

Reading Society of Model  
Engineers  
www.prospectpark  
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Charity Number 1163244

# The Prospectus

November 2018



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Steam ploughing in the Autumn. This is a 450 yard pull with Fowler Z7 and BB1 engines and a 6 furrow plough. View taken on 24 October 2018 Photo John Billard

**DAWSON'S DIARY  
SELLING RAIL RESEARCH  
INTERFACE -THE WHEEL ITSELF  
TRACK EXTENSION PROGRESS  
ANALYTICS**

## DAWSON'S DIARY

## kept by the President

Since I last saw our member John Sargeant he has been moved to Abingdon Hospital and is making good progress with his recovery. SWE at the RSME wish him all the best for the future.

I had a very nice surprise when I entered the club house on club running day Saturday to see the club's Polly loco looking very nice painted in British Rly green by Stuart Higgins and Peter Harrison. This made up for the rain that day! Alec Bray did brave the wet to try out his 5" 1400 GWR 0-4-2 tank. It had been run on air but will not run on steam. This Winson engine is very difficult to time correctly with both valves in one steam chest between the cylinders is not a lot of help. One idea put by David Scott is to drill sighting holes in the wall of the chest, would help to set the valves right.

October public running was another fine sunny day the members again made it a good day for the club. The club Baldwin failed with a broken water gauge glass. I think this is a first time with this engine. With quick dropping of the fire the member saved the day! The raised track ran well with no problems this time with a good mix of steam and electric locos. The two other Baldwins coped with well loaded trains with the help of Mike's Class 66 electric loco a smart looking work horse.

We gained two more members this time round. We are doing well so far this year. Welcome to you both! In the club house Liz and Jackie again kept the teapot full all day. Thanks again ladies helping to make it another good day for the RSME.

## PONDERINGS

## by 61249



One of the KCRC Metro Cammell units poking out from the depot underneath high rise flats.

Photo 61249

## **BR Research, part of AEA Technology**

So where was UK railway research in 1997? The honest answer to this is that it was not at its strongest position ever. For some time before privatisation, the need for BR to be involved in research at all had been under debate, and the uncertainty of the impending change had caused two main effects. So BRR was roughly half the size it was at its peak, but profitable, just £1m / year on a turnover around £12m. Those things that BR Research did that were not really research had been moved to other parts of the railway business, operating test trains was a good example of this.

Secondly there was still some hangover from the cancellation of the APT project nearly two decades earlier, decisions of this size and importance bite deeply into the culture and reputation. Despite this, the international reputation of BRR was excellent, and we pulled well above our weight on international research bodies, such as the World Congress on Railway Research, held every 2 years and a truly global event. It would be a surprise for us not to receive one of the main prizes awarded at these gatherings of well over a thousand delegates.

The other influence was the commercialisation of research. It was recognised that success in the private sector demanded skills in selling our wares, although the efforts in this direction were characterised more by hope and enthusiasm than expertise. It was early days, and international sales were noticeable, but not all that strong. Bridge design advice for the Hong Kong airport railway and a track testing vehicle for Spanish high speed lines being the notable recent “successes”.

I put this in commas as this latter project was seen as a jewel in the crown by the acquiring AEA as they bought the business, and the contract was trumpeted in all the publicity that helped to underpin the AEA share price as it moved in the private sector. Buyer beware! The truth was that a serious commercial mistake had been made. What RENFE had asked for was exactly the same performance that they saw in the UK Track Recording vehicle, for use both in their broader gauge and standard Gauge railway by bogie swapping. The recording and data collection was based on analog equipment of some vintage, and someone anonymous in BRR made the mistake of offering a digital upgrade, without thinking too much about the development costs or the impact on delivery timescales.

The result was that the “jewel” turned out to be fake paste commercially and took me to Spain in several rescue attempts that eventually meant we delivered two years late at a £6m loss on a £2m project. Ugh! The customer was not impressed either, although he did eventually get a superb vehicle that did all it said on the tin, at higher processing speeds, but repeat orders never really came as planned, possibly because the reputation had been damaged. Less clever but more predictable technology took the market.

In the privatisation stakes, the management team bid for BR Research lost to

AEA probably because they knew too much, including the risks associated with this project. They knew how far they had got with the software, and put financial risk protection into their bid, and lost. C'est la vie.

