



NEWSLETTER OF THE
COLCHESTER SOCIETY OF MODEL & EXPERIMENTAL ENGINEERS LTD

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Photo - Eddie Carter

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Cover Picture

Lest we forget! Eddie Carter's picture reminds us that perhaps one of our future projects should be a snow plough for the ground level track..

Editorial

I should start this editions editorial with an apology for shortcomings in the last edition. When the printed copies of the magazine arrived through my letter box and I checked through a copy I realised that when converting the publication to a pdf file format for the printers the desk top publishing software which I use had corrupted the Greek letter pi, used in Artisan's article, and produced an unrecognisable symbol. I had not noticed this before sending the copy to the printer. I think most people realised what had happened but I apologise for any confusion caused. I am afraid that I have still not found a solution to the problem, but at least I now know that it exists!

This year's AGM, held on 26th April, saw a change of Club secretary. Jon Mottershaw had served in that capacity for just over five years and has done an excellent job. He felt, however that the time had come to hand the reins to someone else. That someone proved to be Yvonne Chappell. Yvonne has been taking care of the Birthday Party scheme for the past two years and will continue with this task, assisted no doubt by husband Peter, as she shoulders her new responsibilities.

There is no doubt that a periodic change to the officers and committee members of an organisation is a good thing. However good at the job and however dedicated to that job any individual may be it is not, in my opinion, in the long term interests of an organisation for them to remain in post for extended periods of time. Everyone has their own particular interests and talents and it is inevitable that these influence how an officer or committee member discharges their duties. If they remain in post for extended periods there will be no opportunity for the introduction of fresh ideas or the development of latent talents among the membership. For this reason the constitution of most organisations requires members of the management team to stand down in rotation after a period of service, usually two or three years. The opportunity for re-election for a further period may be provided but the total length of tenure for any post without a break is usually limited to two such periods. This ensures that whilst reasonable continuity of management is provided there is also a guaranteed turnover of fresh talent and ideas in management rolls. Furthermore, without the stimulus of forced change the membership becomes resigned to the status quo and become apathetic. Is it time, perhaps, to review the CSMEE constitution? My opinions on this matter extend to non executive posts within an organisation. If anyone fancies taking over the role of LINK editor I shall be happy to relinquish the post – just have a word with our secretary!

I have been "banging on" for some time in my editorials on the subject of "Letters to the Editor". I feel that this is one of the best opportunities available to members to air their views on any subject related to the Club operation as well as commenting on articles published in the magazine. If you have any ideas for improving some aspect of the facilities or a gripe about something that you feel is unsatisfactory a public expression of your feelings in LINK will be far more effective than a comment to two or three members in the corner on a Friday evening and will give a far wider audience the opportunity to respond. I am delighted that this edition of LINK carries several contributions to this feature and thank those who have taken the trouble to write.

As readers will no doubt be aware this year marks the 75th anniversary (on the 3rd July) of the record run by the LNER A4 *Mallard* when it achieved the as yet unbroken world record for steam traction of 126 mph. To celebrate this event the National Railway Museum is gathering all six of the surviving A4s to display round the turntable in the museum's great hall. On a slightly smaller scale Model Engineer magazine is planning a display of model A4 locomotives in a dedicated area at the Sandown Park Model Engineer Exhibition in December. This display will be for models of any scale either finished or part built. There are at least two potential exhibits in our Club. Owners – why not fly the CSMEE flag and support the event?

As I write these notes towards the end of May winter still seems reluctant to relax its grip. The temperature is still struggling to reach ten degrees, a steady rain is falling and the forecast threatens gales! Personally I have spent much less time than usual in the workshop during the winter months because it has been too cold to work in comfort. Eddie Carters photograph, features on the front cover of this edition, reminds us that there were plenty of occasions when the idea of a “steam up” was not an attraction! Let us hope that things will “perk up” soon so that we can enjoy the forthcoming running, party and exhibition season.

Editor

From the Chair

Let's hope that the weather this summer is better than last year – so far so good!

We have now completed all of the work on the ground level track with just general maintenance now necessary as required. The new ballast below the raised track is almost complete, with just the section between the tunnel and the station to finish.

Now that the weather has warmed up the Sunday gang have started to re-brick the weather damaged brickwork on the raised track bridge. This will have all of the joints filled with hot pitch to keep the weather out. The long station seat has been re-made using hard wood and treated with teak oil.

Yvonne Chappell has a full programme of parties organised. If any member would like to help with these events please put your name on the list on the notice board on on the web site.

I am running signal box training courses on a Friday evening for those who are interested.

Andy Hope

Secretary's Report

Hello to all CSMEE members. Firstly, I thank everyone that was at the AGM and the warm welcome I received as your new Company Secretary, which I really appreciated and can only hope I live up to your expectations.

I have been interested in locomotives for a long time, whether they are full size, 5” gauge, 00 or 2m. At the moment I am part of the core team of six that operates “Copenhagen fields” which is a 2m layout that has taken 26 years to build and still isn't finished! The layout is based on the approach-

es to Kings Cross and even includes the tunnel mouth where the film of the Lady-killers bodies were thrown over on to a passing wagon. To appreciate the film at its best you need to see the original version with Alec Guinness. If you are interested you can see "Copenhagen Fields" on www.themodelrailwayclub.org/Pages/CopenhagenFields.aspx and watch a couple of videos at www.youtube.com/watch?v=fZji6qDIh0A (2m Society) or www.youtube.com/watch?v=EN6o6nanDRY (BBC TV).

A couple of years ago my husband surprised me by buying me a Deltic (Nimbus) D9020 which I thoroughly enjoy driving and we "share" it. I am now hoping for a baby Deltic of my own but it could be a long wait! Together with other CSMEE Members we went to the 40th rally of the Ryedale Model Engineers Society who have a ground level track at Gilling East in North Yorkshire. I managed to scoop a couple of pictures of CSMEE in action.



Photo - Yvonne Chappell

The "Gang" at Gilling

I became more involved with CSMEE when I became the Party Organiser which is very successful and brings funds into the Club, last year around £400. Our first party this year was on the 4th May 2013 with guess what, 19 children and 30 adults, yes 49 people attended. Thanks to loads of support from Club

Members the afternoon was hugely successful and the birthday boy went home very happy. There are six parties booked for 2013 and anyone who would like to volunteer as a driver, guard, station master or railway hand would be very welcome. A list of the parties is not only on the board in the Club House but is also on the website, under "Parties with a difference".

About a month ago a few people from the Club went to visit Basingstoke Model Railway Club which engages in public running. There is a visit report on the website for those interested. A return visit is being made on 23rd June 2013; it would be good to have a number of members present to form the welcome party.

I have been contacted by Jake Beer who is in possession of a Warco BH600G Lathe which his late father used for making model engines. It has a digital readout system together with many extra tools, including a coolant pump. Jake has now decided to sell the lathe and if anyone is interested please contact him on 0773 380 881 or email jakebeer@hotmail.co.uk

A small amendment is being made to the By Laws as per resolution 8 at the AGM. As soon as the booklet has been updated we hope it will be printed in time to be able to be sent out with LINK magazine. (*Editors note - a copy of the new by laws should be included with this mailing of LINK*) It has been decided to change the wording under the Membership section to read as follows:-

"Candidates under eighteen years of age may be admitted as Junior Members provided they are sponsored and accompanied at all times on site by a named family Full Member who must assume the role of responsible adult. The named responsible adult must accompany the Junior Member on site at all times. Junior Members shall have no voting rights".

If you have an email address which we can use to keep you up to date please let me know by emailing me on petal309@btinternet.com. Many thanks. I look forward to meeting more of you at some time in the near future.

