

INFORMED SOURCES e-Preview January 2019

Yes, e-Preview is arriving early. Modern Railways publishes on the fourth Thursday of the month preceding the publication date which, this month, will be the day after Boxing Day. However we've gone to press early, so postal subscribers should get their copies of the January issue in time for Christmas.

This publication schedule is very confusing because it means that Christmas greetings to readers appear in the January issue, which may well puzzle future generations of researchers going through the back numbers. I also get temporally disoriented as it is still 2018, but the research file for the February 2019 column is already live.

Just to really confuse matters, the 2018 Golden Spanners awards for rolling stock reliability were held in November. But in the January issue you will find the 2019 Rolling stock reliability review, including details of the winners of the 2018 Spanners.

Talking of the Reliability Review, it continues to fascinate me how many researchers, as well as those with an interest in railways, ask me where they can find details of rolling stock reliability statistics. This is a dead giveaway that they don't read Modern Railways.

'Can you send me the information' they ask? 'No', I snarl, 'You'll have to buy the magazine'.

So in this spirit of goodwill to nearly all men, it's time to bring you up to speed with what's in the first Informed Sources of 2019.

Siemens to enter UK TM market

Safety - RAIB warns on corporate memory loss

You wouldn't think that something like Automatic Route Setting (ARS) could be controversial. But back in the December 2013 Informed Sources I reported on a spat within the Institution of Railway Signal Engineers (IRSE) over its capabilities.

A past-President of the IRSE had written in IRSE News that ARS could set routes in accordance to timetable requirements, 'but it cannot do much more than that'. Various engineers involved in the development of ARS at British Rail Research responded vigorously in the correspondence columns, pointing out that ARS was actually quite smart.

Of course we now have Traffic Management (TM) which is supposed to be really, really clever and able to identify and resolve potential conflicts hours in advance and enable controllers to plan and re-plan services. However, Network Rail's 1st Deployment schemes mixed and matched proprietary TM systems with proprietary control systems.

While these control systems can run a third party ARS, the specification for the early TM applications means that the route setting facility can't respond in real time to the updated timetable downloaded by the TM.

Thus at Three Bridges, the Hitachi Tranista TM is interfaced with the Siemens WestCad-e work station controlling the Thameslink central core. WestCad-e incorporates a facility called 'Immediate Route Setting' (IRS).

When there are changes to the service, the Tranista TM sends an updated version of the timetable to the WestCad IRS to run. But IRS just does what it is told.

That would be OK, but changes Tranista makes to the timetable cannot be implemented during a rolling 5 minute 'window' ahead of actual time. The same 5 minute window applied to the Thales ARAMIS-D TM at Cardiff and Romford.

In a busy railway 5 minutes can be a very long time. For example, a lot can change in 5 min on either side of the Thameslink Central core, especially at peak 24 train/h throughput.

With a train having to arrive on time every 2.5 minutes, there will be situations where Tranista's Conflict Detection & Resolution system can see the service about to go pear-shaped, but is left hopping up and down in frustration because the five minute window rule prevents it taking prompt corrective action.

In contrast, Resonate's Luminare TM, which I saw at Swindon, sits on top of the Company's Scalable control system which incorporates Enhanced-ARS. With no five minute window restriction Luminare can, as it was put to me at Swindon, revise the plan and throw it at EARS to implement immediately.

LU experience

I had been pondering these conflicting views on the role of ARS within TM for some time when in July the Institution of Mechanical Engineers, in conjunction with IRSE, ran a conference on making the most of Traffic Management. One of the papers was presented by Ivan Curties, late of Thales and now Principal Project Engineer (Control & Information), Transport for London.

My immediate reaction was whether an urban railway, mostly made up of end-to-end lines with few if any junctions, would contribute much of relevance to my preoccupation with TM on the main line. How wrong I was! Ivan's presentation threw new light on the TM/ARS relationship.

There are four layers in the latest LU systems. Within the system, running the service safely is down to Automatic train Protection (ATP). Automatic Train Operation (ATO) is the key to close headways.

Next in the hierarchy is Automatic Train Supervision (ATS) which runs trains to the timetable. Finally there is Automatic Train Regulation (ATR).

ATS is the LU analogue of Network Rail TM. It handles traffic through what junctions there are and enables the operators to edit the

timetable.

This leaves ATR, which has the job of smoothing the gaps between trains. It makes multiple minor changes simultaneously that, in Ivan's words, 'it is almost impossible for a human operator to understand what it is doing'.

Initial experience with ATR on the Jubilee line was not positive, because operators and passengers were unhappy seeing trains being held for no apparent reason. A second attempt on the Central Line ran into the dual problem of testing the algorithms and then getting staff to accept it. However, it was third time lucky on the Victoria Line where ATR is in successful operation.

Ivan's paper reinforced my view that that you need smart tactical intelligence to complement the wider role of TM. So, when I met Siemens in October I asked what the company was doing about TM.

Siemens wasn't involved in Network Rail's original TMS procurement, which, in retrospect, was no great loss. But now there is the prospect of serious business to be won.

Siemens is adding facilities to its WestCad to provide Integrated Traffic Management. And they are going down the TM+ARS route, although, of course, the abbreviations are different.

Instead of TM, Siemens refers to Digital Conflict Resolution (DRC). And when the conflict has been resolved, the revised timetable is sent to the Dynamic Route Setting (DRS) function, which, I have to say, sounds more 21st Century than ARS.

Coincidentally, on the day of the meeting Siemens had switched on the first DRS, covering Preston-Blackpool and controlled from Manchester Rail Operating Centre (ROC). In parallel with this development Siemens has also been working on the need to provide the option of ARS, or rather, DRS where legacy Route Relay Interlockings have been relocked to a WestCad control system. I describe the ingenious solution in the column.

