Expansion Link

Newsletter of the B&DMES

Editor John Taviner - Volume Number One - Issue Number Three
Date: September 2007

Editorial

Welcome to issue No3. I hope you enjoyed the last newsletter and found the various contents interesting. In this issue we have an article by the club's Vice Chairman Terry Hobbs on preparing your boiler for testing, club Librarian Ken Jones tells us how the library operates and Bob Lovett gives an insight on the complexities of combustion. There is far more to the black lumps than you might think.

Bob also wrote a humorous report on the efficiency contest that took place on 17th of June. The original intention was for it to published in "Expansion Link" but after discussion we decided it would be better on the website.

As you can see a lot of the contents are railway biased although this is not the interest of all club members. However without input on other subjects this is inevitable. So come on you traction engine men and others with different aspects of our hobby, send in an article and let us all share in your side of things.

John Taviner, Editor.

Forthcoming Events

October

7th Public running.

9th Meeting night (Bits and pieces).

21st Halloween run.(Sat. evening including shunting comp. and BBQ)

23rd Meeting night.

November

6th Meeting night

18th Members running day

20th Bring and buy evening

AGM. Date to be confirmed.

December

2nd Public running. SANTA SPECIAL.

Lots of help required plus volunteer to be Santa

4th Meeting night.

18th Meeting night.

Presenting your boiler for testing

Our club uses the criteria set out by The Southern Federation for testing boilers of all types used in miniature engineering. This can be read in the club house at anytime in the *Red Book On Examination And Testing Of Miniature Steam Boilers.* You can also purchase your own copy of this publication via. the club Secretary.

It can take up to 8 hours to carry out the hydraulic and steam tests on a 3" – 4" or 4 ½" scale traction engine boiler and up to 4 hours to do the same on copper boilered 3 ½" or 5" gauge locomotives.

As our boiler testers and assistants freely give their time it is only fair to present your boiler in a suitable condition for testing. Listed below is a simple guide of things you can do to save our boiler testers time.

1. Pressure gauge removed and boiler blanked off.

2. Safety valves removed and blanked off.

3. A nipple fitting made and fitted into the highest point of the boiler and threaded to fit the clubs test equipment. ¼ BSP.

4. Grate and ash pan removed OR it must be possible to examine inner firebox and tubes.

5. Front tube plate clean and ready for inspection.

6. Due to the latest regulations the water capacity has to be proven, which is part of the hydraulic test. This can be either the latest type professional builder certificate that will list the Bars Litres etc. OR by draining the boiler completely after it's hydraulic test into a container and measuring the contents or presenting the boiler empty and measuring the quantity used fill the said boiler.

Further to the above any clacks known to not seal should either be blanked off or rectified before testing.

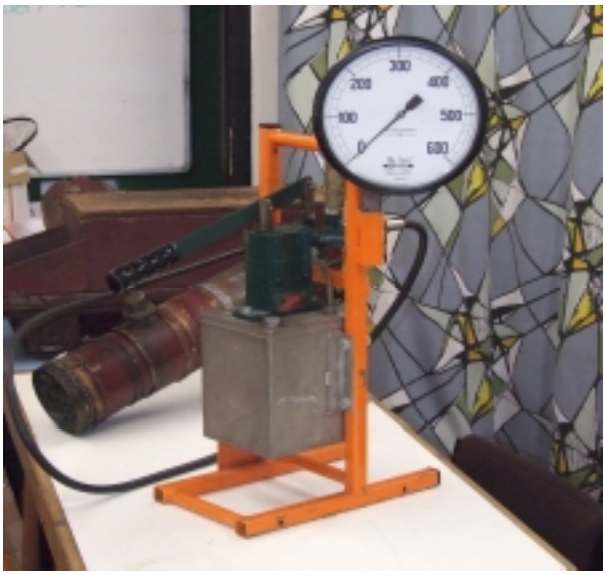
Any leaking regulators need to have some system for sealing off the main blast pipe.

Hopefully the above will be of use to members when presenting their boilers for testing.

Further to this of course when it comes to do the steam test you need to have at least two working methods of getting water into the boiler, so steam you loco. or boiler before presenting it, making sure water gauges are working including blow down, safety valves blow at correct pressure and pressure gauge is red lined at working pressure.