Yvonne Chappell

Treasurer's Report

We welcome the following to our Society:-

John Clark	Full
Terry Hiley	Full
Duncan Adkinson	Full
Tobias Adkinson	Junior

Membership stands at 125 including 11 juniors and 1 student.

The reduction in members over the previous report is due to resignations and non renewals.

At the AGM I was re-elected for a further 2 years as a director of The Society. It is my intention to step down at the AGM in April 2015; this means that a treasurer will have to be found. Should any full member be willing to take on this role then please contact me for further information.

David Cocks

Event Organisers Report

As you read this article we are well into the 2013 running season. Attendance at the Club steaming days has been a little disappointing so far. I think the weather has a lot to answer for!!! Please try to and make the effort to come along. If you are unsure of anything then do speak to me and I will make every effort to help you out. For those of you who are not sure of the times, we start at 10:00hrs and run as long as we like. Don't worry about your driving skills - we all had to learn how to drive our loco's at some stage. It is your club so why not make use of the facilities. We all have good and bad days so don't worry if you are holding someone up - they have probably had problems themselves at some stage in the past. I know I have (my J94 springs to mind). If you have a problem you only have to ask and I am sure someone will be willing to help you out.

The turnout of members who went to Basingstoke was very good - we reached double figures. I think we had 6 locomotives running at various times. An excellent lunch was provided, tea/coffee was on tap all day and the weather was good to us as well, which made a very nice change. All future events for 2013 are listed on the large wall calendar, I have also listed these in date order for easy reference on a separate poster which can be found on the calendar.

I am in the early stages of putting the winter talk programme together. Topics that I hope to cover are simple press tool construction, North Sea oil production platform construction and installation, Paxman engines, and North East Essex Tractor and Engine Club. We will also be having the usual regular events, plus a new idea which I spoke about last winter. This is to provide an opportunity

for any member who wishes to give a short talk of no more than about ten minutes on any subject that they think the rest of us may be interested to hear about. There is no need for a polished presentation using the over head projector etc You don't even need to stand up at the front - we can all sit around the table. The talk can be about your current project, a problem that you have overcome or a problem you are looking for ideas on how to solve, so if you have a topic of interest please do let me know so I can plan the evening and, if you wish, help you prepare your talk.

Please keep an eye on the notice board for any last minute changes.

Ian Pryke

The Wednesday Wrinklies Report

The Wednesday meetings have been relatively quiet lately but very enjoyable for the members who attended. Every week there are several locomotives being steamed and run.

In recent weeks work has restarted on the final length of the ballast replacement under the raised track. Sadly we have been without the company of Jeff Lang, who has not been well. The track from the station area down to the tunnel mouth is the last part to be dug out and the ballast replaced, along with a new membrane to discourage the weeds from coming through.

The top of the tunnel has been dug over and is now planted all over with the blue flowered Vinca, which is also known as periwinkle to us common people. This has been done by Don Black, Gordon Ager and others. It must be said that the site looks great as you drive over the bridge, with the grass newly cut.

In the workshop Dave Chadwick has now finished the machining of his crankshaft (from the solid) and is now working on the eccentrics for the valve gear. These have to be able to be inserted onto the crankshaft centre section and then locked in position for the valve timing. We are all looking forward to his first steaming with the new crankshaft in his Claud Hamilton.

Now is the time for a MOAN. Where has all the enthusiasm gone for attending and showing our work. The Aldham rally show was cancelled, and when I asked Mick why he told me that there was not enough support of members to put up the gazebo. We have 125 members in the club, and to not be able to support this show was a DISGRACE. New members come from the public who see our models and then join us to make their own. I very much hope that this poor show will not become the norm. There are a number of members who have never shown their work at any function or help in any way to support the efforts of the club. If you are one of these, please give your but a kick and join in next time.

We are going to carry out a modification to the ground level track to make it easier to get out of the steaming bay. On completion it will not be necessary to operate the points coming out of the steaming bay from the signal box, as these will be worked from a control box near the steaming bay. It will still be necessary to run the compressor to provide air to move the point motors, and to operate the level crossing gates from the signal box. On days when the track is all in operation, the signal box will have total control and the local control box will be locked to allow the signals to be used. It is expected (hoped) that this modification will encourage an increase in ground level track use in future.

Geoff King

Winter Programme Reports

March 1st

This was “Models Night” when members brought along their current projects for others to see how much progress had been made (or not!) since last year. Your editor felt that this year’s display was not as well supported as on previous occasions. Perhaps the very cold weather during the winter had deterred people from spending time in the workshop – it certainly deterred me!

March 15th

On this occasion Mark Wood presented a talk on his procedures for the production of lost wax castings of locomotive wheels. Although he usually works with gauge 1 and 3 he is able to produce wheels for larger scales and showed a mould he had made for a 7¼” gauge Black Five. Mark described the procedure for making an initial pattern assembled on a flat board. A rubber mould is then cast and this female mould used to produce a resin pattern which is refined by carefully shaping spoke details etc. with the aid of craft knives and riffling files. Once an accurate resin pattern has been produced this is used to make a two part rubber mould from which wax patterns can be produced. This rubber mould is provided with a filling hole which also produces the sprue used by the foundry to attach the wax pattern to the main filling sprue. The resulting assembly of wax patterns is dipped into a slurry of ceramic material, dried and recoated until a satisfactory thickness of ceramic has been achieved. The assembly is then baked in an oven to remove all trace of wax, leaving a mould into which molten Iron is poured. Once cooled the ceramic mould is shot blasted away and the wheels cut from the sprue.

Mark displayed a variety of different wheel types together with moulds. This excellent talk concluded with questions from the floor.

April 12th

Norman Barber presented a talk entitled “Boiler making without tears”. Illustrated with photographs in a “Power Point” presentation Norman discussed all aspects of building boilers for locomotive and other applications. The various material specifications for copper and reinforcing bushes were described and the hazards of using material to the incorrect specification considered. Heating equipment, the brazing hearth set up and silver soldering procedures were described. The flanging of the edges of the flat plates required for the fire box and boiler ends was dealt with together with preparation and fitting of the flue tubes. Norman described his preferred method of assembly prior to silver soldering using bronze screws in preference to rivets, concluding with the assembly procedure for the whole boiler, including installation of the fire box stays, and testing procedures.

The talk concluded with a brief review of construction methods alternative to silver soldering, emphasising the need to involve the Club boiler testers at all stages in the planning and execution of such procedures.

April 26th

This was the occasion of the Annual General Meeting of the company. The meeting opened with a minutes silence in remembrance of three members, John Bye, Ian Laycock and N. Macmillan, who had passed away during the year. The directors and treasurers reports were accepted by a show of hands and retiring members of the council were re-elected in the same way. Jon Mottershaw retired as secretary, which post he had held for five years, and was replaced by Yvonne Chappell.

Dave Chadwicks New Crankshaft

As mentioned in the last edition of LINK, David Chadwick has been making a new crankshaft for his Claud Hamilton. I can now report that his crankshaft is nearly complete.



Photo - Geoff King

He started with a rather large lump of steel about 3½ inches in diameter, and about 8 inches long. The ends were faced off square. The three centres for the main shaft and the crank throws were marked out and drilled on each end of the bar. This was then set up in the Myford and David started on the rather laborious task of machining off the surplus material. He first turned the main shaft and the crank throws down to 1 1/8 inches diameter. This provided the radius to file the shape of the crank webs to the correct shape. When this had been done the crank throws

were turned down to their finished size of ¾ inch. Only when this had been done could the crankshaft centre and the journals for the axle boxes and the wheel seats be finished to size. The steel containing the centres for the crankshaft throws on the ends of the crankshaft was machined off and the shaft finished to the correct size.

