NetworkRail

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Stockley Junction – Investigation Findings

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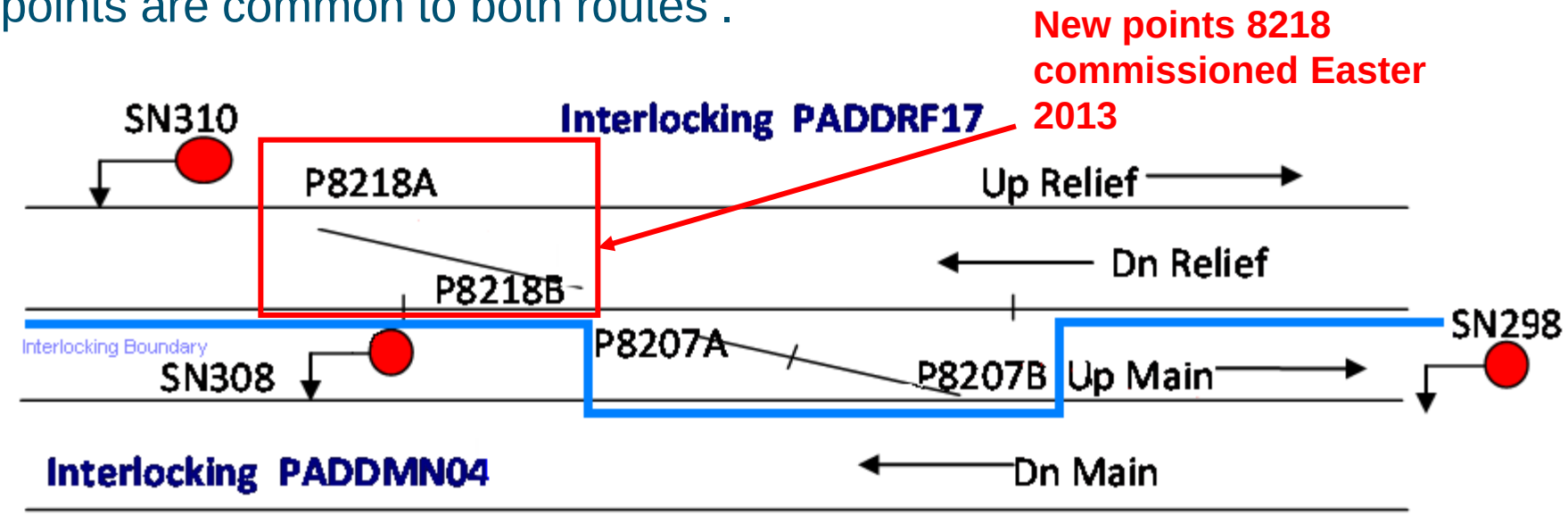
Background

- The Paddington to Stockley area was resignalled using SSI controlled from Slough IECC in the mid 1990s.
- At Christmas 2011, the area was re-controlled from Thames Valley Signalling Centre using Alstom “Smartlock” interlockings with essentially unaltered data.
- At Christmas 2012, data alterations were installed associated with layout changes planned up until Easter 2013 when additional S&C was to be installed and routes commissioned.
- Following commissioning of one of these new routes at Easter 2013, a wrong side failure was found in the data previously commissioned.

Site Configuration

Slough IECC had castellated (horizontal) interlocking boundaries which is now considered to be a non-preferred design practice. The SSI data prep guide also defines the data constructs used as obsolete.

