

# MEC News



A Quarterly Newsletter for MEC's Business Associates

APRIL-JUNE 2007 ISSUE No. 01

## COATING SYSTEMS for HVOF, PLASMA, FLAME SPRAY, ARC SPRAY & ROD SPRAY



S. C. Modi (CEO & MD)

### FROM OUR MD's DESK

*With vast experience of more than 40 years and state of art manufacturing facility has improved the quality of the thermal spray systems and integrating them with Robots has opened many applications. With the growth of industrial sector specially aerospace, the future is still brighter for thermal spray industry. As this growth will unleash number of opportunities in this industry. About 850 aeroplanes will be in Indian sky after 3 years. Maintenance & overhaul operation will be major concern of aero industry involving huge plasma & HVOF coatings.*

Dear Readers,

This has been a long time since you had heard from us. However, our team will ensure that you will get regular feedback from us. We will keep you abreast with the latest what is happening from our side and the technological strides made in the direction of coating. But, you all will agree to this fact that a best coating is obtained by a matching equipment only. The art of making a coating system is no mean task as there are several of operations and parts are involved. This newsletter will showcase the trick involved in achieving the same.

You will also appreciate that having the best of the coating system will not solve the problem as the field requirements are very strenuous and the multitude of factors leads to sometime premature failure. The factors are many. So MEC thought about addressing this issue by organizing a workshop. The workshop was quite successful and the overwhelming response, that we got is an indication to the level of awareness. We have tried to quench the thirst of the participants by giving them the best of the best speakers. You will find more details in the next page.

MEC recently participated and had their stall in Aeroshow 2007, Bangalore and Engineering Expo, Pune. We got very good feedback. One of causes for concern among the participants was about corrosion protection. You will find a special feature on this and the novel coating ZINCAL patented by MEC.

Readers, I invite you to contribute in this newsletter with your success stories so that the fraternity of thermal spray will grow.

Happy Reading

Regards  
Editor

### EVENTS

**INTERNATIONAL THERMAL SPRAY  
CONFERENCE & EXPOSITION**  
May 14-16, 2007 -- Beijing (China)  
[www.asminternational.org/ITSC](http://www.asminternational.org/ITSC)



Visit our Booth # 74

## SUCCESSFUL ORGANIZATION OF

# WTS 2007

## WORKSHOP ON THERMAL SPRAY

A workshop on Thermal Spray (WTS-2007) was conducted in Jodhpur, by Metallizing Equipment Co. Pvt. Ltd. (MEC) on 22 & 23 Feb., 2007.

The two day workshop was organized to give the basic knowledge and an insight of various applications of thermal spray to Indian manufacturing industries. Expert Lectures were delivered by renowned professors of IITs, Proficient Surface Coating Engineers. Live Demonstrations of various coating process was shown to the participants. WTS-2007 was the largest ever event in Indian Thermal Spray history in terms of presentations, attendees and live demonstrations. Each of the participant was fulfilled with prowess of thermal spray technology.



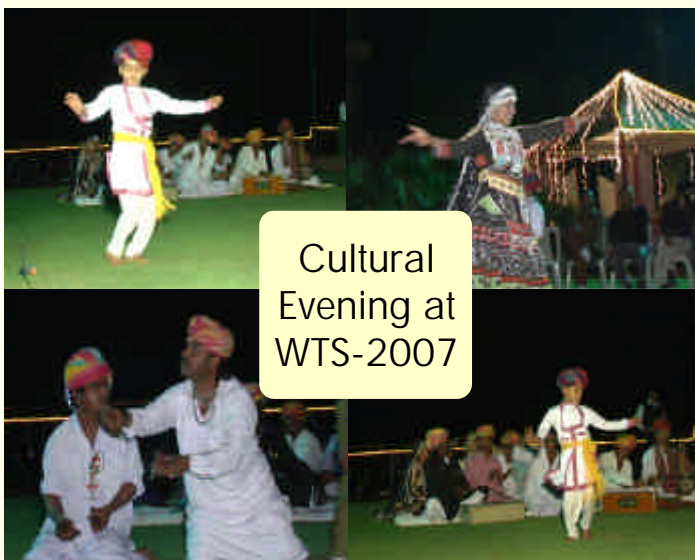
### KEY SPEAKERS

- |                         |                       |
|-------------------------|-----------------------|
| 1) Prof. A. S. Khanna   | 2) Dr. Karandikar     |
| 3) Mr. Ragesh Batriwala | 4) Mr. Ankur Modi     |
| 5) Mr. R. Girish Rao    | 6) Mr. N. Karunanidhi |



### FEW MEMORABLE MOMENTS

Presentation - Discussion - Demonstration



### Topics covered

- Thermal spray Technology in India : Past - Present - Future
- Significance of Thermal Spray
- Introduction & Applications of Plasma, Arc & Flame Spray
- Automation & Process Control of Thermal Spray Process
- Selection of coating with reference to applications
- Live Demonstrations

# ZINCAL COATING\*

(\* The patent rights of ZINCAL Coating rest with MEC )

## A new weapon against corrosion from the Thermal Spray Coatings Armoury

This is a modification of conventionally used arc spray process in which Pseudo Alloys of Zinc & Aluminium is formed. Pseudo Alloys is a structure formed in the coating when two dissimilar wires are sprayed simultaneously in a twin wire arc spray system. For e.g. Zn & Cu can be sprayed to form pseudo alloy brass coatings. Al and Zn wires can be sprayed to form the Al-Zn pseudo alloy coatings. ZINCAL is the process of creating Al-Zn Pseudo Alloy Coating. ZINCAL pseudo alloy coating consists of the discrete particles of zinc and aluminium plus the stoichiometric and non-stoichiometric alloy phases of zinc and aluminium.