The picture shows the final stages of machining the crankshaft. David has done all the work on the Myford lathe on a Wednesday, and his progress has been closely watched by all the Wrinkle gang. There remains the machining up of the eccentrics, which must be of the split type of some form or another. We are all looking forward to David having his Claud back running on the track this summer.

I have now heard of six built up crankshafts that have failed, some of which have been built up by very competent model engineers. David's machined- from- the- solid crankshaft will not be one of the next failures that we hear about!

Geoff King

Letters to the Editor

Locomotive Springing, Adhesion and Pulling Power by “Artisan”

Dear Sir,

I much appreciated this article, especially as it stirred my ancient brain cells into action. This activity came about because in an early part of my professional career on BR, I was responsible for approving the design and performance of the electrical equipment fitted to the AC electric locomotives provided for the West Coast Main Line. As electrical engineers we were content to rely on tractive effort data provided in graphical form by the equipment suppliers. Our mechanical colleagues were not convinced and requested running tests with a dynamometer car. So a magnificent train of fifty 20 ton brake vans was assembled, complete with the LNER car and a test was run in the Stockport area early one morning. The point of this story is that the test crew were initially very worried that their calibrations were suspect as they were recording drawbar horse-power values of over 5000 and such values were not within their ken, based as it was on steam and diesel loco trials. I was able to reassure them that their readings were what would be expected from the loco on trial. Recollection of this incident brought to mind the practical difficulties of evaluating steam loco performance in both miniature and prototype, whereas there were no similar problems with evaluation of performance with diesel or electric locomotives.

One other aspect of test results from dynamometer cars was the careful distinction kept between “drawbar pull” (net output of a loco when hauling a train) and “tractive effort” (gross output of a loco at the rails). Drawbar pull was easily measured, but tractive effort, if values were needed, could only be estimated, taking into account such loco factors as air resistance, friction in moving parts, acceleration or deceleration of loco mass, effect of gradient, etc.

In spite of my best endeavours, I have completely failed to get my 5 inch gauge ‘Evening Star’ to lose her feet on our raised track. This has been surprising since a calculation using the formula for ‘E’ quoted, gives a value of tractive effort requiring a coefficient of static friction about 0.5, “vastly in excess of anything that can be achieved in practice” as Artisan says. This suggests that the value of ‘k’ is very much lower than any of those quoted in the article.

It may not be immediately obvious why the formula for ‘E’ on page 20 does not include the symbol (π) in order to take into account the actual value of the area of the piston. The reason for this is that the mechanical system shown in Figure 1 obviously results in the well known characteristic of steam loco’s (especially those with 2 cylinders) having a pulsating tractive effort output, resulting in corresponding variation in the drawbar pull. Considering the revolution of a wheel starting from inner dead centre, where the instantaneous value of tractive effort will be zero, the values of tractive effort will increase as the wheel rotates, following a sine wave form until it reaches maximum value when the crank reaches the position shown in Figure 1- a right angle between crank and connecting rod. The value of tractive effort will then decrease, still following the sine wave until the wheel reaches outer dead centre, where tractive effort will have been reduced to zero. It just so happens that the arithmetic mean or average of a sine wave is $2/(\pi)$ of the maximum value. Multiplying by the area of the piston $(\pi)d^2/4$ results in the value of $d^2/2$ with (π) being eliminated. Hence the divisor of 2 in the formula for ‘E’ on page 20, where ‘E’ is the average value of tractive effort. It should be noted that the equations on page 21 evaluate ‘E’ as peak value of tractive effort in accordance with Figure 1. Having looked at

my copy of the official BR diagram for 'Evening Star', the formula for average tractive effort seems to have been used for the calculation of 39,667 lbs: very precise!

The recent provision of an axle weighbridge is a welcome addition to our facilities for examining the actual values under operating conditions. I intend to weigh all the axles on my 5 inch gauge 'Evening Star', even though I will be able to do little if anything in the way of adjustments, as no corresponding provision was made by Winston in the design. Particular attention will be given to the pony truck axle weight, as good lateral spring control was provided as an integral part of the design. The coupled wheels will also be weighed, even though after considerable thought I have come to the conclusion that longitudinal weight distribution is a secondary issue on a 10-coupled loco, subject possibly to reasonable positive values for both leading and trailing coupled axles. After all, our raised track is so much over-engineered due to well-known practical considerations that little harm will come to it from even very unequal axle weight distribution. The saving grace adhesion-wise is of course coupling of the wheels.

On the pony truck, both the lateral control and axle box springs are soft helical ones, whereas extremely stiff leaf springs were supplied for all other axle boxes. I had doubts initially about the advisability of using such springs on the coupled axles, in view of the lack of adjustment provision. It looks to me as if Winston, however, gave some thought to the vital safety purpose of the truck in giving essential guidance to the long fixed-wheelbase of over 20 inches. The pony truck has never derailed on the raised track and guides the loco into each of the curves smoothly.

During building, the engine chassis with wheels coupled and later the fully assembled loco were pushed by hand around the complete raised track in a gauging and clearance test. The extra effort required to move either chassis or loco around the curves, over that needed for the straights, was considerable- possibly 3 or 4 times as much.

Finally, I have been puzzled by Artisan's assumption that only wheels on one side slip when negotiating curves. Whilst this may happen under specific conditions, I cannot see any reason why this should be universal. I have always thought that in the general case both wheels on an axle slip: one forward and the other backward, not necessarily at equal rates. The resulting loss of adhesion on all coupled wheels, rather than just half of them, could go a long way to explain the extreme difficulty sometimes encountered restarting on a curve.

I have much enjoyed diving into my memories in dealing with my first love on the railway- introducing a series of electric locomotives to the West Coast Main Line which were at least twice as powerful as any previous locomotives running on BR. In suggesting that finely balanced axle weights need not be sought in our activities at Colchester, I await others' opinions.

Brian Sandham

Artisan includes a response to Brian's letter in his contribution to this edition of LINK - Editor.

Track Safety

Dear Sir,

I was at the track a few days ago and noticed a well known member driving his brand spanking new locomotive around whilst wearing a Hi Vis jacket. This would appear not to be for safety reasons as he was the only person braving the elements on that day. It was bitterly cold! He was, however, very easy to see, even in those areas of the track that have limited visibility such as around the tunnel.

When the signals are in use there is obviously no possible justification for wearing Canary Kit, but when there are perhaps just two people on the track having a relaxing afternoon steaming or component testing without putting out all of the signals it might be a useful visibility aid. Under these circumstances a situation might easily develop when a driver could be momentarily distracted and the use of a Hi Vis jacket might provide a little extra security.

I am not suggesting the use of Hi Vis clothing be made mandatory – just that it might be helpful. What are other members opinions on the idea?

Eddie Carter

Car Paints

Dear Sir,

On reading the article in LINK by Eddie Carter about paints I was reminded of a list that I'd been told about and went looking for it. Inevitably it was not to be found, but sifting through a pile of papers came across it! The list is published on the Royal Air Force Kinloss Model Railway Club website. The link is <http://www.rafkinlossmrc.co.uk/info.html>

Mike Malleson

Plymouth Miniature Steam Club

I have checked the web site and the list is indeed far more comprehensive than Eddie's list and includes all of the colours on his list. - Editor

A New Acquisition for the Club

We are pleased to announce to Members that the Club has now purchased "Trundle," the 71/4" gauge petrol engine powered locomotive. Brian Upson has agreed to take responsibility for the maintenance of the engine at no charge to the Club. We will have a list of authorised drivers and members names can be added to the list provided they undergo the required training, Please let me know if you would like to be added to this training list. If an authorised driver is driving "Trundle" and it breaks down or develops a fault it must be reported to Brian by registering it in the log book which will be provided at the Club. "Trundle" is a big hit at the children's parties and will be a real asset to The Club.

