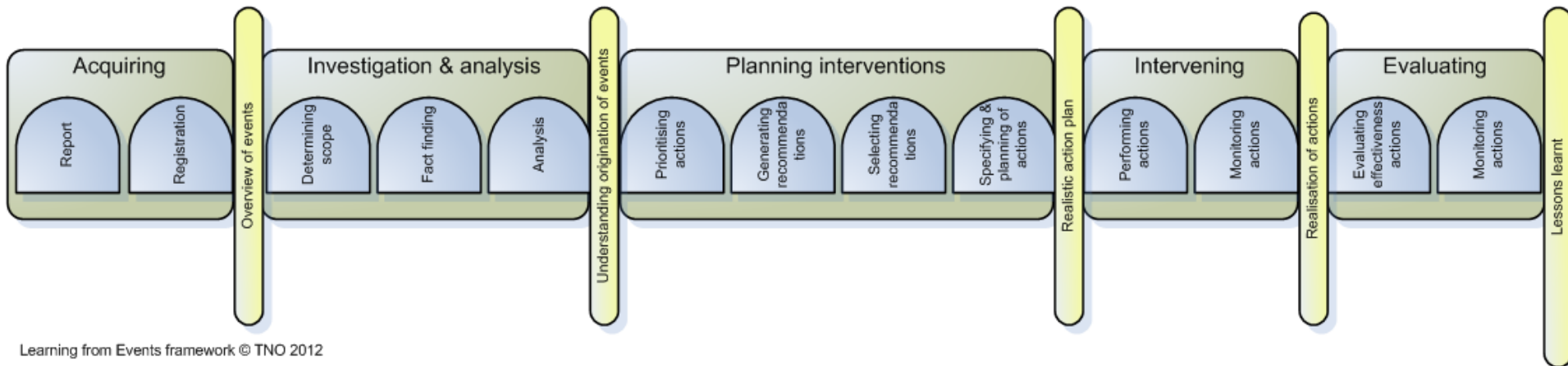


Selection of and proportionality in investigation

aka spending your time on the right things ...

Learning from Events

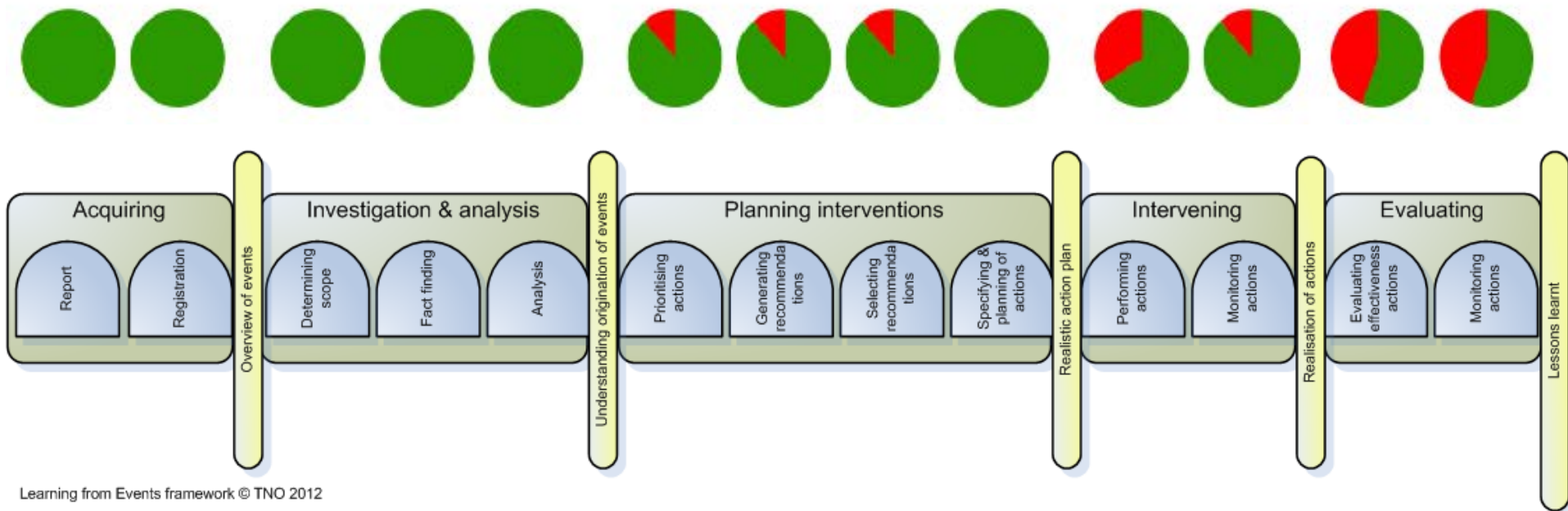
Model Based on an extensive literature review: 13 steps and 5 stages



