Lessons learnt from the investigation of accidents at the PTI

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Chief Inspector of Rail Accidents
Ladbroke Grove, Oct 1999 – Cause: SPAD
Outcome: head on collision (130 mph)
31 fatalities, > 500 injuries
The public inquiry into the 1999 Ladbroke Grove accident recommended that an independent organisation should be established to investigate rail accidents.

- This should be independent of government, safety regulators, police and all industry parties.

UK legislation:

- Railways and Transport Safety Act 2003
- Railways (Accident Investigation and Reporting) Regulations 2005
  - Guidance for the use of the Regulations is published by the RAIB (www.raib.gov.uk)

RAIB’s scope includes: Mainline, metros, trams and heritage rail
RAIB’s operation
Platform train interface (PTI) risk

- There are 3 billion platform train interface interactions every year.
- The total level of harm (measured in fatalities and weighted injuries, FWI) to passengers/public for 2015/16:
  
<table>
<thead>
<tr>
<th>Description</th>
<th>FWI</th>
</tr>
</thead>
<tbody>
<tr>
<td>On trains and in stations</td>
<td>52.1</td>
</tr>
<tr>
<td>On the platform edge (PTI)</td>
<td>13.6</td>
</tr>
<tr>
<td>- during boarding and alighting</td>
<td>5.9</td>
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<tr>
<td>- due to trapping in doors</td>
<td>1.0</td>
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- The year 2015 saw three serious accidents in which passengers were trapped in doors and then dragged (Clapham South on LUL, West Wickham and Hayes & Harlington). In two of these accidents the passenger fell under the train and was seriously injured.
- The overall level of harm at the PTI increased by 48% in 2015/16 compared with the previous year.
What PTI incidents does the RAIB investigate?

Investigations since Oct 2005;
National rail network 9
LUL 3
Metro 1
Tram 1

Of the 9 investigations on the national rail network;
- 8 related to train dispatch

Of the 8 train dispatch investigations;
- 4 were dispatched by drivers (incl. 3 trap and drag)
- 2 were dispatched by platform staff (incl. 1 trap and drag)
- 2 were dispatched by conductors (incl. 1 trap and drag)
<table>
<thead>
<tr>
<th>Year</th>
<th>Location</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>Huntingdon</td>
<td>Trap and drag</td>
</tr>
<tr>
<td>2007</td>
<td>Tooting Broadway (LUL)</td>
<td>Trap and drag</td>
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<tr>
<td>2011</td>
<td>Brentwood</td>
<td>Train dispatched with person in platform edge gap</td>
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<tr>
<td>2011</td>
<td>Kings Cross</td>
<td>Trap and drag</td>
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<tr>
<td>2011</td>
<td>James Street</td>
<td>Train dispatched with person leaning against train</td>
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<tr>
<td>2012</td>
<td>Jarrow - Tyne and Wear</td>
<td>Trap and drag</td>
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<tr>
<td>2012</td>
<td>Charing Cross</td>
<td>Person fell in platform edge after RA given</td>
</tr>
<tr>
<td>2013</td>
<td>Newcastle Central</td>
<td>Trap and drag</td>
</tr>
<tr>
<td>2013</td>
<td>Southend &amp; Whyteleafe</td>
<td>Wheelchair and pushchair rolled onto track</td>
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<tr>
<td>2014</td>
<td>Holborn (LUL)</td>
<td>Trap and drag</td>
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<tr>
<td>March 2015</td>
<td>Clapham South (LUL)</td>
<td>Trap, drag and fell down gap</td>
</tr>
<tr>
<td>April 2015</td>
<td>West Wickham</td>
<td>Trap, drag and fell down gap</td>
</tr>
<tr>
<td>July 2015</td>
<td>Hayes &amp; Harlington</td>
<td>Trap and drag</td>
</tr>
</tbody>
</table>
The PTI can be dangerous. Special care is always needed:

- slow down and step carefully
- good behaviour on crowded platforms
- any obstruction of the doors can be dangerous
- alcohol and drugs can exacerbate the risk
Train doors do **not** behave like lift doors

- they may not re-open when obstructed
- they have higher closing forces
- they may not detect small objects like hands, fingers, straps, scarfs
- it can be harder to extract trapped objects
- .....and much harder when the train starts moving
Important learning
- for dispatchers (drivers, conductors, platform staff)

- Allow sufficient time for passengers to leave the train before closing doors [West Wickham 03/2016]
Important learning
- for dispatchers (drivers, conductors, platform staff)

- Where practicable, observe the doors as they close (looking for anything unusual) [Brentwood 19/2011; West Wickham 03/2016; Hayes & Harlington]
Important learning
- for dispatchers (drivers, conductors, platform staff)

- Remembering that door interlock can still be obtained with a hand, or other small object, trapped between the door’s leaves [Newcastle Central 19/2014; Holborn 22/2014; West Wickham 03/2016; Hayes & Harlington]
Important learning
- for dispatchers (drivers, conductors, platform staff)

- Undertake an adequate final safety check after doors are closed [Brentwood 19/2011; Kings Cross 09/2012; Jarrow 26/2012; Newcastle Central 19/2014; West Wickham 03/2016; Hayes & Harlington]
Important learning
- for fleet engineers and rolling stock owners

- The need for a review of design of certain types of door control systems to prevent doors being opened by passengers after the driver has initiated the closure sequence

[West Wickham 03/2016]
Important learning
- for fleet engineers and rolling stock owners

- The need to better understand the design of sensitive edge obstruction detection systems

[Newcastle Central 19/2014]
Important learning
- for fleet engineers and rolling stock owners

- The need to ensure reliable operation of door detection systems [Jarrow (T&W Metro) 26/2012]
Important learning
- for station managers and train operators

- Risk assessment of train dispatch arrangements, particularly when platforms are crowded, and the identification of suitable risk control measures (e.g., altered camera positions) [Brentwood 19/2011, Newcastle Central 19/2014 Clapham South (LUL) 04/2016]
Important learning
- potential improvements in the design of the PTI

- Adapting trains and/or platforms to reduce the platform edge gap [James St 22/2012; Charing Cross 10/2013]

Class 508 in 2011

1906 stock (in 1955)
Important learning
- potential improvements in the design of the PTI

- Ways of enabling dispatchers to stop trains quickly in an emergency (including after the signal to start has been given) [James St 22/2012; Charing Cross 10/2013]
Important learning
- potential improvements in the design of trains

- Minimisation of force needed to extract an object from between door leaves
  - Forces applied by doors and locking devices
  - Design of seals

[Huntingdon 11/2007, Kings Cross 09/2012; Hayes & Harlington]
Important learning - for the entire industry

- improved information on door trapping incidents;
- strategies to manage over-crowding;
- continuation of the work of the PTI risk strategy group;
- how to engage the public on PTI safety.
Thank you for your attention