STEAM TURBINE AND GENERATOR USER GROUP 2016

Organised by

Institution of MECHANICAL ENGINEERS

Power Industries Division
Conference

16-17 March 2016
Manchester Conference Centre

More details available at
events.imeche.org/STUG2016

"Great networking opportunity structured around engaging presentation topics"

Jamie Bannister,
Coventional Island Coordinator,
EDF Energy

"Very useful get together for networking and education of what is going on in the industry"

Tim Shurrock,
Alstom

"Good venue, good presentations and networking opportunities"

Tony Wise
Engineering & Maintenance Co-ordinator
RWE Generation

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STEAM TURBINE AND GENERATOR USER GROUP 2016

16–17 March 2016
Manchester Conference Centre

THE ANNUAL TWO-DAY STEAM TURBINE AND GENERATOR USER GROUP 2016 IS THE NEXT IN THIS POPULAR SERIES OF THE INSTITUTION'S POWER GENERATION USER GROUPS.

This must-attend event will enable those involved in the management, operation and maintenance of steam turbines and generators to discuss common problems and issues, exchange ideas, identify potential solutions and learn about new developments.

The Institution's User Groups encourage open debate and problem solving, using informal presentations and discussion forums to promote networking and sharing experiences among the steam turbine generator community.

Key topics include:

- Industry Trends
- Steam Turbine Technologies
- Generator Technologies
- ST Modifications and Enhancements
- Generator Degradation, Failures and Case Studies
- Plant Mothballing
- Plant Operation
- Turbine Overhauls and Life Extension
- Inspection and Monitoring

"Its almost like a family reunion now but the family keeps growing"

Ron Eskdale,
Engineering & Turbine Consultant,
Engineering & Turbine Consultancy Ltd

ATTEND THIS SEMINAR TO:

- **Learn** from real-life case studies illustrating project experience and best practice
- **Improve** the performance of your plant
- **Discover** updates on the latest industry developments and technologies
- **Hear** advice from leading specialists on a wide number of issues
- **Understand** how to manage and minimise plant risks

"Excellent event from many industry viewpoints"

James Porter,
Principal Electrical Engineer,
Atkins

"Event of the year - a 'must attend' event for all UK engineers"

Bharat Mistry,
Senior Sales Manager,
Siemens

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PROGRAMME

DAY 1 — WEDNESDAY 16 MARCH 2016

08:30 REGISTRATION AND REFRESHMENTS

09:00 CHAIR'S WELCOME AND INTRODUCTION

SESSION 1 INDUSTRY TRENDS

09:10 IMPACTS OF WIND GENERATION ON THERMAL POWER PLANT OPERATING REGIMES

Professor Gareth Harrison, Chair of Electrical Power Engineering, University of Edinburgh

- High wind penetration fundamentally changes role of thermal generation
- Analysis uses advanced system dispatch and wind models to define power plant operation
- Important changes in mid-merit behaviour and potential flexibility implications identified

09:30 AN INTRODUCTION INTO SOLAR THERMAL POWER GENERATION

Jaideep Sandhu – Head of Solar, Transmission and Energy Storage, ENGIE

- Introduction to concentrated solar collector technology
- Short history and present state of the thermal solar industry
- Case studies, challenge and developments

09:50 ALLAM CYCLE

Dr Hideo Nomoto, Chief Fellow, Toshiba Corporation and Rodney Allam, Chief Technologist, 8Rivers

- Design Concept Overview
- Research and Development Results
- Development Plan

10:10 QUESTION AND ANSWER SESSION

10:30 NETWORKING REFRESHMENT BREAK

SESSION 2 PARALLEL SESSIONS

2A STEAM TURBINE TECHNOLOGIES

11:00 INNOVATIVE HYBRID TURBINE TECHNOLOGY

Pramodchandra U. Gopi, Vice President, Triveni Turbine and David Tilley, General Manager, Triveni Turbines Europe Pvt

- Hybrid blade path technology with combination of impulse and reaction technologies
- Reliability and robustness for turbines
- Compact designs and efficiency

