EXPANSION LINK

BASINGSTOKE and DISTRICT MODEL ENGINEERING SOCIETY

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Editor Austin Lewis

Picture Austin Lewis and Adobe Photoshop

MINIATURE STEAM GALA 2017
8th and 9th APRIL

EDITOR

Dear Member, as you can see from the cover the annual Miniature Steam Gala is almost upon us. We will be using the same format as last year. The raised track will provide rides for the visitors with the garden railway adding great interest for the young and old alike. Traction engine rides on the traction engine track as well in the large field and twenty plus traction engines in steam (I hope).

The marquees will be up and containing wood turning demonstrations by Axminster Tools, our Tombola, models by members of the Basingstoke Boat Club and our members as well. As usual, we will need as many members as possible to be available to help. On Friday 7th April we need help to set up the marquees, then on Saturday and Sunday the 8th and 9th April to help at the raised track, garden railway, receiving donations, selling programmes and on the tombola. Speaking of the tombola – can you please bring donations of gifts to the club house during March. The more donations we have the greater will be the profit to the club. All types of new or unwanted gifts are required: bath washes and 'smellies' of all types, books, household items, 'in date' tinned or packaged food stuffs, wine and non-alcoholic drinks or what have you. Everything is welcomed. Please contact me if you wish to help on any or all of the days.

Austin Lewis

CHAIRMAN'S REPORT

Just a short note to keep you informed of the Board's plans for development at our site.

Workshop Security
Most of you will be aware that the new burglar alarm is now in operation in the Workshops. If you do not know the code, or where to find it, please do not attempt entry.

New Coaling Stage
The new concrete base in place of the old coal bunker is for Dave Andrews to build a G.W. style coaling station.

Renovation of the Old Tunnel
We have been long concerned about the lifting required to put passenger trolleys on the track, particularly those stored in the ticket office. We are, therefore, proposing to utilise the old tunnel for trolley storage. This would allow us to make-up a complete train without lifting. The first stage will be to renovate the old tunnel to provide waterproof storage with internal lighting. The second stage would be to fit rails inside with a section of the main track swinging to meet it.

All hands to the Pumps
You will appreciate that a project of this nature takes time and effort to bring to fruition, so please be ready to assist when required, many thanks.

Meanwhile - Happy Steaming! - and don't forget the GALA on April 8th-9th.

Colin Stubbs
Chairman

MAINTENANCE AT VIABLES

During our previous year's maintenance, we experimented with inter-trolley covers to reduce the risk of injury to anyone tempted to put their fingers (or other bits of anatomy) between the trolleys whilst in motion. Having been successful, we extended the idea so that we could connect any of our rolling stock in any formation we liked. 2016 was a very busy year passenger hauling year and on several occasions we needed to add to our normal two carriage trains in order to cope with the demand!

Our recently implemented safety policy requires that we undertake annual inspections of our rolling stock to ensure we keep them in good running order - to this end, all our rolling stock now carries identification plates so that defects and repairs can be kept on record.

Following an attempted break-in during the year, the Board decided that we should upgrade our security and so we now have a new burglar alarm system installed.

Throughout the last 12 months we have had a relatively incident free season (track wise) but there has been a few reports of locos binding where the gauge of the track tightens just prior to the tunnel (as you run off the renewed section). To overcome this problem another new panel of track, up to the tunnel mouth, has been installed. The track through the tunnel is in reasonable condition but from the exit the sleepers have suffered from the damper shaded conditions down the back straight, so a program of sleeper replacement will have to take place during the coming year.

During our recent 'Maintenance Weekends', our intrepid volunteers have removed the old coal bunker and lifted the paving slabs to gain access to a water leak that was deemed to be responsible for the subsidence of that area. The leak proved to be no more than a joint pushed apart by the frost! The ensuing subsidence had not only resulted in a drunken coal bunker, but had dragged the spur from the engine lift down with it. Whilst the area was being leveled, the support post for the spur was cut, and a spacer welded in to allow the spur to regain its original height. Whilst the weather for the February maintenance weekend was not exactly conducive, the assembled members got on with the task of mixing the concrete and laying the slab for the new coaling stage. The second day was taken up with general tidying of the whole site and burning of the accumulated rubbish.

As I write this, the next important date in our calendar is the 'Driver/Public Running training day' on 26th February, during which I intend to run a loco both ways round the track to ensure that there are no unforeseen problems with this year's work.

There will also be another 'Driver/Public Running training day' on the 19th March, so we need as many members there as possible in order that we all become comfortable with the implementation of our safety rules. There is a distinct possibility that we will be able to put everything into practice during the afternoon!

Whilst we have concentrated on the raised track, our two stalwarts have been beavering away keeping the garden railway up and running, and there are, doubtless, others who have quietly toiled and slipped under the radar, so I would just like to thank all those who have turned out to assist - I won't name names, then I won't offend anyone who has slipped from my memory bank!

