



# SOUTHERN FEDERATION of MODEL ENGINEERING SOCIETIES

Formed from the Federation established in 1970

[www.sfmesc.co.uk](http://www.sfmesc.co.uk)

## International Flavour this Issue



*If a picture is worth a 1,000 words, this says it all.. Just a wonderful sight, but we must wait for the story in the next issue*



Left.  
David Mayall with Barry Glover from the Australian Association of Live Steamers on his visit to the Southern Federation Spring Rally at the Hereford Society of Model Engineers



Right  
NYC J2 'Hudson' No. 5279 at work at Confederation Park, British Columbia Society of Model Engineers at Burnaby Central Railway.

## ***In this issue we bring you . . .***

*Hereford Society of ME host the Southern Federation Spring Rally.*

*Some technical stuff for the boiler testing fraternity.*

*Visit to the British Columbia Society of Model Engineers.*

*Southern Federation Autumn Rally Sept 19/20 — You must come!*

*-A little special something. (See p8)*

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Views and comments expressed in this publication are not necessarily those of the Southern Federation of Model Engineering Societies

## EDITORIAL

**B**rent is away having a good time at Train Mountain in the USA and I have had a month in Canada and would you believe it, both my granddaughters (nine and four) dragged me to the British Columbia Society of Model Engineers railway in Burnaby. How could I refuse them? I describe it inside. Having got into the habit, I also visited the Vancouver Island Model Engineers and what a marvellous railway they have too. They actively support, marine, clock making, stationery engines and the full breadth of model engineering.

Both Canadian societies have mile or two mile long tracks that weave in and out of the forests (woods), over rivers or streams (one a salmon spawning ground) and commune with nature. Both have well equipped workshops and no vandalism problems!

But the 'British' in BC lives on. Amongst the Mikados, Hudsons, Consolidations and Shays I saw a 3 1/2" 'Mabel', a Britannia and Van Island members have a Princess of Wales and a Midland 2P in 5" in their roster. (Descending into North American speak now!!

They also share the membership issues that we often discuss. Many members but only a few to keep activities running and perennially, how do we get the youngsters involved in the face of competition from iPads etc.

Here, we are blessed with the Polly Engineering, Southern Federation award scheme to encourage young people into model engineering, see revised and simpler Polly nomination forms on last pages or on the website.

With lots of material coming in from individual societies, many thanks for your support, the write up of some of our adventures will have to wait for the next issue as will a look at rail preservation in Canada.

*David Goyder*, Newsletter Editor

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## (Vice) CHAIRMAN'S CHAT

**W**ith Brent taking a well-deserved holiday in the US, I have been asked to pen a few words in his absence.

The season is now well under way and I hope you have enjoyed good times at the various events around the country. We have had the Federation Spring Rally, at Hereford, and attended the Harrogate and Guildford Shows, all enjoyable events.

You will have noticed a number of changes over the past two or three years in the way in which the Federation does its business. A major change, of course, was the introduction of the Website and the move towards an increasingly paperless environment. The Federation's records and documentation are in a database sitting behind the public pages enabling the committee to manage The Federation's affairs in an accurate, more timely and much less costly way. Martin Baker should be recognised for the tremendous amount of time that he devoted to this activity.

Close on its heels came the conversion to a Company Limited by Guarantee, which means that The Federation now has legal status, rather than being a Committee formed of a loose band of volunteers doing their level best for the hobby. What's all this got to do with the Chairman's Chat, I hear you ask? Brent Hudson (Chairman) and Peter Squire (Secretary) have overseen

the Federation through this period of change, but at the last AGM Brent announced his intention to stand down at the end of this year. The hunt is on for an individual who can take over from him, building on what he has achieved and growing the Federation and its work in the future. The Candidate needs to have an appreciation of model engineering as a hobby and the legislative world it sits within. Whilst not essential, previous experience in business or Model Engineering Club management would be beneficial; enthusiasm is essential. Are you that person, or do you know that person? They will have a cohesive, capable, and dedicated Committee to support them.

The Committee have asked me to look after this search task, and if you wish to know more, please contact me for further information. It goes without saying that any discussions would be in the strictest confidence, and without any commitment at this stage. The candidate would, of course, eventually be subject to the formal nomination and election process at the next AGM.

Please think about it – the future of The Federation will be the reward.

*Ivan Hurst Hon Vice Chairman*

*Southern Federation of Model Engineering Societies*

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## EVENTS, EVENTS and more EVENTS 2015

04-Jul-15	Guildford Show and Rally 2 days
01-Aug-15	3 1/2 " day at Southampton Riverside Park
01-Aug-15	Weald of Kent Steam Rally TN26 3QY 2 days
14-Aug-15	Bristol Show for 2 days
22-Aug-15	Single Wheelers day At Southampton Riverside Park
29-Aug-15 & 30 Aug 15	Harrow and Wembley Society of Model Engineers Open Day

## Hereford Society of Model Engineers

Hosts the

### Southern Federation of Model Engineering Societies Spring Rally

Your newsletter editor and roving reporter set forth one early Saturday morning to attend the Southern Federation Spring Rally at Hereford with the Satnav providing the directions.

