



After it's hit the fan....

Network Rail Track Maintenance Engineering Conference

22 May 2025

Simon Kay, Inspector, Rail Accident Investigation Branch

RAIB and legal background



Railways and Transport Safety Act 2003

Railways (Accident Investigation and Reporting)
Regulations 2005

INDEPENDENT



We investigate and publish

www.raib.gov.uk



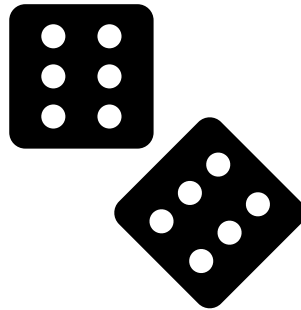
We do not get involved with....

- Blame
- Liability
- Prosecutions

Safety lessons only

RAIB legal background – incidents/accidents types

- Seriousness – death, injury or extensive loss
- Near misses
- Where safety lessons can be learnt



Scope - Mainline



Scope - Metros



Scope - Tramways



Scope - Heritage

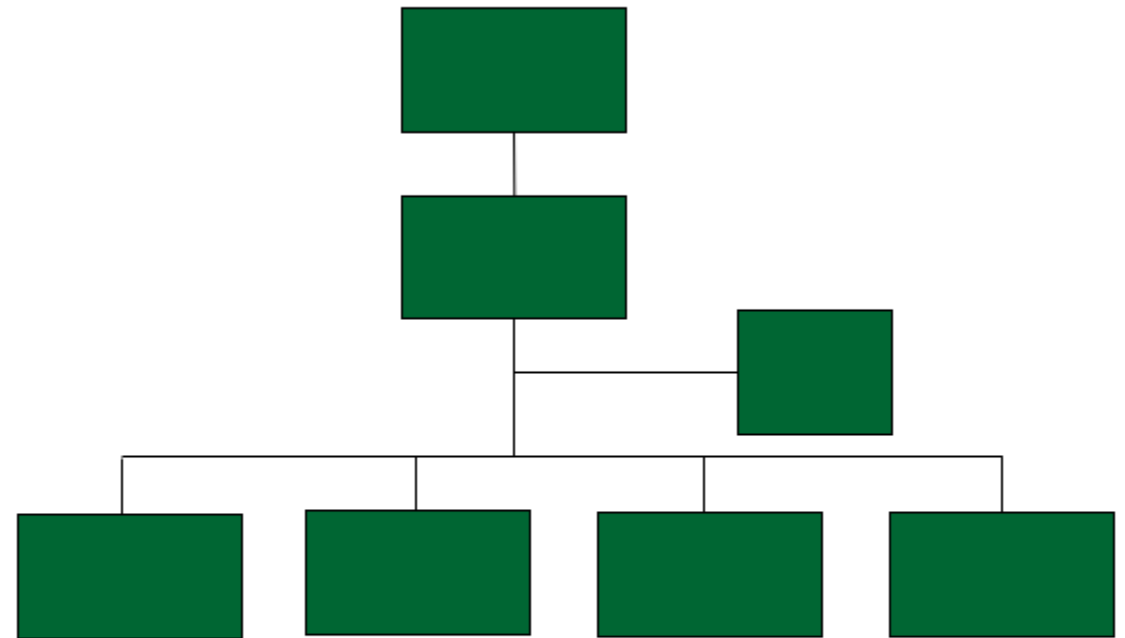


RAIB operational areas / facilities



RAIB people

- Chief Inspector
- Deputy Chief Inspector
- 4 Principal Inspectors
- 20 Inspectors
- 16 Support staff



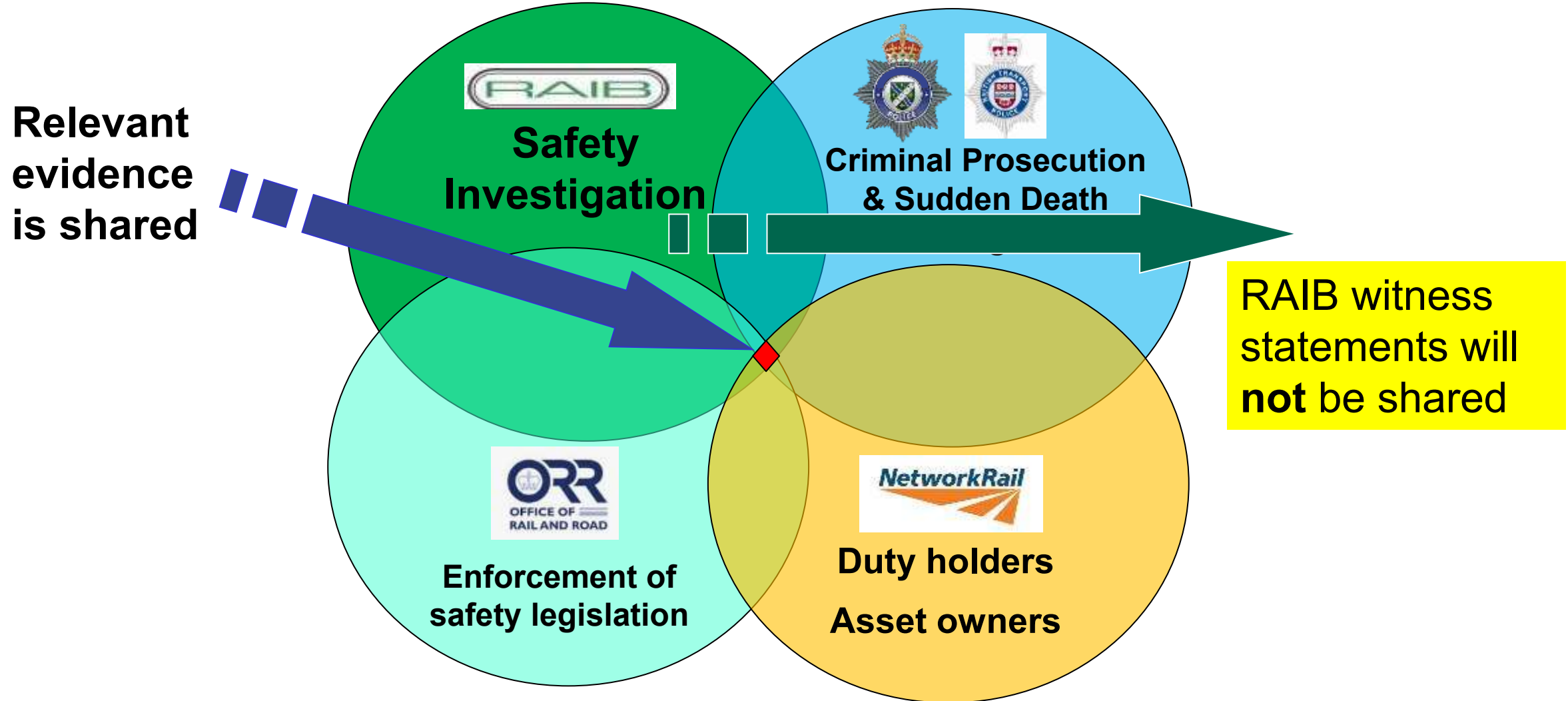
RAIB people



If you've ever been on an accident site



RAIB witness statements

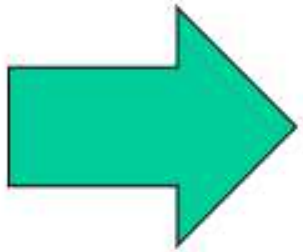


RAIB investigation approach

What? When? Where? Who? How? Why?

- Identify the cause → causal factors
- Consequence - what was the outcome?
- What are the safety lessons? → Recommendations

Why things sometimes hit the fan



The Swiss Cheese Model (James Reason)

event

Unsafe acts
and inactions

Culture
(Organisational)

