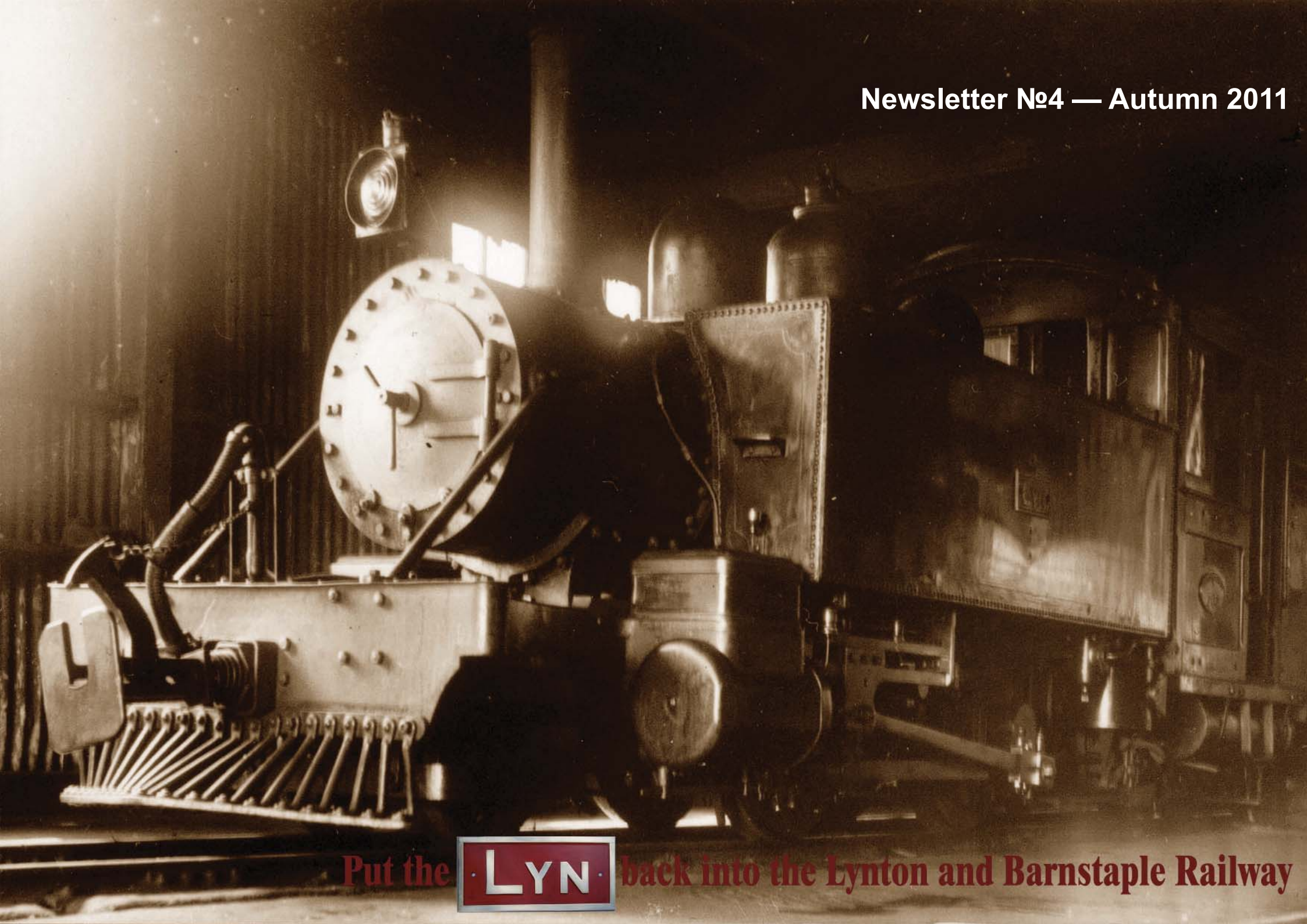


Newsletter №4 — Autumn 2011

Put the LYN back into the Lynton and Barnstaple Railway

NEWSLETTER 4

The 762 Club

Building No 762 Baldwin locomotive Lyn
for the Lynton & Barnstaple Railway

Introduction

Welcome to Newsletter, No 4 of the 762 Club. This covers progress and activities of our collective mission to bring the new-build Baldwin 2-4-2T locomotive, Southern Railway No 762 Lyn to the legendary Lynton and Barnstaple Railway. There has been progress on a number of fronts; however a significant amount of time has been involved in the re-structure of the 762 Club to convert it to Charitable Status. This is now complete and all attention can focus on the build and associated fund raising.

