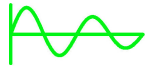


# ALSTOM POWER CONVERSION

In association with:



Applied Control Technology Consortium



Technical University Delft



Innoval Technology



University of Strathclyde

## International Rolling Mill Academy

### HOT & COLD MILL CONTROL & TECHNOLOGY

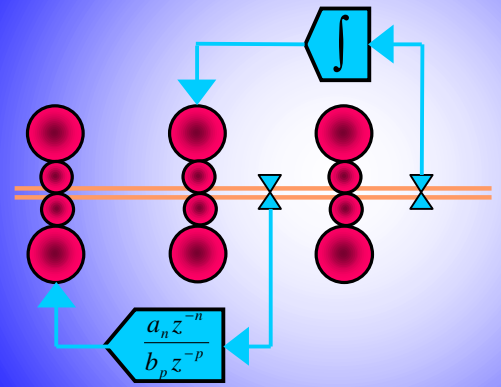
**6-10 March, 2006**  
**Amsterdam**

Alstom Power Conversion is pleased to announce details of the next Rolling Mill Academy to be held in Amsterdam in 2006. This continues the partnership from six previous successful courses, which were located at Glasgow, Rugby and Pittsburgh and attended by over 185 delegates from 23 countries and 47 companies.

The course introduces rolling mill engineers to state of the art control theory and practices in hot and cold mills with emphasis on product quality and cost optimization. The focus of the course is on control design for thickness, width, profile, flatness and temperature. The potential of advances in multivariable control, predictive control, condition monitoring systems and mill simulations will be discussed. The lectures will be given by leading international experts in hot and cold mill control systems. As well as providing an in-depth understanding of the theory they will also explain the practical issues involved in implementing rolling mill control systems.

Every afternoon there is a practical session with interactive demonstrations on PCs, which will allow the delegates to explore the control principles behind the presented techniques. The wide range of subjects covered in the practical sessions will enable the delegates to focus on their own interests. Numbers on the course are restricted, to ensure that each delegate receives individual attention. Early registration is advisable.

[www.rolling-academy.com](http://www.rolling-academy.com)



#### Past delegates from:

ABB, Aceralia Corp, Alcan,  
Alcoa, Allegheny Ludlum,  
Anshan Iron & Steel, Avesta, Bethlehem Steel,  
BHP, Brussels University, Cardiff University,  
Cegelec, China Steel, CST, Cockerill Sambre,  
Corus, Columbus Stainless,  
Danieli Automation, Danieli United, Duferco,  
Dunaferr, Dofasco, Elval,  
Hibbitt, Karlsson & Sorensen,  
Hoogovens, Hylsamex,  
Integrated Industrial Systems, Iscor Steel,  
Ispat Inland, Logan Aluminum, Mittal Steel,  
Parsytec Computer, Pechiney,  
Rautaruukki Steel, Sahaviriya Steel Industries,  
SAIL, Siderca, Siemens, Sollac Unisor,  
Stelco, T. Sendzimir, US Steel,  
USS Posco, VAI Industries, WCI,  
Wheeling Pittsburgh Steel.

## What is Included

- 4.5 days of lectures & computer-based training.
- Presented by leading academic and industrial experts.
- Control methods with proven industrial applications.
- Lunches/refreshments. & Academy banquet.
- Comprehensive course notes, self-study notes, references and a CD with course software.

## Past Delegates Comments

"Never heard yield criterion explained so well, wish I'd had this lecture 20 years ago !",  
Corus Delegate, March 2004.

"The course gave a good overall balanced view. I would attend again ... and recommend it to others."  
Corus Delegate, March 2004.

"The practical sessions were good - helpful."  
Ispat Inland Delegate, April 2005.

" Overall, this is probably the best one week class on rolling that I have taken."  
Mittal Steel Delegate, April 2005.

"Organisation was excellent, dynamic presentations."  
U.S. Steel Delegate, April 2005



## Target Audience

- ✓ Electrical and mechanical engineers involved in process control.
- ✓ Technical Engineers working in the metals production and processing industries.
- ✓ Design engineers wishing to refresh their control engineering knowledge.
- ✓ Managers requiring an up-to-date overview of quality-improving technology.