Environment

Supervision

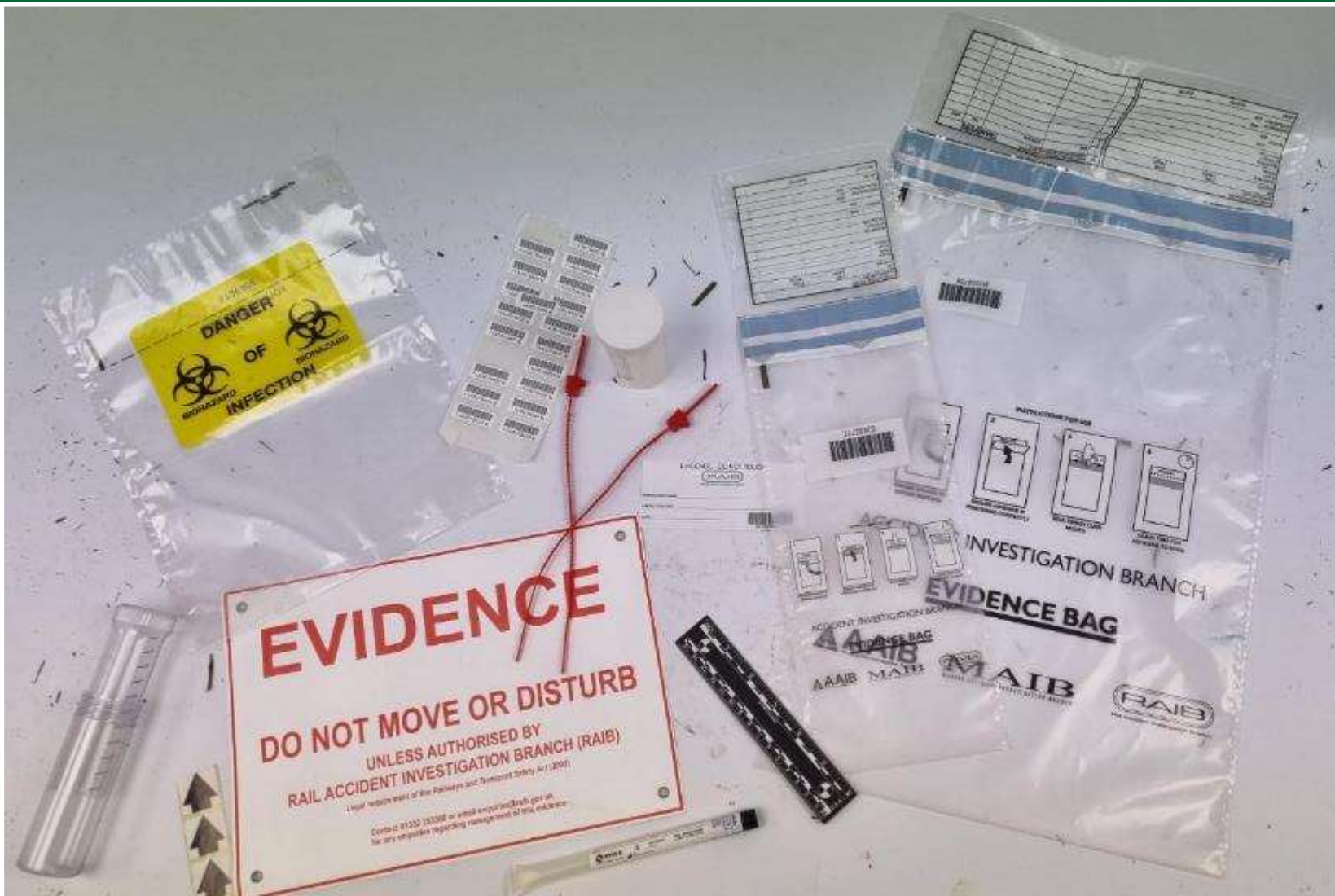
Defences fail

‘Underlying factors’
e.g. management/organisational arrangements

‘Observations’ – not related to cause, but have safety learning

accident





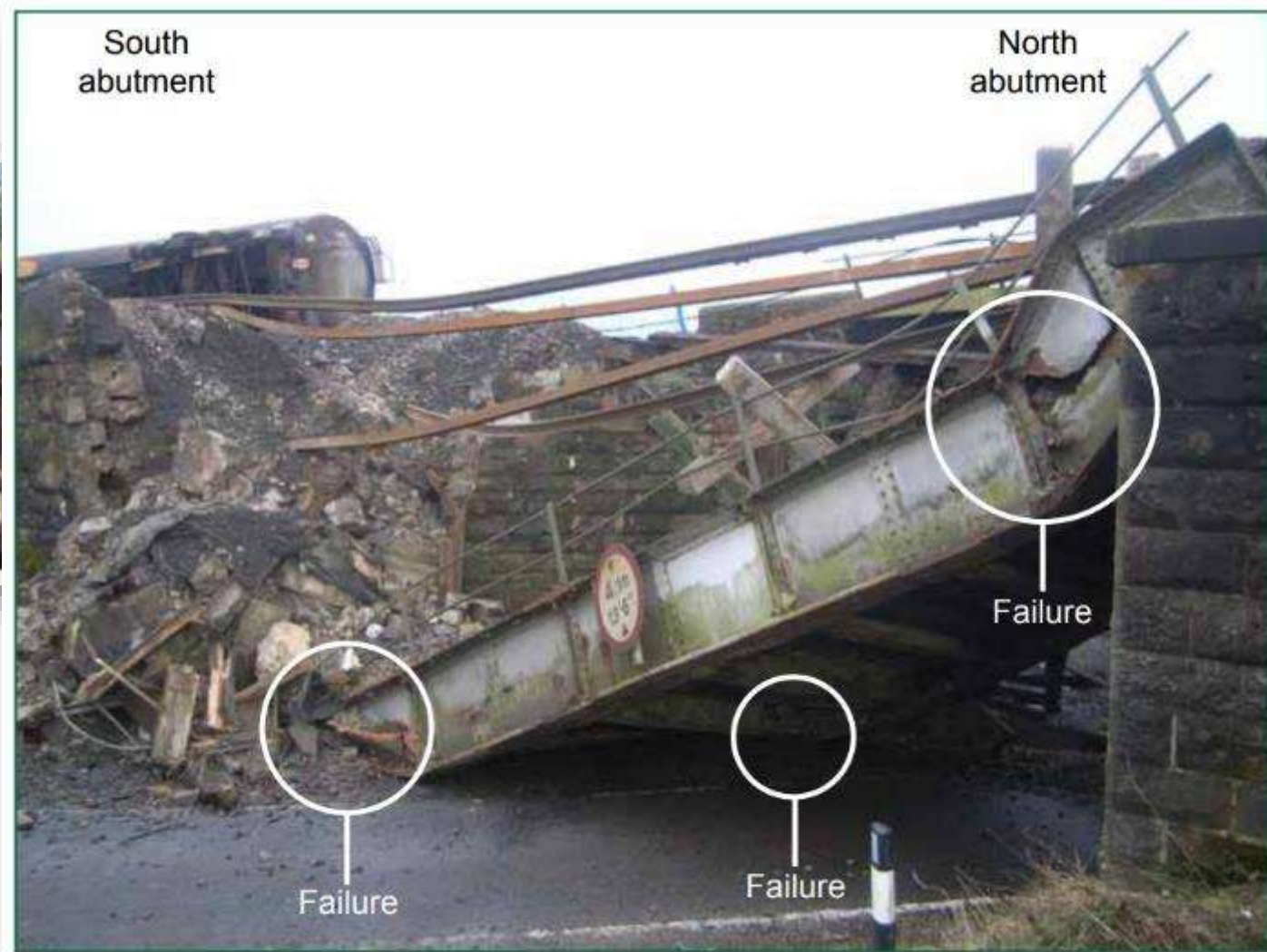
Evidence



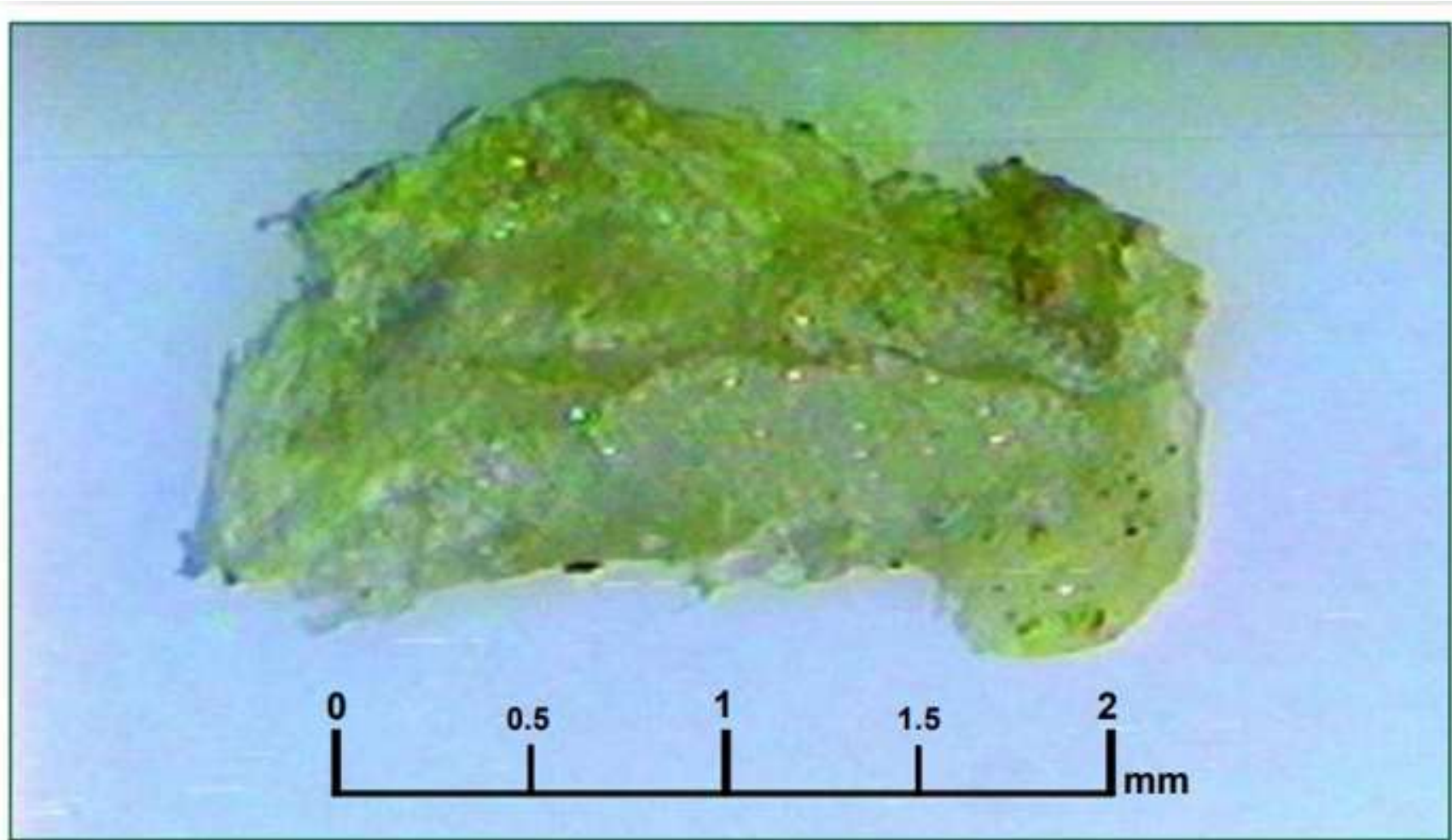
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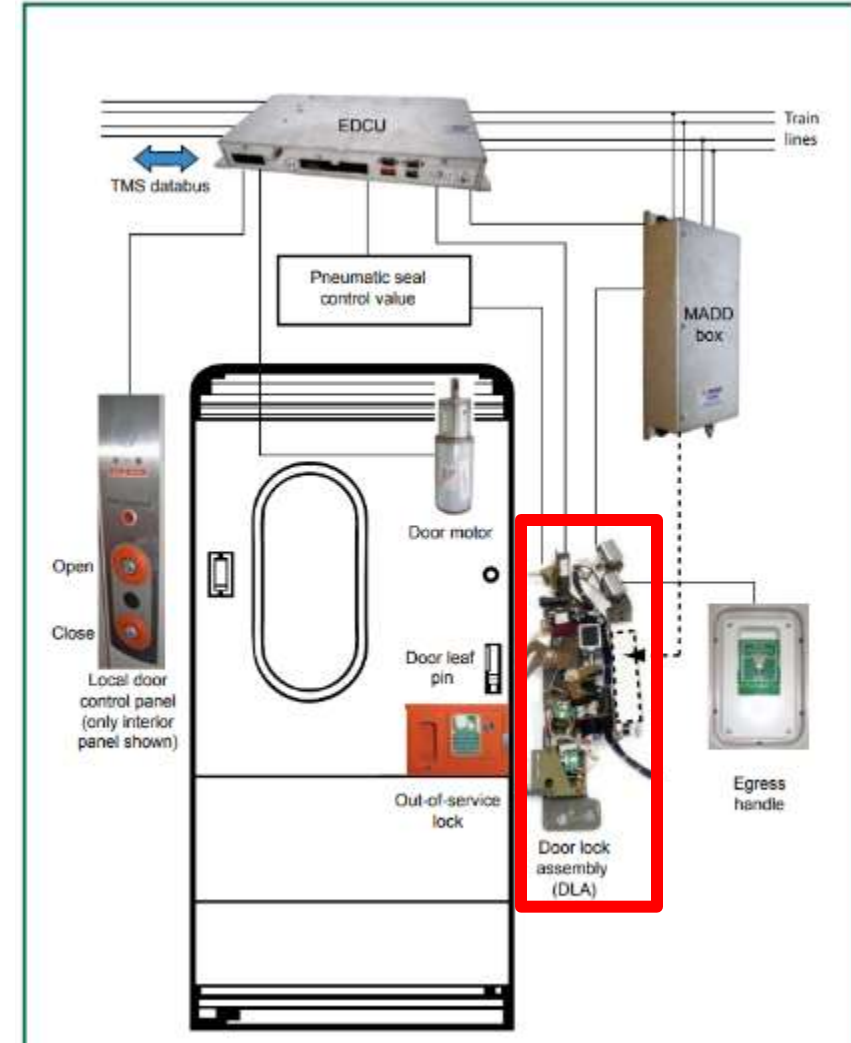
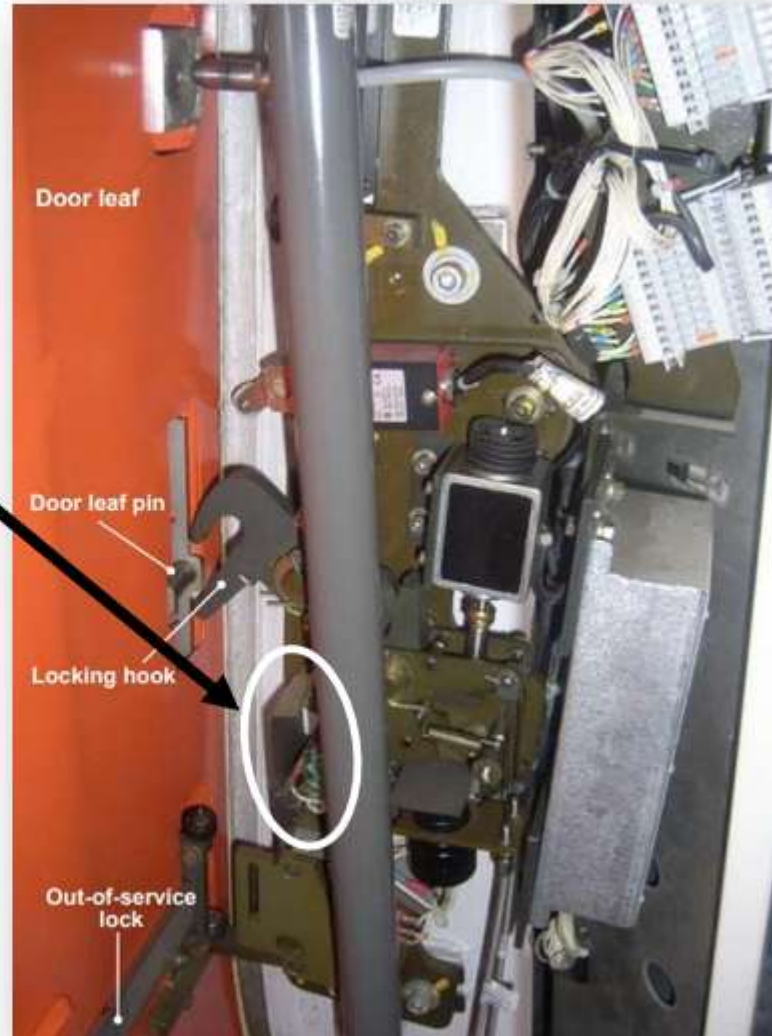
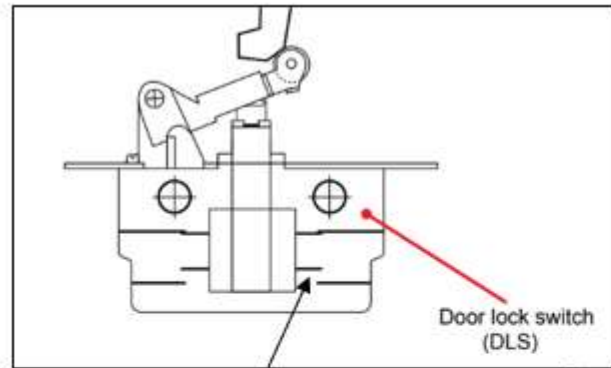
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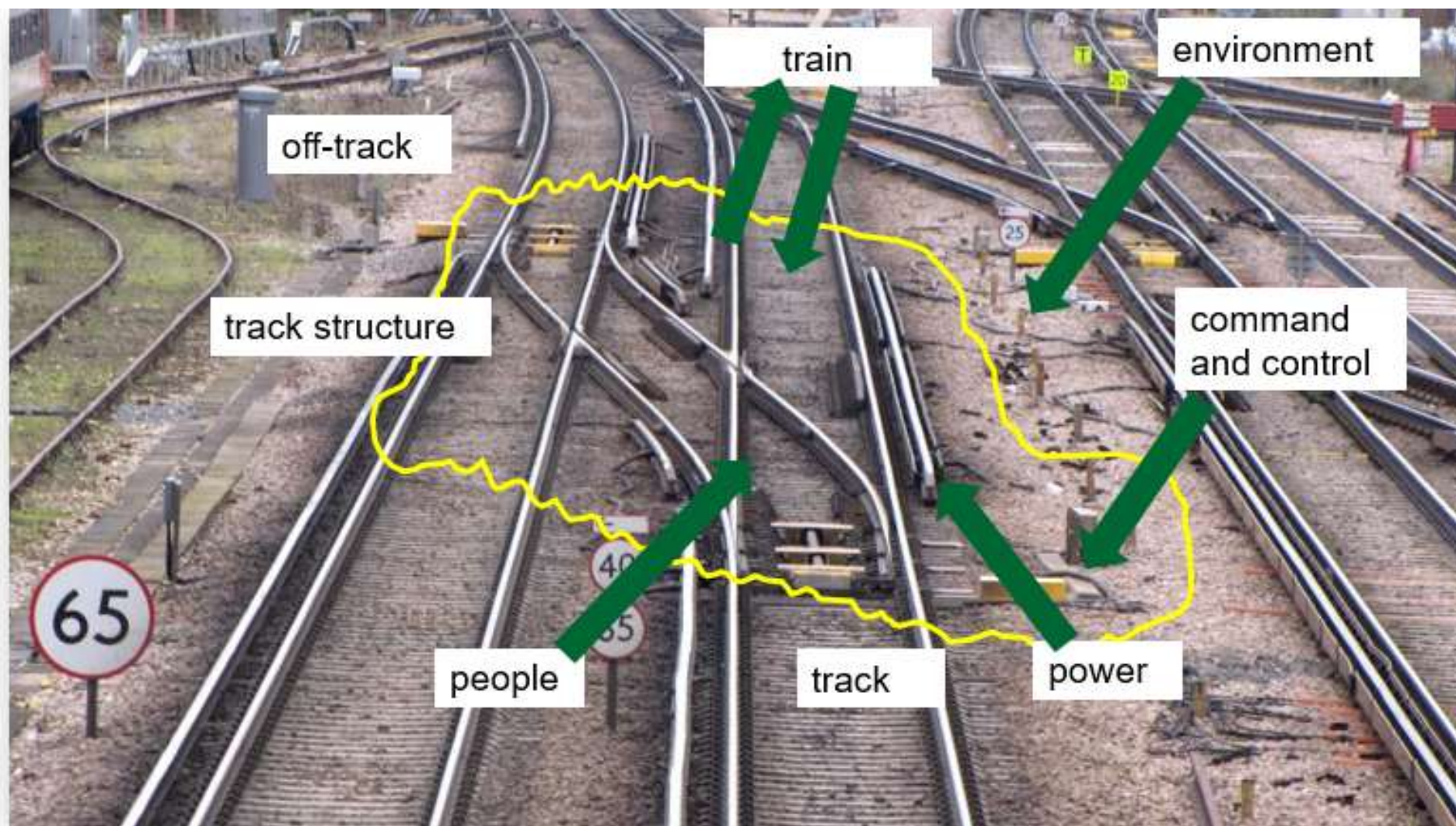
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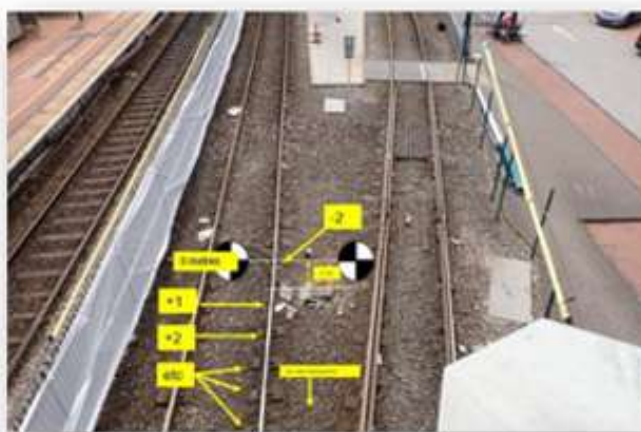
Discounting cause from other parts of the system