Highlights

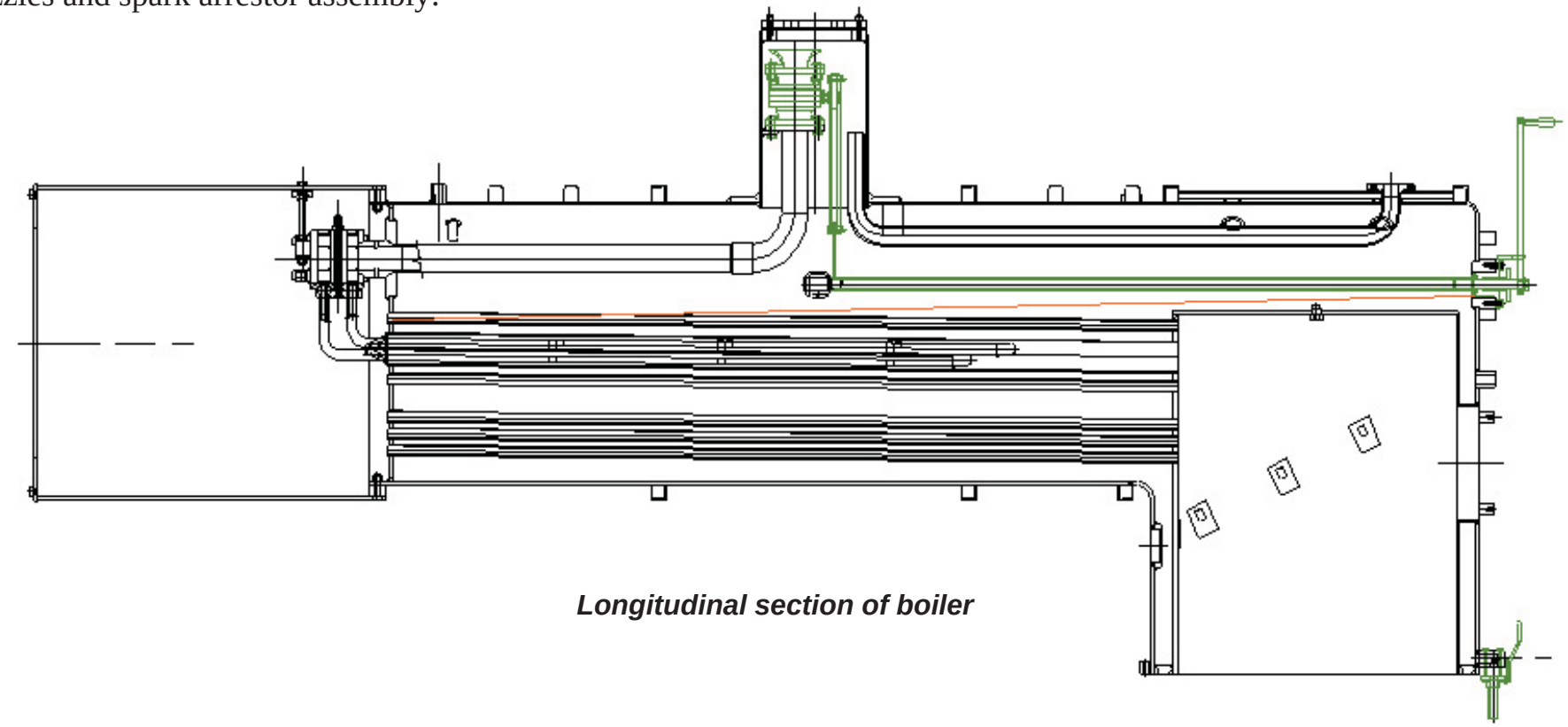
- **Alan Keef Ltd scope of work expanded; Keefs will now construct and commission the locomotive.**
- **Final boiler design details completed by Ian Gaylor and Andy Bennett with delivery date now set for the middle of 2012.**
- **Alan Keef Ltd to start on cylinders due for completion at the end of March 2012.**
- **Side tank order due to be awarded in the next 2 months.**

We are pleased to have Alan Keef taking over the build of 762 bringing the firm's extensive locomotive construction experience to bear on the project . This will ensure that all parts of the locomotive go through the correct construction and quality control process, resulting in an engine capable of delivering exceptional power output and performance.
At the current rate of funding we have a provisional delivery date of mid 2014. This may sound a long way out but if you compare this to similar projects, it is in the right ball park. If we look at Lyd on the FR, from initial design to trail running the process took approximately 15 years. If we are able to keep to the rate of funding at the current level Lyn can be built in approximately 5 years. It must be added that this time line is linked to current rate of funding; if this slows down obviously the completion date will be pushed out.

Technical Progress to Date

Since the last newsletter there has been significant progress on the planning stage and currently we have completed half of the fundamental design work and a quarter of the drawings required for the manufacturing process.

