



## HSE Insights

# Using artificial intelligence in QHSE

Mark Rushton & Steve Holmes



What's the problem?

My Story...





## What's the problem?

Organisations of all levels of maturity gather & store large volumes of HSE data, eg. observations, incidents, investigations, hazards & unsafe acts, process safety data.

Often this information is recorded in natural language descriptions, on different systems & languages, in diverse formats & locations.

Unlocking the potential of the data is often impossible, letting leaders only glimpse a fraction of the insight hiding in it, as to underlying themes, systemic issues, patterns, trends, leading indicators, root causes & latent dangers.

# What Safety Leaders struggle with?

## How can I turn HSE Data Into actionable insight?

- Insight 'hides' in the descriptions
- Losing the 'signals' when digitising processes
- More data than you can ever read
- Too many data silos & formats
- Heavy & slow digital transformation projects
- Can it stop me 'acting on just gut feel alone'?

# So much more than just BI !





What if you didn't need to categorise data...

What if you could get insight immediately...

What if you could track patterns in every new report...

**Imagine doing it all with a click of a button.**

**Listening at scale**

## Power sources...



Scanning unstructured data for insights.

Investigation, assurance, RCA, preventive actions.

Finding correlations between topics, hazards, and root cause categories.



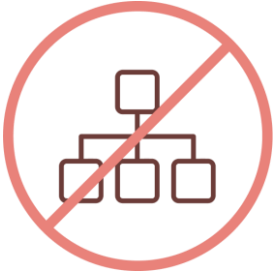
# Proving Concept



# Built on solid foundations...



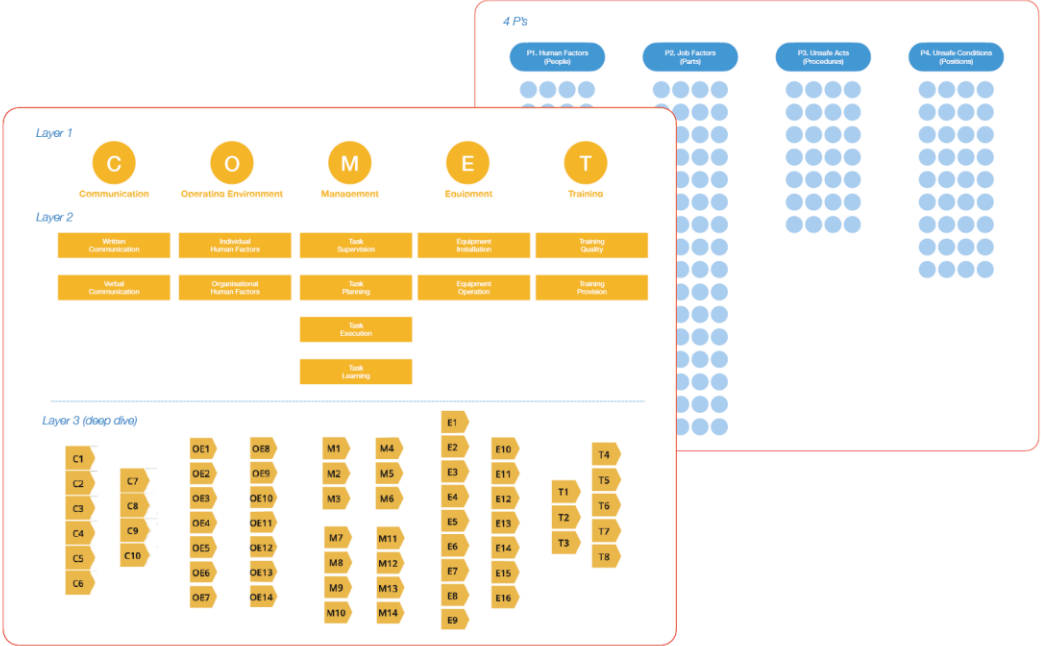
Root Causes **never** occur in isolation.



