NetworkRail

An End User Perspective

SAFER-LC, Network Rail - UK

Ed Rollings MSc. C Eng. MIET FIRSE, Head of Level Crossings Engineering, Network Rail
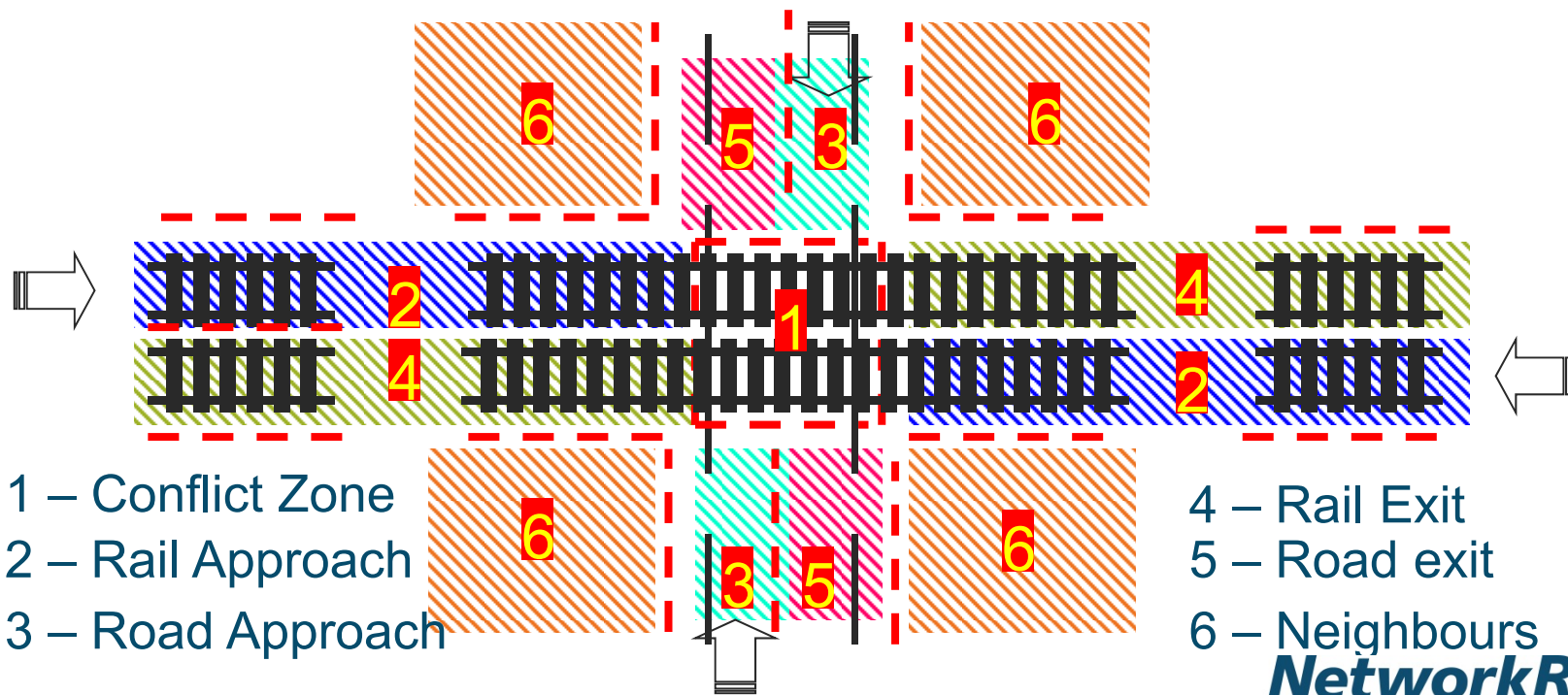
NetworkRail

Safety, Technical and Engineering

Quality, Health, Safety & Environment

Operations, Security & Information

Engineering

Asset Management

Research & Technology

Innovation

A better railway for a better Britain

NetworkRail

What is a level crossing?