Hand pump, axle pump, crosshead pump and injectors, whatever method is used must work. (Also remember you need a minimum of two working systems to put water into the boiler). It follows also that non return valves (clacks) must be in good working order.

Do all of the above and you should not have too much trouble in getting your boiler through it's test.



Types of Test

There are three sorts of test you need to be ready for:

Initial Hydraulic test: This is performed on new boilers, and on boilers for which you do not have evidence of a previous hydraulic test and boilers which have been modified or subject to damage and repair. Test Pressure is 2 times working pressure and certificates last FOUR years.

Examination & Hydraulic Test: These tests involve a cold examination of the boiler and a hydraulic test at a lower pressure (1.5 times working pressure) and must be repeated every FOUR years for a copper boiler or every TWO years for a steel boiler.

Examination & Annual Steam Test: This is a test to ensure that the pumps/injectors, water & pressure gauges and other fittings operate correctly, are correctly fitted and sound. For example safety valves must prevent boiler pressure rising more than 10% above working pressure with full blower.

Remember you must always have a valid hydraulic and annual steam test certificate if you want to steam the boiler at the club or in public.

Documentation

For a hydraulic test you need to arrive with:

- Initial/previous Hydraulic test certificate(s).
- The boiler's record card and history/drawings.

For a steam test you need to arrive with:

- Valid Hydraulic test certificate.

Other things to note:

- If the boiler is not built to a standard/established design, then you will need to provide calculations to show its design has adequate strength.
- Don't forget you must be able to drop the grate "on the run".

Lastly please remember we don't expect to ONLY see you when you need a boiler test… the Club needs your help and involvement to continue to operate, without your support we will not be here to test your boiler…. and just see how much commercial boiler testers charge!

Terry Hobbs, Vice Chairman

The BDMES Library

It is incorporated in the club constitution that we should maintain a full set of Model Engineer's as a reference library. In 2005 we had so many magazines and books stored about the club house that space had become a problem and it was difficult to identify what we had. In order to cope with this I created a system for recording issues and volumes so that duplicates and omissions could be identified.

There was already an embryonic system which had issues stored in yearly batches so I

chose to continue in this way, however I now think it would have been better to store by volume (I might change it even now).

I prepared a spread sheet for each year and with the help of John Dixon we went through all the piles of un-filed mags, separating out the duplicates, triplicates and quadruplicates! These I removed and by choosing the best copy for the file we gradually built up the library as it is now with each issue stored in date order and more or less one year per box. We have an almost complete series starting from 1935 on up to 2005, most are individual issues but some are in bound volumes. In general I prefer the unbound sets as they are easier to exchange and control. The most complete years start around 1940 and there are almost complete years up to 2000, there after we have odd issues up to 2005. The spare copies were sold and raised the club funds by the princely sum of £50.00

We are offered further copies from time to time and I will always accept more. Sometimes we are lucky and we can fill in a gap but spares will be sold as before, so please keep them coming. I currently hold about a 500 duplicates which I am negotiating for exchange/sale.

Members should remember that this library is for ALL club members' reference and use. Any member wishing to refer to an issue should first check (with me) to verify that we do have that issue (or series) and then book it/them out in the usual way. There has been an instance where a whole year – about 20 issues have gone missing without explanation which I think all will agree is very mysterious, so please lets try to keep to the system by booking out each issue in the book provided or just let me know and I will record it against the name of the borrower. If a member requires some research for a particular subject I can sometimes do this through the internet, let me know if I can be of any help.

When returning issues I would prefer that the returned mag is given to me as this gives me a chance to check the file and ensure that that year is complete and correctly filed.

The library also contains a few issues of Engineering in Miniature and Model Engineers Workshop which are filed in a similar way. I will collect and maintain these for the club as they appear so please let me have your spare copies.

Other railway and engineering magazines are about and we often get given them, my policy with these is to leave them out for a couple of weeks but in order to avoid being snowed under I do bin them after a time. If any member wishes to add any of these to his personal collection please let me know.