As you can see from the attached photos, a good number of people turned out to concrete the slab for the new coaling stage ***despite the snow***.

Eddie Turner

Well, what shall we do now?

The DIY SOS 'Little Build' starts

Smoooooooth

Where do you want it?

More anti-frost solution --- quick

Photos Austin Lewis

Safety Valves

An article by Bob Bramson (Issue 2 September 2016)

Part 2 continuing from Expansion Link December 2016

The Essentials For Miniature Safety Valves

The first of the five main factors that were mentioned in Part 1 was Design. No matter how well you machine and construct a model, it will only perform well if designed properly. Any design of an engineering component or system must serve predominantly to fulfill the purpose for which it is intended. It must also be capable of being made, of being assembled, be maintainable, be reliable and have a long working life. For those of an artistic disposition, it must also look right and not least for the accountants, be cost effective. The purpose of this second part of the article is to discuss the *principles* that will achieve this for miniature safety valves.

The choice of safety valve type is largely dependent upon the prototype being modeled. The eternally “fizzing” plain valve can be greatly improved by adopting “POP” type principles. POP safety valves properly designed and made are undoubtedly the best from an operational point of view. Unfortunately, it is a fact that many young children and some parents that visit club tracks and miniature railways can be alarmed by the sudden discharge of a POP valve. By careful design and construction, it is possible to “soften” the discharge sufficiently to moderate the opening of the valve although this will have the adverse effect of increasing the shut off range. Another factor to consider is the effect of water lifting. A sudden discharge when carrying high water levels may well result in lifting water and provide an uninvited shower; most inconvenient for bystanders! It will also lower the boiler water level very quickly and this tendency must be mitigated as far as possible as will be discussed later

The Safety Valve Spring

This sub section deals with springs intended primarily for directly loaded ‘POP’ Safety Valves. A working model safety valve typically suited for 1/8 scale is illustrated in Fig. 8.

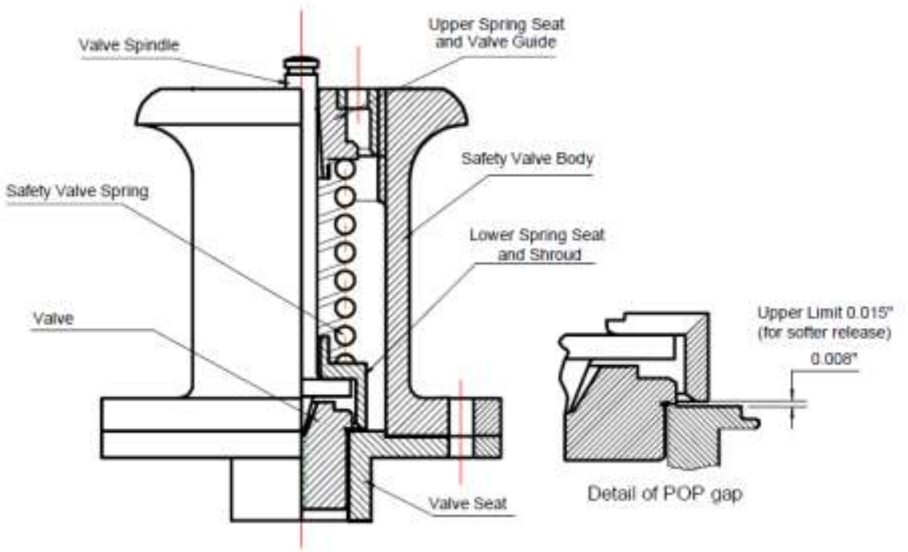


Fig 8 “Best Practice Principles” 1/8 Scale Safety Valve

The heart of an efficient safety valve is its spring. Any old spring out of the recycle box is unlikely to deliver the required performance. A simple fact with safety valves is that the load on the valve due to the steam pressure is resisted by the load imparted by the spring. At the point of opening, these two forces are equal and opposite and in perfect balance. It can be appreciated that as the steam pressure rises above the blowing off point, the spring stiffness is the key to the amount the valve opens and thus the relief of excess pressure. Too little and the valve starts to 'flutter' causing premature wear and unwelcome acoustic effects; too much and the valve does not open sufficiently in order to do its job. As has already been discussed, reliance on the spring alone to control the opening of the valve will not relieve the excess pressure and accumulation is more likely to occur.

In Part 1, the spring load and spring rate were mentioned and for the above reasons, great care needs to be taken to select the correct characteristics. This publication is perhaps not the appropriate place to detail the engineering criteria employed for the selection of springs*, however, it is appropriate at least to consider the principles that apply such that the design issues can be appreciated.

