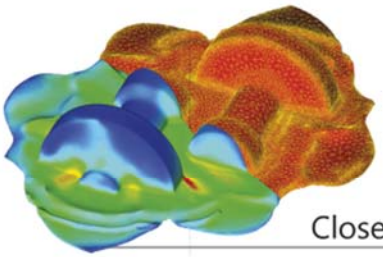
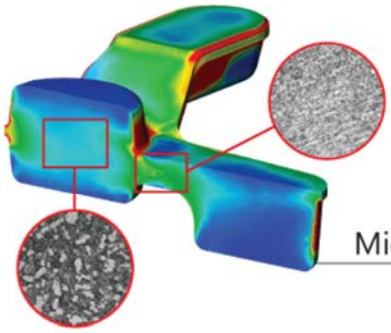
QForm Forum. Berlin

27-29 May 2019

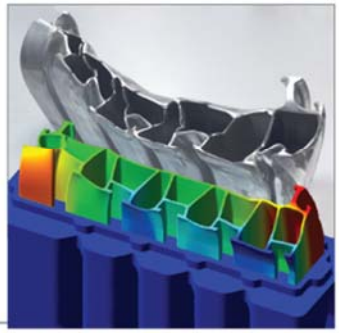
Latest developments in numerical simulation of metal forming and heat treatment processes



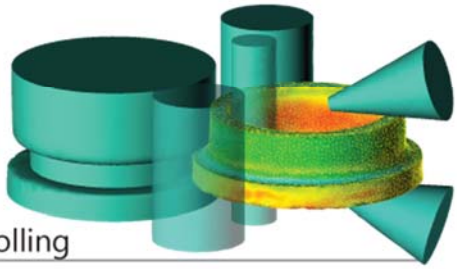
Closed die forging



Microstructure



Profile extrusion



Ring rolling

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The development team for QForm simulation software would like to invite you to attend our QForm Forum to allow us to introduce a new version of QForm and to learn about the latest interesting and important developments that have been implemented. We pay special attention to effective technical support and advanced training of users and we expect this QForm-Forum to be an opportunity for productive and friendly communication between developers and users of the program for a mutual exchange of information and ideas that will result in intensive development of our simulation software to further improve its benefit and practical implementation in industry.

First of all, we would like to introduce a new variant of our client-server architecture that has been developed and implemented following the contemporary trend of cloud computational services. It allows the use of powerful multi-processor computational resources available through the Internet. Next, we can show you how our already strong applications for the modelling of ring rolling and extrusion of aluminium profiles have been improved and extended even further. Specifically, a new type of equipment with electromechanic drive was introduced for ring rolling simulation that allows automatic adjustment of specified parameters of the ring size growth rate depending on its diameter. The extrusion module now has the option to utilize symmetry planes that significantly speeds up simulation for symmetric profiles. New special output fields have also been introduced for more comprehensive analysis of profile extrusion technology. The simulation of sequential extrusion of several billets has been implemented as well.

Our system of automated extrusion die design QExDD has been significantly enhanced. This system speeds up the development of new dies and provides design and simulation integration for fast and accurate feedback required in die making. The success of our extrusion die design automation has initiated similar development for automated die design for closed die forging. Now this work is going very intensively.

The application of QForm for sheet metal forming has initiated the implementation of a new type of brick-type finite elements that significantly speed up the simulation of this kind of task. New specific friction laws have been also been implemented to simulate sheet metal stamping more effectively.

The new version of QForm has an option for multivariate simulation in which a batch of cases can be run as a numerical experiment following a plan based on design of experiment (DOE). This will allow the program to automatically find the optimal parameters for a specific forming technology.

The option has been added for ductile fracture predicting. It includes several models based on different damage criteria that are applicable to cold and hot forming operations.

Heat treatment and microstructure simulation modules have been enhanced and extended to a variety of metals and alloys.

A new improved method has been developed for more accurate simulation of coupled thermo-mechanical tasks that is important for cases of hot deformation when very high temperature gradients may occur.

The interface of the program has been enhanced to make setting up a simulation task and analysis of results even easier and more informative. Specifically, the program now has multi-window graphic output of the results that is very convenient for comparison of results of the simulation of different cases and projects. The program has become even more user-friendly and more effective for solving various industrial and scientific problems.

