SOUTHERN FEDERATION of MODEL ENGINEERING SOCIETIES

Formed from the Federation established in 1970 by Model Engineers for Model Engineers
A Company Limited by Guarantee in England and Wales No. 9002737
www.sfmes.co.uk

Coming up:

Boiler Inspectors' Seminars at Cardiff: 12 October and at Lancaster & Morecombe in November,
SFMES AGM at Swindon: 14 March and
Federation Trophy & Polly Prize Award for our Young Engineer of the Year

Thank you Maidstone MES for a great rally and Congratulations on your 90th!

Congratulations to Les Pritchard
Winner of the Australian Association of Live Steamers Trophy
with his 5in. gauge Lancashire & Yorkshire 'A' Class No. 127

Editor: David Goyder - tel: 023 8042 1201 - newslettereditor@sfmes.co.uk

EDITORIAL

A bit of a shock to be laid low after thinking I was in fine health. I suppose it sunk in when the ambulance crew reported over the radio, "*coming in under the blue.*" I don't know how anyone survives an ambulance ride as it is the roughest I've ever had!

Anyway, better now so here we are doing the Newsletter courtesy of our Chairman Polley, the arm twister. A bit of a potpourri to start with as I had to dig into reserves to find something of interest. Of course, the Maidstone Rally was a Good Do and Maidstone MES did us proud, especially Sue P with her cake.

The GL5 Mainline association have kindly let me include an article on the often not understood question of how much cant we need. And they point out that 8 mph in 5in. gauge is 113 mph. So next time we are charging around with our 0-6-0 goods engines, remember that their more usual speed with forty loaded coal wagons was about 30 mph and we should be going about 2½ mph! Then at least we can see the wheels go around realistically.

And yes, we have found a little social comment that should not upset us 'dyed in the wool' model engineers.

Now for the future. The newsletter cannot go on for ever lecturing about speed limits, we need to give something back to our member societies - perhaps even swap ideas. So, we hope to be able to come and do a profile (horrible word), a story perhaps on your society and what makes it a success, so we can share your ideas with other societies. Please let us know if you are willing.

Of course, we welcome your newsletters from which some true gems come our way. The classic that we still quote today some years after first reading it is Richard Gibbon's comment: *"Boiler inspection is not a spectator sport!"* So please send them to us, all contributions will be gratefully acknowledged.

And remember, it is not too early to be thinking about the Federation Trophy and Polly Prize award which is only a few months away at the March AGM.

David Goyder, Newsletter Editor

CHAIRMAN'S CHAT

Phew - I no longer have to produce a newsletter! It's good to have David back in the driving seat.

One of todays buzz words is recycling. For many years I have 'recycled' scrap aluminium into castings using my small foundry facilities which I have then machined into new items that I have needed. The most recent has been a replacement toothed pulley, to replace a well worn plastic pulley for my garden strimmer, which involved casting, turning, cutting the teeth as one would a gear, and so on.

This got me wondering how many others use their model engineering skills in this manner. I'm sure I remember, when a teenager, reading articles in the model engineering press, not only about repairing but constructing household items. Times have changed but do you still use your skills not just to build models but other useful items? If you do then why not write an article for the newsletter?

While on the subject of newsletter articles I am sure David would welcome articles on models, your club, places with engineering interest you have visited, and such like for inclusion in future issues. The darker nights will soon be with us and hopefully we'll be spending more time in our workshops so may I wish you many happy hours making those small twirly bits of metal.

Bob Polley, Chairman

Please, *please,* keep your email addresses up to date!

Every quarter, when we send an email message to the Prime Contacts of our member societies telling them the newsletter is available, we receive about a dozen "*Undelivered Mail Returned to Sender"* and we're told further *"johndoe@something.com; Host or domain name not found."*

We can track these folk down and spend an evening or two calling them to ask them to update their email address. Some tell us they don't know how to do it so we do it for them and, incidentally, have a nice chat. Others are just not there so we have to send a letter by Snail Mail which usually gets it changed.

You can update this information yourself to make our lives easier and save my phone bill!

If you have problems accessing or changing data then please contact the webmaster by using the 'Need any Help?' on the home page or contact membershipsecretary@sfmes.co.uk and we will do our best to assist.