The thermal design of the boiler, boiler auxiliaries and the draughting are now complete and the design can be seen in the illustrations below, which show a longitudinal cross-section of the boiler, the grate/ashpan assembly, superheater, chimney, blast nozzles and spark arrestor assembly:



Longitudinal section of boiler

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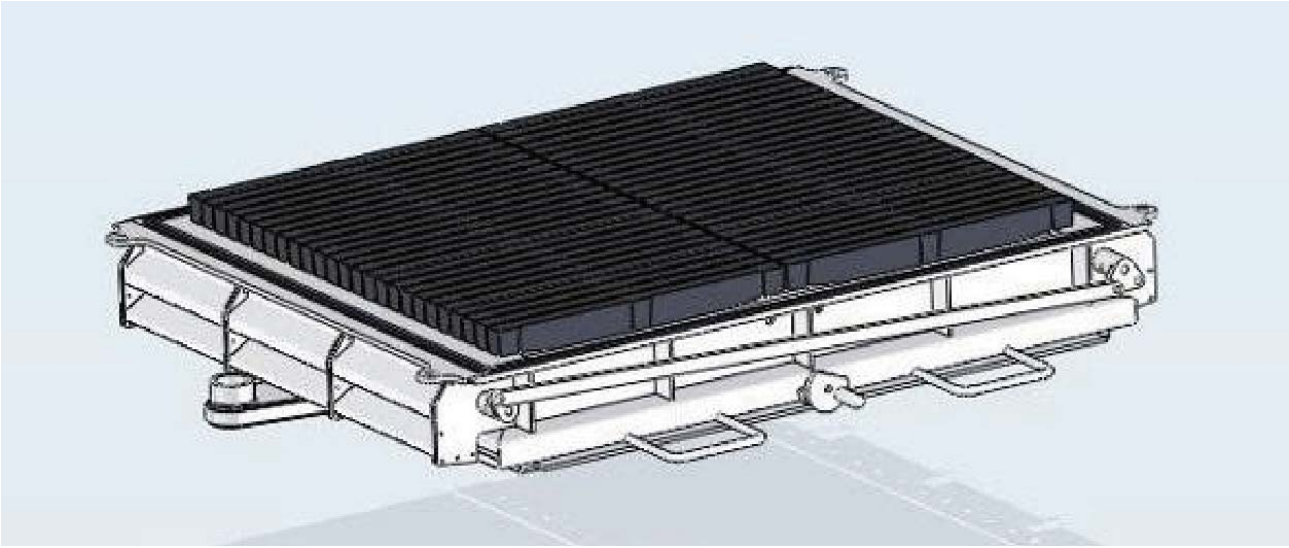
One of the last challenges of the boiler design was the mounting arrangement with the main frame. Baldwin locomotives use the boiler for the major structural member as the light bar frames are not meaty enough to carry many of the applied loads. In this respect Lyn will follow in the tradition. However, the early practice of rigidly mounting the boiler to the frames at either end, without any provision for thermal expansion, has not been replicated as this would be contrary to good modern practice. The boiler will be conventionally, rigidly mounted to the boiler saddle and have three simple sliding attachment points, one on the throat plate and two on the sides of the firebox, to take the torsional loads arising from the track/ suspension and the transverse loads created by the piston thrusts.

The ashpan/grate incorporates conventional cast iron firebars with twin butterfly valve dampers and twin sliding bottom discharge ash doors. Spark screens are fitted to the air inlets to prevent cinders falling out and creating lineside fires. Provision has been made for implementation of a Gas Producer Combustion System(GPCS) in the future, when operational considerations require it.



Ashpan/Grate assembly

Superheater assembly

Discussions have been held with a number of suppliers in conjunction with the boilermaker, to determine the optimal manufacturing method, materials for the superheater return bends and elements. A meeting to discuss this in more detail, took place in August.

The draughting design is now complete. In order to maintain the external appearance of the original locomotive in the condition that it was outshopped from the 1929 rebuild at Eastleigh Works, the chimney profile has been scaled from old photographs. The lempor exhaust which minimises the cylinder back pressure will be concealed within this profile. The exhaust geometry has been optimised as far as is practicable, but some loss of ejector efficiency, due to excessive gas velocity at the chimney cap, is unavoidable. Exhaust technology has moved on significantly since 1929! The chimney can be unbolted from the smokebox complete, to gain access to the superheater header.

