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Press release

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# Steel specialist Dillinger is funding material research projects at Saarland University

**Nearly EUR 1 million in continued funding for another three years: The Saarland-based steel company Dillinger is continuing its strategic partnership with the Materials Science and Engineering department at Saarland University and the Steinbeis Material Engineering Center Saarland (MECS). Since 2014 the steel specialist has supported steel-related joint research projects with almost EUR 1 million. This has enabled three of the university's professors and their teams to focus efforts on the versatile material. The result: three nearly completed doctoral dissertations, 25 bachelor's and master's theses, ten international publications, and 20 lectures at scientific conferences.**

The Saarland-based steel company AG der Dillinger Hüttenwerke (Dillinger) is continuing its strategic partnership with the Materials Science and Engineering department at Saarland University and the Steinbeis Research Center called Material Engineering Center Saarland (MECS). Since 2014 the steel specialist has supported steel-related joint research projects with almost EUR 1 million. This has enabled three of the university's professors and their teams to focus efforts on the versatile material. The result: three nearly completed doctoral dissertations, 25 bachelor's and master's theses, ten international publications, and 20 lectures at scientific conferences.

Offshore wind power plants and pipelines constructed on the ocean floor are subjected to high stresses and loads. Heavy plate steel from Dillinger in Saarland is used for these projects all over the world. "These structures must withstand hurricane-force squalls and enormous ocean currents as well as ensure safe operation under these extreme conditions for decades," explained Bernd Münnich, who earned his doctorate in materials engineering at Saarland University and today is Chief Technical Officer of Dillinger. The manufacture of special steels is therefore extremely exacting and dependent on many factors, from the chemical composition and rolling method used to the various heat treatments. "In the joint research projects with materials scientists at Saarland University, we want to use 3D analysis techniques to more precisely understand the inner structures of the steel. With the help of new simulation methods, we are working to be better able to predict the properties of the steel so that we can avoid lengthy and expensive trial runs," Münnich explained at today's extension of the partnership agreement. The agreement covers another three years and will provide nearly EUR 1 million euros in funding for research projects.

Three years ago, Frank Mücklich, professor of functional materials at Saarland University, brought two colleagues on board for the research: Stefan Diebels specializes in engineering mechanics and Christian Motz is responsible for experimental methods in materials science. All three professors have focused parts of their working groups on steel-related efforts and have obtained yet more research funding to initiate other projects in addition to the doctoral dissertations financed by Dillinger. "With this approach we have now formed the basis for a long-term strategic partnership with the steel company in Saarland," said Mücklich, who also heads the on-campus Steinbeis Research Center called Material Engineering Center Saarland (MECS) as well as coordinating the partnership.

The three dissertations funded by Dillinger indicate the ultimate objective: "The product properties of the steel are determined by its internal structure – the microstructure. Since this structure is highly complex and even the smallest

changes can lead to enormous differences in the properties, it is important to characterize and describe this microstructure as completely as possible – including in 3D. For this reason, Jessica Gola developed a computer-supported process for her dissertation that allows the internal structure of steel to be described objectively and reproducibly," Frank Mücklich explained.

The second doctoral candidate, Lena Eisenhut, is seeking to determine through simulations how the internal structures of heavy plate steel change during the individual production steps. For this she is analyzing which details of the microstructures are influenced by the chemical composition, by the rolling method or by the heat-treatment process.

In the third dissertation financed by Dillinger, Frederik Scherff is developing mathematical models to allow patterns of behavior to be read from 3D analysis data. This will make it easier to predict how a special steel needs to be designed so that it can be used in arctic conditions, for example. With these basic research projects, the Saarbrücken-based scientists are supporting the Dillinger steel company with solutions that have practical applications. The projects were developed at the Steinbeis Research Center under the guidance of Prof. Mücklich. "We want, for example, to help further improve quality control in steel production," the material researcher said.

Fred Metzken, Spokesman of the Board of Management of Dillinger, expressed enthusiasm following the three-year test phase of the joint research activities and wants to take a longer-term approach to the strategic partnership. "We profit not only from the high-caliber basic research at Saarland University's Materials Science and Engineering department. The application-oriented projects, which are tightly integrated with our own research activities, help us to continuously improve our heavy plate steel – and therefore help us secure competitive advantages in the fiercely competitive world market for heavy plate," Metzken said. In conjunction with this, he explained, the share of product innovations at Dillinger have led to a gain of around EUR 2.7 million in this year alone. In addition to the direct technology transfer, the Board of Management Spokesman also highly values the "transfer via minds." Around one dozen graduates in materials science and materials engineering at Saarland University have already taken jobs at Dillinger during the past decade, with most of them joining the Research and Development department.

