



Rail Accident Investigation Branch

Investigating overspeeding incidents

Rail Accident Investigators Seminar

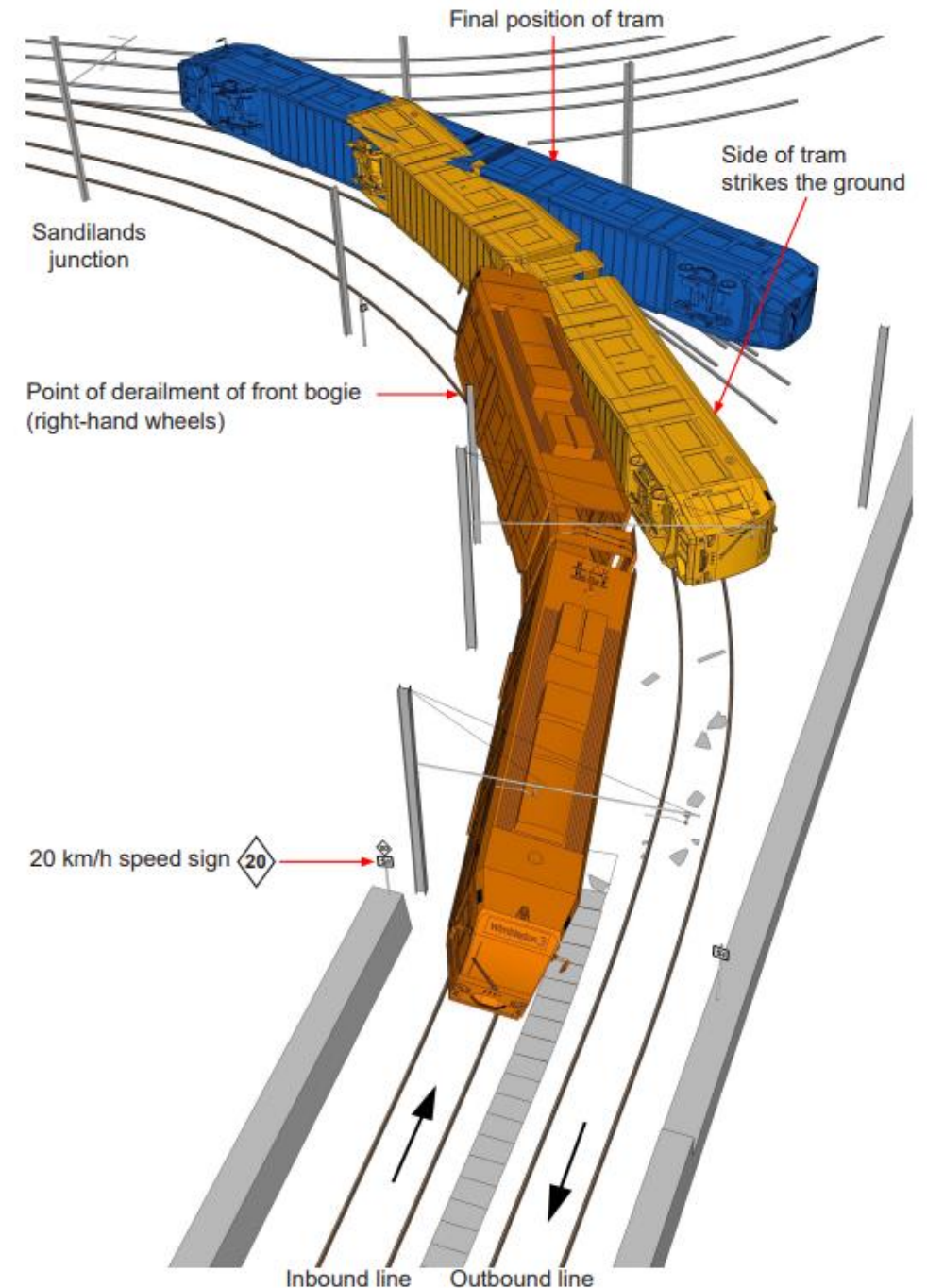
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RAIB has investigated many incidents where overspeeding has been a factor, these include:

- Temporary speed restrictions
 - Sandy
- Emergency speed restrictions
 - Ty Mawr crossing
 - Queens Park
- Blanket speed restrictions
 - Lawrencekirk and Portlethen
 - Blackford and Gleneagles
- Misunderstanding of route
 - Bletchley
 - Spital junction x2
- Losing awareness of location
 - Sandilands junction
 - Middlewood Road- tram overspeed on a curve
- Overspeeding in worksites
 - Badminton- collision between on track machines
 - Ramsden Bellhouse
- Loss of data
 - Cambrian ERTMS



First Steps

Investigating these incidents starts, like nearly all investigations, with gathering the facts, the hard evidence:

- On train data recorders
- On train CCTV, both outward (forward facing for example) and interior
- Signalling data
- Infrastructure design and normal permitted speeds
- Temporary or emergency speed restriction design
- Records of what was communicated to the drivers, late notices, WONs etc

NOTICE TO TRAIN CREWS BLANKET SPEED RESTRICTION IMPOSED

Depot* _____ Date/Time: 19:00 Sunday 17th July 2022

Routes: **ALL LINES ON WESTERN ROUTE NORTH AND EAST OF COGLOAD JUNCTION (TAUNTON)**

THE FOLLOWING BLANKET SPEED RESTRICTION HAS BEEN IMPOSED ON
MONDAY 18th JULY 2022 BETWEEN LOCATIONS SHOWN BELOW
FOR THE **TIME PERIOD 12:00 TO 22:00 MONDAY 18th JULY 2022.**
DURING THIS PERIOD THE SPEED OF ALL TRAINS MUST NOT EXCEED: -

30
60

MPH OR

THIRTY OVER SIXTY

Has this speed been imposed as a result of severe or adverse weather conditions? **YES**

Lines of Route:	ALL LINES
At or between:	PADDINGTON TO COGLOAD JUNCTION (VIA FORDGATE & ATHELNEY). INCLUDING ALL WESTERN ROUTE LINES NORTH AND EAST OF COGLOAD JN (TAUNTON) TO REGIONAL BOUNDARIES WITH NORTH WEST & CENTRAL / WALES & WESSEX (Acton Wells/ Northolt/ Woodstock Rd Jn/ Heyford/ Pershore/ Eckington/ Awre L/C/ Piling/ Warminster)



Is the overspeed the symptom or the problem?

- Do drivers have the information to handle their train to the appropriate speed?
- Did the 'system' contribute to a misunderstanding?
- Did the performance of the rolling stock negatively impact the outcome?

Next Steps

Again, like any other investigation we're going to want to:

- Interview those directly involved, drivers, signallers, control room staff, designers for example
- Request voice recordings and records of decisions to impose a speed, if applicable, so that a timeline of events can be established
- Request the records of the people involved, particularly training and rosters

Further analysis (1)

The important question is “why this train?”:

- Was it systemic? If so, the overspeed may be a symptom of a larger issue
- There are sources of data that can give clues as to whether this was an isolated incident, before requesting more of the previously listed data from operators, or speaking to more people:
 - List of trains that passed through the area in the same period, or using the same route, this can be from open-source train running information such as realtime trains
 - Compare train running times with timetable, if there is a temporary speed restriction, of any type, you would expect to see some delays, any train that does not exhibit delay warrants further investigation
 - For longer periods, or where the area of concern is a permanent speed restriction, signalling data can be analysed to derive speed over sections of line
 - In the case of an unusual route, signalling data will reveal how often trains are so routed

Further analysis (2)

- For the overspeeds in the weather related BSR in the Lawrencekirk area in 2020, analysis of the timetable and signalling data was used to determine the average speed of each train.
- This expanded the investigation from a single train not observing the restriction to at least six out of sixteen trains that were speeding for some or all of the restriction.
- This changed the emphasis of the investigation onto the systems used to inform drivers.

