

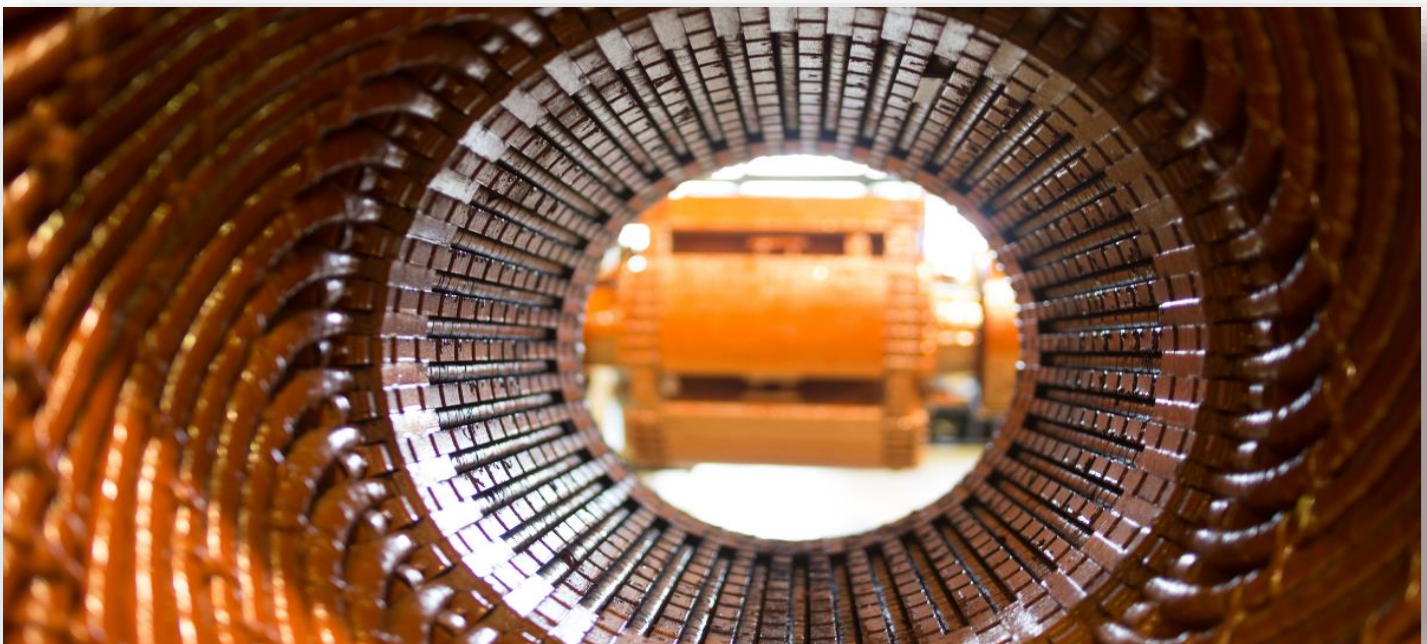
ENERGY1 Asia - Virtual instructor-led Training (Online)

Due to the recent developments with COVID-19 we have, for the health and safety of our speakers and attendees, our selected multi-day courses will be delivered live online led by experience practitioners. This will enable you to experience a similar engagement experience to our successful traditional classroom setting which includes exercises, answering your question and provide feedback – all without having to travel anywhere!

Electrical Rotating Machine Stator Core Design Characteristics, Failures and Testing

“Learn how to evaluate stator core conditions by learning its characteristics, failure modes and diagnostic techniques.”

24th – 25th November 2021 | 09:00 – 13:30 (GMT+8) Daily | ONLINE Virtual instructor-led Training



In collaboration:

Energy1asia.com

**HRDF
Claimable**



**Oil & Gas
Training**
TRAINING & CONSULTANCY

Electrical Rotating Machine - Stator Core Design characteristics, failures and testing (2 Half Days) Online Virtual instructor-led Training

Electrical Rotating Machines are crucial components in an industrial plant and are designed to operate reliably for many years. One of the most expensive parts of a 3-phase rotating machines such as generator is the stator, which is where the energy from the magnetic field is converted into electrical energy. The condition of the generator and its core deteriorates over time, increasing the likelihood of failures. Stator core is an essential component of the rotating machine which requires some diagnostic tests to evaluate its conditions over time.

