

MATERIALS SCIENCE AND TECHNOLOGY DIVISION BOARD ANNUAL REPORT FOR 2015

1. Board membership

The current MSTD Board has 13 members, the Chairs of the MSTD technical committees, the Chairs of the Surface Engineering, Functional Materials and the Light Metals Divisions, the vice-chair of the Sustainable Development Group and a representative of the Younger Members Committee. All Board Members are members of IOM3. Mike Winstone completes his 4 year term as Chair of MSTD at the end of 2015 and will be succeeded by Mark Jolly.

MSTD technical committee chairs remained unchanged during 2015 but Mick Steeper leaves the Bulk Metalforming Committee at the end of 2015, to be replaced by co-chairs Didier Farrugia and John Wilkinson:

ASFC: Advanced Sheet Metal Forming Committee. (Chair: Rajab Said)
BMC: Bulk Metal Forming Committee Rolling Committee. (Chair: Mick Steeper)
DSSC: Defence, Safety and Security Materials Committee. (Chair: Eoin O'Keefe)
HTMC: High Temperature Materials Committee. (Chair: Jonathan Wells)
MCC: Materials Chemistry Committee. (Chair: Andrew Watson)
PEC: Particulate Engineering Committee. (Chair: Cem Selcuk)
SPMC: Structure and Properties of Materials Committee. (Chair: Mike Cox)

Details of scope and activities of each committee can be found on their websites. Committee membership has changed significantly with many new faces. Each committee has about 15 to 20 members.

2. Board meetings

The MSTD Board met twice during 2015 with over 80% of board members attending. The January meeting was kindly hosted by Cem Selcuk at the Brunel Innovation Centre, Granta Park and the July meeting was hosted by Mick Steeper at Primetals Technologies, Sheffield.

The technical committees held a total of 18 meetings, split between IOM3 (London) and guest locations. Attendance was typically about 50% of the committee membership. Telephone facilities were used to enhance participation but video conferencing facilities were not used. All committees preferred face-to-face meetings.

3. Activities during 2015

3.1. Technical programme

MSTD led 4 events in 2015, down from 6 in 2014. This was due to the late cancellation of 2 events. Communication with IOM3 conferencing has been poor.

One event was cancelled because IOM3 issued the publicity too late and the other due to conflict with another event which IOM3 should have flagged much earlier. The technical committees put a lot of effort into generating ideas and attracting good speakers and it is disappointing when IOM3 does not provide the support required.

The technical committees continue to generate new ideas and 5 IOM3 events are confirmed for 2016 with 5 others under consideration. An increasing proportion of the events involve collaboration between the MSTD Committees and collaboration with other Divisions. Appendix 1 lists recent and future activities.

In addition to the events listed in Appendix 1, MSTD provides support to numerous events led by other engineering institutes and societies. Co-sponsorship provides benefits for IOM3 members without risk to IOM3. Information on these can be found on the committee websites.

3.2. Web-site developments

MSTD and the technical committees maintain microsites. All have been launched on the new IOM3 website. Initial problems have been resolved and in December the microsites received in total over 1000 visits.

3.3. Engagement with technical community and/or local societies

MSTD continues to strengthen co-operation between its constituent committees and with other technical communities within IOM3. In addition the committees of the Division continue to benefit from strong national and international links. Examples include:

- ASFC works closely with the AFRC and WMG Catapult Centres. It also has a strong association with the European Superplasticity Group. The Committee has also supported a major international conferences, including IDDRG, SheMet, ICTP and ICSAM. At least one member was involved in the organising committee and presenting papers.
- ASFC Members participate regularly in the KTN network activities and have broadened access to the SME/Supply-chain community by having a permanent member representing the Confederation of British Metal-forming.
- BMC members are active in the Rolling Guild. Committee members are Council members of three local societies (SMEA, LISI, CIE)
- DSSC is intimately involved with Government work. This alignment is reflected in the make-up of the committee membership which includes representatives of MOD and the Home Office.
- MCC provides the UK representative on the Alloy Phase Diagram International Commission (APDIC). Initial discussions have been held between MCC and SPMC to develop a joint event.
- HTMC has strong links with the High Temperature Materials Testing Committee, TMS, IMechE Fossil Power and the Institute of Physics.
- PEC has collaborated with Innovate 2015 and EuroPM 2015 and joint IOM3 events with DSSC and SPMC. PEC is well positioned within UK and beyond as the main active committee in the UK covering Particulate

Engineering. It has good links the former Powder Advisory Board and the European Powder Metallurgy Association.

- SPMC and HTMC work with the French SF2M and German DGM counterparts to organise the European Superalloys conferences. The 2017 conference will be held in Oxford, organised by IOM3. SPMC members are on the TMS High Temperature Alloys Committee and ASM in organising the International Symposium of Superalloys Conference in the US. The SPMC and HTMC committees also collaborate to organise the Optimising Performance Through Integrated Modelling of Microstructure Conferences (OPTIMoM).
- SPMC has developed a working relationship with the Materials & Characterisation Group within the Institute of Physics (IOP), AWE Technical Outreach and the Manufacturing Technology Centre (MTC) on the Additive Manufactured Metallic Materials, Properties & Structures (AM3PS) Conferences.
- MSTDB chair represents IOM3 on the IMechE Structural Technology and Materials Group.

The committees and individual members participate in industry / academia programmes, such as InnovateUK and the KTNs. This provides support for events of mutual interest.