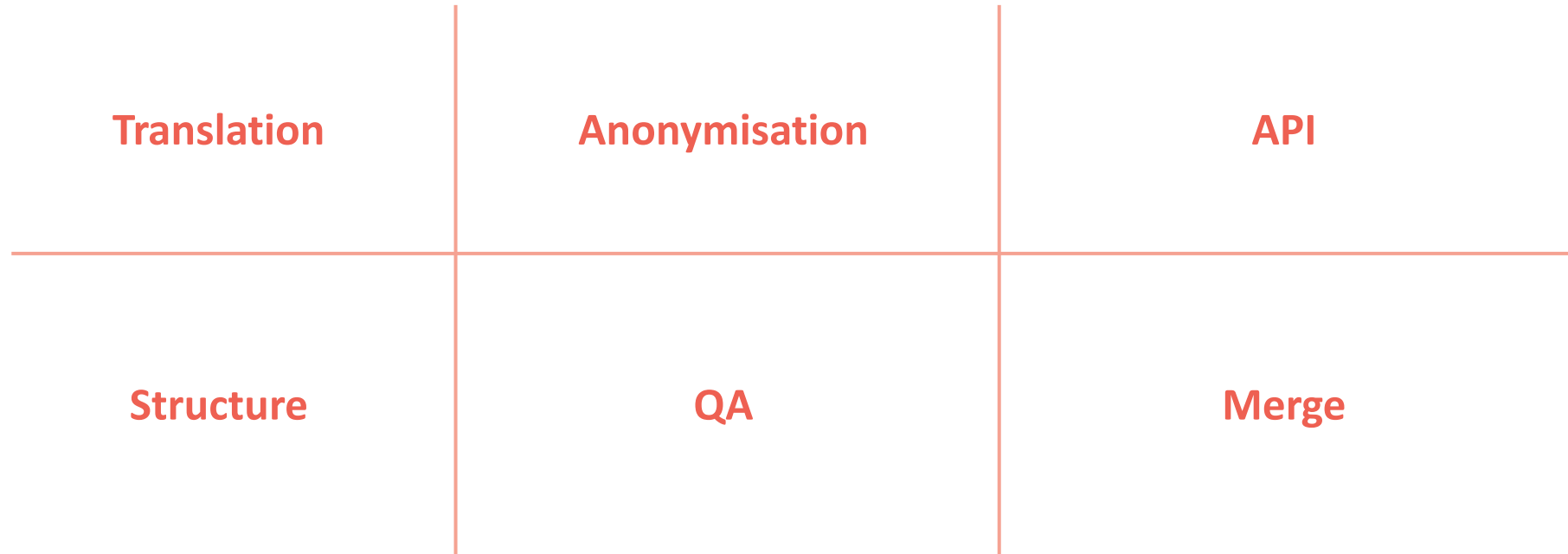
Root Causes **don't** have a hierarchy of seriousness.



Root Causes **don't** change based on failure type.



# Easily optimising your data



# Collaboration

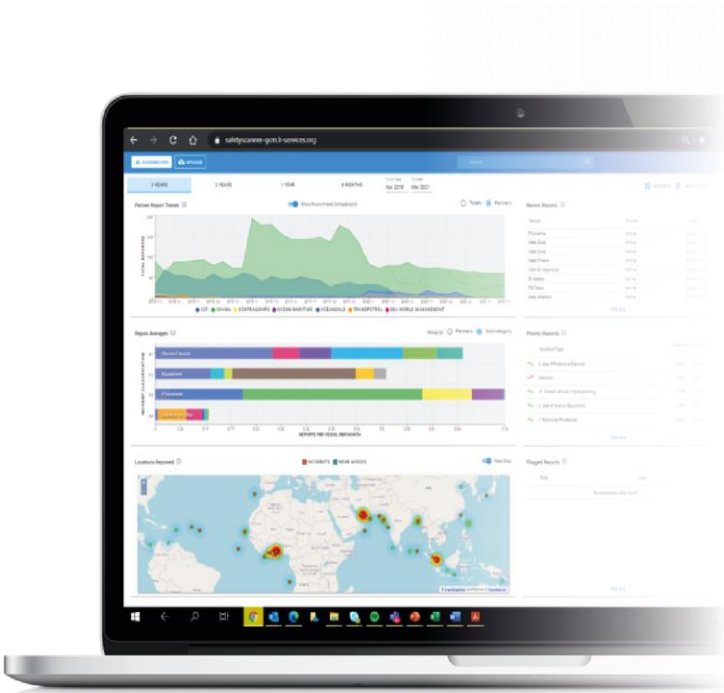
Cost efficiency

Bigger Data Sets

Industry  
Standardisation

Shared Benefits

# Driving Continuous Improvement



## Continuous 'Listening'

- AI 'reads' continuously & at scale
- Powerful visualisations benchmark and trend with one click



