

Accident investigation: what's the point?

Presentation to IRSC 2017

John Cope (Principal Inspector, Rail Accident
Investigation Branch, UK)

Overview of presentation

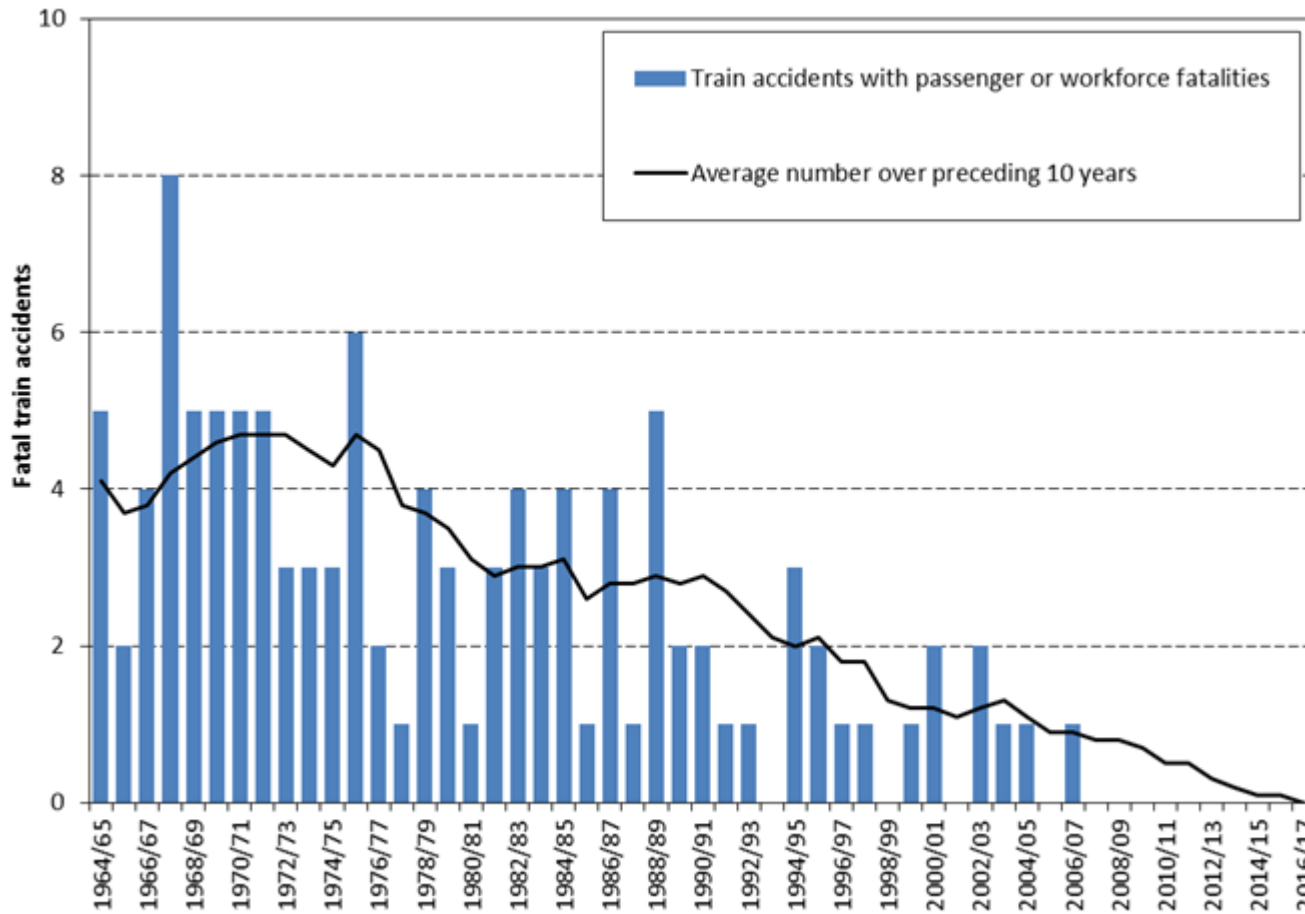
- ▶ Major rail accidents - the reason the RAIB exists
- ▶ Trend in major rail accidents in the UK
- ▶ The link between major and minor accidents
- ▶ Case study - near-miss at Hest Bank, 22 September 2014
- ▶ Near-misses and accidents - interchangeable safety learning
- ▶ So what is the point of accident investigation?