Yvonne Chappell.

The Museum of Power Easter Show

As usual this show was held on Easter Sunday. As on previous years the Museum of Power supplied and erected a large marquee for our use. However, due to the appalling snow and bitterly cold weather conditions during the early part of Easter week, we were concerned that the whole “Easter Steam Show” may be cancelled. The Museum Chairman, Dick Waylen assured us that the show would go ahead no matter what the weather and if necessary we could be housed inside in the main hall.

With the help of some of the Wednesday gang, we loaded the trailer with the normal tables, chairs and display plinths ready for collection and towing to Maldon on Easter Sunday. Frank Emmins and



myself completed loading the car and collected the trailer from the club's site early on a very cold but dry Sunday morning. I was hoping we would be putting on our display inside!

We arrived at the Museum at 8.15 Summer Time (really 7.15 as the clocks went forward an hour that weekend), and already Bob Miller was on site. As the Museum had kindly erected the marquee for us, it was decided that we would put our display outside. When we had nearly completed setting up our show, Dick Waylen informed me that an entrant who was due to be located inside would

not be turning up and asked if we would like to put on a small display inside, in the main hall. This year we therefore had two displays of our models, with the larger models outside and the more delicate models plus a late comer's locomotives (no names but his name rhymes with sing), inside.

Again probably due to the very cold weather the number of visitors to the “Easter Steam Show” was down. However we had a steady number of visitors to both our displays throughout the day. Having the two displays did enable us to alternate between the bleak outside and the warm inside displays.

During the day we handed out a number of our club flyers and also a number of our “birthday party” leaflets. We also had one positive new membership application.

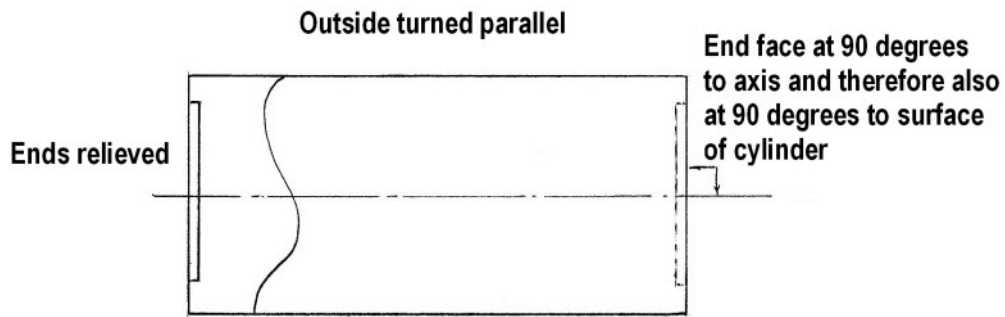
So all in all, I believe that due to all the help given by those involved the day was a great success, thank you to all those who made it so.



Artisans Challenge – The Solution

Readers may remember that in the last edition of LINK I asked for help for my friend Joe Hardup to produce an accurate reference square using the very limited facilities available to him. As a reminder, this equipment consisted of a 5" lathe, a small milling machine, a shaper and a drill press. All the machines are old and not in particularly good condition and the only precision measuring equipment available is a 1" to 2" micrometer for which there is no setting standard. Joe does not have a DTI so could not use the method described by Andrew Becker in a previous edition of LINK.

No one responded to the challenge, which is disappointing, so I had better describe how I advised Joe to solve the problem.



Principle of the Cylindrical Square

The solution is to use the ability of the lathe to generate a cylinder whose ends are exactly square to the cylindrical surface to form a “cylindrical square” – a contradiction in terms, one might think. The diagram illustrates the process and the photograph shows just such a square made over sixty years ago during my apprenticeship. The diameter of the cylinder is of no importance as long as it is parallel so the micrometer available to Joe is adequate. The lathe is unlikely to face the end of the cylinder exactly flat but this does not matter if the centre of the end face is relieved. If the lathe cannot be persuaded to turn parallel to the required accuracy a number of lands can be machined and each one turned to the same diameter.



The Authors Cylindrical Square

The tool shown in the photograph is hardened and ground but for occasional use in the home workshop unhardened mild steel is adequate.

Artisan

A Naval Gun Barrel Transporter Wagon in 5" Gauge

Part 3

In this last part of the article we will cover the construction of the main section that carries the breach end of the gun and the sub frames that connect the individual bogies to make up the 3 main sub frames.

The sub frames was made from an 8ft. Length of 25 x 25 mm steel box section cut in half along its length. This produced two lengths of channel which were cut to form the individual frame components, the cut edges being cleaned up either by file or milling depending on the length.

As I intended to have functioning brake gear on all wheels I needed to ensure the distance between axle centres on each bogie unit was the same between the leading and trailing bogie on each sub frame. Having worked out this dimension it was then fairly easy to work out the length of the 2 sole bars and the size of the head stocks. This gave me a large rectangular frame into which I fitted the



Photo A -A Completed Sub Frame

cross members that acted as the pivot points for each bogie unit. Additional bracing pieces were fitted as required. I tended to follow the same layout of parts as used in the construction of conventional wagons. Small angle brackets were used to join the various parts to each other using 1/16" copper rivets. This riveting was carried out using an adapted set of Mole grips.

On occasions I was unable to use this method of construction and resorted to 10BA round head bolts with no slot. Placed side by side it is quite difficult to tell the difference between the two types of fixing. Photo A shows a completed sub frame. Fitting all the individual

parts was quite time consuming. Unfortunately this is the only photo I have of the sub frame.

The next part to be made was the frame work that carried the breach end of the gun. I studied the photo's in the book I mentioned in previous articles. Having taken some measurements and worked out a basic scale I cut out the proposed shape in hard board and offered this up against the already completed sub frames in order to ensure that the scale and outline looked in proportion. After a few adjustments I was happy with the final outline and it was time to cut steel.



PhotoB - Set up to form Main Girder Flanges

fi

The method I used was the same as that used when building loco frames. Two pieces of steel 1/8th x 6" x 35" were bolted together having first ensured I had a datum edge to work from. The bolt's were put in area's that would eventually become scrap. The hard board profile was then laid on the steel and a scribe was drawn around the edge. The profile was then cut out using a band saw and then milled to the scribed line. Draw filing and emery cloth produce a nice clean burr free edge. The profiled plates thus produced were to form the webs of I section side members of the framework. The flanges of the section were formed by fixing 1"x1/16" steel strip to the top and bottom edges of the profiled web plate. To form these strips I drew around one of the profiled plates on a piece of hard board and then clamped a piece of 2" angle iron along the bottom edge (Photo

B). The strip was then clamped to this and bent as required using the drawn line as a guide. Final fitting was done using the profiled steel plate as a guide. Once I was happy I had a snug fit all the way around made a jig that ensured that I could drill a 10BA tapping holes into the steel strip on the centre line and into the edge of the profiled plate. To make sure I had a solid unit I used a 2 part epoxy glue in conjunction with 10BA screws which were counter sunk into the steel strip. The scale on the steel strip was cleaned off to ensure a good key for the glue.



