Infrastructure Projects

NetworkRail

Share with Pain SwP001/13

IP Signalling

everyone
home safe
every day

NetworkRail

SSI Data Assurance

Background

An independent review was commissioned to consider SSI data assurance through design, testing and commissioning stages for the purposes of understanding the causal factors that have resulted in the occurrence of ‘unwanted events’ after projects have been commissioned.

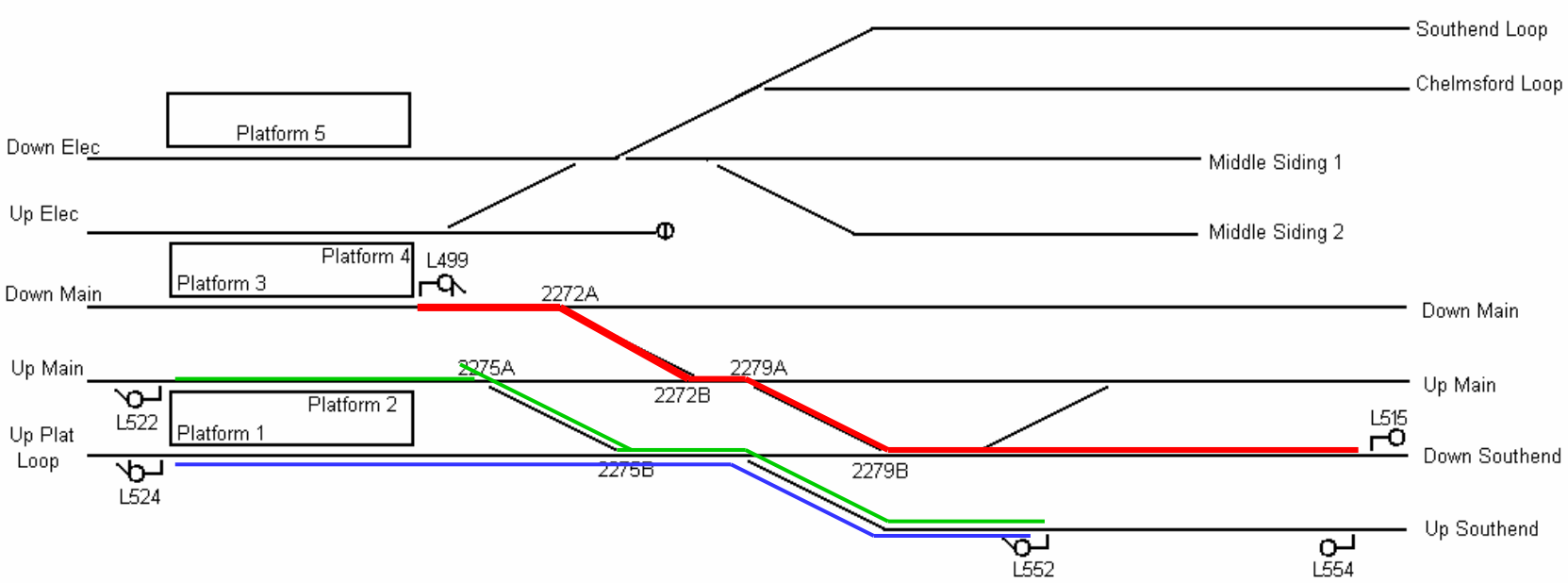
It is considered that previous events have not been communicated as effectively as they could have been and the purpose of this presentation is to share the key issues and key lessons learnt / pitfalls relating to the individual events.

Shenfield

Incident

On Sunday 20th April 2008, 2K28 (13:45 Liverpool Street to Southend Victoria) arrived at Platform 3 at Shenfield station on the Down Main. L499 signal at the end of the platform was showing a green aspect with a position 5 junction indicator for the route over 2272 and 2279 crossover onto the Down Southend line (red line). The route was set from L552 signal into platform 2 which the train 2K31 took and arrived in platform 2 (green line). The signaller then set L552 signal into platform 1 (blue line) which required 2275 to go reverse to normal and in doing so irregularly called 2272 reverse to normal even though they were supposed to be locked by the route from L499. Having undertaken his station duties, on closing doors and preparing to move off the driver of 2K28 saw that L499 was now a red aspect and 2272A points immediately ahead were now lying in the normal position for the route to the Down Main.

