

# RSSB Human Factors

## Case Studies - Engineering

### Cab evaluation using human modelling

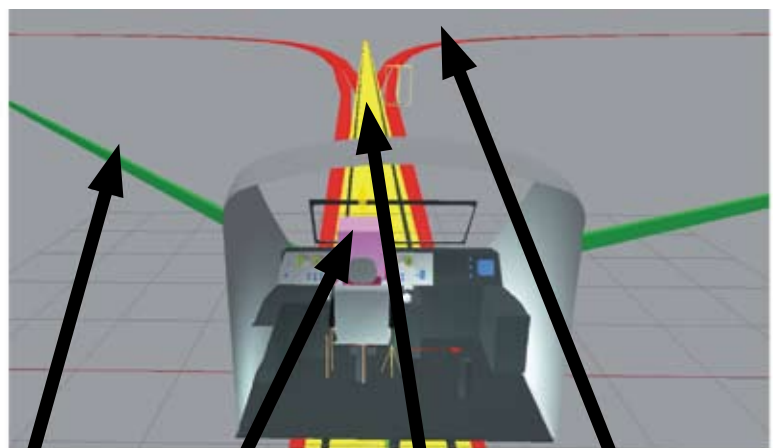
#### Issue

In October 2006, a train operating company asked RSSB to conduct a Human Factors assessment of a refurbished High Speed Train (HST) driving desk, to identify whether the refurbished driving desk increased the risk to the railway.

#### What we did

With support from a Human Modelling Specialist, funded through the industry research programme managed by RSSB, a CAD-based Human Factors assessment was carried out by:

- Recording the frequency of driver-control interactions on a typical journey
- Identifying the main requirements for a driving desk to ensure that the re-design mitigated the main risks to the railway
- Reviewing the impact of a new seat on usability of the driving desk



Marker to determine viewing distance to curved track

Reference cube for eye point analysis

Track bed

Curved track with 1000m radius for viewing distance analysis

Figure: some of the features used for the analysis

## What we found?

Based on the analysis carried out, the refurbished desk design did not import any additional risk to the railway from a human factors point of view. The project also identified other lessons that can be used to inform an update to the standard.

There is an assumption that drivers know how to adjust their seats and those seats are functioning properly, so that the vision requirements of the industry can be met. It was recommended that cabs contain an indication, to which the driver can align their eyes when adjusting the seat (similar to that provided in passport photograph booths) to ensure that visibility requirements can be achieved.

The layout of the controls (in particular brake and power controllers) should not rely on the driver remaining in an active driving position for prolonged periods of time, e.g. driving on restrictive aspects. Where drivers may have to spend prolonged periods responding to restrictive signal aspects, the cab layout should ensure that the brake and power controller and other frequently used controls, e.g. AWS can be operated from a passive posture, i.e. a position where the back and arms are fully supported, e.g. by the seat.

The cab seat is a complex issue as it has to encompass many elements, e.g. comfort, support to prevent musculo-skeletal injury, access to all controls and displays and enable the vision requirements of the Railway Group Standards to be achieved. It was recommended that further research is needed to enable a cab seat design to be recommended / mandated in a Railway Group Standard that can be meet this complex criteria.

