

# TABLE OF CONTENTS

Peer Review & Acceptance of Technical Paper Submissions.....	iii
AFS Board of Directors.....	iv
AFS President’s Biography.....	v
Acknowledgments.....	vii
2022 Metalcasting Congress Paper and Presentation Awards.....	ix
2022 AFS Awards.....	xi
2022 Author Index.....	397
2022 Subject Index.....	403

## TRANSACTION LISTINGS BY AFS TECHNICAL DIVISION

### HOYT MEMORIAL LECTURE

<i>“Seven Keys to Long-Term Success: Lessons Learned from a 50-Year Career (22-106)”</i> J. Bye.....	1
---	---

### ADDITIVE MANUFACTURING

<i>“Abrasive Wear Testing of Additively Manufactured Patterns (22-016)”</i> N. Bryant, J. O’Dell.....	15
<i>“Preliminary Investigation on the Influence of Refractory Coating Formulation on the Surface Roughness of A356 Aluminum Castings Produced by 3D Printed Sand (22-095)”</i> N. Bryant, D. Cygal.....	19
<i>“Rapid Casting using Machinable Molds Compared to 3D Printing Technology (22-039)”</i> S. Derrick, S. Ramrattan.....	23

### ALUMINUM & LIGHT METALS

<i>“Aluminum Degassing: A Historical Review (22-092)”</i> G. Sigworth.....	35
<i>“Aluminum in Green Sand: A Fresh Look (22-107)”</i> P. Larsen, T. Baron.....	49
<i>“Cast-In Inserts, Including MMC Inserts in Aluminum Compound Castings (22-074)”</i> A. Rohlwing, K. Rane, A. Kordijazi, D. Weiss, N. Sonnetag, B. Church, P. Rohatgi.....	57
<i>“Direct, Clean, Quiescent, Counter Gravity Filing for Aluminum Castings (22-067)”</i> J. Foo, S. Ramrattan.....	73

<i>“Distributed Temperature and Gap Measurements at the Metal-Mold Interface during Aluminum Casting using Optical Fiber Sensors (22-104)”</i>	
D. Neeklakandan, M. Roman, D. Balogun, D. Alla, S. Chakraborty, L. Bartlett, R. Gerald, J. Huang, R. O’Malley.....	83
<i>“Factors Influencing Mechanical Properties In Aluminum Castings Part 1: The Roll of Filling Systems on Mechanical Properties (22-007)”</i>	
D. Weiss, D. Hoefert.....	93
<i>“Implementing SMARTT (Self-Monitoring, Adaptive Re-calculating Treatment Technology) Degassing into a V-process Foundry Making A356 Aluminum Alloy Castings (22-029)”</i>	
E. Baker, B. Began, J. Johnson.....	101
<i>“Investigation of Silicon Carbide Reinforced Aluminum Matrix Composite Prepared by Using an Induction Furnace (22-044)”</i>	
V. Okhuysen, M. Rabea.....	115
<i>“Mechanical Properties Inside Large Aluminum A356 Castings (22-005)”</i>	
F. Chiesa, J. Rousseau, D. Levasseur.....	123
<i>“Chemical Composition and Melt Treatment Optimization of 5XXX and 6XXX Alloys for Ablation Technology (22-019)”</i>	
E. Barbarias, A. Bakedano, I. Lizarralde, S. Orden, A. Fernández-Calvo.....	131
<i>“Melting a Novel Beryllium Free Aluminum 535 without Inert Gas Cover (22-032)”</i>	
F. Chiesa, S. Ha, D. Levasseur, G. Marin, S. Kim.....	143
<i>“Porosity Modeling and Validation in Aluminum Sand Castings (22-087)”</i>	
L. Wang, Q. Wang, D. Wilson, G. Backer.....	151

