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IMF DIARY

DISTANCE LEARNING START DATES

23rd May 2025 for start date 6th June 2025.

Please note that all course fees must be paid in full before any course materials can be released.

Please contact Karen Yates by email training@materialsfinishing.org

You can find details of courses and qualifications on our website- <u>https://materials-finishing.org/</u>

UPCOMING EVENTS

7th May - Webinar History of Patination in Fine Art - J Bick

3rd June - Webinar Life and Times of an Electroplating Company - P Alexander





SECRETARY GENERAL'S COLUMN (i)

Here we are in April already, a third of the year gone in a complete flash! At least we got through the winter without too many problems, and its lovely to have the light nights again, and with the recent weather, to be able to get out into the garden. A bit of relaxation away from the trade turmoil of the world.

The recent tariff announcements from the USA have really stirred up a hornet's nest throughout the world, and the effect on international stock markets has been devastating. I worry about my own personal finances, but I'm sure our treasurer John Oliver will be carefully monitoring the IMF investments.



We can only hope that these punitive tariffs will not have too great an effect on business but have to be aware of a possible global downturn. This, linked to the recent taxation changes within the UK are certainly concentrating the minds of business owners and management. We must hope any effect won't be too serious and our industry manages to ride out the storm.

Here at the IMF, there are some changes afoot to bring you up to date with. In June, Karen will reduce here working hours to 2 days per week; at the same time Michelle will increase to 3 days so the management of education and training courses will continue to be well covered. Our stalwart of the Institute, Helen, continues to keep us all in place and runs a well-managed ship!

It should be noted that John Burgess, has decided, for personal reasons, to leave the post of chair of the Membership and Marketing committee, and his place will be taken by James Beck, introducing fresh young talent not only to the M&M group, but the management board. I would like to thank John for his sterling efforts over many years as part of the IMF management board, and his input will be missed. As well as finishing as the leader of M&M, he hands over running of the Southern branch to Clive Arnold.

It is with great pleasure that I must tell you I have again been invited to speak at the technology convention of the Surface Coatings Association New Zealand (SCANZ) in this coming May, which I have been delighted to





SECRETARY GENERAL's COLUMN (ii)

accept. The convention is taking place on Wednesday to Friday 21st to 23rd May, at Rotorua in North Island, the spiritual home of the Mauri population.

Most of you will know I have a great affinity to New Zealand, and it really is a pleasure to be invited back! I had always thought I could live in that beautiful country, but I am in fact moving to somewhere closer to home.



I am in the process of buying a house in Cyprus, and it is my intention to move there permanently during the summer. This is partly due to meeting my partner who lives there, but also driven by my feelings for wanting to escape the madness of the UK in 2025!

Your board have asked me to continue in the role of Secretary

General once this has happened, which, with modern communication systems, will not be difficult. I do look forward to the continued "cut and thrust" and fun of being involved in the organisation of the Institute.

So I hope you all have a great Easter break (here's hoping the weather holds out!!) and enjoy some well-earned leisure time,

Graham Armstrong April 2025.







Next Enrolment

(imi

6th June 2025

Apply by the 23rd May Contact Michelle training@materialsfinishing.org





EDUCATION & TRAINING (i)

DISTANCE LEARNING A

Foundation Module Basic Surface Finishing

Develops fundamental understanding from 29 Units of which a student studies 15, including 7 mandatory units. One of three core technology blocks are chosen, either **Electroplating** (8,9,10 & 18); **Organic Coating** (19, 20, 21, 22, & 23); or **Aerospace Finishing** (19, 21, 23, 24 & 25), each comprising 5 units plus 3 optional units relevant to the student or their employer – all units are listed below.

Two pieces of marked coursework are required and on passing an examination a student is awarded the **Foundation Certificate.**

Unit 1 *	Surface Finishing	Unit 16	Alloy Plating & Composites
Unit 2 *	Corrosion	Unit 17	Printed Circuit Board Processes
Unit 3 *	The Environment & Surface Finishing	Unit 18	Electroplating - Care & Maintenance of
Unit 4 *	Health and Safety		Solutions & Product Quality
Unit 5 *	Cleaning and Pre-treatment	Unit 19	Conventional Paint Processes
Unit 6 *	Sacrificial Coatings	Unit 20	Electrophoretic Paint Processes
Unit 7 *	Services	Unit 21	Paint Application Methods
Unit 8	Surface Improvement	Unit 22	Coating Powders & Application
Unit 9	Principles & use of Electroplating - double unit	Unit 23	Testing Paint & Powder & Coatings
Unit 10	Plant and Equipment	Unit 24	Chemical Conversion Coatings and
Unit 11	Copper, Silver and Gold Plating		Sol Gel Coatings
Unit 12	Nickel Plating	Unit 25	Anodising of Aluminium & Alloys
Unit 13	Chromium Plating	Unit 26	Vacuum Coating Processes
Unit 14	Zinc & Cadmium Plating & Passivation	Unit 27	Duplex Coatings of Galvanising plus Pair
Unit 15	Electroless Plating	Unit 28	Electroforming
		Unit 29	Nanotechnology

* Mandatory units

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On achievement of the **Foundation Certificate** candidates may wish to progress to the **Technician level modules**, please see over the page for details.