Southern Federation Rally 2019

Hosted by Maidstone Model Engineering Society

If you didn't get to the Maidstone Model Engineering Society 90th anniversary celebrations and, of course, the Southern Federation Rally, you missed a great party. All the ingredients were there: sun, a lovely setting in Mote Park, great eating, fun track and gracious hosts! Eighteen locomotives and one traction engine attended, a good turnout indeed.

The last thing you need is a commentary from your editor so lets have a picture show to feast our eyes on the range of locomotives various members brought with them.

After a good day's running, the official business was the presentation of the Australian Association of Live Steamers Trophy. Open to all members of SFMES affiliated clubs and societies, this trophy is awarded to the locomotive judged to be the best example of a Commonwealth prototype in any gauge between and including 2½ and 7¼ inches running during the event. The first to be contested in the UK was at the SFMES Autumn Rally hosted by Staines SME in 1988.

A similar competition for the Southern Federation MES Trophy is held in Australia at the AALS Easter Convention. Recent winners of the Southern Federation MES Trophy were Hugh Elsol of Queensland SMEE at the 2016 Convention held in Cobden, Western Australia with his 3½in. gauge LNWR Hardwicke and Gerardus Mol of Canberra SMEE at the 2017 Convention held in Newcastle, New South Wales with his 5in. gauge Queensland Railways PB15.

Recent winners of the Australian Association Trophy include our own Ivan Hurst of Guildford MES at the 2016 Rally held at Guildford in Surrey with his 5in. gauge SR 'U' Class locomotive No. 31798, Bernard White of Maidstone MES at the 2017 Rally held at Fareham DSME in Hampshire with his 5in. gauge SR Rebuilt Merchant Navy class locomotive Orient Line and Tom Parham of Maidstone MES with his 5in. gauge 'Jinty' hosted last year by Cambridge DMES.

Les Pritchard of the Harlington locomotive Society is the 2019 winner of the AALS trophy, here presented by Mike Chrisp aided by SFMES President, Brent Hudson. Les's locomotive, to be seen in due course, is a beautiful Aspinal 'A' Class 0-6-0 that he built some 25 years ago.

Southern Federation Rally 2019

Hosted by Maidstone Model Engineering Society

How many young people dream of having their very own locomotive? Wow! This is Ollie Tompkins with Dad, Paul, hooked behind - does he push or pull?

Denis Mulford with Dholpur *- real power there!*

A rather nice Gresley V3 on display inside the marquee built by Tom Parham.

Ben Healey from Gravesend Marine and Model Engineering Society with his Maid of Kent.

Gresley A3 brought by Jim York from Gravesend Marine & Model Engineering Society.

We know who loves his Princess of Wales *when he brings it from Southampton. Slipped a bit on the aluminium track up the hill - flew*

Paul Norrington driving his Schools - must be almost done.

Southern Federation Rally 2019

An august display of AALS Trophy winners at Maidstone

Above: ***2005:*** *Edgar Playfoot - Maidstone - MR 4-2-2*

Right: ***1993:*** *Martin Parham - Maidstone -* Duchess of Hamilton *46229*

2016: *Ivan Hurst - Bracknell - Southern 'U' Class Mogul*

2003: - Bernard White - Maidstone - 3½in. Britannia

2009: *Richard Linkins - Romney Marsh - BR Class 2*

2017: *Bernard White - Maidstone - Rebuilt Merchant*

Above: ***2018:*** *Tom Parham - Maidstone - LMS 'Jinty'*

Right: ***2019:*** *Les Pritchard - Harlington - L & Y 'A' Class*

Southern Federation Rally 2019

More Rally Participants at Mote Park

Victorian Beauties

Roy Preston's SECR 'C' Class,

A Great Central Railway Class 8C, one of only two built to this class. Shown here by Peter Kingsford.

SECR 'D' Class 737 (BR number 31737) is preserved in the NRM. Andrew Hulse's loco was built by Jack

Thames barge Sheila Irene*, a lovely rendering of one of these graceful workhorses built by Dave Deller. Striking realism and atmosphere in the detail.*

MECCANO AT MAIDSTONE

This Meccano model represents a second world war AEC Matador cross-country lorry carrying a light crane. The prototype was manufactured in two- and three-axle versions and used extensively by the RAF and Army. Many lorries like this towed field guns and ammunition.

