With an aging fleet of traction transformers and tight maintenance budgets, traction transformers remain in service well past their optimal life spans. The assumption that all are healthy for an extended working life can be a dangerous game and one which railway operators were not prepared to play.

The story
The french private railway company operates a fleet of dedicated Bo-Bo-Bo locomotives on its shuttle trains transporting cars, coaches and lorries through the Channel tunnel between England and France. As the tunnel is more than 100m below sea level, trains enter it through inclined sections at either end.

The locomotives must not only be powerful enough to start the heaviest train on these gradients, but the tunnel’s special significance and length have led to stringent demands in terms of fire protection and redundancy which these locomotives must fulfill.

Customer need
Limit the risk of outage with a full transformer factory revision package during vehicle midlife overhaul program.

ABB response
ABB won the order to overhaul the 15 years old traction transformers of 17 of these locomotives in a 3 year preventive maintenance contract lasting from 2006 to 2008 due to their extensive workshop facility, world class quality and tight project scheduling.

Scope of work
The scope of this preventive maintenance work included for each of the 17 traction transformers:
- Oil analysis, interpretation and recommendation
- Inspection, cleaning and diagnostic measurement
- Inspection and control of the active part (pressure of the windings, spacers)
- Tightness optimization of the tank (O-ring gasket)
- Replacement of all gaskets, refilling with fresh oil
- Special tightness test under pressure with warm oil
- Oil analysis after overhaul
- Electrical Routine tests “as-new” and according to IEC Standards

Customer benefits
- Shorter lead-time due to the tight project scheduling
- Reduced maintenance costs
- Updated components provided increased reliability and reduced risk of outages.
Fleet Midlife Refurbishment / Overhauling
- Extensive overhaul of a transformer to extend remaining lifetime and increase reliability, typically performed after half of the expected lifetime
- Visual inspection of active part of traction transformer
- Analysis of events, maintenance and operation history
- Transformer and active part drying
- Advanced diagnostics to check mechanical, thermal and electrical condition
- New/refurbished accessories such as bushings, pumps, temperature sensors, valves, gaskets, water coolers
- Refurbishment of the active part such as cleaning of active part, winding reclamping, connection retightening and new installation parts

Quality
ABB service factories are ISO 9001, ISO 14001 and IRIS certified. ABB believes and strictly applies quality systems, especially where the environment is concerned. ABB’s factories use special instructions to ensure proper handling of old and/or hazardous materials. The same Quality Plan is used for both new and remanufactured transformers. Quality documentation follows the unit from shipping to disassembly and all the way through the process back to shipping to the customer site.

Recommended solutions
1. Regular Asset Services
2. Early Life Inspection
3. Mid Life Refurbishment
4. End of Life or Remanufacturing for Life Extension

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