TNO – Dutch independent research organisation

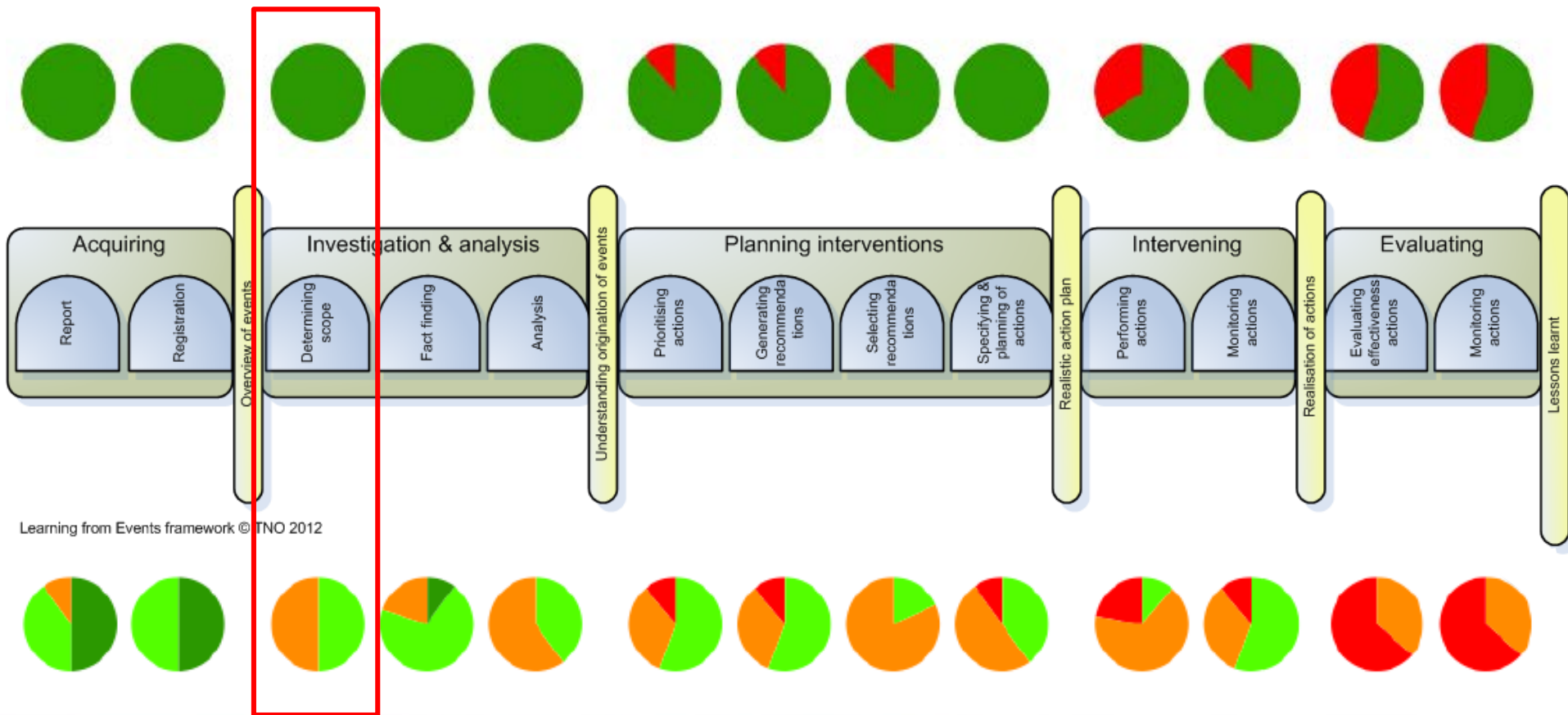
Learning from Events – formal procedures

- 11 companies surveyed
- How do you formally organise your learning from events process?