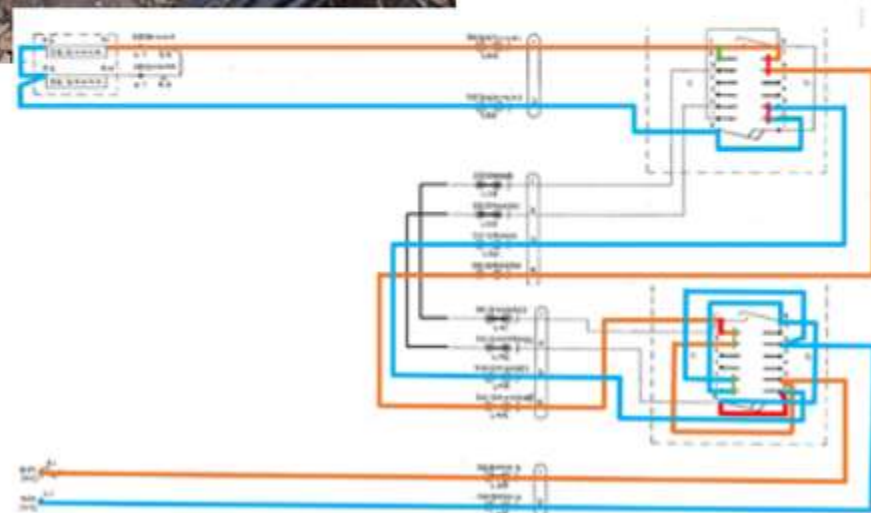
Railway interfaces



Photography, video and measurement



Testing on site



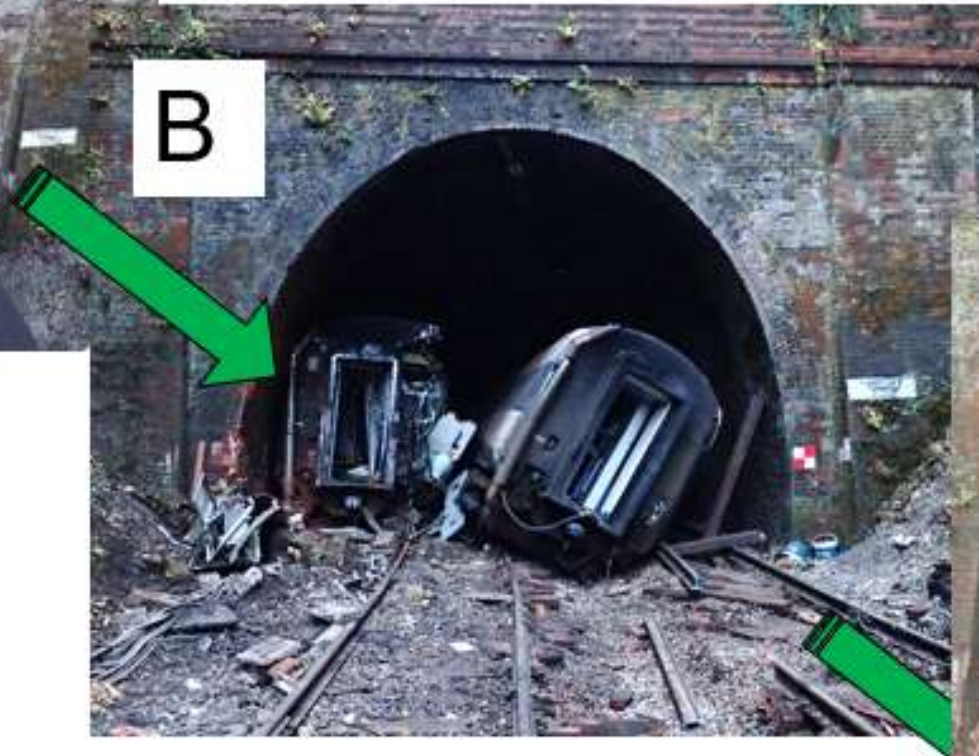
A common question asked...

When can we have our railway back?

A better question to ask...

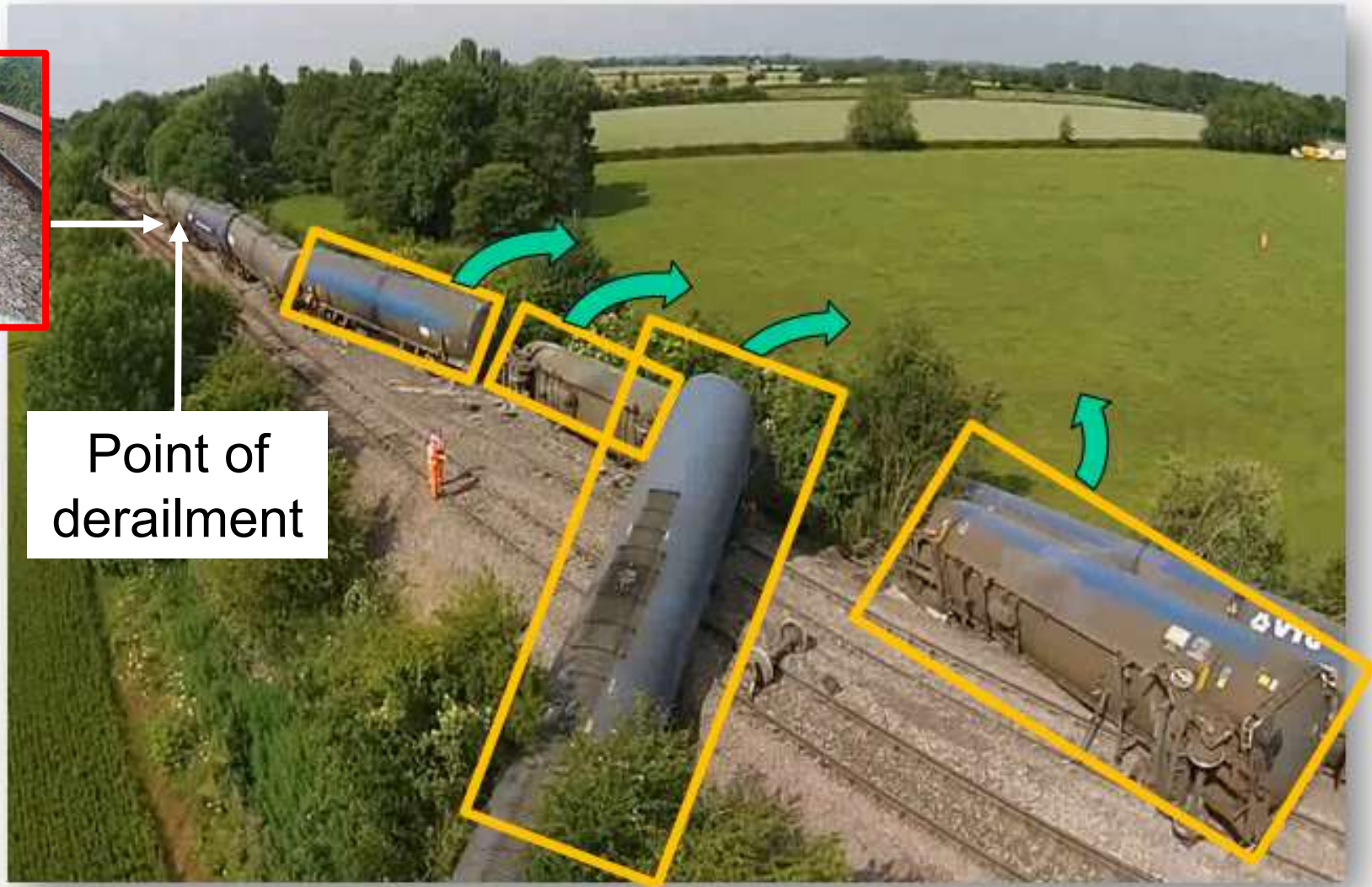
How can we assist RAIB to get its evidence
so we can have our railway back?