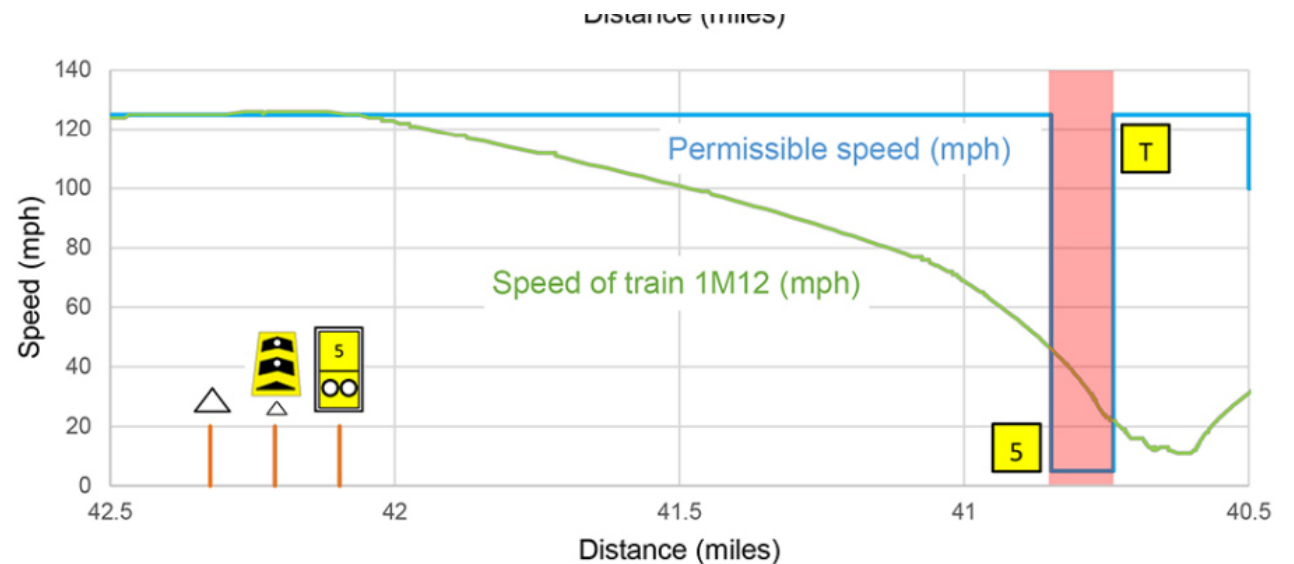
Possible reasons for overspeeds

To answer the “why this train” question, the investigator will need to answer questions including:

- Was there lineside warning signage and was it correctly placed, or designed?
- Were the drivers aware of the restriction?
- Were drivers fully familiar with the route?
- Did the layout and visibility of the infrastructure give drivers the best chance?
- Could the attainable speed in modern traction, or a light engine be greater than that envisaged by the designers