* Ref: "Spring Design and Manufacture" – Tubal Cain ISBN 0-85242-925-8

A coil spring is simply a torsion bar coiled up in several convolutions so that it can do its job in a confined space. For any particular spring material, the formulae for determining the *stiffness* or *spring rate* are such that the mean diameter of the coils and the spring wire diameter are identified as the critical factors. For any spring material:-

- The LOAD that a coil spring can support is influenced by the CUBE of the wire diameter
- The LOAD that a coil spring will support is independent of the number of coils
- The TOTAL DEFLECTION of a coil spring is directly proportional to the NUMBER OF WORKING COILS
- The DEFLECTION is influenced by the CUBE of the mean diameter of the spring and by the FOURTH POWER of the wire diameter

It can thus be appreciated just how sensitive a spring's performance will be due to variations in the mean diameter of the coils or the wire thickness.

There is also the torsional elasticity and shear strength of the spring material to consider. Most full sized safety valve springs are made from heat treated spring steel, usually of square and trapezoidal section so that they end up true section after coiling. A spring made in this manner will have the maximum stiffness, equivalent circular section springs less so. As these springs work in a corrosive element (particularly when cold) their section gradually reduces with time as does the blow off pressure. This is a classic "right side" failure in that the spring always fails safe. In miniatures, operating only occasionally and laid-up for long periods of time, stainless steel is often used for safety valve springs. There are many variations in the composition of stainless steels, some capable of being hardened although the amateur engineer is very unlikely to possess facilities for properly heat treating it. Untreated, it is a comparatively soft material and whilst it is often used, in order to obtain the desired stiffness it has to be made with a relatively small mean diameter and of heavier wire thickness. Austenitic stainless steel coil springs are available commercially, however, the range is somewhat restricted and it may be necessary to resort to a carbon steel spring having a larger mean diameter and of thinner section (size for size, stainless steel springs have about 20% less stiffness than carbon steel).

Proprietary springs can be obtained coated to offset corrosion although due to the unique requirements of model safety valve springs it may not be easy to obtain a specific spring "off the shelf" and piano or music wire is possibly the best readily available material to use for home construction as it can be obtained in a variety of thicknesses.
The key considerations for a safety valve spring are:

- The spring stiffness

- The ends must be close coiled and accurately ground normal to the axis with at least 70% of flat surface
- The spring must not become coil bound (coils in contact with each other) when compressed to the full working deflection

Table 1 shows the spring dimensions for miniature safety valves set to lift at 100 lb/in^2 (psi.). These springs have been identified by practical experimentation and graphical analysis. The rates therefore take into account the temperature of the steam which also has an effect on a spring. Unfortunately, it is very difficult to obtain custom springs to some of these dimensions. Since the spring stiffness is very much a function of the fourth power of the wire diameter, it will be appreciated that only a small change in wire thickness will significantly affect its characteristics. In course of experimentation, the author selected the next higher rated spring available and made up a mandrel over which the spring was pushed so that its outside diameter could be progressively reduced by grinding. The stiffness was checked after removing the crests of the spring using a lever set-up, spring balance and dial gauge. The process was repeated until the desired stiffness was obtained.

Bore of Safety Valve in (mm)	9/32” (7)	5/16” (8)	3/8” (10)	7/16” (11)	1/2” (13)
Spring Stiffness lb/in (N/mm)	20 (3.5)	40 (7)	80 (14)	110 (20)	150 (26)
Ideal wire diameter in (mm)	0.038 (0.97)	0.056 (1.42)	0.064 (1.63)	0.070 (1.78)	0.075 (1.90)
Suggested spring O/D in (mm)	0.313 (8)	0.375 (9.53)	0.375 (9.53)	0.438 (11.15)	0.500 (12.7)

Table 1

The above spring stiffness rates will suit the bore of safety valves set to blow off at 100 lb/in^2 (7 Bar) and relate to a 1” (25.4mm) free length carbon steel spring having between 8 and 10 working coils.

For the purposes of this article, suffice it to say that the technique of close coiling the ends of a spring and of grinding the faces flat and normal to the spring axis are easily achievable in the average model engineer’s workshop. It cannot be emphasised enough that these operations are vital to the efficient operation of a safety valve. The reason for this is that if the spring sits off axis, the load will be offset to one side, causing the valve spindle to bind on the guide and also to push the valve to the other side when it opens. This will cause frictional resistance and the sensitive nature of the valve will be destroyed resulting in sluggish opening and closing, i.e. overpressure and wastage of a lot of steam. This tendency was compensated for in the design of full size valves by employing hemispherical seats for the spring seating pads, this of course, being impractical in miniatures.

The Valve

Ball Valves:

The ubiquitous ball valve is quite satisfactory in 7 ¼” gauge (for standard gauge prototypes) but takes up a fair amount of space within the valve. Where space is limited, or for narrow gauge engines with larger sized boilers, it is better to adopt a properly designed flat faced, wing guided valve.

