

TUESDAY 10TH OCTOBER

	0800-0845	Registration		
	0845-0900	Opening Formalities		
Paper	Time	Author(s)	Affiliation	Title
SESSION 1		FSW TOOLS I	Chairman: Ian Norris	
36	0900-0930	Burford D A, Tweedy B, Widener C A	National Institute for Aviation Research, Wichita State University (USA)	Influence of shoulder configuration and geometric features on FSW track properties
62	0930-1000	Dubourg L ¹ , Dacheux P ²	¹ Aerospace Manufacturing Technology Centre, National Research Council Canada, ² Aluminium Technology Centre, National Research Council (Canada)	Design and properties of FSW tools: a literature review
	1000-1030	Coffee Break		
SESSION 2A		FSW OF HIGH TEMP ALLOYS	Chairman: Tim Li	
2	1030-1100	Jun H J & Ayer R	ExxonMobil Research & Engineering (USA)	Precipitation behaviour of Ni base alloys during FSW.
4	1100-1130	Fujii H	Osaka Uni/JWRI (Japan)	FSW of high temp materials
48	1130-1200	Mononen J T	Helsinki Uni (Finland)	FSW of PH 15-7 stainless steel sheet
104	1200-1230	Ishikawa T ¹ , Fuji H ² , Iwaki S ¹ , Matsuoka S ¹ , Nogi K ²	¹ Tokyu Car Corp. , ² Joining and Welding Research Institute (Japan)	High-speed friction stir welding of 304 stainless steel
SESSION 2B		MODELLING I	Chairman: Mike Russell	
22	1030-1100	Williams S W ¹ , Colegrove P A ¹ , Shercliff H ² , Pragnell P ³ , Robson J ³ , Withers P ³ , Richards D ³ , Sullivan A ³ , Kamp N ³ , Lohwasser D ⁴ , Poad M ⁵	¹ Cranfield University, ² Cambridge University, ³ University of Manchester, ⁴ Airbus (Germany), ⁵ Airbus UK (UK)	Integrated modelling of the FSW process
44	1100-1130	Tartakovsky A M	Pacific Northwest National Lab (USA)	Lagrangian particle model of friction stir welding
51	1130-1200	Schmidt H and Hattel J	Technical University of Denmark (Denmark)	Analysis of the velocity field in the shear layer in FSW - Experimental and numerical modelling
70	0930-1000	Sato T, Otsuka D, Watanabe Y	Nippon Sharyo Ltd (Japan)	Designing of FSW parameters with finite element flow simulation
	1230-1330	Lunch Break		

SESSION 3A		FATIGUE I	Chairman: Danie Hattingh	
65	1330-1400	<u>Jene T</u> ^{1,2} , Dobmann G ¹ , Wagner G ² , Eifler D ² ,	¹ Fraunhofer Institute for Non-destructive Testing, ² Institute of Materials Science and Engineering, University of Kaiserslautern (Germany)	Oxide fragments in friction stir welds-distribution and effects on crack initiation
80	1400-1430	Ali A ¹ , Brown M W ² , Rodopoulos C A ³	¹ University of Putra (Malaysia), ² University of Sheffield (UK), ³ Sheffield Hallam University (UK)	Crack coalescence and growth in aircraft friction stir welded joints
109	1430-1500	Uematsu Y, Tokaji K, <u>Murata S</u>	Gifu University (Japan)	Fatigue behaviour of FSSW joints in Al-Mg-Si alloy
