Seminar with TEAMS meeting

Long Product Quality Optimisation through Enhancement and Utilisation of Residual Stress minimising Process Strategies

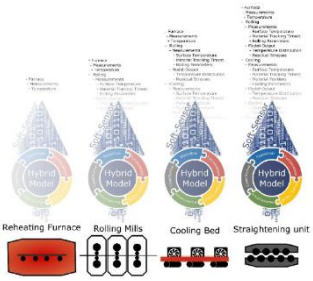

Foto: Digital twin technology with hybrid process model and soft sensor along long product production chain

30 October 2024
8.45 a.m. to 3.30 p.m. CET

Aim

During rolling, straightening and thermal processing of long products internal stresses arise impairing the products material properties and causing material distortion due to stress relief mechanisms. The characteristics of those effects are still associated with a high degree of uncertainty. The seminar gives an overview of the research work done and the resultant proposed solutions that can be implemented with limited efforts in terms of residual stress minimising process strategies to increase the economic efficiency and the future perspective to achieve better product quality in hot rolling of long products.

The PROTEUS-RS project

The seminar is organised as a workshop activity within the project "PROTEUS-RS" (Long Product Quality Optimisation through Enhancement and Utilisation of Residual Stress minimising Process Strategies). The project is sponsored by the Research Fund for Coal and Steel (RFCS; Project No. 899455). The aim of this project is to overcome the uncertainties in dealing with the effects of relief mechanisms through improved process engineering. Hybrid process models (physical and statistical) are linked to a virtual plant model (digital twin) so that the online simulation of material states and properties, e.g. residual stresses responsible for deformations, is possible through the use of soft sensors. The project was started the 1st of July 2020 and ends in October 2024. By this seminar the European steel plants will be informed about the activities and selected practical results in the PROTEUS-RS project.

Who should participate

- European steel industry
- Supplying industry for cooling bed and straightener
- Supplying industry for straightness measurement
- Supplying industry for residual stress measurement
- Operating staff / engineers from hot rolling mills
- Staff from innovation departments or production optimization
- Plant manufacturers for the steel and related industry

Registration

Please send your registration to:

seminare@vdeh.de

The TEAMS meeting is free of charge.

Organisation

VDEh-Betriebsforschungsinstitut GmbH
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Our partner in Organization

Steel Institute VDEh | Steel Academy
40237 Düsseldorf, Germany

The Project Group

The seminar is organised as an activity within the project "PROTEUS-RS" (Long Product Quality Optimisation through Enhancement and Utilisation of Residual Stress minimising Process Strategies). The project is sponsored by the Research Fund for Coal and Steel (RFCS). The project group consists of:

- VDEh-Betriebsforschungsinstitut GmbH, Germany
- Mannstaedt GMH Gruppe, Germany
- Siec Badawcza Lukasiewicz - Gornoslaski Instytut Technologiczny Łukasiewicz, Poland
- Sidenor Investigacion y Desarrollosa, Spain
- Akademia Gorniczo-Hutnicza im. Stanislawa Staszica w Krakowie - AGH University of Krakow, Poland

Seminar with TEAMS-Meeting

Two days before the Seminar is starting you receive an e-mail with an invitation and a link. The link leads you to Microsoft Teams where you can participate.

PROGRAMME 30 OCTOBER 2024

08:45 **Welcome and introduction to the seminar**

Residual stresses in the environment of industrial processes

09:00 **Introducing Presentation on the project's motivation**
Christian Trappmann, MWT

09:20 questions and answers

09:30 **Billets, Bars and Special Profiles – Specifics in symmetric and asymmetric long product production**
Nora Egido Perez, Sidenor,
Volker Diegelmann, BFI

09:50 questions and answers

10:00 **Determination of Residual Stresses and Usability of Data**
Boleslaw Augustyniak, NNT

10:20 questions and answers

Sources of residual stresses and their impact on long product properties

10:30 **Effect of the austenite microstructure, phase transformations and cooling conditions on the residual stress development during long products hot rolling process**
Roman Kuziak, GIT

10:50 questions and answers

11:00 **Investigation of the evolution of the residual stress during the subsequent stages of long product manufacturing**
Roman Kuziak, GIT

11:20 questions and answers

11:30 **Residual stresses visible effects and their measurement by use of optical, camera-based systems**
Hagen Krambeer, BFI

11:50 questions and answers

12:00 Lunch Break

Scientific approach to controlling the effects of existing residual stresses

13:00 **Numerical Model and Computer Code for Online Prediction of Residual Stresses in Hot Rolled Profiles considering Phase Transformations in Steel**
Andrij Milenin, AGH

13:20 questions and answers

13:30 **Finite-Element Models for simulating the cooling and straightening process of special profiles with special respect on straightness and residual stresses development**
Volker Diegelmann, BFI
Hagen Krambeer, BFI

13:50 questions and answers

14:00 **Finite-Element Models for simulating the manufacturing process of billets and bars with special respect on residual stresses development**
Nora Egido Perez, Sidenor

14:20 questions and answers

Industrial use of elaborated approaches

14:30 **Soft-Sensor for Distortion Risk Assessment**
Andreas Wolff, BFI

14:50 questions and answers

15:00 **Guidelines for improved long product production**
Nora Egido Perez, Sidenor,
Volker Diegelmann, BFI

15:20 questions and answers

=> afterwards: end of seminar

SPEAKERS

Christian Trappmann, Mannstaedt GMH Gruppe, Germany • Prof. Roman Kuziak, Siec Badawcza Lukasiewicz - Gornoslaski Instytut Technologiczny Łukasiewicz, Poland • Prof. Boleslaw Augustyniak, Novel Nondestructive Testing Sp. z o.o., Poland • Prof. Andrij Milenin, Akademia Gorniczo-Hutnicza im. Stanislawa Staszica w Krakowie - AGH University of Krakow, Poland • Nora Egido Perez, Sidenor Investigacion y Desarrollosa, Spain • Dr. Andreas Wolff, VDEh-Betriebsforschungsinstitut GmbH, Germany • Hagen Krambeer, VDEh-Betriebsforschungsinstitut GmbH, Germany • Volker Diegelmann, VDEh-Betriebsforschungsinstitut GmbH, Germany