In order to obtain the best results, all ball valves must be designed in the following manner:

Precision ground balls can be obtained cheaply in various materials although nonmagnetic stainless steel (grade 316) is possibly the most appropriate.

The next consideration is the ratio of the ball diameter (D) to the bore of the valve (d). For best results, this ratio should be between 1.3 and 1.4. The hole must be as circular as possible, achieved either by reaming or fine boring.

The most important consideration is the valve seat. It is no use whatsoever in perpetuating the sharp edged version so frequently described in the model engineering press since this practice will lead to premature wear and leakage. The valve faces must be hemispherical and the face depth, typically for a 7/16" diameter ball, should be between 0.025" to 0.035". This is easily achieved using a ball ended end mill and by lapping-in afterwards (any excessive depth can be machined off). It should *never* be necessary to hammer a ball valve in order to seat it! A ball valve version is shown in Fig 9 (Note; the POP Shroud may be incorporated as part of the spindle).

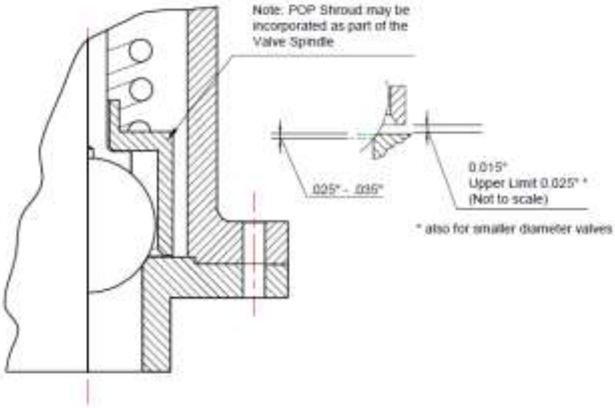


Fig 9 Alternative "Ball Type" Safety Valve

Wing Guided Valves

For valves having a bore diameter of over 3/8" it is good practice to employ a wing guided valve having either a flat or 45° coned valve face. Fig 10 shows the valve used by the author during the experiments. The author has found that in model valves, the coned face is easier to make and seal. Unlike its big sister, it does not seem to make any difference to performance compared with the flat seated version. The fit of the wings in the bore must not be too close as expansion effects may cause it to jam. On the other hand, effective guidance will be lost if the clearance is too large.

Fig 10 Experimental Flat Faced Valve

The Valve Body

Many conventional designs of miniature safety valves provide for the body and seat being machined in one piece. Whilst this is acceptable up to 5" gauge, in larger miniatures where the volume of steam to be relieved becomes greater, it is better to adopt the principles used in full size. There are several other reasons for this. Firstly, the set-up procedure begs ready access to the valve seat. Secondly, different materials can be used to advantage. Thirdly, lapping-in of the valve is more easily accomplished.

The valve bodies used during the experiments were threaded the same diameter at both ends but the distances between the threaded portions were relieved to provide a larger escape passage for the steam. Leaded gunmetal or phosphor bronze is a suitable material although the latter very rapidly discolours upon heating. It is essential to achieve full thread engagement at both the top and bottom of the body.

A word of caution is appropriate with relation to this design. It is important that a means of secondary locking is applied to the screwed interface between the seat and the body during final assembly. This is to prevent the body accidentally unscrewing in use. The most positive method is shown in Fig 13. Alternatively, this may be assured by using a fine thread, 32 tpi is satisfactory and a high temperature thread locking agent. The true Ross POP valve body is bolted to the seat which eliminates this potential hazard. The author has used this method as illustrated in Fig11.

Fig 11 Model Ross POP Safety Valves 1/8 Scale

The Valve Seat

The first essential is the material of the valve seat. Never use brass as this will soon erode and degrade. Cast gun metal or phosphor bronze is better but the best results will be realised using a machining grade of stainless steel. The valve seat can be made like its full sized counterpart or as an insert. The seat designs used during the experiments were made to suit ball and flat seated wing valves.

Smaller sized valves can be screwed into a bush in the boiler but larger ones are best bolted as in full size practice. Once a safety valve is fitted, adjusted and locked, it should not be disturbed until maintenance or remedial attention becomes necessary. The practice of filling a boiler through the safety valve bush is satisfactory only for small models. Larger models may be conveniently filled by back feeding through the blowdown valve using a flexible hose. Earlier in the article, mention was made of the problem of water lifting. There is no sure cure for this ailment but its effect can be mitigated. For one thing, the phenomenon is more likely to occur if water treatment is used and there is a large concentration of dissolved solids. The usual remedy is to blow down the boiler to reduce the concentration or employ a suitable antifoam additive. A simple mechanical expedient is to make a baffle plug as part of the boiler pad upon which the safety valve is mounted. An example of this is shown in Fig 12.