The first couple of hours were straightforward enough, Newbury, Swindon, A417 towards Gloucester but once past Gloucester, I felt like the lorry driver sent down a one track lane that ends on a cliff into the sea. I was now on the B4224 which is a bout a lane and a half at best and is very much a country road. My satnav told me to relax and enjoy the country side. And indeed it was beautiful and quite breathtaking at times as this little road brought me closer and closer to Hereford.

We were following the picturesque Wye valley, crossing little bridges, skirting the river itself and one just had to slow down to drive safely but also to enjoy a



Mordiford Bridge courtesy of Google Earth



Wye Valley by P J Marriott

part of England many of us do not often see. And where else would one see a pub called the Bunch of Carrots but in Hampton Bishop! Any-

way enough of this prattle, lets get to Hereford and model engineering.

One comes down a lovely gentle hill to this society's site at Broomy Hill and what a site. A long fully signaled double looped ground level track for 5" and 7¼" and raised track for 5" and 3 ½" with John Meaford, their Chairman welcoming us, logging us in and checking the ever required boiler certificates.

Around fourteen visitors and seven visiting locos were evident on Saturday when I attended. And when not running one could idle away the afternoon chatting at their station where excellent nourishment was provided by members and their wives. Great day.

The rather worried Southern Federation Treasurer, Norman Rogers from Bristol with his 'Jessie' on its maiden run.



Peter Squire, Chairman of Northampton and also the Southern Federation Secretary with a 7¼" freelance diesel.



The Hereford Club loco waiting its turn on the roster. A hobo is hitching a ride



Tim Trotman from COSME driving Denis Mulford's heavily modified Baldwin 2-4-2 Winson Kit based on the Lyndon & Barnstable Railway "Lyn"

## EVENTS, EVENTS and more EVENTS 2015

31-Aug-15	Harrow and Wembley Society of Model Engineers Open Day
19-Sep-15	Southern Fed Autumn Rally - Southampton
20-Sep-15	Chicester Steam on Sunday Afternoon PO19 7FS
26-Sep-15	POG Rally day at Maidstone MES
03-Oct-15	Welling & District Model Engineer' Soc Open Day and Gauge 1 get together

## More from Hereford



*Gavin Osman driving Gordon, built by his father to a Clarkson design of the Longmoor Military Railway 2-10-0.*



*David Mayall with his Speedy*



*Norman Rogers, Barry Glover and John Walker deep in discussion about important matters*



*Tranquillity at Hereford*



*Sam Wellor discusses his 5" Pansy with Bill Hall from Hereford*



*Guests and members chatting at the club house*



*A very helpful Ewan gets a go with the editor's Compound. Remember the coal next time Ewan!*

## Calibration' of Dead Weight Testers.

By R. Walker

Safety Officer, Southern Federation of Model Engineering Societies.

Recently, the topic of 'validating' a dead-weight pressure tester (DWT), as required by the current Boiler Test Code (BTC), has arisen. This started with a query raised about "calibrating" a dead weight tester. The source of the confusion lay in the distinction between "calibrated" and "validated".

The Federation has produced a technical note explaining the issue. It can be found on the SF web site. This article is a very brief summary of that note.

The concept of a "calibrated" pressure gauge is fairly simple. A gauge can be sent to an approved test facility and is returned with a certificate stating its reading errors relative to a traceable standard. As a result, it is relatively easy to agree about the meaning of "calibration" as applied to pressure gauges in the BTC. The definition and use is in accordance with the common understanding of the word.

The alternative of using a DWT appears also to be simple, at least for those Societies that actually have access to one - they are quite expensive. In principle, it also is straightforward - the difficulties arise from the use of the description "validated" in the BTC.

A DWT is a primary standard, i.e. one that will reproduce a value based only on the fundamental physical parameters of length, time and mass. The value produced is dependent only on those basic parameters and can be predicted accurately from them. This of course is subject to the device remaining in good condition and being used correctly.

*In order to be considered a primary standard, all measurements must be traceable to physical stan-*

*dards of mass and length and all errors inherent within the instruments must be either eliminated or evaluated. For a commercial DWT the original manufacturers will have established that traceability for the device as originally supplied and will have supplied an original certificate of performance. Generally, expected errors of the order of 0.02% would arise (based on specifications for current commercial instruments) assuming the DWT was in serviceable condition. Such errors are entirely inconsequential in the context of boiler safety testing.*

Pressure gauges of the usual kind are only 'transfer' or 'secondary' standards to allow a primary determination to be conveniently transferred to a different location or time. By their nature, they cannot produce an absolute measurement based just on their physical parameters and need to be calibrated against a primary standard. Error of the order of +/- 1% or 2% are about the best that can be expected, and that's for a gauge that has been properly looked after. That may still be inconsequential for boiler safety testing, but it corresponds to +/- 1 or 2 p.s.i. at the sort of pressures commonly used. That is bordering on an acceptable limit, so care needs to be taken in their use and maintenance/calibration.

