

Stahl Steel Application Research Reports

5th

Steels in Cars and Trucks
 June 18 – 22, 2017
 Amsterdam-Schiphol,
 The Netherlands

SCT2017
www.SCT2017.com



The **Research Association for Steel Application (FOSTA)** presents at SCT 2017 results of actual research projects and itself on some exhibition booths.

FOSTA's main characteristics and tasks

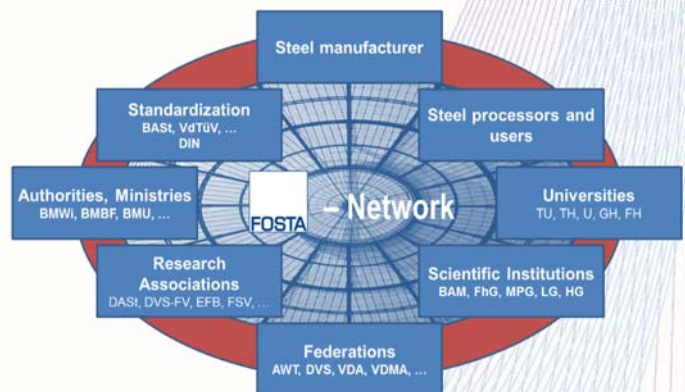
FOSTA is a Network-Partner for funding and management of collective research activities focussed on steel application. The Association is financed by the steel industry and supported by members from steel application industry and research institutes.

FOSTA's research project targets for steel are:

- Improving and saving the competitiveness
- Optimising processing technologies
- Opening/Developing new fields of application
- Substitution of competing materials
- Finding new solutions with hybrid materials

FOSTA is a non-profit association, that has been established in 1968.

Actors in FOSTA's network



FOSTA's main research topics and cross section topics

Material behavior	Manufacturing	Transport technologies	Construction sector	Environment
<ul style="list-style-type: none"> • Characterization • Data evaluation • Corrosion • Wear behavior 	<ul style="list-style-type: none"> • Deep drawing • Metal forming • Shaping • Joining • Cutting • Machining • Surface technology 	<ul style="list-style-type: none"> • Road • Rail • Water • Aerospace 	<ul style="list-style-type: none"> • Steel & Light weight steel constructions • Composite structures • Roof, Wall & Façade constructions • (Steel) Architecture • Heavy steel structures in mechanical engineering 	<ul style="list-style-type: none"> • Wind energy • Solar technology • Power generation • Water power • Bio power plants • Sheet pile walls
Simulation				
Sustainability				
Standardization				



Forschungsvereinigung
 Stahlanwendung e. V.

Research Association for
 Steel Application



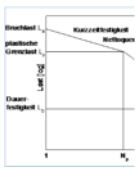
SCT2017 Monday, 19th of June 2017

Session: *Properties of hot stamping steel grades*
11:05, Room Salzburg



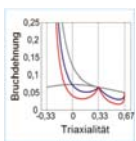
Tribological behavior of Zn coated 22MnB5 in hot stamping (P 871)
Patrik Schwingenschlögl, Jennifer Steiner, Kolja Andreas, Marion Merklein, Institute of Manufacturing Technology (LFT), University Erlangen-Nürnberg, Germany

Session: *Required Data for the design of components*
14:50, Room Amsterdam



Fatigue design and material qualification for vehicle components during early product development stages (P 1061)
Matthias Hell, Research Group of System Reliability and Machine Acoustics (SAM), TU Darmstadt, Germany, Rainer Wagener, Tobias Melz, Fraunhofer Institute for Structural Durability and System Reliability (LBF), Germany

Session: *Simulation of sheet metal forming 2*
14:50, Room Braunschweig



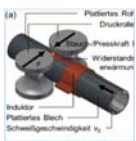
Material characterization and parameter optimization for a damage model (P 1039)
Maria Doig, inpro, Germany, A. Erman Tekkaya, Kerim Isik, Till Clausmeyer, Institute of Forming Technology and Lightweight Construction (IUL), TU Dortmund University, Germany, Helmut Richter, thyssenkrupp Steel Europe AG, Germany, Sebastian Heibel, Mercedes Benz Cars, Germany