The reason the RAIB exists

- ▶ Ladbroke Grove, 5 October 1999
- ▶ Head-on collision between two trains
- ▶ 31 people killed, more than 400 injured
- ▶ Public Inquiry chaired by Lord Cullen QC
- ▶ Part 2 of the Inquiry considered management of safety:
 - ▶ Recommendation 57 - the establishment of the RAIB
 - ▶ Recommendation 59 - RAIB to focus on more serious accidents



Trend in fatal rail accidents - Britain's main line railways



The link between major and minor accidents



- ▶ Does the reduction in fatal accidents mean that safety is under control, and there is nothing more to learn?
- ▶ Can explore the issue by asking questions about less serious accidents and incidents:
 - ▶ “Could this event have had a much more serious or even catastrophic outcome?”
 - ▶ “What was it that prevented a more serious outcome?”
 - ▶ “Is there valuable safety learning to be obtained from less serious events?”

Hest Bank - 22 September 2014



*Forward Facing
CCTV images
courtesy of
First
TransPennine
Express*

What happened?



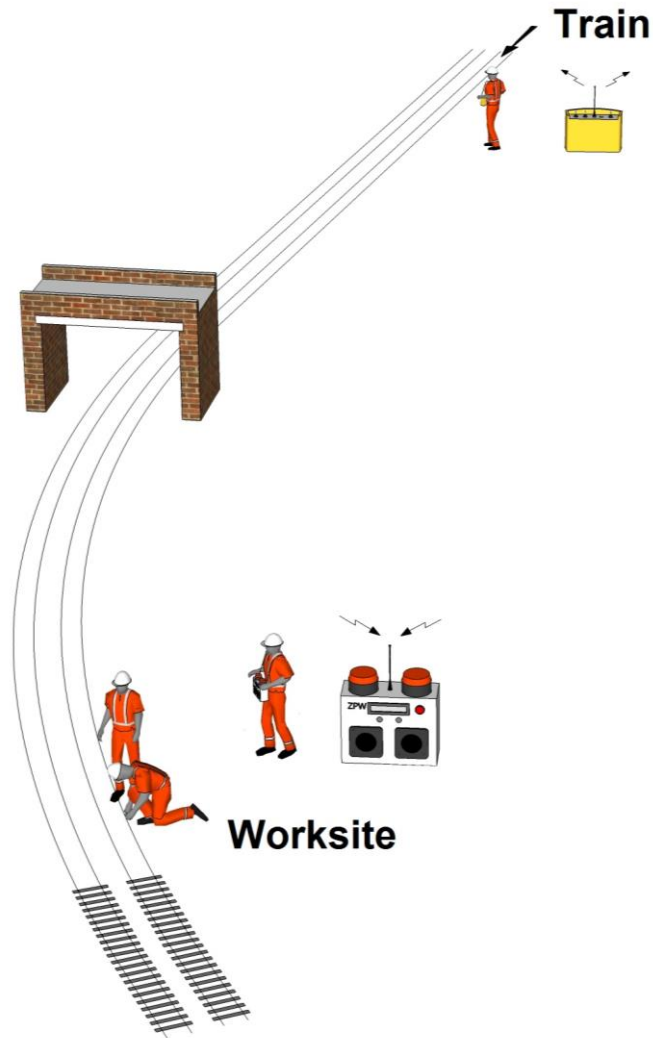
- ▶ Train running at 98 mph (158 km/h) approaches a group of nine track maintenance workers without warning
- ▶ They have 3 seconds to get clear of the line
- ▶ One rail has been lifted by a jack which collapses under weight of train
- ▶ No injuries and little damage

What should have happened?

