jobs listed at "For Hire" www.thermalspray.org

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SPRAYTIME Second Quarter 2011



ITSA Mission Statement

The International Thermal Spray Association is a professional trade organization dedicated to expanding the use of thermal spray technologies for the benefit of industry and society.

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Chairman Wright

company representatives to better understand member benefits. A complete list of ITSA member companies and their representatives are at www.thermalspray.org

ITSA Mission Statement The International Thermal Spray Association is a professional trade organization dedicated to expanding the use of thermal spray technologies for the benefit of industry and society.

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ITSA Scholarship Opportunities

The International Thermal Sprav 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 www.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 Sprav Historical Collection which is now on display at their headquarters office in Fairport Harbor, Ohio 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 thermal spray publications and reference books.

Spray

market

and

Metallizing Service

Contractors, the association

has been closely tied to

most major advances in

thermal spray technology,

equipment and materials,

industry events, education,

and

A company-member trade

association, ITSA invites all

interested companies to

talk with our officers,

chairs,

standards

development.

committee

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 Newsletter

Since 1992, the International Thermal Spray Association has been publishing the **SPRAYTIME** newsletter for the thermal spray industry. The mission is to be the flagship thermal spray industry newsletter providing company, event, people, product, research, and membership news of interest to industrial leaders, engineers, researchers, scholars, policy-makers, and the public thermal spray community.

ITSA Headquarters

208 Third Street, Fairport Harbor, Ohio 44077 USA tel: 440.357.5400 fax: 440.357.5430 itsa@thermalspray.org www.thermalspray.org

Become a Member of The International Thermal Spray Association



Your company should join the International Thermal Association

Bringing Technology and Technique Together Spray now! As a company-

member, professional trade association, our mission is dedicated to expanding the use of thermal spray technologies for the benefit of industry and society.

ITSA members invite and welcome your company to join us in this endeavor.

Whether you are a job shop, a captive in-house facility, an equipment or materials supplier, an educational campus, or a surface engineering consultant, ITSA membership will be of value to your organization.

The most valuable member asset is our annual membership meetings where the networking is priceless! Our meetings provide a mutually rewarding experience for all attendees - both business and personal. Our one-day Technical Program and half-day business meeting balanced by social activities provide numerous opportunities to discuss the needs and practices of thermal spray equipment and processes with one another.

As an ITSA member, your company has excellent marketing exposure by being listed on our website along with a multitude of additional benefits.

ITSA member companies are also highlighted in the ITSA booth at several trade shows throughout the year (International Thermal Spray Conference ITSC, Fabtech Thermal Spray Pavilion and Conference, Weldmex Mexico, PowerGen, Society of Vacuum Coaters and TurboExpo).

If you would like to discuss the benefits of your company becoming a member of the International Thermal Spray Association, we suggest you contact Kathy Dusa at our headquarters office or visit the membership section of our www.thermalspray.org website.

International Thermal Spray Association Welcomes Three New members

Byron Products has joined the International Thermal Spray Association.

Byron Products is a thermal processing company specializing in plasma spray, HVOF (High Velocity Oxygen Fuel) VPA (Vapor Phase Aluminide) coatings, blasting, heat treating, brazing, and welding. Some of the industries that Byron Products Serves: aerospace OEM and overhaul. power generation/turbine, medical automotive, refining/coal dampers and louvers, pumps, mixers, valves, agriculture, food processing. Certifications that Byron Products holds are Nadcap Approved for coatings, heat treating and welding. FAA Repair Station Cert# YB5R630Y ISO: 9001:2000 AS9100B

"WHATEVER IT TAKES" is our motto at Byron Products. By that statement we are dedicated to supplying our customers with the best service. Being able to react with personalized and professional service is what has allowed us to be in business and grow since 1982.

For more information, contact ITSA company representative Keith King, kking@byronproducts.com and visit their website www.byronproducts.com

DVS, The German Welding Society has joined the International Thermal Spray Association.

DVS is a technical-scientific non-profit-making society with its headquarters in Düsseldorf.

Its purpose is to promote welding and allied processes for the benefit of the general public - beyond the circle of its members.

For more information, contact ITSA company representative Jens Jerzembeck, jens.jerzembeck@dvs-hg.de and visit website www.die-verbindungs-spezialisten.de

TSCC, The Thermal Spraying Committee of China Surface Engineering Association has joined the International Thermal Spray Association.

TSCC is the largest and the most authoritative thermal spray legal organization in China, with about 800 members representing more than 10,000 people from aerospace and aircraft, chemical, petroleum, machinery, shipping, automobile, energy, light industry, etc. engaged in the thermal spray industry.