Recovery

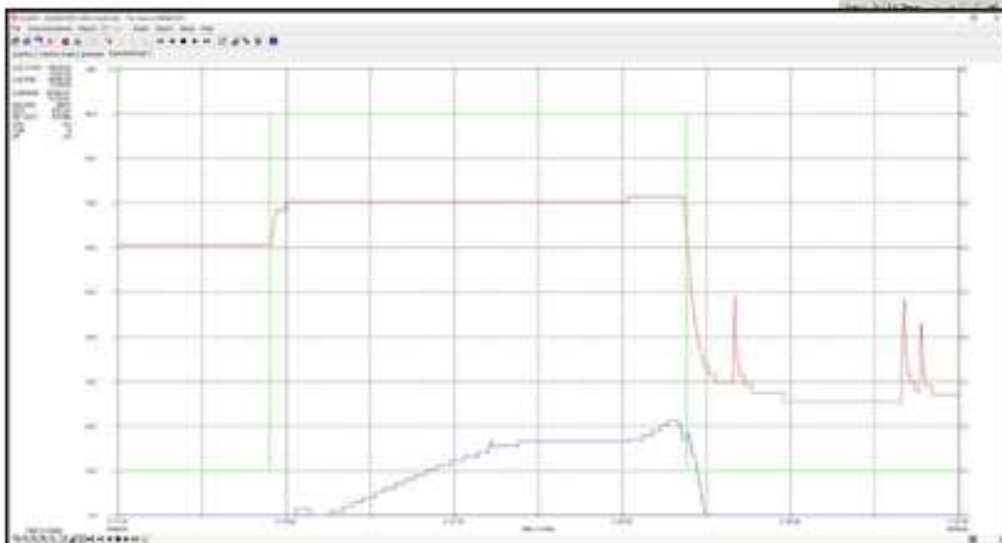
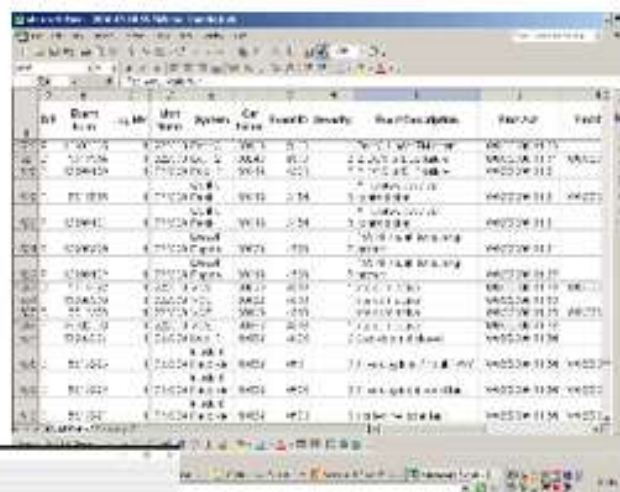




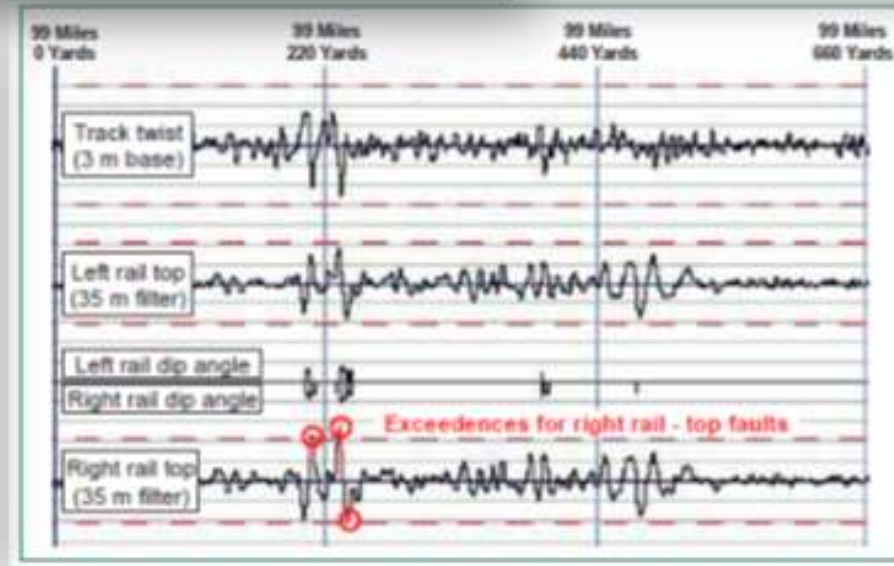
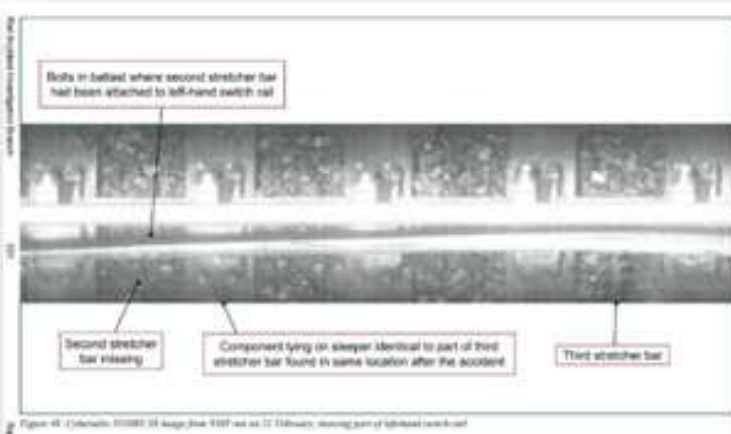
Recovery planning



Point of
derailment

[illegible]

Data sources – off site

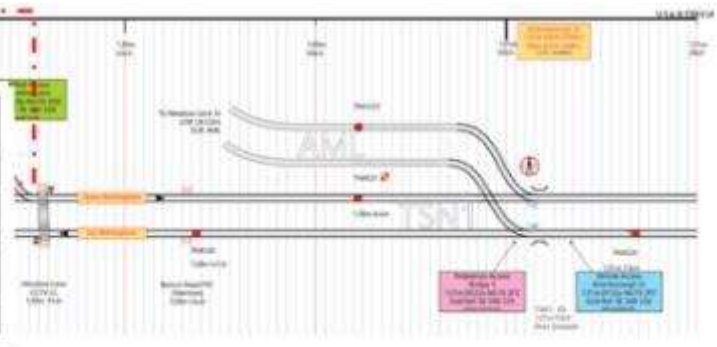


Date	Time of Call	Nature of Request (e.g. car, horse, tractor, trailer, pedestrian, routine road maintenance)	Time Required for Movement (minutes)	Time Permission Refused	Time Permission Granted	Time Reported Clear (if applicable)	Time Next Tr Cautioned Together with Reporting N (if applicable)
1.12	0836	Horse on N. side	3	0858	0907	0908	
3.12	1405	Plough blocked way	2				
5.12	1345	Plough blocked way	2				
7.12	0948	Plough blocked way	2				
1.12	0548	Plough blocked way	2				
2.12	1559	"	2				
4.12	1245	Plough blocked way	2				
10	1235	"	"				
11.12	1015	Plough blocked way	2				
12.12	1531	Plough blocked way	2				
13.12	1445	Plough blocked way	1.4				
14.12	1459	"	1.4				