The model here was made approximately 62 years ago by a current Club member when 12 to 13 years old and may be typical of what was made by those early members when the Society was in its infancy, dating back 90 years to 1929.

Meccano was the brainchild of Frank Hornby, who patented the system in 1901. He was also responsible for Hornby Trains and Dinky Toys.

Meccano was produced in boxed sets numbered from 0 to 10, as well as individual parts and was intended for children of various ages to help them understand engineering. Meccano was popular at a

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POLLY MODEL ENGINEERING LIMITED

Have you a young member in your Club or Society eligible for the

SOUTHERN FEDERATION TROPHY & POLLY MODEL ENGINEERING PRIZE?

The Nominee shall be no more than 24 years of age at the date of nomination.

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.

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.

Visit www.sfmes.co.uk for further information and an entry form

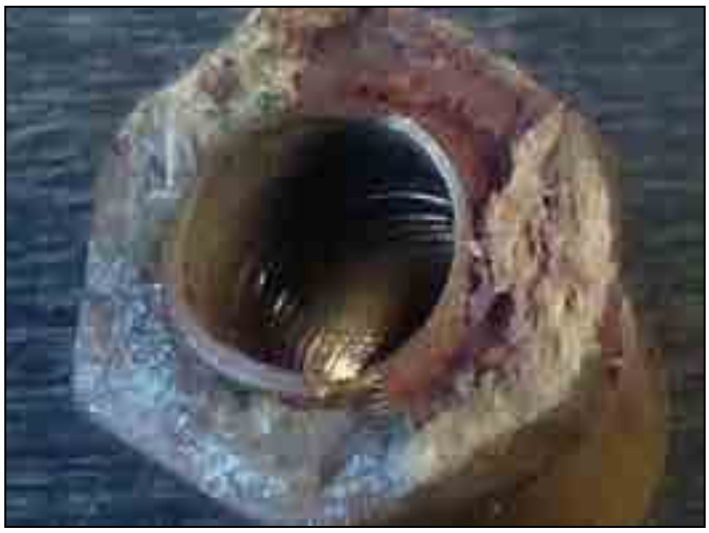
Something for metallurgists and model engineers to ponder

Here we have two little items that are actually one or should we say, were one until they rent themselves asunder (broke is too weak here). They are small and seemingly insignificant but we will continue.

Some of you may know that your editor is bravely encouraging an old lady who has not steamed for some 50 years to have another go. She is a 3½in. Princess Royal built to the Clarkson drawings at least 50 years ago but by whom we do not know. This little item is a blow down valve mounted on the backhead. It consists of the screw put in the end and a hole, which you can see, underneath. As fitted, blowing down means the cab is filled with hot water and perhaps a little steam. So, could we improve it?

Upon removal, it came away in two bits! The outer section dropped into the cab, the inner was extracted by putting the long nose pliers in the hole and turning, all very easy really.

Now we come to the analysis that I trust our readers will do. The top picture is the outer bit that was against the backhead and the lower picture is what was left. The shiny section seems to be all that was holding them together and that is after a shell test on the boiler at 180psi. By the shiny bit, I mean the less than half a circle on the right hand side in the upper picture (below) and a similar shiny rim on the portion in the lower picture, that was the part screwed into the backhead. Makes one shudder to think what might have happened while trundling around the local track. Anyway over to our readers. I will keep the bits for a little while.



*"**There** is hardly anything in the world that some man cannot make a little worse and sell a little cheaper, and the people who consider price only are this man's lawful prey.*

It's unwise to pay too much, but it's worse to pay too little. When you pay too much, you lose a little money - that's all. When you pay too little, you sometimes lose everything, because the thing you bought was incapable of doing the thing it was bought to do."

BOILER SEMINARS

The next Joint Southern Federation of Model Engineering Societies and Northern Association Boiler Inspectors Seminar is to be held in October.

Venue
Right in the centre of Cardiff, just off the A48 which is the main road into Cardiff.

