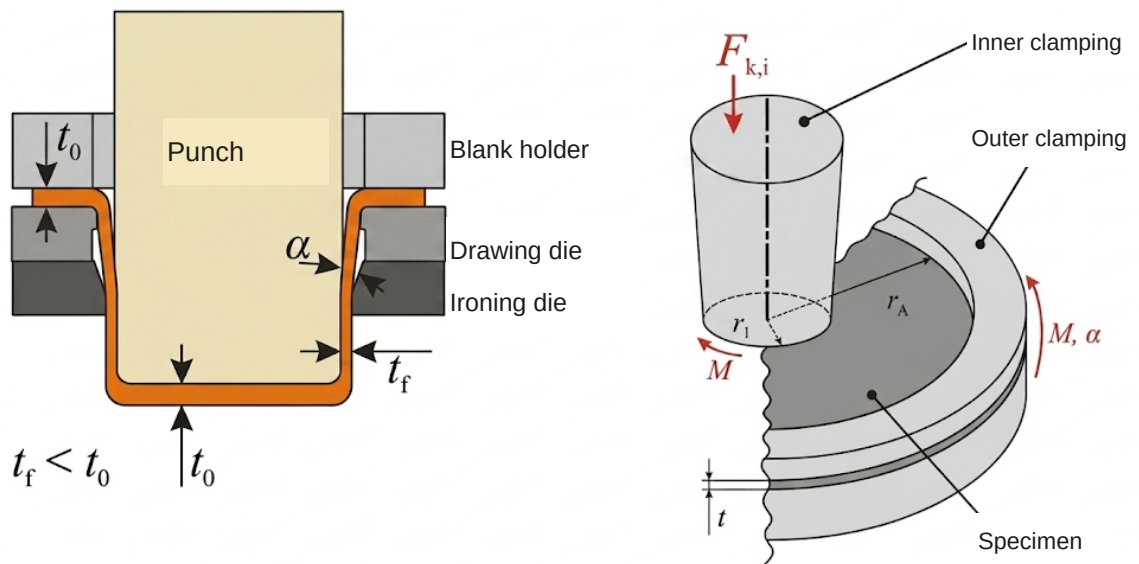


Numerical Modelling of Ironing in One Stroke of Ultra-Thin Sheets Using In-Plane Torsion Tests

The numerical simulation of Ironing in One Stroke for ultra-thin sheets requires precise material data at large strains because of the high levels of deformation involved. Data from conventional tensile tests must therefore be extended using mathematical extrapolation approaches based on assumptions. In contrast, the in-plane torsion test enables the actual flow curve to be determined experimentally up to very high strains.

The objective of this thesis is to characterize the material experimentally using tensile and in-plane torsion tests, followed by numerical modelling of the Ironing in One Stroke process in LS-DYNA. The data obtained will be used to analyse how precise flow curves affect the prediction of process forces. The thesis will largely be conducted on site at the project partner Novelis in Göttingen and will be remunerated.



What will you do?

- Determine material properties
- Create material cards
- Set up the simulation model
- Analyse influencing parameters

What should you bring?

- Ideally, experience with FE simulation (LS-DYNA) and Python
- Basic knowledge of forming technology
- Ability to work independently

Master's thesis
Starting:
January 2027

TU Dortmund University
Faculty of Mechanical Engineering
Institute of Forming Technology
and Lightweight Components
Prof. Dr. Yannis P. Korkolis

D-44227 Dortmund
Baroper Strasse 303
South Campus / Entrance 42

www.iul.eu

Contact:

Christopher Horstmann, M.Sc.
MB 3, Room 4.026
christopher.horstmann@iul.tu-dortmund.de
Tel.: +49 231 755-6917

Position Overview:

About Novelis

Novelis' purpose is to shape a sustainable world together.

As a global leader in innovative products and services and the world's largest recycler of aluminum, we work with customers in the automotive, beverage can, aerospace, and specialties industries to deliver solutions that maximize the benefits of sustainable lightweight aluminum.

We have an integrated network of technically advanced rolling and recycling operations as well as foundries, with 31 plants in 9 countries across North America, South America, Europe, and Asia, and 13,250 employees worldwide. The company is headquartered in Atlanta, USA.

Our customers include some of the world's largest and most recognized brands, including Coca-Cola, Ford, BMW, Jaguar Land Rover, Airbus, Boeing, Nespresso, and Samsung. In addition, Novelis is a pioneer in sustainability and recycling within its industry.

Become part of our mission to shape a sustainable world and join us from January 2027 at our site in Göttingen as:

Master Thesis (m/f/d) in the field of Simulation & Material Characterization as a part of the DFG Transfer Project "Characterization of Thin Sheets Using the In-Plane Torsion Test"

Responsibilities & Qualifications

What you can expect:

- Support mechanical testing and material characterization.
- Analyze experimental data and prepare simulation input.
- Set up and evaluate finite element simulations.
- Compare simulation results with experimental observations.
- Document and present your findings.

How you convince us:

- Master's student in Mechanical, Materials, Computational Engineering, or a related field.
- Previous experience in numerical simulation (LS-Dyna preferred) and material modeling.
- Programming or data analysis skills are an advantage.
- Independent, curious, and structured working style.

What Novelis offers you:

#innovation: An internship with the global pioneer in technology and sustainability in the future market of aluminum processing and recycling, with the opportunity to actively contribute to innovative projects and help shape the future

#variety: Look forward to diverse tasks in an internationally operating company. With us, you can gain insights into different areas and develop your talents in a dynamic environment

#compensation: You will receive a fixed internship compensation for your commitment — valuable recognition of your work

#leisure: Your work-life balance is important to us. With a 35-hour work week, flexible working hours, and flextime, you have enough room for personal activities and relaxation

#goodies: Novelis is a member of Corporate Benefits and benefits-me. Benefit from attractive shopping advantages from well-known providers in various areas

Have we sparked your interest?

Please send a brief application or any questions regarding the position to:

Christopher Horstmann, M.Sc.

TU Dortmund University

Institute of Forming Technology and Lightweight Components (IUL)

MB 3, Room 4.026

christopher.horstmann@iul.tu-dortmund.de

Tel.: +49 231 755-6917

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