



Malaysia Leads Coating Fingerprint Initiative First in the World!

Forum on “Towards Fingerprinting of Polymeric Coatings” IV

Reported by: Ir. Max Ong Chong Hup and Assoc. Prof. Dr. Melissa Chan Chin Han, Chief Editors of Materials Mind

Date : 29th October 2015
Time : 9.00 am – 2.00 pm
Venue : Dewan Tunku, Kelab Golf Negara Subang, Petaling Jaya

Jointly organized by:

1. IMM Polymer Committee
2. IMM Materials & Asset Integrity Committee
3. IMM Task Force on Coatings Fingerprinting

IMM continues its progress report with the **Forum on “Towards Fingerprinting of Polymeric Coatings” IV** on 29th October 2015 at Kelab Golf Negara Subang, Selangor. This event was officiated by the Deputy President of IMM, En. Mohd Azmi Mohd. Noor, Head of PETRONAS Asset Integrity, Upstream HSE. This important event was made possible with the sponsorships and strong support from 3 companies, Anton Paar Malaysia Sdn Bhd, Bruker (M) Sdn Bhd and Hempel Paints (M) Sdn Bhd. The forum was well attended by participants from coating manufacturers, fabricators/contractors/sub-contractors, external auditors, end-users, testing laboratories and universities as depicted in Table 1.

Table 1 Summary of participation in Forum on “Towards Fingerprinting of Polymeric Coatings” IV

No	Organization/University	Number of participants
1	Aker Solutions Sdn Bhd	3
2	Akzo Nobel International Paint (M) Sdn Bhd	1
3	Anton Paar Malaysia Sdn Bhd	3
4	Becker Industry Coatings (M) Sdn Bhd	2
5	Corroserv (M) Sdn Bhd	2
6	ECMI ITE Asia Sdn Bhd	3
7	Envimech Sdn Bhd	1
8	ExxonMobil Exploration & Production (M) Inc	4
9	Fischer Technology (M) Sdn Bhd	1
10	Hempel (M) Sdn Bhd	5
11	International Islamic University of Malaysia	2
12	Jotun (M) Sdn Bhd	3
13	Kansai-PLC Coatings Sdn Bhd	3
14	KCC Paints (M) Sdn Bhd	3
15	Lembaga Getah Malaysia	1
16	Malaysian Nuclear Agency	1
17	Materials Technology Education Sdn Bhd	10
18	NACE	2
19	Nippon Paint (M) Sdn Bhd	1
20	Norimax Sdn Bhd	2
21	PETRONAS	15
22	PPG-Sigma Coatings (M) Sdn Bhd	6
23	Safinah Ltd	1
24	Shell, Malaysia	3
25	Sirim QAS International Sdn Bhd	2
26	SMACO International	1
27	Technip Geoproduction (M) Sdn Bhd	1
28	Universal Corrosion Engineering (M) Sdn Bhd	1
29	University of Malaya	3
30	Universiti Malaysia Sabah	1
31	Universiti Putra Malaysia	4
32	Universiti Teknologi MARA	2
33	Universiti Teknologi PETRONAS	2
34	Universiti Tunku Abdul Rahman	22
35	Velosi (M) Sdn Bhd	1
36	WASCO Coatings Malaysia Sdn Bhd	2
38	Woodgroup Kenny Sdn Bhd	1
Total		121



Deputy President of IMM, En. Mohd Azmi Mohd. Noor, Head of PETRONAS Asset Integrity, Upstream HSE.

Much debate has been ongoing about the percentage contribution towards coatings failures in the oil & gas and heavy industries by (i) surface preparation, (ii) paint application, (iii) paint materials, (iv) quality control inspection and (v) painting contract management. Many reports and papers presented at conferences and magazines have targeted the blasters and painters as the prime contributors with some pointing to poor quality of Certified Painting Inspectors who did not inspect the blasting and painting works correctly. Some also pointed to the contract execution at painting sites where construction managers place little emphasis to painting quality and often squeeze the project schedules for the painting scopes thereby causing paint defects to occur. No report has ever identified the paint materials as defective or inferior quality.