Construction drawings

Due to the generosity of Fred Pheby the library now has several sets of construction drawings for reference and I have listed them below. Should any member be interested in a particular engine please let me know and I will make them available for reproduction. All costs for reproduction must be borne by the member who must also ensure that any copyrights are not infringed.

Drawings held by the librarian

The following are 5 Inch Gauge:-

1: 'TICH' 0-4-0 By C. Kennion & R. Thompson.

2: G.E.R. – L.N.E.R. Class Y4 0-4-0 Side Tank 1-1/16 Scale

3: 'CHUB' 0-4-0T By C.J. Kennion.

4: 'METRO' By Martin Evans. An ex 'Great Western' (Small Metro Class).

5: Gresley L.N.E.R. N2 Class 0-6-2T 'Barnet' By Don Young.

6: 'CRAMPTON' 4-2-0 (Note: Some of these drawings are rather faded but much of the detail has been inked in).

7: 'HUNSLET' (Alice Class) 0-4-0 Narrow Gauge Saddle Tank By Don Young.

8: 'CHARLATAN' 0-6-0 Diesel Unit modelled for electric motor drive.

The following are 3½ Inch Gauge:-

9: 'ROB ROY' By Martin Evans. A 3-1/2 Gauge 0-6-0 Caledonian Railway Tank Locomotive.

10: 'TICH' 0-4-0 by L.B.S.C. & L. Clarke.

11: 'SWEET VOILET' 0-4-0 Engine design By Blackgates.

The following do not have a gauge specified on the drawings:-

12: 'DIDCOT' Collett 0-4-2 Tank '1400' Class By H. N. Evans.

13: 'EDWARD THOMAS' 0-4-2 –The Talyllyn Railway Company By Lirima Designs.

Ken Jones Librarian

Paddling about

On the 9th September a small gang of members and ladies spent the day paddling about on the waters of the Solent and South Coast aboard the Paddle Steamer Waverley.

Leaving Southampton at 9:00am, we headed first to Yarmouth on the Isle of Wight to pick up passengers and then on to Bournemouth. Here we changed to a smaller vessel for the trip to Swanage and Waverly demonstrated that her 2,100HP triple-expansion engine provided a turn of speed, by steadily overhauling the boat we were on despite the best efforts of the captain.

The engineer explained that Economic Cruising Speed was 14knots (achieved at 45RPM), however on the return trip the captain ordered "ramming speed" to get us home on time, and with the engines pounding away at 60RPM, and according to Ken Jones's GPS we were making 19MPH!!!

Disembarking at Swanage we "charged" across town and had a pleasant afternoon riding the Swanage Railway.

It just so happened that this was a "Gala Weekend" with a Vintage Transport Rally so we all felt even happier that we got a £15 rover ticket included in our £31 ticket for the whole trip including trains and ships…

Some of us strayed into a local hostelry at Corfe Castle, and partook of the wares, but we were soon off to the transport rally with a wide range of cars, commercial and farm vehicles and even a Traction Engine….

The railway had one of the Standard Class 4s, a Drummond M7 and a GWR 61xx in steam so we were all treated to a good mixture of transport.

We then returned to Bournemouth on the Dorset Belle, and rejoined Waverly for the return trip to Southampton. I am told the Solent made a fine sight at night, but personally I was just fascinated watching the engines deliver their rated 2100HP and watching the steam reversing gear stop and reverse the engines without the slightest hesitation, and marvelling at the "flexing" of the entire engine room under the load! A GRAND day out – thanks to Andy Hobbs for a great idea!

Malcolm Duckett

Combustion by the book

I was browsing around the shop at the South Tynedale Railway in Alston up in Cumbria over the summer whilst waiting for a train to depart for its short trip up the South Tyne Valley on a 2 foot narrow gauge track laid along the part of the old Newcastle and Carlisle's Railway's trackbed. Unfortunately, my trip was going to be behind a Diesel acting as a replacement for the scheduled steam loco of the day as the driver had reported in sick – I'd have driven it! However, the day was going to get better because on the shelf selling items for fund raising was the **British Transport Commission's 'Handbook for Railway Steam Locomotive Enginemen'** published in 1957. The book was in fabulous condition for its age (somewhat like the author of this article some may say! Or not, others may say!) and it even had a handwritten list on the inside cover of dates and signatures from 1958 to 1964 when its erstwhile owner was 'examined' annually on the contents. I wonder who the owner was? Maybe a top link driver from 52A Gateshead shed or perhaps someone based at 52H Tyne Dock? Anyway, in spite of a slightly hefty price tag, I bought it. What a mine of information it has turned out to be.