SESSION 3B		FRICITION STIR PROCESSING	Chairman: Murray Mahoney	
97	1330-1400	<u>Nguyen J</u>	U S Navy (NSWC) (USA)	Corrosion evaluation of friction stir processed NAB
47	1400-1430	<u>Chung S W</u> ¹ , Morishige T ² , TsujiKawa M ² , Takigawa Y ² , Oki S ³ , Higashi K ²	¹ Osaka Industrial Promotion Organization, ² Osaka Prefecture University, ³ Kin-Ki University (Japan)	High strength Mg-Y-Zn alloy by FS processing
102	1430-1500	<u>Posada M</u>	U S Navy (NSWC) (USA)	Variable ductility evaluation of FSP'd NAB castings
	1500-1530	Coffee Break		
SESSION 4A		QUALITY I	Chairman: Hisashi Hori	
12	1530-1600	Beamish K ¹ , Ezeilo A ¹ , Smith S ¹ , Lewis P ² , Cheetham P ³	¹ TWI Ltd., ² Applied Measurements Ltd., ³ Sigmapi Systems Ltd (UK)	Development of a low cost FSW monitoring system
21	1600-1630	Boldsaikhan E, <u>Corwin E M C</u> , Logar A, Arbegast W	SDSMT (USA)	Neural network evaluation of weld quality using FSW feedback data
95	1630-1700	<u>Barnes J E</u> ¹ , McMichael J ² , Reynolds A ³	¹ Lockheed Martin Aeronautics, ² Alcoa Technical Center, ³ University of South Carolina (USA)	Effects of FSW defects on 7075 joint strength and fatigue life
SESSION 4B		AEROSPACE I	Chairman: John Baumann	
27	1530-1600	<u>Lohwasser D</u>	Airbus Deutschland (Germany)	FSW for A350 aircraft
82	1600-1630	<u>Luan G</u>	Beijing FSW Technology (China)	FSW the lightweight aircraft structure
	1630-1700			
	1715-1830	LICENCEES MEETING		

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SESSION 5A		PROCESS I	Chairman: Gil Sylva	
3	0800-0830	<u>Nishida H¹</u> , <u>Inuzuka M¹</u> , Koga S ¹ , Nishiyama G ² and Yamazaki K ²	¹ Kawasaki Heavy Industries, ² Kawasaki Ship Building Corporation (Japan)	Development of a new FSW machine for large Al alloy structures
50	0830-0900	<u>Baumann J A</u>	Boeing (USA)	FS process capabilities for highly contoured applications.
84	0900-0930	<u>Liu H</u> , Guo N, Feng J	Harbin University (China)	FSW assisted by micro-plasma arc
86	0930-1000	<u>Smith C B</u> and Hinrichs J	Friction Stir Link (USA)	Deeper FSW penetration expands use of robotic FSW and processing
SESSION 5B		RESIDUAL STRESSES	Chairman: Jorge dos Santos	
23	0800-0830	<u>Williams S W</u>	Cranfield University (UK)	Control of residual stresses and distortion in FSW
53	0830-0900	<u>Lombard H¹</u> , <u>Hattingh D G¹</u> , James M N ² , Steuer A ³ .	¹ Nelson Mandela Metropolitan University (South Africa), ² Plymouth University (UK), ³ ESRF (France)	Synchrotron Diffraction residual strain scanning in FSW as a function of process conditions
49	0900-0930	<u>Blanchard S B</u>	ONERA (France)	Analysis of the dynamic behaviour and ruin of FSW joints using strain field measurement techniques based on stereo digital image correlation.