For more information, contact ITSA company representative Professor Huang Xiaoou, Xiaoou@chinathermalspray.org and visit their website www.chinathermalspray.org

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- Steel, stainless, and zinc shot and dust
- Thermal spray, Plasma spray, Cold Spray, and HVOF overspray powders, dusts, solids, and sludges containing chromium, cobalt, copper, indium, molybdenum, nickel, rhenium, and tungsten carbide
- Certified parts destruction

Corporate offices are located in Shaker Heights, OH. Facilities are located in Augusta, GA; Cleveland, OH; Houston, TX; and Phoenix, AZ

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Tel: 216-921-6500 Fax: 216-921-3840 www.ardleigh.net

Nearly 200 Datasheets on PTFE and UHMW Tape are now Available at www.DeWAL.com



DeWAL Industries, Inc., a leader in the manufacture of skived PTFE and UHMW-PE film and tape, has enlarged and updated its entire datasheet library to include more

films and tapes and to provide both English and metric values where applicable.



DeWAL is offering this current and broad-ranging library to professionals concerned with improving product and reducing costs. The library covers virtually every type of PTFE and UHMW-PE film as well as pressure-sensitive tapes, special laminated materials, bondable films and plasma tapes. Available at the DeWAL website, www.dewal.com, datasheets can be read online or downloaded as PDFs.

"With these online data sheets, engineers can have the information they need at a moment's notice," said Chris Brooks, DeWAL Director of Sales and Marketing. "The updated DeWAL library will help engineers and designers both improve their products and develop new applications."

DeWAL precision films and tapes are often used for wire & cable insulation and jacketing, hose linings, abrasion layers, permeation barriers, thermal spraying, and squeakand-rattle reduction. Engineers with unique applications use them in fields as diverse as aerospace and downhole drilling.

The DeWAL datasheets offer information on mechanical properties, heat and abrasion resistance and compliance with the requirements of U.S. and international governments and agencies.

Since its founding in 1974, DeWAL Industries has become a leader in the manufacture of skived PTFE and UHMW-PE film. DeWAL manufactures pressure sensitive tapes from PTFE, UHMW-PE, polyimide, and PTFE-coated glass fabric. DeWAL is known for electrical, mechanical and plasma films and tapes, including porous, laminated and die cut films and tapes manufactured to the tightest tolerances.

For more information, contact Christopher Brooks, DeWAL's Director of Sales and Marketing, (800) 366-8356 or cbrooks@dewal.com. **See advertisment page 16.**

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Conference 2011 Hamburg, Germany September 27-29, 2011

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For more information, visit www.dvs-congress.de and www.asminternational.org/tss

Where is your article? We encourage you to send articles, news, announcements and information to itsa@thermalspray.org.

Thermal Spray Pavilion FABTECH

Join the International Thermal Spray Association at the Fabtech Thermal Spray Pavilion this year in Chicago November 14-17, 2011.



To reserve your booth space, contact Joe Krall, Exposition Sales, 800.443.9353, jkrall@aws.org See advertisement page 8.

NEW "Supporting Societies" Membership The International Thermal Spray Association is pleased

to announce a new "Supporting Societies" membership category to establish communication with other associations/societies involved in thermal spray and surface engineering activities worldwide.

See the Supporting Societies listing on page 21. This is ideal for membership exchange between organizations. Contact Kathy Dusa at the headquarters office via email to itsa@thermalspray.org

Practical Cold Spray Coatings

CenterLine's Supersonic Spray Technologies supplies a full range of patented cold spray metal coating systems to rebuild and repair high-value parts and equipment thus preserving structural properties and saving significant overhead costs. You can depend on SST Cold Spray to protect, repair, restore, refinish and recoat manufactured products. Call us today to discuss your challenges.



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Accuwright Expanding Thermal Spray Horizons

Accuwright Ind. of Gilbert, Az is leveraging their technological expertise by moving into diverse markets. According to President David Wright "No longer just aerospace, we are finding new applications all the time in automotive, sputtering, semi-conductor and medical industries." Their recognized leadership in developing diverse cold spray processes is bringing mainline manufacturers with unexpected applications.



Accuwright management staff (left to right), John Ludwig, marketing; Dave Wright, President-CEO; Jay Shuler, operations; Linda Lea, office; Jory Wright, production; Jaren Wright, QA logistics.

Implementing processes and applications onto a production basis is a constant challenge for Operations Manager Jay Shuler "We are currently moving our Cold spray process capabilities to the high pressure arena. That means much more gas handling capacity and beefed up hardware

all around, but the payoff in terms of new materials capability and processing speed is attractive" Currently, testing and production of high nickel alloys as well and pure metal applications is bringing results that have been out of reach before. Production Manager Jory Wright is currently pushing the envelope developing thin-film applications for the communications industry, "It's just amazing what people are bringing us from a



Cold spray technicians Matt Stock (left) and Ammon Guernsey demonstrate medium pressure cold spray on an aerospace scroll housing.

range of OEM's and Repair companies. Our forte is responding to those parameters with robust and affordable solutions".

