



WTS-2009 WORKSHOP ON THERMAL SPRAY

The idea of forming WTS is the brainchild of our Chairman Shri M. D. Modi a few years ago to facilitate a dedicated forum to share Thermal Spray technology related issues with users, applicators, equipment manufacturer, material suppliers and R & D organizations.

The first WTS was held in 2007 in Jodhpur sponsored by MEC. The second WTS was organized in April 2008 in Bangalore in collaboration of MEC & PESIT. WTS-2009 organized jointly by MEC & Indian Institute of Technology (IIT)-Mumbai.



In WTS-2009, it has been offered to all job shoppers (Thermal spray service providers) to take part in the event to promote their services and facilities. Most of the job shoppers presented their expertise in the field of thermal spray. Due to the participation of user as well as solution founders, the technical sessions became more interactive than ever before. Many functional and operational problems of industries were discussed and found solutions. Live demonstration helped new comers to understand the basic fundamentals and Hardware requirements of HVOF and Flame spray processes. Participants have not only learned and shared their knowledge related to thermal spray but also enjoyed the pleasant evening of IIT Bombay at Banquet dinner with Organizers Mr. S. C. Modi (Managing Director MEC), Mr. Ankur Modi (Executive Director MEC) & Prof. A. S. Khanna (Corrosion Science and Engg. Dept, IIT Bombay).

MEC ANNUAL FESTIVAL

Not only in everyday work, MEC staff are energetic even in making joy. Every year its been planned to celebrate in one of the recreating spots of Jodhpur. However Jodhpur is well known for its amusement spots. These kind of events lead us to maintain healthy relations among each other irrespective of position in the organization. This year the team went to Venture Resort located 15km away from city a peaceful picnic spot, accommodates open air partying, resorts and dining facilities. All the attendees were played on the openlawns, while a musical team continuously entertaining and lead the enthusiastic participants to the dance floor, about 11pm the team dispatched from the location after having a delicious meal.



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MEC News

A Quarterly Newsletter for MEC 's Business Associates

CURRENT STATUS OF THERMAL SPRAY IN INDIA

Dear Friends,

Thermal Spray is perhaps the most versatile class of available coating techniques. Not only large number of materials can be coated on any substrate, their excellent quality, precise thickness, achievement of functional property of the coating, are the added advantages. With continuation of the research in this field, many existing techniques are either modified or new techniques are being discovered. Though, this is of great advantage to many seasoned users, it is a problem for a new user to select a suitable technique for a particular application. For example, several kinds thermal spray techniques are available on the principle of flame, arc, plasma or HVOF gun, and are further differentiated on the basis of the state of coating material, powder or wire and its type, metal, ceramic or polymer.



It is pity that compared to western world, the use of thermal spray coating is just minimal in India, though there is a great potential for that. What could be the reason for that? Lack of awareness, proper education of the technique and its utility. Very few institutes cover surface engineering as a subject in the engineering disciplines, thus many engineers lack the knowledge about this technique. Mundane users who have hardly heard about this technique are unable to understand its versatility and depth. How this gap can be overcome?

Metallizing Equipment Company, Jodhpur under the dynamic leadership of Mr. S.C.Modi, has not only created a state of art of industry on the manufacturing of various thermal spray equipments, but also started very recently the educational workshops in the form of WTS. There is good participation in these workshops by the users, manufacturers, job-shop people and R & D personnel. We just concluded the 3rd WTS workshop on April 23-24 at IIT Bombay, which was well attended and discussed the state of art of various thermal spray techniques and their future applications. Also, there was an effort to form an Indian Thermal Spray Society (ITSS). I request all of you to encourage this positive effort.