24	0930-1000	<u>Williams S W¹</u> , Price D A ² , Wescott A ² , Steuer A ³ , Peel M ³ , Altenkirch J ⁴ , Withers P J ⁴ , Poed M ⁵	¹ Cranfield University, ² BAE Systems, ³ ILL-ESRF (France), ⁴ University of Manchester and UMIST, ⁵ Airbus UK (UK)	Distortion control in welding by mechanical testing
	1000-1030	Coffee Break		
SESSION 6A		AEROSPACE II	Chairman: Daniela Lohwasser	
5	1030-1100	<u>Marie F</u> and Allehaux F	EADS (France)	Development of FSW for optimum run-out performance
10	1100-1130	<u>Hsieh H T H^{1,2}</u> , Tasi P ¹	¹ Metal Industries R&D centre, ² National Cheng Kung University (Taiwan)	Case study for net shape joining of launch box by FSW
110	1130-1200	<u>Sylva G¹</u> , Moore G ² , Thomas B ² , Kok L ²	¹ MTS (USA) ² Bombardier Aerospace (Canada/UK)	Advances in FSW for commercial aircraft applications
75	1200-1230	<u>Cao X</u>	NRC Montreal (Canada)	FSW of aerospace Mg alloy
SESSION 6B		FRICION STIR SPOT WELDING	Chairman: John Hinrichs	
17	1030-1100	Pan T Y ¹ , Schwartz W J ¹ , Lazarz K A ¹ , Santella M L ²	¹ Ford USA, ² Oak Ridge National Laboratory (USA)	'Spot friction weldbonding' for sheet Al joining

13	1100-1130	<u>Kyffin W J</u> ¹ , <u>Threadgill P L</u> ² , <u>Lalvani H</u> ³ , <u>Wynne B P</u> ³	¹ TWI Technology Centre (Yorkshire) Ltd., ² TWI Ltd., ³ University of Sheffield (UK)	Progress in FSSW of DP800 high strength automotive steel
35	1130-1200	<u>Badarinarayan H</u>	Hitachi America (USA)	Process development and material property evaluation of FS stitch welded sheet metal (Al)
107	1200-1230	<u>Tozaki Y</u> , <u>Uematsu Y</u> , <u>Tokaji K</u>	Gifu University (Japan)	Effect of welding condition on tensile strength of dissimilar FS spot welds between different Al alloys.
	1230-1330	Lunch Break		
SESSION 7A		APPLICATIONS	Chairman: Tadashi Nishihara	
67	1330-1400	¹ <u>Gerçekioğlu E</u> ¹ , <u>Eren T</u> ² , <u>Yildizli K</u> ¹ , <u>Salamci E</u> ³	¹ Erciyes Uni, ² Military Main Repairment Factory, ³ Zonguldak Karaelmas University (Turkey)	The application of FSW method to the Al alloy of AA 6063-T6 pipe using milling machine
39	1400-1430	<u>Grant G J</u>	Pacific Northwest National Lab (USA)	Superplastic forming of Al multi-sheet structures fabricated using FSW and refill FSSW
68	1430-1500	<u>Cederqvist L</u>	SKB (Sweden)	FSW to manufacture and seal 5cm Cu canisters for Sweden's nuclear waste
SESSION 7B		FATIGUE II	Chairman: Dwight Burford	
1	1330-1400	<u>Tsujikawa M</u> ¹ , <u>Koizumi S</u> ¹ , <u>Oguri T</u> ² , <u>Oki S</u> ³ , <u>Chung S W</u> ⁴ , <u>Higashi K</u> ¹	¹ Osaka Prefecture University, ² Technology Research Institute of Prefecture, ³ Kinki University, ⁴ Osaka Technology Licensing Organization (Japan)	Fatigue crack growth in Mg alloy FSW joints
96	1400-1430	<u>Yang X</u> ¹ , <u>Fang D</u> ¹ , <u>Luan G</u> ² , <u>Jian B</u> ²	¹ Tianjin University, ² Beijing FSW Technology Co Ltd. (China)	Experimental investigation on fatigue properties of FSW in aircraft Al alloys
61	1430-1500	<u>Vugrin T</u> , <u>Biallas G</u> , <u>Ghidini T</u>	DLR (Germany)	Influence of root and nugget flaws on static and fatigue properties of FSW
	1500-1530	Coffee break		
SESSION 8A		QUALITY II	Chairman: Mohammad Jahazi	
30	1530-1600	<u>Lamarre A</u>	Olympus NDT (Canada)	Eddy current array and ultrasonic phased array technologies as reliable tools for FSW inspection.