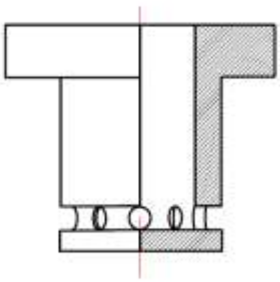


Fig 12 Anti Priming Baffle

The Valve Spindle and Lower Spring Seat

The valve spindle has to do three jobs. It must locate the spring centrally on the axis of the valve. It must transfer the thrust of the spring to the centre line of the valve. Finally, it is used to support the POP shroud. The spring seat is incorporated in the POP shroud and the spring locating spigot must not be a close fit in the spring. The spindle used in the experiments had a screwed end to provide means of adjustment of the POP gap. Full size practice dictates that the point of contact for the spindle must lie below the valve face. In miniatures it does not matter at all, in fact the ball valve type can only be interfaced above the ball. A suitable design can be seen in Fig. 8.

The outside diameter of the POP shroud tends to influence the amount of opening of the valve. The experiments showed that if the diameter was too large, the valve opened too violently and refused to shut. If it was too small it had limited effect. It was determined that a ratio of 1.35 to 1.38 was optimal. Since quite close limits are involved in setting the required gap, it is only practicable to do this accurately by using the split body design. Set to the ideal clearance, a valve will gently feather at approximately 3 psi below the blowing off point and then open fully. Upon the boiler pressure falling, the valve will shut between 3 and 5 psi below the blowing off point. It was found that less hysteresis could be achieved but this will tend to cause continuous "POPPING" resulting in faster wear and annoyance to bystanders (let alone most drivers!).

Surprisingly, it was found during the experiments that there was a remarkable difference in the ideal POP gap when using a ball valve as opposed to the flat or coned seated variety as is evident from the dimensions shown in the scrap views of Figs 8 and 9. The smaller the gap, the more violent will be the opening of the valve. If the gap is too small the valve may not seat without the loss of a great deal of pressure. To soften the lifting characteristic, simply increase the POP gap to the upper limit shown (this will increase the shut off margin to approximately 10 psi).

Henry Greenly described his POP valves for 15" gauge locomotives in the 1920s. The valve as shown in the book may not represent exactly the "as made" installation. The author was asked to renew the valves for a well-known railway in North Wales and the final result was based on the diagram shown in Fig 13 (simplified for 7 ¼" gauge) and detailed in Fig 14.