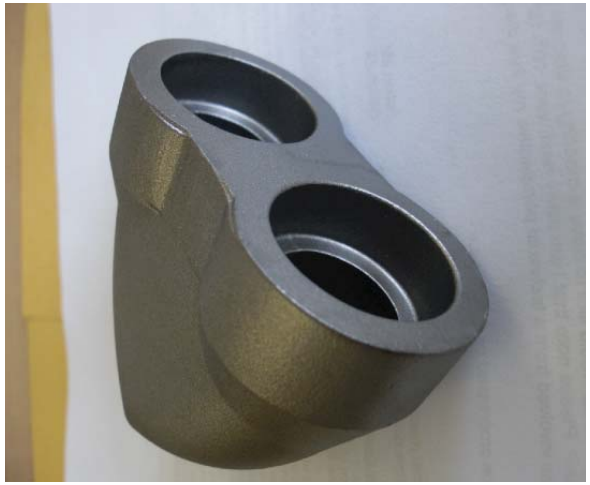
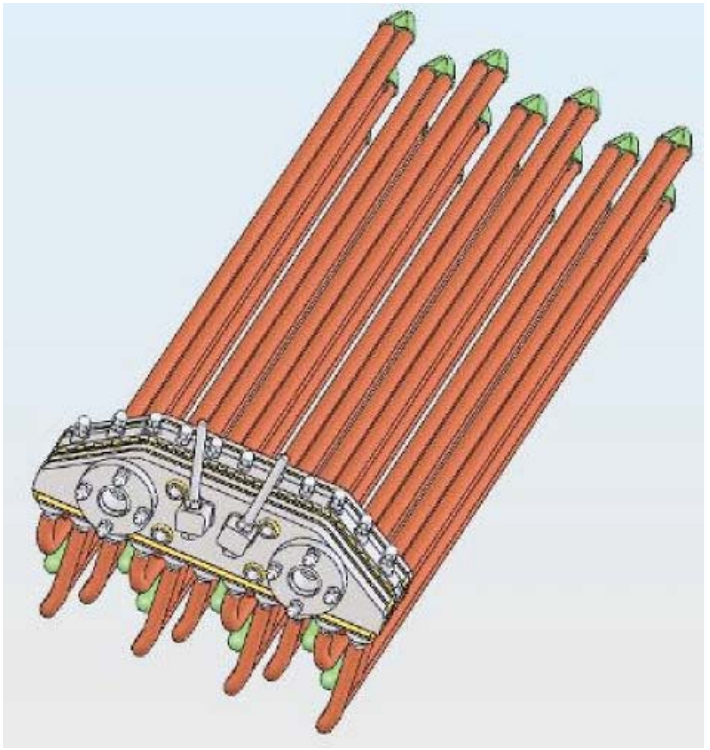


Photo showing finished superheater return bends as used on the full size locomotive, King Edward II No 6023 . Similar style return bends will be used for 762.



Superheater assembly

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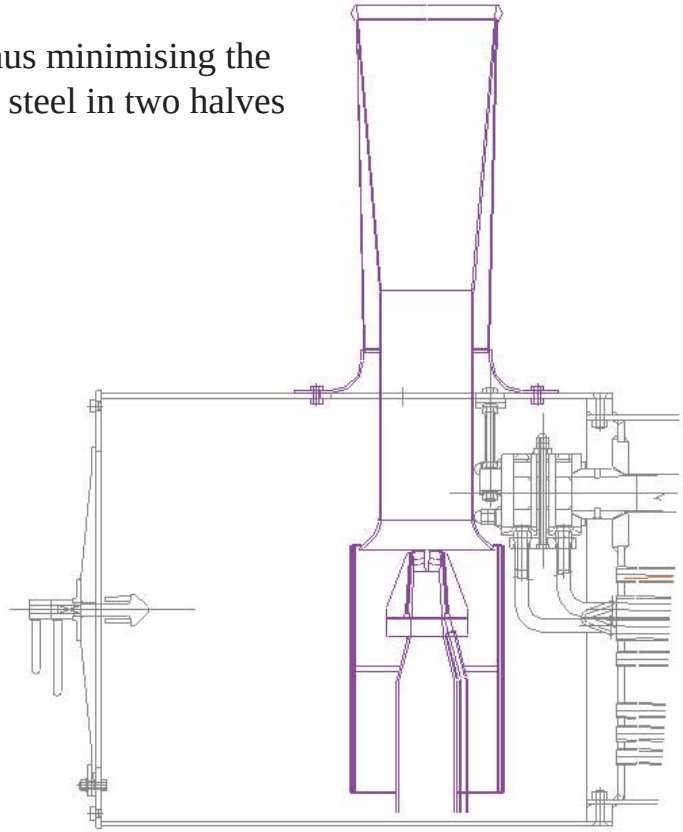
A four jet blower is incorporated into the blast nozzle assembly and is fed via a pipe, which can be seen to the rear of the blast nozzle stand. In addition to the normal steam feed an auxiliary compressed air connection point with quick release coupling and blower control valve will be provided to aid steam raising resulting in keeping the cab clean.

Below the blast nozzle the stand incorporates a Kordina which utilises the energy in the exhaust steam at the time of release to lower the exhaust pressure in the opposite cylinder and thus aid back pressure reduction.

The smokebox is specifically designed to be non self-cleaning to avoid spark throwing , thus minimising the chances of lineside fires. The basket type, spark arrestor will be manufactured in stainless steel in two halves which can be easily removed for smokebox cleaning.



Chimney, blast nozzle and spark arrestor assembly

Cylinders

The cylinder design is currently progressing and the illustration below shows the initial indicator diagrams created using Prof. W. Hall's 'Perform 2' Programme. This is based on an initial design for the cylinder and valves with a cylinder dia. of 220mm and a stroke of 406.4mm.

The 'Perform' programme and associated supporting documentation was kindly provided by the 5AT project with David Pawson assisting our project. The software has been validated by David Pawson against the BR Rugby test data and the empirical formula for estimating cylinder cover temperature (which strongly influences efficiency and is mainly driven by steam inlet temperature) was developed by him, as part of this process.