Accuwright has spent much of this year developing a cohesive production team using role/interface identification to drive out redundancy and maximize productivity in a medium sized company. Thus, this high performance work team takes a standard organized approach to assure that the smallest customer gets the same quality and turnaround time as established clients. QA and Logistics Manager Jaren Wright has been on the job driving a comprehensive data collection program to define and eliminate recurrent problems. Through a workable "second set of eyes" and accountablity methodology, no part leaves the site without multiple checks.

With the boom in cold spray applications from diverse sources, Accuwright is poised to expand from a small to medium size company by opening up capacity in highpressure coldspray applications of Superalloys and Titanium. By adding four (4) new robot stations by the end of 2011, a one-day turn time for delivery driven customers will become the norm. Parts from the smallest semi-conductors to 1-ton industrial shafts will all fit in the manufacturing envelope.

For more information, visit www.accuwright.com

FJ Brodmann and Company Expands Green Manufacturing

During its 25 years in the engineered powder manufacturing business F.J. Brodmann & Co. has gradually expanded its "green" manufacturing capacity to conserve energy and material resources. The development and commercialization of closed cycle low temperature material processing methods has resulted in substantial performance improvements and cost savings.

The low temperature processes include both mechanofusion for the production of composite powders and tribochemical alloying for the synthesis of dispersion strengthened and work-hardened alloys. The following special metal alloys are produced either under vacuum, inert gas, or cryogenic atmospher conditions: NiB, CoCrMo, AINiY, AICoSm, TiAINb, CoMo, WMoTa, NbFeB, CrAIY, SiB, LiAl, AIMgSi, MoRe. A growing number of dispersion strengthened cermet formulations are commercially synthesized.

The synergistic powder products are sized to meet the specifications for filler, coating, pressing or surface treatment applications. The coating powders are classified to meet the specifications for plasma, HVOF, PTA laser cladding, low and high pressure cold spray processes.

The capacity for "green" contamination free grinding and screening of high purity metallic and oxides phase powders has been substantially increased.

For more information, visit www.fjbco.com



www.mecpl.com



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CALENDAR OF EVENTS AUGUST 2011

1-5 Québec City, Canada Thermec 2011 - contact email secretariat@thermec2011, www.thermec2011.ca

8-10 Minneapolis, MN USA MPMD Materials and Processes for Medical Devices Conference and Exposition- visit www.mpmdconference.com

14-18 Cancun, Mexico XX Int'l Materials Research Congress IMRC 2011 - contact Materials Research Socity, info@mrs.org, www.mrs.org

SEPTEMBER 2011

5-7 Estoril, Portugal 24th European Conference on Liquid Atomization and Spray Systems ILASS 2011 - contact Luis Almeida Moreira, email ilass2011@dem.ist.utl.pt, www.ilass2011.org

12-15 Orlando, FL USA Int'l Test & Evaluation Assoc email symposium@itea.org, www.itea.org

13-15 Houston, TX USA Texas A&M 40th

Turbo and 27th Pump Symposium 2011 - I visit www.turbolab.tamu.edu, email

inquiry@turbo-lab.edu, visit turbolab.tamu.edu/

20-21 Fort Lauderdale, FL USA 14th Aluminum Welding Conference - visit www.aws.org

20-22 Boston, MA USA HI TEMP 2011 High Temperature Materials, Processes and Diagnostics - contact Ms. Fumi Akimaru hitemp2011@netzsch.com

22 Houston, TX USA 2011 Aboveground Storage Tank Conference NISTM National Institute for Storage Tank Management - contact email janelle@nistm.org

25-27 Charleston, SC USA 2011 MPIF 67th Annual Meeting - Metal Posder Industry Federation, visit www.mpif.org

24-26 Hamburg, Germany Thermal Spray Technology, Processing and Evaluation Education Course at ITSC 2011 contact memberservicecenter@asminternational.org

26-29 Hamburg, Germany ITSC Int'l Thermal 2011 Sprav Conference & Exposition with DVS Congress & DVS Expo 2011 -



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contact customerservice@asminternational.org, website: www.asminternational.org/tss or email DVS at tagungen@dvs-hg.de

OCTOBER 2011

2-5 San Diego, CA USA Titanium 2011 -contact Int'l. Titanium Assoc. 303.404.2221, email ita@titanium.org, web www.titanium.org

3-5 Tours, France 5th S2TS Int'l Workshop on Suspension and Solution Thermal Spraying - visit web http://www.intworkshop-s2ts.org

11-13 Charlotte, NC USA South-Tec 2011 Showcase Automotive, heavy equipment, aerospace, green energy and *medical*- visit www.southteconline.com

17-20 Columbus, OH USA MS&T 2011 Materials Science & Technology Conference & Exhibition - visit matscitech.org

