

**Report to R&ERPS Council on visit to Krauss Pacific 8457, Mataró
19 October 2015 (v2)**



1. Summary

A review team from the R&ER Preservation Society travelled to Mataró, near Barcelona, on 19 October 2015 to view a Krauss Pacific locomotive which has undergone restoration works and is for sale.

The review team found that Krauss locomotive No. 8457 is in excellent condition and in nearly complete state. The boiler and frames are in a condition consistent with low use over the first year of its life in the late 1920s and subsequent storage, and are effectively 'as new'.

The boiler inspector used by the R&ER, Bob Garnett, was a member of the review team. He considered that the boiler and firebox were in excellent condition with minimal signs of wear on rivets and stays. Spot thickness measurements were as expected. There are some essential, but generally minor, works which must be carried out to obtain a boiler certificate in the UK. Bob Garnett considered that certification can be achieved readily.

The tender has a new body. Some modifications will be necessary to suit Ravenglass conditions, notably fitting of air brake systems, a compressor, battery and couplings. Modifications will need to be carried out to provide a comfortable driver's seating position, but this is readily achievable with minor steelwork modifications.

The required works are relatively minor therefore the locomotive could conceivably be running within 12-18 months, should the R&ERPS decide to purchase the locomotive and carry out these works. The review team did not observe anything which could preclude this being achieved.

The asking price for the locomotive and tender is €200k (£147k). Other groups from Russia and China have expressed an interest in the locomotive.

The finding of the review team is that, so far as has been practicable to establish, the locomotive would be suited to conditions at Ravenglass and would require some, but not major, works to complete. It could be in service within 12-18 months. It would appear to be approximately half the cost that has been quoted for a new-build engine and has similar overall design parameters in terms of traction capability. The recommendation of the review team is that, should the R&ERPS wish to pursue the acquisition of a steam engine, this locomotive is purchased and that the purchase occurs as soon as can be arranged.

2. Attendees

At the request of the Council meeting on 13 June 2015 (see minute 2968), a review team travelled to Spain to view the Krauss Pacific with a brief to report back on key parameters including quality of components and build and likely cost of refurbishment.

The trip was organised by Di Chase. Members of the review team were:

Name	Role
Peter van Zeller	Representing senior steam experience from Ravenglass and as a Council member
Keith Herbert	Representing the newer generation of drivers at Ravenglass
Mungo Stacy	As an Officer of the Council
Bob Garnett	Boiler inspector from RSA, employed by the Society to report on condition of the boiler and likely works required to gain certification in the UK

The review team was hosted by a Barcelona-based group of model engineers who currently own the locomotive. The principal contacts were Jaume Circuns and Jordi Comella.

3. Background

The locomotive now at Mataró, along with an unrestored chassis, are two of four machines built for the May 1929 Ibero-American Exposition in Seville. They were apparently sponsored by King Alfonso because the prototype Krauss locos were already booked from Eric Brangsch to run at Barcelona in separatist Catalonia. Whereas the other prototypes went on to run at Antwerp, Toulouse, Rotterdam and Cork in the years that followed, these four locomotives stayed in Spain. They ran daily through the 14 month duration of the exhibition and only a few special occasions up to 1932.

With the onset of the Depression and the Spanish Republic, the liquidator of the Exposition sold the track but failed to shift the stock and left it stored. The rolling stock survived the Civil War in which Seville was an early flashpoint, and it remained in store until the mid 1960s, when 3 locos were acquired by the Caso del Campo pleasure park in central Madrid.

One loco – now an unrestored chassis- had its boiler replaced by a diesel motor and ran on a circular track in Madrid for the next forty years. Each winter it swapped its wheels cannabalised from another engine, which were then turned in the fairground workshops. For about ten years a complete loco was steamed occasionally and then stood on static display.

A Barcelona-based group obtained the remaining stock from the pleasure park, hoping to start a railway in the Mataró area. The group has restored two of the locomotives. However, the plans to start a railway have been abandoned, it is thought due to difficulties from the local government.