A.S.Khanna

Prof. Dept. of Met. Engg. & Mater Sci., IIT Bombay

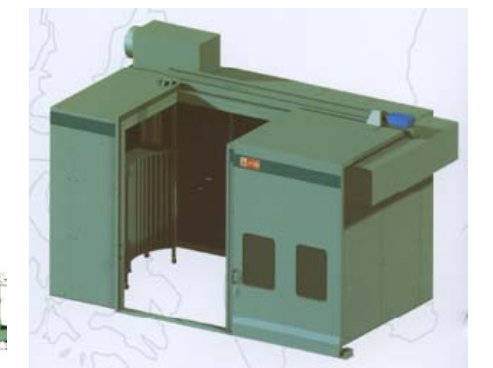
EXPANDED MEC "MEC INTERNATIONAL"

MEC started its new export oriented unit as "MEC International" at Boronada, a new industrial area of Jodhpur developed by Govt. of Rajasthan. At MEC International, complete sheet metal fabrication facilities are established with a floor space of 2100 sq. m. Through this advanced fabrication facility, MEC is proud to announce their expanded operations, which really adds the reputation of MEC in domestic and international market for the surface engineering products related to thermal spray. MEC auxiliaries can work for high precision applications which can facilitate the coating operation with ease and flexibility. The equipments are specially designed and manufactured for thermal spray working environments includes both on site and off site applications.



The following range of products are manufactured in the New Plant.

1. Grit blasting machines
2. Shot peening machines
3. Acoustic rooms
4. Spray booths(Wet& Dry)





MANUFACTURE OF CAPACITORS



Capacitor ends

The rolled capacitors are mounted in a jig. Masking is accomplished either by an extra film winding, which is removed before boxing or encapsulation of the capacitor, or by flattening the capacitors and packing them tightly into the spraying jig. For small quantity production, jigs may be hand sprayed or hand fed to a ARC GUN on a fixed mounting, but, where large quantities (several hundred thousand - several million/week) are required, fully automated plant where both ARC GUN and jig are moved to give a controlled x-y traverse may be supplied. The ARC GUN is usually directed either normal to the capacitor end or up to 15° from the normal. The choice

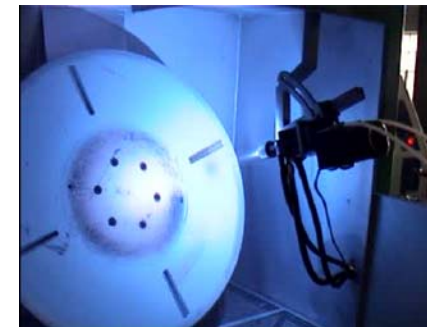
of coating depends on the joining technique; usually the coating is mainly zinc with the final 0.003"-0.004" (75µm - 100µm). MEC manufactured ARCJET 96/400 system is used to employ the above process. In addition to the spray system, PLC controlled Jig arrangements are also supplied as a tailor made solution to facilitate ease of operation to the end user.



ARCJET 96/400 system

Advantages of Arc spraying on Capacitor Ends:

- Reduced spraying ranges and higher particle velocities give better penetration of the foil windings.
- The lower heat input to the capacitors gives more consistent products.
- Arc spraying is inherently more consistent in operation
- Arc spray coatings are denser and contain less oxide
- The lower heat input to the capacitors gives reduced scrap rates
- Electrical energy costs are cheaper than fuel gas/oxygen
- Potentially flammable and explosive gases are not required



PLC controlled Jig

TECHNOLOGY UPDATES FROM AROUND THE WORLD

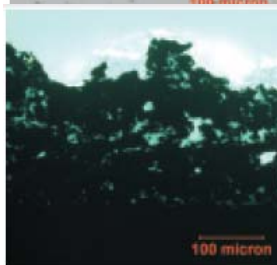


Fig: Brightfield (top) and UV (down) view of an aluminum thermal spray coating. A fluorescent dye has been used to identify inherent porosity within the coating.

How to identify metallographically induced damage in a thermal spray Coating: One of the more common problems in the metallography lab is how to differentiate features inherent within a thermal spray coating from those induced during metallographic preparation. Fortunately, there are a few simple yet reliable tools that can be used to make a proper evaluation. When evaluating a thermal spray coating,

These features include cracks, delaminations, separations, porosity, and, to some extent, phase. Features such as unmelts, oxides, thickness, and interface contamination have limited sensitivity to metallographic preparation. Fluorescent or colored dye, mixed with a two part resin and hardener cold mount epoxy, is an effective tool for identifying operator-induced artifacts within porous (>2% porosity) coatings. During the mounting process, voids (including cracks) inherent to the coating will fill with epoxy, assuming that a sufficiently low-viscosity epoxy in combination with a vacuum chamber is used. During subsequent evaluation of the coating, inherent features should be filled with epoxy and will be readily visible because of the added dye. In contrast, features induced during grinding and polishing will not have had the opportunity to be filled with epoxy and will differ in appearance from the inherent features.