17-20 Toronto, Canada CMTS Canadian Manufacturing Technology Show - visit www.cmts.ca

18-21 Toulouse, France AeroTech 2011 - SAE www.sae.org/events/atc/

18-21 São Paulo Brazil Brazil Welding Show - visit www.brazil-welding-show.com

25-27 Windsor, Ontario Canada 2011 North American Cold Spray Conference Sponsored by the Canadian Cold Spray Conference and ASM Thermal Spray Society - contact Marc Levesque, marc.levesque@cntrline.com, web www.coldspraynorthamerica.org

25-27 Wuhan, Hubei China ITSS 2011 14th Int'l Thermal Spraying Seminar & CNTSC 2011 China CHINA National Thermal Spraying Conference contact Prof. Huang Xiaoou, xiaoou@chinathermalspray.org

310CT-2NOV Beijing, China 2011 Int'l Conference on Offshore Wind Energy and Ocean Energy - email cset@mail.etp.ac.cn

NOVEMBER 2011

13-16 Chicago, IL USA FABTECH Int'l & AWS Welding Show with a Thermal Spray Pavilion and Conference - organized

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www.a	ws.org, Fabr	ricators	and	Mfgrs	Assoc,	AWS WELDING PRA	
vww.f	mafabtech.	com,	Soc.	of	Mfg.		
Engine	eers, www.sn	ne.org/	fabte	ech			

15-16 San Jose, CA USA ISTFA 2011 37th Int'l Symposium for Testing and Failure Analysis - visit www.istfa.org 28NOV - 2DEC Boston, MA USA 2011 MRS Fall Meeting -

contact Materials Research Society, info@mrs.org, www.mrs.org/fal/2011

DECEMBER 2011

7-9 Limoges, France 5th RIPT: Int'l Workshop on Thermal contact Lech Pawlowski, Spraying lech.pawlowski@unilim.fr, www.unilim.fr/spcts

13-15 Las Vegas, NV USA Power-Gen International - visit www.power-gen.com

2012

JANUARY 2012

30JAN-2FEB Tampa, FL USA SSPC 2012 - www.sspc.org **FEBRUARY 2012**

1-4 Jeddah, Saudi Arabia Metal & Steel 2012 - visit website http://www.metalsteeleq.com/metal, email jeddah@arabiangerman.com

29FEB-1MAR Houston, TX USA LAM 2012 Laser Additive Manufacturing - visit Laser Institute of America www.lia.org

APRIL 2012

9-13 San Francisco, CA USA 2012 MRS Spring Meeting contact Materials Research Socity, info@mrs.org, www.mrs.org/spring2012

11-14 Osaka, Japan Japan Int'l Welding Show - visit www.weldingshow.jp/english

22-25 Las Vegas, NV USA IBSC 2012 5th Int'l Brazing and Soldering Conference - visit website

www.asminternational.org/content/Events/ibsc

28APR-3MAY Santa Clara, CA USA 55th SVC Annual Technical Conference - visit www.svc.org

MAY 2012

2-4 Mexico City, Mexico Weldmex Expo Industrial Mexico 2012 - visit www.expoindustrialmexico.com.mx

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21-24 Houston, TX USA ITSC 2012 Int'l Thermal Spray Conference visit www.asminternational.org/itsc 23-26 St. Petersburg, Russia Essen Welding Pavilion visit www.schweissen-schneiden.com **JUNE 2012** 10-13 Nashville, TN USA PowderMet 2012 Int'l Conference on Powder *Metallurgy* - visit www.mpif.org 11-15 Copenhagen Denmark ASME TurboExpo 2012 visit www.turboexpo.org, email igti@asme.org **JULY 2012** 8-14 Denver, CO USA 65th Annual Assembly IIW ſ International Conference - Contact-IIW General Secretariat Α , email l.durand@iiwelding.org **OCTOBER 2012** 15-17 Las Vegas, NV USA FABTECH with a Thermal Spray Pavilion and Conference - organized by Α American Welding Society, www.aws.org, FABTECH Ν Fabricators and Mfars Assoc, www.fmafabtech.com, Soc. of Mfg. D Engineers, www.sme.org/fabtech 23-27 Hanover, Germany EuroBLECH 2012 22nd Int'l Sheet F Metal Working Technology - visit www.euroblech.com 29-31 India Essen Welding Cutting Surfacing with R Metallurgy India and Tube India - visit www.schweissenschneiden.com **NOVEMBER 2012** 0 8-9 Munich, Germany 9th HVOF Colloquium High Velocity Oxy-Fuel" F Flame Spraying - contact GTS hvof@qts-ev.de, web www.hvof.qts-ev.de 2013 Ε **MAY 2013** TBD Salt Lake City, UT USA Int'l Thermal Spray Association Annual Membership *Meeting and Technical Program* - contact itsa@thermalspray.org Ν SEPTEMBER 2013 16-21 Essen, Germany Int'l Trade Fair Joining Cutting Т Surfacing - visit www.schweissen-schneiden.com S International Thermal Spray **Conference 2011** Hamburg, Germany September 27-29, 2011 The world's unique meeting of experts in Joining, Cutting and Surfacing technology. Being held in the Hamburg Congress Center located in the heart of Hamburg with good traffic links. For more information, visit www.dvs-congress.de and www.asminternational.org/tss

LinkedIn Has Thermal Spray Group

The business social network "LinkedIn" has a group titled "Thermal Spray Coating" *currently with 431 members* and some discussions.