The first machine (the one which was steamed occasionally) was restored and has recently been sold to the Killesberg Park railway in Stuttgart. The Stuttgart railway report that they are satisfied with their purchase. It is currently having the bottom of the boiler barrel replaced due to pitting from being left with water during this occasional use.

The Barcelona group have now re-assembled the cannabalised machine which is the 'red' one now on offer to us. It was ordered and delivered after its three sisters in August 1929 and only ran until the following June with a last steaming in 1932. By the 1990s it was sat in the Fairground

maintenance yard stripped of its running gear and Geoff Holland and Chris Mounsey sorted through undergrowth to find everything spare part, when they tried to buy a loco before Sian.

The locomotive has been restored with a 'British' look – the group has filled in the front running boards and added new cab sheets and smoke deflectors. With a boilertop sandbox and dome, it is going to look 'Colonial' rather than British main line and could well be fitted with a slightly taller wider chimney as now on RH&DR No 10 Dr Syn. Because the loco has been changed from the original design of which there are several examples, its appearance could be sympathetically adapted.

4. Locomotive and frames



The frames and locomotive in general were well presented and in excellent condition, consistent with low past usage.

The loco has 4-6-2 configuration. The centre driving wheels are flangeless. All driving wheels have been fitted with roller bearings.

Overall length of the loco (from rear of frame to clearance of leading bogie flange) is 4.0m.

Overall length of the tender (from front of frame to clearance of rear bogie flange) is 2.6m.

Allowing 0.1m gap between loco and tender gives an overall clearance length of 6.7m.

Note that 22' (turntable length) translates to 6.705m.

Therefore the loco is expected to fit on the turntables but with minimal clearance.

Measurements were taken of key components, for comparison with a list of key dimensions of Northern Rock and River Esk which were prepared by Duncan Webster. Most dimensions were comparable; only the piston valve gear had slightly smaller dimensions.

The locomotive names were historically assigned to the tenders, and there was some mixing about over time. It is thought that no. 8457 was originally called '*Santa Maria*', although that name has now been adopted for the locomotive which was sold to Stuttgart.

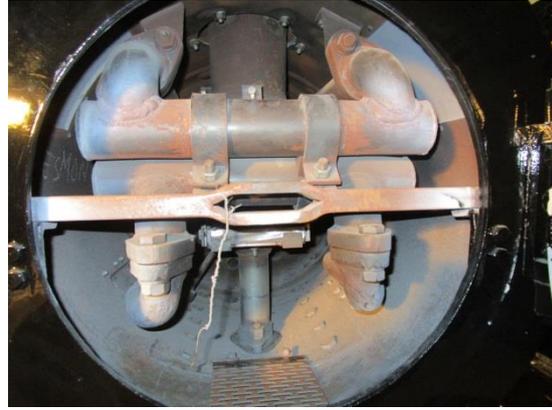
Works to the main locomotive body and frames are listed overleaf.

Ref	Area	Work description	Category
1.	Lubricator	Provide and fit a mechanical lubricator, connect to plain bearings (NB main driving wheels are fitted with roller bearings)	Essential
2.	Pressure gauges	Provide and fit replacement pressure gauges (the existing pressure gauges are in metric).	Necessary
3.	Whistle	Provide and fit a whistle	Necessary
4.	Train brakes	Fit pipework, fixed connection to tender, and air coupling at front of loco for connection to train.	Necessary
5.	Front coupling	Fit front coupling to loco	Necessary
6.	Plates	Manufacture or purchase 2 no. brass plates 'Property of the Ravenglass and Eskdale Railway Preservation Society'	Necessary
7.	Wheel profile	The loco tyres do not have the standard Ratty wheel profile. They are similar to the profiles used at Romney and Dresden, and believed similar to those on <i>Douglas Ferreira</i> . Potentially re-turning of the wheels may be required.	Consider after trials
8.	Regulator	The regulator is a push-pull style, similar to the Bressingham engines and <i>Synolda</i> . It may be desirable to fit a standard Ravenglass-style regulator. The flange fitting to the boiler would allow for this. The loco could be operated initially with the current regulator and a decision on replacement made at first overhaul.	Consider after trials
9.	Reverser	The reverser is tight against the cab frame. Repositioning could be considered based on feedback after initial usage.	Consider after trials
10.	Cab roof	It may be desirable to consider an extending cab roof similar to River Esk.	Consider after trials
11.	Drain cocks	The drain cocks project below the cylinders. Clearance needs to be checked.	Consider after trials

