



Modernizations and Retrofits

Modern science and technology allows building steam locomotives and steam engines, which are far more powerful and efficient as their traditional ancestors. Whilst it usually pays to consider a new design, it can be worthwhile to have a look at rebuilding and modernizations. The degree of improvement depends on the quality of the original design and the amount of modifications. The following improvements are possible:

- Light oil-firing ⇒ very clean combustion, higher efficiency, shorter preparation time, no waste
- Roller bearings ⇒ less servicing, less maintenance, less rolling resistance
- Better insulation ⇒ saves energy, shortens preparation time
- Internal streamlining ⇒ more power at high speeds, improved efficiency
- Improved balancing ⇒ better riding quality, higher speed possible

Light-oil firing is recommended for ease of operation and cleanest combustion. However, steam locomotives are capable of handling most fuels and in many countries it is more economical to use coal or biomass. Big improvements are possible with conversion to the gas producer combustion system. This gives a cleaner combustion with reduced smoke, higher efficiency and power.





Vitznau - Rigi Railway No. 7

The Swiss Locomotive & Machine Works SLM in Winterthur had built this historically important standard gauge rack steam locomotive in 1873 with the works No. 1. For the 125th anniversary of both SLM and Vitznau – Rigi Railway, this unique steam locomotive has been restored and re-commissioned in 1996. Although the overhaul was made as close as possible to the original condition, today's requirements in regard to safety and operation made a new boiler and a new rack drive necessary. The original coal firing was retained.

After two successful summer seasons with daily operation on both the Vitznau and the Arth line, the locomotive had to be handed back to its owner, the Swiss Traffic Museum in Lucerne. Steam trains are now operated by the newer locomotives No. 16 and 17.

Borkumer Kleinbahn, Germany

This little steam locomotive works regularly on the 900 mm gauge line of the Island of Borkum in northern Germany. Light oil firing and electric preheating device ensure a very clean operation, which was essential as the line runs right through the town, similar to a streetcar line. The external appearance was left unchanged.



Matterhorn - Gotthard Railway

This metre gauge rack and adhesion steam locomotive from the former Brig-Visp-Zermatt Railway was only seldom used when coal fired. This changed since the conversion to light oil firing, making operating much easier, cleaner and more reliable. The light oil firing also eliminates the danger of line side fires. In view of the historic value of this locomotive, the overhaul was done without other modernizations.

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