If you are interested, please visit www.linkedin.com and join the network and then join the group.

Scholarship Opportunities

Since 1991, the *International Thermal Spray Scholarship Program* has contributed to the growth of the thermal spray community. ITSA offers up to three Graduate Scholarships **worth \$2,000.00 each**.

Applications are accepted April 15 through June 30 ONLY.

Please visit www.thermalspray.org scholarship area for details and a printable application form.

Join the ASM Thermal Spray Society Online Community Forum

ASM TSS members welcome visitors to register and access the new *searchable* forum, as well as explore the new online community.

To subscribe, visit http://tss.asminternational.org, choose networking and forum for instructions.

Journal of Thermal Spray Technology® A publication of the ASM Thermal Spray Society Current Status and Future Prospects Of Warm Spray Technology Seiji Kuroda, Makoto Watanabe, KeeHyun Kim, and Hiroshi Katanoda

A modification of high-velocity oxy-fuel (HVOF) thermal spray process named as warm spray (WS) has been developed. By injecting room temperature inert gas into the combustion gas jet of HVOF, the temperature of the propellant gas can be controlled in a range approximately from 2300 to 1000 K so that many powder materials can be deposited in thermally softened state at high impact velocity. In this review, the characteristics of WS process were analyzed by using gas dynamic simulation of the flow field and heating/acceleration of powder particles in comparison with HVOF, cold spray (CS) and high-velocity air-fuel (HVAF) spray. Transmission electron microscopy of WS and CS titanium splats revealed marked differences in the microstructures stemming from the different impact temperatures. Mechanical properties of several metallic coatings formed under different WS and CS conditions were compared. Characteristics of WC-Co coatings made by WS were demonstrated for wear resistant applications.

Read the entire article in the June 2011 Issue
 Visit www.asminternational.org/tss
Editor: Christian Moreau • Lead Editor: Basil Marple
 Editor Emeritus: Christopher C. Berndt
 Associate Editors:
 Kendall Hollis, Seiji Kuroda, and Armelle Vardelle

Sulzer Metco's new TriplexPro-210 embodies robust design improvements that deliver sound performance and simplifies maintenance.

Based on customer input, the recent release of the TriplexPro-210 plasma spray gun improves upon the

JULZE

Triplex Pro -210

already successful Sulzer Metco TriplexPro gun platform. Market feedback revealed two particular areas for further enhancement: ease of maintenance and performance robustness.

"Our TriplexPro-200 customers tell us that they love the gun's performance and stability", says Steven Ort, Equipment Product Line Manager for Sulzer Metco. "However, they also expressed their concerns regarding the cost and availability of helium, and told us that the gun would be even better if we simplified gun maintenance and improved durability when using aggressive parameters."

As a result, the new TriplexPro210 was redesigned for fast, simple maintenance that is less prone to error and misalignment and is now more durable. The gun adapts equally well to long or short spray campaigns and highly



automated operations. Features such as the less expensive, modular neutrode cartridge and simplified cathode configuration make maintenance procedures easier and reduce part changeover time. Other new design features improve performance stability in automated

installations and diminish the chance of damage to O-rings during maintenance.

In addition to these new maintenance efficiencies, owners of the new TriplexPro-210 will appreciate the subsequent time and cost savings. The gun's capability for low helium or helium-free

operation effectively reduces spray process costs. Customers who wish to contract heliumfree parameter development can do so conveniently through Sulzer Metco's Coating Solution Service Centers.

The upgrade to TriplexPro-210 is effortless as customers can continue to use the same spray parameters and motion programs they currently use for the TriplexPro-200.

Dave Hawley, Director of Thermal Spray Component Research & Development at Sulzer Metco, acknowledges that considerable engineering, testing and validation has gone into the redesign of the new TriplexPro-210 to ensure that the goals for this product and crucial expectations of the customers were met. He states that, "TriplexPro-210 exemplifies the Sulzer Metco tradition of gun design leadership in the industry, and represents the first of several major innovations to be launched in the coming years."

Sulzer Metco is a global leader in surface engineering solutions and services offering: thermal spray and thin film equipment, materials and coating services; plasma heat-treatment services; engine components for industrial and aero turbines; and customer support services.