One of the sections that got my interest was on 'Combustion'. I hesitate to say that I was 'burning to read it' or that it 'fuelled my imagination' because those would be cheap puns and not consistent with the erudite content of this worthy publication. Let's just say I learnt something and I'd like to share it with you – even though most of you probably know it already! What it boils down to is that coal is clever stuff! And, when the arguments about 'my coal's better than your coal' take place, there are good chemical reasons why. It's all down to the composition of the stuff – that is, the relative amounts of carbon, gases and ash that make up any particular type of coal formed in the Carboniferous period of the Earth's development, some 300 million years ago but hewn from its mine somewhat more recently.

Your average lump of coal would look something like this in terms of what it's made up from:

Constituent	Percentage
Carbon	75%
Ash	10%
Oxygen	8%
Hydrogen	5%
Nitrogen	1.5%
Sulphur	0.5%

The thermal energy (a.k.a heat!) given up by coal comes from the combustion of the carbon and hydrogen – initiated when they reach a sufficient temperature (over 800 ºF in old money or 420ºC in decimal coinage) and in the presence of copious amounts of oxygen, which luckily exists in the air that we breathe (unless you live in Beijing – trust me, I know). But for really efficient combustion (i.e. wringing every last bit of heat energy out from the chemical reaction) the temperature needs to be three times that. Wow, that's hot!

Wining ways for the efficiency competition?

It is stating the bloomin' obvious, but if you want to get the most out of your coal, it is important to transfer as much as possible of the heat energy that is liberated when it burns into making really hot steam. The key to this is oxygen. That's where firedoor management comes into play. This is, I suppose, a variation on the modern business saying that senior managers' door is 'always open'. In my humble opinion, several senior managers I have worked for should have had theirs permanently shut, but that is another matter.

Assuming you are chucking fresh fuel on a lovely, white hot firebed, the gaseous elements in the coal will burn off first. These are known as the volatile elements. However, to get the most out of them quickly and maximise the heat output before they disappear up the chimney, they need a lot of oxygen, more than can be supplied by the primary air – that is, the flow of air through the firegrate. This is where the open door policy comes into play. Keeping the firebox door open after adding a charge of coal (assuming you have no firebox door ventilators) lets air in through the firehole. This air is known as secondary air, and it runs over the top of the freshly added fuel, supplying additional oxygen to

supplement that in the primary air, thus enabling combustion to take place more quickly and more fully. Hey presto, rather than letting un-combusted or partially combusted volatile matter whoosh up the chimney, a much more complete combustion takes place in the firebox and more heat energy is liberated.