1 – Conflict Zone
2 – Rail Approach
3 – Road Approach

4 – Rail Exit
5 – Road exit
6 – Neighbours

NetworkRail

Safety, Technical and Engineering

Quality, Health, Safety & Environment   **Engineering**   Research & Technology

Operations, Security & Information   Asset Management   Innovation

NetworkRail

Types and Risk Properties

| [9]Source – ALCRM, August 2015	Crossing core type	Number of level crossings on the network	FWI (as calculated by ALCRM)
Passive level crossings	UWC/Bridleway (with telephone)	1717	1.1
	Footpath/bridleway/station	2246	2.8
	UWC	686	0.4
	Open crossing	48	0.1
Automatic level crossings	AHB	443	4.0
	ABCL/AOCL+B	119	0.4
	AOCL/R	39	0.6
	MSL	174	0.6
Protected level crossings	MCB CCTV	425	2.2
	MCB OD	55	0.1
	MCB	185	0.6
	MCG/Train Crew Operated	154	0.1
Total		**6291**	**13**

NetworkRail

Safety, Technical and Engineering

Quality, Health, Safety & Environment

Operations, Security & Information

Engineering

Asset Management

Research & Technology

Innovation

So we know all about safety?
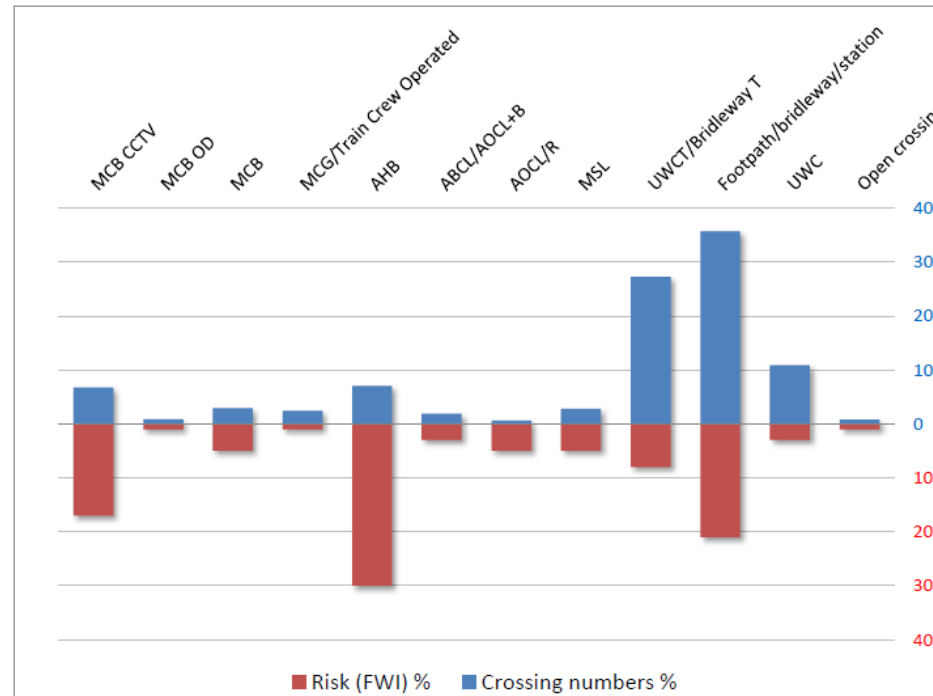
Safety, Technical and Engineering

Quality, Health, Safety & Environment

Operations, Security & Information

Engineering

Asset Management

Research & Technology

Innovation

NetworkRail

Which are the big risk types?

Automatic Half Barriers (Public roads)

Footpath/Bridleway/Station Crossings (Public pedestrians)

Full Barrier Crossings – Supervised through CCTV (Public roads)

User Worked Crossings with telephone (Private vehicles)

User Worked Crossings – Direct observation by User (Private)

NetworkRail

Safety, Technical and Engineering

| Quality, Health, Safety & Environment | **Engineering** | Research & Technology |
| Operations, Security & Information | Asset Management | Innovation |

NetworkRail

Half barriers; Why not?

Automatic Half Barriers

- ▸ Weaving (Misuse)
- ▸ Pedestrians/Cyclists (Human error, misuse)
- ▸ Barrier strikes
- ▸ Vehicle stranded (No rail signal)

Current design

- ▸ 'Unfenced' off side
- ▸ Pedestrian facilities

Safety, Technical and Engineering

| Quality, Health, Safety & Environment | **Engineering** | Research & Technology |
| Operations, Security & Information | Asset Management | Innovation |

NetworkRail

Where does the risk come from?

Footpath/Bridleway/Station Crossings – 'Stop, Look and Listen'

- ▸ Fail to look each way (Distracted)
- ▸ Night time quiet period (No train horn)
- ▸ Impaired view (Line curves, vegetation, poor weather)
- ▸ Encumbered by the gate system

NetworkRail

Safety, Technical and Engineering

Quality, Health, Safety & Environment   **Engineering**   Research & Technology

Operations, Security & Information   Asset Management   Innovation

NetworkRail

Risk, What risk?