*R. Walker*

*Safety Officer, Southern Federation of Model Engineering Societies.*

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## Fire Hazard - John Briggs

There is a sad tale in issue 4498 of the Model Engineer that relates the complete destruction of a workshop, double garage and greenhouse from fire. The cause is attributed to a Stanley cordless drill's NiCad battery that was left on charge overnight on the bench and caught fire. That particular battery is apparently under investigation but nothing relevant is shown on the internet. Perhaps there is more of a risk to this practice than some of us have assumed?

Courtesy Plymouth Miniature Steam—Spring 2015

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## EVENTS, EVENTS and more EVENTS 2015

15-Oct-15	Midlands MEEE for 4 Days
25-Oct-15	Roxbourne Railway Halloween Run
06-Dec-15	Chicester Santa Special Afternoon
13-Dec-15	Chicester Santa Special Afternoon

## A Visit to the Burnaby Central Railway

What a marvellous excuse it is when visiting your grandchildren in Vancouver to have them take you to the local miniature railway. Such was the subterfuge that allowed a visit to the Burnaby Central Railway in Confederation Park. The railway is operated by the British Columbia Society of Model Engineers. And as you might expect, there are similarities to many Societies in the UK except perhaps for the scale of their operations, they are bigger.



Track diagram with westbound in red and eastbound in blue

Before describing their magnificent miniature railway, a couple of comparisons with our societies might be of interest to you. First they have about 120 members. Of these about half (let's say 60) live outside greater Vancouver leaving 60 within easy access to the site. Of these about half regularly attend the public running days and of these 30, the mainstay of the society is about 20 regular hard working members who 'keep it going'. I could not avoid the comparison, much the same as our society in Southampton and similar in spirit to the Hereford society where we supported their Southern Federation Spring Rally only two weeks ago. There always appear to be the industrious core of members.

Further, John Meaford, Hereford's Chairman, had told me that they had been able to acquire their site very economically as it floods every couple of years or so and the local council could not do anything with it. In the same vein, the BC Society was forced to move from their previous site some years ago and were offered a site by the Burnaby Parks Board, basically a tip

with a 20% slope!! Déjà vu! More of this later.

Upon asking the "track manager" for the day, Phil MacGregor, if I could take some photos, I was introduced to Bruce Wilson who hailed originally from Birmingham. He very kindly became our host for the afternoon



Bruce Wilson was very generous with his time and gave us a grand tour including the workshop where he showed us a "Greenly" 4-8-4 'Northern' being re-wheeled. This must be a rare example of Greenly's work.

and gave us (two granddaughters and my son) an extensive tour of the site.

Bruce explained that the society was formed in 1928 and used members own tracks until 1975. The reader should appreciate that the average Canadian 'yard' or garden is not too much different in area to

the average club track, there is space in Canada! In 1975 the society opened their own track at Deer Lake but by the end of the 80's they were forced to relocate. The Burnaby parks department found the society a 600 x 600 standard Burnaby block, (or about 7 acres) that had been a works yard. Bruce described it as a tip on a 20 degree slope and suggested that a little landscaping might have been needed.

At that time the City of Vancouver was building a 730 yard six lane connector tunnel under Cassiar Street to be known as the Cassiar Tunnel and this produced some 8,500 loads of spoil. The society suggested to the tunnel builders that they might donate this spoil to the society in order to landscape the site and they were



The Confederation Park Station with four through tracks

## Burnaby Central Railway, continued

happy as the transit time to dispose of the fill was cut to 5 minutes from much longer and the builder even provided a bull dozer to spread the loads. The result was a site with different levels, tunnels and grades ideal for an interesting railway. Bruce took us to the edge of the site and indeed the surrounding roads were considerable lower than the railway. The new site was opened in 1993 and continues to flourish in the now called Confederation Park.

The railway is mainly 7 1/2" in two 1 mile circuits as shown in the attached diagram. Mainline minimum curvature is 60-foot radius with a maximum grade on main line at 2% or 1 in 50. There are two tunnels, two bridges and two viaducts and at one point boasts three levels! And there is a raised track for 3 1/2" and 5" but the main emphasis is the ground level railway.

The steaming facilities are marvellous with at least a dozen steaming bays serviced by a traverser opposite a "car barn" with hydraulic turntables and all normal facilities. The locos are stored at steaming bay level in the 'car barn' with the carriages underneath.



Steaming bays to the right and the loco shed (car barn) to the left with the traverser down the middle.

Of course the 7 1.2" locos are heavy so the facilities are justified.

Coal is apparently unpopular with the BCR and as a result they have only one coal fired loco, a lovely



A 'Jubilee' 4-4-4 F2b CPR 2930, only 29 were built so this one had pot be no 2930!

'Jubilee' 4-4-4 high speed built by the CPR for express service. I remember seeing these at Montreal West when I was about 18 as they sped on to Quebec City.

All the rest are propane fired. Bruce remarked that the public do

not like the smell of coal notwithstanding the problems in getting good quality steam coal in Canada!

The club own 4 ground level steam locos and 6 diesel outline.

During our visit they, very democratically, had a Cana-



CP 1920 although I am sure someone can tell us what it is and CN 9000, an F3a originally built in 1948

dian Pacific and a Canadian National side by side.

