

Risk of Fires from Inverter Drives

What happened?

The transformer in the thruster circuit for an accommodation support vessel caught fire after the internal insulation was damaged by overheating due to the effects of harmonic currents introduced by variable frequency drives.



In this incident, the transformers had not been correctly rated. Transformers intended for use with inverter drives should be rated for the additional heating effects imposed by harmonic currents resulting from the non-linear nature of switched and unbalanced loads.

Other precautions include: minimising harmonic current generation by using twelve-pulse systems; using a balanced pulse-width modulation 3-phase bridge design; monitoring of winding temperatures and phase voltage imbalance, and designing the inverter-fed load to be as balanced as possible.

Risk of Fires from Inverter Drives

What could go wrong?

In addition to the obvious risks of fire, in this case there could have also been risks associated with the loss of the dynamic positioning of the facility if the failures occurred during a safety critical operation.

Key Lessons

The correct design of all equipment for use in circuits where harmonic currents are likely is essential to prevent fires.

All transformers fed by inverter drives should be checked to see if they are rated for inverter duty, and inspected periodically for the effects of overheating. For three-phase transformers, all phases should be loaded uniformly and any imbalance leading to phase overheating attended to urgently.

Who is responsible?

Clause 13 of Schedule 3 of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* places duties on suppliers of facilities, plant or substances (suppliers) to take all reasonably practicable steps to ensure that at the time of supply the condition of the facility, plant or substance is, when properly used, safe and without risk to health.

Suppliers must also take reasonably practicable steps to carry out the research, testing and examination necessary to discover, and to eliminate or minimise any risk to health and safety that may arise from the use of the equipment they have supplied.

Operators of facilities have a duty of care to ensure that plant and equipment at the facility are safe, and without risk to health. Maintaining equipment and operating it within its design envelope is an important means of meeting this duty.

Contact

For further information email alerts@nopsa.gov.au and quote Alert 40.