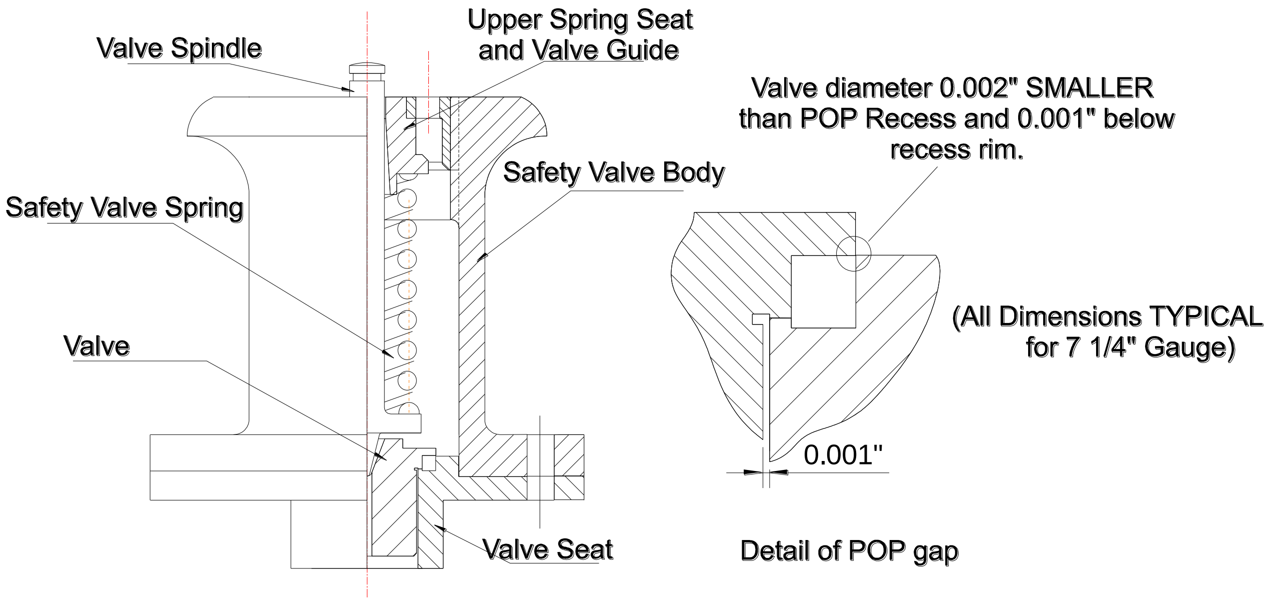


Fig 13 Alternative POP recess and valve

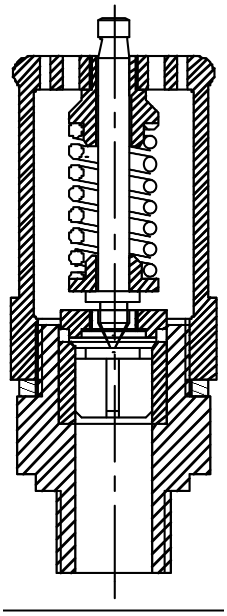


Fig 14 Safety Valves for 15" Gauge Locomotive

The Valve Guide and Upper Spring Seat (Cap)

The design of the conventional Spring Seat Cap can be improved easily. The essential need is to guide the spindle, provide unimpeded release of surplus steam, support the fixed end of the spring and provide means of adjustment. The design shown in Fig. 8 will fulfill these requirements.

Locking the Adjustment

The final "issue" set out in Part 1 was the locking of the valve at the safe operating pressure. Hitherto, this essential requirement appears to have received no attention in the model world at all. All full size valves must be locked and so must miniatures. This is to ensure that the valves do not creep out of adjustment and blow at pressures above the safe working limit. It is easy to do. With a screwed cap, locking can be effected by any of the methods shown in Fig. 15. The author also stamps the blow off pressure on the cap.

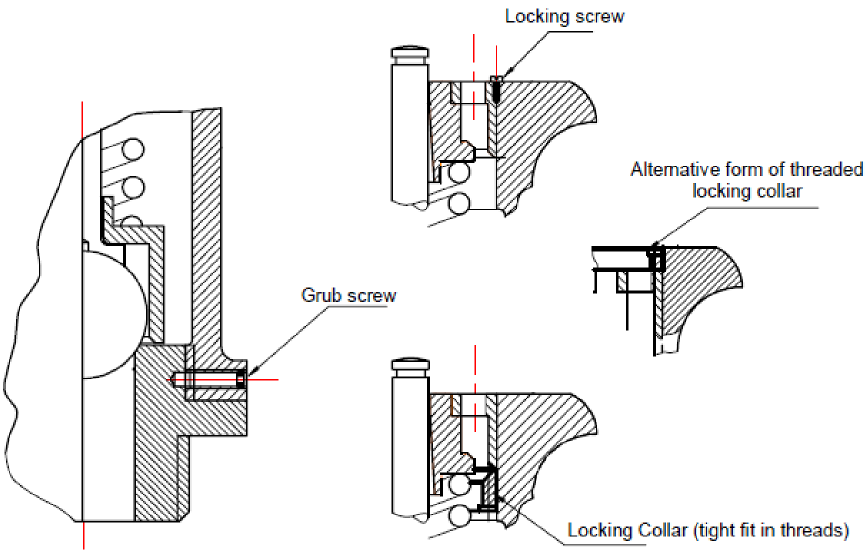


Fig 15 Locking Methods

Valve Setting and Testing

In the steam days of British Railways, all safety valves were set off the job in main works. They were then locked and rendered tamper resistant. Nowadays, they are nearly all set up on the job as are most miniatures. This can be a little hazardous but by employing simple and sensible techniques it becomes quite safe. Steam contains a lot of heat energy and can burn and scald well before most people can react to get out of danger. First of all, never attempt to test safety valves alone. Always have a capable assistant who can react in the event of anything going amiss. The right tools are needed so that during adjustment the fingers are kept well out of the plume of the steam and also any hot metal surfaces. It should be obvious that the screwed cap must never be wound out of full engagement with the threads in the body. Face and eyes must be kept well out of the way of discharging steam. It should also be borne in mind that static electricity can be generated by the action of the discharging steam and it is thus possible to receive a shock. Unless the handle of the adjusting tool is insulated, it is safer not to adjust a valve during discharge. A suitable insulated adjusting tool is shown in Fig. 16.