On the steam front, we saw a NYC Hudson in operation hauling passengers and she sounded very powerful especially climbing the 2% ruling grades on this railway.



NYC 5279, a J1 dating from 1927-1931

After our extensive tour of their grounds we went back into their exceptionally well equipped workshop. Here they have some major projects underway including the rewheeling of a 75 year old Greenly 4-8-4 'Northern'. I think I must find out the provenance of this loco as it might prove



The Greenly Northern waiting its new driving wheels

to be interesting.

And in conclusion of this most enjoyable visit, I must thank Bruce and his colleagues for their welcome and generosity as well as the two youngest rail fans in our family for the trip.



Get them young, editor's two granddaughters who took me to the RR.

## A poignant extract from a book

**Steaming to Victory How Britain's Railways Won the War by Michael Williams published by Preface 2013.**

I enjoyed this story of the role of the railway's in the second world war but much of the material was familiar. One section though, some personal reminiscences, was very touching and I thought I might share it with you.

### WE NEVER CLOSED - THE BLITZ PART II

**A** part from the purely physical problems associated with the war, railwaymen also had to endure much that could be regarded as psychological torment. Driver Robertson vividly describes his own experiences and those of his mates during this period, operating trains, like Reg Farrow, along the old Great Eastern line in east London:

*Many of my firemen mates and drivers lived in the Stratford area and I could see them gradually being worn down by life under fire. I have seen men lose their reasoning after coming to work and being told that a bomb had hit their home. I'll never forget one man in the coal gang. He had just started the 10 p.m. shift and we were standing in front of the Jubilee Shed. Heinkels were droning overhead and we could hear the swish of bombs coming down. We all dived into an empty pit outside number one road and saw the skyline light up about half a mile away. The angry orange flare backed up by the brilliant silver flash of the explosion lit up the entire area and we could see the jagged rooftops of houses either side of the explosion. 'My God,' he screamed. 'That's my house!' We tried to tell him that it could have been further on but he was insistent. 'They've gone,' he mumbled, and cried like a baby. They took him to hospital for sedation. He was right. It was his house. His wife and four children died in the rubble. The last I knew he was still in a mental home.*

Robertson recounts other examples of hope and despair shared among mates, telling a story of a journey through the bombing so vivid that it is worth quoting at length. There was

*the night, for instance, when I worked a train of 500-pound high-explosive bombs from north London to the docks at Canning Town. It was one of those trip shifts and I was with my regular driver in the local goods link. There wasn't much of him. About 45 years old, six feet tall and weighing about ten stone. One of the thin wiry cockneys who lived in the smoke-grimed terraced houses ringing the East End suburbs. We had the job because he knew*

*the road over the LMS lines from Kentish Town to the junction with the London-Cambridge line at South Tottenham. We relieved the LMS crew at Kentish Town and were surprised to find the J39 working tender first with its lethal load. It was about eight at night in the winter and the air raid had been going since six. He told me he'd made sure that his wife and children would sleep in the Anderson shelter in the back*

Robertson reported that the going was slow and hot.

*We had blackout curtains up and the cab windows were closed so that the fire's glow was curbed as much as possible from the night sky. The only light in the cab came from the gauge-glass lamp hanging on the sooty boiler. The cloud ceiling was about 4,000 feet. Searchlights were constantly sweeping them in most suburbs. The erratic crump, crump, berwoof of the anti-aircraft guns and shells filled the air with their reverberations, and angry red blobs would glow above the clouds when the shells exploded. Now and then we could see a fat barrage balloon against the clouds as a stick of bombs would light up the darkness a few miles away.*

Even so, the crew kept going.

*We reached the junction at Tottenham and had the road to Temple Mills. One thing about the old paraffin lamps sitting high on the timber signal gantries, they never went out. Power failures due to bombing never affected our Victorian-era signals. At least the going was easy for me. With first port on the regulator and the wheel at 25 per cent cut-off, the old girl wasn't using too much steam. Our speed was only about 10 mph. It was a case of being ready for the rapid stop when the track suddenly disappeared.*

*We were lumbering by the Hackney Marshes when a string of flares drifted down from the heavy sky. Some German bomber was deciding to have a closer look. It was obvious they were after Temple Mills [the biggest marshalling yard in east London]. The flares drifted down in a brilliant array like giant Roman candles - only death stalked above them. The Bo-fors guns on the marshes began to chatter fiercely in an effort to blast them out of the sky. We could feel the tremor of high-explosive bombs as they ripped into the houses that we knew*



## A poignant moment, continued

stood on the hills to our left. The driver stepped over to my side and pulled over the blackout curtain to one side. 'That's my home, Rob,' he said. 'That's where I live. I hope to Christ they've missed us . . .' He went back to the driver's side. The Lea Bridge home signal was at danger. Over towards Hackney a dull red glow increased to a glaring gold as fires got out of hand after a Molotov bread-basket emptied its load of incendiary bombs over the city. I made up a fire ready for the pull when we had the load and climbed into the tender to drag some coal forward. The drone of aircraft was everywhere. There was the crack of the AA guns that ringed Temple Mills on waste ground and the dull thud of distant bombs. Shrapnel from bursting shells whined through the air on its downward fall. The red turned to green and we rolled through the deserted station, a gentle beat leaving the chimney and the side rods clanking rhythmically as the greasy wheels of the scruffy-looking Standard took us slowly but surely to the London Docks. The marshalling yard was in complete darkness and no work was in progress. They were waiting for the lull that would come. The Germans were very methodical. They worked to a better timetable than we did.