Further Information:

Chair of Functional Materials: www.fuwe.uni-saarland.de
Materials Science and Methods:
www.uni-saarland.de/mww
Technical Mechanics: www.uni-saarland.de/lehrstuhl/diebels.html
Material Engineering Center Saarland: www.mec-s.de

Steel Company Dillinger: www.dillinger.de

Pressefotos: www.uni-saarland.de/pressefotos
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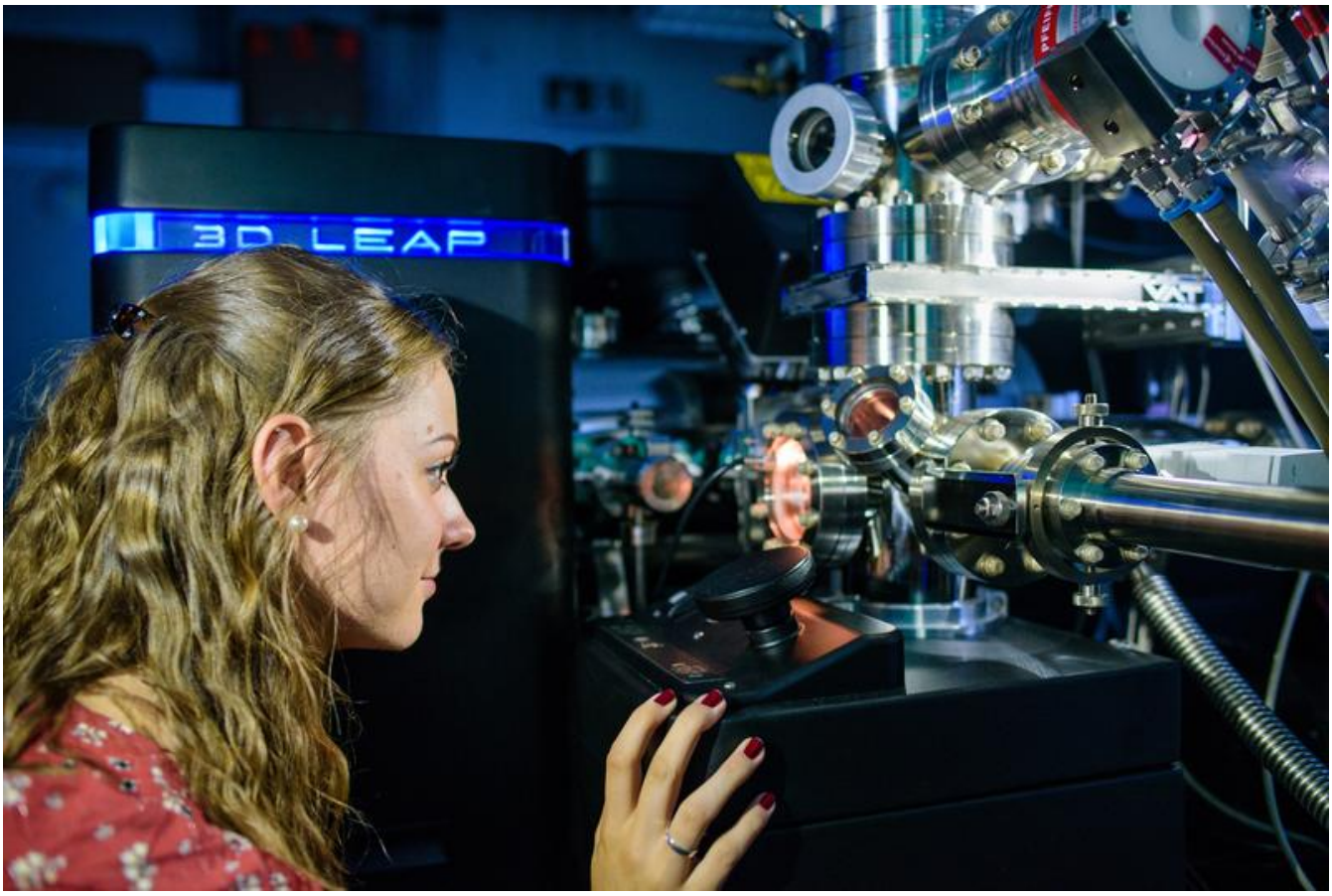


The 3D Atom Probe Tomography
Oliver Dietze

Professor Frank Mücklich
Maximilian Schlosser