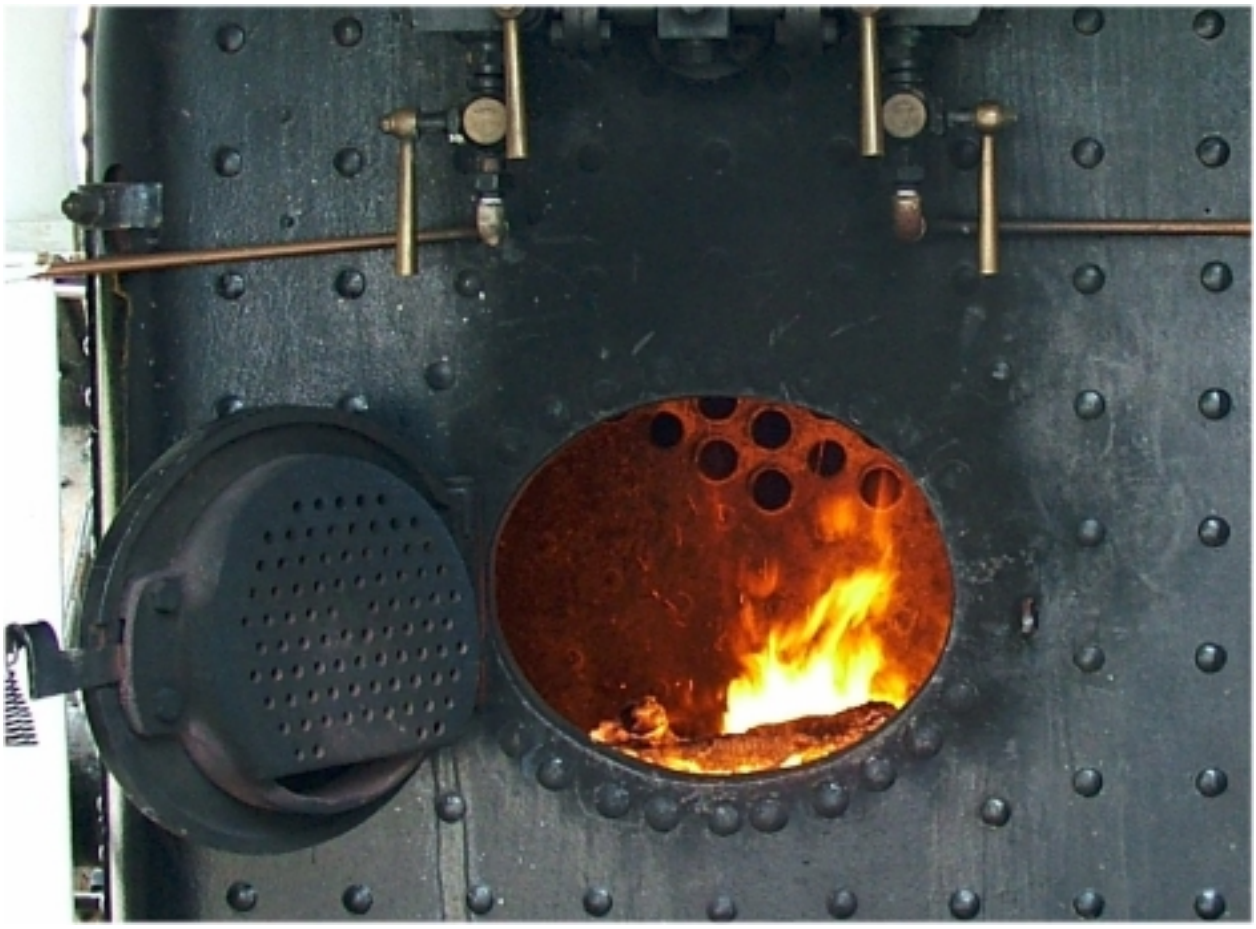
Here I should like to make mention of those who like stinky smoke! This is due to the combustion of the Sulphurous compounds (usually Iron Pyrites). These vary in percentage from coal type to coal type. They don't add a dickybird to the heat production process but they do create a great olde worlde smell and make the passengers cough on Public Running days.

Back to the search for more heat. The fixed carbon remains as solid matter on the firebed and the combustion continues. Even here, primary air may not be sufficient to ensure complete combustion, so secondary air can come to the aid of the situation via the firehole again. However, this is a fine call as too much air just cools things down because part of the heat energy of the hot gases in the firebox heat up the excess air instead of the water in the boiler! In reality, the combustion process requires approximately 20% more air (well, oxygen) than is theoretically suggested.

According to the Handbook, in order to facilitate the fullest combustion possible, little and often is the answer as far as adding fresh fuel is concerned. Haa, and you thought it was just a question of chucking another shovel or two on – one at the back, one at each side and one under the door! Apparently not. Whilst the lay of your fire is important, the rate at which you add fresh fuel can be critical.

So, there you have it (according to the BTC) – and I have given away the secret weapon that was going to help me win next year's efficiency competition. Well, of course, all this could be a red-herring couldn't it? But you may see me practicing – little and often, firedoor open – little and often, firedoor open.

