

Overheated transformer activated fire alarm

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An under-rated transformer was installed, causing overheating and thermal degradation of the transformer which subsequently tripped the breaker and activated the vessel's fire alarm.

The incident occurred after the boiler in the mess room became faulty and needed replacement. The original boiler had an internal transformer within the unit, but an identical boiler was not available onboard. A new boiler was sourced and installed, along with a new transformer in the dry store switchboard cabinet.

During commissioning, the unit tripped, and a burning smell was noted.

Subsequently the fire alarm activated, and the vessel crew were instructed to leave the accommodation and the fire team were deployed to investigate.

What went wrong?

The vessel electrician had incorrectly calculated the rating of transformer required to accommodate the new boiler. He applied the correct formula but input the wrong values.

Lessons learned

- There was a positive and immediate response from the electrician and motorman to prevent further escalation.
- The calculation used to determine which transformer was needed was incorrect due to lack of concentration and a typo. This led to an underrated transformer being used. The actual load was 4 times the rating of transformer.
- The current should have been checked with a clamp-on meter during the initial switch on – this would have identified the overcurrent, giving the electrician the opportunity to switch off the boiler before the transformer overheated.
- Whilst there was poor ventilation to the transformer unit, this was not the root cause. It was also found that flammable material was stored outside and inside of the electrical cabinet.

Actions

- Review replacement of transformers in the vessel electrical systems to determine if replacement transformers are correctly rated.
- Complete an immediate inspection of all electrical cabinets, electrical equipment and panels to ensure there are no materials stored adjacent to them which could present a fire hazard. This should also be a focus of regular work place inspections.
- In dedicated storage areas, indicate **no storage zones** on the deck around electrical cabinets.

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