Paint Quality Control (QC) Inspectors certified by NACE (USA), Society for Protective Coatings (SSPC) (USA) and the Norwegian Professional Council for Education and Certification of Inspectors for Surface



Participants



Nurul Asni Mohamed



Muhd Hawari Hassan



Rence Teo Yong Yin



Nigel Foong Jee Lip



Dr. Hassan Malik

Treatment (FROSIO) (Norway) have been providing the QC inspection of painting projects in Malaysia since 1970's. PETRONAS initiated the IMM Coating Inspector Certification Scheme in Malaysia in 1990 to upskill local Malaysians to participate in this industry. Institute of Corrosion (ICorr) (UK) and TWI-the British Gas Approved Scheme (BGAS) (UK) initiated their Coating Inspector Certification Scheme in Malaysia from 2005. Since 1980's, blasters and painters worldwide have to undergo training and certification to improve the quality of surface preparation and paint application. In Malaysia, this was initiated by PETRONAS with IMM in 2000. Yet despite all these, the painting works continued to face many failures during service. Whilst the construction site managers acknowledge some blame for rushing delayed projects, there had been speculation that the paint materials could contribute to the problem and there had been no quality control mechanism to check the quality and consistency of paint supplied to-date. Metals manufactured and supplied have to be accompanied by a "Mill Certificate". *How come, polymeric paints do not provide a similar mill certificate?*

Puan Nurul Asni Mohamed from PETRONAS Group Technical Solutions (GTS) Department (who is also the Chairperson of the IMM Task Force for Coatings Fingerprinting) highlighted that the Coatings Fingerprinting Task Force has successfully completed Phase 1 of its tasks, *i.e.* establishing a draft Coating Fingerprint Certificate with relevant QC parameters to be measured. She informed that Phase 2 of the program will commence soon with sample collection of both raw materials and finished products of epoxy coatings to check the consistency of Fourier-transform infrared (FTIR) evaluation results using different brands of FTIR equipment followed by polyurethane coatings, zinc-rich coatings and other coatings used in the industry. Coating Fingerprint Certification requirement will be included in PETRONAS Technical Standards (PTS) 15.20.03 (replacing previous PTS 30.48.00.31), which is waiting official approval issuance at the moment.

The work by this Task Force has demonstrated a successful Industry-Academia collaboration where Industry Players were unaware of the capabilities of the FTIR technique to develop "Fingerprint" of polymeric materials such as Paints. Although "Fingerprinting" had been specified by many industry players in their

Painting Specifications, no one knew exactly what "Fingerprinting" meant. En. Muhd Hawari Hassan, also from PETRONAS GTS Department, presented the new Paint Qualification Specifications from PETRONAS with more stringent quality requirements including the Fingerprinting Requirement. With clearer understanding of the FTIR techniques and interpretation of the test results, Oil & Gas and Heavy Engineering industries will be able to clearly specify the Coating Fingerprint requirements in due course.

Ms. Rence Teo Yong Yin from Bruker (M) Sdn Bhd presented the comparison results of FTIR tests on various epoxy coating samples to check their consistency and reproducibility. Consistency and reproducibility were more than 0.95 and this gave confidence to the Task Force members on the reliability of FTIR analysis for paint quality assurance. Mr. Nigel Foong Jee Lip from Anton Paar Malaysia Sdn Bhd presented new technologies for rheological tests methods for paint quality testing to complete the Fingerprinting requirements. Note that Coating Fingerprinting comprises not only the FTIR for structural analysis but all other physical tests such as viscosity, density, color code, non-volatile matter (by mass), mass of Zn metal/Total Zn *etc.*

Finally, Dr. Hassan Malik from Bureau Veritas Malaysia highlighted the importance of Coating Fingerprinting data entry into the Risk Based Inspection (RBI) database for validation that paint materials supplied to a project meets the project specifications and standards. Such data should be validated, encrypted and accessible in the RBI database during performance review and/or failure analysis.

Associate Professor Dr. Melissa Chan Chin Han from Universiti Teknologi MARA (who is also the Chairman of the IMM Polymer Committee and Advisor to the IMM Task Force on Coatings Fingerprinting) highlighted that IMM has initiated training and certification programs in Coating Fingerprinting to educate the industry players as well as ensure qualified and trained Coating Fingerprinting Quality Controllers are in place before the full implementation of the Coating Fingerprinting requirement by the Oil & Gas and Heavy Engineering industries. IMM is towards collaborating with the local chapters of NACE, Society for Protective Coatings (SSPC) *etc* for standards development.