11:20 EVOLUTION OF MATERIALS FOR HIGH TEMPERATURE STEAM TURBINES

Douglas Gass, Manager Materials Engineering, Siemens Power Generation Services and Dr Torsten-Ulf Kern, Principal Engineer Materials, Siemens AG

- Materials
- High temperature steam turbines
- 620°C

11:40 THE 'ARABELLE' STEAM TURBINE

Tim Shurrock, Engineering Manager, GE Power

- Nuclear Turbine Technology
- New UK Nuclear Project
- New turbine technology for the UK

12:00 THE NEXT GENERATION OF INDUSTRIAL STEAM TURBINES FOLLOWING A MODULARIZED ENHANCED PLATFORM CONCEPT

Stefanie Wloczka, Project Manager, Siemens AG

- Modular Design
- Improved efficiency
- Improved working conditions

2B GENERATOR TECHNOLOGIES

EXPERIENCED TECHNOLOGIES FOR HIGH RELIABILITY LARGE CAPACITY GENERATORS IN NUCLEAR APPLICATIONS

Hitoshi Katayama, Chief Engineer, Toshiba Corporation

- Nuclear Units are now reaching over 1500MW capacity, with a demand for high reliability.
- Output Voltages, Current are raised and physical sizes increased, challenging many aspects of design.
- The presentation is an outline of Toshiba's technologies developed to address these challenges.

REMOTE MONITORING OF GENERATORS

Andrew Crosby, Manager, Generator Field Service Engineering, Siemens Power Generation

- Impact of renewable energy on generator operation
- Electric failures
- Early detection and diagnosis

700 MW NON WATER COOLED GENERATOR

Julien Tromenschlager, Generator Product Manager, GE Power

- 710MVA 50Hz indirect cooled generator.
- High-performance machine using TVPI insulation and three parallel path stator winding.
- Machine tested and already sold several times

WESTON GENERATOR ROTOR REPAIR

Bill Moore, Director, Technical Services, National Electric Coil

- Case study into a generator rotor failure
- Recovery of forging avoiding lengthy procurement times

12:20 QUESTION AND ANSWER SESSION

12:40 NETWORKING LUNCH

SESSION 3 STEAM TURBINE MODIFICATION AND ENHANCEMENTS

13:40 USE OF CRACKED BODY MODELLING TO DE-RISK STEAM TURBINE LIFE EXTENSION

Joe Lindsey, Senior Engineer, Frazer-Nash Consultancy

- Cracked Body Modelling
- Custom SIF Solutions
- Future Exploitation

14:00 STEAM TURBINE START-UP IMPROVEMENTS

Dave Wallis, Lead Steam Turbine Engineer, RWE Generation UK

- Steam turbine start-up improvements at a CCGT power station
- Assessment of the steam turbine start-up and potential improvements
- Outcome and results, including the time savings to the stations

14:20 A FLEXIBLE ANALYTICAL CALCULATION APPROACH FOR START-UP TIME- AND LOAD MANAGEMENT OPTIMISATION

Wolfgang Beer, R&D Engineer, Siemens Power & Gas and Lukas Propp, R&D Engineer, Siemens Power & Gas

- Fast and flexible analytical calculation approach
- Start-up optimisation
- Lifetime optimisation

14:40 **HEYSHAM 2 TG7 HP TURBINE - HIGH SHAFT VIBRATION INVESTIGATION AND RECTIFICATION**
Simon Carr, System Engineer - Turbine and Auxiliaries, EDF Energy - Heysham 2 Power Station and Sam Atkin, Mechanical Engineer, EDF Energy - Turbine Support Group
- Historical evidence and long term vibration trend
- Investigation and diagnosis
- Solution design and installation

15:00 **QUESTION AND ANSWER SESSION**

15:20 **NETWORKING REFRESHMENT BREAK**

SESSION 4 GENERATOR DEGRADATION, FAILURES AND CASE STUDIES

15:40 **CASE STUDY – EMERGENCY REFURBISHMENT OF NEXEN'S BUZZARD GENERATOR**
Gavin Rippe, Regional Sales Manager, Brush Electrical Machines and Mike Williamson, Regional Sales Manager, Brush Electrical Machines
- Sudden failure of generator
- Non-intrusive inspection
- Emergency turnaround within confined space