5. Boiler



Firebox and tubes



Superheater

Refer to the separate report provided by the boiler inspector, Bob Garnett.

Bob Garnett carried out thickness measurements on the boiler and inspected internally using a boroscope. Bob reported that the firebox and boiler appear to be in excellent condition with very few signs of wear, which reflects the reported limited running over approximately one year in the late 1920s. Rivets and stays were in excellent condition. The boiler has been retubed in Mataró.

The firebox is copper. The returns (overlaps) are in good condition. Slightly greater care is required over water levels with a copper firebox to ensure that the firebox does not become scorched. *Bonnie Dundee* previously had a copper firebox so this is not novel to Ravenglass, although currently all of the other Ratty locos are fitted with steel fireboxes.

The loco is fitted with a superheater which has been fabricated new as part of the recent refurbishment. Bob Garnett recommended that the superheater is retained, at least initially, since the valve gear and other aspects of the design are optimised for superheat.

There is no merit in undertaking further testing in Spain, since any further tests will be towards obtaining a UK boiler certificate.

Works to the boiler are listed overleaf.

Ref	Area	Work description	Category
12.	Paperwork	Review all paperwork and certification relevant to the boiler and its continued use	Necessary
13.	Lagging	All external coverings to be removed. Rationale – coverings being in place for a stated 10 year period. It is normal for all boiler external coverings to be removed at periods not in excess of ten years. At the time if this plate exposure thickness reading will be taken by ultrasonic means.	Essential
14.	Superheater	Remove and examine superheater. The superheater will require a hydraulic test and may require NDE of the welds.	Essential
15.	Fusible plug	Fit fusible plug to firebox crown. The fitting of this plug may require the boiler to be removed from the locomotive frames (poor access).	Essential
16.	Firebox tubes	Ensure that the exposed tube ends in the firebox are attended to. The tubes have been in place for a period of time; to justify them being left in place examination by remote camera and ultrasonic techniques will be required.	Within 5 years
17.	Wash-out plugs	Ensure suitability of outer firebox washout openings for further service. Fit matching plugs. Fit blowdown valve.	Essential
18.	Fittings	Thoroughly inspect all boiler fittings. Purchase or fabricate safety valves and seats, install and test.	Essential
19.	Formal examination	Make a formal out-of-service examination of the boiler and its system. This will be reported formally and a Written Scheme of Examination issued as required by The Pressure Systems Safety Regulations 2000.	Essential
20.	Hydraulic test	Subject the boiler to a hydraulic test – stated pressure 21 bar	Essential
21.	Steam test	Re-fit the boiler to the locomotive and conduct an in-service steam test as required by The Written Scheme of Examination	Essential

6. Tender



The tender consists of the original frames and bogies. A new body has been constructed during the last year. Modification works will be required to the tender to provide compatibility with the Ravenglass systems and operations.