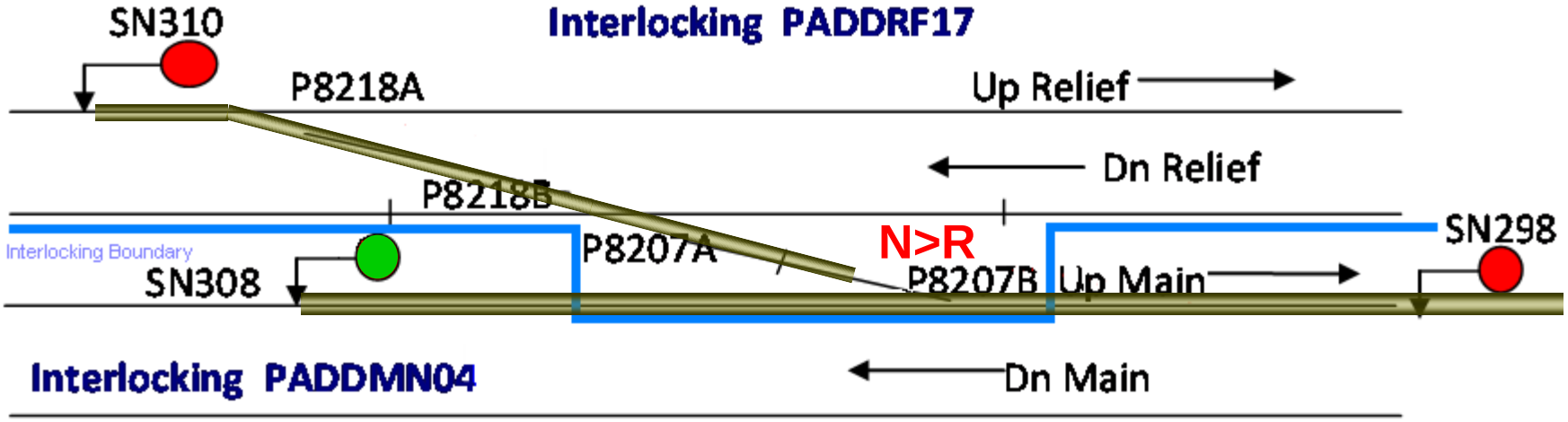
At Stockley Bridge Junction, both SN308 and SN310 routes up to exit signal SN298 require interlocking cross-boundary data because 8207 points are common to both routes .



Stockley Incident

At 0238 on 21/5/13, route SN308A(M) was set and signal SN308 displayed a proceed aspect.

The signaller attempted to set a conflicting route from signal SN310 towards exit signal SN298. Route SN310C(M) did not set, but points P8207, which should have been locked in the normal position by route SN308A(M) moved to their reverse position when called by route SN310C(M). The loss of P8207's normal detection caused signal SN308's aspect to be replaced to danger.



Stockley Incident

- Because of the high line speed and traffic density the risk associated with this event was very high.
- Route SN310C(M) and points 8207 were immediately secured out of use and the data error was quickly identified.
- **Immediate Cause:** a command to move 8207A&B points reverse was executed before a test was made that the B end of the points were free to move, because of the way the cross boundary interlocking was constructed.
- After the event was reported, checks of cross boundary data constructs across the former Slough IECC area were carried out quickly and revealed no similar errors.

Stockley – underlying causes.

- The data error was introduced **after** the first independent check when the design was altered to improve data processing (in accordance with modern cross boundary data constructs).
- The designer had undertaken their “set to work” in parallel with the first independent check resulting in a large volume of changes after the first independent check.
- Subsequent independent checks failed to identify the error or the significance of the change in data constructs.
- The principles test specification (SWTH: F110) does not require the setting of all** conflicting routes in order to test the integrity of route locking and the testers did not identify this gap in testing.
- The project team was aware of the obsolete data constructs and believed that no further mitigations were needed to manage the associated risks.

** F110 does not require routes in the same direction to be set when testing routes which have a common destination or which cross.

Actions taken since this design event

- PAN 89 has introduced the requirement for Interlocking Data Development Plans to be produced and maintained with independent technical stage gates held through the life of the project.
- The design and test organisation has introduced enhanced automated rogue point tests into their interlocking data preparation process, capable of detecting cross boundary errors in points data constructs.
- PAN 92 has introduced the requirement to produce detailed interface specifications detailing how boundaries between systems are to be managed, reinforcing the importance of SSI DIS165 on “Set to Work & Cross Boundary Best Practice”.

Actions / lessons learned

- IDDPs shall be produced and maintained through the project lifecycle and address the specific risks which are known about in each project.
- Best practice in DIS 165 shall be applied – “set to work” should be completed before independent checking or alternative risk mitigations identified in the IDDP.
- The intent of TI148 should be applied whenever data is altered – during new build or data alterations so that designers provide advice** on the scope of data alterations to supplement the testers’ understanding from the difference list.
- Designers and Testers must consider the scope and methods of testing required.
  SWTH F110 states that it is not a comprehensive test specification for all types of interlocking. It is fundamentally flawed to base principles testing of most CBIs on a test specification derived from RRI design practice.

** It is not intended to lead or direct testers, only to provide an alternative view of the scope of test required, for consideration by the testers.

Further information…

Other strategic recommendations arising from the formal investigation report are subject to review by the relevant review panels and are not yet detailed within this briefing.

For any further details or information please contact:

Andy Free, Principal Engineer (Signalling), IP W&W

07917 578518

andrew.free@networkrail.co.uk