These innovations emphasise the importance of a deep understanding of the development of UK signalling and its various systems down to interlocking level, when it comes to TM. Mike Lewis, Control Systems Director of Siemens, provided an interesting perspective on TM. 'Once your route setting engines are running, Traffic Management is just IT (information technology) on top.

Signalling is the hard part, but somehow industry believes that Traffic Management is difficult and expensive', he told me.

#### Waterloo collision - RAIB report published

In February 2018 Informed Sources provided a detailed analysis of how, on 15 August 2017, the 05.42 Guildford service off platform 11 at Waterloo could be signalled into the side of a train of hopper wagons parked on an adjacent track. The RAIB final report published on 19 November provided more detail on the human and system errors that made it possible.

To aid commissioning of the resignalled Waterloo station throat, a Test Desk had been installed in the Waterloo relay room, connected to the interlocking with over 600 wires. It enabled signalling inputs to the interlockings to be simulated during commissioning.

At the start of a session, the testers would remove the fuses from the operational circuits and insert a link from the test desk. Using the desk, testers could send signals simulating the state of points, for example, to the main interlocking.

However, the test Desk had been designed in 2016. Subsequent changes to a trackside cubicle meant that the desk could no longer simulate all the inputs detecting the points at the exit from Platform 11.

On 13 August 2017, a Principles Tester at Wimbledon Area Signalling Centre was testing routes which included inputs from this set of points. When the 'C' ends of the points were not shown as detected on the Wimbledon signallers' display, the Principles Tester contacted the Functional Tester in the Waterloo relay room and asked him to sort out the problem.

According to RAIB, the Tester told the inquiry that when developing his solution, he did not realise that the detection circuits for the 'C' ends had been separated from the circuits for the A and B ends. The solution involved installing four wires. This 'uncontrolled wiring was added without the safeguards required by Network Rail signalling works testing standards, and remained in place when the line was returned to service', says RAIB.

As a result, the signaller was able to set the route for the 05.42, see it confirmed on the panel and the driver given a green signal despite the crucial set of points not being detected. On top of which, irrespective of additional wiring, the points should have been secured with scotches. Instead were lying in an intermediate position.

While the RAIB report is critical of numerous other failures to follow the correct processes, the proximate cause was the unauthorised changes to the wiring in the Waterloo relay room. There is an obvious parallel with Clapham, but there is also a significant difference.

Clapham was a sin of omission – a technician failed to clip off a redundant wire, but bent it out of the way and failed to wrap the still live bare end in insulating tape. Waterloo was a sin of commission – unauthorised changes were made which circumvented the basis of primary safety, the interlocking.

For those who were around at the time of Clapham, and who were involved in the massive restructuring of signalling management and processes that followed Sir Anthony Hidden QC's inquiry, the reports into Waterloo and Cardiff East have been deeply worrying. But I am not alone in sensing that because it was 'only' a gently sideswipe and there were no fatalities its seriousness has failed to register.

In its report RAIB shares this concern when it writes: 'Events at Waterloo and the RAIB's investigation of the serious irregularity at Cardiff East Junction suggest that some in the railway industry are forgetting the lessons learnt from the 1988 Clapham Junction accident in which 35 people died.

The major changes to signalling design, installation and testing processes triggered by the Clapham accident remain today, but the RAIB is concerned that the need for rigorous application is being forgotten as people with personal knowledge of this tragedy retire or move away from front line jobs. This deep-seated, tacit knowledge is part of the corporate memory vital to achieve safety. Loss of this type of knowledge as previous generations leave the industry is a risk which must be addressed by organisations committed to achieving high levels of safety'.

More on this in a future column.

#### New Train TIN-watch

TIN-watch uses Moving Annual Average (MAA) Miles per Technical Incident because it smooths the ups and downs of fleet reliability from Period to Period. But with the South Western Trains Class 707 fleet consistently topping the rankings I thought it might be of interest to record how Wimbledon Depot and Siemens have got to the current reliability level.

A table shows how the number of faults per period has been trending downwards, albeit over a short timescale in rolling stock reliability growth terms. But at 81,764 the MTIN for the latest period shows why MTIN MAA is my preferred yardstick for TIN-Watch!

#### Roger's Blog

Last month I left you with the conservatory filled with 23 trophies for the 2018 Golden Spanners awards. Since the awards began I have put the trophies in a travel bag and taken them to London by train. This year I needed a suitcase and a small box just for the trophies.

Add in a bag with my presentation notes, notebook and recorder and I didn't really fancy slogging that lot on the train and Tube so I got a cab for the outward journey. This was technically interesting because the car was a Toyota Prius bi-mode and I spent much of the trip watching the display which shows the energy flows between engine, battery and the wheels.

There was a great atmosphere at the Awards. What was particularly rewarding was the number of people coming up to collect the award. Once you might get the TOC Engineering Director or Depot Manager. Now the platform is filled with the people whose efforts have won the Spanner. As Tony Miles joked after an award for a Class 153 fleet 'you probably couldn't get all the platform party in one of the units'.

After that it was Waterfront's Third Annual Rolling Stock Forum. What makes this such an informative event – apart from the excellent presentations, is the quality of the questions and observations from the floor. Plus of course, the chance to network with informed sources old and new.

Last week it was the Rail Freight Group Christmas Lunch, an informed sources-rich environment, not that I talked to anyone, of course. This week it is the Modern Railways staff lunch on Great Western Railway's 13.03 off Paddington. We were hoping to have an IC125 which has a more social seating layout.

Which only leaves me to wish all subscribers to e-Preview a joyous Christmas and a happy new year.

Roger