The program QForm has originated from our first code FORM2D that was issued in 1991 for the DOS operating system run on PCs with only 640 kB of RAM! QForm has been implemented as a Windows application since 1998 and the program has been expanded every year since then. Starting as a tool for just closed die forging tasks, QForm is now able to effectively simulate shape and ring rolling, piercing, cogging, rotary forming, profile extrusion, microstructure evolution, heat treatment simulation and other related technologies. Our team of developers has grown significantly today it includes many talented scientists and programmers who look forward to meeting you in Berlin.

Dr. Sergey Stebunov, CEO
QuantorForm Ltd.

27 May

18:00	Check-in at Pentahotel Berlin-Köpenick
19:00	Joint dinner at the hotel

28 May

GENERAL SESSION (language – **English**). Big conference room.

8:30	**Complimentary speech** *Dr. Sergey Stebunov, CEO, QuantorForm Ltd., QForm Group, Russia* *Dr. Alexander Borowikow, GMT Berlin, Germany*
8:35	**New possibilities of QForm** *Dr. Nick Biba, Managing Director, Micas Simulations Ltd., QForm Group, UK*
9:00	**Failure prediction models in QForm** *Dr. Sergey Stebunov, CEO, QuantorForm Ltd., QForm Group, Russia*
9:25	**Microstructure simulation cases for steels, titanium and nickel-based alloys** *Dr. Artem Alimov, Head of laboratory of metal forming technologies, Bauman Moscow State Technical University*
9:50	**Coffee break**
10:20	**Cloud computing for simulation of metal forming processes** *Arthur Gartvig, Head of Technical Support Department, QForm Group*
10:45	**Optimization of hot forging technology, variance analysis** *Dmitry Gerasimov, Product Manager D/A/CH, QForm Group*
11:10	**Heat treatment simulation cases for steels, aluminium and titanium alloys** *Dr. Artem Alimov, Head of laboratory of metal forming technologies, Bauman Moscow State Technical University*
11:35	**Forging technology design based on simulation** *Stanislav Kanevskiy, Business Development Manager, QForm Group*
12:00	**Lunch**
13:00	**Sessions 1, 2, 3**
15:05	**Coffee break**
15:25	**Sessions 1, 2, 3**
17:30	**Sessions end**
18:00	**Boat trip on the river Spree**
20:00	**Dinner**

SESSION 1. Bulk forming processes (language – **English**). Big conference room.

13:00	**Incremental Bulk Metal Forming processes: Flow Forming, Rotary Forming, Rotary forging** *Dr. Olga Bylya, Research Fellow, Advanced Forming Research Centre, University of Strathclyde, UK*
13:25	**Improving the plasticity of materials in dieless drawing processes using FEM simulation and optimization** *Prof. Andrij Milenin, Department of Applied Computer Science and Modelling, AGH University of Science and technology, Poland*
13:50	**Design of thermomechanical processing of die-forgings with aid of QForm** *Dr. Piotr Skubisz, Assistant Professor, AGH University of Science and Technology, Poland*
14:15	**Optimized yield ratio and reduction of involving impurities in clad wire production by Conclad extrusion with twin wheels** *Prof. Michihiko Hoshino, Nihon University, College of Science and Technology, Department of Mechanical Engineering, Japan*
14:40	**Modelling of severe plastic deformation processes** *Dr. Roman Kulagin, Researcher, Karlsruhe Institute of Technology, Germany*
15:05	**Coffee break**
15:25	**New material property classes by integrating intensive forming into the thermomechanical treatment** *Dr. Kristin Helas, GMT mbH, Germany*
15:50	**Simulation of the production of layered metallic composite based on aluminum using the angular extrusion process** *Cand. of Tech. Sc. Andrii Samsonenko, Associate Professor, National Metallurgical Academy of Ukraine, Ukraine*
16:15	**How QForm helps to save money and time** *Hakan Aydin, Team Leader, R&D, Birinci Otomotiv, Turkey*
16:40	**Simulation of roll-bonding of aluminum/aluminum and aluminum/austenitic steel mesh /aluminum flat composites using QForm software** *Yurii Haranich, Aspirant, National Metallurgical Academy of Ukraine, Ukraine*
17:05	*report is being prepared*
17:30	**Session end**

SESSION 2. Bulk forming processes (language – **German**). Conference room 2.