When we reached the signal box near the yardmaster's office my driver stopped the train and went up the steep wooden stairs to where a faint glimmer showed the signalman at his frame. He wanted to know what it was like at Leyton. Where had the bombs fallen that we had seen across the marshes? He was told that his street had been hit. No, there was no news yet but they

would keep him informed. No, he couldn't be relieved to go home. Yes, they knew he'd been on duty for nine hours but there was no relief. There was no proof that his house was damaged. He would just have to keep going, he was told, until relief was available.

Robertson tells how he climbed back into the cab and eased the couplings on the trucks of bombs:

The joints clattered slowly under the driving wheels as we steamed through the war-torn night. He told me this conversation with Train Control as we swayed erratically over the crossing points through the Temple Mills complex. As his home was receding in the background, crossed headlights in the distance showed us where the docks hid in the blackness.

He lit a hand-rolled cigarette and the sudden flare of his match etched his drawn face on my mind for all time. Under the peaked hat I saw the grime of the coal dust, collected from the tender as we travelled tender-first. There were rivulets where his tears had cut a channel to his chin. The match went out and he was back to his personal sorrow. We never got relief. We rolled on to the Stratford disposal pits four hours later. He went home and I went to the canteen for a cup of wishy tea and a talk with anyone who happened to be there. 'Poor old Alf,' they told me, talking about my mate. 'Direct hit, they say. What swine, eh?' And it went through my mind, what soldier had to experience all that and still report for duty next day after burying his family?

Ed, Big boys don't weep do they, pass the tissue!

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## Autumn Rally for the Southern Federation at Southampton

**T**he date for your diary is September 19, a Saturday, for the Rally. Those who wish to may stay for passenger hauling on Sunday 1 to 4-ish pm.

Have a look at [www.southamptonme.org](http://www.southamptonme.org) for many of the details. We plan to put caravans in the middle of the track provided the ground is firm. If too soft, in the adjacent parking lot. We are equipped for most eventualities and have good facilities. We have a raised 5" & 3 1/2" and a ground level 7 1/4". Lots of space for a Traction engine utopia. Those who wish to arrive on Friday pm should call/ email/ snail mail me at any of the following. 023 8042 1201 [dgoyder@fidelio.ltd.uk](mailto:dgoyder@fidelio.ltd.uk) or if you are really brave 07769 604 101 although the battery is usually flat or I do not hear the stupid thing!

Lots to do in town away from the railway, West Quay Mall for retail therapy, maritime museums and we might even have a couple of Queens in town!

Of particulate interest might be a very lovely and completely unknown seaman's chapel in the local St Mary's. I am less interested in the praying part but this is a mesmerising work of art that will enthrall you for many minutes

My dear wife will be stocking up on very tasty grub from the local meat wholesaler so watch out for the sausages and carrot cake. No charges being made just a contributions tin if you feel flush.

O yes, the Satnav is SO18 IPQ you can see us at [www.southamptonme.org](http://www.southamptonme.org).

Looking forward to seeing you.

## The pro boards have a lot of chatter but occasionally wisdom prevails, Hadley 4930 let me quote him,

Silver soldering by 4930 Hagley

The silver solder will normally run via capillary action, that's why you need a good, close-fitting joint for this .i.e.- a light, finger-push on. NOT a press-fit or tapping with a hammer (Not BS Instructions I know, but I think you get the idea.).I used to put 3 "nicks" into the tube plate holes to ensure adequate volume of solder would penetrate through to the inside and around the tubes themselves, but like young Mr Parrot I've not found the need for that on a straightforward cone/pipe joint.

Again it's cleanliness in preparation, fluxing as instructed, heat the metal NOT the rod (and keep the heat in there as you apply the rod ), allow to cool down to black then quench and pickle, scrub-wash with

warm water (only 'cos it's kind to your hands AND we're worth it!!).Finish off with some wire wool to make it look all shiny and nice and you'll be tickled "pink" at your handiwork!!

Naturally there are many other variations on that, I've just put-up a generalisation. Normally I'd use the same "Creamy" brew that Julian taught us recently, but if you're only doing a one-off then again clean the pipe end, wet the pipe-end with water (or spittle, worked for me on more than one occasion when needs must). dunk pipe into flux powder and apply the nipple. (Blow through from the other end if you can, just to ensure the flux is clear), wipe off excess and join as mentioned. Patience---Practice----Perseverance..

## Model Engineers make Good Husbands! Courtesy of Jack Salter, Chair, Leeds Society of ME

I was waiting for a train on Doncaster Station last week and the other platform was full of elderly train spotters, a female member of East Coast staff I was talking to described them as "harmless". Whilst train spotters have a certain reputation with the ladies, I suggest that Model Engineers are in a very different category!