For more information on the above article : Doug Puerta, IMR Test Labs, 131 Woodsedge Drive, Lansing, NY 14882; tel: 607/533-7000;



"MEC" TWO AXIS MANIPULATOR

"MEC" has developed a new Automatic Two axis manipulator with Job rotation arrangement for coating on piston rings, which is designed for high volume of production with uniform coating thickness to economize the coating cost in terms of the consumption of powder & time. The system assures controlled two axis gun manipulation for consistent and precise coating.

The Two axis manipulator is fitted with two servo motors & spray distance adjustment slider. The tail stock has a special feature which takes care of the increase in the mandrel length due to thermal expansion during the coating operation. The machine is packed with lot of flexibility and safety features.

The Spray gun is mounted on the manipulator to cover the entire mandrel length of the piston rings. All the sequence of operations is controlled by a touch screen PLC. The Job spray length and spray angle can be varied by feeding the data in MMI. Operator safety switching facility to avoid any injury while working with loading/unloading of job.

The programmed sequences in the system take care of all major aspects of thermal spray which includes:

- Start positioning & flame stabilizing control.
- Setting of pre heat parameters.
- Angle of Spray With respect to Job axis.
- Coverage of various job diameters.
- Integration with external Metallizing system for controlling the start/stop of gun and powder.
- External interlocking for safety, which will shut down all movements if triggered.
- Remote pendant provision for checking/setting up the movements manually.

For different Jobs & Sizes MEC can provide special manipulators to integrate with thermal spray systems like Plasma, HVOF, Flame & Arc Spray spray processes.



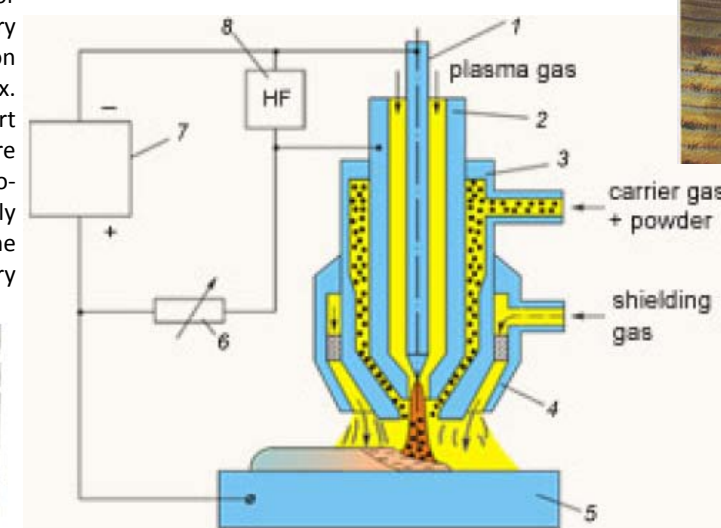
MEC two axis manipulator

"MEC" HIGH -TECH TWO AXIS MANIPULATOR WITH JOB ROTATION ARRANGEMENT FOR COATING OF PISTON

PLASMA TRANSFERRED ARC (PTA)

Plasma transferred arc (PTA) system is a high energy, inert gas welding process. Arc is basically used for arc plasma supply, powder transport and molten material shielding. It produces a very high quality deposit offering optimal protection with minimal dilution or deformation of the base material. It is a process that deposits very precise coatings of perfectly controlled alloys on mechanical parts that are subject to intense wear, significantly extending their service life.

PTA technology is particularly effective in protection against corrosion, thermal shock and abrasion. Wide range of overlay alloys are available for practically any part. Some alloys are very hard; others are softer with hard abrasion-resistant particles dispersed in a matrix. Certain alloys are made to rebuild a part to a required dimension while others are designed to be a final overlay that protects the work surface. MEC has recently started research on PTA process, The production of the system starts very soon.



1. electrode
2. Plasma nozzle
3. Powder feed nozzle
4. Shielding nozzle
5. Work piece
6. Ballast resistance
7. Powder source
8. Oscillation unit