16:00 **ROOT CAUSE ANALYSIS OF A STATOR TO GROUND FAULT ON A 550 MVA GENERATOR (TIHANGE NUCLEAR SITE)**
Jean-Louis Farvacque, Generator Service Manager, ENGIE
- Introduction
- Disassembly process and Bar autopsy
- RCA conclusions and experiment movie

16:20 **HOW TO CONTROL QUALITY WHEN IT IS FROM EXPERTS**
Mazhar Saleem, Key Account Manager, Laborelec
- Inspection after first year of operation is critical but Robotic inspection is not sufficient
- Quality control during manufacturing is not to the mark these days. How to ensure that customer gets a quality product
- Horizontal restacking versus Vertical restacking – a big challenge and a compromise to quality

16:40 **ISSUES WITH POOR DESIGN/QA/MANUFACTURE IN MODERN BUILT GENERATORS**
Ben Adams, Electrical Technical Expert, ENGIE
- Failures
- Poor QA
- Poor Design

17:00 **QUESTION AND ANSWER SESSION**

17:20 **CHAIR'S CLOSING REMARKS**

17:30 **CLOSE OF DAY ONE**

19:00 **NETWORKING DINNER**

DAY 2 THURSDAY 17 MARCH 2016

08:30 **REGISTRATION AND REFRESHMENTS**

09:00 **CHAIR'S OPENING REMARKS**

SESSION 5 PLANT OPERATION

09:10 **CONSIDERATIONS FOR LARGE STEAM TURBINES ROUTINELY EXPERIENCING LONG SHUTDOWN PERIODS**
Jonathan Thorns, Engineer, GE Power
- Optimised start times
- Long shutdowns
- Risk mitigation

09:30 **THE ECONOMIC IMPACT OF POWER PLANT CHEMISTRY IN RESPECT TO OPERATION, LIFETIME AND MAINTENANCE OF A STEAM TURBINE**
Frank U. Leidich, Transverse Technology Unit Director Mannheim, GE Power and Joerg Sperling, Principal Engineer Chemical, GE Power
- Impact of deposits on turbine performance
- Increased turbine failure probability by inappropriate chemistry control
- Case studies

09:50 **FLEXIBILITY UPGRADES ON STEAM TURBINES**
Dr Burak Kaplan, Service Development Manager, Mitsubishi Hitachi Power Systems Europe and Alessandro Calabrese, Customer Support Engineer, Mitsubishi Hitachi Power Systems Europe
- Variable startup
- Automatic plant startup completion at a lower load
- Relaxation of steam admission limits

10:10 **STEAM TURBINE OVERSPEED CALCULATION METHOD**
Stuart Rowe, Manager, GE Power
- Turbine overspeed calculation
- Block of energy' method
- Requirements of BS EN 60045

10:30 **QUESTION AND ANSWER SESSION**

10:50 **NETWORKING REFRESHMENT BREAK**

SESSION 6 GENERATOR OVERHAULS AND LIFE EXTENSION

11:10 **IMPEDANCE SPECTROSCOPY AND RESONANCE IN TESTING OF TURBOGENERATOR ROTOR RETAINING RINGS TECHNICAL CONDITION**
Dariusz Baron, Turbogenerator Specialist, EthosEnergy Poland S.A
- NDT testing of turbogenerator rotor retaining rings
- Method to be used is induction coil impedance spectroscopy and resonance method
- Test results and the role of retaining rings in the turbogenerator operational safety

