14th Blade Mechanics Seminar
Wednesday, September 2, 2009
8:30 – 17:30 h, Winterthur (Switzerland)
Zurich University of Applied Sciences
Goals and Motivation

After a break of two years, the Zurich University of Applied Sciences (ZHAW) in Winterthur is going to host the Blade Mechanics Seminar in cooperation with the Swiss Section of ASME.

The key target of this seminar is to offer a platform for know-how and experience exchange among engineers from various turbo machinery companies. Therefore, each presentation will be followed by a comprehensive discussion about the understanding of the presented problem and practical manners of its solution. All presentations will be given in common engineering terms using comprehensible mathematics.

Keynote presentation

Eric Seinturier, Chief Engineer, Turbomeca, France

«Forced Response Computation of Bladed Disks: Industrial Practices and Advanced Methods»

Turbo machinery designers have to deal with two main problems: improve performance while reducing masses. The new aerodynamic computation tools (CFD) are leading to new types of blade geometry, generating complex and thinner blade shapes. One main consequence, often underestimated, is the effect on the blade stress design and dynamic behavior.

Static loads are now so increased that the ability of the material to tolerate extra dynamic stresses is dramatically reduced. Moreover, the intensity of the excitation sources in turbomachinery has increased. A significant illustration of that is the generalization of HCF problems, which has become a major source of non-reliability of turbomachinery cores.

The object of the lecture is to present how engine manufacturers are currently dealing with the dynamic design of bladed disks. The state of the art will be presented as well as advanced methods. This lecture will explain how forced response computation can contribute in blade design, taking into account important phenomena such as mistuning and non-linearity.

Finally, these practices will be illustrated by four chosen application cases. Well-instrumented research cases will be presented for numerical methods assessment purpose as well as industrial applications on compressors and turbines.
08.00 Welcome coffee and croissants
08.30 Welcome address

Session 1 – Nonlinear Blade Vibration and Damping I
08.50 Keynote presentation:
Forced Response Computation of Bladed Disks:
Industrial Practices and Advanced Methods
Eric Seinturier, Turbomeca,
SAFRAN Group, France
09.50 Reduction of Blade Vibration Amplitudes by Friction
Damping Devices and Innovative Damping Principles
Lars Panning, University of Hannover, Germany
10.20 Coffee

Session 2 – Nonlinear Blade Vibration and Damping II
10.50 Optimization of Turbine Blade Shroud and Under-
Platform Dampers
Bob Elliot, Rolls-Royce plc, UK
11.20 Integration of Calculation of Damping due to Friction in
a Standard Steam Turbine Blading Design Process
Jürg Meier, Zurich University of Applied Sciences, Switzerland
11.50 Calculation of Modal Stress Transmission Factors with
ABAQUS
Ulrich Deckart, ALSTOM Power Service GmbH, Germany
12.20 Lunch

Session 3 – Experimental Blade Analysis
13.30 Experimental and Numerical Investigations of a HPC-
Blisk with Focus on Travelling Waves
Ulrik Strehlau, Brandenburg University of Technology, Germany
14.00 The Measurement of Dynamic Vibration Modes and
Frequencies of a large LP Bladed Disc
Tomas Misek, Skoda Power, Czech Republic
14.30 Overview on Tip-Timing Measurement Results on
Compressor
Arnaud Talon, Turbomeca,
SAFRAN Group, France
15.00 BSSM – Vibration Measurements on Compressor Blades and Shrouded Turbine Blades
Michael Zielinski, MTU Aero Engines GmbH, Germany
15.30 Unsteady Pressure and Aerodynamic Work
Measurements during Blade Forced Response
Albert Kammerer, ETH Zürich, Switzerland
16.00 Coffee

Session 4 – Blade Design
16.30 Optimization of the Compressor Blade Fixation in Rotor Groove with Respect to Durability
Herbert Brandl, ALSTOM, Switzerland
17.00 Simplified Automated Tool for Compressor Blading Dynamic Assessment
Ilya M. Fedorov, ALSTOM, Switzerland
17.30 Automatic Front Stage Blade Modeling with ABAQUS CAE
Sewer Michalowski, Zurich University of Applied Sciences, CH
18.00 Seminar end
General information

Conference venue
ZHAW Zurich University of Applied Sciences
Lecture hall, SM 01.01, Theaterstr. 15c, 8401 Winterthur
The conference venue is situated at a walking distance of 300m from the station.
The trains run as often as every 15 to 20 minutes from Zurich Airport and take about
15 minutes to arrive in Winterthur.

Costs and Closing date
The participation fee amounts to Euro 120/CHF 180 for registrations until August 21,
2009 or Euro 140/CHF 210 for registrations after this date. This payment includes
also documents (proceedings on CD) and meals.

Registration
Please registrate online at: www.imes.zhaw.ch/blade-mechanics-seminar

Hotel information
For special hotel rates for participants at the Blade Mechanics Seminar please see:
www.imes.zhaw.ch/blade-mechanics-seminar

Organizer
University of Applied Sciences (ZHAW) in Winterthur, in co-operation with the Swiss
Section of ASME

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Further information/Abstracts
For abstracts of the presentations and further information please contact our webpage:
www.imes.zhaw.ch/blade-mechanics-seminar