74	1600-1630	<u>Dubourg L</u> ¹ , <u>Gagnon F O</u> ² , <u>Nadeau F</u> ² , <u>St-Georges L</u> ³ , <u>Jahazi M</u> ¹	¹ Aerospace Manufacturing Technology Centre, NRC Canada, ² Aluminium Technology Centre, NRC Canada, ³ REMAC Industrial Innovators (Canada)	Process window optimization for FSW of thin and thick sheet Al alloys using statistical methods
6	1630-1700	Hori H et al	The Japan Light Metal Assoc Welding & Construction Association Inc (Japan)	Studies on Characteristics of FSW joints in structural Al alloys - Part 1
SESSION 8B		FSW TOOLS II	Chairman: To be confirmed	
38	1530-1600	<u>Widener C</u>	Wichita State University (USA)	High rotational speed FSW with a fixed shoulder
81	1600-1630	<u>Kurt A</u> ¹ , <u>Uygur I</u> ² , <u>Ates H</u> ¹	¹ Gazi University, ² Abant Izzet Baysal University (Turkey)	The effect of shoulder diameter to weldability on the FSW

99	1630-1700	<u>Nishihara T</u>	Kokushikan University (Japan)	Development of simplified FSW tool
	1800-2300 (?)	Social Event		
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SESSION 9A		PROPERTIES	Chairman: Luan Guohong	
7	0830-0900	Hori H et al	The Japan Light Metal Assoc Welding & Construction Association Inc (Japan)	Studies on Characteristics of FSW joints in structural Al alloys - Part 2
43	0900-0930	<u>Shukla A K</u> ¹ , Baeslack III W A ²	¹ Rensselaer Polytechnic Institute, ² The Ohio State University (USA)	Effect of process conditions on microstructure evolution and mechanical properties of FSW thin sheet 2024-T3
42	0930-1000	<u>Steuwer A</u> ^{1,2} , Peel M J ^{1,2} , Withers P J ²	¹ University of Manchester (UK) ² ESRF-ILL (France)	Influence of welding speed on the properties of AA5083-AA6082 dissimilar FSWs
SESSION 9B		MODELLING II	Chairman: Stewart Williams	
63	0830-0900	<u>St-Georges L</u> ¹ , Dasylva-Raymond V ² , Kiss L I ² , Perron A L ²	¹ REMAC, ² Université du Quebec á Chicoutimi (Canada)	Prediction of optimal parameters of FSW
89	0900-0930	<u>De Vuyst T</u> ¹ , Magotte O ¹ , Robineau A ² , Goussain J-C ² , D'Alvise L ¹	¹ CENAERO (Belgium) ² Institut de Soudure (France)	Multi-physics simulation of the material flow and temperature field around FSW tool
77	0930-1000	Sanbao L, Zhao Y, He Z, Wu L	Harbin Institute of Technology (China)	3-dimensional flow modelling of the FSW process for optimising FSW tool design
	1000-1030	Coffee Break		
SESSION 10A		FSW OF STEELS	Chairman: To be confirmed	
11	1030-1100	<u>Cui L</u> ¹ , <u>Fujii H</u> ¹ , Tsuiji N ² , Nakata K ¹ , Nogi K ¹	¹ Joining & Welding Research Institute, Osaka University ² Department of Adaptive Machine Systems, Osaka University (Japan)	Mechanical properties of FSW of carbon steel joints – FSW with transformation
73	1100-1130	<u>Li T</u> , Gan W, Khurana S	EWI (USA)	FSW of L80 and X70 steels
15	1130-1200	Mahawish S, Fox M, Barnes S J, Johnson R* and Withers P J	Manchester University (UK) *TWI (UK)	Residual stress and microstructural analysis of single and multi-pass FSWs in HSLA-65 steel
112	1200-1230	Nelson T, Sorensen C	Brigham Young University (USA)	Advances in PCBN tooling for friction stirring of high temperature alloys