Sulzer Metco provides a comprehensive manufacturing, distribution and service network, catering to aerospace, power generation, automotive and other strategic growth industries. Sulzer Metco is a division of Sulzer Ltd. (SIX:SUN).

For more information, visit website www.sulzermetco.com or email info@sulzermetco.com

Where is your article? We encourage you to send articles, news, announcements and information to itsa@thermalspray.org.



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SPRAYTIME Second Quarter 2011

PEOPLE/INDUSTRY NEW

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Jason Falzon New ITSA Vice-Chairman

Jason Falzon, a managing partner at FW Gartner Thermal Spraying was elected to the Vice-Chairman position for the International Thermal Spray Association at the May annual membership meeting.

Jason was born into the thermal spray industry as the fifth generation successor at FW Gartner in Houston, TX. He began his tenure with the company at the age of 14,



working in the shop during summer breaks from high school. After earning an engineering degree from Texas A&M University in 2005, he came back to the company full time. As current managing partner, Jason is actively involved in day to day activities handling various internal/external projects, managing customer relationships, and is a part of Gartner's engineering team.

Jason and his wife Kelsey have been married for 5 years and have two children, Jack and Sarah. He is active in his church, plays drums for their praise team, and enjoys participating in endurance sports.

For more information, contact Jason at FW Gartner via email jfalzon@fwgts.com





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Curtiss-Wright Acquires BASF's Surface Technologies

Curtiss-Wright Corporation, the parent firm of Metal Improvement Company, has acquired the assets of BASF's Surface Technologies business from BASF Corporation. The Surface Technologies business is a leading supplier of metallic and ceramic thermal spray coatings primarily for the aerospace and power generation markets, and currently operates as part of BASF's global Catalysts Division.



Peter Ruggiero, Rob Specht, Pierce Cleary (left to right) of Curtiss-Wright, at the International Thermal Spray Association annual membership meeting.

"The acquisition of BASF's Surface Technologies business adds a new offering in the area of high technology coatings to Curtiss-Wright's existing portfolio of niche coating technologies. Thermal spray coatings are synergistic with our current offering of highly engineered metal treatment services. We anticipate leveraging this technology for additional growth opportunities across our global network of metal treatment service facilities," said Martin R. Benante, Chairman and CEO of Curtiss-Wright Corporation.

BASF's Surface Technologies business has approximately 150 employees at its three operating facilities located in East Windsor, CT, Wilmington, MA and Duncan, SC. All three facilities are ISO 9001 certified and Nadcap approved for thermal spray coating of aerospace components.

Metal Improvement Company provides precision metal

finishing services, including shot peening, laser peening, coating services and heat treating, through a network of over 65 facilities in North America, Europe and Asia. Metal Improvement Company is a wholly-owned subsidiary of the Curtiss-Wright Corporation.

For more information, visit www.metalimprovement.com

Is Your Employee Listed? Send notice to spraytime@thermalspray.org

MesoCoat Groundbreaking



Duane Parks (Loan Officer, Ohio Department of Development), Shawn DaVis (Assistant Director, Cleveland Growth Partnership), Dr. Michael Martin (VP Technology at EMTEC), Stephen Caviness (Faith-Based and Economic Development Liaison, Office of Representative Marcia L. Fudge), Andrew Sherman (President/CEO, MesoCoat, Inc.), Mayor Bill Cervenik (City of Euclid), Kenny Yuko (State Representative -House District 7), Max Blachman (Northeast Ohio Regional Representative - Senator Sherrod Brown at United States Senate)

IJ "MesoCoat recently held the groundbreaking ceremony for their new 11,000 sq ft facility in Euclid, OH. This was a very well attended event with strong participation from State of Ohio, Ohio Department of Development, JumpStart Inc., City of Euclid, NorTech, Case Western Reserve University, University of Akron, University of Dayton, Edison Materials R Technology Center, NASA, Department of Energy, Department of Defense, National Institute of Standards and Technology, and several other MesoCoat partners and customers.

The construction of this new facility is expected to be completed by September, 2011, and it will take an additional two months to complete production set-up at this facility. MesoCoat is certain that with advent of 2012, they will able to start full-scale production at this facility. This facility will have a single line 'CermaClad' production set-up to produce around 10,000 square meters of corrosion and wear resistant clad tubes, pipes, and plates. This facility will provide a finished end product and hence includes state-of-art equipment for blasting, application, and testing. To commercialize and gualify their PComP™ product line for end users in Aerospace, Oil and Gas, Mining, and Chemical processing; this facility will also have a complete turnkey thermal spray solution system that includes blasting, thermal spray application, and finishing system set-up. Provisions have already been made for expansion of this plant in early 2012, which could double the size of this production facility.