Cardiff MES
King George Drive East
Heath Park
Cardiff CF14 4AW

Future plans

- November 2019 - Lancaster & Morecombe area
- Spring 2020 - Furness area
- Autumn 2020 - East Midlands

What would you do?
A question for a potential boiler inspector:

Mr Modeller is completing his chassis and is looking toward to his acquisition of a boiler. Quotes from various reputable boiler makers range between £3,000 and £5,000 with delivery extending to 36 months.

While complaining during a Wednesday workday - it rained all the time hence the discussion - and after the third cup of tea, Mr Solderer chirps up to say he's making one of those boilers and could easily make two and sell one to his mate, Mr Modeller.

Okay, they agree a price agreed and later both boilers are on their chassis and presented for inspection and testing complete with their shell tests.

What would you do?

Answers to Peter Squire: petersquire@sfmes.co.uk

BLINDED IN ONE EYE

Woman, 57, left BLIND in one eye after the 2¾ inch long whistle on her pressure cooker burst off and lodged in her skull.

Extracted without permission from the Daily Mail website but I'm sure they'll not mind! - Ed.

An Indian woman was blinded in one eye after part of her pressure cooker blew off and lodged in her skull.

Munda Birsi, 57, was cooking dhal when she suffered the life-changing injury, which almost killed her.

She left the pressure cooker on the gas stove while cooking dhal and forgot about it while she went to cut hay in her back garden.

Local reports say the whistle of the pressure cooker burst off and pierced her skull next to her left eye.

The whistle, which was 2¾ in. (7 cm) long and 0.8 in. (2 cm) wide, indicates when the cooker is too hot.

Ms Birsi reportedly did not hear the whistle screaming because it was drowned out by the hay cutter she was using in the garden.

She was taken to a local hospital and given first aid - but doctors recommended she be taken to a better equipped super-specialty hospital.

Therefore, she was taken to a hospital 34.8 miles (56 km) north of her village in Khunti district, Jharkhand, a state in the east of India. Medics couldn't see the bullet-sized bit of metal from the outside - only a CT scan revealed it was deeply jammed inside her skull. Doctors then performed an operation to remove the whistle on September 6, two days after the bizarre injury."

DID YOU KNOW?

A 'SHOT' OF WHISKEY

In the old west a .45 cartridge for a six-gun cost 12 cents, so did a glass of whiskey. If a cowhand was low on cash he would often give the bartender a cartridge in exchange for a drink. This became known as a 'shot' of whiskey.

SHIP 'STATEROOMS'

Travelling by steamboat was considered the height of comfort. Passenger cabins on the boats were not numbered. Instead they were named after states. To this day cabins on ships are called staterooms.

'OVER A BARREL'

In the days before CPR a drowning victim would be placed face down over a barrel and the barrel would be rolled back and forth in a effort to empty the lungs of water. It was rarely effective. If you are over a barrel you are in deep trouble.

Superelevation and Transition Curves

by John Heslop

This article first appeared in Turnout, the Journal of the Ground Level 5in. gauge Mainline Association Issue 13 - Autumn 1996 and is reprinted here by kind permission of the Editor, Keith Taylor-Nobbs

One of Newton's Laws of Motion (I can't remember which) states that a body continues in its state of uniform motion in a straight line unless acted upon by an external force. In the case of a railway vehicle the force which causes it to move in a curved path is provided by the pressure of the outside rail against the wheel flanges. Another of Newton's Laws of Motion states that to every action there is a an equal and opposite reaction; in this case the reaction is the pressure of the wheel flanges against the outside rail, which is known as the centrifugal force. This force varies directly as the square of the speed, and inversely as the radius of the curve.

The forces acting at the centre of gravity of a vehicle moving on a curved track are shown in Fig. 1, where *G* is the centre of gravity, *GC* represents the centrifugal force in direction and magnitude, and *GW* the weight of the vehicle. In the parallelogram *CGWR*, the *diagonal GR* represents the resultant of the forces *GC* and *GW*. This force *GR* acts towards the outside rail, so increasing the load thereon. If the speed is increased or the radius decreased, the centrifugal force *GC* will increase while the weight *GW* will remain the same, so that *GR* will get ever nearer to the outside rail. If the stage is reached that *GR* passes through the point of contact of the wheel and rail, then the vehicle will be on the point of overturning. Even before this stage is reached, however, the outside rail will have been taking more than its fair share of the load.