These **2 half-days Online Virtual instructor-led Training (VILT)** waste no time but focus directly on the overview of the stator core design, different components, construction and characteristics. This will follow by the theoretical explanation and representation of the stator core current flows. Description of the different stator core's failure modes with explanation and representation of the failure process. Aspects considered will include : Back of core burning, Burning at core bars, Surface anomalies, Damage at core ends, Effects of leakage flux and flux fringing, Catastrophic failure at core clamping and tooth supports and Overheating will also be discuss.

Excitation circuit design, Core Testing Types & Comparison:

The second session, attendees will learn how to evaluate and design the excitation circuit. Required for the stator core tests. The instructor will show the types of core testing which is available to determine the condition of the stator core on big rotating machines which are:

- **Power Flux Test** (The test is more expensive compared to the ELCID test, but the diagnostic data collection and interpretation is easier) and
- **Electromagnetic Core Imperfection detection (EL CID test) Test** (which do not require external power source and no risk of damaging the stator core).

The instructor will further explain the testing principle, excitation requirement, measuring techniques and data interpretation. For each core testing types, advantages and disadvantages will be described during the explanation and comparisons are conducted in the case studies.

During these **2 days virtual Instructor Led training** you will learn how to evaluate stator core conditions by learning its characteristics, failure modes and diagnostic techniques.

Advance your knowledge and learn about:

- Stator core working principle
- Stator core characteristics
- Flux paths
- Failure modes
- Design the core flux test excitation circuit
- Core Testing Types: Full flux test and ELCID test
- Diagnostic test data interpretation

This program is intended for:

This comprehensive virtual course will be valuable to professionals who work in the power industry (Generation), Hydropower, oil & gas plants, refineries, chemical & petrochemical plants, mining, manufacturing, fertilizer & process industries that uses all types of large HV rotating machines and power generators.

- Electrical Engineer / Maintenance Engineers/Technicians
- Service engineering / Testing engineering / Instrument Engineers
- Engineering, Testing and Maintenance, Rotating Equipment Engineers
- Mechanical Engineers, Reliability Engineers, Production Engineers.
- Condition-based Monitoring Engineers involved in condition-based maintenance analysis.
- Engineers who wish to expand their service portfolio in testing.
- Engineers performing core testing on power generators or large HV motors
- Hydroelectric power stations synchronous generators with salient poles rotors.
- Engineers responsible for the condition assessment rotating machine and would like to know the existence and the benefit of the core testing.
- Any industries/engineers involved with large HV Motors (6.6kV – 11kV / 17.5kV) and Generators (6.6 –30kV).

Electrical Rotating Machine - Stator Core Design characteristics, failures and testing (2 Half Days) Online Virtual instructor-led Training

DAY 1

The design considerations for magnetic cores

- Electrical steel and the B-H curve
- Laminations
- Interlaminar insulation
- Diameters
- Slot details
- Magnetic flux density in
 - Stator teeth
 - Back iron
- Ventilation

In phase and quadrature flux in the laminations

- Flux flows in the stator core
- In phase current
- In quadrature current

How cores might fail

- Overheating
- Mechanical damage
- Other failure modes

DAY 2

Core testing

Testing principle

- Magnetization curve
- Calculation of excitation requirements
- Voltage proportional to flux density
- Current proportional to magneto motive force MMF

