

# A STATISTICAL ANALYSIS OF AUSTRALIAN AND NEW ZEALAND POWER TRANSFORMER FIRES AND EXPLOSIONS

*The statistics of power transformer fires and explosions is necessary to understand, because this gives industry an indication of the risks that they are incurring when operating power transformers.*

**D**educing a probability of fire or explosion is challenging because these types of events occur too rarely for one utility to adequately determine this probability.

#### **88,000 TRANSFORMERS SERVICE YEARS**

Consequently, a large scale analysis of data is being performed by the Australasian Transformer Innovation Centre (TIC) on data from many Australian and New Zealand utilities. Many utilities have been contacted for data, which is being used to build a database of power transformer reliability. The outcome of this work is to provide the utilities up-to-date information on the probability of failure, and its different modes, for them to strengthen their asset management policies. Currently, approximately 90,000 transformer service years of data from a fleet of 6,600 power transformers has been collected and is being analysed.

Preliminary analysis is showing a classic bathtub-type age distribution, where there have been several failures in the life of the transformer, e.g. perhaps caused by design, manufacturing or installation issues. In mid life, up to twenty years, no fires or explosions were reported, and then after twenty years the rate began to increase.

The data is undergoing review and a small focus group of engineers from industry is being formed to evaluate the analysis and advise implications on asset management policy, and also to evaluate the effectiveness of existing solutions to mitigate the risk of transformer fires and explosions.

*To learn more about this TIC research project please contact:*

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University of Queensland – E: d.martin6@uq.edu.au*

## UPCOMING ADVANCED CPD COURSE

12-13 NOVEMBER 2018

### **POWER TRANSFORMER HV BUSHINGS - DESIGN, MAINTENANCE AND RISK MITIGATION**

Nine presenters from industry and academia will deliver the two day course, providing the desired balance between industry practicality and academic scientific understanding.

The course will be sectioned into areas of HV bushing design, mechanisms of failure, maintenance, failure statistics, factory & site testing.

#### **KEY LEARNING OUTCOMES:**

- Understand the basic design principles of HV Bushings.
- Learn the differences in technology for SRBP, OIP, RIP, RIS bushings and how these differences influence your maintenance and asset strategies.
- Be informed of the latest Australian HV bushing failure statistics.
- Understand the mechanisms of HV bushing failure.
- Learn how to detect bushing failures using offline techniques, such as the advantages of dissipation factor and capacitance at different frequencies.
- Learn practical methods to improve your bushing testing methodology.



- Understand online bushing monitoring techniques, what they measure, and diagnostic tools in common use.
- Learn what the common practices employed by other electrical utilities in: bushing life cycle management, testing, replacement practices and issues, determining end of life and justification to mitigate risks.
- Participate in group sharing activities and build your network of friends and technical experts.

This course was originally run in February of this year, where eighteen delegates attended and:

- 100% of delegates said they would recommend this course to others.
- 100% of delegates rated the course either Excellent or Good.

What delegates said:

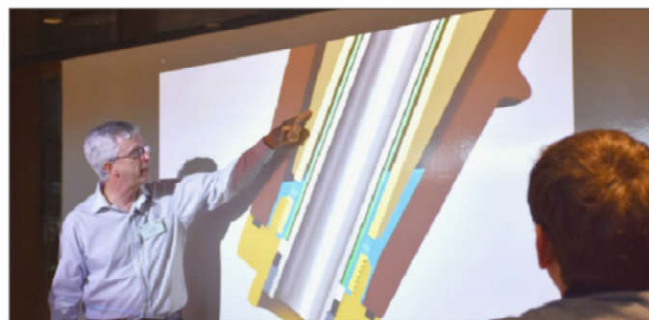
*"Provided excellent quality information"* - Snowy Hydro Ltd  
*"Well organised, relevant to the topic, excellent speakers"* - Energy Queensland  
*"Very good information on design/maintenance practices"*,  
*"Great course, high quality."* - Stanwell Corporation Ltd  
*"Significant learnings"* - SA Power Networks



Karl Haubner Doble Australia highlighting HV bushing test preparations.



Rob Milledge ABB Australia explains intricacies of HV Bushing Design.



*How to register:*

The online registration will be posted on the TIC website by the 11th September 2018  
<http://www.itee.uq.edu.au/tic-cpd> or contact  
 Ray Holzheimer, Manager, Australasian Transformer Innovation Centre, University of Queensland -  
 E: [r.holzheimer@uq.edu.au](mailto:r.holzheimer@uq.edu.au) M: 0417 629 684

If you want to learn more about TIC and the benefits of becoming a member, visit: <http://www.itee.uq.edu.au/tic> or contact:  
 Prof Tapan Saha, Director, Australasian Transformer Innovation Centre, University of Queensland -  
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