User Worked Crossings with telephone

User Worked Crossings – Direct observation by User

Failure to use the telephone

Telephone not answered

Telephone not working

Misunderstand instructions

Frustration (Long wait for permission)

NetworkRail

Safety, Technical and Engineering

Quality, Health, Safety & Environment	**Engineering**	Research & Technology
Operations, Security & Information	Asset Management	Innovation

NetworkRail

Why are they higher risk?

Full Barrier Crossings – Supervised through CCTV

.

- ► Signaller training (Effective observation – Figure of 8)
- ► Signaller error (Workload)
- ► Poor equipment (Picture quality)
- ► Poor contrast (User clothing/background)

NetworkRail

Safety, Technical and Engineering

Quality, Health, Safety & Environment

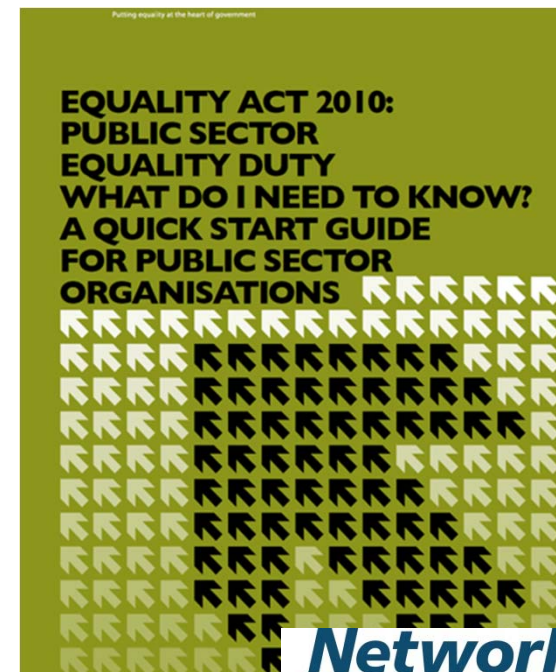Operations, Security & Information

Engineering

Asset Management

Research & Technology

Innovation

NetworkRail

Equal access for all

Protected characteristics

► Mobility impaired (Older population)

► Loss of hearing

► Sight impairment

► Mobility scooters

  • Angle of approach/turning

  • Speed

EQUALITY ACT 2010:
PUBLIC SECTOR
EQUALITY DUTY
WHAT DO I NEED TO KNOW?
A QUICK START GUIDE
FOR PUBLIC SECTOR
ORGANISATIONS

Putting equality at the heart of government

NetworkRail

Safety, Technical and Engineering

Quality, Health, Safety & Environment	**Engineering**	Research & Technology
Operations, Security & Information	Asset Management	Innovation

NetworkRail

What are we doing?

Technical

- ▸ Brighter LED displays
- ▸ Ambient noise compensation
- ▸ Overlay systems (No connection to signalling)

NetworkRail

Safety, Technical and Engineering

Quality, Health, Safety & Environment	**Engineering**	Research & Technology
Operations, Security & Information	Asset Management	Innovation

A better railway for a better Britain

NetworkRail

Compare!

NetworkRail

Safety, Technical and Engineering

| Quality, Health, Safety & Environment | **Engineering** | Research & Technology |
| Operations, Security & Information | Asset Management | Innovation |

NetworkRail

What are we doing?

Human factors

- ▶ Clear simple signs
- ▶ Spoken warnings/warble
- ▶ Second train warning
- ▶ Pulsating boom lighting?
- ▶ Deterrent (Red Light Enforcement)
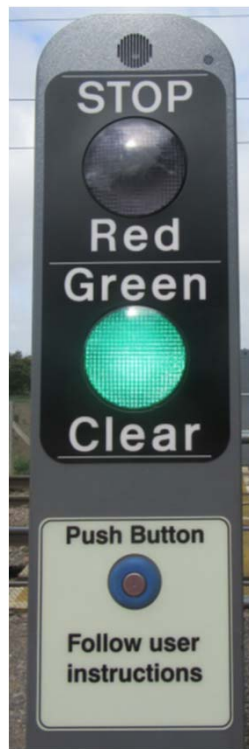
STOP
Red
Green
Clear

Push Button

Follow user instructions

NetworkRail

Safety, Technical and Engineering

Quality, Health, Safety & Environment	**Engineering**	Research & Technology
Operations, Security & Information	Asset Management	Innovation

NetworkRail

What are we doing?

