

Gas Turbine Failure Analysis

Discover The Latest Technology and Best Practical Experience from Gas Turbine Failure Expert

22nd - 24th April 2019 | Kuala Lumpur, Malaysia
06th - 08th May 2019 | Bangkok, Thailand
04th - 06th September 2019 | Bandung, Indonesia
04th - 06th November 2019 | Kuala Lumpur, Malaysia

Complicated Major Failure Case Studies, Knowledges Not From Literature and Practical Exercises! Many Practical Exercises!



Petrosync Distinguished Instructor

Jim Oswald, C.Eng, MIMechE

Leading Gas Turbine Failure Investigation Consultant

- ▶ Director of Oswald Consultancy, a leading gas turbine failure investigation consultant for many various turbine
- ▶ 35 years experience designing & developing gas turbines
- ▶ Chief Engineer Gas Turbines, Rolls-Royce
More than 20 years experience gas turbine failure investigations
- ▶ Established and runs own consultancy specializing in GT failures since 2003
- ▶ Published international papers on gas turbine variable area nozzle, gas turbine recuperators and wind turbine grid deployment

Major Gas Turbine Failures Investigations

- ▶ OEM aero derivative turbine blade failures
- ▶ CCGT combustor transitionduct major failures resolved
- ▶ Published paper on design of Variable Area Nozzle WR-21 Turbine
- ▶ Aero derivate oil and vibration investigation
- ▶ CCGT combustor major failures resolved

Testimonials

"I learned a lot of experiences which are not available in the literature!"

"I have confidence for not only using formal methods. Creativity and searching pattern become important for me after following this course!"

"This course has a really good point of view that I never met before to solve such a complicated failure"

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Masterclass Overview

Failure investigations are tough rigorous challenges form the best in engineering. This course will teach delegates the range of thinking and subjects, which need to be considered in driving to find the real root cause of failure. The class will be based around some of the most difficult challenges faced by the professions in the industry and challenge the analytical and creative ability of the best students.

Jim Oswald has resolved many major gas turbine failures that can not be solved by many consultants before him. These cases will be presented on the course and there will be a lot of exercises to let the delegates have a deep understanding in solving major gas turbine failure.

Masterclass Objectives

- ▶ Learn from real experience on some of the most challenging gas turbine failure investigations
- ▶ Learn how to avoid failureshappening again
- ▶ Learn about the pressure of failure investigation and how to stay cool whilst work
- ▶ What sort of methods OEMs use to avoid responsibility for failures.
- ▶ How to analyze data effectively to identify the root cause quickly and cost effectively
- ▶ Learn from an expert investigator with international reputation

Specially Designed for

The course is designed for professionals who want to know practical knowledge which will sharpen analytical skill in resolving major gas turbine failures.

- ▶ Reliability Engineer
- ▶ Rotating Mechanical Engineer
- ▶ Maintenance Engineer
- ▶ Electrical Engineer
- ▶ Instrument Engineer

Each attendee must bring a **Laptop computer** with Microsoft operating system with Microsoft Excel and Power Point installed.

HYBRID TRAINING SOLUTIONS

FOCUS TRAINING • REDUCE COST • ENHANCED RESULTS

Over the years, there has been a growing demand for hybrid training programs. It is an excellent option to maximize your training dollar for your specific training needs. We make it possible to run a training program that is customized totally to your training needs at a fraction of an in-house budget!

If you like to know more about this excellent program, please contact us on +65 3159 0800 or email general@petrosync.com

▶ Petrosync Quality

Limited Attendees

The course has limited seats to ensure maximum learning and experience for all delegates.

Certificate of Attendance

You will receive a Certificate of Attendance bearing the signatures of the Trainer upon successful completion of the course. This certificate is proof of your continuing professional development.

Interactive Training

You will be attending training designed to share both the latest knowledge and practical experience through interactive sessions. This will provide you with a deeper and more long-term understanding of your current issues.

High Quality Course Materials

Printed course manual will provide you with working materials throughout the course and will be an invaluable source of reference for you and your colleagues afterward. You can follow course progress on your laptop with soft copies provided.