Learning from Events – actual

- 11 companies surveyed
- How are the steps in the learning process actually performed?



Safety Bulletin

A serious incident has taken place



Engineering work site given up whilst track remained obstructed

Issued to: All Network Rail line managers,
safety professionals and RISQS
registered contractors

Ref: NRB 17/09

Date of issue: 19/05/2017

Location: Kirkham South Junction, LNW
Route

Contact: [Darren Cobb](#), Head of Safety &
Sustainable Development



Overview

At 05:25 on 15 May 2017 a tamper, travelling at 15 mph transiting to exit the possession safely stopped short of a 5 metre long pile which was obstructing the Down Main line.

The transit was not part of arrangements for verifying the line as clear. Other than the chance presence of the tamper, there were no further controls in place to prevent the first passenger service, at line speed encountering the pile.

So the work group installed the pile to a safe depth and travelled back to the access point approximately 20 minutes away. No-one on-site remembered to collect the pile which had been set down in the four foot.

An investigation is underway; however the following contributory factors have been established:

RSSB Investigation Guidance

Taking a risk based approach to investigations



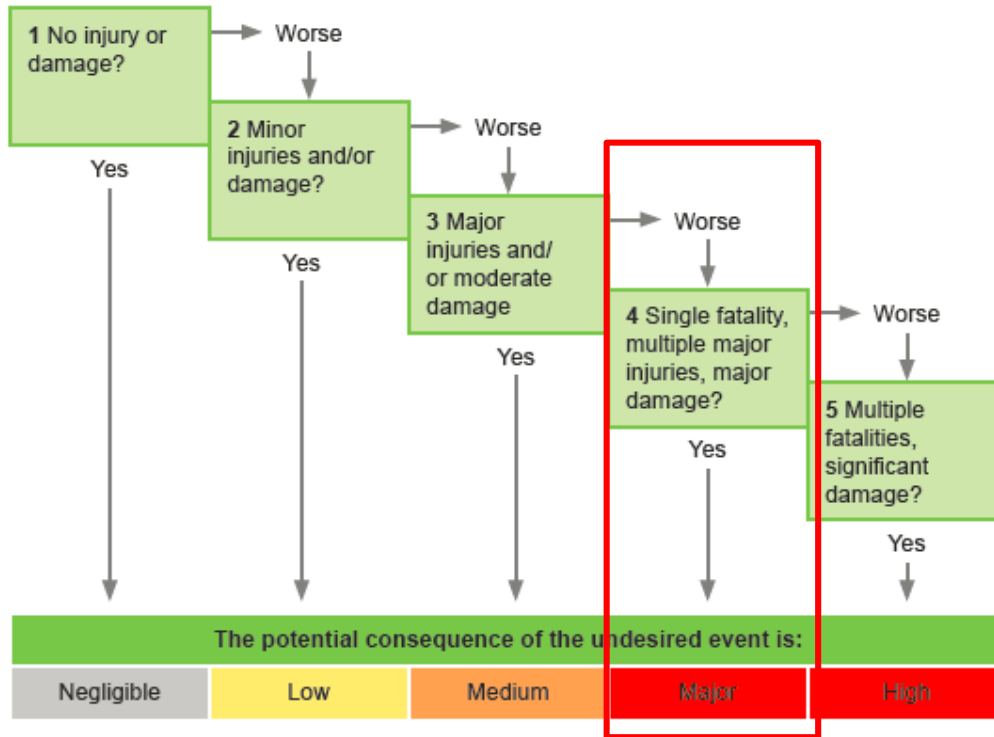
Undesired Event

Question 1
What is the credible worst outcome?

