

INFORMED SOURCES e-Preview October 2018

It's a tech-heavy column this month. I thought we'd seen the last of traction current interference issues back in the late '90s when manufacturers were racing to get safety cases for their new three phase drive EMUs. But apparently not. On the positive side, I've now seen Integrated Traffic Management at work on a live railway, which produced some useful insights.

IEP EMC hits GWR, LNER and NR
Great Western – Luminate Traffic Management is go.
New Train TIN-Watch

Despite experience of running ac traction packages on UK infrastructure going back 15 years, Hitachi's 800 Series Intercity Express Trains (IET), have been bedevilled by Electro-Magnetic Compatibility (EMC) issues. Test running on the GWML electrified 'test section' between Reading and Didcot started in July 2016, but halted temporarily due to electrical interference problems.

I assumed it was the infrastructure, but in a visit to Hitachi's Newton Aycliffe plant in December that year (Informed Sources February 2017), the company confirmed that type testing was still progressing, working in parallel with Network Rail on electrical interference issues.

With DfT desperate to get its flagship project into service by the October 2018 target, the GWR Class 800 fleet was given a Qualified Type Acceptance Certificate. But to date electric operation has been restricted to Paddington-Didcot.

If interference had raised concerns on the GWML, it became a potential show-stopper when testing in electric mode began on the East Coast Main line (ECML). It was discovered that when an IET entered the York Integrated Electronic Control Centre (IECC) area, the Solid State Interlocking (SSI) Data Link Modules, which drive the points and signals, began flashing up faults. As a result IET has been banned from running under electric traction north of Colton Junction.

For the technically minded there is a primer on traction current interference and SSI in the column.

Pendolino

With the Class 390 Pendolino traction package Alstom had used various techniques to minimise interference. But during early testing on the WCML in 2001, technicians at Birmingham New Street Power Signal Box detected intermittent faults with the SSI controlling Proof House junction. Investigation showed that there were serious problems with the data link between the interlocking and the modules controlling the signals and points.

Tests showed that the interference was generating anomalous pulses which were corrupting the 'data telegrams' the interlocking was sending to the signals and points. Of course, the designers of the SSI had foreseen the possibility of interference and had fitted internal transformers which would block the onward transmission of the interference. However, a defect associated with the design of the transformer allowed anomalous pulses to be transmitted.

A temporary fix allowed Pendolino to continue testing while Park Signalling was commissioned to produce the definitive solution known as an Isolating Surge Protection Unit (ISPU). As a result the Pendolino timetable was introduced in September 2004 and they all lived happily ever after.

Well, not quite, because a cloud of amnesia then settled over Network Rail. This meant that when similar problems emerged with Class 800 on the ECML no wise old signal engineer said, 'Hang on a minute, new three phase traction interfering with SSI, that sounds like a replay of Pendolino on the WCML'. So everyone retreated into their silos declaring it was someone else's fault.

Naturally, the instinctive response was to call in consultants. Not surprisingly their report drew heavily on the 2004 report into Proof House Junction. At a meeting on 4 September, it was agreed, surprise, surprise, that ISPUs were the solution to the ECML SSI interference.

Now while the Class 800 is particularly 'noisy' in EMC terms, the fact that the SSI Data Link Modules had a known weakness means that Network Rail will have to pay to bring its infrastructure up to scratch. With legacy SSI in York IECC, Tyneside IECC and the Morpeth, Alnmouth, Tweedmouth and Edinburgh Signalling Centres, there are likely to be multiple locations affected.

Interestingly, amnesia was selective. In Scotland, the EGIP resignalling with SSI was fitted with the full armoury of interference protection kit ready for when the new electrification went live.

Continuing concerns

So end of IET interference issues? Unfortunately not.

Under the route modernisation programme, GWML has been re-signalled with the modern equivalents of SSI – Alstom Smartlock and Siemens Westlock. Train detection is by Thales axle counters and there have been instances of axle counters failing-safe and indicating occupied after a Class 800 has passed.

Hitachi told the ECML meeting on 4 September that there had been no axle counter failures on the GWML since 11 May. However, Great Western Route sources remain concerned, noting that testing with 800 Series units in electric mode has yet to be carried out West of Didcot.

According to Informed Sources DfT is unhappy that the GW IET fleet is continuing to run under Qualified Acceptance Certificates while issues remain outstanding and is determined that it won't make the mistake twice. Hitachi are reported as being confident that they can obtain Type Acceptance for LNER to introduce a Leeds service in December, followed by York in February and Newcastle in March next year. How this relates to Network Rail's programme for immunising the SSL data links is uncertain. I am told there is already a backlog of ISPU orders.

