

Contents

Part I High Temperature Applications I

Effect of Thermal Aging on the Corrosion and Mechanical Properties of Friction Stir Welded 250 Grade Maraging Steel	3
Bharat K. Jasthi, Todd Curtis, Christian A. Widener, Michael West and Brendan Kellogg	
Friction Stir Processing of 304L Stainless Steel for Crack Repair	13
M.P. Miles, C. Gunter, F. Liu and T.W. Nelson	
Influence of Underwater Operation on Friction Stir Welding of Medium Carbon Steel	23
Tomoko Miyamori, Yutaka Sato and Hiroyuki Kokawa	
Feasibility of Iridium Containing Nickel Based Superalloy Tool to Friction Stir Spot Welding of High Strength Steel	29
Kunihiro Tanaka, Tatsuya Nakazawa, Koichi Sakairi, Yutaka Sato, Hiroyuki Kokawa, Toshihiro Omori and Kiyohito Ishida	

Part II High Temperature Applications II

Development of Friction Stir Processing for Repair of Nuclear Dry Cask Storage System Canisters	39
Ken Ross, Ben Sutton, Glenn Grant, Gary Cannell, Greg Frederick and Robert Couch	
Performance of Tungsten-Based Alloy Tool Developed for Friction Stir Welding of Austenitic Stainless Steel	47
Yutaka Sato, Ayuri Tsuji, Tomohiro Takida, Akihiko Ikegaya, Akinori Shibata, Hiroshi Ishizuka, Hideki Moriguchi, Shinichi Susukida and Hiroyuki Kokawa	

Investigation of Process Parameters for Friction Stir Processing (FSP) of Ti-6Al-4V Alloy	53
Sandip Chougule, Digvijay Sheed, R.K.P. Singh, N. Prabhu, B.P. Kashyap and Kaushal Jha	

Part III Derivative Technologies

Solid-State Joining of Thick-Section Dissimilar Materials Using a New Friction Stir Dovetailing (FSD) Process	67
Md. Reza-E-Rabby, Ken Ross, Scott Whalen, Yuri Hovanski and Martin McDonnell	

Joining Aerospace Aluminum 2024-T4 to Titanium by Friction Stir Extrusion	79
William Todd Evans, George E. Cook and Alvin M. Strauss	

Dissimilar Metal T-Joint of Aluminum and Steel Formed by Friction Stir Extrusion	91
Adam W. Jarrell, Alvin M. Strauss and George E. Cook	

Part IV Lightweight Applications

Friction Stir Welding of Thick Section Aluminium Alloys—New Techniques	99
Jonathan Peter Martin	

Friction Stir Weld Lap Joint Properties in Aeronautic Aluminium Alloys	109
Egoitz Aldanondo, Ekaitz Arruti and Alberto Echeverria	

Friction Stir Welding of Thick Aluminium Welds—Challenges and Perspectives	119
Murshid Imam, Yufeng Sun, Hidetoshi Fujii, Yasuhiro Aoki, Ninshu MA, Seiichiro Tsutsumi and Hidekazu Murakawa	

High-Speed FSW Aluminum Alloy 7075 Microstructure and Corrosion Properties	125
Jingyi Zhang, Piyush Upadhyay, Yuri Hovanski and David P. Field	

Flow Features in Shoulder Zone During Scroll Tool Friction Stir Welding Thick 6061 Aluminum Plates	137
David Yan, Xiaoming Wang and Guy Littlefair	

Part V Dissimilar Applications

Joining Dissimilar Material Using Friction Stir Scribe Technique	147
Piyush Upadhyay, Yuri Hovanski, Blair Carlson, Eric Boettcher, Robert Ruokolainen and Peter Busuttil	

Influence of Stir Flow on Joint Quality During Friction Stir Lap Al-to-Cu Welding	157
D. Parnigotan, M. Tarrant, Z.W. Chen, A. Hilton and T. Pasang	
A Numerical Simulation for Dissimilar Aluminum Alloys Joined by Friction Stir Welding.	167
Carter Hamilton, Mateusz Kopyściański, Aleksandra Węglowska, Stanisław Dymek and Adam Pietras	
Realization of Ultrasound Enhanced Friction Stir Welded Al/Mg- and Al/Steel-Joints: Process and Robustness, Mechanical and Corrosion Properties	179
Marco Thomä, Guntram Wagner, Benjamin Straß, Christian Conrad, Bernd Wolter, Sigrid Benfer and Wolfram Fürbeth	
Part VI Industrial Applications	
Friction Stir Welding Process Development of AA7075 for Hot Stamping Applications.	197
François Nadeau and Nia R. Harrison	
A Novel Approach for Joining EN AW 1050 Stranded Wire and EN CW 004A Contact Elements by Friction Stir Spot Bonding	211
Anna Regensburg, René Schürer, Jan Ansgar Gerken, Helmut Steinberg and Jean Pierre Bergmann	
Joining Al 6061 to ZE41A Mg Alloy by Friction Stir Welding Using a Cold Spray Transition Joint.	221
Todd R. Curtis, Victor K. Champagne III, Michael K. West, Reza Rokni and Christian A. Widener	
Refill Friction Stir Spot Joining for Aerospace Aluminum Alloys.	237
Enkhsaikhan Boldsaikhan, Shintaro Fukada, Mitsuo Fujimoto, Kenichi Kamimuki, Hideki Okada, Brent Duncan, Phuonghanh Bui, Michael Yeshiambel, Brian Brown and Alan Handyside	
Part VII Control and Simulation	
Depth and Temperature Control During Friction Stir Welding of 5 cm Thick Copper Canisters	249
Lars Cederqvist, Olof Garpinger and Isak Nielsen	
Predicting Lap Shear Strength for Friction Stir Scribe Joining of Dissimilar Materials	261
Erin Iesulauro Barker, Piyush Upadhyay, Yuri Hovanski and Xin Sun	

Simultaneous Independent Control of Tool Axial Force and Temperature in Friction Stir Processing	269
Ken Ross, Glenn Grant, Jens Darsell and David Catalini	
Process Force Reduction During Robotic Friction Stir Welding of Aluminum Alloys with Reduced Tool Aspect Ratios	277
Anna Regensburg, Michael Grätzel, René Schürer, Michael Hasieber and Jean Pierre Bergmann	
Part VIII Poster Session	
Friction Stir Processing of 2507 Super Duplex Stainless Steel: Microstructure and Corrosion Behaviour	289
M.K. Mishra, G. Gunasekaran, A.G. Rao, B.P. Kashyap and N. Prabhu	
Effect of Heat Treatment on Friction-Stir-Processed Nanodispersed AA7075 and 2024 Al Alloys	297
I. El-Mahallawi, M.M.Z. Ahmed, A.A. Mahdy, A.M.M. Abdelmotagaly, W. Hoziefa and M. Refat	
Numerical Analysis of FSW Employing Discrete Element Method	311
Kenta Mitsufuji, Masahito Nambu and Fumikazu Miyasaka	
Author Index	321
Subject Index	323

Friction Stir Welding and Processing IX

Hovanski, Y.; Mishra, R.; Sato, Y.; Upadhyay, P.; Yan, D.
(Eds.)

2017, XIV, 324 p. 245 illus., Hardcover

ISBN: 978-3-319-52382-8