In theory there was a great international market in all those countries that were too small to have their own research capability, in fact the competition for products was pretty fierce from established private sector companies, while price, local suppliers, and more mundane issues often impressed a customer rather than technical excellence or world leading capability. Selling half way round the world and delivering good after sales service for complicated kit are not the sort of things that folk do for fun!

One other sale of note was our world leading brake pad measurement automation system, called "Padview". This had been sold to the Kowloon and Canton Railway Company (KCRC) who ran part of the Hong Kong metro network. With signalling, trains and infrastructure from the UK, they delivered Japanese performance. The installation of Padview in their depot (under a 20-storey block of flats) was designed not to save the man hours of fitters measuring pads, but to increase the depot throughput by cutting out the time brake checking took in terms of berth occupation. In a depot of constrained size (as is everything in Hong Kong) to run more trains, throughput must increase. The installation was key to their trains being maintained, and we provided the capability of taking a digital picture of the pads and comparing it with the last image we took of that particular pad. Clever enough to be world leading. (A similar system is just being installed over 20 years later for the Elizabeth line trains at Old Oak Common).

The system was installed close to the carriage washing machine because that was where the speed of the train was low enough to make sure we got a good image.

It had been operating for a month when we had the desperate call "Your B\*\*\*\*y system is not working. We despatched our best man to HK who rang back on arrival "...did the customer specify that the cameras should work and measure while under water?" The answer was quickly established "no of course not, the water will interfere with the image through diffraction etc." "I thought as much, the problem is that the drains in the carriage washer get filled up with sludge from dirty trains and stops working, so the cameras are still recording, but under water" Solution – get the customer to clean his drains, but it has cost us a week of our best man to tell him something that should have been routine, or obvious to us when we fitted the system.

In the second month, a similar call, and we sent the same man again. Once again the system is failing for the customer, this time because only 35% of the images are useable. Must be the system. Best man flies to HK again to find that the average speed of the trains through the washer is roughly twice what the customer had told us when we installed the system. Incidentally, the washer does not work well at the higher speed either, but washing is usually done at the end of the shift when the folks are keen to get home – so the

incentive to rush is understandable. Solution? Nothing to do with our system, just make sure the trains go through at a speed that means they get cleaned decently, and in the process, get their pads measured. Neither of these expensive trips would have been necessary if the local junior management had really been on board, and keen to make the system work, but they saw technology as possibly taking away their jobs, so why should they help it? This factor alone helps to create the real technology gap, not that between what we do in the UK and what the rest of the world does, but the gap between what we can do technically, and what is achievable with the culture, people and training that we have in place.

An interesting by-product of the installation in Hong Kong was that in a railway driven by high reliability and standards, we discovered that about 10% of the brake pads never wore at all. The only way this could be true is if the brakes on that wheel/vehicle were not working. And so the investigation proved – the wheel slide equipment had a generic fault that meant on static testing the brakes would be applied, but in normal running, they would immediately be released through a hardware fault in the control circuitry of the wheel slide protection system. It is very unlikely that this fault would have been unearthed through the rigours of manual inspection, - Safety Regulators wedded to the idea of human intervention being necessary - please note.

To its credit, BR Research was already an international organisation in 1997, and growth outside the UK was key to our development strategy – more excitement next month!

## Ground Level Crossing Safety

from the Trustees

**Following a recent ‘near miss’ members are reminded that:**

- **The first driver to leave the steaming bay on the ground level is responsible for checking that the level crossing is operational.**
- **Drivers using the ground level track must always be aware of vehicles and pedestrians crossing the track. Drivers must slow down when approaching the level crossing and be prepared to stop safely.**
- **If on club running, if the covers have not been removed from the lights at the level crossing, then drivers must always STOP at the crossing and CHECK it is safe before proceeding.**
- **Locomotive owners’ cars and vans should be parked away from the level crossing.**

## THE NOT-SO-PERMANENT WAY

by John Spokes

This is the concluding article in this series and deals with the other half of the Wheel-Rail Interface, the Wheel itself. In the preceding part I discussed rail wear and some specific rail defects resulting from Rolling Contact Fatigue. However, just as the rail wears so does the wheel and particularly the tread which is the main contact with the rail. I am sure some of you will recollect the subject of my first photograph. I certainly remember this occurring at Reading during my early days of London commuting in the late Seventies; the dull ring of hammer on wheel can easily be recalled.