Photo C - Drilling for Dummy Rivets

The next stage was to simulate the rivets used in the original wagon. This was achieved by again making a drilling jig to accurately position and space the rivet holes. This jig took the form of a short length of 3/4" angle with a series of holes drilled down one side at a distance from the inner corner of the angle to put them in the correct location relative to the edge of the strip. Locating the jig on the strip with one side hanging down enabled a series of holes to be



Photo D- Side Frame Components

drilled at the appropriate pitch. The jig was then moved along and located by putting a peg through a hole in the jig and the last hole of the previous batch drilled. This process was repeated along the length of the girder, although it was a little tricky going around the curved parts. I had to make a very long drill using a piece of silver steel with a drill silver soldered in the end. Photo C shows how tricky this drilling operation got at times. Once all the holes had been drilled the rivets were put in



Photo E-Complete Main Frame

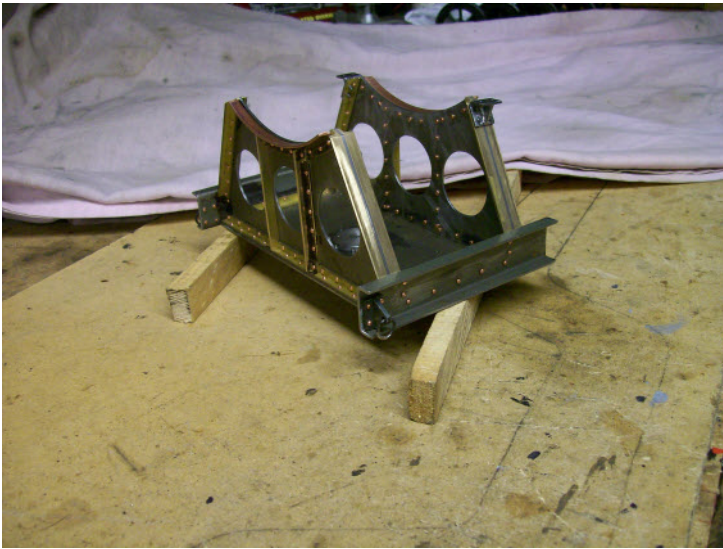


Photo F-Gun Barrel Cradle

place held in position with 2 part epoxy glue. I tried to rivet in the conventional manner but was not happy with the results, particularly where the head had been formed by a rivet snap. Photo D shows all the individual parts that made up one side of the main frame prior to assembly. Photo E shows the completed frame.

Next came the two cradles that carried the gun barrel itself. Both of these are made from 1/16th plate and brass angle held together with 1/16th copper rivets. To ensure that everything moved easily thrust ball races were fitted under both cradles.

I only have the one photograph of the cradles, Photo F being the one for the breach end.

That just about covers the construction phase. Painting was a bit of a nightmare due entirely to weather conditions. I had set myself a completion date of early May as I wanted to take the finished wagon to Gilling. To overcome the weather problem I constructed a spray booth in my workshop using old bed sheets and two 100 watt bulbs to warm it up. By hanging the piece to be painted in the curtained off area for a couple of hours with the two lamps on I was able to spray with no adverse effect on the final finish. I know this method may make some people cringe but I achieved the results I was looking for. A set of Dave Noble transfers were then applied to finished off the entire project.

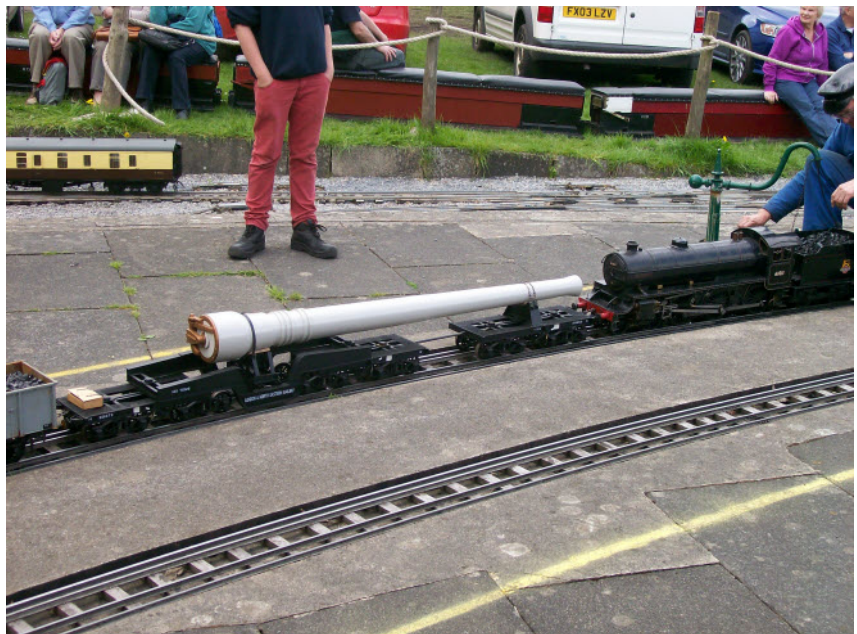


Photo G-The Finished Wagon

I did not keep a record of the number of hours it took to make the wagon but here are some facts and figures that I have to hand:- 24 wheels, each axle box is fitted with needle roller bearing, in excess of three and a half thousand 1/16th copper rivets were used, total weight is about 1cwt. The only items purchased were the wheels, rivets, nut and bolts, bearings. Everything else was made in house.

Photo G shows the finished article at its first public showing at Gilling May 2013

INDENTURED

A tale of old time learning in industry

Episode 10

As mentioned previously Edward's next engine was called a 4DSM. This was a marine unit of fairly ancient parentage but still used by the Royal Navy in patrol boats. (Its output was 44BHP at 2000 rpm). It was an indirect injection engine using the Ricardo Comet system. A word or two of explanation is needed at this point.

The difference between direct and indirect injection is significant. Dorman's had, in company with many others, begun their diesel activity in the early thirties using an indirect system but had, a few years later, largely changed to the direct system –this was mainly on the grounds of fuel economy.

A direct injection engine had the fuel squirted into a cavity created within the piston; normally four sprays were used and an important feature was the provision of swirl to create a vigorous movement of the air crossing the path of the fuel sprays.

The swirl could be created by several means but Dorman's favoured the masked inlet valve; this allowed air to enter the cylinder via one side of the valve head only -- thus creating a positive tangential movement of the air within the cylinder. This method was favoured by many at the time but was not suitable for high engine speeds because it was deleterious to the engine's breathing ability. With the indirect systems the swirl was created by a totally different method:--

These engines featured a (typically) spherical chamber offset to one side of the piston and positioned within the cylinder head. There was a short communication passage between the chamber and the space above the piston; in the Ricardo Comet this passage sloped at about 35 deg. from the horizontal. The forcing of air through here on the compression stroke was the means of creating the requisite swirl. The fuel was injected into this chamber. (Hence 'indirect injection' -- i.e. not into the main cylinder). A major virtue of this system was that the engine speed was not constrained by the ability of the engine to breathe. Furthermore, the injector was not of the multihole type but featured a moving part within the orifice which was said to aid self-cleaning. These were known as pintle nozzles. The downside of the indirect system was: a) Inferior fuel economy (but still better than a petrol engine) b) more heat passed to the cooling system c). A tendency to create sludge in the sump d) needed some thermal assistance when cold starting.

Despite these disadvantages the indirect systems were to totally dominate the motorcar and light van scene for many years to come -- mainly because of the system's ability to attain high engine speeds. (Radical advancement of the direct system – particularly its ability to achieve high speeds— lay some three decades into the future).