Session: *Simulation of sheet metal forming 2*
15:15, Room Braunschweig



Material science-based simulation strategies for the adiabatic cutting process (P 1127)
Fabian Schmitz, Till Clausmeyer, A. Erman Tekkaya, Institute of Forming Technology and Lightweight Construction (IUL), TU Dortmund University, Germany, Sven Winter, Martin Wagner, Chair of Material Science (LWW), TU Chemnitz, Germany

Session: *Set the properties by heat treatment*
14:25, Room Salzburg



Flexible properties in open and closed steel profiles manufactured by roll forming with integrated induction heating (P 1183)
Martin Kroll, Andreas Kunke, Alexander Fröhlich, Jonas Kimme, Verena Kräusel, Dirk Landgrebe, Institute for Machine Tools and Production Processes (IWP), TU Chemnitz, Germany

Session: *Set the properties by heat treatment*
14:50, Room Salzburg



Investigation of geometrical discontinuities in blanks for hot sheet metal forming process under the influence of induction heating (P 1057)
André Dietrich, Holger Schülbe, Bernard Nacke, Institute for Electrotechnology (ETP), University Hannover, Germany, Florian Pfeifer, Thorsten Marten, Thomas Tröster, Automotive Lightweight Design (LiA), University Paderborn, Germany

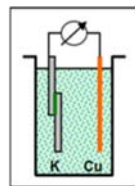
Session: *Joining technologies: Adhesive bonding*
16:10, Room Braunschweig



Manufacturing of lightweight parts in bonded blanks technique by a combined deep drawing and structural adhesive bonding process (P 944)
André Spiekermeier, Institute of Forming Technology and Machines (IFUM), University Hannover, Germany

Session: *Joining technologies: Adhesive bonding*
16:35, Room Braunschweig

Electrochemical rapid test of adhesive joints (P 1088)



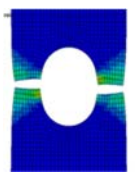
Michael Ditz, Gerson Meschut, Laboratory for Materials and Joining Technology (LWF), University of Paderborn, Germany, Gerhard Kötting, Marcel Windoffer, FH Münster, Germany, Richard Grothe, Guido Grundmeier, Technical and Macromolecular Chemistry, University of Paderborn, Germany

Session: *Joining technologies: Adhesive bonding*
17:25, Room Braunschweig



Characterisation of load-bearing capacity and failure behaviour of different mechanical joints under crash load of steel intensive structures (P 1032)
Patrick Giese, Gerson Meschut, Laboratory for Material and Joining Technology (LWF), University of Paderborn, Germany, Silke Sommer, Philip Rochel, Fraunhofer Institute for Mechanics of Materials (IWM), Germany

Session: *Testing and simulation*
16:35, Room Salzburg



Simulation of deformation and failure behavior of high strength steels for crash-loading scenarios (P 979)
Andreas Trondl, Dong-Zhi Sun, Florence Andrieux, Fraunhofer Institute for Mechanics of Materials (IWM), Germany

SCT2017 Tuesday, 20th of June 2017

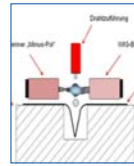
Session: Forming technologies + testing of properties
09:45, Room Salzburg



Internal flow-turning-efficient manufacture of load-adapted tubes with a constant external diameter (P 948)

Eugen Wiens, Department of Forming and Machining Technology (LUF), University of Paderborn, Germany

Session: Steel grades in multi-material-design
11:55, Room Salzburg



Development of an arc process technique for thermal similar and dissimilar joining of steel / polymer / steel composite materials (P 1073)

Khaled Alaluss, Oleg Nuss, Gunnar Bürkner, Steinbeis Innovation Center Intelligent Functional Materials, Welding and Joining Techniques, Implementation, Germany

SCT2017 Wednesday, 21st of June 2017

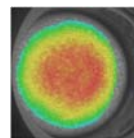
Session: Joining technologies: Laser welding
08:55, Room Braunschweig



Comparative study of hot cracking susceptibility for laser welded joints by means of a self-restraint and an externally loaded hot cracking tests (P 991)

Nasim Bakir, Andrey Gumenyuk, Michael Rethmeier, Federal Institute for Material Research and Testing (BAM), Germany

Session: Testing of materials properties 1
14:50, Room Salzburg



Survey of the ongoing developments of bulge testing at elevated temperatures (P 947)

