Role of Human Factors in Supporting Safety Learning from Accidents

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Introduction

Human Factors - Supporting Safety Learning from Accidents

Human Factors and the RSSB Research Programme

Role of Human Factors in Incident Investigation

Example results on Verbal Communication Issues

Human Reliability

Human Factors

- The optimisation of human performance in the workplace.

- Considers the working environment from a human-centred viewpoint, looking at the whole system and its influence on the way people behave and interact with the railway.

RSSB R&D Programme

- Funded by the UK Department for Transport; ~£9 million per year
- Managed for industry by RSSB
- Programme scope: engineering, operations and management
- Research that no one company or sector could solve on its own
- A balanced programme of tactical improvements and strategic change
- SPARK for railway knowledge sharing and information:
  - free to access and open to anyone, anywhere
  - access to a range of international publications
  - information on research projects and initiatives
  - pointers to test facilities and centres of expertise.
  - www.sparkrail.org

Development Process: HF and Incident Investigations

1. Demonstrating the value of human factors data from investigations
   - An analysis of formal investigation and inquiries (SPARK Ref. T635)
2. Creating the software and framework to record human factors data in the national incident reporting system
   - Development of an incident factor classification system for SMIS (SPARK Ref. T994)
3. Supporting industry decision making and strategy with the data
   - Fatigue and its contribution to railway incidents
   - Developing a safety critical communication training package (SPARK Ref. T1078)
   - Human Factors causes of SPADs (SPARK Ref. T1128)
   - Train Driver Route Knowledge (SPARK Ref. T1108)

Investigation Framework

SMIS Classification System

Human Performance

1. **Slip/lapse**
2. **Intentional rule breaking**
3. **Decision error**
4. **The person was asleep or unable to respond to the situation**

10 Incident Factors

Verbal Communication

Fatigue, health and wellbeing

Processes and procedure documents

Written information on the day

Competence management

Infrastructure, vehicles, equipment and clothing

The person's environment

Workload (real or perceived) and resourcing

Teamworking and leadership

Risk management

10 Incident Factors

Verbal communication
The exchange of spoken information concerned with how safety critical information is communicated between staff

Fatigue, health and wellbeing
The individual's fatigue, health and wellbeing which is the joint responsibility of the organisation and the member of staff

Process and procedure documents
Written rules, standards, processes and methods of working which guide and structure activities undertaken

Written information on the day
Information that can be renewed day-to-day or week-to-week, and supports people in carrying out an activity or task

Competence management
The company competence management systems regarding selection, training and assessment

Infrastructure, vehicles, equipment and clothing
The infrastructure, vehicles, equipment or clothing used to undertake or support a task

The person's environment
The environmental stressors such as lighting levels, noise and temperature which can affect the performance of a person

Workload (real or perceived) and resourcing
Workload is the demands on a person which are influenced by the task, its context, the individuals who carry out the activity, and resourcing

Teamworking and leadership
How people are organised to work together, and how they relate to and influence each other to undertake their work safely