At the illustrated maximum power output of the locomotive when hauling a six coach train approaching Woody Bay from Barnstaple, Lyn will be producing around 319 ihp at just over 21mph at 57% cut-off. This will sound very impressive! Whilst on our visit to Bennett Boilers in August, an opportunity was taken to get some idea of the scale of 762's boiler.

The photograph below shows a boiler Andy Bennett is working on, from one of the 3' gauge locos on the Isle of Man railway. Lyns boiler including the smokebox will be approximately the same diameter but around 600mm longer.

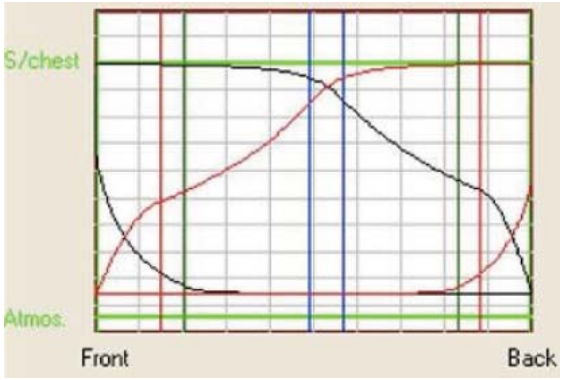


Photo taken at Bennett Boilers showing Jeremy Martin, Andy Bennett and Ian Gaylor measuring up the Isle of Man railways boiler to show the scale of Lyns new boiler.

Water tank assembly

The design of the water tank assembly is now complete and prices are currently being obtained for manufacture.
To ensure the appearance is authentic much effort was put into looking at photographs for the rivet detail. Hopefully the rivet counters amongst us, will be impressed!

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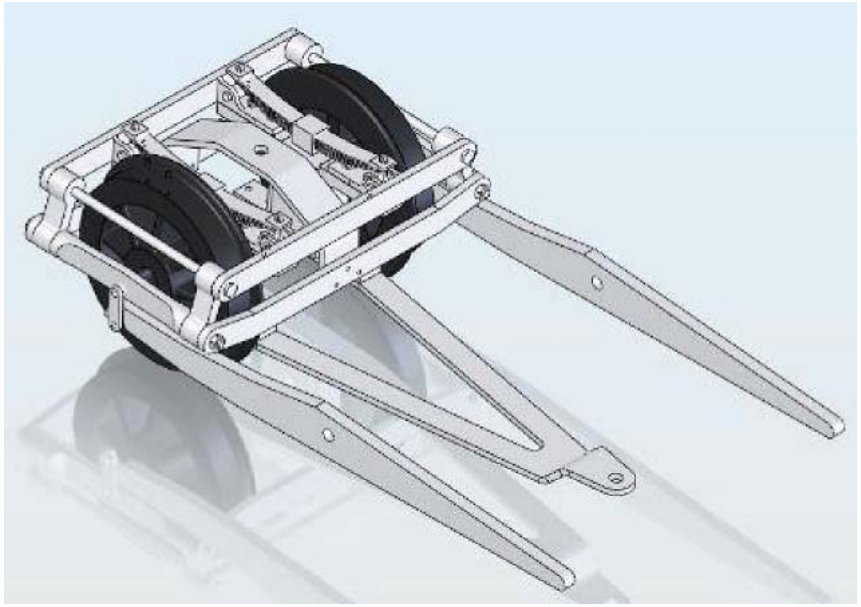
Rear pony truck

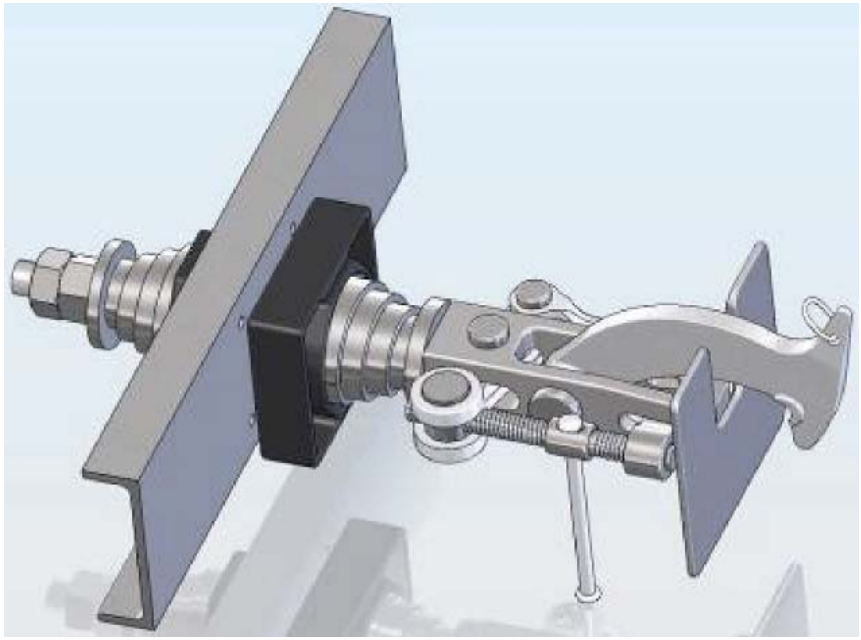
Mike Nelson has created a model of the original rear truck based on the information kindly provided by Steve Phillips, as shown in the illustration above. This will be checked out structurally in due course and integrated into the overall design of the chassis, with some modifications to the radial pivot arrangement This is similar to that used on both the Tallyn and Perrygrove Railways, as the ashpan will occupy the space required for the original‘A’ frame.