All this brings us back to Edward and his 4DSM. In mounting this to the dynamometer he needed to arrange for raw water cooling. In practice this meant that sea water would be passed through the cooling jacket and the flow restricted to achieve suitable temperatures in the cylinder head. On the test bed he would simply do the same but, of course, it would not be sea water—just tap water.

Because it was an indirect system it had to be started by means of glow plugs. These were a far cry from the later electrical types that merely called for you to wait a few moments before pressing the starter. Four Tee-shaped handles protruded from the cylinder head. When removed these possessed a small cavity roughly the diameter of a cigarette. When screwed into the cylinder head the inner ends of these accessed the fuel/air mixture in the swirl chamber. Into the cavity was placed a small paper spiral about half an inch long which had been previously soaked in a saltpetre (potassium nitrate) solution and then dried out prior to packaging—that is if you bought them retail. Needless to say, Dorman's did not encourage such unnecessary expenditure and made up a suitable substitute on the spot. (They did buy the saltpetre though).

Often the men would use partially consumed cigarette butts which they would collect by prior arrangement from the smokers in the shop. These would then be poked into the cavities as required. Apparently this ruse was successful because cigarettes contained a small quantity of saltpetre to promote continuous burning. (Not of great benefit to the human respiratory tract).

Whatever was used it was necessary to ignite each one and screw it back into the engine as swiftly as possible. Once the glowing plugs were in position, no time should be lost before attempting the start. With any luck it would fire quite readily. If, of course, it was hand started things were not quite so easy and it was all too easy for the glow plugs to expire before a successful start was made. Fortunately, in this case, the 4DSM was electric start and it fired up at once..

Whilst warming his engine up and making some initial adjustments he noticed that Denis was running the 6JO up on full power. Mr.Lance had now joined him and it was evident from their faces that all was not well. They had in front of them a rather tatty looking graph which was apparently the power curve run off many years ago. It spoke volumes for Dorman's data storage system that they were able to come up with such a thing at all. Nonetheless, the problem of the moment was that this one would not reproduce the original power. The first remedial action had been to remove the cylinder heads and regrind the valves but this only gave a marginal improvement. Mr.Lance was clearly worried. Towards the end of the day another man appeared and was seen in close discussion with Mr.Lance and Denis. This chap was quite elderly and Edward learnt later that his name was Lemon and that he was in fact the charge hand and habitually worked the nightshift.

Mr.Lemon was clearly a character held in high esteem and, in due course, Edward was to have some interesting conversations with him. However, the immediate problem was the 6JO. The matter had now become critical because the customer was due in that afternoon to witness the power curve. Meanwhile a ladder had been erected which reached to the roof structure of the shop; eventually Denis appeared with a large tin, obtained from the canteen, and this was duly taken up the ladder and tied via a pulley to one of the cross girders. It seemed to the onlookers that its position relative to the engine was fairly critical because they spent some time moving it fractional amounts this way or that.

Finally the tin was brought back to the ground by means of the pulley and a cord, whereupon it was filled with water. It was then hoisted back aloft and the engine started up. More power checks were made and apparently things were now looking much better. The engine was then shut down pending the arrival of the visitor. After the lunch break the 6JO was restarted and warmed through. About 2 o'clock the visitor arrived accompanied by a man from the technical department. By now the tin had been rehoisted into the roof and apparently all was ready for the test.

Edward, along with everyone else, was absorbed by the scene being enacted in front of him and the power curve was duly completed – evidently to the visitor's satisfaction. After that there was a good deal of hand shaking -- finally he was taken back to the office by the technical man. Here the figures recorded during the test would be graphed up for the visitor to take away with him. Later, a conversation with Denis revealed all. The tin in the roof was pierced with one tiny hole and the drip emanating from it had been so aligned that it would be sucked into the open intake of the carburettor. The water thus ingested provided a benefit to the engine's performance by both cooling the intake air and enhancing the humidity.

The surprising thing was that the visitor didn't notice anything untoward but Mr.Lemon, who had employed this trick many times before, simply pointed out that they never did – presumably they found the noise and turmoil of the test house too distracting for them to take in much detail at all.

Whilst all this was going on the 4DSM had also given of its rated power and its injection pump had been sealed by Mr.Lance. Hence Edward was now in the act of removing it from the test bed. It would then go to Taffy's gang in the erecting shop who would complete its build into a neat little unit on a sub-frame for the Royal Navy. When completed it looked quite attractive and featured a brass instrument panel comprising a tachometer, ammeter and temperature gauge. How long the brass would stay shiny was a moot point but then, as someone pointed out, there would always be enough matelots on hand to keep polishing it.

Surprisingly, his next engine was another 4DS but this time – as indicated by the lack of the latter 'M' – this one was the ordinary industrial version. Naturally he was confident about setting this one up because after all it was, mainly, a repeat of the previous job. Alas, such self confidence was to lead our hero into a something of a trap.

At this time all injection pumps were of the 'in line' variety. That is to say the pump looked a bit like a miniature engine-- four pumping elements in a line to match four engine cylinders. To set the timing of the engine it was necessary to remove the delivery valve of element number one. Having removed the valve he now attached a spare high pressure pipe to the outlet such that the end of the pipe pointed downwards. He then carefully positioned the engine flywheel so that the 16 degrees mark was aligned with a pointer put there for the purpose. This was the standard injection timing for the 4DS engine. Next, he turned the fuel supply on until a stream of fuel emerged from the pipe, then by gently tapping the drive coupling of the pump he was able to just stop the flow after which he tightened the bolts which had allowed the pump a certain amount of angular freedom. (The bolts fitted into curved slots). This procedure was known as spill timing.

The engine was now spill timed correctly – or so he thought. He then completed the rest of his preparation and in due course fired the engine up using the electric starter .Although he only lit two of the glow plugs it started readily enough. He was in the act of bringing it up to a reasonable speed when suddenly he was doused with a cascade of warm water; one of the hoses linking the engine to the down pipe from the cooling tank had slipped off the end of the pipe leading to the tank high up on the test house wall. The best action in this event was to move sharply out of the way until the tank had emptied itself.

He stopped the engine at once only to hear his mate Jeddy laughing his socks off.(It was a favourite test house trick to wait until you had connected up the pipes to the cooling tank and then, when you weren't looking, to slide the hose back until it just about overlapped the steel pipe by a minimal

amount --and carefully reposition the Jubilee clip so that everything looked alright. Naturally, once the engine started it shook things about a bit and the inevitable would occur). Much guffawing all round – everyone (except you) seemed to know when you were set up in this way.

When running again, he thought the engine didn't sound quite normal but was at a loss to account for this. He then set the fuel to the figure specified and, on completing the running in period, wound it up to full load and started on the power curve. By the time he had reached the peak torque point it was clear that the engine was running well below par. The question was why? First, he changed the injectors -- but to no avail. Next, he removed the head and had the fitting shop re-lap the valves – this gave a slight improvement but clearly something more serious was amiss. He checked and re-checked the timing, -- even getting Denis to oversee this activity.

Finally he slipped outside of the shop to check the smoke emitted from the top of the stack and by using a 'Ringleman card' determined that the smoke was only a little darker than usual which didn't really prove much at all. (The 'Ringleman' was a disc shaped card with different shades of grey and black printed on segments around a hole in the centre. There were words on the card to denote the severity such as: 'just visible' through to 'heavy black' . You were supposed to view the smoke through the hole and try to decide which shade corresponded with the smoke). It was all pretty crude and much depended on the colour of the sky against which you were making the judgement. (The Bosch and Hartridge smoke meters of later years were far more use). In any event , in this instance, the smoke told him nothing and he returned a bit disconsolate to his engine still pondering what else he could do. He hadn't checked the blow-by (past the pistons) and he hadn't taken compression pressures but these were a bit outside the normal routine of the test house.

