

**Reading Society  
of Model  
Engineers  
Charity Number  
1163244**

# The Prospectus

**June 2022**



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Romney Hythe and Dymchurch No 3 *Southern Maid* at Hythe on 30 June 1962. Photograph John Billard

**TRUSTEE NEWS  
KNUCKLE JOINTS  
MORE HOLIDAY PICS  
60 YEARS AGO  
LittleLEC**

## **A VIEW FROM THE CHAIR**

**JOHN BILLARD**

Members may have noticed some changes to the raised track carriages to provide additional protection for passengers sitting behind couplings. This follows an incident on 8th May when a small passenger was injured at a birthday party. RSME has made a report to the authorities as required and despite our exemplary safety record up to that date RSME has taken steps to ensure that nothing like that can happen again. We send our sympathies to the family directly involved. A regular trustees meeting took place shortly afterwards and a detailed discussion took place leading to the actions about taken as above.

To summarise the rest of the agenda we noted that the next public running coincides with the jubilee weekend. No special arrangements will be made other than the possibility of a few flags. The use of a card reader and a separate ticket office will certainly make a difference to the day.

With the departure of Peter and Carol Harrison we are looking for a member to guide our young membership including the young engineers. All volunteers will be carefully considered. Please let me know if you are interested in this. It is an important job for the future of RSME.

We are considering changes to the structure of our subscription rates. It might be argued that we have too many categories and there may be scope to reduce the rates charged. Subscription income is important but by no means the only source of our funds. The trustees intend that any changes will be put to the next annual general meeting.

Finally, another reminder that RSME is hosting the national LittleLEC trials on 18th 19th June. This will be another opportunity to showcase the good work done at our site in Prospect Park. There were there will be plenty of things to do for members to make it a success and I very much look forward to seeing you there on those dates.

**SUBSCRIPTIONS FOR 2022/3 WERE DUE ON 1 APRIL.**

**AN APPLICATION OR RENEWAL FORM HAS BEEN  
CIRCULATED SHOWING RATES AND FOR YOUR SIGNATURE.**

**PAYMENT SHOULD BE MADE BY BACS TO THE BARCLAYS  
ACCOUNT IN THE NAME OF RSME  
BANK SORT CODE 20-78-58  
ACCOUNT NUMBER 70796077.**

**COMPLETED MEMBERSHIP FORMS SHOULD GO TO THE  
MEMBERSHIP SECRETARY BY E MAIL  
michael.manners2@ntlworld.com OR POST TO  
257 LODDON BRIDGE ROAD, WOODLEY, READING, RG5 4BL**

# GWR Locomotives: Coupling Rod Knuckle Joints Part 1

Alec Bray

The Great Western Railway benefitted from a succession of excellent Locomotive (later, Chief Mechanical) Engineers who looked for improvement in locomotive performance and where appropriate applied these changes across all suitable locomotives: application of audible cab signalling, new draughting arrangements – this list is huge. There is one small area of locomotive engineering where the rules – and/or the application of the rules – were not so clear-cut. This is the location of the knuckle joints on the coupling rods of 4-6-0 locomotives – the “ten-wheelers”. This does *not* apply to other six-coupled locomotive classes- just the 4-6-0s. You many have come across this story before – this article is a development of a chat that was on Zoom at the start of the pandemic lockdown and gives more of the background to an article in the “Great Western Echo” Spring 2022 number 237 (the latest edition).

Some years back an old school friend asked me why the coupling rods on a Gauge 1 wooden model of a locomotive that he was building had a “hinge” in the middle – he was getting in a terrible muddle trying to sort out the valve gear, connecting rods and coupling rods. (The kit was OcCre's 1/32 scale wood and metal model kit for a French Pacific loco.) At this point I realised that I had not shown any coupling rod joints on the drawings of locomotive profiles (elevations) produced by my program “GWR Locomotive Sketchpad” for those locomotives with more than four driving wheels (two driving axles) (this program is available on the RSME Clubhouse Computer), and so I started to investigate why I had made this error.