Rear pony truck

Coupler assembly

The coupler assembly has been modelled and units for Lyn will be made by the Ffestiniog Railway at their Boston Lodge Works as part of the process of manufacturing the underframes for the heritage coaches. Interestingly Lyn’s coupling at the rear didn’t carry a hook whilst the unit at the front had a hook but no tensioner.



Coupler assembly

Wheels Cast

On the 14th April there was much excitement when the first metal parts were successfully produced. Seen below is the casting of the first of the driving and pony truck wheels, from the patterns illustrated in the last news letter.

Lastly for those who would like to view the design progress on a regular basis, 3D images of the SolidWorks models being created as part of the design for manufacture process by Mike Nelson, can be viewed on his web page. http://www.machineconcepts.co.uk/baldwin242/baldwin.htm

Finance

Membership of the Club has now reached 50% of the original target of 350 subscribers. This is a fantastic achievement for such a project and contributions continue to be made regularly both in terms of new members joining and parts being sponsored.

As the design has matured we have had the opportunity to consider developments to improve the locomotive's ultimate performance when completed and in operation at Woody Bay. We have a choice of investing some additional capital now to reduce the cost of operation to the L&B Railway when in service. As a result, the overall budget for the locomotive has been reviewed and increased in line with the technical development and revised quotations from component suppliers. A portion of the cost increase is also attributed to the increase in cost of metal prices.

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The overall budget is now expected to be in the region of £470,000 to £490,000 but this will result in a quality, professionally designed and built locomotive. The design and manufacture of any locomotive (especially steam) is incredibly expensive, as many similar projects attest, but the support and commitment to date gives us the confidence to carry on, in order to deliver a product that will surely enhance the heritage train.

To put figures into context, builders often use "cost per ton" to manufacture a new steam locomotive. Tornado, at 100 tons reportedly cost £3 million. Lyn will weigh just over 22 tons. If using this guideline, the Baldwin would require £660,000 for its production.

Several members have recently completed their final standing order payment for their membership and we ask them to consider taking out a further membership or sponsoring a component.

Many members have signed gift aid declarations and this provides a useful source of additional income to the project. The club is VAT registered and claims back the appropriate VAT content on expenditure.

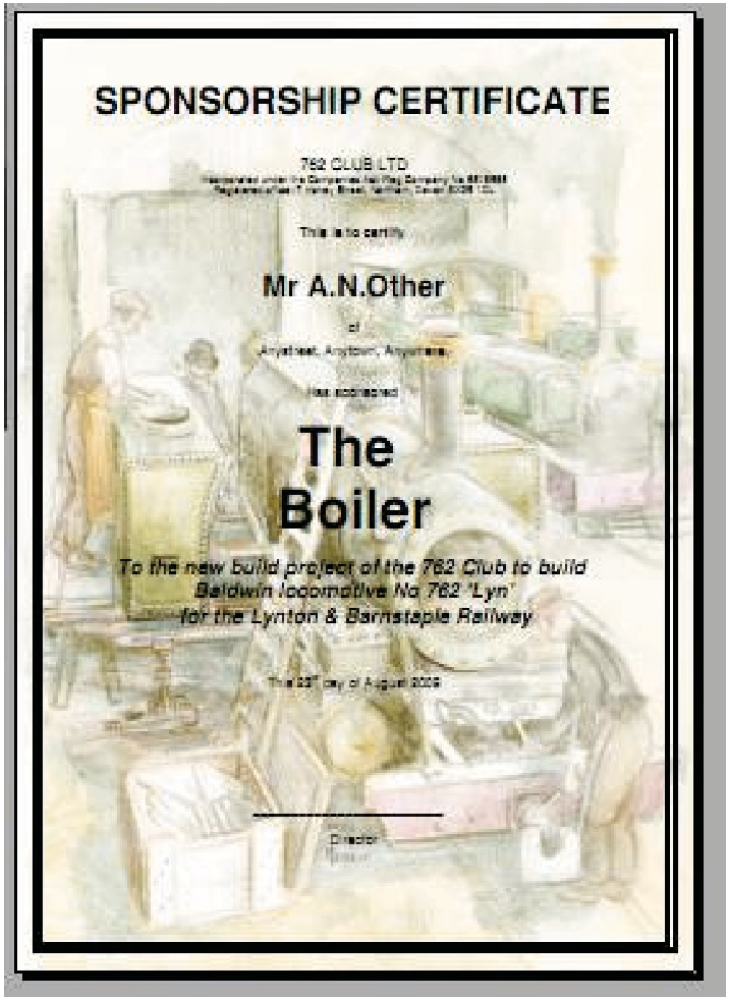
Sponsor a Part

The Sponsor a Part scheme has been hugely successful in raising almost £14,000 additional funds and an additional £12,000 of sponsorship has already been pledged. The intention is to significantly expand the sponsorship list as manufacture commences and component parts are produced. Thus donators will then have the opportunity to contribute in a tangible way to the Project, without the commitment to membership. The roll-of-honour on the website will be expanded to include a photograph of the sponsor, 'handing over' the completed component of the locomotive, if he or she so wishes.