When I was involved with Doncaster Model Engineers they received grant funding for their miniature railway in a public park as " it provided positive male role models to the sons of single mothers"!

If you think about it, when we are out running the portable track we are both demonstrating our engineering skills & selflessly raising funds for good causes, by giving pleasure to others, whilst also dem-

onstrating a certain level of physical fitness by moving 1/2 a ton of metal twice a day!

I would rather emphasis these positives rather than the avoidance of negatives that made up part of the reason for the Doncaster grant funding, these being that we were not drunk or violent!

I do not have any evidence but I suspect divorce rates are much lower amongst model engineers, partially because we would not want to leave our workshops!

It is not all avoidance of negatives. Jill tells me that when we were students the trainee metalwork/ woodwork teachers were always in demand amongst the female students because we were "good with our hands", I presume that this means that we would be good at DIY?

## Model Engineering at Sandown 2014 Thanks to the photographic expertise of Mike Crisp



*Bentley Blower 4.5L (1930) by Arthur Saunders  
Silver Medal*



*Windermere launch Margaret 1:1 1/2 scale by J R Sargent  
Highly Commended*

## A review of pipe bending options

Stuart Walker, of SMEE runs through common techniques that many of us need from time to time.

Note: We have permission to reprint this from the SMEE Journal and as it is both topical and interesting we have their gracious permission to use their article. It is quite long so it will be broken into three parts for our newsletter.

Sooner or later most model engineers are confronted with the need to produce some neat pipe work to complete a project but, unlike bending solid section, it is prone to shape loss, over stretching, compression wrinkling and even complete collapse, so it's worth having a look at the challenges as well as the materials and tools that might help achieve our particular needs.

Over the years, a number of commercial tools have been produced and several articles published in the model engineering press showing how similar tools can be made in a home workshop. However, little insight has been given into the design issues and what has been achieved by others. This article seeks to take a wider look at the various challenges and solutions that already exist. Whilst I have some general experience of pipe work, I'm not an expert in any way and would therefore welcome the views and experiences of other members to help establish a more rounded understanding. Before considering the pros and cons of particular benders, it's worth taking a look at the material properties of the pipes we hope to bend as well as the wall thickness and the bend radius, all of which influence success or failure.

To achieve low friction flow for liquid or gas, a gentle bend radius of three to six times the pipe diameter seems reasonable. However, such frictional losses are seldom critical and it might be more important to resolve the demands of space and aesthetics by using a bend radius down to one pipe diameter, but wall thickness on the outside of the bend will be significantly thinned, even if one is able to encourage an increase in thickness on the compression side, and it might be better to consider introducing purpose-made elbows, or even banjo fittings, at difficult pinch points.

The ductility and ease of achieving and maintaining plastic deformation without losing shape, work hardening, creasing and even becoming structurally unstable all need to be considered and might require specialist advice and even testing to avoid uncertainty. Useful advice can be obtained from metal stockists like Metal Supermarkets who have branches throughout the UK.

Whilst most small bore pipe work used by model engineers is copper, it's available in both straight hard drawn and soft which is supplied in coils. Generally, the hard drawn tubes are thinner walled and less suited to forming tight bends, whereas the soft annealed tube tends to have a thicker wall and is easier to bend without losing its circular profile. It might be worth mentioning that the soft tube will need straightening before use. Tubes of less than 1/4 in. diameter can easily be hand straightened by rolling with a board on a flat surface, but as the size increases it becomes impractical and a roller-guided tube straightening tool will be needed - not difficult to make, typically requiring two groups of five profiled rollers set at right angles to one another.

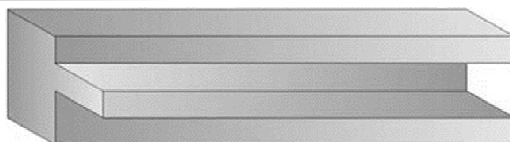
Similarly, aluminium tubes can be purchased in coil form as well as straight drawn with recommended grades of 3003 and 6061 respectively, while brass tube is supplied in straight lengths and the recommended grades are C260 or C330.

In the case of steel pipes, the carbon content defines its suitability for bending and this should not exceed 0.3%. It should be bent in its annealed state. Probably the best known steel pipe is Bundy tube which is a type of double-walled low-carbon steel tube manufactured by rolling a copper-coated steel strip through 720° and resistance brazing the overlapped seam in a process called Bundywelding. It is normally zinc or plastic coated for corrosion protection. It has been used for automotive hydraulic brake lines in cars since the 1930s.

Whilst stainless steel can be problematic, it's generally recognised that 304, 316 and 321 are the preferred grades for bending. They all have good corrosion resistance and are capable of being easily welded and brazed. Annealing to help the bending process can be simply achieved by local heating with a soft propane flame after marking the pipe with a bar of household soap and heating until the marks turn black, after which it is left to cool naturally.

*To be continued in the next newsletter*

**A Milling question.**



**Formulate the milling operations to produce the item on the left.**

**Time allowed is 5 minutes.**

## Harry Brearley and the invention of Stainless Steel

### Part 2, conclusion, continued from the March 2015 newsletter.

At the end of the last instalment we saw that in 1913 Brearley had produced his first batch of 'rustless' steel (to be known as stainless steel.) However, his suggestion that rustless steel would be an excellent material for cutlery production was ignored, although privately Firth's are known to have sent two samples to Sheffield cutlers for their opinions.