The reason for the error? I went back to one of the prime sources. I had worked from the GWR posed photographs and Locomotive Diagrams of the initial GWR 4-6-0s as reproduced in the “GWR Engines Names Numbers Types Classes” book [1] – and these photographs are side elevations of locomotives in a *classic* pose – pistons in mid travel, coupled wheelset cranks set vertically downwards, coupling rod at the bottom of their movement – and there are no visible “hinges” in the coupling rods.

Some documents refer to the join in coupling rods as “hinge joints”, but this implies vertical movement only. The GWR 2-8-0 heavy goods locomotives and the 2-8-0T and 2-8-2T tanks included spherical bearings in the rear coupling rod joints: the term “knuckle joint” covers all the various types of joint, and is the term used from now on!

The knuckle joints in steam locomotive coupling rods are used to connect two (or more) parts of a coupling rod as there is a requirement for a small amount of flexibility to allow the coupled wheelsets to spring independently (vertical movement) or to move laterally (sideplay). The weight loaded on the coupled wheels and the springing provided usually means that each of the

coupled wheel axles have about one inch of vertical motion: when there are only two coupled axles, this degree of movement places only slight stress on the crank pins: for any locomotives with more than two driving axles, however, the coupling rods need to have some flexibility to cope with the driving axles' independent vertical movement, the sideplay built into some driving axles, and the flexing of the frames themselves.

Although the joint between two parts of a coupling rod could be made part of the bearing on a coupled wheel crankpin (as they were on the very first 4-6-0 built in 1847 - the "Chesapeake" by Septimus Norris in the US), nearly every locomotive builder – including the Great Western – placed the knuckle joint in an extension of one part of the coupling rod (this was needed, in any case, for the spherical joints).

For the GWR two-cylinder passenger and mixed traffic classes, my initial review of the material seemed to indicate that Saints and Halls had the knuckle joint in front of the connecting rod (driving wheel) crank (that is, the front coupling rod was "hinged") - but, oh dear! - that the Granges and Manors, Modified Halls and the 4-6-0 Counties had the knuckle joint *after* the driving wheel crankpin, so the rear part of the coupling rod was "hinged" – and of course the knuckle joint should be visible in full. The review seemed to indicate that a change in knuckle joint position may have been due to a design change for these later locomotive designs.

A simple generalisation would be that the GWR 4-6-0 2-cylinder locomotive classes built under George Jackson Churchward's regime (and subsequently Collett's) have the knuckle joint placed in front of the bearing for the driving axle crankpin (this is the axle on which the big end of the connecting rod from the cylinders of a two cylinder locomotive, or the outside cylinders of a four cylinder locomotive, are mounted) – in other words, in a six-coupled locomotive, between axle one and axle two. In the side elevation *classic* pose for these locomotive classes – pistons in mid travel, coupled wheelset cranks set vertically downwards, coupling rod at the bottom of their movement - the knuckle joint is therefore hidden by the connecting rod in outside cylinder locomotives and so the knuckle joint can not be seen.



Such a sweeping generalisation is flawed. With a large class such as the Halls it is not surprising that there were variations in the construction and maintenance of the locomotives. Photographic evidence shows, for example, that 5912 “Queen’s Hall” [2] and 5972 “Oulton Hall” had the knuckle joint *after* the driving axle crankpin, as does 6993 “Arthog Hall” [3].

However, for all other GWR six-coupled two-cylinder locomotives other than the 4-6-0s, the coupling rod knuckle joint was placed to the rear of the driving wheel crankpin right from the early years of the 20<sup>th</sup> century. There are few exceptions. The knuckle joint is clearly visible, whether the locomotive is inside or outside cylindered, or inside or outside framed. The knuckle joint can clearly be seen, for example, on an Aberdare. So the question is: what determined the position of the knuckle joint? *To be continued.*

#### *References*

[1] Chapman, W. G. *GWR Engines Names, Numbers, Types, Classes, Etc of Great Western Railway Locomotives* London : Great Western Railway, 1946 Reprinted as Thomas, D. S., (ed.) *GWR Engines* Newton Abbott: David and Charles, 1971 ISBN: 0 7153 5367 5

[2] Blenkinsop, R. J. *Echoes of the Great Western plate 100* Oxford: Oxford Publishing Company, 1973 SBN: 902888 32 3

[3] Blenkinsop, R. J. *Reflections of the Great Western plate 14* Oxford: Oxford Publishing Company, 1974 SBN: 902888 52 8

*To be continued*

## **EXTENDING OUR LAST DAY OF THE HOLIDAY!**

**by David and Lily Scott**

How many have wished that they could?...