Shenfield


Southend Loop
Chelmsford Loop
Platform 5
Down Elec
Middle Siding 1
Up Elec
Middle Siding 2
Platform 4
L499
Platform 3
Down Main
2272A
Down Main
Up Main
2275A
2279A
Up Main
2272B
Platform 2
L522
L515
Up Plat
Loop
Platform 1
Down Southend
2275B
2279B
L524
Up Southend
L552
L554

Shenfield

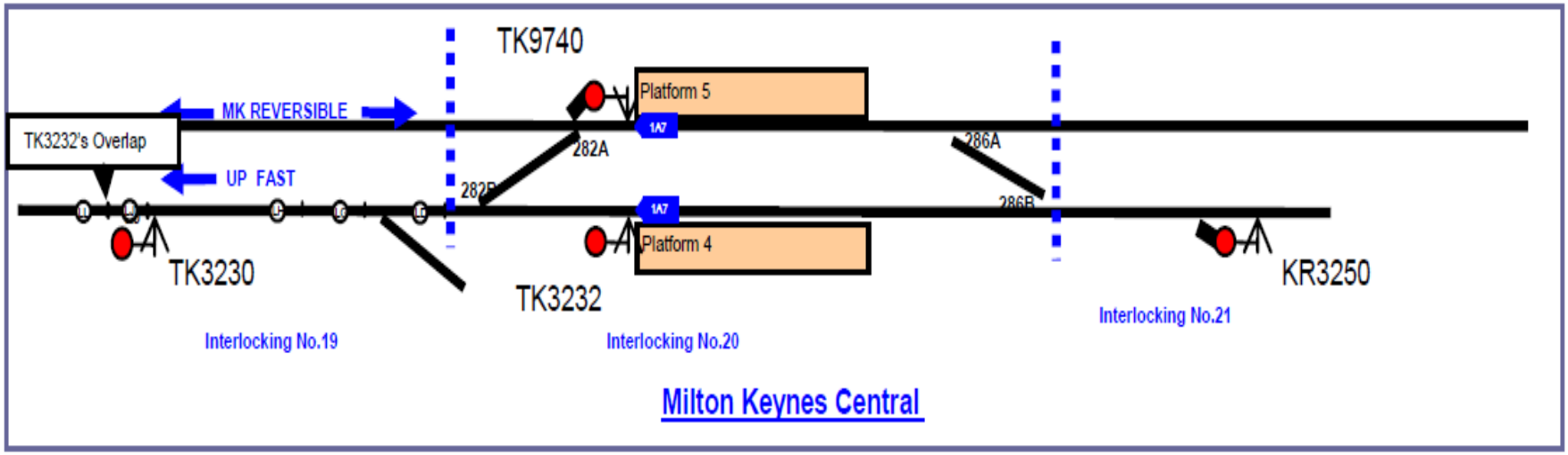
Lessons Learnt / Pitfalls

- Error was in 2272 points call R to N only
- Deficiencies with Control Tables meant data was generated from scheme plan, not from approved control tables and entered straight into the Design Workstation
- Rogue point test used but didn’t find the error so swinging overlap rogue point test introduced
- PRR (Panel Route Requests) must be linked to a corresponding PFM (Points Free to Move)

Milton Keynes

Incident

For a train from platform 5, Signal TK9740 was set to TK3230 and TK9740 displayed a green aspect to the driver whilst a train was still visible to them on the Up fast line, the aspect in TK9740 then changed to a single yellow aspect.