They reported back that the alloy was useless due to difficulties in forging, grinding and hardening. However, these cutlers took no instruction from Harry regarding the correct temperatures or specifications to produce rustless steel wares and declared both batches a failure. The talk of the town was that Harry Brearley was "the man who invented knives that won't cut".

However, being a man of considerable conviction Harry was unperturbed by this setback. Through an intermediary he purchased one hundred weight of chromium steel from his employer and arranged for it to be made under his own careful supervision into rustless steel cutlery by a local cutlery firm: **R.F. Mosley & Co. of Portland Works, Randall Street.** Working closely with the cutlery manager of R.F. Mosley & Co., Ernest Stuart, who recognised that rustless cutlery could be of considerable merit, Harry supervised the production of a number of batches of cutlery, which he gave to his friends, asking them to return them "if fruit, condiment or food marks them" (*ibid.*). None were returned. In the process of testing the corrosion resistance of Harry's new steel alloy with vinegar for himself, Ernst Stuart commented that *stainless* steel would be a more marketable name than rustless steel. Thus, 'stainless steel' was born in Portland Works! Harry returned to his employer adamant that this kind of steel had enormous potential. However, the conservative directors at Firth & Brown Steels proclaimed that "restlessness was not so great a virtue in cutlery, which of necessity must be cleaned after each using", and so he was again ignored to the point of reprimand for being over enthusiastic (Mittal Corp Ltd., 2010).

Later that year, shortly before the outbreak of the First World War, a Firth's director visited the factory of Krupps and Co. in Essen, Germany. On the desk of one of the company's directors he saw a bar of shining steel. The man who had seen nothing unique in Brear-

ley's work suddenly realised the consequences too late. Firth Brown Steels had no patent, nor were they aware of the properties that would give rise to patent rights. The Germans had beaten them to it, which would not have been the case had they listened to Harry Brearley and his views on stainless steel. Harry resigned from the Firth & Brown Research Laboratories in dispute over ownership rights of the invention of stainless steel in 1915, which the company claimed full ownership of due to the fact that he was an employee. Harry became works manager at Brown Bayley's Steel Works in Sheffield, where he continued with the development and production of stainless steel.

However, later that year a 75-year old man from London, who had read of Harry's work and frustration, approached him with a proposition. This individual believed that stainless steel represented a huge opportunity in the U.S.A., where no patent had yet been registered. He and Harry duly obtained the US patent, but they required assistance to develop the product across the Atlantic. Harry reluctantly returned to his former employer and formed a new venture partnership with them, which was named the 'Firth Brearley Stainless Steel Syndicate'.

In 1921 Harry had to visit the U.S.A. to act as a witness over his patent rights. However, Firth & Brown Steels undermined his case yet again. They insisted that the patent was theirs and continued to argue that he was merely an employee. So he broke his arrangement with them in exasperation. A year earlier, in 1920, Harry was awarded the Iron and Steel Institute's Bessemer Gold Medal. He eventually became a director of Brown Bayley in 1925.

Although he was never awarded ownership of his invention, Harry's chromium steel formed the basis for the wide range of stainless and special steels, which are now used across the globe. A case in Sheffield's Cutlers Hall still contains a set of ordinary looking table knife blanks and blades. These knives - produced in Portland Works by R.F. Mosley & Co. and presented to Cutlers Company of Hallamshire by Harry Brearley Esq. - are the earliest specimens of stainless steel cutlery in the world. In his autobiography: 'Knotted String', which was published in 1941, Harry commented that his discovery of stainless steel was a "Highly coloured incident. The people in authority saw nothing of commercial value and still less of scientific interest in it. The rusting of iron is universally accepted and no one seems willing to accept that it can be overcome. I hope I will not be taken amiss if I say that workmen are often much wiser than their masters".



## PUBLICATIONS AVAILABLE FROM SOUTHERN FEDERATION MES

The SFMES publications listed below are available from our stand at rallies and exhibitions or by post from David Mayall. Please make contact first by phone or email to get combined postage costs when ordering more than one item. (See note below). The figures shown here are for single items only. Please make cheques payable to 'Southern Federation MES'

Title	From Our Stand	By Post
Examination & Testing of Miniature Steam Boilers BTC 2012 - Green Book .....	£0.50 .....	£1.25
Ditto - Pack of 5 .....	£2.50 .....	£3.25
Boiler Test Certificates - Pad of 50 .....	£5.00 .....	£7.50
Written Scheme of Examination - Pad of 50 .....	£6.00 .....	£8.50
Small Boiler Test Certificate - Pad of 50 .....	£5.00 .....	£8.00
Boiler History Record Card - Pack of 10 .....	£3.50 .....	£4.70
Plastic wallets to hold certificates size A5 .....	£0.75 .....	£1.50
Ditto - Pack of 5 .....	£3.75 .....	£5.25
HSG216 Passenger-carrying miniature railways 'Guidance on safe practice' .....	£3.00 .....	£4.50