13:00	**New possibilities of QForm. Overview with examples** *Dmitry Gerasimov, Product Manager D/A/CH, QForm Group*
14:00	**Failure prediction models in QForm. Overview with examples** *Dmitry Gerasimov, Product Manager D/A/CH, QForm Group*
14:30	**Simulation of profiled ring production** *Dr. Alexander Kovalev, Schmiedewerke Gröditz GmbH, Germany*
15:05	**Coffee break**
15:25	**How to control FE Mesh parameters. What is it: adaptation and element size?** *Dmitry Gerasimov, Product Manager D/A/CH, QForm Group*
16:20	**Interpretation of simulation results using standard subroutines** *Dmitry Gerasimov, Product Manager D/A/CH, QForm Group*
17:30	**Session end**

SESSION 3. Aluminium profile extrusion (language – **English**). Conference room 3.

13:00	**QForm Extrusion. New features and developments** *Ivan Kniazkin, Leading Engineer, QForm Group*
13:25	**Detection of profile defects at die design stage by mean of simulation** *PietroAlfredo Bevilacqua Fazzini, Research & Development Department, CO.M.P.ES. Spa., Italy*
13:50	**Some experimental results about common defects affecting productivity in extrusion process: Seam welds, Charge evolution, Billet skin** *Prof. Luca Tomesani, University of Bologna, Department of Industrial Engineering, Italy*
14:15	**QForm Extrusion Die Designer (QExDD)** *Ivan Kniazkin, Leading Engineer, QForm Group*
14:40	**Prediction of structural defects in profile extrusion by means of simulation** *Kadir Haşim Derman, ASAS, Turkey*
15:05	**Coffee break**
15:25	**Direct extrusion of aluminum profiles** *Dr.-Ing. Maik Negendank, Technical University of Berlin, Extrusion Research and Development Center, Germany*
15:50	**Examples of effective use of QForm Extrusion. Comparison of simulation and experiment** *Ivan Kniazkin, Leading Engineer, QForm Group*
16:15	**Material characterization techniques for extrusion: how to deal with high strains and strain rates** *Prof. Luca Tomesani, University of Bologna, Department of Industrial Engineering, Italy*
16:40	**Industrial case study of die design optimization using innovative cartridge type solid die** *K.D.H.D Praveen Chathuranga, Alumexgroup, Sri Lanka*
17:05	**Economic aspects of simulation software implementation** *Stanislav Kanevskiy, Business Development Manager, QForm Group*
17:30	**Session end**

29 May, Master classes

SESSION 1. Bulk forming processes (language – **English**). Big conference room.
Master classes. *Lecturer: Arthur Gartvig, Head of Technical Support Department, QForm Group*

8:30	Variance analysis of hot forging process
9:15	Failure prediction models in QForm
10:00	Coffee break
10:30	Simulation of recrystallization in hot forging process
11:15	Hexahedral FE-Mesh and anisotropy of material properties
12:00	Session end

SESSION 2. Bulk forming processes (language – **German**). Conference room 2.
Master classes. *Lecturer: Dmitry Gerasimov, Product Manager D/A/CH, QForm Group*

8:30	Variance analysis of hot forging process
9:15	Failure prediction models in QForm
10:00	Coffee break
10:30	Simulation of recrystallization in hot forging process
11:15	Hexahedral FE-Mesh and anisotropy of material properties
12:00	Session end

SESSION 3. Aluminium profile extrusion (language – **English**). Conference room 3.
Master classes. *Lecturer: Ivan Kniazkin, Leading Engineer, QForm Group*

8:30	Advanced analysis of defects in aluminium profile extrusion
9:15	Extrusion variants. Optimization of technological parameters by means of simulation
10:00	Coffee break
10:30	Implementation of steady-state criterion for profile extrusion simulation
11:15	QForm for extrusion study
12:00	Session end

12:30	Lunch at hotel restaurant
14:00 – 15:30	Excursion to Gesellschaft zur Förderung angewandter Informatik e. V. *www.gfai.de* Topic: «Use of modern information technologies in the steel producing and the steel processing industry»

http://www.qform3d.com/forum/berlin

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