## For more information regarding the course please contact:

**Chris Fryer**  
**Alstom Power Conversion Ltd.**  
**Boughton Road, Rugby**  
**CV21 1BU, UK**

**Tel: +44 (0) 1788 563 659**  
**Fax: +44 (0) 1788 563 757**  
**chris.fryer@powerconv.alstom.com**

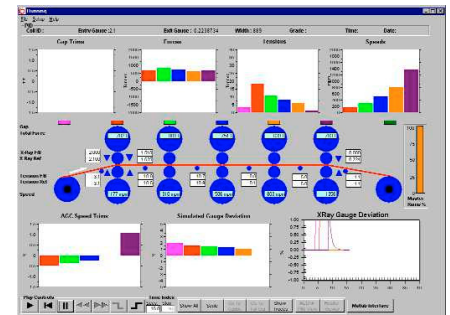
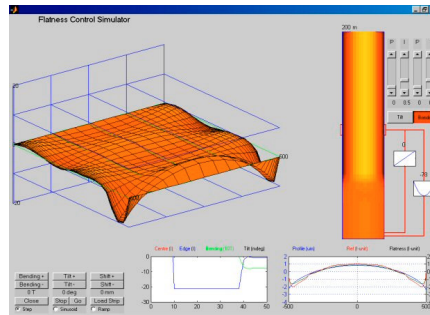
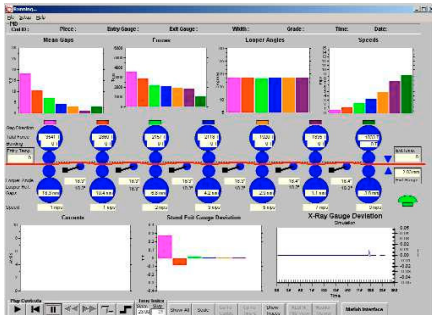
**Or see [www.rolling-academy.com](http://www.rolling-academy.com)**

## Provisional Academy Timetable

Monday		Tuesday		Wednesday		Thursday		Friday	
9.00:10.00 Benefits of Improved Control		9.00:10.00 The Mechanics of Rolling		9.00:10.00 Process Line Control		9.00:10.00 Model Adaption		9.00:10.00 Temper & Double Reduction Control	9.00:10.00 Model Based Controls for Run-out-table Cooling
10.00:11.00 Systems and Control Introduction		10.00:11.00 Roll Bite Models		10.00:11.00 Roll Thermal Evolution & Cooling Control		10.00:11.00 Rolling Mill Vibration		10.00:11.00 Cold Mill Setup Models	10.00:11.00 Flatness and Profile Control in Hot Rolling
11.00-11.20 Coffee		11.00-11.20 Coffee		11.00-11.20 Coffee		11.00-11.20 Coffee		11.00-11.20 Coffee	
11.20:12.20 Rolling Mill Metallurgy		11.20:12.20 Gauge Control Methods for Reversing Single Stand Mills		11.20:12.20 Feedforward Width Controls for Roughing Mills		11.20:12.20 Multivariable & Predictive Control for Finishing Mills		11.20:12.20 Diagnostic Systems	
12.20:13.20 Lunch		12.20:13.20 Lunch		12.20:13.20 Lunch		12.20:13.20 Lunch		12.20:13.20 Lunch	
13.20:14.20 Automation Architectures		13.20:14.20 Hot Strip Mill Gauge Control Part 2		13.20:14.20 Gauge Controls for Tandem Cold Mills		13.20:14.20 Flatness Control in Cold Rolling		13.20:14.00 Round Table Discussion	
14.20:15.20 Hot Strip Mill Gauge Control Part 1		14.20:15.20 Advanced & Future Mill Control		14.20:15.20 Eccentricity Control		14.20:15.20 The Dynamics of Metal Drive Systems			
15.20-15.40 Coffee		15.20-15.40 Coffee		15.20-15.40 Coffee		15.20-15.40 Coffee			
15.40-17.30 <i>Practical</i>		15.40-17.30 <i>Practical</i>		15.40-17.30 <i>Practical</i>		15.40-17.30 <i>Practical</i>			
Mill Simulation Introduction	Mill Simulation Introduction	Hot Rolling	Reversing Cold Mill	Eccentricity Control	Tandem Cold Mill	Flatness Control	Predictive Control		
						Multivariable Control			

## Course Software

All course software is driven by custom written graphical user interfaces to enable the fundamental principles to be learned quickly. The practical sessions include hot mill simulation, tandem cold mill simulation, reversing cold mill simulation, eccentricity control, multivariable control, smith predictors, predictive control and flatness control. It is possible for delegates to focus on hot or cold mill control, or a mixture during the practical sessions.



## Principal Course Lecturers

### Alstom Power Conversion, UK and Germany:



**Chris Fryer**, Chief Engineer (Process Control) for Industry Systems Division within Alstom Power Conversion Ltd. Joined ALSTOM (as GEC Projects) in 1982 and worked in a number of disciplines including dynamic-ship-positioning, cold rolling flatness control, tandem cold mill gauge control, and rolling mill models. Extensive commissioning experience from rolling mills in Europe, North America, and S. Africa.



**Dr. Adam Randall** followed a mathematics degree at the University of Durham with industrially based postgraduate work in collaboration with Coventry University. He has more than 20 years of experience in the design and commissioning of automation schemes for hot rolling of strip, plate and section, at a number of plants worldwide.



**Martin Brannagan** is a systems design engineer specialising in automatic gauge, flatness control and modelling for hot and cold mills. His design and commissioning experience is extensive and covers Europe and North America.