Ref	Area	Work description	Category
22.	Footwell and seat	The driving position is currently high and would expose the driver. The footplate is flat (no recess). Rework this area of the tender to provide a recessed footwell and lower the seat (the area below the seat is voided at present and does not form part of the water tank), similar to other Ravenglass locos. Fit cupboard for driver. Install metal sheet and coal-hole door.	Necessary
23.	Air compressor	An air compressor is required. It would appear to be possible to fit an axle-driven unit in the void below the seat (even after dropping the seat to a lower position) but this would need to be confirmed.	Necessary
24.	Air cylinders	Air cylinders are required. These could be installed on the top of the rear portion of the tender, similar to <i>River Mite</i> .	Necessary
25.	Train brakes	Adjust and test tender brakes to run from the train braking system. Fit pipework, valves and brake valve for driver to control air system. Fit air coupling at rear of tender for connection to train.	Necessary
26.	Electrics	A battery and radio system will be required. These could be installed in the void below the seat (even after dropping the seat to a lower position).	Necessary
27.	Drawbar and flap	A drawbar and cover flap need to be fabricated, between loco and tender.	Necessary
28.	Couplings	Fabricate and fit a Ravenglass-style coupling to the rear of the tender. There appears to be a suitable place to attach to the frames.	Necessary
29.	Tank waterproofing	The waterproofing to the interior of the water tank appeared to have been applied shortly before the inspection and had bubbled up. The waterproofing layer needs to be re-applied.	Necessary

7. Second locomotive chassis



The parts (frames, wheels, rods, other parts) for a second locomotive are stored in the workshop. No work has been carried out on these. Jordi and Jaume indicated an asking price of €100k for the second chassis and parts.

8. Owners

The locomotive is owned by a consortium of three people, consisting of Jordi, Jaume and one other (whom the review team did not meet).

Jaume appears to be one of Spain's steam experts and has a mainline footplate pass. He builds and drives 7 ¼" gauge locos on a local line. He showed us examples in his house.



Jordi (left) and Jaume (right)



Jaume's cellar

9. Railways and Other Guided Transport Systems (ROGS)

The R&ER General Manager has to determine whether any new equipment or work on the railway is 'novel to the duty holder' or 'dangerous'. Peter van Zeller has discussed this briefly with the General Manager, Trevor Stockton. The General Manager is content that the loco is sufficiently similar to Black Prince which was used here for the 1982 and 1990 seasons, therefore would not be considered novel for the R&ER.

10. Other costs and risks

The asking price for the locomotive and tender is €200k (£147k).

Other groups from Russia and China have expressed an interest in the locomotive. There is a significant risk that the locomotive is bought by another group, as it is well presented and in visibly good condition.

The chassis has not been tried in motion so there is a risk of remedial work required to resolve wear or snagging of parts. This would be the same after any steam locomotive overhaul.

There is a residual risk of further boiler works being required during hydraulic and steam testing, but the opinion of the boiler inspector was that there is no benefit in taking investigations any further on site in Spain.

Transport is not included, estimated cost circa £1/mile. 1,250 miles each way, so cost circa £2,500 (unconfirmed).

If the locomotive is purchased through the Society which is registered for VAT then Spanish VAT will not be payable but UK VAT will need to be paid; but this may be reclaimed.

There is no import duty due since the purchase is from within the EU.

An estimate of £8k has been provided for the boiler works by Shaftesbury Steam Restoration, who are currently doing work to *River Esk's* boiler.

Quotes have not yet been obtained for the works to the tender, but it is likely these would cost in the region of £10k-£15k.

Costs for engineers will need to be allowed for commissioning the locomotive into service, conducting trials and carrying out any remedial work identified.

The R&ERPS should consider whether there is any merit in also acquiring the second locomotive chassis (unrestored).

11. Conclusions

The required works are relatively minor therefore the locomotive could conceivably be running within 12-18 months, should the R&ERPS decide to purchase the locomotive and carry out these works. The review team did not observe anything which could preclude this being achieved.

The finding of the review team is that, so far as has been practicable to establish, the locomotive would be suited to conditions at Ravenglass and would require some, but not major, works to complete. It could be in service within 12-18 months. It would appear to be approximately half the cost that has been quoted for a new-build engine and has similar overall design parameters in terms of traction capability. The recommendation of the review team is that, should the R&ERPS wish to pursue the acquisition of a steam engine, this locomotive is purchased and that the purchase occurs as soon as can be arranged.