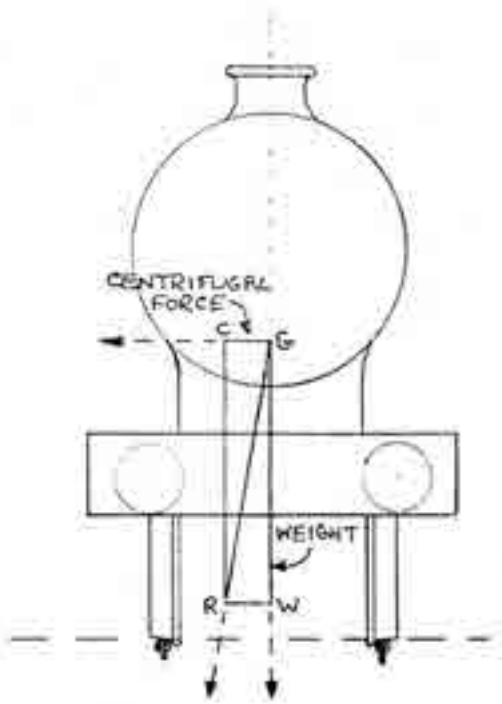


FIG 1

The method used for reducing this unequal loading of the rails is to make the plane of the tops of the rails as nearly as practicable normal (at right angles) to the resultant of the centrifugal force and the weight. This involves raising the outer rail above the inner rail so that the track is canted; the amount by which the outer rail is raised is known as the superelevation. Fig. 2 shows a vehicle on superelevated track such that the resultant force *OR* is normal to the surface of the rails. The gauge is *B* and the superelevation is *H*. It will be seen, from similar triangles that

$$\frac{H}{B}=\frac{GC}{GW} \quad \text{or} \quad H=\frac{BWv^2}{WgR}=\frac{Bv^2}{gR}$$

where *v* is the velocity in feet per second, *R* is the radius in feet, and *g* (the acceleration due to gravity) has a value of 32 feet per second per second.

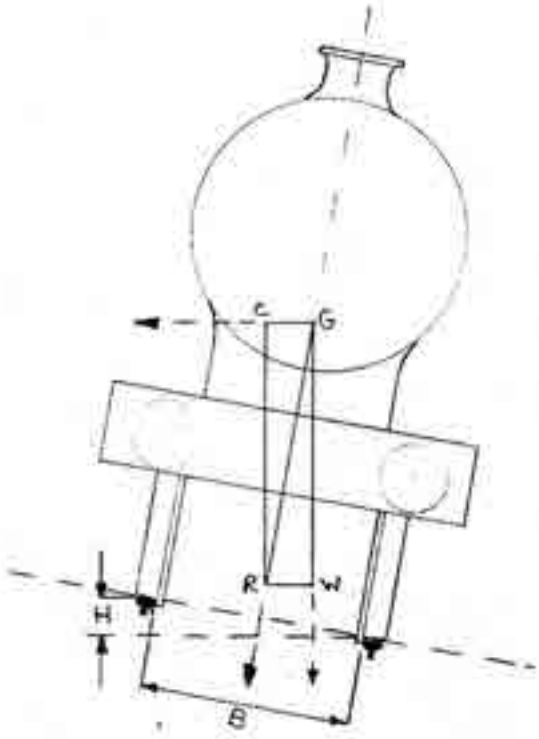


FIG 2

Superelevation and Transition Curves - by John Heslop

Continued

The quantities *H* and *B*, the superelevation and the gauge respectively, are for our purposes conveniently expressed in inches, so that *B* = 5. Hence

$$H = \frac{5v^2}{32R}$$

If we wish to think of the velocity in miles per hour, which is easier to visualise, then we use the conversion 1 mph = 1.47 feet per second, hence

$$H = \frac{5 \times 1.47 \times 1.47 \times v^2}{32R} \text{ or } H = \frac{0.337v^2}{R}$$

where *v* is in mph and *R* is in feet. To take a practical example, suppose we have a train doing 6 mph (a scale 68 mph) on a curve of 50 feet radius. Then

$$H = \frac{0.337 \times 36}{50} = 0.243 \text{ inches}$$

or ¼ in. approximately. It should be noted that the superelevation on a particular curve is only theoretically correct for one speed, and must therefore be a compromise. If we were to provide the correct superelevation on the 50 feet radius curve for a train doing 10 mph (a scale 113 mph) then

$$H = \frac{0.337 \times 100}{50} = 0.674 \text{ inches.}$$

Or $^{11}/_{16}$ in. approximately. Such an amount of superelevation would feel disconcerting to a train travelling at a low speed, or brought to a standstill, so the lower figure of ¼ in. would be much more suitable for general use.

