Shared Learning

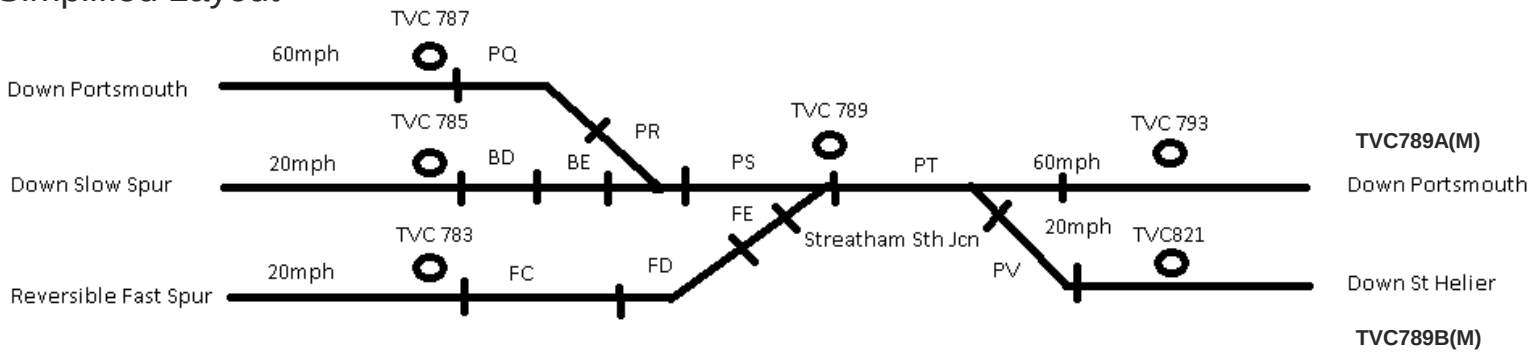
SwP024/16 v2 – Streatham TVC789 Data Error

Background

On 4th May 2016 the Signaller at Three Bridges ROC reported “No Approach Release applied for route TVC789 B(M) to TVC821 when route set from TVC787”

Only the route from TVC787 Down Portsmouth (60mph) to TVC821 Down St Helier (20mph) requires MAR applied to TVC789. All other approaches are MAF.

Simplified Layout

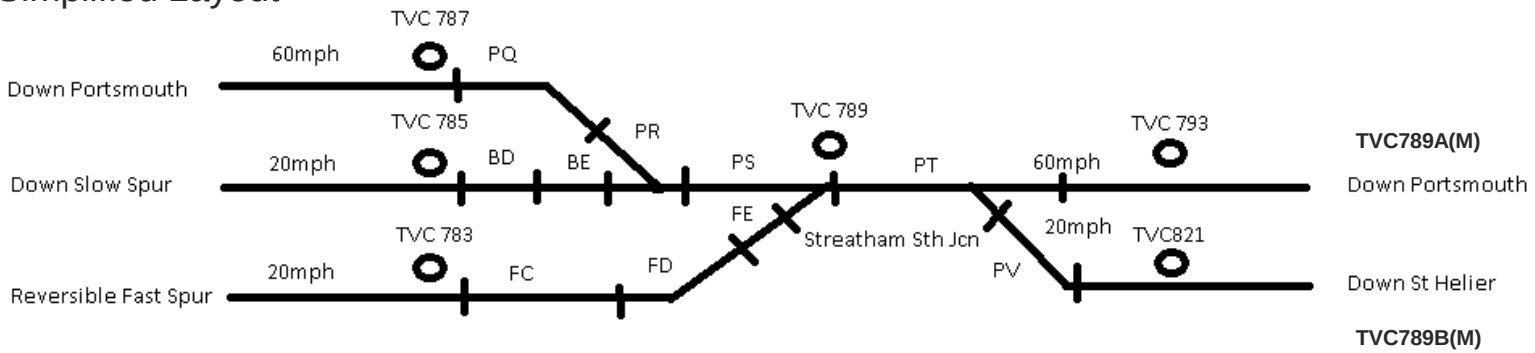


Streatham TVC789 Incident

Incident Scenario

- TVC785 to TVC821 Route set via TVC789 – No MAR required so MAF latch set.
- First train proceeds past TVC789 and rear of train is on berth detection section (PS(X)).
- TVC787 to TVC821 via TVC789 route overset – requires TVC789B(M) MAR condition
- First train passes TVC821.
- TVC789B(M) route sets but MAF latch still set from first train
- Second train approaches TVC789 from TVC787 with no MAR

Simplified Layout



Immediate Cause

A latch applies MAF controls to TVC789B(M). This operates in conjunction with PS(X) sectional route locking. As both approaches set this sectional route locking it does not always become unset when required. i.e. If TVC787 route oversets a train from TVC785 which is occupying PS(X) detection section. This scenario incorrectly applies MAF controls to TVC789B(M) when MAR controls are required.