Alexander Braun, Gerhard Hirt, Institute for Metal Forming (IBF), RWTH Aachen University, Germany, Gunnar Matthiesen, Institute for Fluid Power Drives and Controls (IFAS), RWTH Aachen University, Germany

Session New steel grades for truck applications
08:55, Room Salzburg



Fatigue life assessment of welded joints by the notch strain concept considering transient effects of the cyclic material behaviour (P 900)

Benjamin Möller, Rainer Wagener, Jörg Baumgartner, Heinz Kaufmann, Fraunhofer Institute for Structural Durability and System Reliability (LBF), Germany, Tobias Melz, TU Darmstadt / Fraunhofer LBF, Germany

Session: Testing of materials properties 2
14:50, Room Salzburg



A new testing procedure for the toughness characterisation of sheet materials under dynamic loading conditions (P 1158)

Markus Könemann, Sebastian Münstermann, Steel Institute (IEHK), RWTH Aachen University, Germany

Session Joining technologies: Spot welding 1
14:50, Room Braunschweig



Overview and new developments in research on resistance spot welding of advanced high strength steels (P 921)

Julian Frei, Michael Rethmeier, Fraunhofer Institute for Production Systems and Design Technology (IPK), Federal Institute for Materials Research and Testing (BAM), Germany

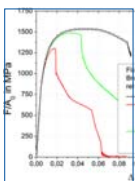
Session: Testing of materials properties 2
17:00, Room Salzburg



Strain rate-dependent characterization of advanced high strength steels under various multiaxial stress states for the determination of forming and failure limits (P 1141)

Silke Klitschke, Frank Huberth, Fraunhofer Institute for Mechanics of Materials (IWM), Germany

Session Joining technologies: Spot welding 1
14:00, Room Braunschweig

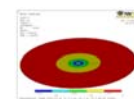


Characterization and modelling of soft zones around spot welds in high strength steels (P 1018)

Silke Sommer, Lilia Schuster, Fraunhofer Institute for Mechanics of Materials (IWM), Germany, Sebastian Burget, Dr. Ing. h.c. F. Porsche AG, Germany

Session: Joining technologies: Welding and testing of welded joints

11:55, Room Braunschweig



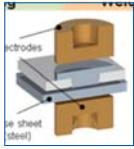
Procedure for developing a constitution diagram for dissimilar metal welds of high manganese steels (P 1108)

Benjamin Wittig, Manuela Zinke, Sven Jüttner, Otto von Guericke University Magdeburg, Germany, Daniel Keil, Volkswagen AG, Germany

Session: *Joining technologies: Welding and testing of welded joints*

10:40, Room Braunschweig

Joining process optimization of the resistance element welding for continually changing steel material properties (P 1010)



Vitalij Janzen, Gerson Meschut, Laboratory for material and joining technology (LWF), University of Paderborn, Germany



Special reports to “Research Network massive lightweight forging”

11:05, Room Wiesbaden

Development of new steels for lightweight construction (P 1055)

Clemens Neipp, Wolfgang Bleck, Steel Institute (IEHK), RWTH Aachen University, Germany, Holger Surm, Hans-Werner Zoch, Foundation Institute of Materials Science (IWT), Bremen, Germany, Christian Weber, Karsten Stahl, Gear Research Centre (FZG), TU Munich, Germany

11:30, Room Wiesbaden

Lightweight gear wheel design using separate gear rim and wheel body – 1 (P 1056)

Christoph Leonhardt, Michael Otto, Karsten Stahl, Gear Research Centre (FZG), TU Munich, Dawid Nadolski, Holger Surm, Matthias Steinbacher, Hans-Werner Zoch, Foundation Institute of Materials Science (IWT) Bremen, Germany

11:55, Room Wiesbaden

Lightweight gear wheel design using separate gear rim and wheel body – 2 (P 1056)

Robert Meissner, M. Liewald, Institute for Metal Forming Technology (IFU), University of Stuttgart, Germany, Michael Otto, Tim Benkert, W. Volk, Gear Research Centre (FZG), TU Munich, Germany

14:00, Room Wiesbaden

Improved property prediction of cold forged components by means of enhanced material models (P 1057)

Felix Kolpak, Martin Schwane, Christoph Dahnke, A. Erman Tekkaya, Institute of Forming Technology and Lightweight Construction (IUL), TU Dortmund University, Germany

