



CHS² 2024

**9th International Conference on
HOT SHEET METAL FORMING OF
HIGH-PERFORMANCE STEEL**

27–29 May 2024, Nashville, Tenn., USA



Organized by



In collaboration with



CHS² 2024 Program

Sunday, 26 May 2024

Time	Wine Bar
16:00–18:00	Registration
17:00–18:00	Reception

Monday, 27 May 2024

Time	Grand Ballroom	Skyline Ballroom
08:30	Opening Speech <i>Prof. Jens Hardell, Luleå University of Technology, Prof. Daniel Casellas, Eurecat/Luleå University of Technology</i>	
09:00	Roundtable Discussion	
10:15	Networking Coffee Break	
	SESSION A1: Materials & Metallurgy I	SESSION B1: Joining & Welding I
11:00	Investigation of the Thermomechanical Properties During Hot Stamping of a Complex Phase Steel Carburized at Elevated Temperatures <i>J. Henning Risse, M. Merklein, Friedrich-Alexander University Erlangen-Nuremberg</i>	Study of Laser-Welded Al-9%Si-Coated and Zinc-Coated Hot Forming Steel <i>D. Xu, B. Zhang, X. Li, Y. Zhang, S. Wang, Y. Han, J. Jiang, H. Teng, Shougang Group Co. Ltd. Research Institute of Technology</i>
11:20	Influence of Multi-Step Forming on the Hardness and Microstructure of Rapidly Austenitized 22MnB5 <i>J. Martschin, M. Wrobel, T. Meurer, A. Erman Tekkaya, TU Dortmund University</i>	Efficient Joining of Coated Tailored Blanks Through Innovative Laser Processes <i>A. Müllegger, D. Corón Moreno, TRUMPF Laser- und Systemtechnik GmbH</i>
11:40	Development of AISi Coated 2000PHS at POSCO <i>J. Oh, S. Kim, POSCO</i>	
12:00	Lunch	
	SESSION A2: Parts & Process I	SESSION B2: High-Temperature Tribology I
13:20	Machine Learning Surrogate Model for Sensitivity Analysis in Hot Stamping <i>A. Abio, F. Bonada, J. Kajberg, F. Larsson, D. Casellas, J. Pujante, O. Pujol, Eurecat</i>	Investigation of the Tribological Impact of the Tool Radius on a Strip Drawing Test Rig With Redirection <i>F. He, M. Merklein, Institute of Manufacturing Technology</i>
13:40	Comparative Numerical Analysis of Straight and Conformal Cooling Channels in Hot Stamping Tools <i>B. Caetano dos Santos Silva, L. Fernando Folle, T. Nunes Lima, M. Antonio Colosio, R. Santiago Coelho, G. Ferreira Batalha, Universidade de São Paulo</i>	High-Temperature Friction and Wear of Hot Stamping Tool Materials Produced by Laser Metal Deposition <i>G. Macêdo, L. Pelcastre, B. Prakash, J. Hardell, Luleå University of Technology</i>