Meanwhile another issue is the Automatic Power Change Over (APCO) system used to tell an IET when to switch automatically between diesel and electric traction modes and vice versa. I understand that APCO is one of the outstanding issues in the GW Qualified Acceptance list. Having seen the Signalling Scheme Plan for the APCO installation at Steventon Bridge I'm not surprised.

And guess who is responsible for APCO system integration? Those technical wizards the Department for Transport

Great Western – Luminate Traffic Management is go.

At the end of August I went to Swindon to see Resonate's Luminate, Integrated TM, which since 10 June has been controlling the Great Western Main Line from Paddington to Oxford and Bristol. Staff training dictated a 'soft start with three Train Running Controllers and three Signalling Shift Managers who could be rostered to work together.

On its first day Luminate made over 300 'interventions'. Many of these were minor – associations and platform docking – but the surprise was the confident way the TRC and SSM were using the new system. Digital Railway Programme TM Director Andy Jones recalls that he expected that the controllers and signallers might have to be encouraged to use Luminate. 'In fact, we had to hold them back'.

Western Route Managing Director Mark Langman remembers that there was some out of course running and immediately the TRC and SSM were rescheduling the platforming at Reading. 'That was an immediate win where previously we would have just waited for ARS to catch up', he told me.

By the time of my visit to Swindon Luminate had been running 24/7 for just over 11 weeks. All but one of 11 TRC had been trained plus four out of six Infrastructure Controllers. At Didcot Thames Valley Signalling Centre, all six SSM and eight out of 96 signallers had been trained.

Signaller training has been compressed into a day, compared with three days for a TRC or SSM, making it easier to release staff.

One thing that impressed me was what Luminate does 'behind' its screens. For example GWML is a very busy route in the throes of a total route modernisation, including electrification and the changeover to a new fleet of trains. This imposes a high level of stress on operating staff.

To accommodate the modernisation work, Western receives a steady flow of amendments to the timetable, known as Very Short Term Plans (VSTP). Luminate downloads these from Network Rail's new LINX (Linked Information Exchange) which provides a central hub accessing existing NR systems such as TRUST.

VSTPs arrive in a basic form, lacking information needed by the IECC Scalable's Automatic Route Setting (ARS) facility. Luminate flags up these omissions but then, as Resonate's Daniel Haycock puts it 'swallows up the VSTP and feeds it into Scalable having inserted the necessary information'. As a result trains that normally would not have been in ARS are now covered. This is a valuable feature because a non-ARS train may be overlooked at a busy period and come to a halt.

I had always assumed that the Train Graph would be the primary operating tool, but all the TRC's workstations at Swindon, were showing the Platform Docker view. Platform Docker flags up future platform occupancy conflicts at stations in the event of out of course running. At Paddington, for example, late arrival can mean that a train planned to form an outgoing service may not be available, or that one unit in a set scheduled to couple up and depart in multiple may not have arrived. This is where Luminate's ability to insert revised outgoing head codes also simplifies the Signaller's task.

Overall Andy Jones is pleased that nothing 'big' has come out of the feedback. 'If you've got something 80% right in technology you are good enough to go. If you wait for 100% you'll never deliver anything'. Now it is a case of prioritising the introduction of features that were 'parked' to enable the soft start only 12 months after contract signature.

With the soft launch a success, Mark Langman is already looking ahead. With the summer over, and the Bristol and Oxford resignalling schemes commissioned, training of the signallers at TVSC is accelerating. 'When every signaller at every work station is using Luminate, that is when we will have the full capability and see Luminate's full potential', he says.

In this new world, where will the demarcation line between signallers and controllers lie, I asked? In particular, how much responsibility will be devolved to the signallers?

Who, for example, will have the authority to 'press the button' to allow Luminate to implement a change through ARS? Theoretically the TRC could download a new plan to ARS, altering the order of trains, without the signaller's involvement. But the signaller is in charge of the train service.

As Mark Langman reminded me, this is not a safety risk, but it could be a performance risk, apart from the impact on relations between signaller and controller. While admitting that this is currently unknown territory, Mark suspects that the pendulum will swing towards signallers doing what is necessary in real time without having to ask, because not only is the system prompting them on what do, everyone can see what is happening.

Andy Jones' working hypothesis has been that signallers will work within a 15 minute forward window, with the TRC responsible outside that. But, as I was constantly reminded, this is a trial which will determine how the new model railway works.

Another function in Network Rail's original TM specification was called timetable plan/re-plan. From his operator's viewpoint Mark Langman contrasts the ability of Luminate to 'see' all trains, with a human operator focusing on one at a time. To illustrate plan/re-plan he quotes the simple case of a Bristol train 10 min late off Paddington.