Note 1 Use the currently available information, eg from initial witness statements, early evidence, identifiable causes, human factors observations and risk assessments

Note 2 In answering the question start at the least outcome and follow the options below

Note 3 See on the next page the descriptions of the levels of consequence linked to the decision points 1-5 in green boxes below



Question 2

What is the overall level of effectiveness of the safety barriers preventing the undesired event reaching the credible worst outcome?
 (When considering the remaining barriers at this stage investigators should focus on those which are more immediate or local, rather than those at a higher management system level)

The level should not change to higher than that for the credible worst outcome. To use the matrix below first note the outcome from Stage 1 then answer Question 2 on the effectiveness of barriers. From the identified box then move down to get the initial level of investigation.

Stage 2: Answer to Question 2	From Stage 1: The credible worst outcome				
	Negligible	Low	Medium	Major	High
High	Negligible risk	Negligible risk	Low risk	Low risk	Medium risk
Medium	Negligible risk	Low risk	Medium risk	Medium risk	Medium risk
Low	Negligible risk	Low risk	Medium risk	Medium risk	Major risk
Negligible	Negligible risk	Low risk	Medium risk	Major risk	Major risk

Initial level of investigation				
	Record the event	Low level	Medium level	High level

Arrows indicate the mapping from the 'Negligible' row of the matrix above to the 'Initial level of investigation' table below.

Stage 1

Stage 2

Stage 3

Level of Investigation

Credible worst outcome

Effectiveness of barriers

Wider factors

Question 3

Should the initial level of investigation be **confirmed, escalated or downgraded** after consideration of the following criteria?

- Any likely systematic management failures
- Existing company policies
- Potential loss via claims and insurance premiums
- The level of investigation for similar previous events
- Other related undesired events forming a series (eg common location, equipment, behaviours, • personnel or underlying causes)
- Gaining the optimum safety benefit for the company and the industry
- Other investigations into the same event by, eg, ORR, BPT and RAIB
- A sense check including consideration of public, passenger and stakeholder interests
- Issues relating to other involved Transport Operators

Confirm, escalate or downgrade the initial level of investigation and record the reason for the decision.

Final: Record the event

Final: Low level of investigation

Final: Medium level of investigation

Final: High level of investigation

The level of investigation should be kept open to review throughout the investigation process.

