

Announcement and Call for Presentations

22nd Blade Mechanics Seminar

12th September 2017 - Winterthur, Switzerland

Goals and Motivation

We are glad to announce that the ZHAW Zurich University of Applied Sciences is about to organize the 22nd Blade Mechanics Seminar & Exhibition. It will be held on 12th September 2017 in a similar theoretical and practical framework and a variety of interesting topics as the previous conferences.

The unchanged key target is to offer a platform for know-how and experience exchange among engineers from various turbomachinery companies. The Blade Mechanics Seminar aims to answer the participants' needs coming from their daily work on axial and radial bladed discs of aero- and heavy-duty engines. All presentations will be held in common engineering terms by using comprehensible mathematics.

Technical Area

Regarding modeling and design methodologies, which can be based on analytical, numerical or/and experimental approaches, presentations are solicited in the area of structural mechanics of bladed discs considering interactions with the working medium. The seminar focuses on structural blade mechanics and contributing fluid, acoustic, thermodynamic and cooling aspects, which have an impact on the reliable blade boundary conditions. Also, monitoring and diagnostic are of interest in this seminar. In 2017, main topics of the Blade Mechanics Seminar are related to:

- Numerical and experimental vibration analyses of tuned and mistuned bladed discs,
- Static and dynamic simulations of blades with contact or material non-linearity,
- Non-linear blade vibrations with friction used for design of damping devices,
- Flutter and forced vibrations based on empirical or numerical fluid-structure interaction results,
- Experimental mechanics and measuring methods like tip timing, strain-gauge system, and others,
- Stress analysis and optimization of thermo-structural problems,
- Integrated thermo-mechanical modeling of bladed discs in transient operation,
- Creep and fatigue life prediction,
- Assessment of Remaining Useful Life (RUL) of components,
- Thermo-mechanical fatigue (TMF) mechanisms and testing,
- Design systems and CAD data handling among various disciplines,
- 3D scanning, Non-destructive evaluation (NDE) and Computed Tomography (CT) as imaging test procedures,
- Novel expertise in finite element modeling, sub-modeling, super-element techniques, Boundary Element Method or others.

All presentations will be put on the proceedings.

Keynote Presentation

Dr. Norbert Suerken, Siemens AG, Power and Gas, Germany

Lifting Challenges of Steam Turbine Blades under Changing Operation Conditions due to Renewable Energy Power Fluctuation

Lifting may be defined as the engineering art of improving the fatigue life of specific technical components and the fatigue properties of materials. For conventional base-load power plants, the turbomachinery component life largely depends on the number of starts and the operation hours. However, in an energy market dominated by renewable energy sources, “flexibility” becomes a key requirement for turbomachinery.

Frequent and continuing part-load operation, rapid load and temperature changes (load-cycling) as well as a largely increased need for start-stop cycles (speed-cycling) are getting common. In other words, the life-cycle assessment of turbine components needs to include additional lifting parameters to reflect more speed cycles at higher peak loads (static & dynamic) and broader load variations. Additionally, the required operation regime may lead towards elevated flow excitation of the blading and degraded steam chemistry, which may necessitate on-site monitoring in the field. A good example for such conditions is windage operation at deep part load (low volumetric flow), which increases the blading temperatures and generates unsteady excitation forces acting upon the last stage blades of low-pressure steam turbines.

In the keynote, an OEM's view is given on how these changed requirements can practically be met by turbine blade design. Important aspects such as material data acquisition, LCF and HCF analysis as well as operational influences on the component lifting will be treated starting with historical and theoretical deliberations, progressing via experimental component fatigue testing and concluding with real size application validation. Special attention is given to recent design and assessment methods for large blades being necessarily exposed to High and Low Cycle Fatigue. The determination of “moving life leading locations” under varying loading, operating and aging conditions will be handled as well as accompanying condition monitoring of blades shall be put up for discussion.

Registration Fees

CHF 200 (approx. 185 Euro) for early birds until August 27, 2017.

CHF 230 (approx. 215 Euro) after August 27, 2017

The registration fee includes all sessions, costs for meals (lunch and coffee breaks) and proceedings.

Two employees of the seminar gold sponsors participate in the Blade Mechanics Seminar free of charge.

Location

ZHAW Zurich University of Applied Sciences
Eulachpassage, TN E0.58
Technikumstrasse 71
8400 Winterthur
Switzerland

Travel to ZHAW, Winterthur

Winterthur is easily accessible by express trains from Zurich Airport in about 15 minutes and Zurich city in 25 minutes. From the main railway-station, the seminar location can be reached within a walking distance of less than 5 minutes. Additional information can be obtained from the seminar office (see below).

Information for Presenters and Registration

Registration and submission of abstract have to be done online at www.zhaw.ch/imes/blade-mechanics-seminar. Together with registration every presenter has to upload a title and brief abstract (up to a 100 words) to the seminar web page. After acceptance of the proposed topic by the seminar organizers, the presenter also needs to upload a 20-minute PowerPoint presentation, which must be cleared for publication. Every presentation will be put on the seminar proceedings.

Seminar Information at a Glance

Seminar Date (Morning & Afternoon sessions): **Tue, September 12, 2017**
Deadline for reduced participation fee: **Sun, August 27, 2017**

Deadline for abstract submission (up to 100 words): Sun, May 21, 2017

Acceptance of presentation:

The Seminar Agenda will be published by:

Deadline for presentation submission:

Tue, September 12, 2017

Sun, August 27, 2017

Sun, May 21, 2017

End of June 2017

Fri, July 14, 2017

Sun, August 20, 2017

Length of presentation: Up to 20 minutes

Seminar Organizer

ZHAW School of Engineering

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Seminar Office

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Please forward this invitation to your colleagues who are interested in attending this event.

We are looking forward to welcome you at the Blade Mechanics Seminar soon.

Best regards

Jürg Meier