

# Camels and Cadillacs

**A History of the South African Railways 25 Class Condensers and 25NC 4-8-4's, by Phil Girdlestone**

After the Second World War, the South African Railways were in dire need of more motive power for its growing traffic, particularly for the artery connecting the Johannesburg area with Cape Town. This includes the 340 mile crossing of the semi-desert Karoo, where water is scarce. Comprehensive studies and development work led to the order for 90 Class 25 4-8-4s with condensing tenders and 50 non-condensing locomotives, Class 25NC, from North British and Henschel. They were the largest non-articulated narrow gauge locomotives ever built and the largest locomotives to use the Henschel condensing system.

In this book, renowned steam engineer Phil Girdlestone details the development of these ultimately very successful locomotives, which incorporated much American technology, such as cast steel frames, automatic axlebox wedges and firebox circulator tubes. He explains the many efforts to improve mechanical and thermal efficiency and output, and the initial problems with the separation of oil from the condensed steam, blower fans, the roller bearing rods and breaking connecting rods.

The locomotives were delivered in 1953-55. Their low water consumption and excellent riding qualities earned them their nicknames. Twenty years later, the usefulness of the complicated condensing locomotives was over, and by 1980 all but three had been converted to non-

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Phil Girdlestone

Stenvalls

condensing. Regular service ended in 1992, but no less than 31 have been preserved. The book is illustrated with several technical drawings and numerous colour photographs showing these impressive machines at work in the often stunning South African landscape. In all, the book is a worthy tribute to SAR's most remarkable locomotives.

160 pages A4, c200 photographs, technical drawings and maps, hardbound with laminated dust jacket. £28.00/€34.00. ISBN 978-91-7266-185-1

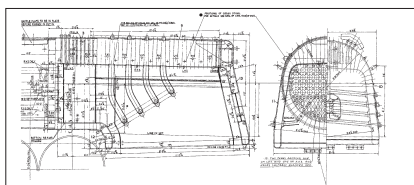


Fig. 26 The design of conventional cross stays was finalized and adopted as standard. Six were fitted, two radial stays from the centre row being removed in each location. Conventional pads were riveted to the wrapper to accommodate the stay tensioning nuts and their seats. All boilers were subsequently fitted to be passed through shops for heavy repairs, which theoretically meant that five years would have elapsed before all boilers were dealt with. The rocking washer flexible radial stays were retained, probably to give a greater freedom of movement of the plate around the cross stay pad location to reduce the risk of cracking which had been experienced with the type 30 boilers in this area. At the same time the application of the BTH stays was discontinued and the standard screw and riveted type substituted.

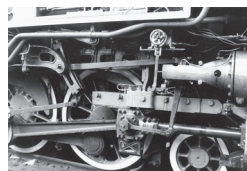


Fig. 26a Friction arrangement clearly showing "Security" circulation. U-shaped foundation ring and the position of the cross stays which were eventually fitted.



Condenser No. 3486 handling the 30th anniversary Blue Train in 1969. The locomotive is in final condition, train Hardy safety valves exhausting to the steam pipe. Notice water separator in front of the firebox, raised lagging cover over the cross and radial flexible stays and L.H. blowdown buffer drum. Photo L. Pinnis.

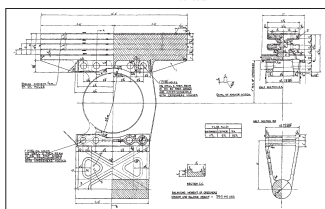


Fig. 28 Multiple ledge crosshead assembly.

Fig. 26b Friction arrangement clearly showing "Security" circulation. U-shaped foundation ring and the position of the cross stays which were eventually fitted.

As per CME's instruction LE 12/9/1924 of 27th May 1944. Cross stays together with rocking washer radial stays were also fitted to the CAMM and CO Garratt boilers as they passed through shops for heavy repair. The position of these was contemporary with the 25-boilers, the same thinking having been applied during their design.

Other Problems It is rare indeed for any machine not to need minor alterations to various parts as defects or need for changes manifest themselves after being in service for a while. These locomotives were no exception and some appeared quite soon, needing temporary solutions before a permanent cure was applied. Once they were identified and solutions found an expenditure sanction<sup>10</sup> was granted for all locomotives to be modified during 1955 wherever they might happen to be.

Very soon after the 25NCs entered service, it was found that the valve liners were moving longitudinally within the steam chest. As a temporary measure all of the locomotives were examined between September and October 1953 and where possible the liners jacked back into position and welded stops fitted. Where the liners could not be returned to their correct position the valve heads were waterbed up to compensate. These locomotives were attended to at Bloemfontein, the one curious exception being No. 3446, which was attended to at Durban. Although no problem had been experienced in this regard with the Class 24 locomotives (which also had cast steel bed frames), calculations made by the Locomotive Drawing Office in Pretoria showed that, owing to the differential rates of expansion for cast iron and steel, the 0.007" interference fit was nullified at a working temperature of 330°C. Enquiries made by the agents for Henschel and North British, as well as the SAR Advisory Engineer in New York, revealed some minor variations in interference fit practiced by various railways and manufacturers in Europe and North America but all used anchor lugs, steps or set bolts passing into the housing and securing steps were eventually standardized on these locomotives. Permanent modifications were made under the sanction the valve liners being extracted and replaced in their correct position before valve liner securing blocks were fitted and the valves reset.

As designed, two varieties of eccentric crank were fitted, one 17.631" long for engine numbers 3401-3406 and 3412-3448 and the other 18.960" long for the balance of the 25NCs and all of the condensing locomotives. Both had circular scotings but although the shorter type was keyed to fix its angular position on the driving crankpin, the former was not. The longer crank meant that it was not possible to set the valves correctly and the engines so fitted had them shortened by 0.125". The eccentric rod also had to be lengthened slightly as a result. One example of the form used to record this and other modifications to this sanction shows that this was carried out to No. 3425 in May 1955. Quite why the longer type had to be key to prevent any movement of the eccentric crank on the circular boiler mounting, relying on just the clamping force and fit of the bolts to prevent movement, which did take place. When the locomotives received the SKF rods new driving crankpins with a conventional square seating were fitted together with new eccentric cranks, but those retaining their Timken rods kept the original eccentric cranks keyed in position.



Converted condenser No.3467 "Sally", having completed five cleaning and overhauls at Orange River, is starting the long climb south to Dr. Aar in July 1976. Photo R.J. Manton.



An unidentified class 25NC was caught in action just west of Oriby working the Blue Train from Klerksdorp to Kimberley on 1st June 1964. Photo L. Pinnis.

The book will be available in South Africa at the end of April. Order your copy from the author at **Girdlestone & Associates** 24 Michwood Road, Umentweni, 4235 Cell 083 301 2590/landline 039 6951187 pgrail@venturenet.co.za

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