## **CAST IRON**

<i>“Production and Processing of Ductile Iron and Steel Bimetal Composite (22-073)”</i>	
S.Fowler, J.C. Liggett, J. Qing, D.Garcia, M. Xu.....	157
<i>“Development of Semi-Solid Die Casting Method in Ductile Cast Iron (22-088)”</i>	
H. Itofuji, M. Itamura.....	167
<i>“Influence of Holding Time in the Heating/Pouring Unit on the Metallurgical Quality of Spheroidal Graphite Iron (22-035)”</i>	
G. Alonso, D. Stefanescu, J. Olaizola, R.Suarez.....	175
<i>“Mutual B, Ti, N Effects on Phase Transformations in Cast Iron: Thermodynamic Consideration and Experimental Verification (22-134)”</i>	
S. Pawaskar, L. Bartlett, S. Lekakh.....	185
<i>“New Ductile Cast Iron Digital Grades for Automotive Components (22-015)”</i>	
A. Fernández-Calvo, J. Garay, D. Johnson, C. Monteiro, A. González-Zabala, R. Suárez.....	197
<i>“A Novel Approach to Austenite Grain Refinement (22-065)”</i>	
R. Gundlach, J. Tartaglia.....	207
<i>“Opportunities to Fully Exploit Ductile Iron Castings in Lightweighting of Vehicles (22-085)”</i>	
J. Biel, A. Charmly, N. Arceci, G. Fedele, U. Khan, T. Leonard, B. Welker, J. Keough.....	219
<i>“Thermochemical Evaluation of Cast Iron Slags Generated from a Holding Furnace (22-046)”</i>	
C. Hartung, L. Michels, M. Liptak, R. Logan.....	225

## **ENGINEERING & SMART MANUFACTURING**

<i>“Achieving Metallurgical Bonding in Aluminum/Steel Bimetallic Castings (22-040)”</i> M. Moodispaw, B. Chen, A. Luo, Q. Wang.....	235
<i>“Manufacturing Process Selection Based on Simulation-Driven Design (22-053)”</i> M. Raval, A. Gray, J. Bangal.....	243
<i>“Reconfigurable Robotic Solution for Effective Finishing of Complex Surfaces (22-101)”</i> F. Pini, F. Leali.....	251
<i>“Utilizing Computer Simulation to Advance Employee Health and Safety (22-045)”</i> B. Bakowski.....	257

## **ENVIRONMENTAL, HEALTH & SAFETY**

<i>“Determination of Tar Products in Phenolic Urethane Resin Systems (22-013)”</i> J. Bascaran, M. Nocera.....	265
<i>“Executive Safety Responsibility (22-025)”</i> T. Schorn.....	269
<i>“Investigation of the Role of Solvents in Smoke and Tar Generation by Polyurethane Cold Box Binders (22-004)”</i> S. Hayward, S. McGovern, M. Hartman, S. Kar.....	283

## **MOLDING METHODS & MATERIALS**

<i>“Alternative Method for Evaluation Strip Time in PUNB Sand (22-071)”</i> A. Pike, J. Gammariello, M. Harris.....	295
<i>“Applications of Chromite Sizing for Casting Production (22-058)”</i> K. Kerns, R. Steele, J. Thiel, P. LaFay, V. LaFay.....	309
<i>“Automated LOI Testing (22-069)”</i> S. Ramrattan, N. Kishi.....	317
<i>“Comparing the Green Properties for Silica, Chromite, and Ceramic Sands using AFS Baseline and Non-Standard Dynamic Tests (22-012)”</i> S. Ramrattan, L. Miller, E. Carlini, P. Nakachima.....	321
<i>“The Effect of Firing Temperature and Time on Silica-Based Investment Shell Strength at Ambient and Elevated Temperatures (22-059)”</i> S. Holt, J. Qing, M. Xu.....	333
<i>“Effect of Phenolic Urethane Resin Ratios on Ambient and High-Temperature Mechanical Properties (22-105)”</i> B. Beirsner, S. Ravi, M. Alverio.....	343
<i>“Evaluating and Reducing the Impact of Hydraulic Oil Contamination on Bentonite-Based Molding Sand and Iron Casting Quality (22-052)”</i> L. Kaiser, M. Ring, L. Miller, D. Kesse, R. Kerestes, T. Arenholz, A. Jacobsen.....	351

## **STEEL**

<i>“Evaluation of Notch Toughness after Simulated Ring-Rolling of AISI 1070 Steel Wheel Castings (22-064)”</i> J. Summers, L. Bartlett, R. O’Malley, M. Buchely, R.Pilon.....	365
<i>“Effect of Ti Master Alloys in HY100 (22-096)”</i> R. Tuttle.....	381
<i>“New Process of Melting and Casting Aluminum Steels (22-006)”</i> D. Li, M. Qayyum.....	391