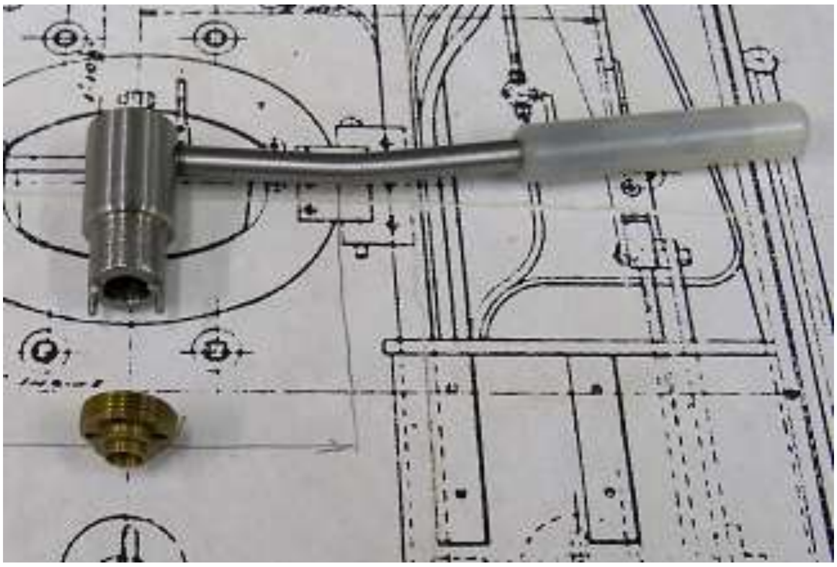


Fig 16 Safety Valve Setting Tool

A procedure for adjusting a safety valve in situ is as follows:

- Remove the locking device
- Raise the boiler pressure and progressively adjust the valve to the safe working level. Whilst it is more convenient to adjust a safety valve during discharge, it is safer to lower the boiler pressure by 10% before making an adjustment.
- Always set a valve on an ascending pressure basis
- Once set, mark the cap and valve body so that the adjustment can be identified
- If more than one valve is fitted, set the second valve to lift between 3 and 5 psi above the first
- Cool down and when all pressure is relieved, remove the valve and apply the locking measure

Ramsbottom safety valves should be set up so that they relieve the pressure effectively at the safe working limit. If POP principles are not employed, this may entail a certain amount of premature feathering. Each valve should be eased and proven during the test.

Testing can be carried out using the procedure described in the "Blue Book" or more correctly, "Examination & Testing of Miniature Steam Boilers." The requirements stipulate that the boiler should be steamed at the maximum firing rate and with the blower full open to attain stable conditions. The author firmly believes that it is appropriate that that old and latterly scarce commodity "common sense" should be exercised when doing this. For example, it is undesirable that the fire should be built up excessively or that the tests should be prolonged for such an extent that it becomes impossible to maintain a safe water level.

The valves should lift only for sufficient time, without exceeding the stipulated accumulation, to prove they are capable of handling the volume of steam under practical full steaming conditions. A couple of things the procedure does not cover are the effectiveness of each valve which may be checked by shorting out each valve in turn using a suitable implement and putting on the injectors to check that the valves shut off correctly.

Operation and Maintenance

A few words on these subjects might be found useful. Always check that the safety valves work effectively before commencing a run. If they don't, fail the locomotive, investigate the cause and put it right before further use. Any inadequacies that are found during the run, including ineffective functioning of the safety valves must be noted and remedial actions put in place. If a lot of water lifting occurs, the valves may become coated with scale deposits which could impede their proper performance or even lead to failure. If this is suspected, strip down the valves after the run and clean the parts using warm kettle descaler.

Given sound materials, design and workmanship, safety valves should perform properly for several seasons before requiring maintenance attention. The triggers for maintenance could be a gradual lowering of the blowing off point (as discussed previously) sticking or leaking valves and when using some forms of boiler water treatment, gumming up of valves when left cold for prolonged periods. If this occurs, there is no better remedy than to strip down the valve and carefully clean it, checking at the same time the condition of the component parts and especially the spring, valve and seat.

Conclusion

There are so many variations in the type of safety valves fitted to different prototypes that it is impossible to deal with any more than the principles described in this article. The exact external dimensions of valves can be deduced by scaling but it will be found, particularly in the smaller sizes that valves have to be oversize to do their job effectively. By using the principles outlined, it should be possible to produce valves that are effective, safe and economical on steam. In the amount of time and with the resources available, the author has not been able to cover every eventuality for miniature safety valves but it is hoped that this article has been of value to those with limited knowledge or experience and a stimulus to those that wish to "have a go" and make valves that do the job with a satisfying degree of perfection.

Bob Bramson

It's that time of year again – a reprint from 2014

Boiler testing*: what everyone should know*

Our club uses the criteria set out by The Southern Federation for testing boilers of all types used in miniature engineering. This can be found in the '*Green Book', The Examination And Testing Of Miniature Steam Boilers (Revised Edition 2012).* Every boiler owner is supplied with a copy, at cost, on completion of a boiler test by one of our testers. You should read this carefully as it is the owner's responsibility to ensure that his boiler is in a satisfactory condition to be operated. 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. Included in the 'Green Book' is the statement that the owner is responsible for presenting the boiler in a suitable condition for testing. It is also only fair to the boiler tester and his assistant(s).

Listed below is a simple guide of things you can do before the Hydraulic Test to save both you and the tester 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 (1/8" BSP, or a Goodall type filler on very small boilers).