To donate to the project simply click the link on the 762 Club website or send cheque made payable to **"The 762 Club"** to Jon Pain, 26 Oaklands, Bideford, N.Devon EX39 3HW.

Where requested, donors can receive a choice of certificate (see enclosed images) and their names added to the website, acknowledging their contribution.

There are also a number of very exciting rewards available to contributors. – please see these on the website.



Surviving Worldwide Baldwins

An interesting approach was received via the 762 club website from an individual living in Bermuda, relating to a Baldwin surviving in the country. The locomotive operated at a railway on the Astor estate. It got its name when American tycoon Vincent Astor - see http://en.wikipedia.org/wiki/Vincent_Astor - (1891-1959, son of John Astor who died on the Titanic) built an estate there, on the South Shore of Ferry Reach, at great expense in the 1930's.

Astor was the major benefactor of the Bermuda Aquarium from 1926 and arranged most of the financing when it was at Agar's Island. His architect was Edward Durrell Stone. The property included a sprawling mansion and guest cottages, all still there, and a large boat house.

Astor repeated his private railway building at his US estate and built a 2ft gauge railway train comprising of a locomotive and twosmall purpose-built carriages, all built by Baldwin -. The train carried him and his guests over the hill to his own private station on the Bermuda Railway until operations ceased in 1948. The remains of what looks like one carriage and the engine was photographed by this

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author in 2003 (see photographs below), clearly in an appalling condition and rusted out for decades. Beyond his property, Astor rented use of the railway track from the Bermuda railway operators to run his private guests to other parts of the island on periodic sightseeing trips, often conflicting with the railway's operating schedule. Some effort was begun in 1967 by the then-owner Herbert Bierman in hopes of engine and carriage restoration but when he died in 1970 all work stopped and was never resumed.

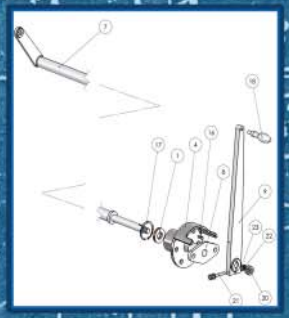
How can you help?

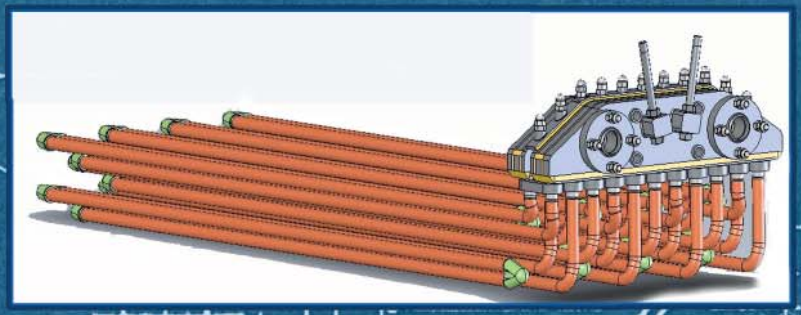
You can help by actively spreading the word, identifying other interested prospective members, supporters and donors. You might be interested in buying additional memberships and we encourage you to do this.

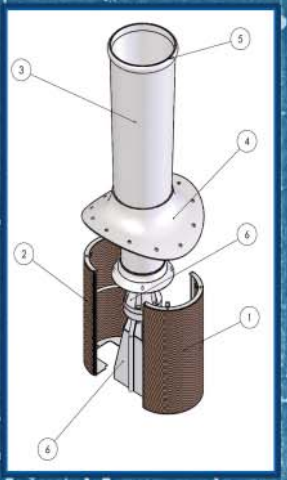
In 2010 we witnessed a Manning Wardle back on the L&B in the guise of 'Lyd'. The sight and sound of Lyn permanently based on the L&B is firmly in progress and with additional support, will be a reality in 2014.

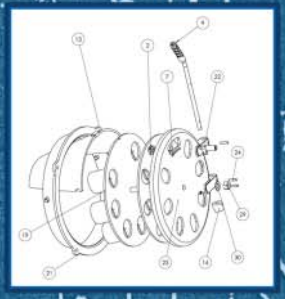
If you haven't yet supported the club, please do take the time to look at the club website and either take out a membership or sponsor a component. When the locomotive is at Woody Bay hauling the L&B's very own heritage train, you can be proud to state that you have contributed to making it a reality.

