Invitation to the Second Nordic Symposium for Young Scientists in Metallurgy
March 22-23, 2006 at KTH in Stockholm

A couple of years ago, Professor Jouko Härkki of Oulo University and Professor Pär Jönsson of KTH came up with the idea of organizing a symposium with the focus on young scientists in metallurgy, since most international conferences concentrate on presentations by more experienced researchers.

The first Nordic symposium in metallurgy for young scientists was held in Oulu, Finland, in June 2003. It was organized by Professor Jouko Härkki and was sponsored by Outokumpu Oy and Rautaruukki Oy. The second symposium is being organized by Professor Pär Jönsson in collaboration with Lars Bentell of Jernkontoret.

The main aim of the symposium is to let young scientists in the field of metallurgy meet to present and discuss their research. The target group for this seminar is thus graduate students who have not yet received their doctoral degrees. The symposium will welcome presentations on both ferrous and non-ferrous research as well as on different process-related aspects, including casting.

Registration: Please send your registration form (name, company/university, postal/email address, telephone no.) including an abstract of your presentation of approximately 250 words by March 1, 2006 to Dr. Margareta Andersson at KTH (see below).

Full paper: A full paper has to be submitted by March 22, 2006. The paper should be formatted according to the instructions of steel research international (www.steel-research.info).

Questions regarding the technical content of the course can be addressed to:

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New Simulator and Modernised Rolling Mill at the IMET of TU Clausthal

The Department of Metal Forming and Processing at the Institute of Metallurgy (IMET) has undertaken an important investment and created for itself an excellent position for future research activities with its new deformation simulator and the modernisation of its 12" rolling mill. On October 6 of last year, 45 guests from industry and research centres attended the inauguration ceremony. Prof. Karl-Heinz Palkowski presented the institute and, especially, the Department of Material Shaping including all its capabilities and research activities. Equipment suppliers cmi industry M+W and Bähr GmbH also used the opportunity for a presentation at the colloquium.

The new deformation simulator enables the Institute to perform static and dynamic analyses under thermomechanical conditions in order to determine and classify material properties. It is now possible to draw up stress-strain curves for metals and non-metallic materials automatically at temperatures up to their melting point. In addition, stress- or temperature-induced processes, recovery and recrystallisation processes, and the relaxation behaviour of materials can be investigated, as well as the thermal expansion coefficients measured. The high deformation speed of the simulator and also its ability for very fast heating and cooling make it possible to simulate a number of deformation processes on a laboratory scale. Tests can be conducted under tension, pressure, torsion or plane strain conditions.

A substantial increase in efficiency and accuracy when measuring different parameters greatly facilitates the simulation of these processes. Thanks to the new deformation simulator, it will be possible to shorten many time-consuming tests in future. Experimental facilities are still indispensable, however, for which reason the old 12" rolling mill has had to be modernised. The spindle-adjusting tool has been replaced by a hydraulic tool, the automatic control system has been renewed, and new rolls and other components have been installed. The modernisation work has been made possible by the strong involvement of the companies cmi industry M+W, Bilstein GmbH & Co KG, Bosch
Rexroth AG, Hydrac Int. GmbH, Siemens AG, and SKF AG.

The installation and upgrade of the DSC (Direct Strip Casting) laboratory casting plant was completed at the same time as the restart of the rolling mill. It is now located in front of the rolling mill to enable in-line processing, thereby offering substantial advantages and considerably shortening the conventional process chain. At present the plant is used mainly for the production of magnesium sheet materials.

The automatic control system of the 6" two/four-high reversing rolling mill had already been completed some months previously. It has been equipped with two thickness gauges made by Vollmer, who have also provided the new thickness-measuring devices for the 20-roll foil rolling mill. These necessary modernisations would not have been possible without Vollmer providing the technical and financial support.

The facilities at the IMET also comprise machines for drawing wires, bars and tubes, as well as a deep-drawing press. With this machinery the Department of Metal Forming and Processing is well-prepared to address all questions relating to materials and processes in the field of material shaping. Further investments in analytical equipment are planned for the near future.

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**Winners of the steeluniversity.org Virtual Steelmaking Challenge**

IISI has announced the winners of the world’s first virtual-steelmaking challenge. The challenge was based on the Secondary Steelmaking Module, one of several steelmaking simulations that form part of the IISI’s steeluniversity.org website. A team from RIVA-ILVA S.p.A. in Italy has won the Industry Challenge while the University Challenge was won by a student from the University of Leoben in Austria.

Competitors were asked to produce a high alloy steel, commonly known as 300M or SAE4340 (modified). The steel is capable of achieving a tensile strength of 2000 MPa with a fracture toughness of $K_m$ of 55 MPa$\sqrt{m}$. It is an ultra-high strength alloy used for critical safety components such as aircraft undercarriage parts.

The contestants had to refine a ladle of liquid steel to the specified low sulphur, high alloy content composition. They had to decide which furnaces and equipment to use, what to add and when. The liquid steel had to arrive at the requested caster at the right time and temperature with low inclusion content and at the least cost. The winner was selected on the basis of the lowest cost, a simulation that was only achieved two minutes before the competition closed.

The industry winners from RIVA-ILVA S.p.A. were Francesco Lentini, Alessandro Buonomo, and Mariggio Gianvito with a winning cost of $224.73/tonne. The university winner was Sebastian Michelic from the University of Leoben with a cost of $226.10/tonne. The winners will receive a cash prize which will be presented at a major IISI meeting.

Over 600 attempts were made in the 24 hours of the competition. More than 50 competitors successfully made the steel and met all the technical requirements. Some contestants made many attempts before they succeeded, others spent several attempts improving their techniques and reducing costs while maintaining the required quality.

Steeluniversity.org is an on-line initiative by the IISI and is aimed at providing a comprehensive package of informative, advanced, sophisticated and highly interactive e-learning resources on steel technologies, covering all aspects of the steelmaking processes through to products, their applications and recycling. These resources are intended for use by undergraduate and graduate students and their teachers and lecturers and also by employees, mainly at the graduate level, and their trainers in companies in the steel industry supply chain.