The Forum's finale was an open dialogue between the presenters and the audience. Ms. Michelle Lau from NACE International was invited to join the Panel. NACE indicated support for this Coating Fingerprinting initiative and possibility of drafting NACE standards on this topic with IMM's input. Paint manufacturers also indicated their support to comply to the Coating Fingerprinting requirements once the Oil & Gas Industry implements the requirement. Puan Nurul informed that PETRONAS has plans to implement this requirement for the Refinery and Petrochemical Integrated Development (RAPID) project in Johor in 2016.

Finally, En. Mohd Azmi Mohd Noor highlighted that PETRONAS and the other oil & gas industry players have initiated the Cost Reduction Alliance 2.0 (CORAL 2.0) to reduce costs of doing business in the Malaysian Oil & Gas industry via innovation and new technologies. The Coating Fingerprinting initiative is one of the innovations to assist CORAL 2.0 achieve its objectives. PETRONAS is grateful to IMM and the Task Force members for their voluntary service and commitment to make this Quality Innovation a success within a short time-frame.

Announcement of *Coatings Fingerprint Satellite Symposium* under the auspices of 10th International Materials Technology Conference and Exhibition (IMTCE2016) to be held on 17th May 2016, will present up-to-date progressive summary of IMM Coating Fingerprint Certification Scheme & the execution of Coating Fingerprint Certificate by coating manufacturer/

supplier, fabricator/contractor/sub-contractor, external auditor, end-user and 3rd-party testing laboratory. All participants are gently reminded to find out more with IMM's initiative on coatings fingerprinting in coming months!



From left : Ms. Michelle Lau (NACE International), Puan Nurul Asni, En. Mohd Azmi, Dr. Hassan Malik, Assoc. Prof. Dr. Melissa Chan & En. Muhd Hawari.

More photos in page 15



Group photo



Participants



Demo session from Anton Paar Malaysia Sdn Bhd



Demo session from Bruker (M) Sdn Bhd

3	Mr. Mohamed Attya <u>Shaaban</u>	Sadara chemicals, Saudi Arabia	Applicability Of Titanium In Chemical Industry.
4	Mr. Mohd Firdaus <u>Mustafa</u>	Universiti Teknologi PETRONAS, Malaysia	Diamond-Like Carbon (DLC) Coating for High Speed- High Density Plasma.
5	Mr. Yousaf <u>Tariq</u>	Emba Corporation Pvt. Ltd., Pakistan	Electronic Equipment Failure due to Corrosion.

ISMAI2016

No.	Full Name	Affiliation	Paper Title
1	Dr. Mohd Azmi <u>Ismail</u>	Malaysian Nuclear Agency, Malaysia	Integrity Inspection of Main Access Tunnel (MAT) using Ground Penetrating Radar.
2	Mr. Anas <u>Kamarundzaman</u>	University of Malaya, Malaysia	TBA
3	Mr. Chee Wayne <u>Tan</u>	Universiti Teknologi Malaysia, Malaysia	Effects of Argon Concentration on the Mechanical Behaviour of Al65Cu20Fe15 Quasicrystal Alloy.
4	Mr. Omar <u>Bentoulia</u>	Université Kasdi Merbah, Algeria	TBA
5	Mrs. Norlida <u>Abu Bakar</u>	Universiti Malaysia Perlis, Malaysia	Principle Study on Barium Strontium Titanate (BST) energy band Using CASTEP.
6	Mrs. S <u>Deepa</u>	Mar Anthanasius College, India	TBA
7	Mrs. Prasannakumari <u>Krishnan</u>	Mar Anthanasius College, India	TBA
8	Ms. Siti Khalijah <u>Kamarudin</u>	Universiti Malaysia Perlis, Malaysia	Microstructural Properties Of Doped Titanium Dioxide Thin Film Prepared Via Sol-Gel.
9	Ms. Tracy Anak <u>Dickie</u>	International College of Advanced Technology Sarawak, Malaysia	Tensile behavior of Nipah fiber/polyester composites.
10	Ms. Vidhya <u>Selvanathan</u>	University of Malaya, Malaysia	Deep Eutectic Solvent Infused Esterified Starch as Novel Quasi-Solid Biopolymer Electrolyte.