- ▶ A 'lookout', positioned several hundred metres from the work group sees approaching train
- ▶ He operates a switch on his transmitting equipment
- ▶ The receiver at the worksite emits an audible and visual alarm
- ▶ The track workers move clear, and are in a place of safety at least ten seconds before the train arrives



The protection arrangements at Hest Bank



So what had gone wrong...and why?

- ▶ The lookout did not operate the warning switch and the work group did not receive an alarm
- ▶ No definitive explanation;
 - ▶ Lookout's vigilance possibly diminished over time; or
 - ▶ He may have operated the wrong switch (similar switches on device performed different functions)

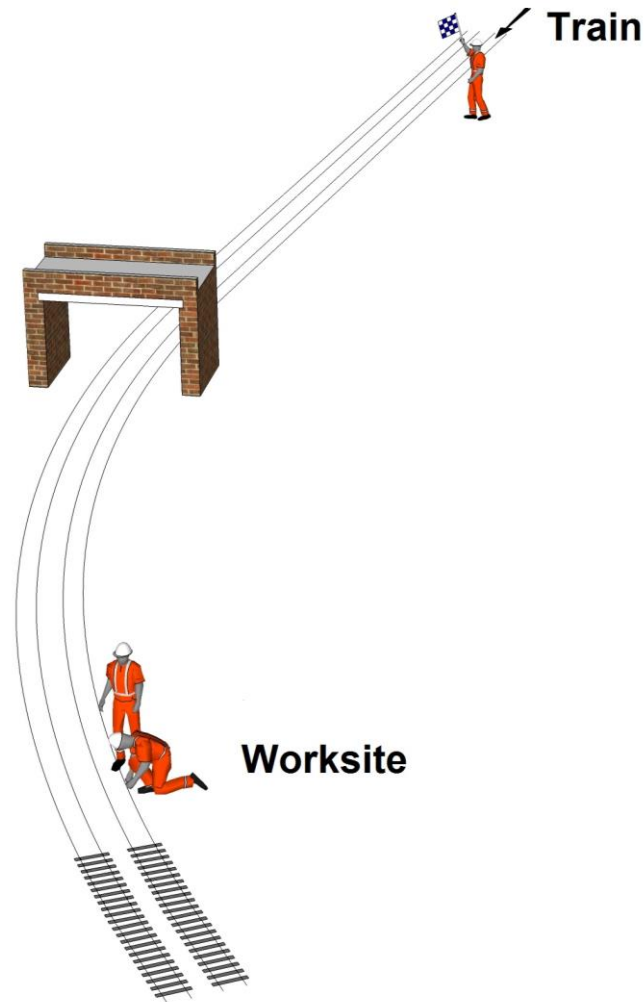


But underlying the incident were two much more important factors

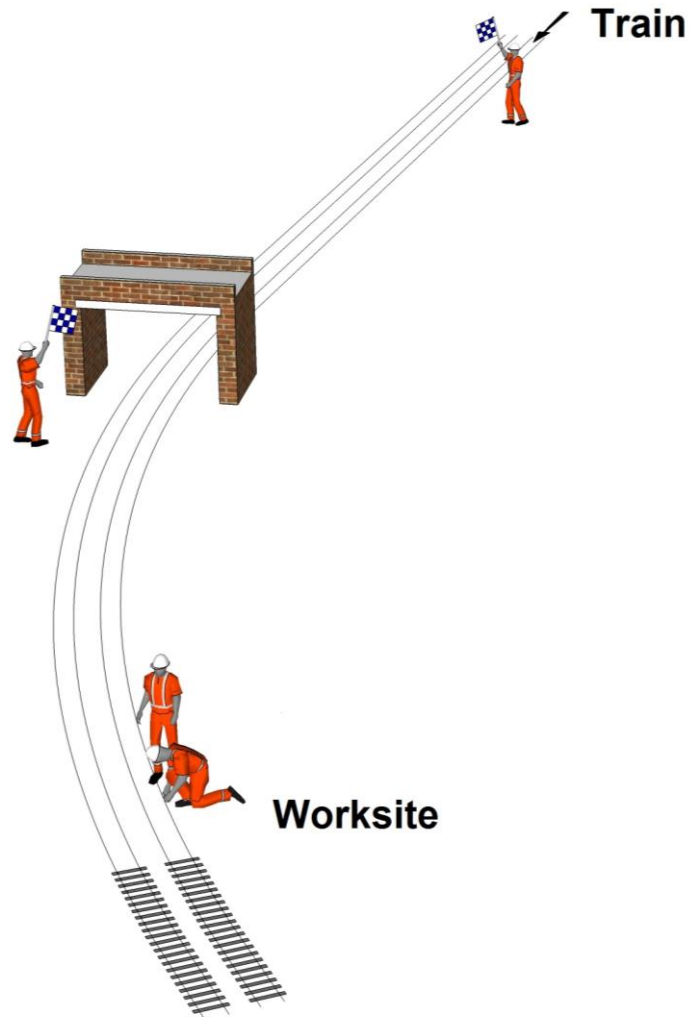
Underlying Factor 1

- ▶ The technology-based method of protecting the work group was less safe than the manual method it had replaced

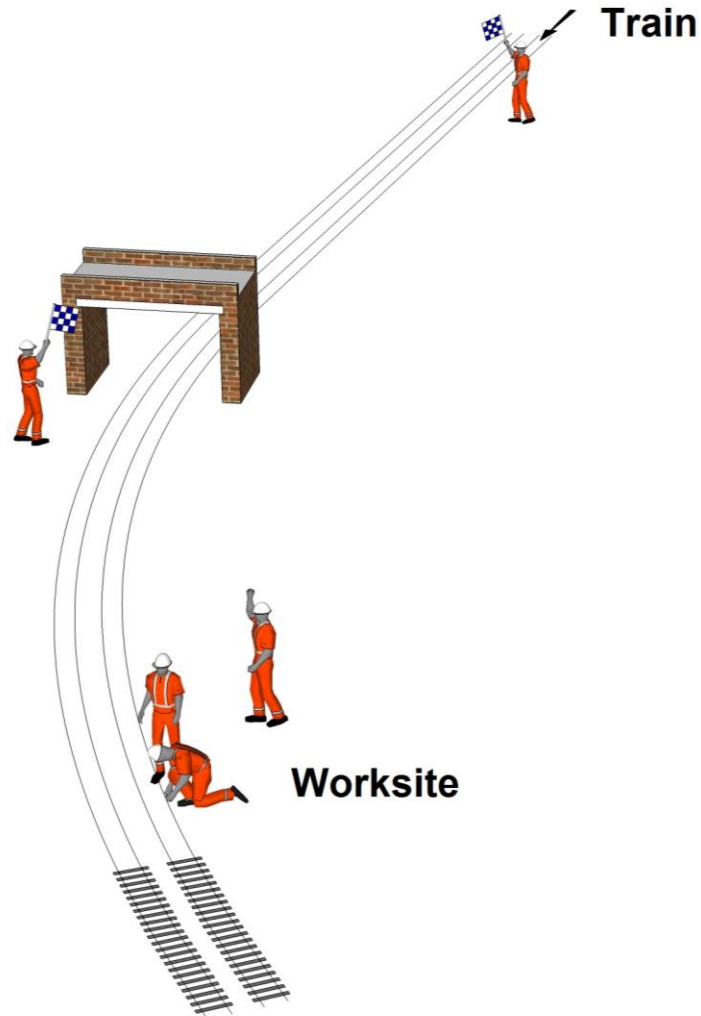
Manual method of protecting track workers (1)