At length, Mr. Lemon came by (he was standing in for Mr.Lance who was away) and stood watching the proceedings for a minute or two. Finally, he came up to Edward and said: 'Look at your rockers' and walked off.

He did as he was bid and then the penny dropped. He felt utterly stupid – he had timed it on the wrong stroke ! It was injecting on the overlap and so the timing was one whole revolution out. They (him and Denis) had spent ages splitting hairs over the exact figure – moving it half a degree this way or that but to no purpose whatsoever. He quickly put things right and the engine came 'on song' immediately.

With the crisis over, he began to think about it all. You wouldn't really expect the engine to run with the timing so grossly in error. He was sure that the direct injection engines wouldn't have fired at all but this one actually ran quite well albeit down on power.

Mr. Lemon, again stopped by, and -- sensing Edward's personal anguish -- told him not to take it too hard. He explained that it had happened many times before but with the coming of the direct injection engines the possibility had largely been forgotten.

Anyway, by now the weekend was drawing near and things like engine timing were beginning to be displaced by other issues of a more personal nature – he was especially thinking about Sunday teatime! Having decided to use the Morgan as transport he planned to spend a bit of time making it look its best.

It was a red car with black upholstery and mudguards. The radiator—a dummy because it was air cooled – was chromed and came up well along with the headlamps and the twin exhausts. The latter

were a bit tricky for unsuspecting passengers: they ran nearly the length of the vehicle and, of course, got hot.

Because there were no doors they were at waist height. To give some protection he had copied a commonplace Morgan fitment in the form of a sort of perforated stainless steel canister placed on the pipe in the vicinity of the passenger. The engine, a Vee-twin, was totally exposed at the front of the car. This too came up well after an application of 'Gunk'. Each rocker box bore the letter 'M' which almost everyone assumed stood for Morgan whereas it signified the engine make which was Matchless. There was no hood -- only a tonneau.

At around three o'clock on the Sunday he reviewed the result of his labours and decided that things looked pretty good. Fortunately it was a sunny day. He was nonetheless apprehensive, Julie at least had some idea what to expect, but what of her parents ? If they had been told he had a car they would probably envisage something with proper doors, four wheels and a roof. Anyway, it was time to go and he thought: whatever will be will be, and set out on the short trip to her house.

As he turned into her road – Coton Avenue – he drove as quietly as he could to reach her house at the end of the cul-de-sac. As he approached, he was slightly surprised to see her waiting there. He cut the engine, got out and was preparing to walk up the drive with her when she said, 'Hang on a minute I want a ride in this amazing looking machine which I've heard so much about'. He said, 'Shouldn't I meet your folks first?' She replied, 'We can do that later'. Without further ado, he restarted the engine and helped her get in – taking care to avoid the now hot exhaust pipe. And so off they went on a short circular trip passing a place called Blackheath which enabled him to then join the Tixall Road and, having passed Dormans, return to her house.

As he approached the end of the cul-de-sac again he noticed a man standing outside her house. He could only think that this might be her father and that he might be displeased that he'd taken her in the car without making any attempt to contact them. He said to Julie: 'Aha, is this trouble ahead? 'No' -- she said -- 'not at all, I reckon he's probably after a ride in your car'. And so it proved. Thus he set out again on the same circular tour and again returned to the house.

This time, with her father's agreement he reversed up the sloping drive (which would enable him to avoid having to use the starting handle later). Then they all trooped into the house where he was introduced to her mother. The first thing she said to him was: 'Don't I get a ride in the red car then? He was mildly embarrassed at this but reacted the only way he could by saying: 'Madam, your carriage awaits you'. And so, round the same route he went for the third time – finally backing up the drive again. At the end of it all he felt pretty pleased with events and was glad that, by chance, he'd put enough fuel in to cover the situation. It would indeed have been embarrassing to have run out of fuel in such circumstances. As it turned out, the evening passed off very successfully and he was struck by the fact that her parents treated him as though he and Julie would be together for the rest of their lives. Later, he reflected on this and realised that it exactly paralleled his own aspirations.

Paul Davies

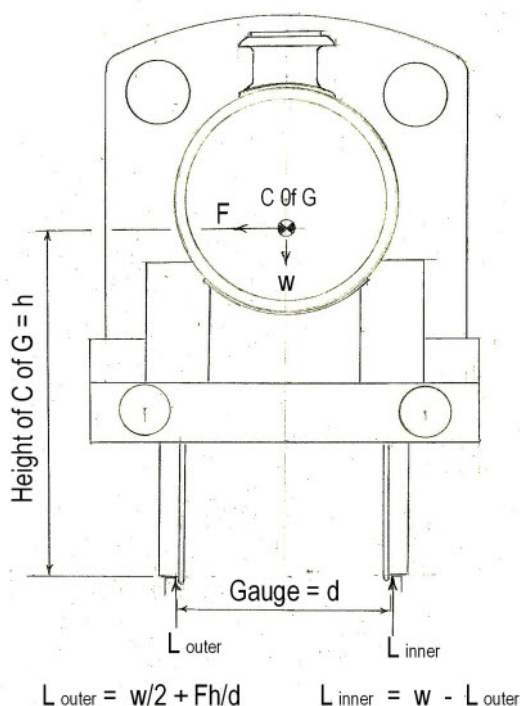
Jottings from the Workshop by “Artisan”

More on Springing and Adhesion

I anticipated that my comments in the previous edition of LINK would result in a torrent of criticism and dissent. In the event only two comments have reached me, one verbal and one in the form of a letter to the editor. Only one of these (the letter) contained any technical content. The other disputed my use of language but I cannot agree with my critic and neither can the Oxford English Dictionary.

The letter from Brian Sandham is far more relevant and I appreciate his interest and his taking the trouble to comment. Brian quite correctly points out that in the derivation of the formulae for tractive effort I swept up the averaging factor for the torque variations during the piston stroke with the “fudge factor” which is intended to cover not only the variation in effective crank throw during the stroke but the effects of cut off, connecting rod angularity and the effects of wire drawing and throttling through the valves and steam ports to mention but a few of the variables not included explicitly in the derivation, all of which represent sources of error in the calculation. Brian goes on to say that he is puzzled by my assumption that only the wheels on one side of the locomotive (the inside of a curve)

will slip. He is, of course, correct in saying that the wheels on the outside of the curve could accommodate part of the differential between wheel and track speed by skidding and this probably occurs in the case of non driven wheels i.e. carrying wheels and trolley wheels, where the friction force between wheel and rail is applied by the rail to the wheel to rotate it. When considering the issue of tractive effort however we are concerned with the driving and coupled wheels of the locomotive. In this case the friction force is applied by the wheel to the rail. Whilst there is a speed regime in which it is conceivable that skidding of the outer wheels might occur consideration of the mechanism involved leads to the conclusion that in general the slip will occur on the inside of the curve. My reasons for this conclusion are as follows. When starting from a standstill it is not possible for the outer wheel to skid (i.e. for the wheel rim to move at a slower speed than the wheel centre) until



forward motion has been established. Furthermore, the “grip” of the wheel to the rail will be enhanced by flange friction. Once forward motion has been established there will follow a short period of uncertainty when skidding might occur although it must be remembered that the friction force between wheel and rail will then be opposing forward motion and will negate any drive derived from the inner wheel and the train will not move. Once the train is in motion the load on the outer wheel will increase, with a corresponding reduction on the inner wheel load, due to the effect of centrifugal force acting through the centre of gravity of the locomotive, which will be well above rail level, as illustrated in the diagram. Table 1 herewith shows the magnitude of this effect for the

Table 1
Effects of Centrifugal Force on Wheel Loads

Speed mph	(L _{outer} - L _{inner}) Lbs		(L _{outer} - L _{inner}) / w %	
	40ft. Radius	30ft. Radius	40ft Radius	30ft Radius
1	0.63	0.83	0.4	0.6
2	2.5	3.3	2.0	2.6
3	5.62	7.52	4.5	6.0
4	10.0	13.36	8.0	10.7
5	15.6	20.88	12.5	16.7
6	22.5	30.07	18.0	24.0

locomotive used to illustrate the previous article, when negotiating curves of two different radii. A further increase in the load on the outer wheels arises from gyroscopic forces although this is a very small secondary effect. Since the load on the outer wheels is invariably greater than on the inner wheels and adhesion is a direct function of wheel / rail load I suggest that the inner wheel is more likely to slip than the outer wheel is to skid. There is, of course, no certainty since the actual behaviour of the system will depend on indeterminate variables such as the condition of the rail head and the coefficient of friction between individual wheels and the track.