## Identify new risk clusters

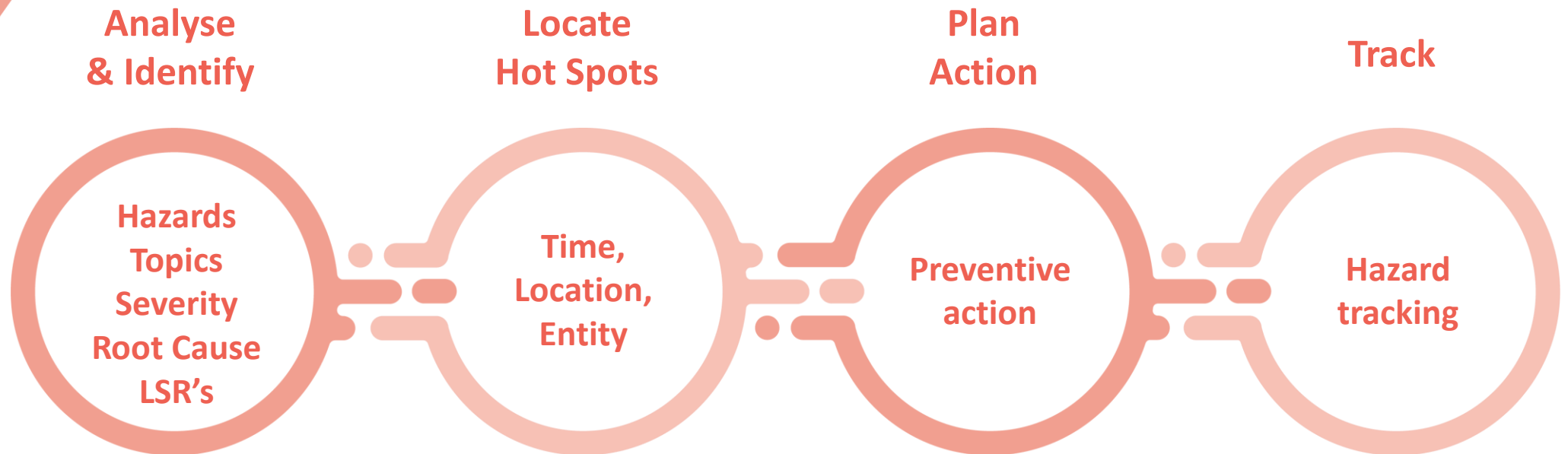
- AI helps prioritise risk clusters
- AI gives recommendation for action