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6



D TUTORED MODULES

Technician Modules

Develops in-depth knowledge for key finishing technologies and their application and best practice methods.

Principles of Electroplating	Broad introduction to electroplating technology
Electroplating Practice	Industrial application of major metals and supporting pre-treatments for electroplating and electroless deposition
Paints, Lacquers & Varnishes	Application methods, equipment, curing, drying and testing of solvent and water based industrial finishing processes
Powder Coating	Application methods, testing, environmental, health & safety topics
Environment, Health & Safety	Legislation information on environmental, health & safety topics
Materials Science	Manufacture, properties and examination of materials which require various forms of coating or treatment to meet service life needs
Automotive Surface Finishing	Applications specific to the automotive industry
Electroforming	How electroforming can be used to manufacture components and tooling

On successful completion of four marked assignments and passing an examination, a student is awarded a **Technician Module** certificate.

Passing two Technician modules leads to the award of Technician Certificate.

Passing four Technician modules leads to the award of Advanced Technician Certificate.

For more comprehensive details of all modules offered please refer to the IMF website **www.materialsfinishing.org** where you find the full syllabus for each module.

71

7



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Attention all Engineers

The Institute of Materials Finishing is internationally recognised as the premiere source of expert knowledge in surface engineering.

All engineers at some point in their career will need to coat a material with another material in order to:

Make it look "attractive" Make it more corrosion resistant Make it stronger Allow the use of a cheaper material to perform as a more substantial material

But the question is: Do you know which coating will do the correct job? Do you know what thickness would be required? Do you know how that material is applied?

Well if the answer to this is "No" or "I know a little about it" then maybe it would be beneficial to enquire the knowledge of the IMF.

The IMF is an institute which provides courses, Knowledge & information so that you can get a better insight into what is required.

Completing the query form in the ASK THE EXPERT section of the IMF's website could take you to an informed email/phone response. In some cases this can be within a few days if the question is simple; if the query is complex then a more lengthy process may ensue.

Technical advice may attract funding from the Manufacturing Advisory Service, a support ser-



vice provide by BIS. If your enquiry needs substantial time commitment, then please be aware of this intervention mechanism that may provide free advice and a solution to meet your needs.

The Institute also has a project management group which can help coordinate support across a range of issues from industrial and academic sources





IMF Southern Branch Evening Presentation Report

Presented to IMF Southern Branch Webinar, Tuesday 21 January, 2025



Henry Cort 1740 -1800: Technical Tales of Puddled Iron Clive Arnold

As metal finishers, we should understand the materials to which we apply coatings, either metallic or organic in origin. Steel is the fundamental construction material of the modern world since the middle of the 19th Century. Applications include shipping, railways, automotive, construction, and machinery.

Before carbon steel was commercially developed there was Puddled Iron. This material was derived by refining pig iron (from the blast furnace) and waste cast iron (both very brittle) to a malleable form of wrought iron which could be further processed and shaped by rolling and forging. Puddled iron was essentially purified iron con-



taining a proportion of slag. Steel is an alloy of iron with carbon.

The refining process was developed and patented by Henry Cort in Funtley, Hampshire in the 1780s. He developed the puddling process where pig iron is heated and stirred to decarborise and purify the material in a reverberatory furnace (see diagram). Molten iron is manually stirred and fashioned into a "ball" (approximately 50 Kg). A purification proceeds, the iron becomes more viscous as the melting point is raised. This was a very physical job for the operator!



Puddling (Reverberatory) Furnace

Product:

Wrought compose Slag

50 Kg W Ball – siz modern

Henry Cort also developed and patented a rolling mill with grooves such that the malleable wrought iron could be better



shaped into bars and other useful sections and shapes as well as flat plates e.g. railway tracks.

This combination of a viable refining process for malleable/ wrought iron and specific shaping processes facilitated the supply of a much improved engineering material which was a major contribution to the Industrial Revolution in the United Kingdom and beyond. The massive expansion of the railways, iron ships and ambitious construction projects such as the Effel Tower, and the Statue of Liberty would not have been possible, at the time, without the development of puddled iron.