The Phantom Shoveller



4-2-2 Locomotive Donation

On August Bank Holiday Monday I collected a 4-2-2 Midland Mainline locomotive, albeit with the boiler removed from the chassis, and

driving trolley, which have been donated to B&DMES, to "make use of and ideally get back into a working condition". The loco, which is similar to the Martin Evans "Princess of Wales" published in ME Volumes 136 to 137, was built by Donald Munro sometime during the 1930s and 1940s. Donald Munro's granddaughter, who has donated it to us, also provided us with some photos of the loco, one of which shows the loco in steam being driven by Donald Munro, and another one showing the loco on a display track with the date 1st April 1949.

When I delivered the loco to the club on the following Tuesday, there was considerable interest and discussion on what we had and what we could do with it. Unfortunately, the consensus of opinion was that the boiler could not be used as it was made from copper and brass (brass being the main issue), riveted and soft soldered, and had a number of stays missing.

In no time the loco chassis was being pushed round the track to make sure it went round the track curves. After a full circuit of the track, without incident, the chassis was chocked up on bricks and an airline connected to the cylinder block. When the compressed air was applied, the motion operated first time, driving the 8" driving wheels for the first time in somewhere between 50 and 60 years, which is a significant testament to its builder Donald Munro.

Next, with 20 plus metres of airline hose we had the loco under compressed air power running up and down the track between the bridge and station exit. Numerous members had a go at "driving" the loco by either controlling the air pressure to the cylinders or changing the reverser. A great deal of fun was had by all.

It is the intension of the committee to discuss at the next AGM what the Society would like to do with the loco. My personal view is that B&DMES should restore it to running condition, giving us a steam loco on which members, without a steam loco of their own, could be trained, as well as providing an interesting centre piece at exhibitions. Although the boiler, by today's safety standards is not usable, a boiler kit and tender castings and frames are available from AJ Reeves for the Martin Evans version of the loco. We have searched through the electronic ME index and found no record of the loco other than the Martin Evans design. If any member has a plan for the loco dating from this period or has magazines such as Mechanic, dating from the 30s and 40s, we would be grateful if you could have a check to see if the loco design is mentioned.

Graham Blissett, B&DMES Treasurer

Secretary's Notes.

Well here we are with the "summer" drawing to a close, (in a much better way that the start of it!), so we can look forward to the winter calendar and gather our bits for the "bits & pieces" evenings.

Club Internet Bulletin Board

Just a quick reminder, our internet message board has lots of information and membership lists. You can find this board at badmes.proboards51.com. You need to register by clicking "create a new account", which will be sent for approval by site admin – this ensures only bona-fide BADMES members can use the system. An email will tell you when you are approved. We have 19 members signed up so far – take a look…

Club Loco.

The Class 66 club loco continues to progress, and we need to thank Tom Burgess for his sterling efforts on this – so far undertaking all the work almost single handed – and to a very high standard. Yours truly is down to sort the electrics in the coming weeks, and then when painting is complete we will have a very fine loco for public running.

Developments at Viables

You should all have received in the post a copy of the proposed plans for an extension to the existing workshop from Tom Burgess. The idea is to provide improved rolling stock storage (to reduce "handling" damage, & save time and effort at start and end of the day), provide storage for the new club loco, and to provide a proper workshop. The workshop will allow us to have an easier time with site maintenance, and we hope contain some machinery which members may occasionally need and not have at home (larger lathe perhaps and mill). We will need to make some rules to make sure we operate this safely and look after our equipment. One way clubs like SMEE do this is by having a number of Workshop superintendents, who hold the keys to the workshop power, and by asking members to bring their own tool bits, milling cutters etc. We would be happy to receive any comments you might have on this plan.

AGM

The club's AGM will be in November, keep an eye open in the club house, on web site and bulletin board for dates…

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Secretary	Malcolm Duckett
Treasurer	Graham Blissett

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John Taviner	Newsletter
Simon Hutson	Garden Railway
Tom Burgess	Member
Mike Lowe	Member

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Electrical Work	Simon Hutson
Library	Ken Jones
Painting/Decorating	Vacant
Publicity	John Dixon/ Graham Blissett
Signalling	Graham Blissett
Station /Contents	Vacant
Track/Site Maint.	Dave Blaza/ Mick Lowe
Traction Engine Track	John Catton
Webmaster	Stephen Newell
Newsletter	John Taviner