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

5. Front tube plate and firebox clean and ready for inspection.

6. The regulations require the water capacity 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, by draining the boiler completely after its hydraulic test into a container and measuring the contents, or presenting the boiler empty and measuring the quantity used fill it.

7. The boiler must have a unique identification number indelibly marked onto it, in such a position as it can be read by the tester.

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.

In addition to this, of course, when it comes to do the Steam Test you must have at least two working methods of getting water into the boiler, so steam your 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 (on the gauge face, not the glass) at working pressure. Hand pump, axle pump, crosshead pump and injectors, whatever method is used must work. 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 its 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:

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

For a steam test you need to arrive with:
(3) Valid Hydraulic test certificate

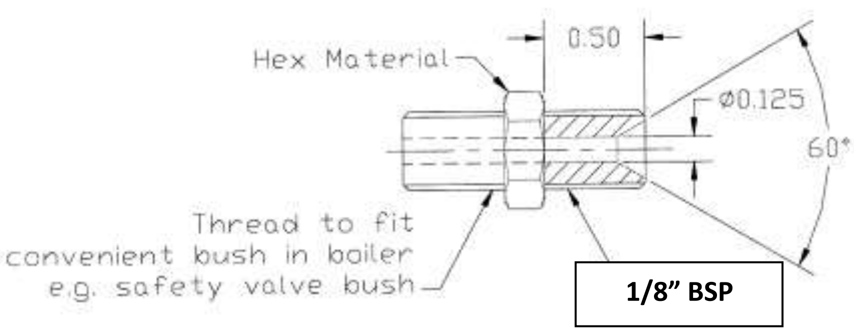
Other things to note:

If the boiler is not built to a standard/established design, you will need to provide calculations to show its design has adequate strength.

Don't forget, although it is not a boiler test requirement, B&DMES insists that you must be able to drop the grate "on the run" when undertaking public running.

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.

<u>Suggestion for a boiler testing converter</u>



(Dimensions in inches)

Basingstoke & District Model Engineering Society Ltd 2017 Calendar (Draft 1)

January

1	Members Day (Sunday)
3	Meeting Night
14/15	Maintenance Weekend
17	Bits & Pieces Evening
31	Meeting Night

February

11/12	Maintenance Weekend
14	Meeting Night
26	Driver/Public Running Training (Sun)
28	Meeting Night

March

11/12	Maintenance Weekend
14	Bits & Pieces Evening
19	Driver/Public Running Training (Sun)
28	Meeting Night

April

1/2	Maintenance Weekend
8/9	**Miniature Steam Gala**
11	Meeting Night
25	Bring & Buy Evening

May

7	**Public Running**
9	Stationary Engines
14	**Visitors' Open Day (Sun)**
23	Meeting Night

June

4	**Public Running**
6	Bits and Pieces Evening
17	Members Running
20	Meeting Night

July

2	**Public Running**
4	Meeting Night
15	Members Running & Barbecue(Sat)
18	Meeting Night

August

1	Bring & Buy Evening
6	**Public Running**
15	Meeting Night
29	Meeting Night

September

3	**Public Running**
10	**Visitors' Open Day (Sun)**
12	Meeting Night
24	Members Running Day (Sun),
26	Meeting Night

October

1	**Public Running**
7	Members Running Day (Sat) incl. Fish & Chip Supper
10	Bits & Pieces Evening
24	Meeting Night
28	**Halloween Public Running (Sat Evening)**

November

7	Bring & Buy Evening
12	Members Running Day (Sun)
15	AGM (Date to be confirmed)
21	Meeting Night

December

3	**Public Running**
5	Meeting Night
19	Meeting Night

Public Running 11am to 4pm (setup from 9:30am) Sunday, unless stated otherwise
Member's Running days 10am to 5pm
Tuesday Evening Meeting 7pm to 9pm, with optional members running afternoon
Maintenance Weekends - Working parties to keep track & site shipshape. Check notice board for details

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Email Addresses
If you have received a copy of the newsletter by post, it is because we don't have your Email address. Each newsletter costs over £1.50 to print and post, where as Email is effectively free. If you do have an Email address, which we can use, could you please Email me with your details.

Jon Evans
Treasurer

Board Members

Chairman	**Colin Stubbs**
Vice Chairman	*Vacant*
Secretary	**Brian Hogg**
Treasurer	**Jon Evans**
Director	**Dave Andrews**
Director	**Darren Davis**
Director	**Steve Newell**

Project Leaders

Catering manager	**Eric Widdowson**
Electrical Work	**Jon Evans**
Library	**Ken Jones**
Station Buildings & contents	**Dave Andrews**
Publicity	**Dave Mitchell**
Track maintenance	**Eddie Turner**
Site maintenance	**Eric Widdowson & James Barrett**
Traction Engine Track	**Austin Lewis**
Webmaster	**Mike Bowman**
Newsletter	**Austin Lewis**