HMS Warrior 1860. Puddled Iron Clad British Warship. Preserved in Portsmouth Harbour





Effel Tower - built from puddled iron in 1887-1889



12

Puddled iron rolled bar produced by grooved rolls manufactured into ship chain cable

Sadly, Henry Cort was not like a modern "Tech Millionaire", and did not profit from his innovations and patents and the massive expansion in the manufacture and use of puddled iron. The loans which had funded process development from his business partner's father was found to be fraudulent. The patents were confiscated and he was declared bankrupt. He has been described as the "Father of the Iron Trade" and yet he died in poverty.

In recent years the technical legacy of Henry Cort and Puddled Iron

has been challenged in Academia. An accusation has been made that Henry Cort "stole" the iron puddling technology from Jamaica during the colonial enslavement period. It is considered, by this Author, that no technical or historic metallurgical forensic evidence was presented to support this proposition.

The iron puddling process and grooved rolling process were a further step development from iron working already being undertaken in Britain in the 1700s. For puddling an existing furnace concept (where fuel is separated from the process charge) was used for a new application. Grooved rolling mills had also been proposed previously, however, the integration of puddling and subsequent product shaping processes was a novel development and a real inflexion point in industrial history.

From the 1850s, steel refining and manufacture was developed on a commercial scale with the introduction of the Bessimer Converter and the Open Hearth Furnace processes. These processes produced an improved engineering material in much greater volume and speed compared to puddled iron. As a result puddled iron was replaced by steel over the next few decades. Steel is a basic material of the modern world, requiring appropriate coatings, and that is where the expertise of the metal finisher is in demand.

References and image attributions are included in Presentation available on IMF website Members Section.



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SCIMED (ii)



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The Bowman P Series XRF offers high precision XRF analysis with a programmable X-Y stage, suitable for various applications.

- High-Resolution SDD Detector: Handles demanding coating applications with precision.
- Micro-focus X-ray tube: Provides enhanced excitation intensity for faster measurements.
- Compliance Standards: Meets IPC (4552, 4553, 4554, 4556) and DIN EN ISO 3497, ASTM 8568.
- Wide Element Range: Analyses elements from Aluminium (AI) to Uranium (U).
- Programmable Motorised X-Y Stage: Ensures precise sample positioning and multi-point measurement.

THE L-SERIES

The Bowman L Series XRF offers the largest chamber design and multiple options for ultimate versatility.

- Largest Chamber: 550mm (W) x 600mm (D) x 280mm (H), extendable to 300mm (H) with X-Y stage removed.
- High-Resolution SDD Detector and Micro-focus X-ray Tube: Ensures precise coating analysis with faster measurement.
- PCB and Plating Compliance: Meets IPC-4552, 4553, 4554, 4556 and DIN EN ISO 3497, ASTM B568 standards.
- Programmable X-Y Stage and Laser Autofocus: Offers precise multi-point measurement with a 250mm x 250mm travel range. Upgradeable System: Optional RoHS package and large-area SDD available for specialised applications.

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PA-TRACTION is a cutting-edge thermal spray coating known for its exceptional grip, wear resistance and enhanced corrosion resistance. This cutting-edge thermal spray technology delivers uniform, dense coatings with exceptional adhesion.

WHO WE ARE

Portsmouth Aviation is a family-owned engineering powerhouse with over 90 years of legacy, standing as a beacon of engineering excellence. Throughout every stage, from design conceptualization to seamless production, Portsmouth Aviation pledges to stand by our clients, ensuring a collaborative and supportive partnership.

PA-TRACTION

Portsmouth Aviation employs a Twin wire Arc Spray technology to mitigate thermal loading, ensuring the sprayed surface remains intact. This process achieves high-quality coatings while preserving the structural integrity of the substrate. Other Thermal Spray processes offered include anti-corrosion coatings and aesthetic topcoat finish solutions.

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In a recent project, Portsmouth Aviation utilized **PA-TRACTION** in the innovative collection hall of the new V&A East Storehouse.

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16



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17

We're proud to announce that we have acquired JOSCAR accreditation!



This recognition means we've met the high standards set by Defence & Aerospace industry leaders, giving our customers added confidence in our transparency, reliability, and commitment to best practices.

We look forward to continue strengthening supply chains for both new and existing customers as a trusted, pre-validated supplier. Please click the link below for our JOSCAR certification:

Qualitetch JOSCAR Certificate

Find out more about our capabilities: www.Qualitetch.com









Upcoming Webinars From The Southern Branch

on Zoom

7th May 2025 7.00pm History of Patination in Fine Art Presented by J Bick

3rd June 2025 7.00pm Life and Times of Electroplating Company P Alexander

If you would like the Zoom details, please contact Helen@materialsfinishing.org





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