Well, while we were playing trains various road going vehicles turned up and arranged themselves in the concrete covered car park. We did an interested sweep with the camera and upon showing an interest in the smallest pair, got a bonnet lifted. “Yes, it is small!” the owner admitted which got a few laughs from the boys. Of course loving machinery of the slightly older and rare, photographed the contents. The only thing not in their favour was of being two stroke, but upon firing up the sounds were inspiring as they went home. Electric cars will have to get sound systems!

One of the early arrivals was a flat-bed Chevvy with a very keen couple who had restored her. Then taken it to many events and inspired. Now loving music I kept





singing ones with Chevrolet in them. Another song has a flat-bed in it but that was a Ford.

Now if you get to know Model Engineers Laser and the owners Ed and Holly you will know that they love Land Rovers. And of course one turned up. The Mid Suffolk being in the middle of farming country very appropriate.

Not many know that the railways were one of the first to invest in containers and their handling. And again one turned up to complete the line up.

Our driver for the day, Laurie covers all sorts in



his YouTube channel and one of these is the LMMons rally. Wonderfully full of young people who meet up and have a last bash of the internal combustion costing about £500. Laurie did his bit in a Robin Reliant... In the Peak District and some of the lanes with grass in the middle added to the excitement.

## A REQUEST FROM OUR BOILER INSPECTORS

**Boilers are being presented for hydraulic tests that have not been adequately prepared. Please make sure that all fittings have been given a preliminary test at home and fix any leaks beforehand to avoid disappointment.**

### LittleLEC

**A further reminder that this takes place on 18/19 June and all help from members on the day will be much appreciated.**



*Above, BR built 7030 Cranbrook Castle at Old Oak Common shed 81A.*

## SIXTY YEARS AGO

Photos by John Billard

25th June 1962 was the day I started my GCE O levels—so where was I the day before? At Old Oak Common to see 30850 Lord Nelson on a special to Swindon! Then followed the obligatory bunk round 81A. Later in the month I visited the RHDR for the first time and earlier I had had a very hot day on the LMR seeing 8Fs on PW trains.



*Above RHDR Southern Maid at Hythe. The semaphores were first replaced by colour lights but are now back again.*



*Above, At 81A and sadly for scrap, panniers 9758 and 9709 the latter being of the condensing variety.*



*Left, 8F 48657 on a ballast train near Kenton. Above, the Home Counties Railway Club train to Swindon. It was delayed because His Lordship arrived at Paddington from the Southern chimney first.*

# DIARY

## June 2022

Sunday	5th	Public running	12 Noon onwards Gates open at 0930 for setting up
Saturday	11th	Club running	10 30 onwards
<b>Saturday</b>	<b>18th</b>	<b>LittleLEC</b>	<b>09.00 onwards</b>
<b>Sunday</b>	<b>19th</b>	<b>LittleLEC</b>	<b>09.00 onwards</b>
Tuesday	21st	Club running	10 30 onwards

## July 2022

Sunday	3rd	Public running	12 noon onwards Gates open at 0930 for setting up-
Saturday	9th	Club running	10.30 onwards
Tuesday	19th	Club running	10.30 onwards

**Note from the Editor. Thank you to all contributors. Please remember that the copy deadline is now 20th of the month and material, unless previously notified, can be held over if received after that date.**

**Please provide photographs as separate files and not embedded into the text.**

Opinions expressed in PROSPECTUS are the personal views of the contributor and cannot be taken as reflecting the views of the trustees or editor.

**The deadline for the July issue is 20 June**

Contributions may be submitted in hard or soft copy to the editor.

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***Please write for Prospectus. Photos welcomed.  
Comments by RSME members on any subject appearing in  
Prospectus are welcomed by the editor.***