Automation/Assistance

 ▶ Obstacle detection

 ▶ RADAR/LIDAR

 ▶ Next generation products

 ▶ CCTV – Video analytics?

 ▶ SMART Sensing?

RADAR ----
LIDAR ----

NetworkRail

Safety, Technical and Engineering

Quality, Health, Safety & Environment

Operations, Security & Information

Engineering

Asset Management

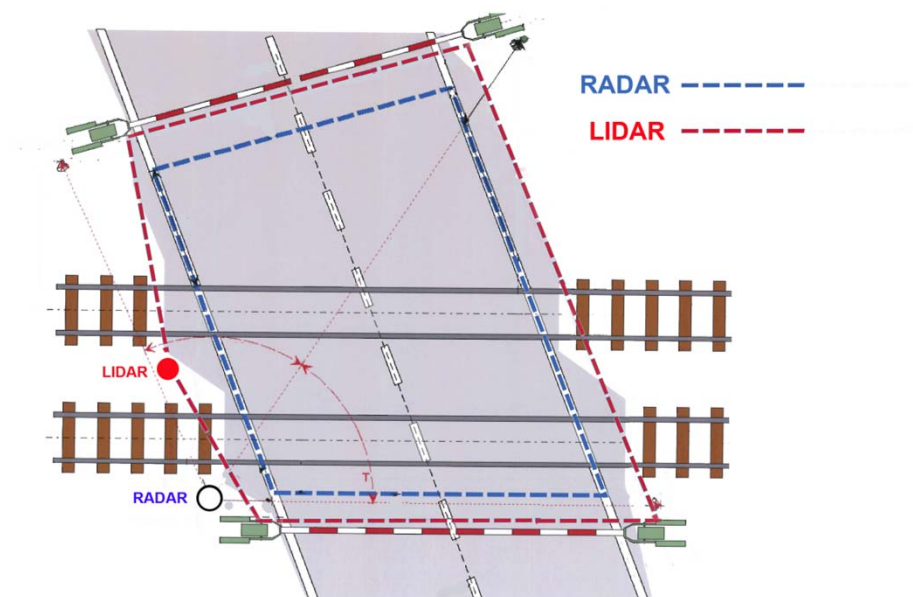Research & Technology

Innovation

NetworkRail

The Law?

▶ **Legal requirements - UK**

▶ Level crossings are 'Authorised' through a Level Crossing Order

    ▶ Now made under the Level Crossings Act 1983

▶ Legal obligation, (Secretary of State when making an Order'),

    'To consider the <u>safety and convenience</u> of all users'

NetworkRail

Safety, Technical and Engineering

Quality, Health, Safety & Environment   **Engineering**   Research & Technology

Operations, Security & Information   Asset Management   Innovation

A better railway for a better Britain

NetworkRail

The Digital Railway

► **New opportunities**

  ► Speed supervision,

  ► Near continuous train location reporting to radio block centre

  ► Internet of Things – Smart access systems

  ► Can the train and the user interact directly?

NetworkRail

Safety, Technical and Engineering

Quality, Health, Safety & Environment   **Engineering**   Research & Technology

Operations, Security & Information   Asset Management   Innovation

A better railway for a better Britain

NetworkRail

Convenience – What can we do?

Provide/Maintain fast operation cycle times

- AHB+ Full barriers, no signals, limited obstacle detection, retrofit

Consistent accurate warning times

► Project 'Meerkat', Dependable sound/light, Novel train detection?

Easy to use gates

- Remote power operation, solar/wind energy source

Reliability/Cost effectiveness

NetworkRail

Safety, Technical and Engineering

| Quality, Health, Safety & Environment | **Engineering** | Research & Technology |
| Operations, Security & Information | Asset Management | Innovation |

NetworkRail

What should we do?

Horizon scanning : What are the emerging risks?

Does convenience = safety?

Value : How do we know when we have done enough?

- The 'As low as reasonably practical' question
- What are the cost drivers for your company?

Reputation : A better business case than 'Safety'?

Performance : Delay minutes have cost/value.

NetworkRail

Safety, Technical and Engineering

Quality, Health, Safety & Environment   **Engineering**   Research & Technology

Operations, Security & Information   Asset Management   Innovation

A better railway for a better Britain

Safety, Technical and Engineering