

SIEMENS

Ingenuity for life

As good as new: Siemens TLM success

HVDC converter transformer repair

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The challenge

Our customer National Grid Interconnector Ltd. needed to ensure that a failed HVDC transformer would be able to continue playing its vital role in providing a safe and reliable electricity supply. The unit was assessed by a third-party transformer testing company that identified the location of the fault allowing it to be considered for repair.

Siemens TLM offered a repair to the damaged unit that would reduce the potential lack of transmission capacity in the event of the outage of another unit. The customer decided to repair the transformer and mitigate the possible risk of future failures. In addition, the customer placed an order for a new HVDC unit at the HVDC transformer plant in Nuremberg.

National Grid

National Grid is an international electricity company based in the U.K. and the northeastern U.S. that plays a vital role in connecting millions of people safely, reliably, and efficiently to energy. National Grid UK owns the electricity transmission system in England and Wales and operates an HVDC substation in Sellindge.

The solution

Siemens UK and Siemens TLM in Germany – well known for excellence in building new transformer parts and their repair experience in their Nuremberg workshop – jointly presented the customer with an ideal solution for the task.

The unit was originally manufactured by Bruce Peebles & Co. Ltd., a former VA Tech company – just like the Siemens transformer plant in Weiz. After the failure was detected, a new, state-of-the-art winding was manufactured in Weiz and shipped to Nuremberg.

The old insulating oil was drained and all components of the active part were checked for metal residue and other damage. After the repair, the converter was filled with new oil. Several cycles of oil processing and filtration were performed to make sure no metal residue would create operational risks for the repaired unit.

After successfully testing the repaired unit, it was shipped to the U.K. for installation and commissioning by the local Siemens workforce.



The dimensions of the unit are enormous, and a weight of 360 t meant a logistical challenge for everyone involved. The picture shows the active part is being removed from the tank.

"We are pleased that it has been successfully tested and returned to Sellindge. The unit will play an important role in supporting the HVDC interconnector with France."

James Sheridan, Project Manager at National Grid

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What happens when a damaged winding meets TLM™?

Precision and expertise make it as good as new!

Technical features

1. Disassembly

A specialist service team from Siemens UK dismantled and packed the unit on site in record time in order to be on time for the scheduled sea crossing.

The damaged HVDC converter transformer was built in 1984 – the tank designed by Peebles was a bell structure, unlike the new tanks that have a lid on top. This meant that the disassembly of the transformer was a challenging task for TLM. It could only be done after the oil was drained.

2. Failure detection

Failure diagnosis had been performed by an external company, but the more precise failure detection was in the hands of Siemens TLM™. The experts found out that a winding-to-winding failure had occurred in phase C of the transformer.

3. Winding manufacturing

Having the construction documentation from the original transformer at hand helped Siemens manufacture a completely new, state-of-the-art HV winding to replace the damaged one. To save time, the winding was manufactured in the transformer plant in Weiz and then assembled to the active part in Nuremberg.

4. Condition assessment

The remaining windings and core were examined closely to make sure no other damage had occurred or would be likely in the future. The presence of carbonised insulation paper meant that the disassembly had to be conducted with extreme precision – gently and systematically extracting the oil.

5. Re-assembly and oil processing

After repairing the faulty winding, the active part was re-assembled and the bushings were installed. The transformer was then filled with new insulation oil. However, to ensure a perfect repair, all copper particles from the old impregnated windings were removed and a special filtering process with several oil processing cycles was put in place.

6. Testing

National Grid and their consultant were present at the successful testing of the transformer.

“Due to the size and weight of the transformer it was a huge challenge to prepare the unit for shipping under a very tight timescale. The repair was managed well considering the level of uncertainty with a failed unit of this age.”

James Sheridan, Project Manager at National Grid

Benefits of a transformer repair at Siemens TLM™

Transformers are cost-intensive products that require long-term planning. When it is repaired, a transformer is restored to its original condition in all respects (current, voltage, and impedance). Thanks to the global network of Siemens repair workshops, we can provide the right repair facility within reach of nearly all transformer operations.

- § sustainable solution that meets the highest ecological standards
- § avoid future bottlenecks in transformer availability
- § adapt existing transformers to new grid conditions
- § increase existing capacity for transformers of all performance classes up to 800 kV/1.200 MVA
- § get everything from a single source, with a single contact for transformers from all manufacturers and in performance classes, from disassembly to commissioning

If you're interested in learning more about the benefits that TLM can offer your operation, talk to us!



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