### Innoval Technology:



**Dr. Tom Farley** studied applied physics before completing a D.Phil in solid state physics at the University of Oxford. He joined Alcan's Research and Development Laboratory in 1989, working initially on novel sensing materials thereafter on profile, flatness and heat transfer. Since 1995 he has been studying Mill Vibration and is now an expert in the solution of problems of vibration in rolling and finishing equipment. He joined Innoval Technology in 2003.



**Dr. Tony Bilkhu** has over 20 years experience in process control technology applications for Steel and Aluminium Rolling Mills. He is responsible for the design and development of Hot and Cold rolling Automatic Gauge Control (AGC), Tension controls and Flatness systems. He has a keen interest in applying new control methods and innovative techniques enabling the continuous improvement of the control technologies.



**Dr. Jürgen Schulze-Ksinzyk** has 20 years experience in process control technology applications for Steel Rolling Mills. Coming from research and development originally he now is responsible for the design and development of technological solutions for Hot rolling. His special interest is focussed on material properties including new applications. Jürgen has worked around the world and he has given guest lectures for automation in rolling mills in Freiberg.



**Dr. Gerald Hearn** is currently a senior systems engineer. He obtained a B.Eng. in Electrical and Mechanical engineering from Strathclyde University in 1994 and subsequently spent 6 years in the Industrial Control Centre as a research fellow investigating the advanced control of hot strip mills in a major industrial project.



**Dr. Chris Davenport** has a first degree in Physics and a PhD in heat transfer. He joined Alcan in 1986. As Alcan's global expert in heat transfer, he developed an approach to the cooling of rolls and strip that was adopted in most Alcan manufacturing operations. He led projects focussed on thermal modelling of the rolling process and the control of strip profile. In May 2003, he joined Innoval Technology, an independent consultancy in materials engineering, spun-out from Alcan.

### Technical University Delft:



**Prof. Van der Zwaag** rejoined the TUDelft in 1992 and has led the Microstructural Control in Metals group until 2002. In that period his group has developed and validated a suite of models for the phase transformations taking place on the hot strip mill in general and the run-out table in particular. Since 2002 Prof. Van der Zwaag is connected to the faculty of Aerospace Engineering and Director of the Delft Centre for Materials.



### University of Strathclyde:

**Prof. Michael Grimble** acquired a BSc (Coventry), MSc, PhD and DSc degrees from the University of Birmingham. In 1981, The University of Strathclyde, Glasgow, appointed him to the Professorship of Industrial Systems and he is now the Director of the Industrial Control Centre. His Centre is concerned with industrial control problems, particularly those arising in the Marine, Aerospace, Manufacturing, Process, Wind, Automotive and Metals processing industries. The theoretical areas include: nonlinear control, adaptive control, robust control, multivariable design, benchmarking, optimal control and fault detection.

### Applied Control Technology Consortium:



**Dr. Andrew Clegg** has been a Senior Consultant at Industrial Systems and Control Ltd. since 1996, during which time he has been responsible for the engineering effort within the Applied Control Technology Consortium (ACTC) providing consultancy, training and software support in the field of control engineering.



Dr. Yao Hou Li  
Bashir Laheria  
Bill Lawrence  
Simon Mulley

### Other Alstom Lecturers:

# REGISTRATION FORM

## International Rolling Mill Academy

6-10 March 2006 - Amsterdam, The Netherlands

To register for the course please complete in block letters one form per delegate and send with proof of payment to:

International Rolling Mill Academy, Alstom Power Conversion Ltd., Boughton Road, Rugby. CV21 1BU, UK.  
Tel. (44) 1788 563 305, Fax: (44) 1788 563 757

Alternatively, you may register on-line at [www.rolling-academy.com](http://www.rolling-academy.com)

Surname (incl. title) .....  
First Name(s): .....  
Company/Organisation: .....  
Job Title: .....  
Address: .....  
.....  
.....  
Tel.: .....  
Fax: .....  
Email: .....  
Current Area of Work: .....  
Special Requirements (e.g. Vegetarian): .....

Course Fee Per Delegate: 3150 Euro + 17.5% VAT

Group Bookings & students: 2 or more delegates registering from the same company may qualify for a discount, discounts for students available on request. Please contact Alstom for details.

Please reserve ..... places on the course. I enclose ..... Euro as the Total Sum Payable.

Please indicate method of payment:

☐ **Cheque** enclosed payable to Alstom Power Conversion Ltd.

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Card number: .....  
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**IMPORTANT:** Course Fees are payable in advance and must be received two weeks prior to the commencement of the course. Full payment, or proof of payment, must accompany all registrations. Your registration is not confirmed until payment is received. Cancellation: Fees will be refunded, less 10% handling charge, for any cancellation received in writing 14 days prior to the course. For cancellations after this and no shows, Alstom reserves the right to charge the full rate. Substitute delegates are welcome at any time. Alstom also reserves the right to modify or cancel training courses, giving adequate notice and refunds to registrants.