SESSION 10B		METALLURGY I	Chairman: Maria Posada	
71	1030-1100	<u>Sato Y S</u> , Kurihara Y, Kokawa H	Tohoku University (Japan)	Microstructural characteristics of dissimilar butt friction stir welds of AA7075 and AA2024

28	1100-1130	<u>Simar A</u> ¹ , de Meester B ¹ , Brechet Y ² , Pardoën T ¹	¹ Université Catholique de Louvain (Belgium), ² Domaine Universitaire (France)	Microstructural evolution and local mechanical properties evolution throughout FSW in Al 6005A
41	1130-1200	<u>Fonda R W</u> ¹ , Wert J A ² , Reynolds A P ³ , Tang W ³	¹ Naval Research Laboratory (USA), ² Center for Fundamental Research: Metal Structures in Four Dimension, Risø National Laboratory (Denmark) ³ University of South Carolina (USA)	Grain and texture development in single crystal FSWs
78	1200-1230	<u>Attallah M M</u> , Davis C L, Strangwood M	University of Birmingham (UK)	The influence of intermetallic particles on the formation of the 'onion rings' structure in Al-based alloys FSW welds
	1230-1330	Lunch break		
SESSION 11A		PROCESS II	Chairman: Lyne St Georges	
108	1330-1400	<u>Völlner G</u> ¹ , Zaeh M F ¹ , Kellenberger O ² , Lohwasser D ³ , Silvanus J ⁴	¹ Technical University, Munich, ² KUKA Roboter GmbH, ³ Airbus Deutschland GmbH, ⁴ EADS Deutschland GmbH (Germany)	3-D FSW using a modified high payload robot
113	1400-1430	<u>Tuck J R</u> ¹ , Rowe C E D ² , Thomas W ³ , Staines D G ³ , Shields J ¹	¹ H C Starck, ² Cedar Metals Ltd., ³ TWI Ltd.	Refractory Metal Tooling for Friction Stir Welding of Hard Aluminium and Steel
45	1430-1500	<u>Okii S</u> ¹ , Tsujikawa M ² , Okawa Y ³ , Chung S W ³ , Higashi K ²	¹ Kinki University, ² Osaka Prefecture University, ³ Technical Research Institute of Osaka Prefecture, ⁴ Osaka TLO (Japan)	Tolerance of tool position and posture in FSW
SESSION 11B		AEROSPACE III	Chairman: Zach Loftus	
37	1330-1400	<u>Tweedy B</u>	Wichita State University (USA)	Fundamental properties of FSW Al 7136 including effects of post-weld artificial ageing.
59	1400-1430	<u>Martin W</u>	Lockheed Martin Space Systems (USA)	FS lap welding methods for manufacturing efficient large scale space-flight pressure vessels
8	1430-1500	Hori H et al	The Japan Light Metal Welding & Construction Association Inc (Japan)	Studies on characteristics of FSW joints in structural aluminium alloys – Part 3
	1500-1530	Coffee Break		
SESSION 12A		FUNDAMENTALS	Chairman: Jukka Mononen	
29	1530-1600	<u>R Zettler</u> ¹ , <u>dos Santos J</u> ¹ , Donath T ¹ , Beckmann F ¹ , Lohwasser D ²	¹ GKSS ² Airbus Deutschland GmbH (Germany)	Material flow in FS butt welded Al alloys
106	1600-1630	<u>Crawford R</u> ¹ , <u>Bloodworth T</u> ¹ , Cook G E ¹ , Strauss A M ¹ , Hartman D A ²	¹ Vanderbilt University, ² Los Alamos National Laboratory (USA)	High speed FSW process modeling

100	1630-1700	<u>Reynolds A P</u> , Pouget G, Tang W Khandkar Z	University of South Carolina (USA)	General features of RPM, torque and process force relationships in Al alloy FSW
SESSION 12B		MMCs	Chairman: Dick Fonda	