When a circular curve joins directly onto a length of straight track there exists at the tangent point the condition that at one moment no superelevation is required while at the next the full superelevation is required. Under these conditions there are three alternatives:

1. apply the superelevation gradually on the straight to ensure full superelevation on the curve,

2. leave the straight at its correct level and apply the superelevation gradually on the curve,

3. apply the superelevation partly on the straight and partly on the curve.

All these alternatives are bad. In 1. the weight of the train becomes shifted to the inside rail while still on the straight and is then suddenly thrown back to normal when the tangent point is reached. In 2. the centrifugal forces are unbalanced at the start of the curve and the outside leading wheels have to take the extra load. In 3. there is a combination of these faults.

The only way of overcoming these difficulties is to insert between the straight and the circular curve another curve in which the radius is gradually decreased from infinity to that of the circular curve. This is called a transition curve, and the curve generally used is the so-called cubic parabola, in which the offsets from the straight increase in proportion to the cube of their distance from the point of origin of the curve. This curve has the fortunate property that the radius at any point varies inversely as the distance from the point of origin, which, since the required superelevation varies inversely as the radius, means that the superelevation can be applied at a uniform rate of increase along the transition curve, starting

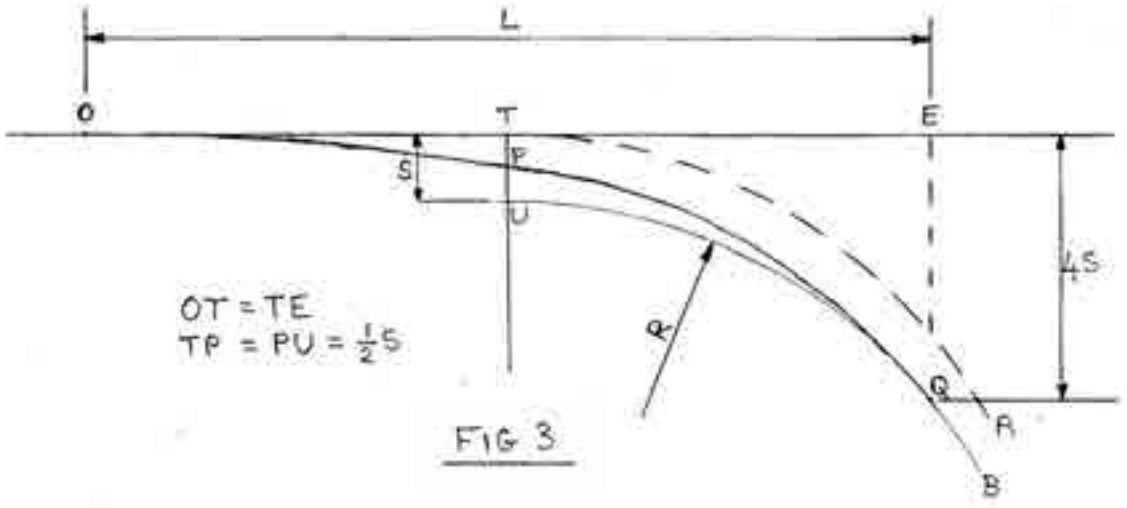


FIG 3

Superelevation and Transition Curves - by John Heslop

Continued

from zero at the point of origin up to the required amount at the final radius.