Forum on “Towards Fingerprinting of Polymeric Coatings” IV 29th October 2015, Kelab Golf Negara Subang



For Forum on “Towards Fingerprinting of Polymeric Coatings” IV report, please refer to page 45



MATERIALS IND

Issue 13

Jan 2016

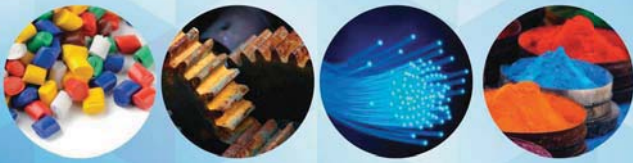
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HIGHLIGHTS



31

**Coatings Fingerprinting
Implementation**



45

MLC 2015



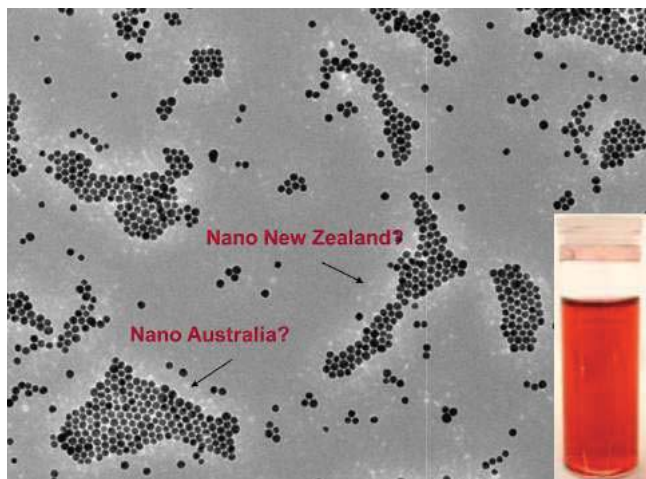
53

**Welding Quality
Improvement Initiatives**



5	IMM Council Members
6-9	IMTCE2016 Conference Leaflet
10-15	IMTCE2016 List of Invited Speaker/Oral-E/Oral-O
16-17	IMTCE2016 Satellite Symposium Leaflet
18	IMTCE2016 Conference Related Events
20-21	IMTCE2016 Career Path Elevation
24	IMTCE2016 Conference Main Program Schedule
25	IMTCE2016 Conference Publication Avenue
26	IMTCE2016 PWTC Neighborhood Maps
27-30	IMTCE2016 Masterclass leaflet
31-34	IMM Coating Fingerprint Certification Scheme
40-42	Report on: <ul style="list-style-type: none">• Forum "Towards Fingerprinting of Polymeric Coatings" IV
43	Report on: <ul style="list-style-type: none">• Jotun Visit to Faculty of Applied Sciences, Universiti Teknologi MARA
44	Report on: <ul style="list-style-type: none">• Kuala Lumpur Engineering Science Fair 2016
45-46	Report on: <ul style="list-style-type: none">• Young Persons' World Lecture Competition (YPWLC2015)
48	Report on: <ul style="list-style-type: none">• Shell Malaysia Exploration and Production Quality Day 2015
49-52	IMM Working Committees & Regional Chapters
53	Reports on: <ul style="list-style-type: none">• 24th Asian Welding Federation Council Meeting• Collaboration between IMM-IIS-MOCA
54-57	Technical Article: <ul style="list-style-type: none">• Economical aspect of efficient process control in welding Fabrication

Materials Mind Photography Competition Winning Photograph Issue 13



Congratulations to Dr. Lim Teck Hock from Faculty of Applied Sciences and Computing, Tunku Abdul Rahman University College, Setapak. He won RM 500 and an award certificate.

Title : NanoGold: A whole new world

Photography description:

A bright-field high resolution transmission electron microscopy (HRTEM) image of monodispersed gold nanoparticles taken at the start of an in-situ study of coalescence at nanoscale. The particles self-assembled into shapes resembling that of New Zealand and Australia - a purely serendipitous and delightful encounter.