Andrew Sherman, CEO, MesoCoat Inc. mentioned "Through the opening of plants like these, we are leveraging our deep industry knowledge and product innovation to build new long-term customer relationships." The investment in this facility will create at least 30 new high-tech jobs in the region over the next 3 years, and will also lay the foundation for a new manufacturing facility planned in 2012 which would create another 60-70 jobs in Ohio. This facility is first in the series of 6 manufacturing plants scheduled over the period of next 5 years in the United States, South America, and Asia."

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For more information, visit mesocoat.com

How can I get a surface treatment machine that meets my expectations?

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Progressive Technologies has changed its name to **Progressive Surface**[™], highlighting our core competencies in the design and manufacture of world-class surface treatment machinery.

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thorough upfront discovery process-specific design lifetime support

The **Procise** Process[™] guarantees that your **Progressive** Surface equipment will perform to your exact requirementsand beyond your expectations—for years to come. Procisely!™

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Rick Davis Joins Universal Thermal Services

We would like to introduce *Rick Davis* to the Thermal

Spray industry as a field service technician for Universal Thermal Services Inc. (UTS). He was hired by

UTS in October of 2009. Rick has come to us from the automotive industry in the calibration field. He has adapted his

past experience into the thermal spray industry at an unparalleled pace; proven himself to have become an excellent and knowledgeable technician in the thermal spray field.

Universal Thermal Services Inc. was founded in 1999. Our goals are to make service available on short notice from an independent service company to get your system(s) operational fast. We have a good attitude in service, desiring to find you a solution to the problem, slowing or stopping production.

Rick has proven to us that his attitude is just the same as our entire team of service technicians. Rick has been on an intense training program studying most the major equipment in this industry. This allows us to introduce Rick,

> with pride to you that he will provide your company with a solution to your equipment problems; not with a "give up attitude" or "the shotgun repair job". Being meticulous is one Rick's best assets.

You will receive the best service when you use Universal Thermal Services Inc. technical service as your outside service group. We feel we are the best

in service and attitude, plus we continually strive to learn and deliver more to our customers.

For more information, contact Universal Thermal Services Inc., www.UniversalThermal.com; email uts@wolfnet.net, phone 920.596.2983 Ph.; fax 920.596.2903

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SPRAYTIME Second Quarter 2011

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David Wright New ITSA Chairman

David W. Wright, President of Accuwright Industries, Gilbert, AZ, was elected to the position of Chairman for the International Thermal Spray Association at the May annual membership meeting.

David W Wright, President of Accuwright Industries, Inc. is a 30 year veteran of the thermal spray processes. He began his career as a thermal spray operator in his home town of Ogden Utah, working for a small jet engine manufacturer in 1981. Recruited to Phoenix



Arizona in 1984 by a start up company repairing and overhauling jet engine components, he managed the thermal spray processes for 12 years and helped to groom that company which later sold for 9 times its original purchase price. Since 1996, he has served as President of Accuwright Industries, Inc. as a leader in thermal spray processes and began working on cold spray applications over five years ago. Today, he is a leader for the cold spray industry in production applications of low, medium, and high pressure applications of cold spray.

For more information, contact David at dave@accuwright.com



To reserve your booth space, contact Joe Krall, Exposition Sales, 800.443.9353, jkrall@aws.org See advertisement page 8.

Quality Calibration and Consulting Adds Quality Manager

Quality Calibration and Consulting Services, LLC (QCC), Quality Solutions for all your thermal spray needs, would like to announce the addition

of Joan Roy as Quality Manager. With Joan's help we are now ISO 9001-2008 certified. With this certification we can provide service and calibration to a larger, more diverse customer base. This certification will propel QCC to a new level of standard performance in the thermal spray service industry.



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QCC has some of the most advanced calibration equipment and software to provide our customers with the most accurate data. Our calibration certification sheets are easy to read and provide our clients with the information they need to make sure their equipment is operating at peak performance. Our calibration sheets provide previous year and current year to show changes in equipment from year to year.

"Quality and service excellence is what our company is all about. We can be reached 24/7. Our promise to our customer is to provide them with the highest quality service and information in order for them to be more efficient and profitable."

Joan is also a member of American Society of Quality (ASQ) and the International Thermal Spray Association (ITSA).

For more information, contact Joan Roy, Quality Manager, Quality Calibration and Consulting Services LLC, W8921 Hwy 96, Hortonville, WI 54944 USA, phone 920-710-4030, fax 920-710-4077, email QCCjoan@aol.com

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Free Poster

From Linde and the GTS (Association of Thermal Sprayers) illustrates the different thermal spray processes (suitable for framing). Send request for poster via email to

itsa@thermalspray.org

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Carbide and Metal Technologies Hire Business Development Managers for Edmonton, Alberta and Houston, Texas

Carbide & Metal (C&M) Technologies GmbH, a leader in the development and manufacturing of premium hardfacing materials is pleased to announce its sales and logistics expansion into both the United States and Canadian Markets. The two locations, Edmonton, Alberta and Houston, Texas will offer sales and technical support to its expanding customer base in mining, oil and gas, and industrial markets, as well as regional warehousing of materials to meet the growing market demands.