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Course Agenda

Day 1

Delegates will be reminded in how a gas turbine works, learn how to think through failure sequences and learn how to avoid misleading failure information

- How a Gas Turbine works, flows, controls, combustors, noise
- **Group Task** with **Case Study** - Delegates will identify gas turbine failure and chart sequence of events before and after failure. Discussion on need for creativity in failure investigation based on Trainer's experience.
- The importance of careful recording and how to record.
- **Case Study**
- Misinformation and how it occurs
- Group Task - How to improve recording data

Day 2

Delegates will learn about formal failure methods, how and why metal fails when and how best to use specialist expertise

- Fishbone, RCA, Ishikawa
- **Group Task** - Redo chart of DAY 1 using formal method. Discuss and Compare the benefits
- Using Specialist expertise in GT Failure investigations: metallurgy, noise, vibration, controls
- When and how to use them in validation and discovery of evidence
- How to break metal: fatigue, creep, fracture, vibration
- The differences, and why its vital to understanding failures
- **Case Study**
- Group Task - identify if fatigue or creep from reports / photos provided. Judge if high cycle or low cycle fatigue

Day 3

Delegates will learn about a common cause of failure (fatigue) and work through case study work using methods taught and thus how to avoid a repeat failure

- **Case Study**
- Thermal Fatigue - What is it, how does it arrive and how leads to cracking and failure.
- **Case Study**
- **Group task** - calculate if thermal fatigue likely from data supplied
- Pattern of failures and why patterns matter
- **Group task** - identify patterns from data supplied. What does the pattern tell you?
- **Case Study**
- **Group task** - Delegates will be presented with failure evidence (based on real and serious failures) and asked to explain the failure using methods learnt. They will work in teams of 3 or 4. Trainer will act as engine operator and OEM. They need investigate and identify root cause followed by presenting the results to senior management

IN-HOUSE SOLUTIONS

SAVE COST • IMPROVE PERFORMANCE • REDUCE RISK

PetroSync understands that in current economic climate, getting an excellent return on your training investment is critical for all our clients. This excellent training can be conducted exclusively for your organization. The training can be tailored to meet your specific needs at your preferred location and time. We will meet you anywhere around the globe.

If you like to know more about this excellent program, please contact on +65 3159 0800 or email general@petrosync.com

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Petrosync Distinguished Instructor

Mr. Jim Oswald, C.Eng, MIMechE

Leading Gas Turbine Failure Investigation Consultant

Jim Oswald, the director of Oswald Consultancy, has 35 years experience designing & developing gas turbines and more than 20 years experience gas turbine failure investigations from various turbines : Alstom, Siemens, RR, Mitsubishi, Westinghouse, etc.

Oswald Established an engineering consultancy in 2003 providing technical support for design and development support for new and operating gas turbine plant and other new product developments in the energy industry.

Previous experiences gained in international energy company - new product design & development and company strategy. Extensive technical knowledge is combined with excellent presentation skills, business acumen, international experience and a desire to assist others in the field of energy. Well regarded for ability to communicate, innovate and solve technically challenging issues

EXPERIENCED IN

- Gas Turbine design
- Risk assessment
- Managing development programmes
- Stress analysis
- Lifting components
- Creep analysis
- System design
- Innovation
- Turbine design

CLIENT LIST

- GDF Suez
- Teesside Power Station
- Rolls-Royce
- Babcock International Group
- Infinis Energy Services
- Energy Technology Institute
- E.on
- PX Ltd
- Stadtkraft
- Carbon Trust
- ITM Fuel Cells

Testimonials

"On a number of occasions I observed Jim Oswald expertly lead his team to successfully identify the root cause of different but equally complex combustor failures on large CCGTs. On each occasion his work had a significant and important bearing on how quickly we were able to resolve the issues faced", Darren Watson, Corelia Solutions Ltd (formerly Technical & Development Manager for GDF Suez Energy uK)

PROGRAM SCHEDULE

08:00	Registration (Day1)
08:10 - 10:00	Session I
10:00 - 10:15	Refreshment & Networking Session I
10:15 - 12:30	Session II
12:30 - 13:30	Lunch
13:30 - 15:00	Session III
15:00 - 15:15	Refreshment & Networking Session II
15:15 - 16:00	Session IV
16:00	End of Day

*Schedule may vary for each training

INVESTMENT PACKAGES

Please checklist the package that you are attending!

	Gas Turbine Failure Analysis Schedules	Price
☐	22 nd - 24 th April 2019 at Kuala Lumpur, Malaysia	USD 2,895
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☐	04 th - 06 th November 2019 at Kuala Lumpur, Malaysia	USD 2,895

* Price is nett excluding Withholding Tax if any and will be quoted separately. Please send us the withholding tax payment receipt.