Milton Keynes

Lessons Learnt / Pitfalls

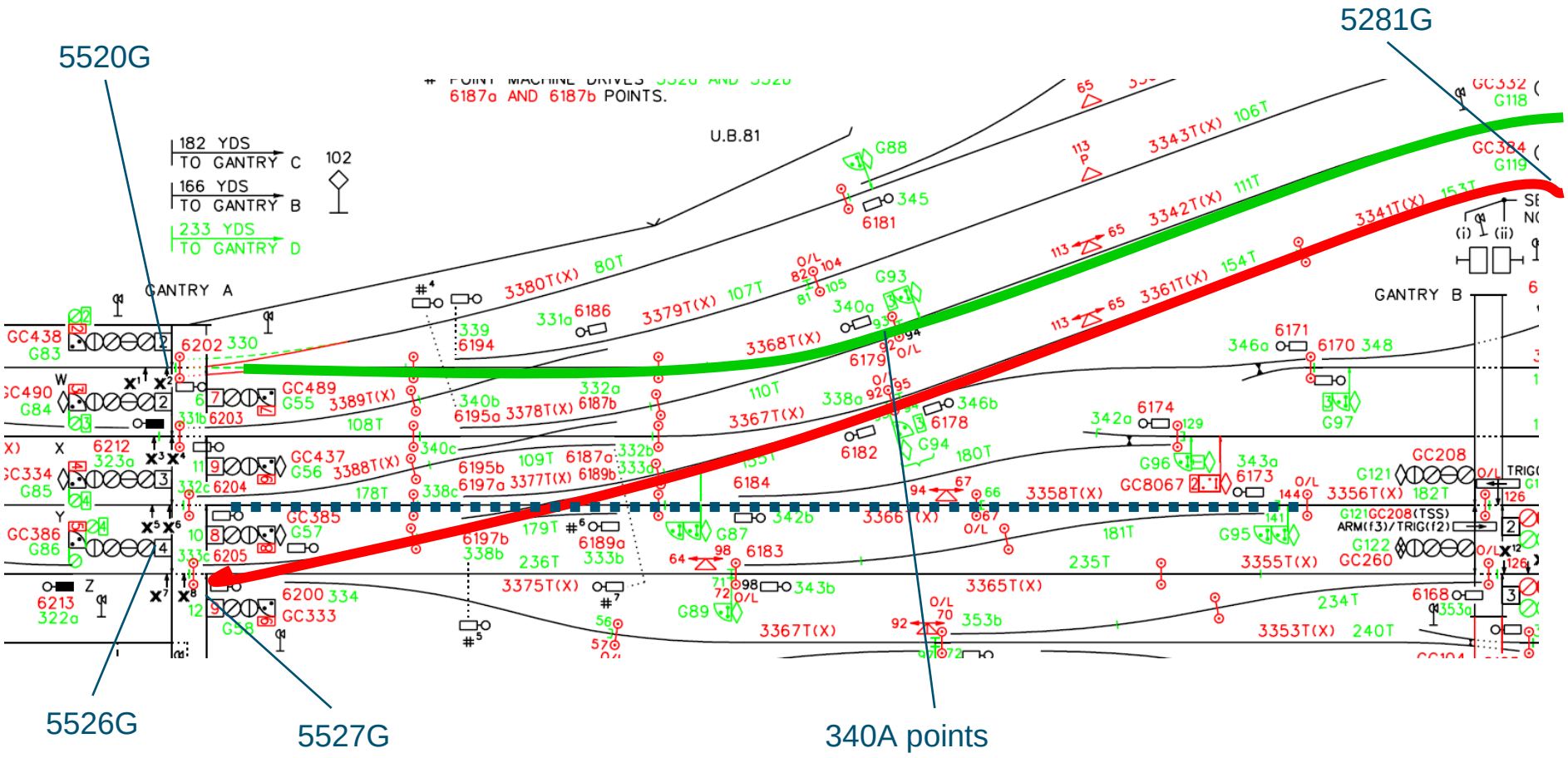
- **The immediate cause was that the occupation status of all appropriate axle counters was not in the cross boundary telegram associated with the aspect controls for TK9740 signal for the route from TK9740 to TK3230. This was inadvertently removed as part of an update to add conditional double reds**
- **It was extremely difficult to keep track on what test logs had been answered in each new CISR as the test logs were not noted on the CISR (Part 2) and the logs themselves were not returned with the new CISR**
- **A need for communication 'rules' between designers and testers to enable discussions on the changes that have/are occurring**
- **If marked up control tables had been produced it would have highlighted the fact that the axle counters had been altered and the testers would have tested the affected control tables. The designers producing the control tables would in producing the control tables have highlighted to themselves the fact that axle counters were affected in the TK9740 to TK3230 route and thus updated that route's data as well**

Glasgow

Incident

Three routes set in the area on the Workstation; a route set up to 5520 signal and a forward route set from 5520 (highlighted in green), a route set up to 5526 signal its overlap is highlighted in dotted blue. When the red route from 5281 to 5527 signal was called, the overlap ahead of 5526 signal was able to swing calling 340 points reverse as part of the new overlap even though 340 points had already been called normal by the route from 5520 signal to 5288 signal (green route). The points moving caused 5520 aspect to revert to red. The train had not passed 5520.