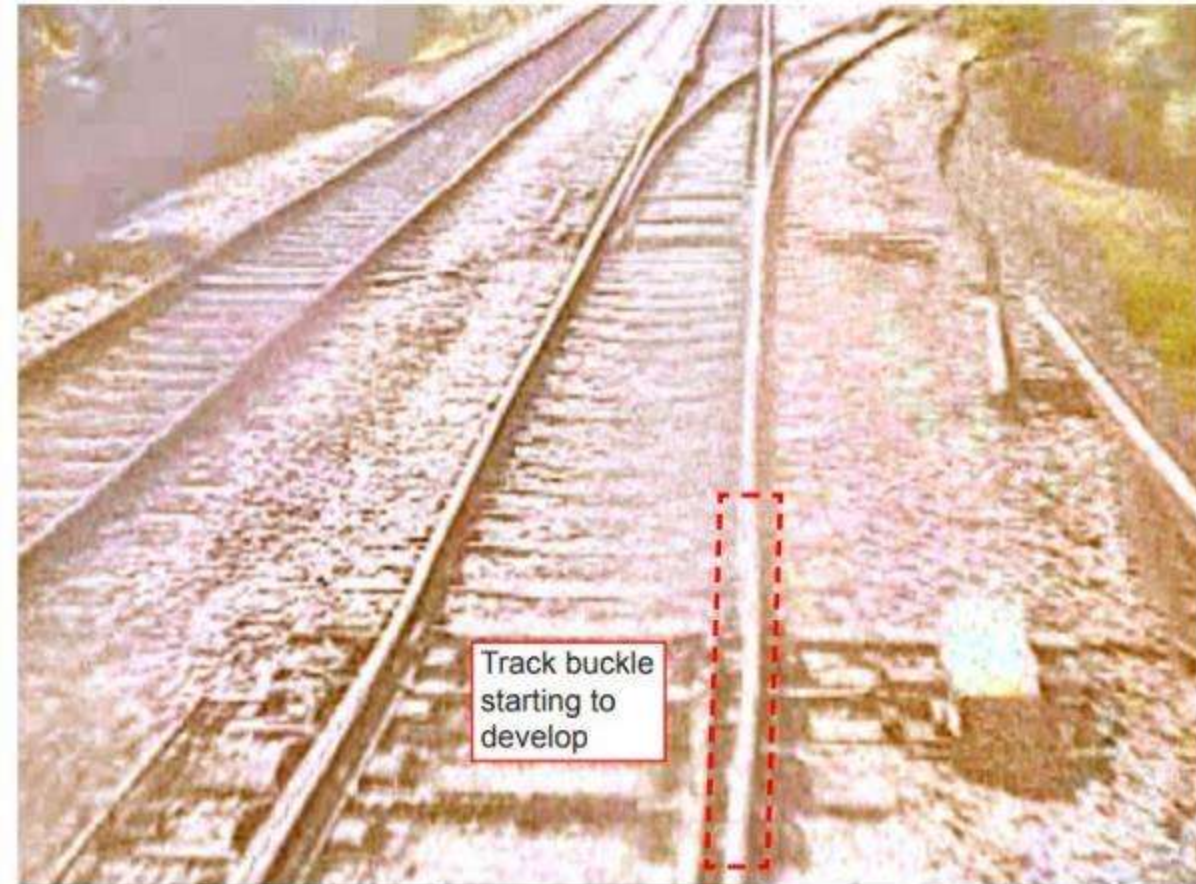
Task Risk Control Sheet		Network Rail																											
Switch Diamond – White Paint		WLS No: NWLSMTCR00047605 Version 3																											
	• Struck by Train (1) • Electrocuting (2) • Fainting (4-OTP) (6) • Manual Handling (17) • Slips, Trips and Falls (12) • Noise (15)	EXP S&T Train OTR Property																											
	Personal Involved Spray Unit & Lanes																												
Tools / Equipment	Hand Tools	Paint Depositor																											
Plant	Generator	OTP (OTR) Repairs																											
		Power Line																											
<table border="1"> <thead> <tr> <th>Task Risks</th> <th>Controls</th> <th>Implemented By</th> </tr> </thead> <tbody> <tr> <td>Key General Task Risks</td> <td> • See Elements Task Risks NWLSMTCR00047605 1, 2, 4, 6, 11, 12 and 15 </td> <td></td> </tr> <tr> <td>Electrocution</td> <td> • See Risk Control sheets NWLSMTCR00047605 Working Adjacent to DC Electrified Lines Risk Level 1-5 • See Risk Control Sheet NWLSMTCR00047605 Working Near Electrical Overhead Line Equipment • When required, check that potentially lethal arcs flash when working on the position where risk is to occur </td> <td> Line Manager / Staff Lead Worker / Staff </td> </tr> <tr> <td>Use of Hand Tool</td> <td> • See Task Risk Control Sheet NWLSMTCR00047605 Use of Manual Tool/Hand Tool (Batter Powered) </td> <td>Team Leader</td> </tr> <tr> <td>Fall / Overhead</td> <td> • Current information will be used to show risk </td> <td>Team Leader</td> </tr> <tr> <td>Striking</td> <td> • Current information for parts and Depositor that be available • Minimum PPE shall be worn • Position staff behind direction of spray behind barriers • Eye protection Risk/Task work that be worn </td> <td>Team Leader / Staff</td> </tr> <tr> <td>Use of ATP</td> <td> • See relevant Task Risk Control Sheet NWLSMTCR00047605 • See Task Risk Control Sheet NWLSMTCR00047605 Transport of ATP equipment & Machine Control present • Maintenance of vehicle and checks that have been completed </td> <td>Team Leader/ECN</td> </tr> <tr> <td>Use of Power Line</td> <td> • See Task Risk Control Sheet NWLSMTCR00047605 Use of Power Line </td> <td>Team Leader / Staff</td> </tr> <tr> <td>Entrapment</td> <td> • See Task Risk Control sheet NWLSMTCR00047605 Working with Switches and Contactors </td> <td>Team Leader / Staff</td> </tr> </tbody> </table>			Task Risks	Controls	Implemented By	Key General Task Risks	• See Elements Task Risks NWLSMTCR00047605 1, 2, 4, 6, 11, 12 and 15		Electrocution	• See Risk Control sheets NWLSMTCR00047605 Working Adjacent to DC Electrified Lines Risk Level 1-5 • See Risk Control Sheet NWLSMTCR00047605 Working Near Electrical Overhead Line Equipment • When required, check that potentially lethal arcs flash when working on the position where risk is to occur	Line Manager / Staff Lead Worker / Staff	Use of Hand Tool	• See Task Risk Control Sheet NWLSMTCR00047605 Use of Manual Tool/Hand Tool (Batter Powered)	Team Leader	Fall / Overhead	• Current information will be used to show risk	Team Leader	Striking	• Current information for parts and Depositor that be available • Minimum PPE shall be worn • Position staff behind direction of spray behind barriers • Eye protection Risk/Task work that be worn	Team Leader / Staff	Use of ATP	• See relevant Task Risk Control Sheet NWLSMTCR00047605 • See Task Risk Control Sheet NWLSMTCR00047605 Transport of ATP equipment & Machine Control present • Maintenance of vehicle and checks that have been completed	Team Leader/ECN	Use of Power Line	• See Task Risk Control Sheet NWLSMTCR00047605 Use of Power Line	Team Leader / Staff	Entrapment	• See Task Risk Control sheet NWLSMTCR00047605 Working with Switches and Contactors	Team Leader / Staff
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Network Rail				Supervisor's Visual Inspection Report: TEF 3022 v3 Sept 2010													
Inspection No	FCTS		Diagram ID	Der24		Start Mileage of Inspection	4m 230y	End Mileage of Inspection	5m 1120y	Access Point	Maeving Street	Egress Point	Durham Road				
Supervisor's Name	John Smith				Scheduled Date of Inspection	12/01/2025	Actual Date of Inspection	12/01/2025	Gauge No.	RA789	Sheet	1	of	1			
To be completed by Supervisor																	
ELR	Track ID	Mileage From		Mileage To		Observations / Action Req'd (If in S&C include Pts No.)	*Condition of Top & Line	Cross Level (mm)	Gauge Check (mm)	Fault No.	Qty	Unit of Work	Priority	Prot. Type	Defect Code	Std Job No.	W/O No (if known)
		M	ch/yds	M	ch/yds												
	110	4	330	4	780	Poor top and line and broken fasteners – 5 months action Plan for temp	Fair	7mm	1437		24/723	in	150		TL 23	9232	7632054



CCTV



Track buckle
starting to
develop

CCTV



People

Witnesses:

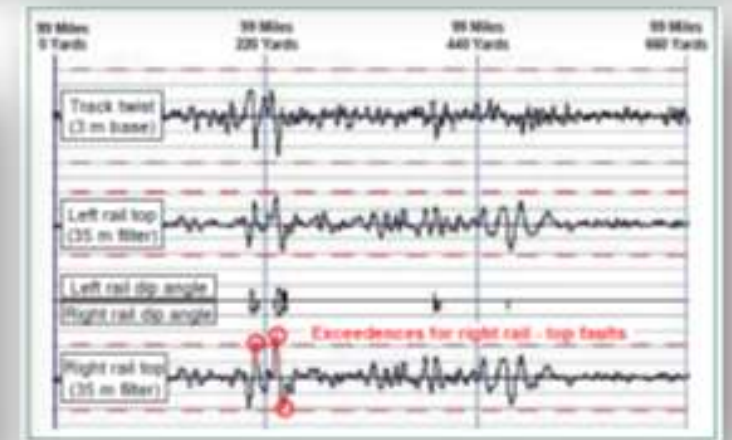
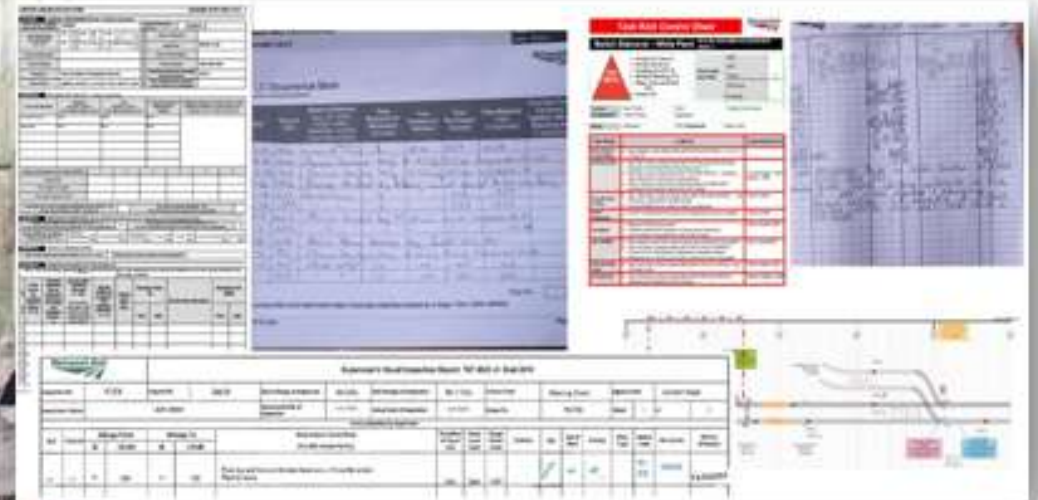
- Eyewitnesses – those present at the scene
 - may have been involved and/or affected by the event

- Others - who can shed light on the background to the factors that led to the accident

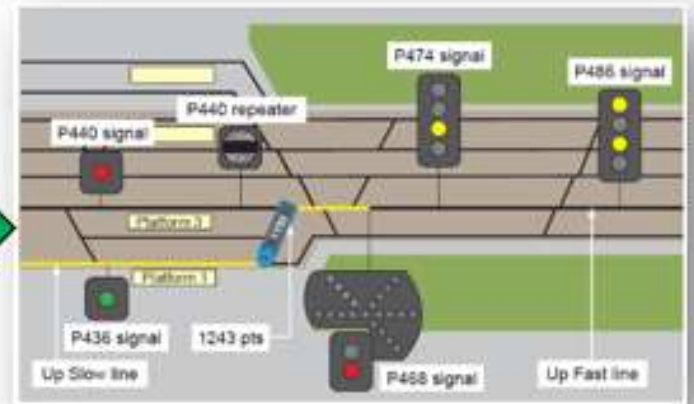
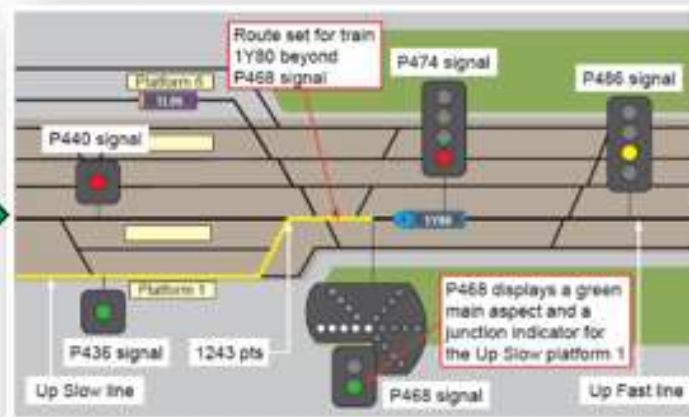
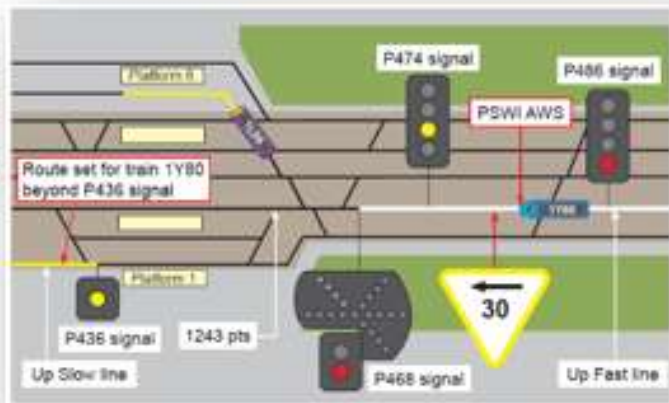
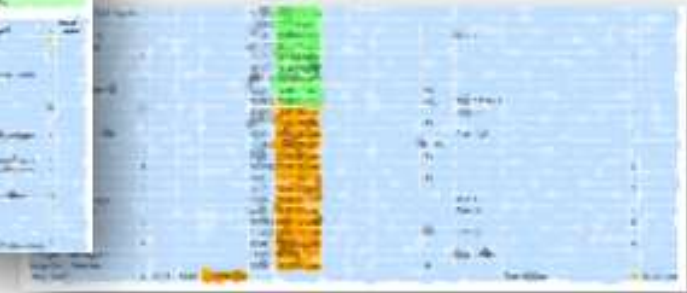
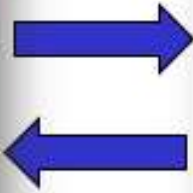
The injured and those bereaved