14:00	Hot Stamping With Modified Process Route for the Production of Thick Sheets With Optimized Fatigue Strength Properties <i>B-A. Behrens, A. Esderts, S. Huebner, R. Masendorf, J. Wehmeyer, M. Jensen, T. Fuenfkirchler, Leibniz Universität</i>	Tribological Modeling in Hot Stamping Processes: Prediction of Tool Wear and Tool Lifetime on Industrial Scale <i>C. van der Veen, J. Hol, M. Sigvant, TriboForm Engineering</i>
14:20	Refreshment Break	
	SESSION A3: Performance I	SESSION B3: Materials & Metallurgy II
14:40	Rapid Assessment of Fatigue Resistance in Press-Hardened Specimens and Components <i>D. Casellas, S. Parareda, G. Gustafssomn, S. Golling, Eurecat</i>	Influence of Low-Temperature Tempering on Mechanical Behavior of a Press-Hardened 22MnB5 Steel Grade <i>E. Hernandez, J. Hu, Cleveland-Cliffs Inc.</i>
15:00	Studying the Rate Dependence of Essential Work of Fracture in Press Hardening Steels <i>S. Jonsson, D. Frometa, J. Kajberg, F. Larsson, L. Grifé, Luleå University of Technology</i>	Aspects of Microalloy Particle Formation During Press Hardening Steel Processing <i>H. Mohrbacher, NiobelCon BV</i>
15:20		Investigation on Higher Bendable Martensitic Microstructure for a Newly Developed Advanced 1.5 GP Hot Stamping Steel <i>B-G. Yoo, S-H. Kang, J. Kim, W. Wook, H-J. Kim, S.K. Han, C-H. Lee, T.W. Kwon, J-I. Jang, Hyundai Steel Co.</i>
15:40	Refreshment Break	
	SESSION A4: Materials & Metallurgy III	SESSION B4: Light Metals
16:00	Material Properties of a Roll Cladded Steel Composite for Press Hardening <i>M. Stennei, A. Erman Tekkaya, Institute of Forming Technology and Lightweight Components</i>	New Stamping Technology for Lightweight Materials Used for Hot Stamping of Aluminum <i>J. Aspacher, Schuler Pressen GmbH</i>
16:20	Effects on the Final Mechanical Properties by Soft Annealing 22MnB5 Steel Sheets Prior to Austenitization <i>E. Lundholm, P. Åkerström, Luleå University of Technology</i>	Hot Formability of a 7000-Series Automotive Aluminum Alloy Using Rapid Heating and Marciniak Tests <i>M. Hunt, P. Samadian, B. Yuksel, R. George, M. Worswick, C. Butcher, University of Waterloo</i>
16:40	Cost-Effective High-Performance Metal Additive Manufacturing (MAM): A Technological and a Sustainable Opportunity for Tooling of Press Hardening Process <i>I. Valls, T. Le Bourdiec, ROVALMA S.A.</i>	Microstructure Evolution, Mechanical Properties and Fracture Analysis of a High-Pressure Die Cast Secondary AlSi10MnMg(Fe) Alloy <i>B. Dalai, S. Jonsson, M. da Silva, P. Åkerström, J. Kajberg, Luleå University of Technology</i>
17:00	Study of the Combined Effects of the Hot Stamping Process Parameters on the Metallurgical Behavior and Performance of the 1.8 MPa Press Hardening Steel <i>C. Chiriac, G. Luckey, Ford Motor Co.</i>	Process Time Optimization of a Hot Stamping Line for Aluminum Automotive Components <i>U. Ibarretxe, S. Garmendia, N. Otegi, U. Argarate, A. Aranburu, A. Ormaetxea, M. Carranza, L. Galdos, Mondragon University</i>
17:40	End of Day 1	