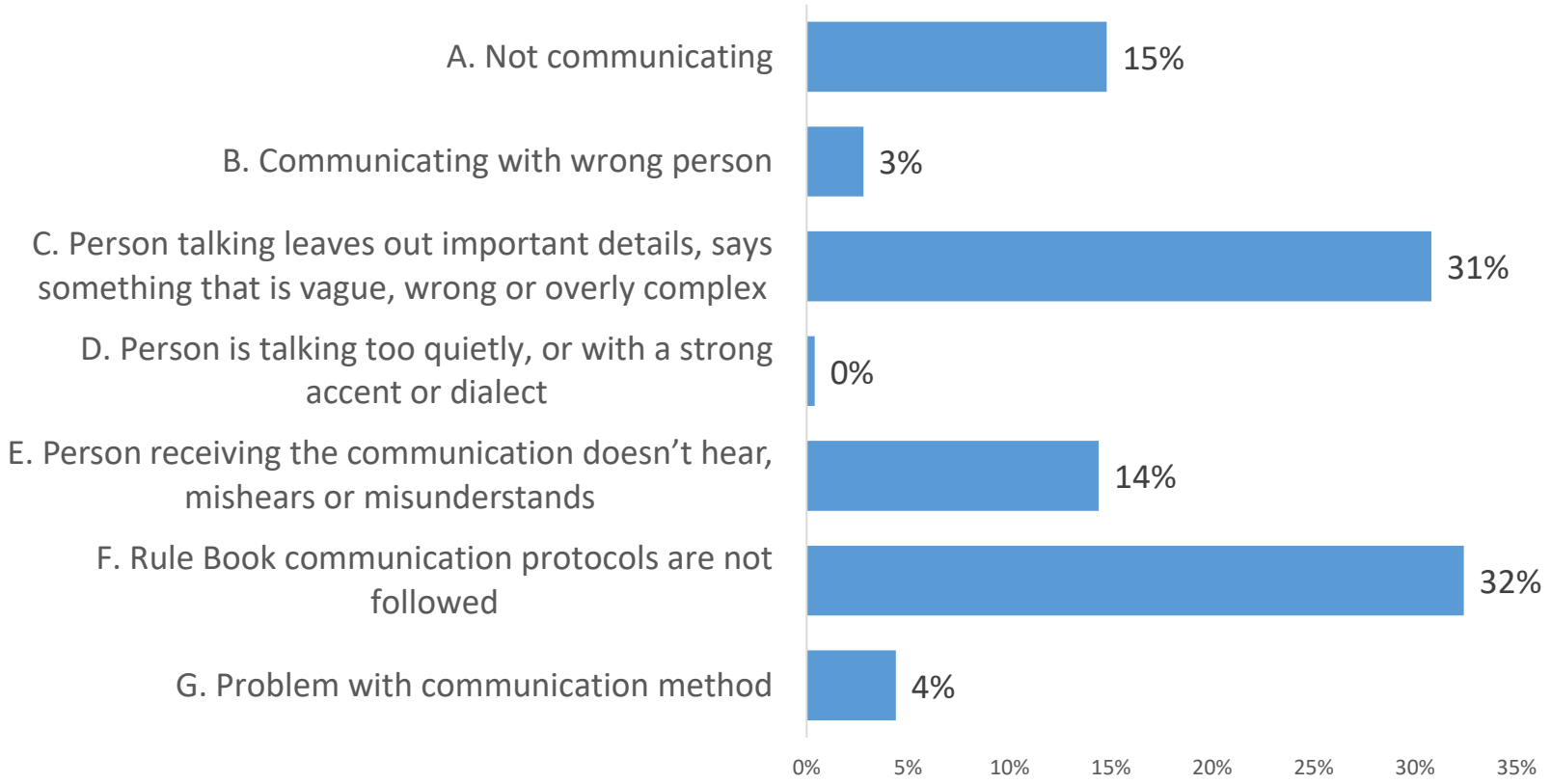
Risk management
The processes used to identify, assess, reduce and monitor potential safety concerns

Results on verbal communication issues

Example Analysis Output – Safety Critical Communications

- Verbal communications contributing to incidents:
  - What types of communication issue?
  - What safety management issues contribute to communication issues?
- Sample of 95 GB investigation reports involving communications as a factor (SPADs, track worker near miss, derailment, collision)
- Applied the HF framework in the SMIS database
- Identified 541 incident factors in 95 incidents (average 6 per incident)
  - 383 communication issues
  - 158 underpinning safety management issues from the 10 incident factors

Communication Factors Issues



Underpinning Safety Management Factors

10 incident factors	Total	%age
Workload (real or perceived) and resourcing	22	18%
Infrastructure, vehicles, equipment and clothing	22	18%
Fatigue, health and wellbeing	21	17%
Competence management	19	15%
Processes and procedure documents	16	13%
Written information on the day	15	12%
Teamworking and leadership	4	3%
Risk management	3	2%
The person's environment	3	2%
Total	125	100%

What did we do with the data?