14:25, Room Wiesbaden

Numerical Analysis of Manufacturing Load-Tailored Components by Cold Forging A Subproject of Research Network massiverLeichtbau (P 1058)

Oliver Napierala, Nooman Ben Khalifa, A. Erman Tekkaya, Institute of Forming Technology and Lightweight Construction (IUL) – TU Dortmund University, Germany, Nadja Missal, Alexander Felde, Mathias Liewald, Institut for Metal Forming Technology (IFU), University of Stuttgart, Germany

14:50, Room Wiesbaden

Innovation transfer of lightweight forging solutions in the automobile value added chain (P 1059)

Michael Rothgang, Jochen Dehio, Wolfgang Dürig, Rheinisch-Westfälisches Institut für Wirtschaftsforschung, Germany

15:15, Room Wiesbaden

Holistic evaluation of lightweight design in drivetrain and chassis (P 1059)

Alexander Busse, Bruno Gnörich, Julia Braeutigam, Leif Hagebecker, Institute for Automotive Engineering (ika), RWTH Aachen University, Germany
(Lightweight forging)



Visit FOSTA’s presentations on two special booths in the exhibition hall:

- ⇒ **Research Network massive lightweight forging**
- ⇒ **Collaborative Research in Adhesive Bonding Technologies**

FOSTA's management tasks in the research projects

Support of idea initiatives

- ⇒ Active idea finding with different sources:
 - technical, politically, socially driven topics
 - branche & technology driven topics
- ⇒ Contact point for collective research ideas from science and industry



Support in proposal development

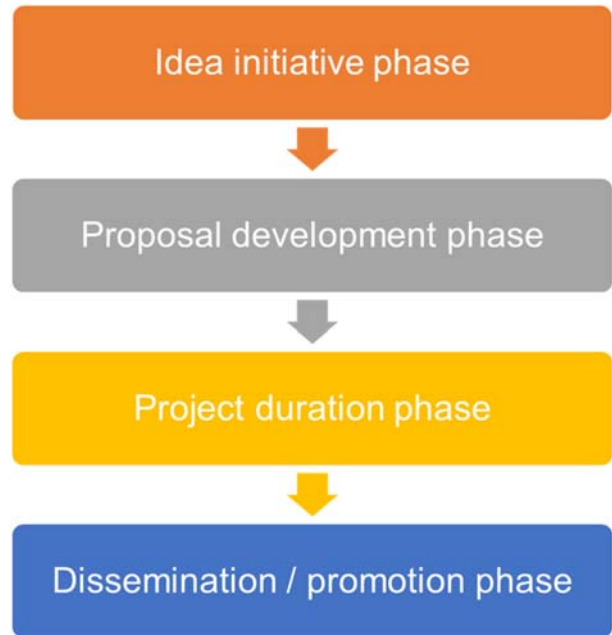
- ⇒ support in selecting suitable industry partners for the project
- ⇒ realization of a partner mix with large companies and SMEs from the supply chain
- ⇒ industry driven adjustment of project targets (economic & technical aspects)
- ⇒ topic related funding possibilities from industry, national & EU organizations

Support in the project phase

- ⇒ contract management (structure, formal matters, controlling)
- ⇒ establish project related working groups with active members from industry & science
- ⇒ implement and support creation and exchange of knowledge in the groups
- ⇒ support active networking and trust-building between the members
- ⇒ interlinking of different projects with complementary topics

Dissemination / promotion phase

- ⇒ promotion of joint journal publications from the project
- ⇒ publication and distribution of the final research report
- ⇒ management of events, press releases & Internet reports about the projects