9	1530-1600	Hori H et al	The Japan Light Metal Welding & Construction Association Inc. (Japan)	Studies on characteristics of FSW joints in structural aluminium alloys – Part 4
34	1600-1630	<u>Yasui T</u> ¹ , Tsubaki M ¹ , Fukumoto M ¹ , Takahashi H ² , Sasaki S-i ³	¹ Toyohashi University of Technology, ² Taiheiyo Cement, ³ NIHON CERATEC Co Ltd (Japan)	Butt welding between Al alloy and Al- based MMC by friction stirring
66	1630-1700	<u>Dalkilic S D</u> , Biallas G	DLR-German Aerospace Center, Institute of Materials Research (Germany)	FSW joints of an Al MMC and a monolithic Al alloy
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SESSION 13A		FSW Al-steel/Cu	Chairman: Tony Reynolds	
	0800-0830			
31	0830-0900	<u>Fukumoto M</u> , Miyagawa K, Yasui T, Tsubaki M	Toyohashi University (Japan)	Spot welding between Al alloy and carbon steel by friction stirring
79	0900-0930	<u>Savolainen K</u> , Mononen J, Saukkonen T, Hänninen H	Helsinki University of Technology (Finland)	A preliminary study on FSW of dissimilar metal joints of Cu and Al
111	0930-1000	<u>Bozzi S</u> ¹ , Etter A L ¹ , Baudin T ¹ , Robineau A ² , Goussain J C ²	¹ Université de Paris-Sud, ² Institut de Soudure (France)	Influence of the dwell time on spot welding between 6008 Al alloy and steel by FSW
SESSION 13B		FSW OF Ti ALLOYS	Chairman: François Marie	
40	0800-0830	<u>Bernath J J</u> , Krem S, Li T	EWI (USA)	FSW of Ti-6Al-4V structural components
58	0830-0900	Ronald E Jones, <u>Loftus Z</u>	Lockheed Martin Space Systems Co (USA)	FSW of 5mmTi-6Al-4V
105	0900-0930	<u>Ikeda M</u> ¹ , Hasegawa S ¹ , Wook C S ² , Higashi K ³	¹ Kansai University, ² Osaka Industrial Promotion Organization, ³ Osaka Prefecture University (Japan)	Fundamental study for development of new tool for Ti and its alloys
14	0930-1000	<u>Russell M J</u> , Nunn M E and Addison A C	TWI (UK)	Recent developments in FSW of Ti alloys
	1000-1030	Coffee break		
SESSION 14A		MODELLING III	Chairman: Laszlo Kiss	
93	1030-1100	<u>Buffa G</u> , Fratini L F, Hua J, Micari R and Shivpuri R	Palermo University (Italy)	FSW research activity at OSU and UNIPA
101	1100-1130	<u>Chen Z</u> , Pasang T, Qi Y and Perris R	Auckland University of Technology (New Zealand)	Tool-workpiece interface and shear layer formed during FSW

103	1130-1200	<u>Gebhard G P,</u> Zaeh M F	Institute for Machine Tools and Industrial Management (Germany)	Empirical model for the tool shoulder temperature during FSW
SESSION 14B		DISSIMILAR & METALLURGY II	Chairman: NRC	
56	1030-1100	<u>Soundararajan V,</u> Kovacevic R	Research Center for Advanced Manufacturing (RCAM), Southern Methodist University (USA)	FSW of steel to Al alloy
33	1100-1130	<u>Yasui T,</u> Ishii T, Tsubaki M and Fukumoto M	Toyohashi University (Japan)	Microstructure of butt welding between Al and steel by FSW
54	1130-1200	<u>Mahoney M</u> ¹ Fuller C ² DeWald A ³ Hill M ³	¹ Rockwell Scientific Co., ² GE Healthcare, ³ University of California (USA)	Residual stresses in multi-pass friction stir processed NiAl bronze using the contour method
	1230-1300	Buffet lunch		
	pm	VISIT TO NRC		