Stage 1

Stage 2

Stage 3

Level of Investigation

Credible worst outcome

Effectiveness of barriers

Wider factors

PER decision grid

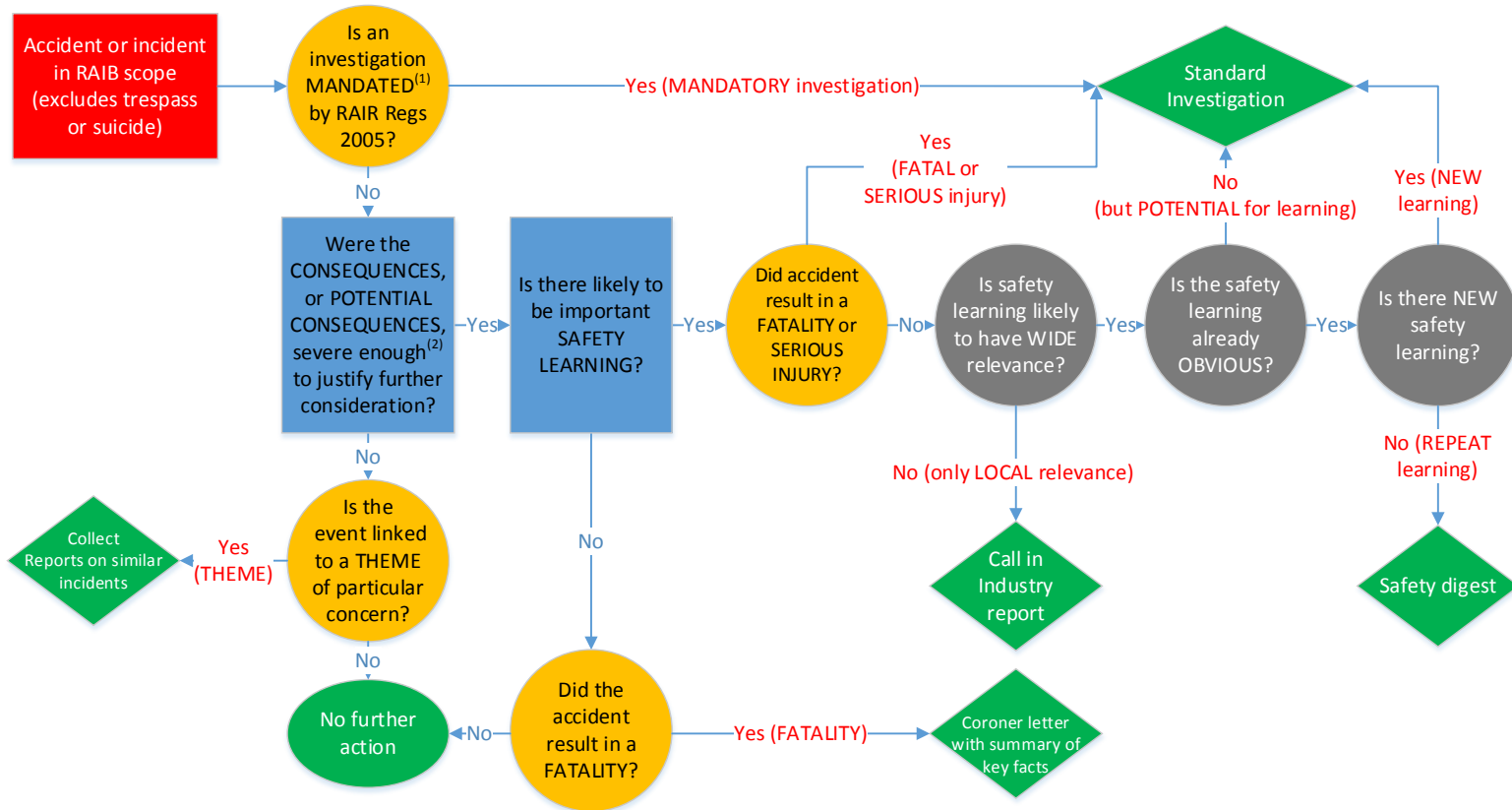
(Guidance on completing the grid is presented in the notes section of the slides)



Selecting Investigations (August 2017)

⁽¹⁾ An investigation is mandated for a 'serious accident', namely an accident involving a derailment or collision of rolling stock which has an obvious impact on railway safety regulation or management of safety and includes such an accident that results in -
 a) the death of at least one person;
 b) serious injuries to five or more persons; or
 c) extensive damage (assessed to be greater than €2m) to rolling stock, the infrastructure or the environment

⁽²⁾ Accidents with the following consequences, or potential consequences are to be considered:
 a) moving train accident with fatality, serious injury, multiple minor injuries or significant damage;
 b) potentially high risk train accidents, ie derailment on a running line, collision causing significant damage, significant distance runaway, discharge from a dangerous goods train; or
 c) other high risk event, eg very serious SPAD, high risk WSF or catastrophic train failure





Accident consequences

		Comment
Schedule of accident	Sch no.	
Is an investigation mandatory	Y/N	
Is it a moving train accident with <ul style="list-style-type: none"> • Fatality • Serious or multiple minor injuries • Significant damage 	Y/N/-	
In slightly different circumstances could it have resulted in: <ul style="list-style-type: none"> • Fatality • Serious or multiple minor injuries • Significant damage 	Y/N/-	
Is it a 'potentially high risk train accident', ie: <ul style="list-style-type: none"> • Derailment on a running line • Collision causing significant damage • Runaway trains (significant distance) • Discharge from a dangerous goods train 	Y/N/-	
Is it a high risk event, eg: <ul style="list-style-type: none"> • Very serious SPAD • High risk WSF • Catastrophic train failure 	Y/N/-	