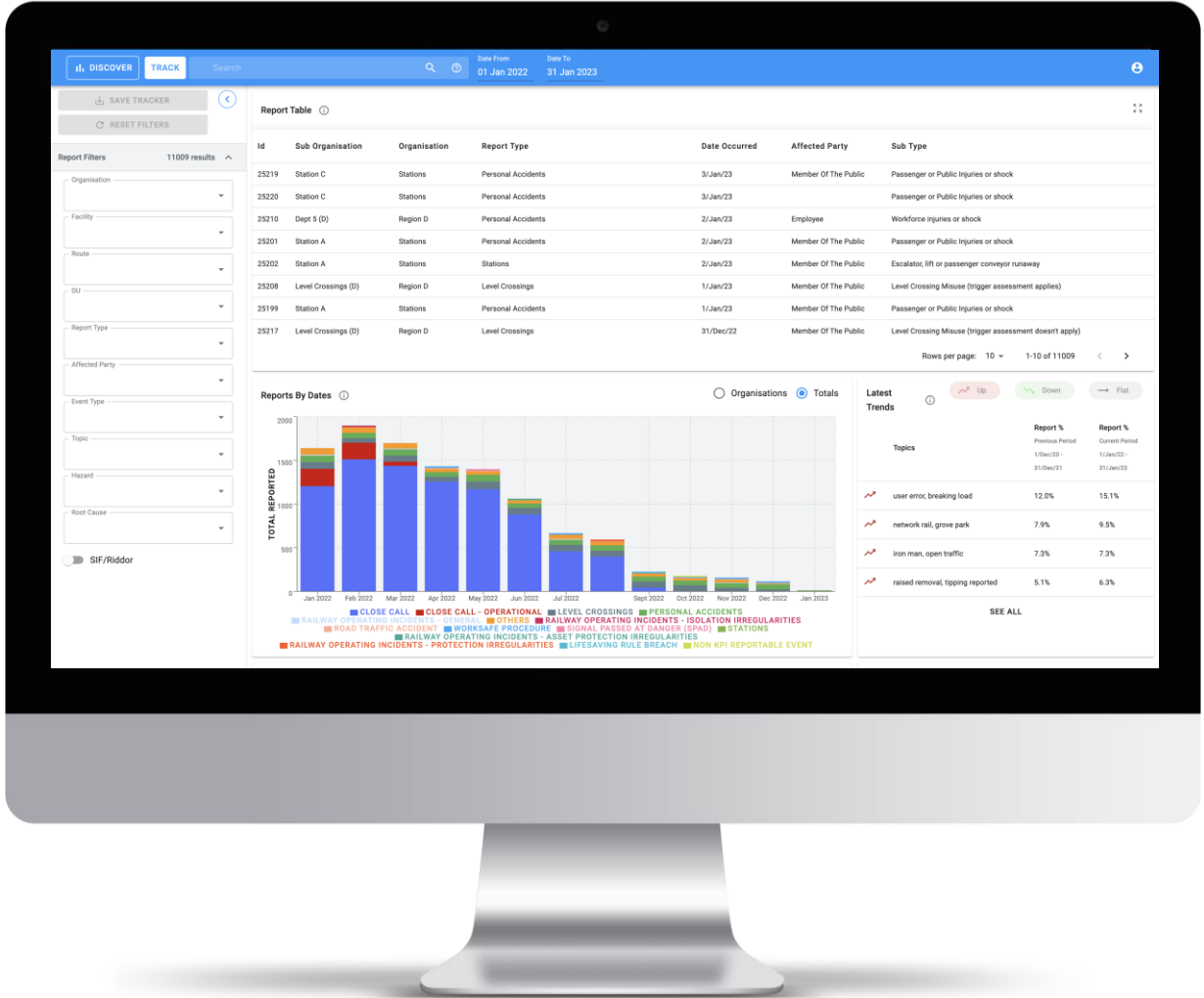
## Act, Measure, Improve.

- Lock risk clusters for tracking
- Set KPIs & alerts
- Share reports & export data

# Introducing COMET Signals...



# All delivered through a live dashboard...



SAVE TRACKER  
RESET FILTERS

Report Filters 11009 results

- Organisation
- Facility
- Route
- DU
- Report Type
- Affected Party
- Event Type
- Topic
- Hazard
- Root Cause