Without TM, the TRC would have to consult the timetable to see where the delayed train could cross at Reading or Didcot. A phone call to the signaller would pass on the revised running. Then it would be a case of the TRC checking further down the line at Swindon or Wootton Bassett followed by another phone call. 'By the time you've done that it's taken 10 minutes where Luminate can do the same task in milliseconds and pass the changes onto ARS to implement' says Mr Langman.

With Luminate the TRC can also run alternative scenarios off line. This might show that in terms of overall performance the best strategy might be to leave the train 10 minutes late, because recovering the delay could impact other services.

Luminate is already being used to model operating strategies in response to short term changes. For example, Western has been providing exclusive access to Crossrail Ltd for interface testing.

SSMs at TVSC have been using Luminate to model and test the best way to maintain normal services around this limitation. Previously, notes Mark Langman, such modelling would have involved paying a consultancy 'thousands of pounds and taken months'. Now SSMs are doing it as a matter of routine.

Next steps

Everyone I spoke to, from Resonate, Digital Railway and Western Route, were determined not to get ahead of themselves. I was reminded several times that if the trial doesn't deliver worthwhile benefits, the option remains to put it down to experience and close down Luminate.

While all those involved were happy to discuss what might come next, with integrated stock and crew management both the holy grail and the summit assault on Everest, such aspirations were immediately qualified by 'but let's see how the trial works out first'. However I did detect one brief chink in this determinedly down-beat approach when talk turned to the potential for Connected Driver Advisory Systems (C-DAS) and Heathrow Junction. Digital Railway's DAS Board is currently considering how to build on the earlier Airport Junction trial.

As an experienced operator, Mark Langman sees a 'real opportunity' at Airport Junction in 2019 when the withdrawal of Intercity 125 will leave a GWR fleet – Classes 800, 387 and 345 – with much more homogenous performance characteristics. With DfT reported to be looking for a C-DAS trial, and C-DAS dependent on having a TM system, I suspect it is a case of 'watch this space'.

New Train TIN-Watch

Because the Fleet Challenge reliability data is based on 13 4-weekly reporting Periods and Modern Railways appears monthly, eventually we fall behind. As a result October is a 'Leap column', when TIN-Watch catches up, with two tables to study.

Period 4 confirmed reports of the extremely hot weather afflicting the Great Western Class 800 Bi-mode fleet with overheating diesel engines. Technical Incidents (TIN) doubled and Miles per Technical Incident (MTIN) halved to just over 4,000, bouncing back to nearly 7,000 MTIN in Period 5.

GTR's Class 700 reliability is still flat-lining around 7,000 MTIN. DfT has just released the Operational Readiness Review from the May meeting of the Thameslink Industry Readiness Board. This revealed that the target reliability for May had been 15,000 MTIN – subsequently reduced to 12,000 MTIN.

More positive is the SWR Class 707 fleet which has now beaten the Moving Annual Average MTIN of the best Pacer. Progress of a sort. But while Informed Sources predicted reliability issues with the flood of new trains entering service, the slow improvement remains a matter of concern.

Roger's Blog

This week starts with all the Modern Railways team coming together for the funeral of our friend and colleague Ken Cordner who died in his sleep at the end of August as the result of an undiagnosed heart problem. Ken edited Modern Railways through the glory days of the Bob Reid era and then moved to the Channel Tunnel Rail link as Head of Media Relations. After returning briefly as Editor at the turn of the century, while James Abbott was living abroad, he became News Editor.

This week will be doubly poignant because I am due to start writing my contributions for The Modern Railway. Ken was founding Editor when this Modern Railways yearbook was launched in 2008 and oversaw its development into the definitive guide to all aspects of the industry.

Like me Ken was a freelance working from home and his children overlapped with our grandchildren. He was also a fellow Reliant Scimitar owner so our business phone calls would often turn to family and motoring issues.

His grasp of detail is one thing I will remember. For example, at the Golden Spanners, while I was enjoying myself handing out the awards, Ken somehow managed to get the names of all those coming up on stage and I can't remember any complaints about incorrect photo captions.

There were many tributes paid to Ken when the news of his death appeared on social media. Several people commented that 'he was a lovely man'. I think that beats anything I can say.

Looking ahead, on 4 October I'll be joining the Modern Railways team at Derby for our recently acquired venture the RVE Show. As always do stop for a chat if you see me wandering around.

Later in October I will be attending the Railway Industry Association annual conference. With a list of speakers including Transport Secretary Chris Grayling and Network Rail Chief Executive Andrew Haines, it could not be more timely.

That's all for this month

Roger.