Accident trends & initiatives

		Comment
Is the accident/incident a part of a theme? <i>If 'NO', there is no need to answer remaining questions on this slide</i>	Y/N	
Are we currently monitoring the theme?	Y/N/-	
Have the industry and/or safety authority got a related initiative?	Y/N/-	
Should the theme be monitored as part of Schedule 3, etc. data capture?	Y/N/-	
Is the associated trend significant enough (and/or rising) to warrant consideration for a class investigation?	Y/N/C/-	C = Continue to monitor



Safety learning

		Comment
Is there the potential for important safety learning: <ul style="list-style-type: none"> • Remove a factor • Prevent/reduce consequence of a factor <i>If 'NO', there is no need to answer remaining questions on this slide</i>	Y/N	
Type of important safety learning: <ul style="list-style-type: none"> • New recommendation • Reinforcing previous recommendation • Reinforcing compliance 	N/R	
Current understanding of important safety learning: <ul style="list-style-type: none"> • Obvious • Potential/requires further investigation to determine 	O/P	
Scope of important safety learning: <ul style="list-style-type: none"> • Locally applicable • Widely applicable 	L/W	

Near miss between a tamper and steel pile near Kirkham, Lancashire, 15 May 2017

1. Important safety messages

This incident demonstrates the importance of:

- having a formal, well briefed process for checking that a site of work is clear of materials and equipment at the end of work, including identification of the person with responsibility for the checking
- where possible, not placing objects capable of endangering trains in locations where such equipment could present a threat to railway safety were they to be forgotten
- good lighting at a site of work to illuminate any materials or equipment remaining on the track at the end of work

Risk Assessment Matrix (Safety) Method

Potential Likelihood Score

Potential Impact Score

		A >25 years	B 5 to 25 years	C 1 to 5 years	D 1 to 5 per year	E >5 per year
5 >10 FWI		0	0	0	0	0
4 2 to 10 FWI		0	0	0	0	0
3 0.5 to 2 FWI		0	0	0	0	0
2 0.1 to 0.5 FWI		0	0	0	0	0
1 <0.1 FWI		0	0	0	0	0

Each cell contains the number of incidents with that risk ranking.

For the risk ranking the following criteria have been applied:

- the potential impact score is based on the worst credible outcome of the event under different circumstances; and
- the potential likelihood score is based on the number of times similar events with that potential impact have occurred previously, or are credible based on current trends.

Likelihood and impact categories are based on the Corporate Risk Assessment Matrix (Safety).

- ▶ Safety events from the National Control logs are assessed using the corporate risk assessment matrix (safety)
- ▶ An initial risk rating determined using the following criteria:
 - ▶ - **potential impact** based on the worst credible outcome
 - ▶ - **likelihood** based on the number of times similar events with that potential impact have occurred previously (or are credible based on current trends)

Risk Assessment Matrix (Safety)

Potential Likelihood Score

		A	B	C	D	E
		>25 years	5 to 25 years	1 to 5 years	1 to 5 per year	>5 per year
Potential Impact Score	5	0	0	0	0	0
	>10 FWI					
	4	0	0	0	0	0
	2 to 10 FWI					
	3	0	0	0	0	0
0.5 to 2 FWI						
2	0	0	0	0	0	
0.1 to 0.5 FWI						
1	0	0	0	0	0	
<0.1 FWI						

Each cell contains the number of incidents with that risk ranking.
 For the risk ranking the following criteria have been applied:
 - the potential impact score is based on the worst credible outcome of the event under different circumstances; and
 - the potential likelihood score is based on the number of times similar events with that potential impact have occurred previously, or are credible based on current trends.
 Likelihood and impact categories are based on the Corporate Risk Assessment Matrix (Safety).