What we do with all this evidence

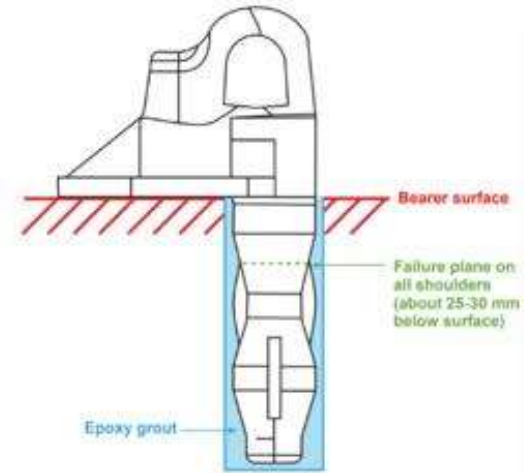


Event timelines

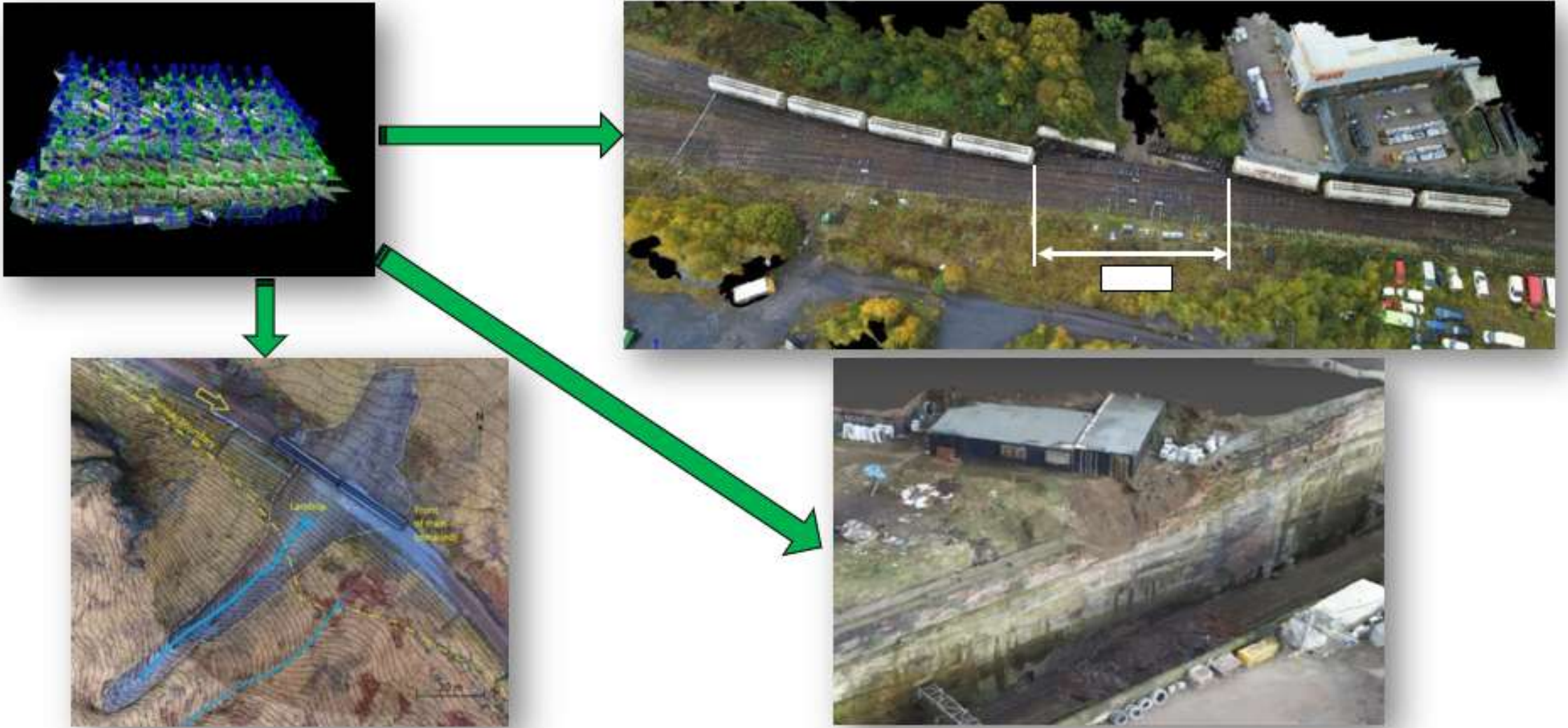




Analysis techniques - examination



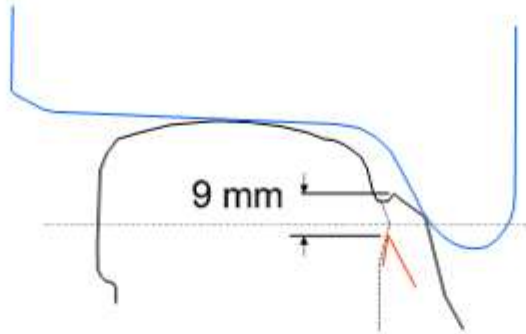
Analysis techniques – modelling



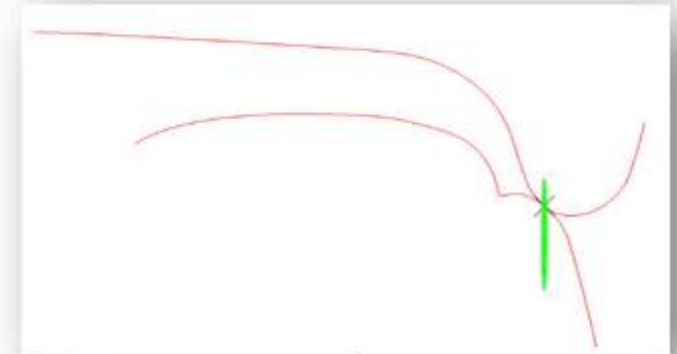
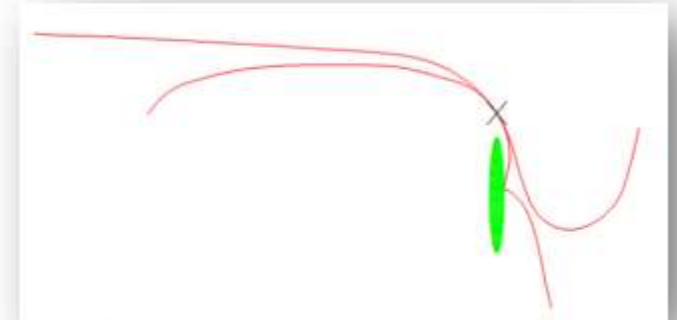
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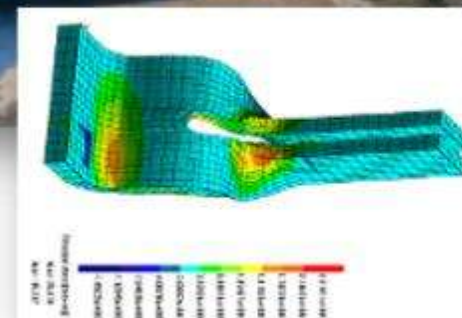
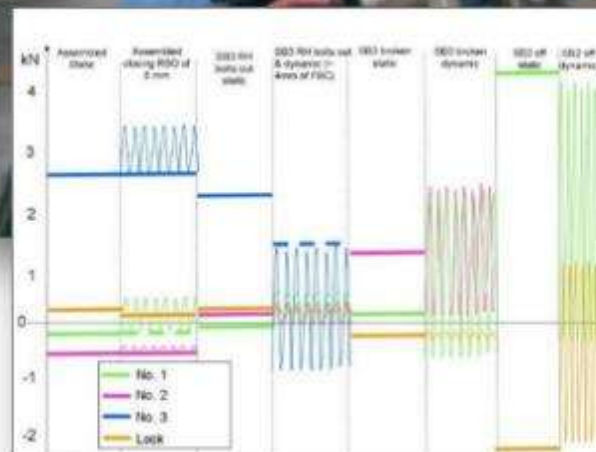
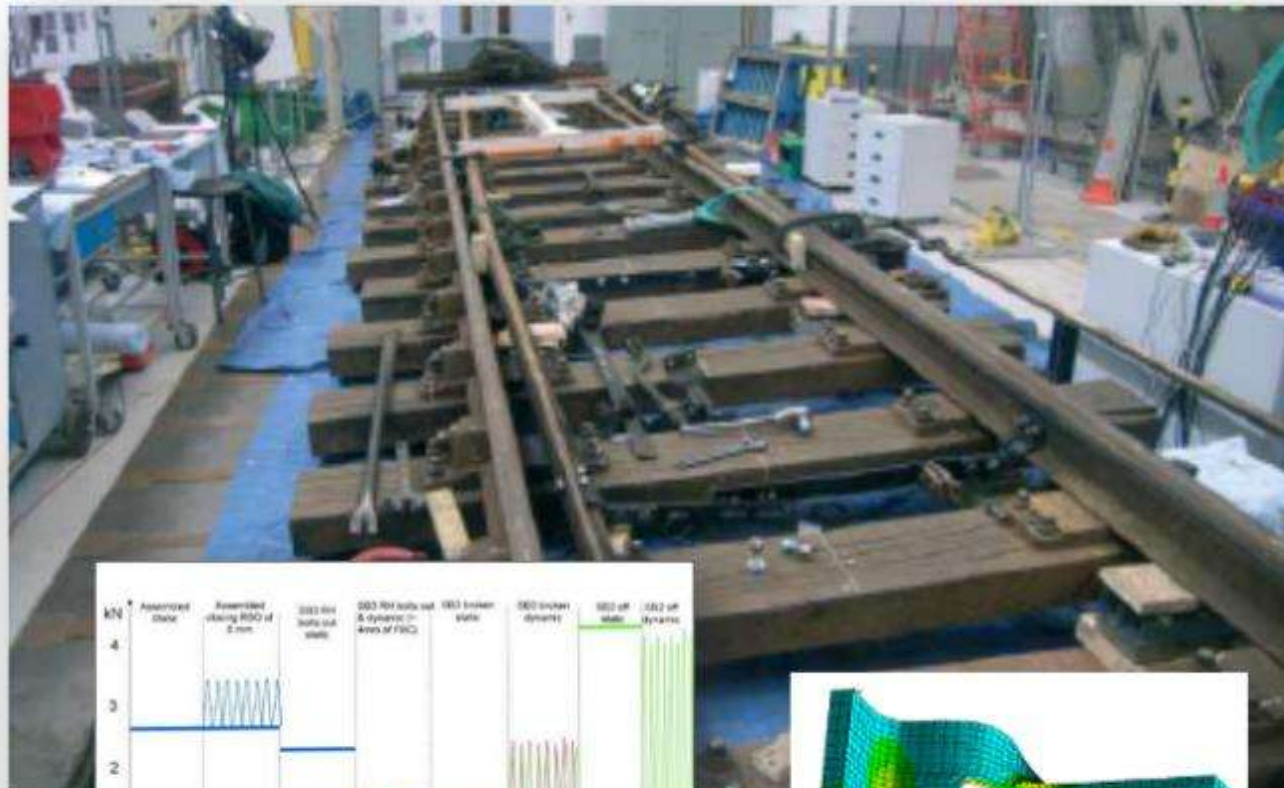
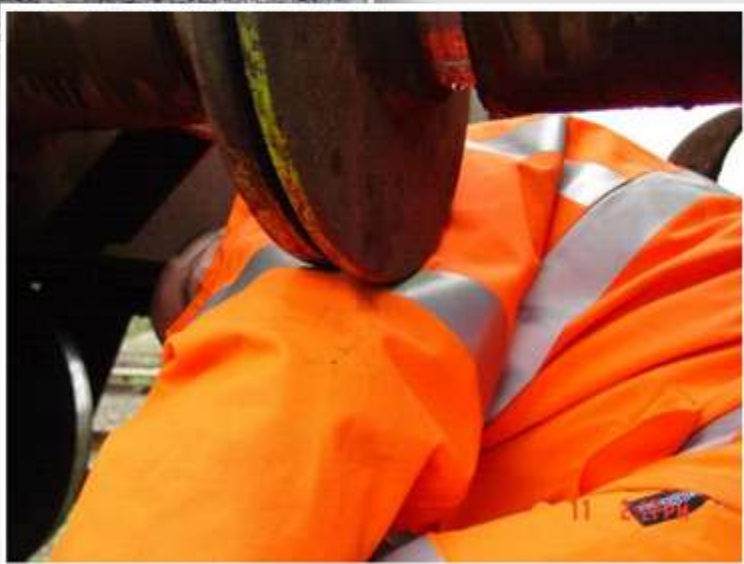
Analysis techniques – simulation