Tuesday, 28 May 2024

Time	Grand Ballroom	Skyline Ballroom
	SESSION A5: Parts & Process II	SESSION B5: Performance II
08:40	<p>Manufacturing of Press-Hardened Tubes by a Passive Granular Media-Based Process F. Kneuper, A. Erman Tekkaya, TU Dortmund University</p>	<p>Strengthening Thin Hot-Stamped Components Through the Integration of Fiber-Reinforced Plastic Structures J. Wehmeyer, T. Fuenfkirchler, C. Gundlach, B-A. Behrens, S. Hübner, K. Dilger, S. Hartwig, Institute of Forming Technology and Machines</p>
09:00	<p>Multi-Piece Structural Assemblies for Subsequent Hot Forming M. Sullivan, H. Fuchs, B. Conrod, D. Fuss, F. Buttler, K. Werner, Multimatic</p>	<p>Experimental and Numerical Investigations on Tailored Product Properties of BIW Applications Using MBW® 1200+AS and MBW® 1900+AS Pro M. Firus, M. Winderlich, J. Bieker, T. Scharfenberg, S. Graff, M. Dinter, F. Dobrowolski, A. Güner, GEDIA Gebrüder Dingerkus GmbH</p>
09:20	<p>Optimization of the Press Process Window for Maximum Productivity and Robust Mechanical Properties in Industrial Press-Hardened Steels C. Philippot, S. Cobo, F. Germain, L. Dormegny, ArcelorMittal Global R&D</p>	<p>Numerical Assessment of the Fatigue Strength of Press-Hardened Chassis Members E. Olsson, G. Gustafsson, Luleå University of Technology</p>
09:40	<p>New Production Strategies for PHS Parts Trimming Based on Five-Axis Cutting Systems A. Muellegger, TRUMPF Laser- und Systemtechnik GmbH</p>	<p>Numerical Simulation of the Forming and Pole Impact of a B-Pillar With Local Tailored Mechanical Properties P. Åkerström, G. Bergman, J. Macchi, S. Allain, J. Teixeira, I. Benrabah, C. Philippot, M. Lopez Lage, Luleå University of Technology</p>
10:00	Refreshment Break	
	SESSION A6: Heating Technology	SESSION B6: Parts & Process III
10:40	<p>Thermal-Inline-Printing of 1,200 MPa and 1,900 MPa Press Hardening Steel Grades to Increase Local Part Ductility N. Jung, D. Buller, D. Rosenstock, J. Banik, schwartz GmbH</p>	<p>Investigation on the Effect of Forming Parameters on the Formability and Property of Hot Stamping Steel With Zn Coating W. Ma, X. Li, S. Wang, D. Xu, X. Zheng, Y. Zhang, J. Jiang, Research Institute of Technology of Shougang Group Co. Ltd.</p>
11:00	<p>Effect of Rapid Resistance Heating on Mechanical Properties and Microstructure of Ultrahigh-Strength Boron Steel Y. Liu, X. Han, X. Zhang, S. Qu, M. Lopez, Shanghai Jiao Tong University</p>	<p>Development of Technology Enabling Selective Product Realization Through Hot Stamping Heating Temperature Control J.Y. Kong, S.C. Yoon, J.M. Park, K.J. Park, C.Y. Lee, D.Y. Lee, C.W. Lee, Hyundai Steel Co.</p>
11:20	<p>Resistance Heating in XHV-Adequate Atmosphere an Energy-Efficient Heating Process for Hot Stamping B-A. Behrens, S. Hübner, L. Albracht, E. Farahmand, U. Holländer, A. Langohr, J. Wehmeyer, T. Fünfkirchler, Institute of Forming Technology and Machines</p>	<p>A Novel Aging Warm Forming Process of Al-Zn-Mg Alloy Sheet W-L. Chen, R-S. Lee, C-K. Lin, Metal Industries Research and Development Centre</p>