3.4. Contributions to IOM3 house journals

MSTD contributed articles on its events to Materials World and produced a revised Divisional Brochure in 2015.

Simon Frost (Senior Reporter for Materials World) asked the SPMC for comments on a story he was writing about new research at MIT on the elimination of crystal defects in nanoscale metal parts. The comments supplied were gratefully received.

Two articles covering different processes and applications (i.e. Stretch Forming in Aerospace and Hot Forming Aluminium in Automotive) are currently under consideration by two academic members in the ASFC.

3.5. Other

Sustainability - MSTDB has a representative from the Sustainability Group (Mark Jolly) and much of the technical committee work is focused on efficient use of materials, energy and natural resources.

4. Strategy and Objectives for 2016 and Beyond

4.1. Opportunities and constraints

MSTD works closely with many other divisions of IOM3 and other professional engineering institutes. Good relationships have been established to facilitate co-sponsored events with IMechE and RAeroSoc.

The committees of MSTD continue to initiate new activities with about a dozen under consideration at any point in time. Approximately 50% of these mature into formal programmes. All this activity relies on volunteer effort and support from employers. That has been increasingly difficult during recent years. An under-utilised resource is the large number of younger members that are affiliated to MSTD. About a quarter of all new IOM3 members identified MSTD as their lead division. During 2015 MSTD enhanced its interaction with younger members and will work more closely with The Younger Members Committee through the YMC representative on the MSTD Board.

An opportunity to work with the IOM3 Training and Education Executive, regarding the Materials Education in Schools programme has been taken this year. Diane Aston has attended several committee meetings and presentation material has been produced by the HTMC. Diane can use this in her schools programme. Additional materials will be developed in 2016.

4.2. Specific targets for 2016

The MSTD committees will organise a minimum of 5 technical events during 2016.

MSTD will provide three or more articles for Materials World.

MSTD will provide the Schools Programme with presentations on materials technology.

4.3 Outline plans for the 3 years beyond 2016

All the MSTD committees have been conducting strategic review and re-drafted their terms of reference in 2015. MSTD has a long-term plan for event. Several conferences are now established as regular events, e.g. the Parsons Turbine Conferences and OPTIMoM, have built world class brands. These will be developed further.

ASFC has identified an opportunities to assist the Elite Centre for Manufacturing Skills+ managed by the Confederation of British Metal-forming. The technical programme of the committee may be widened to cover more aspects of the SMF process, e.g. die technology and post processing of formed sheets.

Mike Winstone

18/01/16



Appendix 1: Technical Programme December 2015

Date	Status (Held/Progressing/Planned)	Title	Location	Organising Division /Committee /Collaborator	Financial Underwriter (IOM3/Local/Other)	100% Target No's	Actual No's
22-24/04/2015	Held	Rolls 5: Optimising Value through Rolls	ICC, Birmingham	BMC	IOM3	150	119
14/05/2015	Held	Additive Manufactured Metallic Materials Properties and Structures.	MTC, Coventry	SPMC/PEC	IOM3	60	50
14-17/09/2015	Held	Parsons Turbine Conference	Loughborough	HTMC	IOM3	~80	86
09/07/2015	Cancelled	Advances in Powders and Particles in Defence, Safety and Security	Lucideon, Stoke	DSSC/PEC	IOM3	40	
11/11/2015	Cancelled	High Temperature Wear and Erosion	Derby	HTMC	IOM3	40	
02/12/2015	Held	1 st Annual Metal Forming Conf: Synergies in rolling and forging practice	AFRC, Glasgow	ASFC/BMC	IOM3	80	58
15-16/03/2016	Progressing	Advances in Camouflage Science and Engineering	IOM3	DSSC	IOM3	50	
12-13/04/2016	Progressing	Innovative Approaches to Bulk Metal Processing	MTC, Coventry	BMC	IOM3	75	
2-3/6/2016	Progressing	Low Rupture Ductility of Materials	Loughborough	HTMC	IOM3	40	
11-15/09/2016	Progressing	13 th International Symposium on Superalloys	Seven Springs, Pennsylvania	HTMC	TMS	400	
4-6/10/2016	Progressing	5 th Aircraft Structural Design Conference	Lisbon	MSTD	RAeroSoc		
2016	Planned	Integrity of High Temperature Welds	TBD	HTMC	IOM3	100	
2016	Planned	Alternative Approaches for Producing Wrought Structures	TBD	BMC	IOM3	40	
2016	Planned	Advances in Portable Energy Supplies for Defence, Safety and Security	TBD	DSSC	IOM3		

23/11/16	Planned	Advances in Powders and Particles in Defence, Safety and Security	TWI	DSSC/PEC	IOM3	50	
November 2016	Planned	'Hume-Rothery Seminar on Phase Diagrams and Thermodynamics'	Derby	MCC	IOM3	50	
2017	Planned	12 th Int Conf on Technology of Plasticity	Cambridge	BMC	Cambridge U	100+	
2017	Planned	Additive Manufactured Metallic Materials Properties and Structures II	TBD	SPMC	IOM3		
2017	Planned	OPTIMoM III	Cambridge	HTMC?SPMC	IOM3	80	
9-13/9/2018	Planned	3 rd European Symposium on Superalloys	Oxford	SPMC/HTMC	IOM3	300	
September 2019	Planned	Parsons Turbine Conference	Cranfield	HTMC	IOM3	~80	