* Prices include lunches, refreshments and training materials.

DELEGATE DETAILS

1st Delegate Name _____ Mr ☐ Mrs ☐ Ms ☐ Dr ☐ Others ☐

Direct Line Number: _____ Email: _____

Mobile Number: _____ Job Title: _____

Department: _____ Head of Department: _____

2nd Delegate Name _____ Mr ☐ Mrs ☐ Ms ☐ Dr ☐ Others ☐

Direct Line Number: _____ Email: _____

Mobile Number: _____ Job Title: _____

Department: _____ Head of Department: _____

3rd Delegate Name _____ Mr ☐ Mrs ☐ Ms ☐ Dr ☐ Others ☐

Direct Line Number: _____ Email: _____

Mobile Number: _____ Job Title: _____

Department: _____ Head of Department: _____

*Please fill all the details including mobile number. This help us to contact participant if they are late in class or if there is any urgent update (through whatsapp/call)

INVOICE DETAILS

Attention Invoice to: _____

Direct Line Number: _____ Fax: _____

Company: _____ Industry: _____

Address: _____ Postcode: _____

Country: _____ Email: _____

Please note:

- Indicate if you have already registered by Phone ☐ Fax ☐ Email ☐ Web ☐

- If you have not received an acknowledgement before the training, please call us to confirm your booking.

PAYMENT METHODS

☐ By Credit Card :

Please debit my credit card: ☐ Visa ☐ MasterCard ☐ AMEX Security Code: _____

Card Number: _____ Expiry Date: _____

Name printed on card: _____

☐ By Direct Transfer : Please quote invoice number(s) on remittance advice

PetroSync Global Pte Ltd Bank details:

Account Name: PetroSync Global Pte Ltd

Bank Name : DBS Bank Ltd

Bank Code : 7171 • Bank Swift Code : DBSSSGSGXXX • Branch code : 288

Account No : • SGD : 288-901898-0 • USD : 0288-002682-01-6

Bank Address : 12 Marina Boulevard, Level 3. Marina Bay Financial Centre Tower 3. Singapore 018982

All bank charges to be borne by payer. Please ensure that PetroSync Global Pte Ltd receives the full invoiced amount.

PROGRAMME CONSULTANT

Contact : Cay Aagen

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TERMS AND CONDITIONS

DISCLAIMER

Please note that trainers and topics were confirmed at the time of publishing; however, PetroSync may necessitate substitutions, alterations or cancellations of the trainers or topics. As such, PetroSync reserves the right to change or cancel any part of its published programme due to unforeseen circumstances. Any substitutions or alterations will be updated on our web page as soon as possible.

DATA PROTECTION

The information you provide will be safeguarded by PetroSync that may be used to keep you informed of relevant products and services. As an international group we may transfer your data on a global basis for the purpose indicated above. If you do not want us to share your information with other reputable companies, please tick this box ☐

CANCELLATION POLICY

Delegates who cancel after the training is officially confirmed run by email, are liable to pay the full course fee and no refunds will be granted. You may substitute delegates at any time as long as reasonable advance notice is given to PetroSync.

In the event that PetroSync cancels or postpones an event for any reason and that the delegate is unable or unwilling to attend in on the rescheduled date, you will receive a credit voucher for 100% of the contract fee paid. You may use this credit voucher for another PetroSync to be mutually agreed with PetroSync, which must occur within a year from the date of postponement.

PetroSync is not responsible for any loss or damage as a result of the cancellation policy. PetroSync will assume no liability whatsoever in the event this event is cancelled, rescheduled or postponed due to any Act of God, fire, act of government or state, war, civil commotion, insurrection, embargo, industrial action, or any other reason beyond management control.

CERTIFICATE OF ATTENDANCE

80% attendance is required for PetroSync's Certificate of Attendance.

DETAILS

Please accept our apologies for mail or email that is incorrectly addressed.

Please email us at registration@petrosync.com and inform us of any incorrect details. We will amend them accordingly.

CHARGES & FEE(s)

- For Payment by Direct Telegraphic Transfer, client has to bear both local and overseas bank charges.

- For credit card payment, there is additional 4% credit card processing fee.

Confirmation

I agree to PetroSync's terms & conditions, payment terms and cancellation policy.

Authorized Signature : _____

PAYMENT TERMS : Payment is due in full at the time of registration. Full payment is mandatory for event attendance.