PRR FILE

```
*R785A(M)                              /to S789
        if R785A(M) a
           LSGBRIGHT-S xs , LSGPORT-SHL xs
           L176SPAD xs , L787SPAD xs
           P401 crf , P404 cnf
           P400 cnf                                              /Flank
           @OL406A
        then R785A(M) s
             LRT-BD/PS s
             P401 cr , P404 cn
             @P400QN                                             /Flank
             UBD-BA l , UBE-CA l , UPR-BA l , UPS-CA l
             @OL406Q
             S785 clear bpull
```

OPT FILE

```
*R789B(M)                                          /to S821
        if TPT o , TDB o \
        if TPT c ( TDB o or TPV o ) \
        if \                                                   . /TISP
        #TPS , #TPT                                            . /SSU
        if ( TPT o or TDB o ) then else L789TOR1 xs \
        if LR789B(M)-R s
        then @LR789B(M)-R
        \                                                      . /RSU
        if ( S789 set stick
             TPT c , LTPT(STR)USED xs
           or TPS o , TPT o , S789 set <r
           )
           TDB c , TPV c , TYA c
           P406 cdr , P405 cdn
           LTPT(EPR) xs , LTDB(EPR) xs
           LTDB(STR)USED xs , LTPV(EPR) xs , LTPV(STR)USED xs
           LTYA(EPR) xs , LTYA(STR)USED xs
           S821 set lp
        \                                                      . /ACD
        if TPS o \                                             . /TAC
        if ( TPQ o
           or TPR o
           or TPS o
           or LRT-FC/PS s
           or LRT-BD/PS s
            )
           LS789(RR)S xs
        \
        G s 3                                                  . /RI
        G s 7 \
        S821 seq 3 , G s 764
        if TPS o , TPT c then L789TOR1 s \                     . /ASD
                                                               . /AWS follows
3789 signal special
        S789 alt> 120                                          . /ALR
        R789B(M) xs \ if L789TOR1 s , TPS c \                  . /RR
\ /end of route select data for R789B(M)
```

FOP FILE

```
'UPS-CA
        if UPR-BA f , UPR-CA f
           TPS c
        then UPS-CA f , LRT-BD/PS xs
```

Immediate Cause (cont)

The conditional MAR data was written using a “route away” latch as per SSI 8003-79 section 4.3, Conditional Approach Control by Route – Simple Case.

However, the scenario arising at Streatham is referenced in SSI 8003-79, Conditional Approach Control by Route – Complex, section 4.4 Streatham nomenclature added in blue.

“*It is important that this should not cause the approach control on TVC789B(M) to be conditioned-out, and for TVC789 to clear-up early in front of the train approaching from TVC787. For this reason, it is not possible to use a simple route-away latch as in the previous example.”*

Section 4.4 recommends use of a “route used” latch which is only set when the detection sections are clear, therefore cannot be set while a previous train is still in route.

Immediate Lessons Learnt

- Extreme care needs to be taken when using latches in SSI data to ensure that they are always unset correctly. Consideration should be given to using “single shot” latches that require to be set / unset every use.
- All alternative methods of applying a control should be understood to ensure the most appropriate method is adopted. E.g. All of SSI 8003 79 section 4 is referenced when applying Conditional Approach Controls.
- Data Complexity needs consideration and recording in the Interlocking Data Development Plan, as referenced in PAN40 issue 3.
  For example, bespoke conditional statements with no prescribed detailed tests need defining in the IDDP and Control Tables, to ensure the control is fully understood by Design & Test.
- Use of automated set to work tools should be adopted at the earliest opportunity. This has been mandated by Emergency Change NR/BS/LI/391, published as part of NR/L2/SIG/11201 Module B11.

Further Learning

- Projects are to consider operational requirements in the development stages to avoid complexity of data and design out where possible. Maintain the ‘Simple is Effective’ solution.
- The Interlocking Control Requirements should identify all novel controls, these requirements should be further detailed within the IDDP, stating if the control is deemed complex or unusual / unfamiliar. These controls should then be specifically highlighted in the control tables. For complex data a more comprehensive set to work needs to be performed.
- The design implementation of the control should remain the responsibility of the data designer (rather than the control table designer), however when implemented the normalising condition should be retrospectively detailed on the control table.
- Work to simplify / declutter scheme plans for Data Designers & Principles Testers is underway. However, until this is implemented Designers are reminded to think about the end user of their designs to ensure the information they are presenting is as clear as possible.

Further Information

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