Erik Mamers has joined C&M Technologies as Business Development Manager for Canada based in Edmonton, Alberta.

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Erik's 25 years combined experience in welding, hardfacing and thermal spraying will be a great asset to C&M Technologies. Erik will greatly enhance our ability to provide superb technical

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support and excellent service to our Canadian customer base.

Scott Lacourse has joined C&M Technologies as Business Development Manager for the United States, based in Houston, Texas.

Scott brings 16 years of direct thermal spray technical support, production management and sales experience. Scott's in-depth knowledge of coating

processes, applications and solutions in the industrial, oil and gas and turbine markets will greatly enhance C&M in its continued expansion.

C&M offers carbide solutions for thermal spraying, spray and fuse, PTA, MIG and oxy-acetylene welding.



C&M Technologies is ISO-9001:2008 certified, ensuring high quality, consistent products.

To reach the new Edmonton office, contact Erik Mamers, C&M Technologies Canada, 9818-44 Avenue, Edmonton, AB T6E 5E5; tel. 780.436.2242; email erik.mamers@c-m-tech.com

To reach the new Houston office, contact Scott Lacourse, C&M Technologies GmbH, Montgomery, TX; tel. 936.448.8140: email scott.lacourse@c-m-tech.com.

For more information, please visit our website www.c-m-tech.com



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Camfil Farr APC Promotes Dauber and Frungillo to VP Posts

- Camfil Farr Air Pollution Control (APC), a leading producer of industrial dust and fume collectors, has promoted *John Dauber* to the position of vice president of sales, U.S.A. and Canada, and *Thomas Frungillo* to vice president of sales, Latin America and Focus Markets.

John Dauber has 19 years of sales engineering and

management experience in the dust collection industry. He joined Camfil Farr APC in 1998 as a regional sales manager and served most recently as North American sales manager. As a vice president, he will continue to be



responsible for the company's dust collection equipment sales throughout the U.S. and Canada, and he will oversee the company's U.S. regional sales managers, Canadian sales engineers and representative and distributor networks. Dauber is a frequent speaker and author on dust collector selection, safety and compliance issues.

Thomas (Tomm) Frungillo has worked in the dust

collection and air filtration industries for 18 years. He joined Camfil Farr APC in 2000 as a regional sales manager and has held a succession of posts in sales management as well as bio/pharma and other special market



management. In his new position, Frungillo has a dual role overseeing the company's focus market programs in the pharmaceutical, mining and thermal spray industries, as well as handling all of Camfil Farr APC's Latin American sales operations. Frungillo is a member of the International Society for Pharmaceutical Engineering (ISPE). He holds a BS degree in business administration from the University of North Carolina at Greensboro.

Both Dauber and Frungillo are members of the International Thermal Spray Association (ITSA).

Camfil Farr APC is a leading manufacturer of dust collection equipment and is part of Camfil Farr, the largest air filter manufacturer in the world. For general information in the U.S. and Canada, contact Camfil Farr APC at (800) 479-6801 or (870) 933-8048; e-mail filterman@farrapc.com; web www.farrapc.com.

For general information outside the U.S. and Canada, visit www.camfilfarrapc.com.

CenterLine (Windsor) Limited Appoints Southeastern USA Representative

Centerline (Windsor) Ltd. is very pleased to announce that Mr. *Stuart Rogers* has joined Centerline as their Southeast USA manufacturers representative.

Stuart has over 30 years of automotive experience in welding equipment planning, implementation, setup and sales. He previously worked for Lamb in the UK until



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moving to the USA 15 years ago. For the past 8 years Stuart was an independent manufacturers representative for two European welding equipment suppliers. During this period Stuart has the chance to work on a number projects that incorporated Centerline equipment. This enabled him to develop a good understanding of CenterLine's product line and range of services.

Stuart has extensive experience supporting BMW and MBUSI as well as many of the Southeastern US 1st and 2nd tier suppliers. In his new role Stuart will provide strong and effective sales and service support to existing and prospective customers operating in the area. With his knowledge of the Centerline product range, practical experience and dedication to customer satisfaction, CenterLine is confident that Stuart will provide the highest possible level of support to its customers.

Centerline (Windsor) Ltd. Is a recognized industry leader in the design, manufacture and supply of a full range of products and services satisfying welding, metalforming and cold spray applications for the automotive, mass transit, aerospace and defense industries. With over 50 years in business, Centerline is continuing to develop advanced technologies and processes to assist its customers in maintain their competitive advantage.

For more information visit Centerline's website at www.cntrline.com.

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