SIF/Riddor

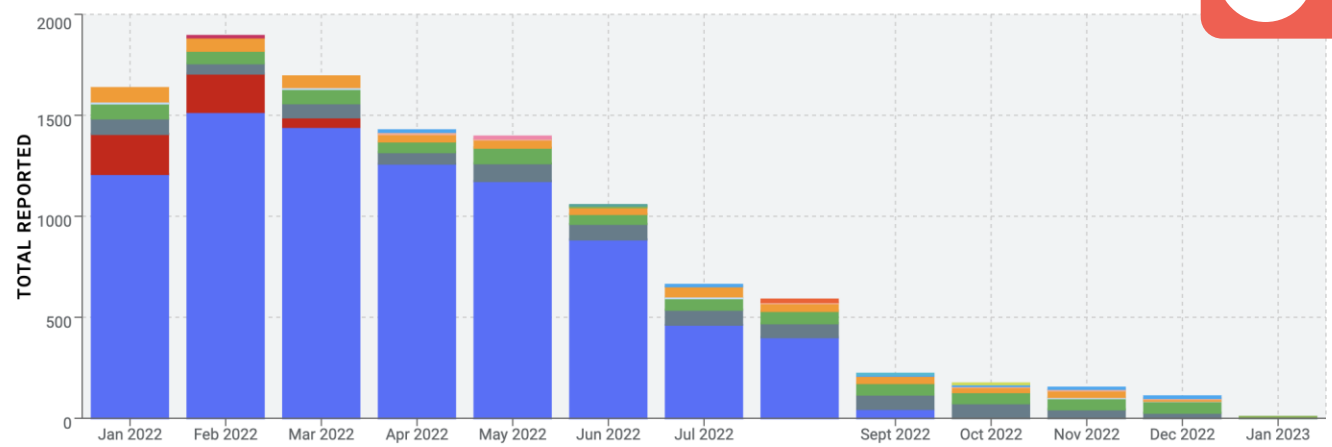
A.I. Severity Scanning

Report Table

Id	Sub Organisation	Organisation	Report Type	Date Occurred	Affected Party	Sub Type
25219	Station C	Stations	Personal Accidents	3/Jan/23	Member Of The Public	Passenger or Public Injuries or shock
25220	Station C	Stations	Personal Accidents	3/Jan/23		Passenger or Public Injuries or shock
25210	Dept 5 (D)	Region D	Personal Accidents	2/Jan/23	Employee	Workforce injuries or shock
25201	Station A	Stations	Personal Accidents	2/Jan/23	Member Of The Public	Passenger or Public Injuries or shock
25202	Station A	Stations	Stations	2/Jan/23	Member Of The Public	Escalator, lift or passenger conveyor runaway
25208	Level Crossings (D)	Region D	Level Crossings	1/Jan/23	Member Of The Public	Level Crossing Misuse (trigger assessment applies)
25199	Station A	Stations	Personal Accidents	1/Jan/23	Member Of The Public	Passenger or Public Injuries or shock
25217	Level Crossings (D)	Region D	Level Crossings	31/Dec/22	Member Of The Public	Level Crossing Misuse (trigger assessment doesn't apply)

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Reports By Dates



RAILWAY OPERATING INCIDENTS - GENERAL
OTHERS
RAILWAY OPERATING INCIDENTS - ISOLATION IRREGULARITIES
ROAD TRAFFIC ACCIDENT
WORKSAFE PROCEDURE
SIGNAL PASSED AT DANGER (SPAD)
STATIONS
RAILWAY OPERATING INCIDENTS - ASSET PROTECTION IRREGULARITIES
RAILWAY OPERATING INCIDENTS - PROTECTION IRREGULARITIES
LIFESAIVING RULE BREACH
NON KPI REPORTABLE EVENT
CLOSE CALL
CLOSE CALL - OPERATIONAL
LEVEL CROSSINGS
PERSONAL ACCIDENTS

A.I. Topic Analysis

Up Down Flat

Topics	Report %	Report %
	Previous Period	Current Period
	1/Dec/20 - 31/Dec/21	1/Jan/22 - 31/Jan/23
user error, breaking load	12.0%	15.1%
network rail, grove park	7.9%	9.5%
iron man, open traffic	7.3%	7.3%
raised removal, tipping reported	5.1%	6.3%