David Mayall  
Tel: + 44 1252 684 688  
Email: davidmayall@sfmes.co.uk

Or use <http://www.sfmes.co.uk/public/?action=publicpublications>

### Postal Charges

In view of the hefty postal charges for packages in force currently, if you require more than one item please contact David Mayall first for advice concerning the postal charges

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## SOUTHERN FEDERATION MES COMMITTEE

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Vice Chairman	Ivan Hurst
Secretary	Peter Squire
Treasurer	Norman Rogers
Membership Secretary	Martin Baker
Boiler Registrar	David Mayall
Safety Officer	Robert Walker
Newsletter Editor	David Goyder
Vulnerable Groups	Volunteer welcome
Committee Members	Mike Chrisp, Bob Polly

### INSURANCE CLAIMS AND INCIDENTS

All claims and reports of incidents should be notified in the first instance to Walker Midgley.

FEDERATION INSURANCE BUSINESS Managed by Walker Midgley Insurance Ltd

Committee members' contact details can be found on the Southern Federation MES web site

**[www.sfmes.co.uk](http://www.sfmes.co.uk)**

# Southern Federation Insurance Scheme

We are delighted to recently have been appointed to arrange the Southern Federation's insurance scheme and we look forward to working with everyone. Clubs and Societies should by now have received an information pack detailing the transitional arrangements.

For the first year only it will be necessary for those clubs, societies and members who have their policy via the Southern Federation scheme, to complete a fresh proposal form. For miniature traction engines and other road vehicles up to 6in scale you need Model Road Steam Insurance. For locomotives, rolling stock, boats and other models you need Southern Federation Members Insurance. Both policies include the facility to insure Road Trailers, Personal Accident, Home Workshops, Products Liability and Garden Railways & Portable Tracks

Cover is also available for Commercial Miniature Railways, Vintage Tractors, Modelling & Model Engineering Businesses, Stationary Engines, full size Traction Engines, Memorabilia Collectables & Bygones and a special policy for vans used for Social Domestic and Pleasure

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**SOUTHERN FEDERATION**  
**of**  
**MODEL ENGINEERING SOCIETIES**

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## **SOUTHERN FEDERATION TROPHY & POLLY MODEL ENGINEERING PRIZE**

**The committee of the Southern Federation of Model Engineering Societies acknowledges with gratitude the generous support provided by Jayne & Andy Clark of Polly Model Engineering Limited in promoting this award.**

This Award is made with the aim of encouraging young persons to participate in the hobby of model engineering with particular emphasis on acquiring the relevant skills and use of appropriate materials.

While pursuance of excellence by those in their late teens and early twenties should be promoted, work by youngsters taking their first steps in the hobby of model engineering is also encouraged. Participation in club/society activities is also important.

Nominations are judged by the committee of the Southern Federation of Model Engineering Societies and approved by the proprietors of Polly Model Engineering Limited. Their decision is final.

The winner will receive a prize donated by the proprietors of Polly Model Engineering Limited and a suitably inscribed Southern Federation Trophy, which shall be retained.

The award will normally be presented at an Annual General Meeting of the Southern Federation of Model Engineering Societies at which representatives of the winner's family and Club or Society are welcome to attend.

Completed nomination forms must be sent to the SFMES Secretary, 18 Wakefield Way, Nether Heyford, Northampton NN7 3LU to arrive no later than 19 January 2016.

### **RULES**

1. The Nominee shall be no more than 24 years of age at the date of nomination.
2. Nomination shall be made by a Club or Society affiliated to the Southern Federation of Model Engineering Societies and the Nominee shall be an active member of that Club or Society.
3. The Nominee shall have demonstrated the acquisition of skills in the use of appropriate materials and metalworking hand tools and/or machinery/equipment by producing a model, other mechanical item or piece of workshop tooling associated with the hobby of model engineering, complete or part built, constructed using metalworking hand tools or equipment normally found in the home, school, Club or Society workshop. Supervisory input and items built as apprentice pieces in a training environment are acceptable. The work shall be the nominee's own but normally acceptable commercial fittings, fixings, fastenings or other components may be used.

## NOMINATION

Please supply a summary of the Nominee's relevant projects completed and/or in hand.

Please supply photographic evidence and state to what extent the Nominee's work has been completed unaided or produced under guidance - please note that supervision is acceptable.

Please supply a summary of the Nominee's involvement in Club or Society activities.

## NOMINEE

Club or Society: \_\_\_\_\_

Signature: \_\_\_\_\_

Name (please print): \_\_\_\_\_

Date of nomination: \_\_\_\_\_

Age at date of nomination: \_\_\_\_\_

Home address: \_\_\_\_\_

Telephone: \_\_\_\_\_

Email: \_\_\_\_\_

## SPONSOR

Club or Society: \_\_\_\_\_

Signature: \_\_\_\_\_

Name (please print): \_\_\_\_\_

Position held in Club or Society: \_\_\_\_\_

Home address: \_\_\_\_\_

Telephone: \_\_\_\_\_

Email: \_\_\_\_\_