

# RSSB Human Factors

## Case Studies - Operations

### Multi-SPAD signals and effects of line identifiers on driver behaviour

#### Issue

Signal D301 near Doncaster station has been passed at danger four times over 17 years, and is classified as a multi-SPAD signal. That means that it has been passed at danger on two or more occasions in a five year period.

#### What we did

The study integrated the outputs from four different techniques developed to analyse the human factors of train driving in order to increase understanding of train driver strategies, the mechanisms underlying start on yellow (SOY) SPADs, and identify effective SPAD mitigation measures for D301

The four methods used were:

Method	Output
Route drivability tool (RDT)	A description of the tasks the driver performs on the approach to D301, a speed profile and two workload analyses
Route hazard checklist (RHC)	Features on the approach to D301 that may increase the propensity for driving error
Eye movement data collection	Evidence about the information the driver uses at different points on the approach to the signal
Interviews with drivers	Subjective evidence regarding contributory factors

#### What we found?

The study showed that the three techniques may be integrated to provide insight into SPADs at signal D301, and explained how the following features interact to increase the propensity of driving errors on the approach to D301:

- The location of D301 in advance of a platform signal
- Expectation of a proceed aspect at D301
- Reduced sighting distance to D301
- Additional tasks and distractions imposed by a neutral section and increases in linespeed.

Based on these findings, the study suggested that a banner repeater would support the driver's decision-making on the approach to the signal to control the risk of SPADs. Additional mitigation strategies such as driver awareness campaigns and changes in procedures were also considered.