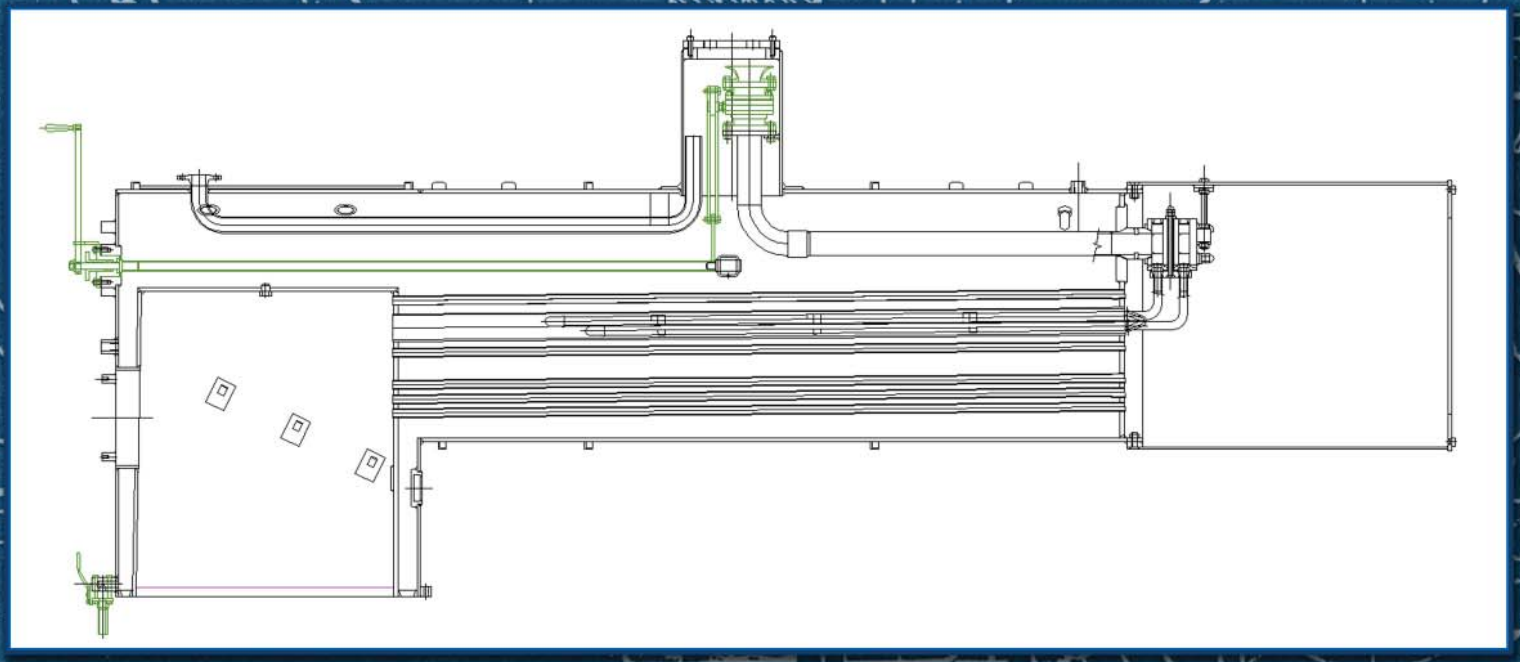
Do you have any Baldwin photographs, anecdotes or articles? We would be happy to upload these to the 762Club website. Already we have had Baldwin enthusiasts contact us and we will adding their contributions on the 762 Club website

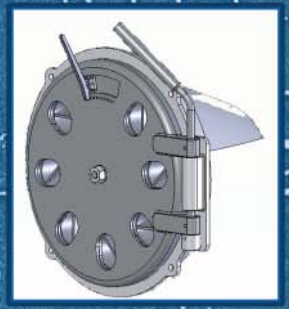




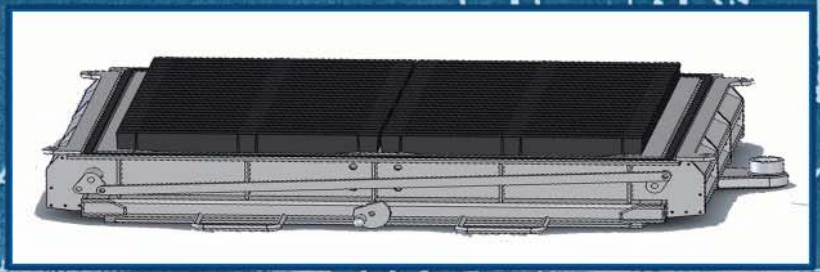


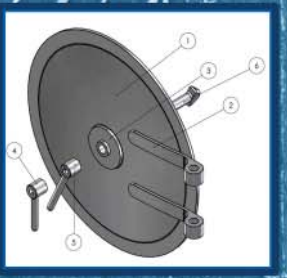






Boiler Design





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