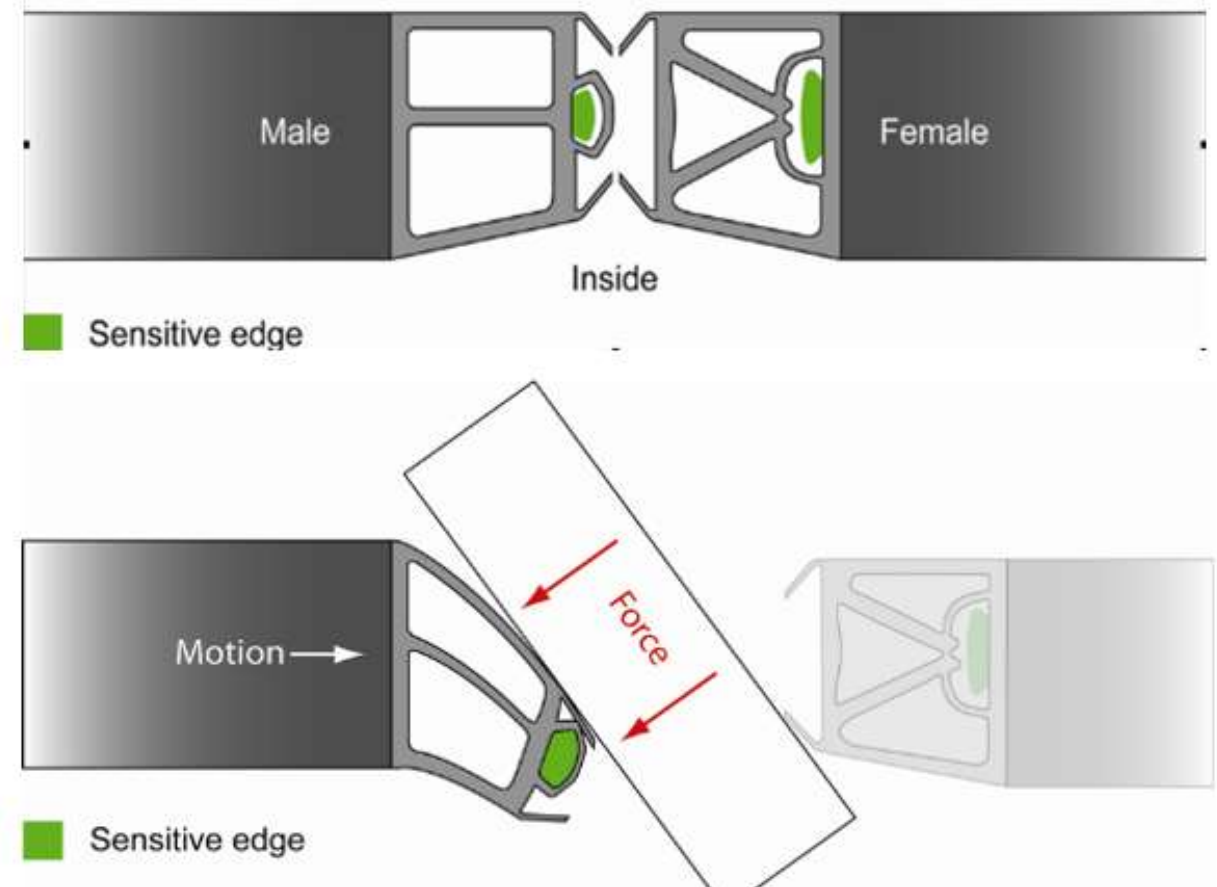
VAMPIRE



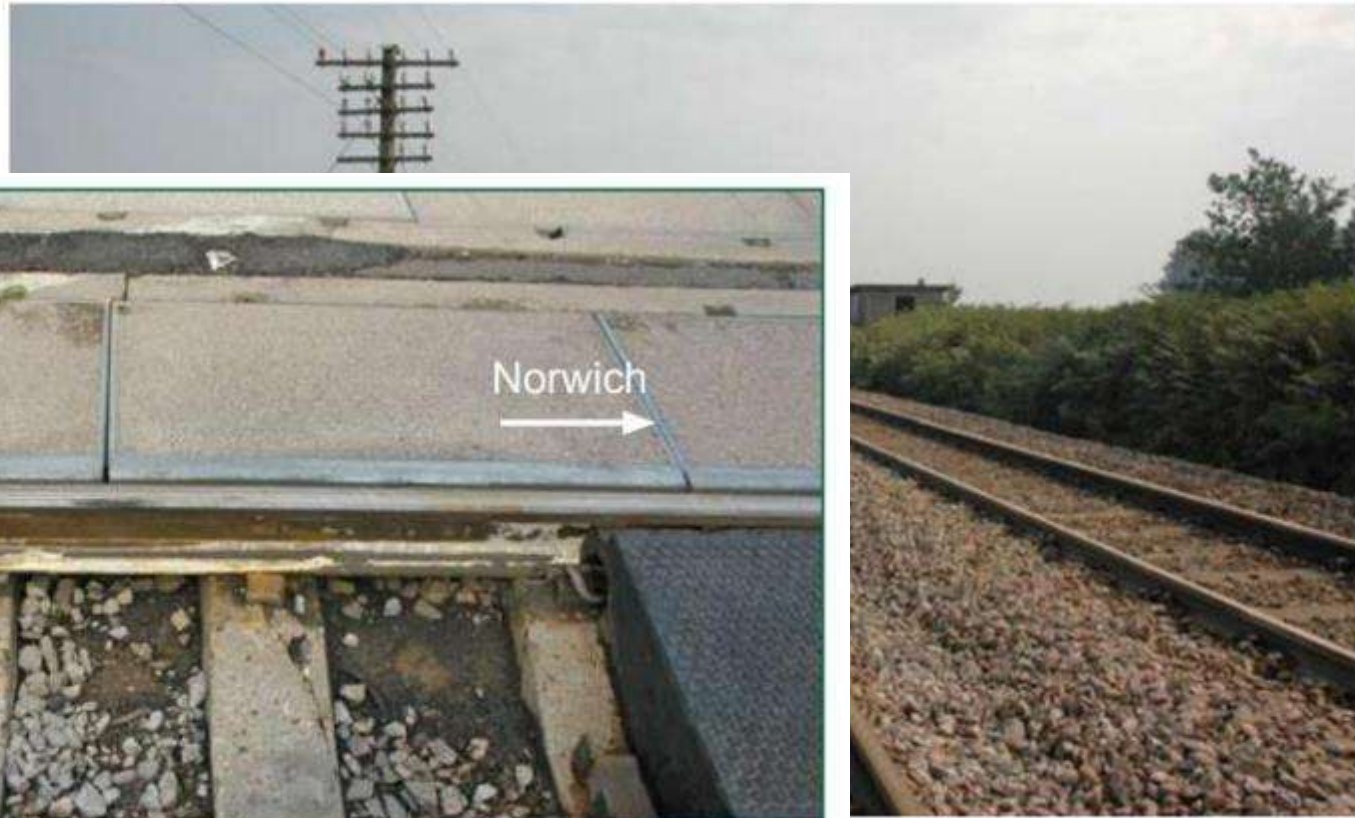
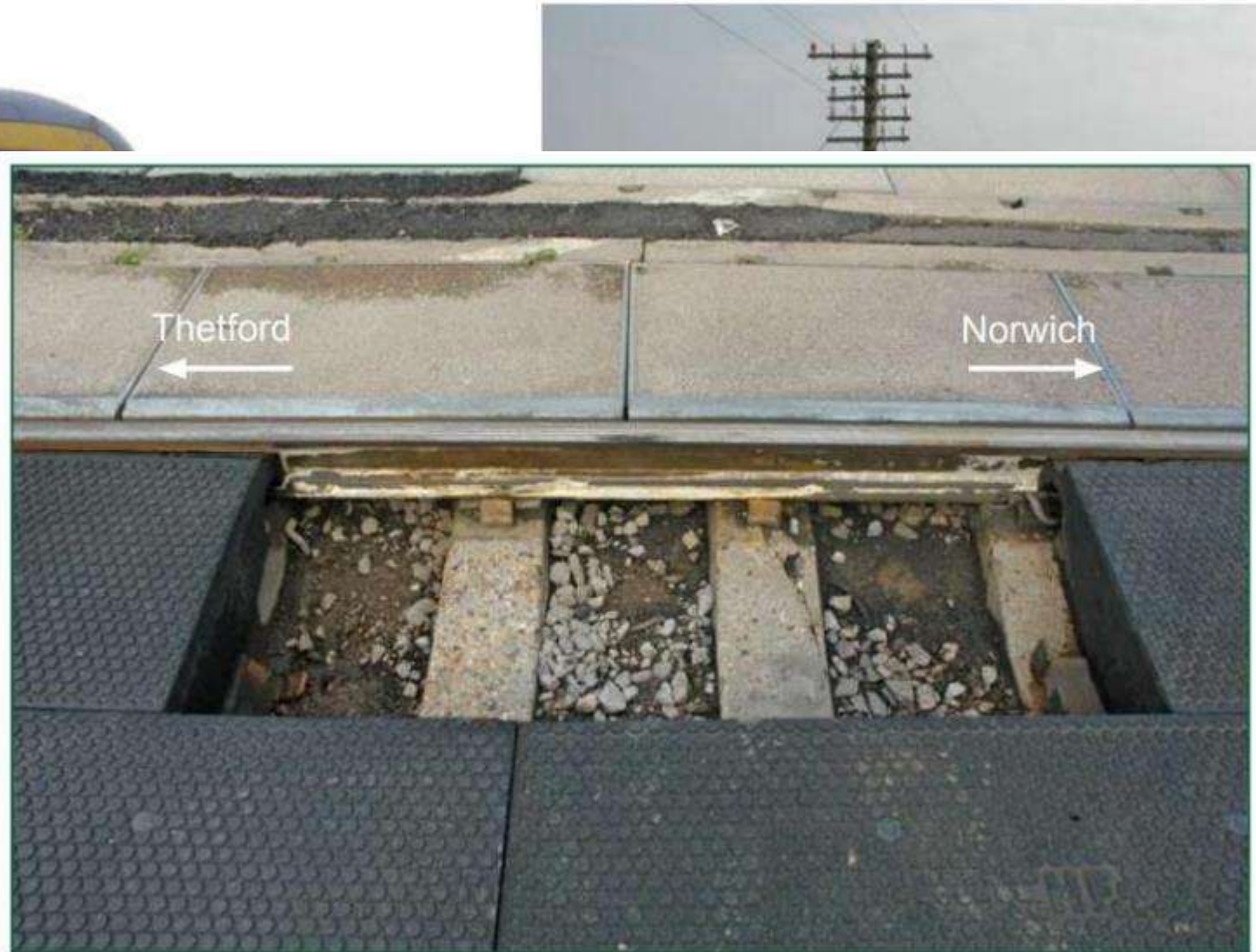
Analysis techniques – reconstruction / testing



Analysis techniques – reconstruction / testing



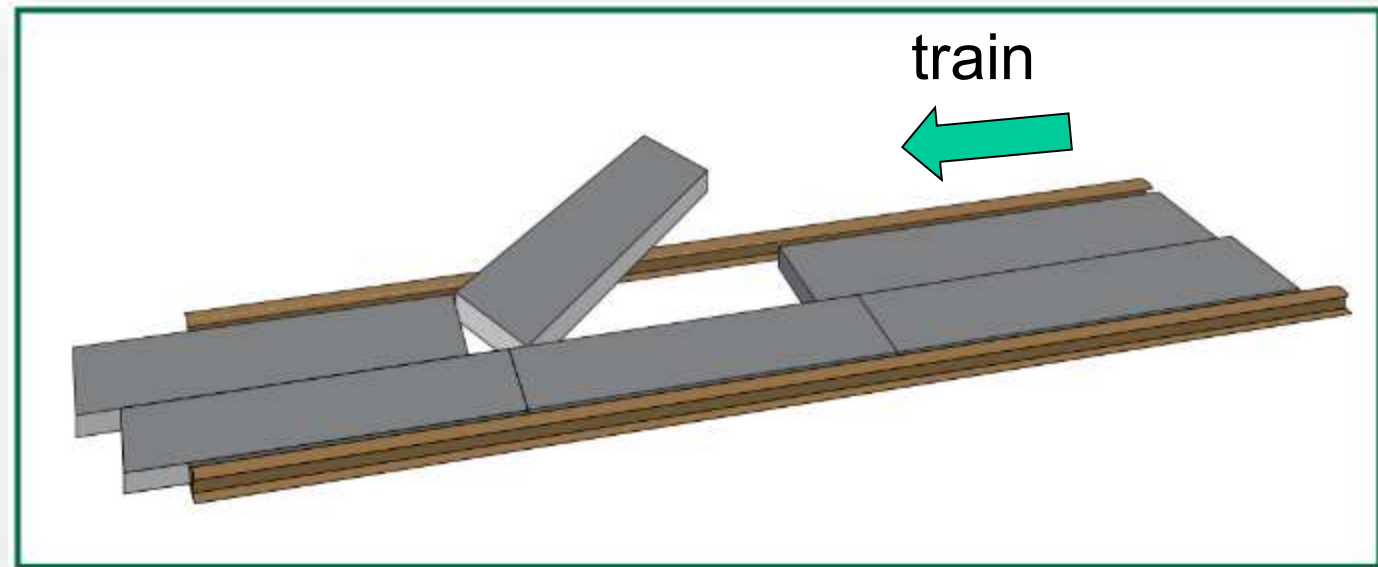
Sometimes it may seem obvious.....