11:40	Properties of Al-Si Coated Material With Direct Resistance Heating in the Steel Tube Air Forming Process <i>R. Ikeda, M. Kawakami, K. Nogiwa, N. Ueno, H. Kan, H. Kumeno, Sumitomo Heavy Industries Ltd.</i>	Physics-Based Modeling of the Evolving Heat Transfer Coefficient in Hot Stamping of Al-Si Coated 22MnB5 Steel <i>A.R. Singh, A.S. Bhattacharya, C. Butcher, K. Daun, University of Waterloo</i>
12:00	Lunch	
	SESSION A7: Materials & Metallurgy IV	SESSION B7: Hydrogen Embrittlement
13:20	Coating-Free Press Hardening Steels for Tubular Applications <i>S. Tedesco, M. Shi, J. Wang, Z. Wang, Z. Chen, J. Pang, M. Struna, M. Sullivan, General Motors</i>	Review of Experimental Methods for Hydrogen Embrittlement Susceptibility Assessment of Press-Hardened Steels <i>D. Frómeta, S. Molas, A. Concustell, D. Casellas, M. Mandy, A. Aouafi, T. Sturel, A. Muhr, Eurecat, Technology Centre of Catalonia</i>
13:40	Application of Quenching and Partitioning Treatment During Press Hardening <i>F. Forouzan, E. Vuorinen, M-L. Antti, Luleå University of Technology</i>	Hydrogen Embrittlement and the Influence of the Dewpoint Regulation in a Multi-Layer Furnace on Aluminized 1,500 MPa and 2,000 MPa Press-Hardening Steels Performance <i>M. Machhammer, J. Johansson, Y. Kucukyavuz, T. Sturel, L. Dormegnny, AP&T Sweden</i>
14:00	Optimized Delayed Fracture Behavior on AISi-Coated Usibor® 2000 by an Induced Surface Softening <i>S. Cobo, J. Gao, Y. Lu, L. Dormegnny, ArcelorMittal Global R&D</i>	Process and Alloy Design of High-Strength Steel Alloyed With Vanadium for Improved Hydrogen Embrittlement Resistance <i>E. Claesson, B. Sefer, N. Fuertes, R. Schmidt, A. Middleton, Swerim AB</i>
14:20	Break	
	SESSION A8: Coatings & Surfaces I	SESSION B8: Materials & Metallurgy V
14:40	Effect of Pre-Coated Ni Layer on GI Coating After Hot Forming <i>B. Zhang, D. Xu, J. Jiang, H. Teng, Shougang Group Co. Ltd. Research Institute of Technology</i>	Microstructural Characterization and Tensile Fracture Behavior of PHS2000 in Comparison With PHS1500 <i>K. Maissara, F. Forouzan, P. Akerfeldt, P. Åkerström, E. Vuorinen, M-L. Antti, Luleå University of Technology</i>
15:00	An Approach to Avoid Shotblasting of Hot-Dip Galvanized Press-Hardened Steel Parts <i>E. Dietmar Schachinger, M. Fleischanderl, T. Steck, voestalpine Stahl GmbH</i>	Integration of Lath-Like Bainitic Microstructures Into a Martensitic Matrix to Improve Crashworthiness in Press-Hardened Steels <i>V.P. Aroca, J. Pujante, D. Frómeta, F.G. Caballero, C. Capdevila, CENIM-CSIC</i>
15:20	Predicting Al-Si Coating Evolution Using an Artificial Neural Network Model <i>S. Wu, Z. Zhou, A. Bardelcik, C. Chiriac, C. Shi, University of Guelph</i>	Characterization of AlZnSi-Coated Press Hardening Steel for Automotive Applications <i>K. Lee, H.S. Hwang, W. Jung, D. Paik, J. Oh, POSCO</i>
15:40	Refreshment Break	

	SESSION A9: Sustainability	SESSION B9: Joining & Welding II
16:00	<p>Press Hardening as a Sustainable Solution for Lightweight Chassis Construction in Heavy-Duty Vehicles From a LCA Perspective</p> <p><i>V. Vargas-Parra, J-J. Espí-Gallart, D. Casellas, G. Gustafsson, Eurecat, Centre Tecnològic de Catalunya</i></p>	<p>Application of FEA Simulation for Spot Welding Joining for Hot-Stamped Steel</p> <p><i>M. Castro, R. Silva, C. Machado, Volkswagen do Brasil</i></p>
16:20	<p>High Performance Achieved in Low-CO₂-Imprint Press-Hardened Solution XCarb® Recycled and Renewably Produced Usibor®1500 AISI</p> <p><i>S. Cobo, N. Echevarria, E. Fadel, C. Djenkal, M. Baija, L. Dormegny, ArcelorMittal Global R&D</i></p>	<p>Experimental Study on Optimal Design of High-Strength Rivet for Hot Press Forming Steel With Aluminum</p> <p><i>J. Park, W.R. Lee, D. Lee, Hyundai Steel Co.</i></p>
16:40	<p>Lightweight Solutions for CO₂ Reduction — Optimized Combination of Material, Surface and Technology</p> <p><i>G. Parma, J. von der Heydt, B. Janko, thyssenkrupp Steel Europe AG</i></p>	<p>Filler Wire Laser Welding of Al-Si Press-Hardened Steel Sheet: The Effect of Laser Beam Oscillation</p> <p><i>C-Y. Lee, S-H. Park, J-S. Kim, D-Y. Lee, Hyundai Steel Co.</i></p>
17:00	<p>Hot Forming a Green Technology? An Evaluation of Sustainability With Regard to Manufacturing and Application of Hot-Formed Components</p> <p><i>J. Banik, T. Flöth, A. Koletti, G. Parma, thyssenkrupp Steel Europe AG</i></p>	
17:20	End of Day 2	
18:30	Gala Dinner	