In 1998 the worst accident on German Railways occurred at a town called Eschede when a high speed train derailed and hit a bridge killing 101 people and injuring another 100. The cause was a single fatigue crack in a wheel. Nowadays wheel blanks are hydraulically forged and much, much less prone to cracking.

One of the most common single faults on a wheel is a flat caused by locking-up of the wheel during braking. The effect is similar to a rail burn and the heat generated at the point of contact causes localised melting and a change in material composition. You may have experienced the sound of a wheel flat on a passing train or even sat over a bogie on an HST with such a defect.

In some places detectors are used to pick-up the sound of a wheel flat passing by.

The next figure shows the extremes of wheel tread and wheel flange wear compared with the profile of a new wheel. I discussed in an earlier part of this series how the coning effect of an appropriately profiled

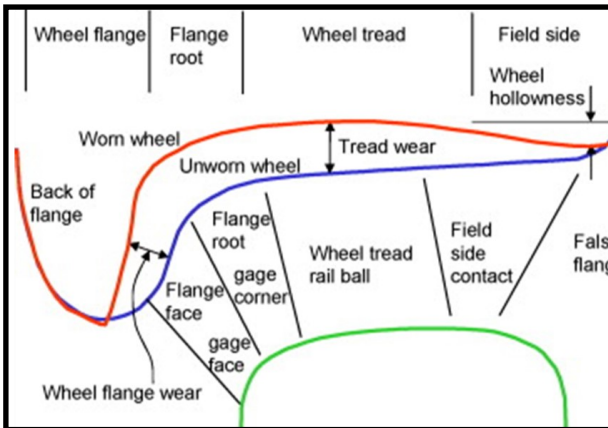


wheel rim and rail results in an inherent self-centring and aligning effect. It's not difficult to envisage that as the rim wears hollow this effect is lost. In fact in this extreme example the single point of rail wheel rim contact becomes two, against which the wheel can oscillate.



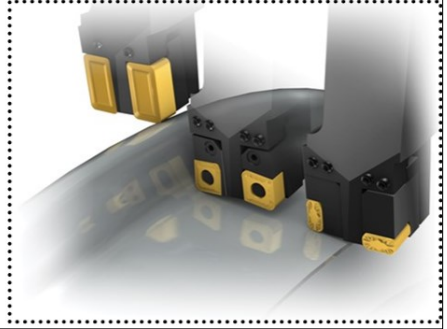
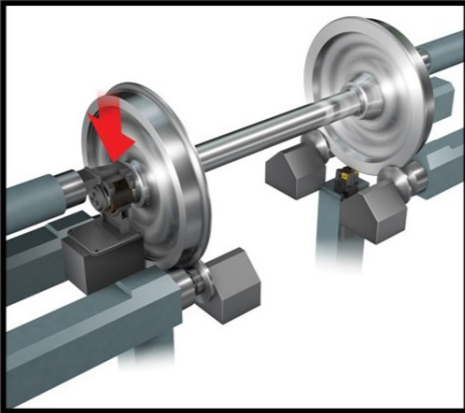
Just as in the case of the rail, regular monitoring of wheelsets takes place as part of routine maintenance and inspection. Obvious damage to wheel rims and flanges can be detected using cameras which operate when the train is under motion. There are also laser systems which can be rail-mounted and measure profiles to an accuracy of 0.5mm on a train running at 150 kph (93 mph).

Ultrasonics are used to check for the unlikely event of a wheel crack and there even devices which can measure wheel diameter, out-of-roundness, flange height and back-to-back distance.



As one would expect unless a wheel has gone beyond its useful life it is possible to re-profile. In some cases this can be done without removing the wheel set in what is

sometimes called an Underfloor Truing Machine. This involves rotating the wheel slowly on a rolling bed and grinding the profile. Typically for this method the amount of material to be removed is relatively small, 1 to 2mm. For new wheel forgings and the badly worn the traditional wheel lathe is used. I say traditional but modern wheel lathes are to a large extent fully automated and modern cutting technology is used. So to conclude, I show a simplified representation of a modern wheel lathe together with something familiar to many people in RSME, the carbide tip! See next page—Ed.



## MORE TRACK EXTENSION PROGRESS

by MIKE MANNERS



Pictures of the raised track extension point construction going on. These are the wheel beams that support the track

beam and allow it

....to be rolled into position.