...but there's still plenty to investigate



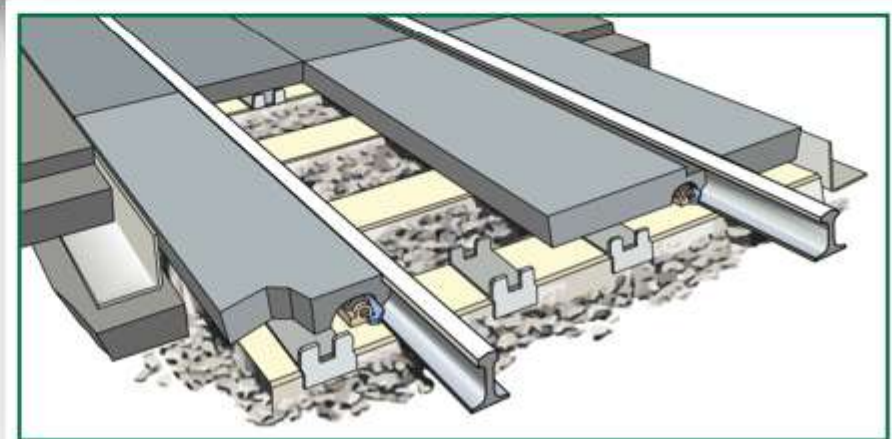
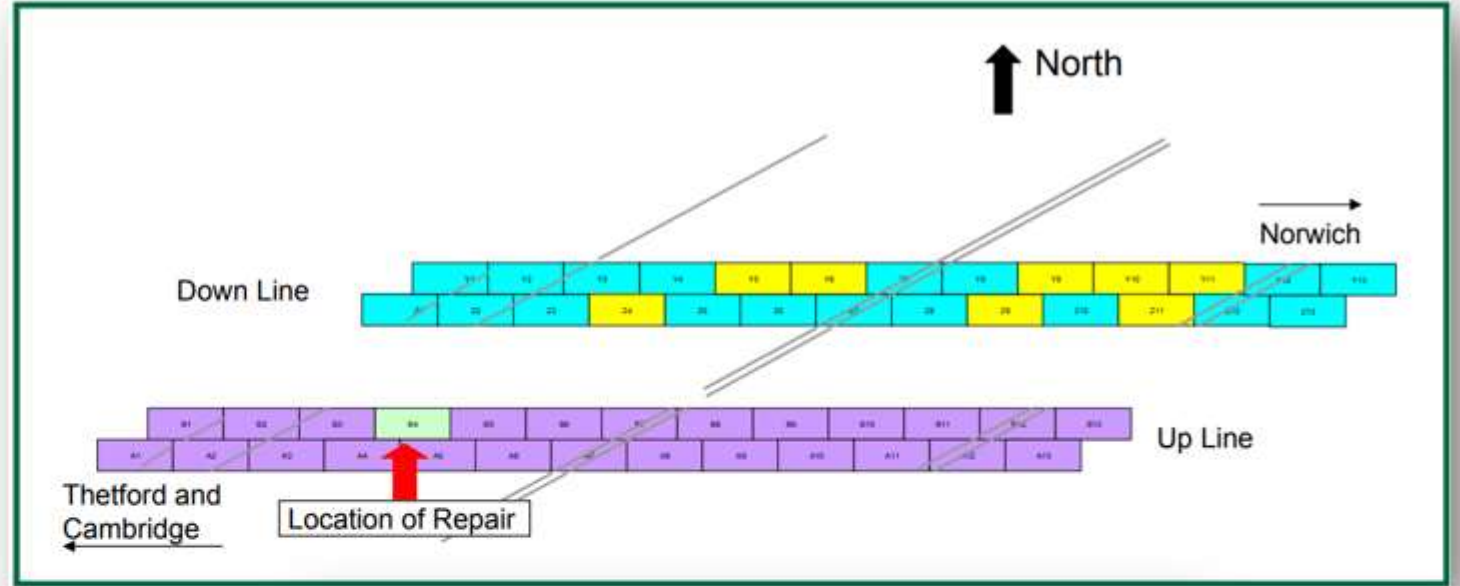
Mutual damage



CCTV / eyewitness



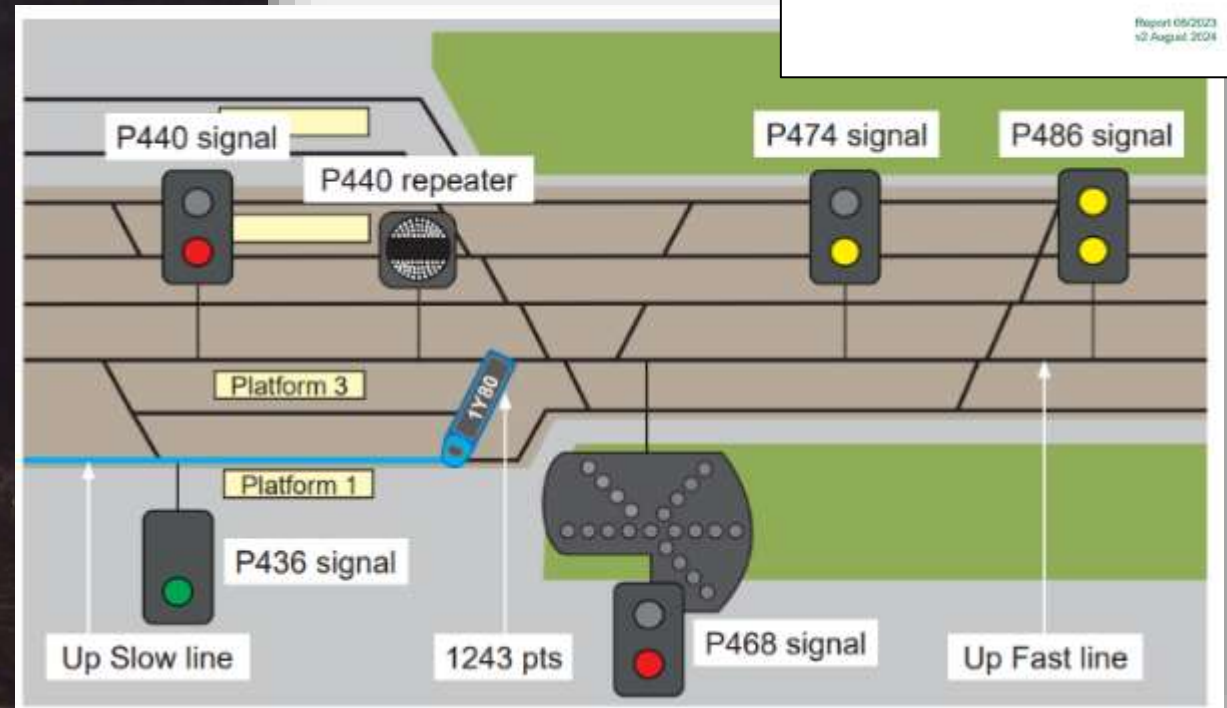
Further examination and analysis



Consequence



Consequence



Rail Accident Report



Train overspeeding at Spital Junction,
Peterborough
17 April 2022

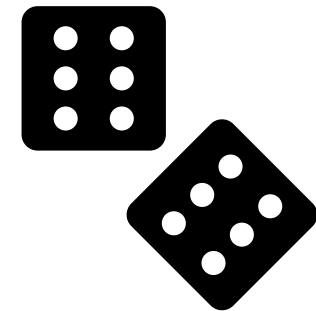
Report 09/2023
v2 August 2024

Consequence



A simple equation....

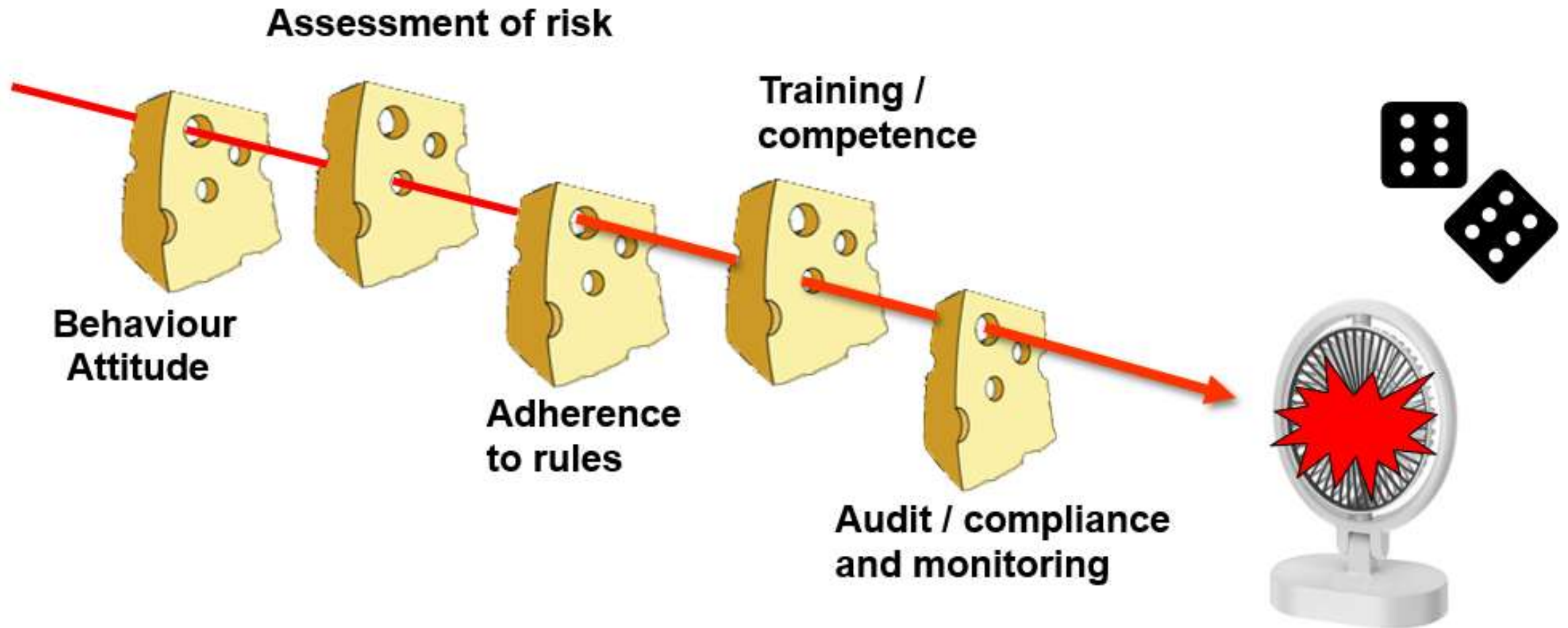
near miss = near hit



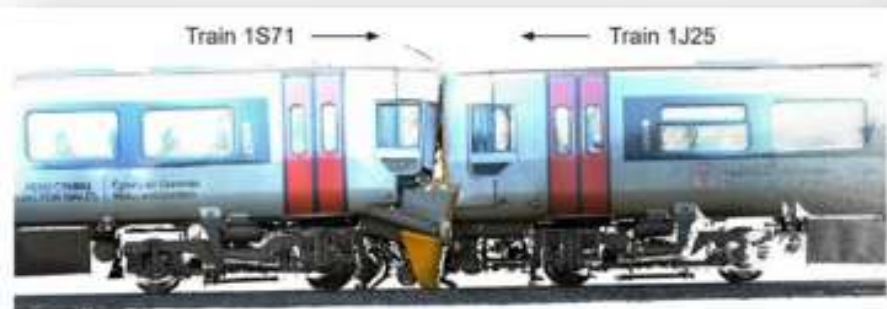
A near hit



Incident factors



What's on the horizon?



What's on the horizon?



Longitudinal Bearer Systems

Independent report

Urgent Safety Advice 01/2024: Derailment on bridges with longitudinal timber systems

Published 24 October 2024