A transition curve such as this cannot be inserted between an existing straight and an existing circular curve. It is necessary to shift either the straight or the curve to a position parallel to its original alignment, as shown in Fig. 3, in which *TA* is the original circular curve which is tangential to the straight at *T* (the tangent point). The curve is shifted to *UB*, and *TU* is the amount of shift, *S*. The total length of the transition curve *OPQ* measured along the straight is *OE*, and *OT* equals *TE*. In other words, half of the transition curve comes before the tangent point and half after it. In addition, the transition curve bisects the shift *TU* at *P*. The end of the transition curve, where it meets the circular curve, is point *Q*, and it will be seen that the offset *EQ* is eight times the offset *TP*, since *OE* is twice *OT* and 23 = 8. However, the offset *TP* is half the shift, hence *EQ* is equal to 4*S*. Without going into the detailed mathematics, it can be shown that for a given length of transition curve *L* and a given radius of circular curve *R* the amount of shift *S* may be calculated from the formula

$$S = \frac{L^2}{2R}$$

where *L* and *R* are in feet and *S* is in inches.

When laying out a transition curve, it is necessary at an early stage to decide on the length of the transition from practical considerations. Since it is on the transition curve that the superelevation is applied, its length is determined by how gradually one wishes to apply the superelevation. At Gilling, our latest length of concrete track bed applies the superelevation at a rate of 0.015in. per foot of track. A coach with bogies spaced at 4 feet would therefore encounter a twist of 0.060in., which seems a fairly modest amount. However, if space permits, a lower rate could be used; this would give a longer transition curve and a larger shift. Let us consider a practical example of a transition curve into a circular curve of 50 ft radius with 0.243in. of superelevation (correct for 6 mph - see earlier calculation), If we decide to apply the superelevation at rate of 0.015in. per foot, the length of the transition curve will be

$$L = \frac{0.243}{0.015} = 16.2\text{ft.}$$

or say 16 feet. The shift will therefore, be given by

$$S = \frac{L^2}{2R} = \frac{16 \times 16}{2 \times 50} = 2.56 \text{ inches.}$$

The transition curve will start 8 feet before the tangent point and end 8 feet after the tangent point. The end of the transition curve will lie at an offset of 4*S* = 10.24 inches from the straight, and the offsets at various distances from the point of origin (*O* in Fig. 3) may be calculated from this dimension using the length cubed relationship.

For example:

$$\text{At 2 feet, offset} = 10.24 \times \frac{2^3}{16^3} = 0.020 \text{ inches.}$$

$$\text{At 4 feet, offset} = 10.24 \times \frac{4^3}{16^3} = 0.160 \text{ inches.}$$

$$\text{At 6 feet, offset} = 10.24 \times \frac{6^3}{16^3} = 0.540 \text{ inches.}$$

$$\text{At 8 feet, offset} = 10.24 \times \frac{8^3}{16^3} = 1.280 \text{ inches.}$$

(half the shift), and so on.

Using these offsets, and a taut line, preferably piano wire, stretched along the straight to measure them from, the actual curve can be accurately laid out. The superelevation may be checked at similar intervals by, for example, using a spirit level with appropriate shims on the inside rail to give an incremental rate of 0.015in. per foot.

It is equally important to use transition curves on reverse curves. When two circular curves reverse directly without any straight section in between, the shock at reversal is even greater than that at the entry to a circular curve directly from a straight without transition. What is required on a reverse curve is two transition curves back to back, with or without a short straight section between them.

I hope that these notes will go some way to removing the mystery and guesswork from the setting out of curved trackwork; writing them has certainly helped to clarify my thinking on the subject.

… and now for something politically incorrect ...

Marine model engineer - is that the *Titanic*?

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 are for single items only.

Please make cheques payable to 'Southern Federation MES'

Title	From Our Stand
Examination & Testing of Miniature Steam Boilers BTC 2018 - Orange Book	£0.50
Ditto - Pack of 5	£2.50
Boiler Test Certificates - Pad of 50	FREE*
Written Scheme of Examination - Pad of 50	FREE*
Small Boiler Test Certificate - Pad of 50	FREE*
Boiler History Record Card - Pack of 10	£3.50
Plastic wallets to hold certificates size A5	£0.75
Ditto - Pack of 5	£3.75
HSG216 Passenger-carrying miniature railways 'Guidance on safe practice'	£3.00
Postage and packing if delivered	£4.50

David Mayall - email: davidmayall@sfmes.co.uk

*These publications are issued free of charge to fully paid up member clubs and societies. However for delivery by mail the cost of the postage, as shown, must be borne by the Club/Society placing the order. Alternatively, use https://sfmes.co.uk/public/?action=homepublications

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

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