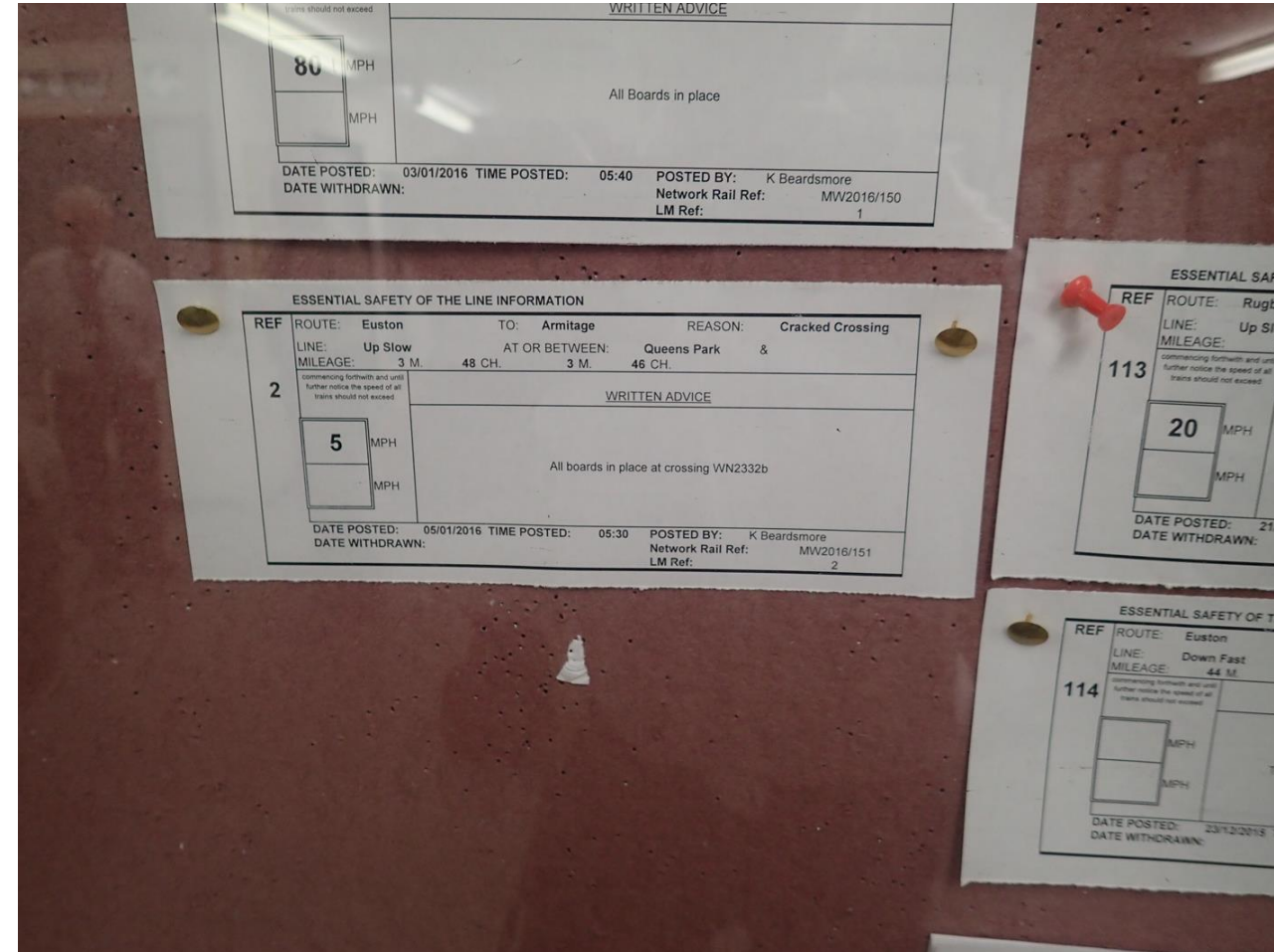
Warning signage is incorrectly placed, or designed

- TSR and ESR signage relies on drivers being able to slow down in the time available, so the design and installation locations of the various boards is critical
- RAIB have found instances where intervals are too short (Beattock) leading to drivers not being able to meet slow enough or signage has been adapted from a previous restriction (Wood Green, and Melton Lane level crossing) which meant drivers did not understand that the restriction applied to them
- Things to check include:
 - The permanent arrangements in the area
 - The design process used
 - Whether the installed signage matches the design
 - What notifications were in WONs and late notice cases