ZINCAL coating formed on the MS substrate was chipped out and the chips were analyzed for the amount of Al and Zinc in the coatings and were compared to the aluminium and zinc content derived from the original wire stock. The result of this analysis is shown in table 1.

	Wire Stock	ZINCAL
% Aluminium	99.5%	29.8%
% Zinc	99.9%	Balance

### % of Zn & Al in the original Wire Stock & ZINCAL

Table 2 shows the result of Chemical analysis of Al 15% - Zn alloy wire & its arc sprayed coating.

	Al 15% Zn Alloy Wire	Alloy Wire Coating
% Aluminium	15%	15.4%
% Zinc	85%	Balance

### % of Zn & Al in Alloy Wire & Alloy Wire Coating

Table 1 & Table 2 show that during arc spraying there is very little deterioration of the coating species in terms of oxidation of the coating species. The coating species remain more or less unchanged chemically during the coating process. This shows that arc spraying can be used to spray ZINCAL coatings with very little deterioration of the coating species.

Salt spray tests were carried out and it was observed that the ZINCAL coating has fared better as compared to only Zinc coated specimen. Further when the same specimen were subjected to Impedence tests it was observed that the pore resistance of the ZINCAL coating is approximately 25 times higher than that of zinc coated specimen.

## Mechanism of Corrosion Protection

Aluminium coating has the structure of aluminium splat, which is surrounded on the outside by aluminium oxide. The thin oxide layer functions as a barrier coating which is liable to pitting and damage by erosion. Such coating can be sealed to prevent further corrosion.

The high sacrificial action of zinc provides cathodic protection to the steel surface.

Moreover the sacrificial action of zinc produces insoluble corrosion products which blocks the porosity of thermal sprayed coatings thus further restricting corrosion of the substrate by preventing the corrosive media to penetrate the coating and come into contact with metallic substrate. The ZINCAL coatings contain two phases, one is zinc rich and the other is aluminium rich. The zinc rich phase offers cathodic protection by its sacrificial action while the aluminium rich phase provides protection by barrier action. The porosity of the coating is partially closed by the products of zinc corrosion.

Due to these reasons the ZINCAL coating offers considerable advantages with respect to corrosion protection vis a vis the conventional zinc and aluminium sprayed coatings

## Applications

Thermal spray coatings are regularly applied on to steel structures like Bridges, TV Towers, Ship Hulls, Windmill Structures, Pipe Lines, Off Shore Oil rigs etc. In fact the entire North Sea oilrig in UK is coated with Al to protect against marine corrosion. Recently Zinc coatings on reinforced concrete have been used for offering corrosion protection to steel rebars. Zinc and Aluminium coatings are usually sealed to offer corrosion protection ability for a period of 40-45 years. Unsealed coatings can offer corrosion protection for 25 to 30 years.



## CONCLUSIONS

- ❖ Pseudo alloy coating Al & Zn (ZINCAL) formed by simultaneously spraying Al and Zn Wire (1.6mm to 2mm dia) in the Twin Wire Arc Spray Gun. Thus the pseudo alloys are formed as the tip of the Al & Zn wire melts due to formation of the arc.
- ❖ Improved life of the ZINCAL coated structure over the conventional zinc sprayed structures. This is as evidenced by the results of salt spray test carried out for the different sprayed coatings.
- ❖ There is a great potential of Zincal Coating for long term protection (50 yrs +) on steel structures such as Dams, Bridges, Towers, Steel Structures, Wind Mills, Ships.



# Quality Engineering with State-of-the-art technology

Tucked in the industrial zone of Jodhpur, stands the neatly kept manufacturing facility of *Metallizing Equipment Co. Pvt. Ltd.*, the lush gardens, spotless premises and the absence of any telltale smoke, the production unit churning out varieties of standard and custom build thermal spray coating equipment. The quest for world class products starts with team work.



Modern Design Section



Production Cell (VMC)



Production Cell (CNC)



Milling Section

Our competent team of designers are always on the look out to deliver the best which will give the optimum performance. The ideas generated are made to reality by our ultra modern facility consisting CNC's VMC's & various other High Tech Precision Machine Tools. Followed by rigorous testing of components at each level before it reaches to our customers.

MEC in its strive to produce the world's best systems has also incorporated number of safety features. Our safety standards follow the highest requirement of European Union & Japanese Standards. Because of which *European Inspection & Certification Co. S.A.*, upon scrutiny has approved to put CE symbol on our selected range of products. MEC takes pride in its dedicated work force who has given their best and maintained the quality standards of the highest order. Because they know their work will be appreciated by quality conscious people world wide.



Final Testing & Assembling Section



Fabrication Section



Well Equipped R&D

This is possible because of regular training programmes to enhance the skill of its people & motivate them to give their best output.



 RATING : SE 2A Condition : HIGH D&B Rating is assigned on basis of language network & components appraisal	Certified ISO 9001 by 	
	MEMBER OF  The Materials Information Society	
SPRAYWATCH		

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