Continue DAY 2

Core testing types

Power flux tests

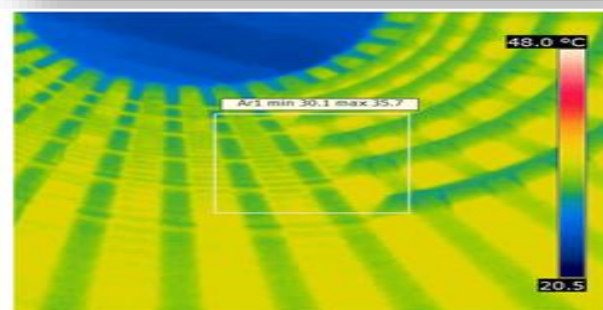
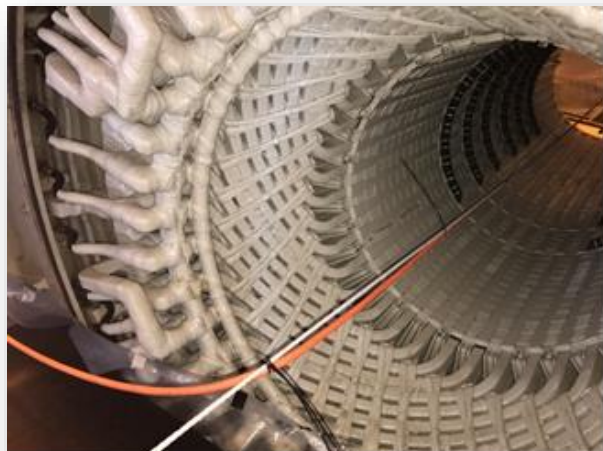
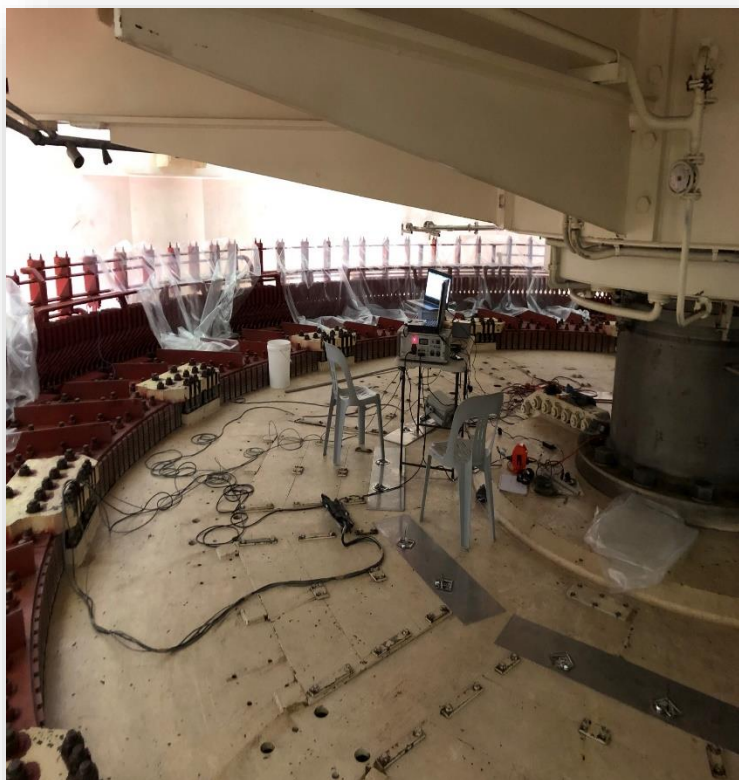
- Excitation levels
- Test set up
- Measurement technique
 - Thermography
 - Packet voltage measurement
- Test result analysis

Electromagnetic Core Imperfection detection (EL CID test)

- Origin of the test – the need for an accurate low flux test
- Test equipment
- Flux vector
- Test method
- Test results
- Test result analysis – comparison of quadrature current with the phase current
- Local fault analysis using a mini chattock

Case studies

- 180MW generator – core repair
- 45MW generator – back of core burning investigation
- 430MVA generator – 60% flux test – correlation with EL CID
- 80MW generator 100% flux test



Electrical Rotating Machine - Stator Core Design characteristics, failures and testing (2 Half Days) Virtual instructor-led Training Registration Form