Wheel beams completed

This is the long steel beam that will support the track for the new point in the woods laying alongside the template used in its manufacture. As you can see, its quite a long structure. Almost the full length on the blue 20 foot container.



## PHOTO ANALYTICS

Where Wolverton Pug examines some old photos taken by the Editor



### 4DD unit at Ashford circa 1980

There were two four-car units designed by OVS Bulleid in 1949 and built at Lancing. They were experimental and were an attempt to overcome overcrowding on the South Eastern section of the Southern Region. Due to their larger loading gauge they were restricted to Charing Cross and London Bridge to Dartford and the Gravesend lines.

Numbered 4001 and 4002 they normally ran as one eight car set. For experimental units, surprisingly, they lasted in traffic until 1971, gaining blue livery and renumbering to 4901/02. This released the numbers for use on the prototype inner suburban units, 4001/2 as 4 PEPs. Class 445.

The last service worked by the 4DDs was the 18.04 Charing Cross to Dartford on 1<sup>st</sup> October 1971. Following withdrawal they were stored at Plumstead and then moved to Slade Green for removal of electrical gear. Finally ending up at Hoo Junction Yard. 4001 was burnt and cut up plus trailer S13504S of unit 4002.

The remaining three cars S13003S and S13004S motor coaches plus S13503S trailer were then sold to the South Eastern Steam Centre at Ashford. Sadly S13503S was then destroyed by BR before the three vehicles could be moved away after the centre closed..

The two motor coaches survive in very poor condition, one at the Northamptonshire Ironstone Railway (S13003S) and the other at a private site in Kent, (S13004S).

S13004S S13503 and S13003 featured in John's picture.



### **Platform 3 at Reading General and a class 08 shunter-late 1970s**

Platform 3 still exists at Reading station despite massive reconstruction and the addition of platforms. I think it is still number 3. Back then it was almost exclusively used for parcels traffic-hence the presence of the diesel shunter. Today it is used for Cross Country trains from and to Southampton.

The building adjacent to platform 1 housed an insurance company –the Prudential I think. The site was previously occupied by the Star Clothing Company’s premises and before that a rifle factory!

The class 08 would have been one of the fleet of shunters based at Reading diesel depot. In 1962 they had an allocation of 14 to cover not only Reading station but the many yards in the area that still existed such as Reading Central Goods, Scours Lane Yard, Reading West Junction Yard, Reading Low Level Goods. Huntley and Palmers sidings and the gas works and probably trips to and from Earley Power Station Sidings adjacent to Sonning Cutting. However by 1977 the rosters had dropped to 8 to cover – the station pilot (1), Reading West Jn. Yard (2), the NCL depot and the Lower Yard (1), plus work at Oxford and Didcot.

**As this is my 150th edition since I commenced the editorship of Prospectus in 2006 I am ending with one of my favourite, though bittersweet, pictures; the very last run in BR service of a GWR King, No 6018, taken on 28 April 1963. The location is Southall and then no one seemed to mind us walking over the tracks—even on the up main line.**



## DIARY

### November 2018

Saturday 3rd	Birthday Party	13:00 to 15:30
Sunday 4 <sup>th</sup>	Public Running	13:00 onwards
Saturday 10 <sup>th</sup>	Members Running	11:00 onwards
Sunday 11 <sup>th</sup>	Birthday Party	11:00 to 13:30
Monday 12 <sup>th</sup>	Trustees Meeting	19:30
Saturday 17 <sup>th</sup>	Birthday Party	11:00 to 13:30
Friday 23 <sup>rd</sup>	Young Engineers	18:00
Saturday 24th	Young Engineers	11:00
	Club Running	13.30 onwards
Sunday 25th	Birthday Party	11:00 to 13:30

### Congratulations

This edition of the Prospectus is John Billards 150th as editor. I hope you will all join us in congratulating John on reaching this milestone and thank him for his skills in getting the newsletter out every month.

Thank you John.

Opinions expressed in PROSPECTUS are the personal views of the contributor and cannot be taken as reflecting the views of the club committee or editor.

**The deadline for the December PROSPECTUS is 18 November. This is the final date.**

Contributions from all members are greatly welcomed

They may be submitted in hard or soft copy to the editor.

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