Symposium on

Mechanics of Slender Structures

MoSS 2006

28-29 September 2006

Hosted by
Division of Engineering

THE UNIVERSITY OF NORTHAMPTON

http://www.eng.nene.ac.uk/~conf2006/Symposium.htm

In collaboration with

Institute *of* **Physics**
Stress and Vibration Group

Co-sponsored by

INVEST Northamptonshire
THE CENTRAL GROWTH LOCATION

BGA
British Gear Association

I MECH E

LEIA
Lift and Escalator Industry Association

Research Innovation Design
TRIaD

Aims and Scope

The University of Northampton is holding a symposium on the mechanics of systems employing slender structural elements. The event is organized in collaboration with the Stress and Vibration Group of the Institute of Physics and follows a successful seminar staged in Northampton during the inaugural School in 2004 on "Ropes, Cables and Chains: Theory and Applications" (details are available from the seminar website: http://groups.iop.org/SV/AE/Ropes.htm).

Applications of slender structures include terrestrial, marine and space systems. Moving elastic elements such as ropes, cables, belts and tethers are pivotal components of many engineering systems. Their lengths often vary when the system is in operation. The applications include vertical transportation installations and, more recently, space tether propulsion systems. Traction drive elevator installations employ ropes and belts of variable length as a means of suspension, and also for the compensation of tensile forces over the traction sheave. In cranes and mine hoists, cables and ropes are subject to length variation in order to carry payloads. Tethers experiencing extension and retraction are important components of offshore and marine installations, as well as being proposed for a variety of different space vehicle propulsion systems based on different applications of momentum exchange and electrodynamic interactions with planetary magnetic fields. Furthermore, cables and slender rods are used extensively in civil engineering; in cable-supported bridges, guyed masts and long-span roofs of buildings and stadia. Also, suspended cables are applied as electricity transmission lines. Chains are used in various power transmission systems that include such mechanical systems as chain drives and chain saws. Moving conveyor belts are essential components in various material handling installations.

The behaviour of these elements plays a significant role in the performance of the host structure and a holistic approach is needed in the analysis and design of the entire system. The symposium will bring together experts from various fields: structural mechanics, thermo-mechanics, dynamics, electrodynamics, vibration and control, structural health monitoring, artificial intelligence, and materials science to discuss the current state of research as well as rising trends and direction for future research in the area of mechanics of slender structures. The meeting is aimed at improving the understanding of structural and thermo-mechanical properties and behaviour of slender structures. More specifically, the methods for the suppression of adverse dynamic responses of such systems will be addressed. The scope covers analytical, numerical, and experimental research into the mechanics of ropes, cables, tethers, chains, yarns and fibres as well as their interactions with the host structure in various engineering applications.

Invited Speakers

Guest Speaker:

Derek Smith, Otis, U.K.
Identifying the Risks in Using Lifts for Evacuation

Keynote Addresses:

Peter Hagedorn, Technical University of Darmstadt, Germany
Dynamics of Cables: Overhead Lines, Belt Drives and Electrodynamic Tethers

Wim Van Horssen, Delft University of Technology, The Netherlands
On the Weakly Nonlinear Dynamics of Axially Moving Belt Systems

Rory Smith, ThyssenKrupp Elevator Cororation, U.S.A
How to Achieve Good Elevator Ride Quality

Weidong Zhu, University of Maryland Baltimore County, U.S.A.
Dynamic Stability of Translating media with Variable Length and /or Speed

Workshop

Convenor: Rory Smith, ThyssenKrupp Elevator, U.S.A.
Elevator Traffic Design and Analysis

Technical Papers

Technical papers addressing the following subjects have been submitted for presentation:

- Active and passive damping strategies
- Composite materials
- Contact and friction models
- Dynamic stability
- Electro-mechanical and magneto-mechanical interactions
- Flow-induced vibrations and fluid-structure interactions
- Inspection, monitoring and sensor techniques
- Intelligent materials and structures
- MEMS technology
- Non-linear dynamic interactions
- Non-stationary dynamic phenomena
- Stochastic dynamics
- Stress and fatigue
- Structural integrity and damage assessment
- Testing methods
- Thermo-mechanical behaviour
- Residual strength and endurance prediction
- Vibro-acoustics
- Vibration and control

Key Dates

Registration deadline: **8 September 2006**
Symposium dates: **28-29 September 2006**

Venue, Accommodation and Travel

The symposium will be held at The University of Northampton, England, U.K. Accommodation will be available at the University conference centre and local hotels.

Northampton is one hour by train from Birmingham International Airport. Budget airlines fly to Luton Airport and there is a regular coach service to Northampton. Delegates arriving at London Heathrow Airport are advised to use underground to get to London Euston train station (Piccadilly line from Heathrow, change to Victoria line at Green Park to arrive at London Euston; approx. 40 min). There is a frequent train service from London Euston to Northampton (the journey takes approximately one hour).

Registration and Fees

The deadline for registration is 8th September 2006. Registration form and details is available from the symposium website

www.eng.nene.ac.uk/~conf2006/Symposium.htm

The registration fees are as follows:

Member	**£200.00**	**(£250.00)**
Non-member	**£230.00**	**(£280.00)**
Student	**£150.00**	**(£180.00)**

The fees in brackets (£…) are for late registration after 8th September.

The fees include admission to sessions, coffee breaks, lunches, welcome reception, symposium dinner, a book of abstracts and the CD-ROM of the symposium proceedings.

Organising Committee

Professor Matthew Cartmell, University of Glasgow, UK
Dr Stefan Kaczmarczyk, University of Northampton, UK (Host)
Dr John Macdonald, University of Bristol, UK.
Mr Rory Smith, ThyssenKrupp Elevator Corporation, USA
Professor Robin Tucker, University of Lancaster, UK

International Scientific Committee

Dr JM Abete, University of Mondragón, Spain
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Dr CE Imrak, Technical University of Istanbul, Turkey
Professor R Iwankiewicz, University of the Witwatersrand, South Africa
Professor AW Lees, University of Wales, Swansea, UK
Dr S McWilliam, University of Nottingham, UK
Professor WM Ostachowicz, PASci, Poland
Professor JET Penny, Aston University, UK
Professor P Picton, University of Northampton, UK
Professor Y Terumichi, Sophia University, Japan
Dr I Trendafilova, University of Strathclyde, UK
Professor W Zhu, University of Maryland Baltimore County, USA

Symposium Office

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