Now for a confession! Shortly after the previous edition of LINK had gone to press I realised that there was an arithmetic error in the previous article and the weight distribution calculation for the driving and coupled wheels of the example locomotive was incorrect. I braced myself for the embarrassment of a stream of letters to the editor drawing attention to my error but none were forthcoming! Clearly no one has checked my arithmetic. Although the weight distribution calculation was incorrect the subsequent spring design calculations were correct, although the springs selected were for the incorrect weight distribution and would not have produced the results intended. The spring selection calculations were therefore repeated for the correct weight distribution and appropriate springs ordered. These have now been installed on the locomotive and the results checked

Table 2
Comparison of Design and Measured Load Distribution

Design Criteria	Load on Bogie Lbs.		Load on driving axle Lbs.		Load on coupled axle Lbs.	
	Design	Measured	Design	Measured	Design	Measured
Original design approximately equal loads on driving and coupled axles	46	44.8	32	37.0	32	38.79
Revised design for increased adhesive weight	30	28.6	70.3	69.02	20.3	21.45

on the weigh bridge. These results are shown in Table 2 together with the weight distribution achieved with the original springing which was designed to produce approximately equal load on both coupled axles. When the original springing design was carried out the locomotive was still under construction and the total weight and position of the centre of gravity had to be estimated. As can be seen from the table, the weight of the superstructure was under estimated and the weight on the driving and coupled axles proved to be considerably greater than predicted. The distribution of the weight between coupled axles was about as intended, however and the adhesive weight

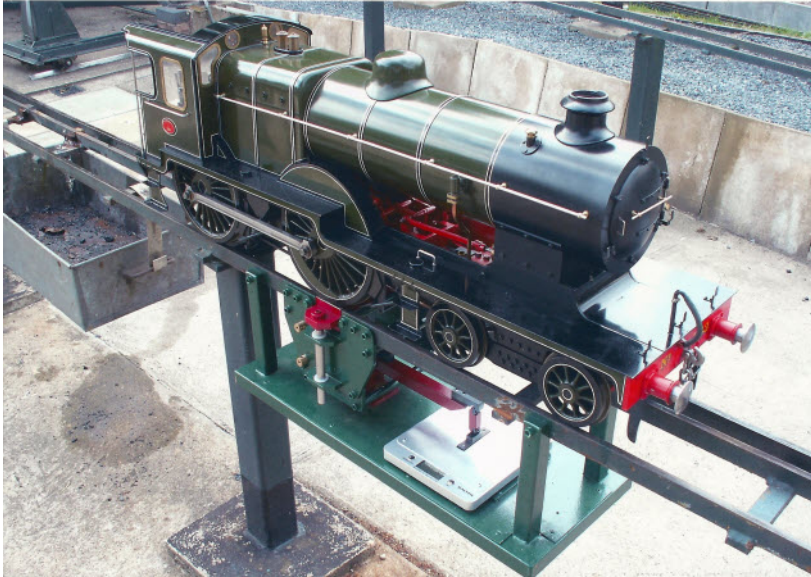


Photo - Keith Wraight

The Locomotive on the Weighbridge

achieved was 75.79 lbs. The revised springing design for increased adhesive weight proved to be quite accurate and has resulted in an increase of almost 15 lbs – an increase of 20%. I was a little concerned that the modified springing, which is much “softer” at the ends of the locomotive than the original, might result in “hobby horseing” but these fears have proved unfounded and if anything the locomotive seems more stable.

Unfortunately, in the absence of a dynamometer car capable of measuring drawbar pull the assessment of the effectiveness of the increase

in adhesive weight must be purely subjective. There must, however, be benefit to be gained by correct design of a locomotive's springing. In his letter Brian Sandham mentions the importance of the guidance given to the front of his 2-10-0 by the pony truck. This guidance is even more importance as the coupled wheel base is reduced, but the load supported by the carrying wheels of bogies and pony trucks all detracts from adhesive weight. Proper design of the springing to ensure that adequate but not excessive load is supported by these carrying wheels is well worth while. During a recent conversation with a well known member of the Club I mentioned some calculations that I had been performing to verify some particular issue. The response was “Oh, I don't do calculations, engineering is not a science!” I venture to suggest that engineering *is* science based and even if our modelling is primarily a practical matter the occasional application of a little theory is of benefit. The design of locomotive springing is a typical example of “trial and error” or “suck it an see” not being the proper way to proceed. The design and setting up of valve gear is another example where the application of some theory produces much better performance than setting up by trial and error.

Artisan

Oiling up – Courtesy of the Grandchildren

The range of sweets on sale to tempt the children these days is bewildering. Far more than the Smiths crisps and Tizer of my youth !



Our grandchildren came in the other day with the latest offering which is illustrated herewith.

This is a product in various flavours which you can spray into your mouth with a sort of atomiser. The one shown is strawberry flavour and goes under the trade name of ' Mega Mouth'.

The product is particularly sticky and when the kids finished with them it got me thinking that if it could spray that sort of product I wonder how it would get on with oil!

A quick clean up with WD40 resulted in the revised version on the right. I filled it with some light hydraulic oil that I have. Bingo – success, the spray of light oil which varies between a jet and a spray is ideal for us tank engine owners who have the problem of inside oiling without being able to see where everything is. A couple of squirts and everything is nicely covered.

I'm sure there are plenty of other uses you can think of so next time you are buying the kids sweets try them on this. If they don't like it you can always recycle it as an oiler!

Mike Gipson

LINK No. 45 – November 2013

Articles and reports for the November 2013 edition of LINK should reach the editor by Friday 18th October 2013. If being prepared on a computer the preferred format is Microsoft Word for text and jpeg for pictures and drawings. Material may be sent by e-mail as attachments (NOT as part of the e-mail itself) or provided on DVD. In spite of repeated requests I am still receiving material as e-mails. The only way I can process these is to print them out and re-type. This is a lot of unnecessary work. If you are not a computer addict hand written copy is acceptable. If in doubt, give me a call – I am here to help!

Editor

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In our game no move is the same, Heavy and wide we can provide

We have a number of Transport units catering for all your needs. The latest addition a DAF 90T double Drive unit has a carrying capacity of 58T and is cross rail compliant and LEZ compliant.

Some of our challenges



Dragline, these machines generally between 10 to 50 ton were common in smaller sand and gravel pits in the uk.



A RNLi Off shore lifeboat house. This was moved from Burnham on crouch to Lowestoft be dismantled.

ANY JOB BIG OR SMALL SET US A CHALLENGE AND GIVE US A CALL