Electrical Rotating Machine - Stator Core Design characteristics, failures and testing	Per Participant	PROGRAM DETAILS ONLINE Virtual instructor-led Training Date: 24 th – 25 th November 2021 Time: 09:00 – 13:30 (GMT+8)
Full 2 Half Days	USD 1099 ()	STEPS TO REGISTER: Simply fill up the registration form and email it to: Email to : registration@petro1.com.my Call us : +603 7727 3952 Mobile /Whatsapp: +6012 568 4696 (Harn)
<ul style="list-style-type: none"> The above investment fee is inclusive of e-course material. This course is limited to 15 attendees to ensure that the course can remain interactive. Please note the Online Virtual Instructor Led Training (VILT) time zone will be as "Malaysia / Singapore" time zone (GMT+8). 		
<p>If you or your company is facing travel restrictions, we may be able to arrange the training at your preferred location for remote participation or conduct the training in-house with minimum 15 pax. Please contact ihtraining@petro1.com.my to discuss this possibility.</p>		

Delegates Details

1. Name: _____ Mr Mrs Ms Dr

Job Title: _____

Email : _____

Contact No: _____

Department: _____

2. Name: _____ Mr Mrs Ms Dr

Job Title: _____

Email : _____

Contact No: _____

Department: _____

3. Name: _____ Mr Mrs Ms Dr

Job Title: _____

Email : _____

Contact No: _____

Department: _____

Head of Department: _____

Invoice Details

Invoice Attention to: _____

Company: _____

Industry: _____

Address: _____

Postcode: _____ Country: _____

Telephone: _____ Fax: _____

Email: _____

Authorized Signature : _____

Payment Method

By Direct Transfer: Please quote invoice numbers on remittance advice.

ACCOUNT NAME: PETRO1 SDN BHD

BANK : United Overseas Bank (Malaysia) BHD

ACCOUNT NO : 2609008514 (USD)

All bank charges to be borne by payers. Please ensure that PETRO1 SDN BHD received the full invoice amount.

CREDIT CARD PAYMENT

Credit card payment will include a charge 3.1%.

Payment Policy: Upon receipt of a completed registration form, it confirms that the organization is registering for the seat(s) of the participant(s) to attend the conference or training workshop. Payment is required with registration and must be received prior to the event to guarantee the seat. Payment has to be received 7 working days prior to the event date to confirm registration.

DATA PROTECTION

The information you provide will be safeguarded by Petro1 that may be used to keep you informed of relevant products and services. We take it seriously when it comes to protection of our client data.

Sales and service Tax (SST):

Apply to Malaysia register company only.

The above investment fee is excluding of SST 6%. The SST charges of 6% will be include during issuance of the invoices.

Cancellation & Substitutions:

Should you be unable to attend, substitutes are always welcome anytime at no additional cost. Please inform us as early as possible. Payment is non-refundable if cancellation occurs 7 working days prior to event commencement. However, delegates will receive a 100% credit on the amount paid which can be used in another PETRO1 SDN BHD training course for up to one year from the date of issuance. The credit is transferable to other persons in the same company and applicable against any future PETRO1 SDN BHD public course/ Online Live Webinar. If cancellation occurs 7 working days prior to the registration date and there is no substitute, the organizer reserves the right to charge 50% of the total investment from your organization.

In the event that, PETRO1 SDN BHD. postpones or cancels a course, delegate payments at the date of cancellation or postponement will be credited to a future PETRO1 SDN BHD course. This credit will be available for up to one year from the date of issuance, and it is transferable to other persons in the same company and applicable against any future PETRO1 SDN BHD public course.

PETRO1 SDN BHD is not responsible for any loss or damage as a result of a substitution, alteration or cancellation/postponement of an event. PETRO1 SDN BHD shall assume no liability whatsoever in the event this training course is cancelled, rescheduled or postponed due to a fortuitous event, Act of God, war, fire, labor strike, extreme weather or other emergency.

Program Change policy:

The organizer reserves the right to make any amendments and/or changes to the webinar, Date/ time, facilitator replacements and/or modules if warranted by circumstances beyond its control.

This course information may not be copied, photocopied, reproduced, translated, or converted to any electronic or machine-readable form in whole or in part without prior written approval of PETRO1 SDN BHD.