



## CASE STUDY

# Major overhaul of English Electric 12 Cylinder SVT Engines, fitted to Network Rail Class 31 locomotives

**Key Parameters:** Complete project on time/within client budget. Utilise any recycling opportunities available

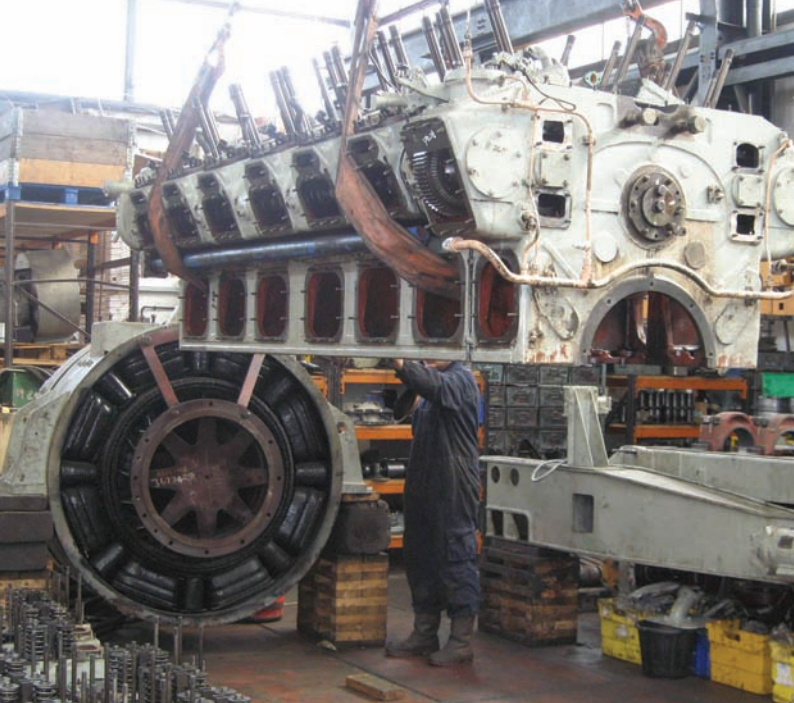
**Date:** June 2007 to December 2008

### Project Description/Specification

In January 2007, GSE were awarded a contract to carry out a major 30,000 hour overhaul of four No. 12 SVT locomotive engines for Railway Vehicle Engineering Ltd. The engines produced power for four Network Rail owned Class 31 locomotives 31104, 31233, 31288 and 31464. GSE were able to completely overhaul the power units whilst working in tandem with RVEL who were able to refurbish the locomotives. All of the works were carried out and completed at the Railway Technical Centre in Derby.

The project specification for each engine detailed a complete strip of the power unit including removal of the generator and separation of the entablature from the bedplate. This work was carried out together with a complete overhaul of all engine components including pistons, connecting rods, cylinder heads, turbochargers, TV damper and gear driven pumps.

During the overhaul programme, each individual engine had specific issues which had to be incorporated within the ongoing schedule. Some of the issues included significant crankshaft and bearing damage on two main engines from earlier lubrication oil failure. This involved removing both crankshafts from the engine to facilitate a complete re-grind with undersize main and large end bearings manufactured to suit.



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GSE were able to utilise recycling technologies by recovering numerous major components including; crankshafts, bedplates, pistons, cylinder liners, heads and TV dampers from out of service power units. These parts were completely overhauled, recalibrated and refitted into specific units. At each stage of the rebuild process, all components were completely stripped, measured and recalibrated. All components measured out of tolerance were replaced along with all consumable parts and bearings. This provided the client with an additional cost saving as well as having an environmental benefit.

At key stages through the rebuild schedule, overhauled generators were re-aligned to each power unit. However, the original generators were not necessarily refitted to each engine, resulting in a requirement to re-bush each engine skid, prior to re-alignment of each generator, allowing new dowels to be fitted on completion.

To facilitate project development for Network Rail, an independent railway support company Interfleet Technology Ltd were commissioned during the overhaul of power unit IH7208 to complete a full process audit. A detailed report was produced, examining procedures and skills employed by GSE during key stages of the engine overhaul schedule.

Prior to any locomotive returning to mainline service, each power unit is subjected to a full static load bank test to facilitate the initial bearing checks and subsequent running in of bearings. During the load bank test all relative parameters are recorded at each load demand increase. This test concludes with a recorded measurement of generator power output.

A comprehensive report was then produced detailing all significant stages during the overhaul schedule, listing all measurements and calibration data.