Wednesday, 29 May 2024

Time	Grand Ballroom	Skyline Ballroom
	SESSION A10: High-Temperature Tribology II	SESSION B10: Materials & Metallurgy VI
09:00	<p>Reducing Material Transfer in Hot Stamping of Aluminum via the Synergy Between Self-Lubricating Claddings and High-Temperature Lubricants</p> <p><i>L. Pelcastre, Luleå University of Technology</i></p>	<p>Thermal History-Dependent Phase Transformation and Kinetics in High-Strength Steel Sheets With Different Zn-Based Coatings</p> <p><i>N. Tan, X. Jin, L. Wang, P. Bao, S. Feng, J. Zhang, H. Zheng, Baoshan Iron & Steel Co. Ltd.</i></p>
09:20	<p>Tribological Characterization of Surface-Engineered Tool Steels and Lubricants for Hot Metal Gas Forming of Aluminum AA6063</p> <p><i>J. Decrozant-Triquenau, L. Pelcastre, B. Prakash, C. Courbon, J. Hardell, Luleå University of Technology</i></p>	<p>Anisotropy of Thick Sheet UHSS at Warm Forming Temperatures</p> <p><i>F. Larsson, S. Hammarberg, J. Kajberg, Luleå University of Technology</i></p>
09:40	<p>Wear Modeling in Hot Stamping — From Laboratory Testing Toward Application on Industrial Dies</p> <p><i>S. Golling, P. Ulfberg, S. Mozgovoy, G. Gustafsson, Gestamp R&D</i></p>	<p>Improved Fatigue and Fracture Resistance of 22MnB5 Steels With Added Nb and Mo</p> <p><i>D. Tolotti de Almeida, E. Juarez Mendes Taiss, S. Parareda, D. Frómeta, D. Casellas, Bruning Tecnometal</i></p>
10:00	Refreshment Break	

	SESSION A11: Coatings & Surfaces II	SESSION B11: Process Monitoring
10:40	Influence of Surface Carbon Content and PAG Size on the Bendability of Hot-Stamped Boron Steel <i>L. Levander, K. Thomason, K. Eriksson, Gestamp R&D</i>	Gas Spring 4.0 <i>I. García, G. Alonso, O. Alejos, Azolgas</i>
11:00	Application of Raman Microscopic Mapping to Understand the Growth of Intermetallic Compounds on Aluminized Steel Blanks <i>R. Smith, J. Zhang, K. Daun, J. Boettger, C. Yau, University of Waterloo</i>	Increasing Energy Efficiency in Hot Forming Processes Through Multivalent Data Use <i>S. Polster, O. Straube, S. Lösch, T. Brenne, M. Boesler, Fraunhofer Institute for Machine Tools and Forming Technology</i>
11:20	Closing Session <i>Prof. Daniel Casellas, Eurecat/Luleå University of Technology, Prof. Jens Hardell, Luleå University of Technology</i>	
12:00	End of conference	

Registration

Advance registration by 15 April 2024:
 Member US\$1,195; Non-member US\$1,345.

Registration fee after 15 April 2024: Member
 US\$1,295; Non-member US\$1,445.

Registration fee includes receptions Sunday and Tuesday, lunch Monday and Tuesday, dinner Tuesday and access to conference proceedings.

Register at [AIST.org](https://www.aist.org).

Hotel Accommodations

A block of rooms has been reserved at The Hilton Garden Inn Nashville Downtown.

Please call the hotel at +1.615.251.3013 by 3 May 2024 to secure the AIST discount rate of US\$249 per night for single/double occupancy.

Sponsorship opportunities are available.