Glasgow


5520G
5281G
5526G
5527G
340A points
6187a AND 6187b POINTS.
U.B.81
182 YDS TO GANTRY C
166 YDS TO GANTRY B
233 YDS TO GANTRY D
GANTRY A
GANTRY B

Glasgow

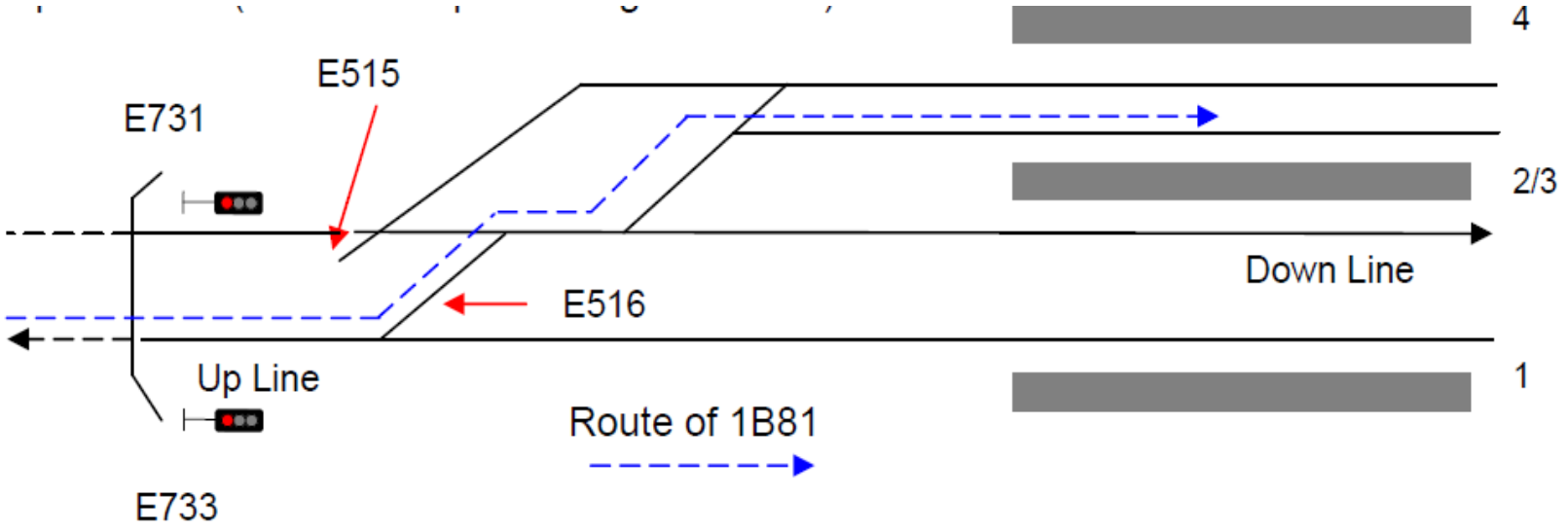
Lessons Learnt / Pitfalls

- Data Complexity due to unnecessary flexibility
- Additional swinging overlaps unnecessarily added
- Control Tables did not fully demonstrate the facilities demanded by the system
- Where the principles tester has been involved with the development of the data, over several iterations the independence of the tester could be compromised. A suitably qualified person should decide if a second level of independent testing should be undertaken
- To help ensure that Principle Testing does not only test to ‘difference lists’ generated by the design office with respect to complex areas, the Designer must positively confirm/list all areas that require re-testing

Southampton

Incident

Route set from E733 over E516 points reverse in to platform 3. Trying to replicate a permitted move under the old RRI interlocking, the signaller turned E515 points N to R on the point key. E516 points moved R to N even though E733 route was set over them.



Southampton

Lessons Learnt / Pitfalls

- Error was in E516 point call
- PRR must be linked to a corresponding PFM
- Data designed and checked by file rather than by complete route
- Points tested with route set up to signal and then with route beyond signal, but not tested with route up to signal set and route beyond signal set

Actions taken / required

- ‘PAN 0089’ issued to require Interlocking Data Development Plan (IDDP) and Technical Stagegates for SSI or SSI Based Schemes (Smartlock and Westlock). This looks to provide intervention points in the process through technical stagegates as a health check and to take a measured risk based approach to Data Development with the IDDP for these systems

- Notice Board 120 issued to remind testers, designers and project engineers of the key SSI process standards

- Briefing of this ‘share with pain’ to highlight these incidents