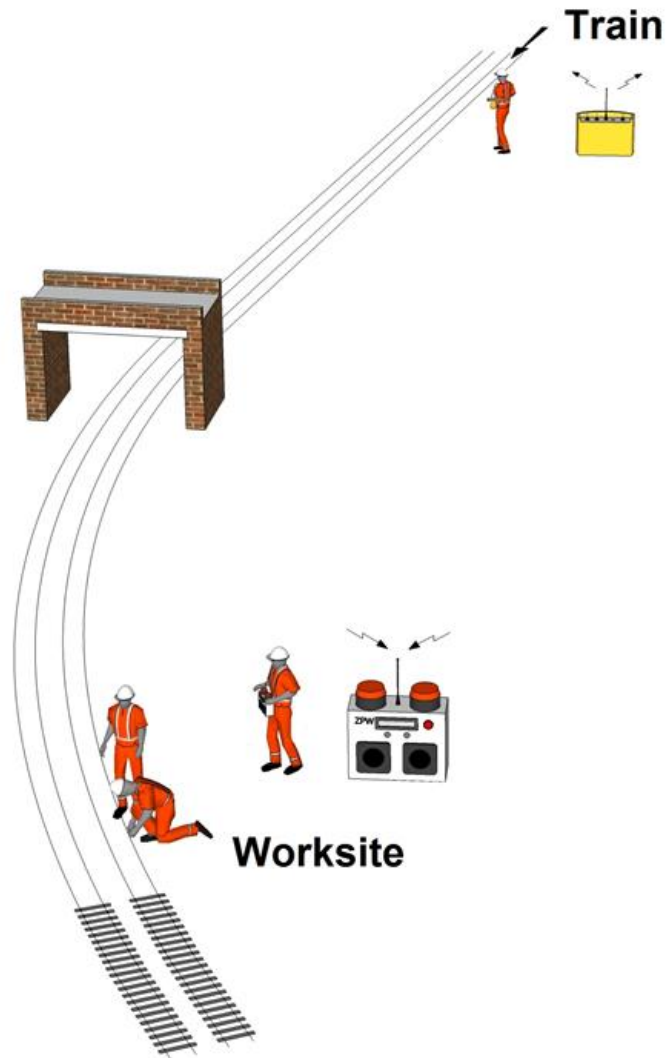
Manual method of protecting track workers (2)



Manual method of protecting track workers (3)



...and with the aid of technology



Underlying factor 2

- ▶ Inadequate risk assessment
 - ▶ Consideration of human factors in design of lookout's handset:
 - ▶ Identical switches for different functions
 - ▶ No 'feedback' to confirm warning given
 - ▶ Introduction of single point of failure

Consequences

- ▶ No physical injuries
- ▶ No damage, but...
- ▶ ...nine people had a near-death experience and suffered the trauma that goes with it
- ▶ What about levels of trust and relationships within the team?
- ▶ The train driver also suffered trauma as a result of the incident
- ▶ Near-misses are not victimless

Near-miss investigation



- ▶ At Hest Bank, the immediate causes, causal factors and underlying factors would have been identical if nine people had been killed
- ▶ There were no technological or procedural defences left against this event
- ▶ It was purely luck that defined the outcome.
- ▶ Therefore:
 - ▶ Irrespective of a strong safety record, risk is not fully under control
 - ▶ The safety learning from the incident is valuable - obtained at no physical cost

So what is the point of accident investigation?

- ▶ Relentless focus on driving down risk, particularly low frequency, high consequence events
- ▶ Challenging weaknesses or lapses in standards
- ▶ Focusing on areas which operators may not be able to see for themselves, e.g. organisational cultural issues
- ▶ Drawing attention to what is contributing to the avoidance of accidents...what went right?
- ▶ A reduction in accident rates is a cause for celebration, but not complacency
- ▶ Industry and investigators must work in partnership to maintain accident rates (and risk) at low levels.