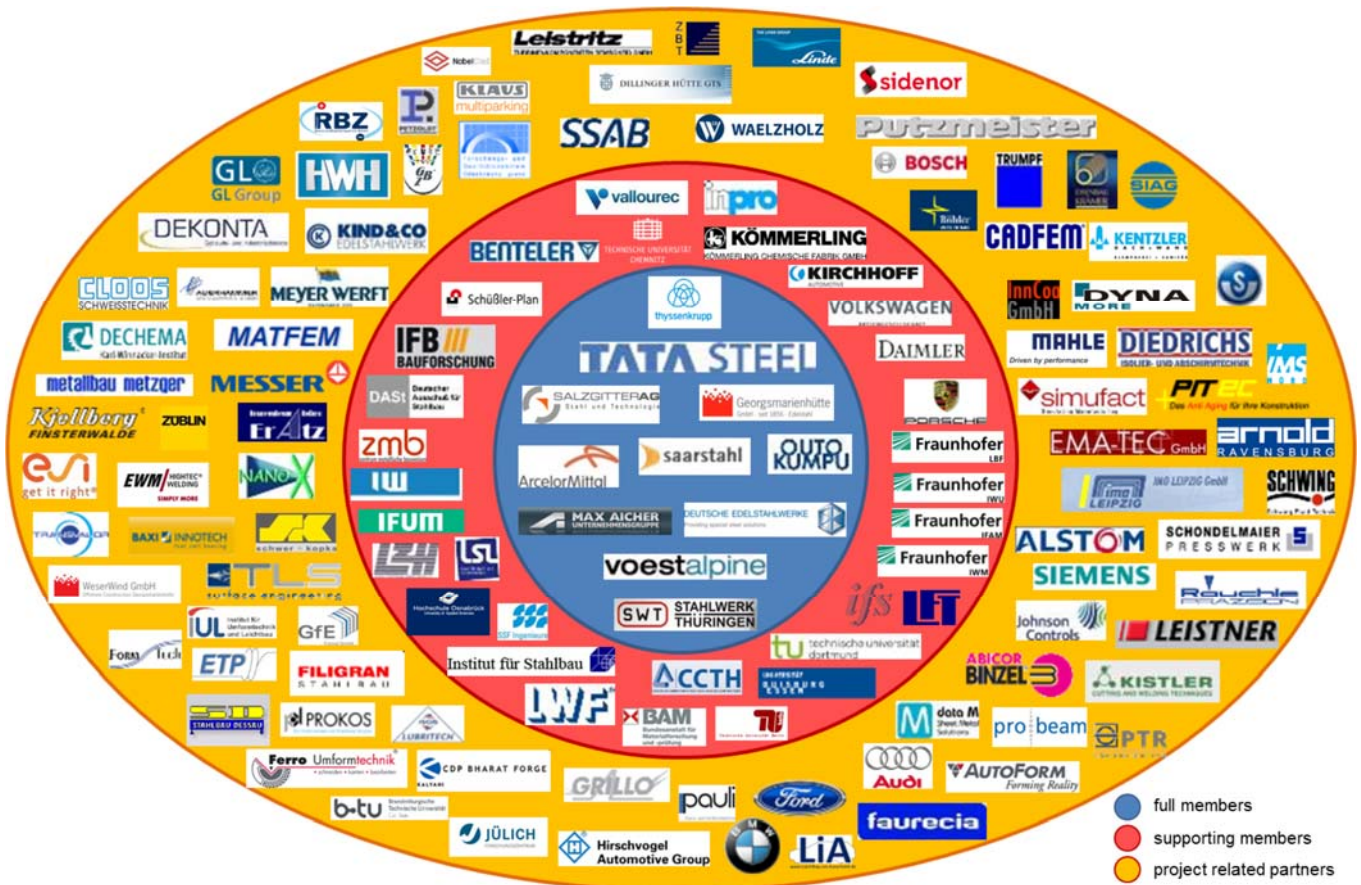


The final research reports could be ordered for a nominal charge at: Verlag und Vertriebsgesellschaft mbH, Postfach 10 51 27, D-40042 Düsseldorf, Germany;
 Fax +49 211 6707-129,
 E-Mail: verlagvertrieb@stahl-zentrum.de
 and as PDF-version via www.stahldaten.de/de/shop



A selection of FOSTA's project actors

2,000 project participants in total



**Today's actual research
pre-competitive — targeted — innovative**

Upcoming events with the participation of FOSTA; Dates

2017

- September 27 to 29 Werkstoffwoche 2017, Dresden www.werkstoffwoche2017.de
- November 09 Internationale Jahrestagung Stahl 2017, Düsseldorf www.stahl-online.de
- December 12 and 13. 7. Kolloquium: Gemeinsame Forschung in der mechanischen Füge­technik, Dresden

2018

- February 27 and 28 18. Kolloquium: Gemeinsame Forschung in der Kleb­technik, Köln
- December 05 and 06 8. Kolloquium: Gemeinsame Forschung in der mechanischen Füge­technik, Paderborn

Impressum:

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