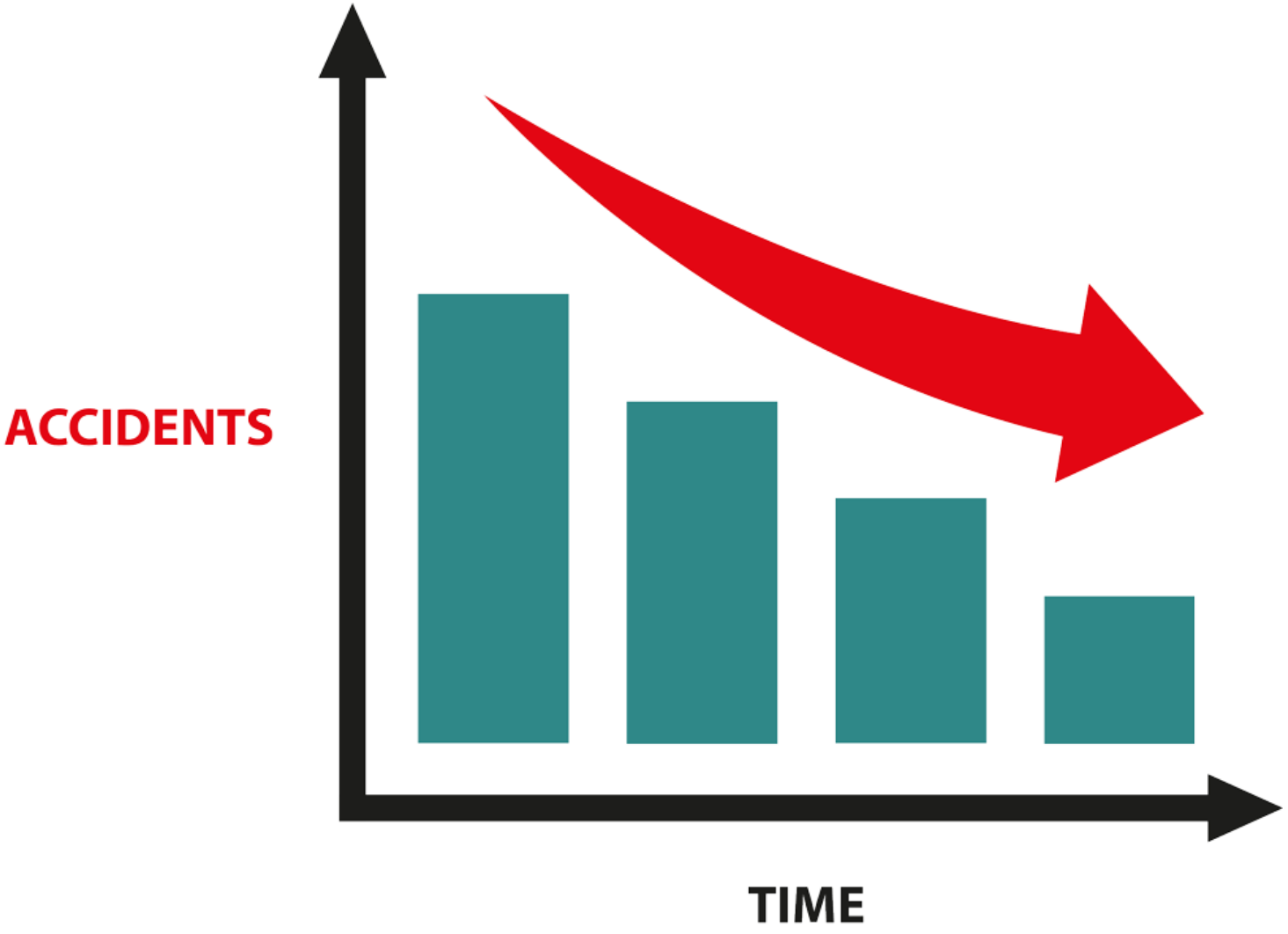
- Fed in to a national training package to support consistent communication competence development across the GB rail industry
- Project: “Developing a safety critical communication training package” (SPARK Ref. T1078)
- Following slides use the incident data to provide background for the national training course

01 Safety Critical Communications

MODULE: FOUNDATION

1 in 5

accidents involves a communication error.


ACCIDENTS
TIME

Errors include:

Leaving out important details

Saying something vague

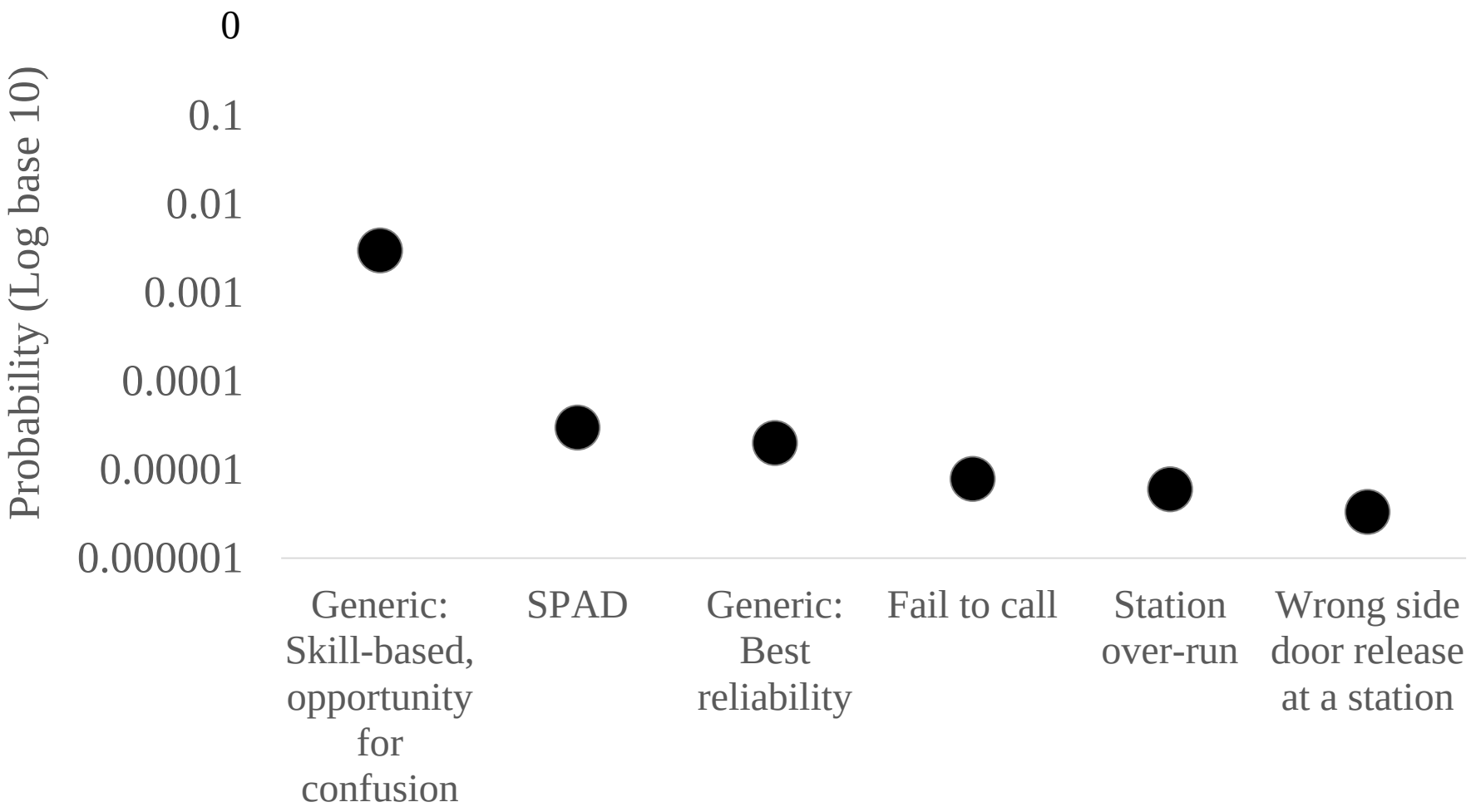
Not communicating when you should

Not following basic protocols

Analysis done as part of this training shows that communications mistakes occur across the rail industry and are not the fault of one group of workers.

Human Reliability

Understanding human performance reliability: the data



Tools To Develop Our Understanding of Performance Reliability

- Railway Action Reliability Assessment (Spark Ref. T270)
  - Supports human reliability assessment, quantification of human performance and provides generic estimates of human performance reliability

- Red Aspect Approaches to Signals (RAATS, Spark Ref. COF-UOH-24)
  - Allows Rail companies to harness the power of big data to identify the signals which are most frequently approached at red, thanks to a new on-line tool developed by rail industry body RSSB and the University of Huddersfield.

Conclusions

Conclusions: Role of Human Factors in Supporting Safety Learning from Accidents

- Human factors central to the incident investigation process

- Human factors investigation outputs used to inform industry strategy and develop cross-industry support

- Process enabled by the GB Research Programme funded by the Department for Transport and managed by RSSB:
  - Development of HF approach
  - Development of software
  - Research used to deliver changes to industry (eg SPAD strategy, standards for on-train camera monitor systems, communications competence)

Thank you