- ▶ **potential impact** based on the worst credible outcome
- ▶ **likelihood** based on the number of times similar events with that potential impact have occurred previously (or are credible based on current trends)



Train Accident Risk HiPos – Period 5 - 7

Potential Likelihood Score

		A	B	C	D	E
		>25 years	5 to 25 years	1 to 5 years	1 to 5 per year	>5 per year
Potential Impact Score	5 >10 FWI	0	0	0	0	0
	4 2 to 10 FWI	0	2	0	0	0
	3 0.5 to 2 FWI	3	69	3	0	0
	2 0.1 to 0.5 FWI	0	80	5	1	0
	1 <0.1 FWI	1	6	46	2	0

Each cell contains the number of incidents with that risk ranking.

For the risk ranking the following criteria have been applied:

- the potential impact score is based on the worst credible outcome of the event under different circumstances;
and

- the potential likelihood score is based on the number of times similar events with that potential impact have occurred previously, or are credible based on current trends.

Likelihood and impact categories are based on the Corporate Risk Assessment Matrix (Safety).

- ▶ The chart shows all Train Accident Risk events that have been ranked in accordance with the Corporate Risk Assessment Matrix and included on the Weekly Safety Summary since the start of Period 5 (up to Period 7, Week 3).
- ▶ Those that are coloured Red are considered High Potential (HiPo) events and are included in this review.

HiPo Events – Periods 5 to 7

The following table shows the Train Accident Risk events that have been identified as HiPo during Periods 5 - 7.

Signalling WSFs	B4	15/08/2017	London Waterloo	Wessex	A passenger train derailed by the two leading bogies and collided with an ALO (Adjacent Line Open) Barrier Train as it passed over pointwork as it departed London Waterloo (line speed 15 mph). Two minor injuries were reported.
Infrastructure Operations	C3	11/08/2017	RIDC Melton	RIDC	Two Bombardier Crossrail trains under test came within a mile of each other on the same section of track on the Down Reversible Line between Asfordby and Old Dalby (line speed 125 mph), after an Operational Safety Manager gave permission for a train to pass a Stop Board and enter the section without establishing the position of the other train. RIDC (Rail Innovation & Development Centre) Melton is operated by Serco under contract to Network Rail.
Objects on the Line	C3	25/08/2017	Giggleswick	LNW	A passenger train struck a P'Way trolley loaded with sleepers on the Down Branch line between Giggleswick and Clapham whilst travelling at 60 mph. A line blockage of the Up and Down Branch lines had been granted earlier with the Down Branch Line Blockage handed back for the passage of the train, but with the P'Way trolley left in situ.
Train Operations & Failures	C3	14/08/2017	Ely North Jcn	Anglia	Eleven wagons of a freight train conveying 33 wagons derailed on the Down Main line at Ely west Jcn (line speed 60 mph). The last vehicle was also reported to be conveying dangerous goods, but did not derail.
Train Operations & Failures	D2	15/08/2017	London Kings Cross	LN&EM York	A passenger train struck the buffer stops in Platform 9 at London Kings Cross at slow speed, moving them back 1 metre. Two persons were reported to have sustained minor injuries.
SPADs	B4	30/09/2017	Princes Street Gardens	Scotland	An unscheduled shunt movement passed E848 signal at danger at Princes Street Gardens by 46 metres, passing beyond the first potential conflict point and running through a set of points in the reverse direction (line speed 15 mph). A passenger train had been signalled through these points and the driver of the shunt movement (GB Railfreight) had read across to that signal.

HiPo Events – Periods 5 to 7

The following table shows the level of investigation, lead investigator and RAIB level of investigation for the Train Accident Risk events identified as HiPo since during Period 5 - 7.

Signalling WSFs	15/08/2017	London Waterloo	Level 3	TBC	RAIB Investigation
Infrastructure Operations	11/08/2017	RIDC Melton	Contractor Level 1	Serco	
Objects on the Line	25/08/2017	Giggleswick	Level 3	David Bray	Safety Digest
Train Operations & Failures	14/08/2017	Ely North Jcn	Level 3	Ian Spencer	RAIB Investigation
Train Operations & Failures	15/08/2017	London Kings Cross	TOC	GTR	Safety Digest
SPADs	30/09/2017	Princes Street Gardens	Level 3	Kenny Blythe	