11:30	**SUCCESSFUL LAUNCH OF RAPID ROTOR REWIND IS CHANGING THE SAME FOR ON-SITE REWINDS OF AIR-COOLED GENERATORS** **Kathy Stubbs, Manager, New Products, GE Power Services** • A 'Rapid Rotor Rewind' (3R) has been successfully performed at a CCGT plant in Thailand within an unwind and rewind time of only 18 days • The 3R aims to minimise outage time at best cost for air-cooled generator rotors • Successful pilot opens opportunities for on-site rotor insulation lifetime extension on small air-cooled generator rotors coupled to gas turbines installed during the gas boom of the 1980's
11:50	**QUESTION AND ANSWER SESSION**
12:00	**NETWORKING LUNCH**
	SESSION 7 TURBINE OVERHAULS AND LIFE EXTENSIONS
13:00	**NEW STRATEGIES FOR OIL FLUSHING DURING THE REVISION OF STEAM TURBINES** **Russell Cradduck, Sales and Distribution Manager, Europe, Fluitec UK and Jo Ameye, General Manager Europe, Fluitec NV** • Remove oil degradation products from steam turbines during revisions by using a compatible, solubility-enhancing cleaning agent • Avoid the need for a "sacrificial rinse" • Reduce time spent on planned outages
13:20	**THERMAL AND STRUCTURAL STEAM PATH AUDITS** **John Alaksiewicz, Senior Technical Leader, GE** • Structural Reliability • Performance Recovery • Technically and Economically prudent maintenance decisions
13:40	**L-0 BLADES IN TURBINES; THEIR REPLACEMENTS AND IN-LINE ROOT CRACK TESTS** **Bjarne Sig Andersen, Principal Specialist, Ramboll Energy – Power and Lars Fejrskov Jensen, Engineer, DONG Energy Thermal Power** • Damages to L-0 blades in 375 MW CHP turbine for wide flow range • Replacement of L-0 blades in 375 MW CHP turbine • In-line tests for root cracks in two 400 MW CHP turbines
14:00	**TROUBLESHOOTING OPERATION AND MAINTENANCE ISSUES - GE A SERIES AND D SERIES STEAM TURBINES** **Scott Cavendish, President, Independent Turbine Consulting, LLC** • Evolution of combined cycle steam turbine design • Combined cycle maintenance issues • Common causes of startup and operation issues
14:20	**QUESTION AND ANSWER SESSION**
14:35	**NETWORKING REFRESHMENT BREAK**
	SESSION 8 INSPECTION AND MONITORING
14:55	**STEAM TURBINE THERMAL PERFORMANCE DIAGNOSTICS** **John Tzagkarakis, Steam Turbine Performance Engineer, GE Power and Water, Thomas Winterberger, Principal Engineer, GE Power and Water** • Steam Turbine Diagnostic Parameters • Performance and Health • Monitoring of the Turbine Cycle • Case Studies
15:15	**A NEW APPROACH TO THE INSPECTION OF LARGE STEAM TURBINES FOR TODAY'S GENERATING FLEET** **Mike Jones, Principle Engineer, GE** • Extended inspection intervals • Flexible approach to turbine maintenance • Opportunities for utilities
15:35	**IN-SITU GENERATOR INSPECTION TECHNIQUES** **Mark Wright, Electrical Test Engineer, Siemens Power Generation** • Assesses the pros and cons of inspecting and testing generators with the rotor removed against with the rotor in-situ. • Discusses the techniques involved in conducting in-situ inspections. • Discusses case studies where these techniques have been put into practise.
15:55	**ACOUSTIC THERMOGRAPHY NDE OF STEAM TURBINE BLADING** **Geoff Horseman, Chief Turbine Engineer, Siemens Power Generation and Forrest Ruhge, Principal Engineer, Siemens Energy** • Special crack detection method for eroded steam turbine blades • Employs acoustic thermography to distinguish between cracks and erosion • May be used in-situ with turbine covers on
16:15	**QUESTION AND ANSWER SESSION**
16:30	**CLOSING REMARKS**
16:40	**CLOSE OF USER GROUP**

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STEAM TURBINE AND GENERATOR USER GROUP 2016

16-17 March 2016
Manchester Conference Centre
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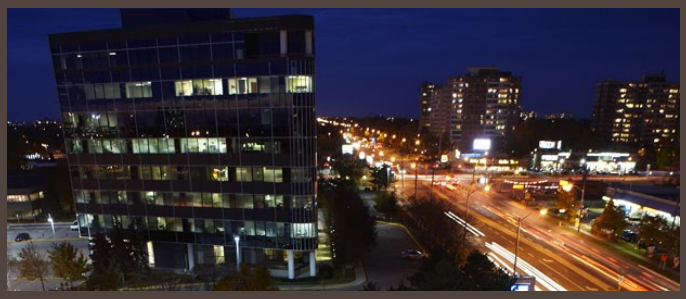

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