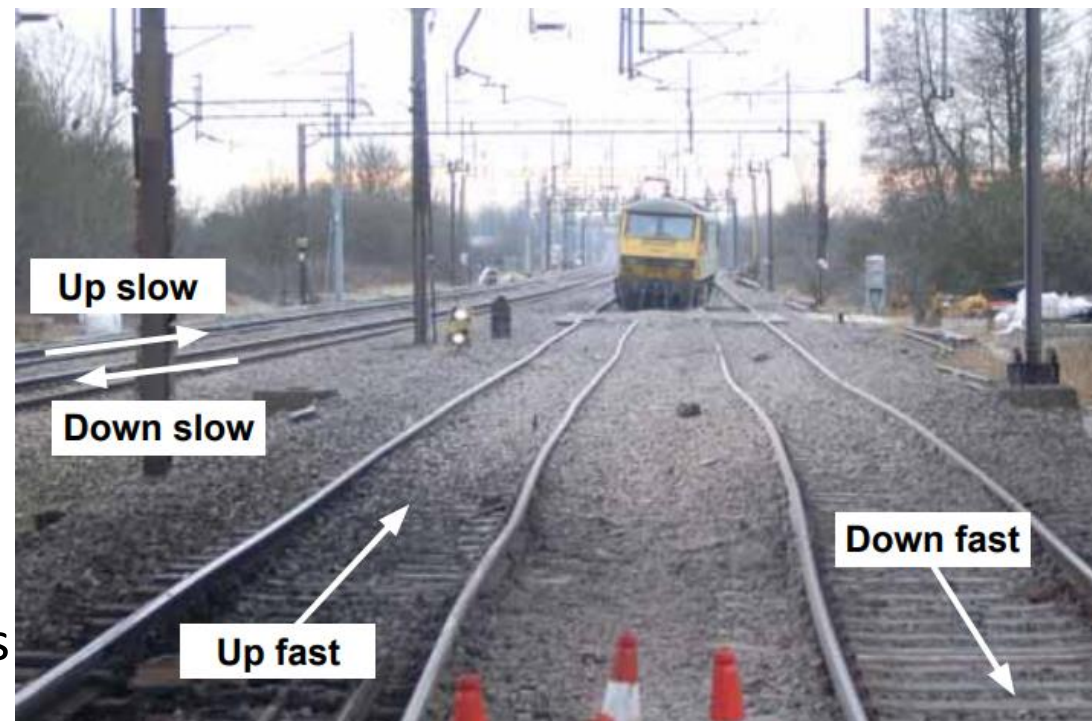
Drivers not aware of restriction

- Where a temporary or emergency speed is in place, the chain of communication is critical
 - Have all drivers received the message?
 - Was the message conveyed in a clear, easy to understand way?
 - What reminders have drivers given themselves? Are they encouraged to write things down or use memory techniques
- Different TOCs and FOCs use a variety of methods, it is particularly critical for unsigned restrictions, like BSRs that the message reaches all drivers
- If there are no signs, have signallers been using GSM-R broadcasts? What are the local guidelines on this?



Driver's route familiarity

- The investigation needs to look at what level of experience the driver has of a route
 - Have they driven it before or just used training videos?
 - How many times?
 - Roster
 - Training records
 - At locations where the network is being changed, how well has that change been managed?
 - Driver briefings
 - Route learning
 - WON/ yellow perils
 - If they know the route well, are there other factors that may have affected the driving, such as distraction or fatigue?
 - Roster
 - Medical records
 - Mobile phone records



Signalling control and attainable speed

- British railway signalling is not designed to be speed signalling and provides route information at an appropriate time for the driver to handle their train using their route knowledge.
- However
 - At some junctions, the aspect sequence and aspect release takes into account the attainable speed of rolling stock
 - TPWS is only intended to mitigate very specific overspeeding events, diverging junctions and speeds under 60 mph are exempt
 - Improvement in acceleration and attainable speed may uncover previously hidden mishandling of trains
- An investigator will need to understand any assumptions made when the signalling scheme was designed, and how these may have changed in the intervening years, such as:
 - A review of the signalling design
 - Sighting of signals
 - A comparison of rolling stock performance



Challenges

- Lack of appetite to make any big changes, because 'ERTMS will fix this'
- General tendency to just blame the identified driver
- Identifying trends - data may be lost so it is difficult to find evidence for anecdotes that drivers 'treat it like a racetrack' and 'its never happened here before'
- Proving or disproving outside influence (such as fatigue/distraction)

Conclusions

- Look beyond the driver
- Look beyond the immediate incident – the majority have underlying factors
- Look for trends