SEE ALL



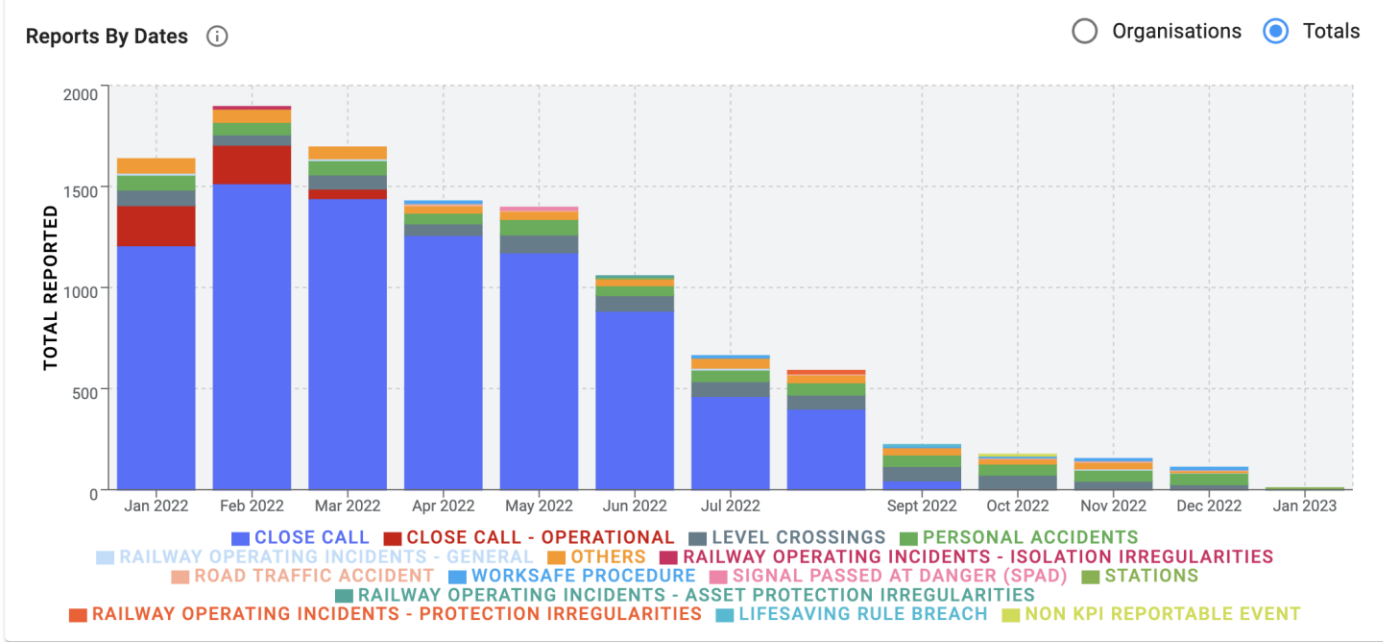
SAVE TRACKER RESET FILTERS

- Report Filters 11009 results
- Organisation
  - Facility
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  - Report Type
  - Affected Party
  - Event Type
  - Topic
  - Hazard
  - Root Cause
- SIF/Riddor

BI Advanced Search

Id	Summary	Report Type	Date Occurred	Affected Party	Sub Type
25219	Station C	Stations	3/Jan/23	Member Of The Public	Passenger or Public Injuries or shock
25220	Station C	Stations	3/Jan/23		Passenger or Public Injuries or shock
25210	Dept 5 (D)	Region D	2/Jan/23	Employee	Workforce injuries or shock
25201	Station A	Stations	2/Jan/23	Member Of The Public	Passenger or Public Injuries or shock
25202	Station A	Stations	2/Jan/23	Member Of The Public	Escalator, lift or passenger conveyor runaway
25208	Level Crossings (D)	Region D	1/Jan/23	Member Of The Public	Level Crossing Misuse (trigger assessment applies)
25199	Station A	Stations	1/Jan/23	Member Of The Public	Passenger or Public Injuries or shock
25217	Level Crossings (D)	Region D	31/Dec/22	Member Of The Public	Level Crossing Misuse (trigger assessment doesn't apply)

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Latest Trends  Up  Down  Flat

Topics	Report % Previous Period	Report % Current Period
	1/Dec/20 - 31/Dec/21	1/Jan/22 - 31/Jan/23
user error, breaking load	12.0%	15.1%
network rail, grove park	7.9%	9.5%
iron man, open traffic	7.3%	7.3%
raised removal, tipping reported	5.1%	6.3%

SEE ALL

**AI Hazard Analysis**

Priority Hazards

- Up Trend
- Down Trend
- Flat Trend

Hazard Type	Report %	
	Previous Period 2/Feb/21 - 31/Jan/22	Current Period 1/Feb/22 - 31/Jan/23
Following Procedures	33.2%	25.6%
Work Exposures	16.3%	14.3%
Control of work / Work planning	0.9%	14.2%
Inattention / Lack of Awareness	14.5%	10.3%
Use of Protective Methods	13.0%	8.1%
Protective Systems	10.3%	7.8%
Tools, Equipment & Vehicles	4.3%	5.8%
Use of Tools or Equipment	2.3%	4.9%
Training / Knowledge transfer	0.0%	3.4%
Behaviour	1.9%	2.7%
Physical conditions	1.2%	1.3%
Work Place Environment/Layout	0.9%	0.6%
Communication	0.7%	0.2%
Purchasing, material handling and material control	0.1%	0.2%
Engineering / Design	0.0%	0.2%
Tools / Equipment	0.1%	0.1%
Mental stress	0.1%	0.1%

- Report Filters
- Organisation
  - Facility
  - Route
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  - Report Type
  - Affected Party
  - Event Type
  - Topic
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  - Root Cause

SIF/Riddo

Report %  
Current Period  
1/Jan/22 - 31/Jan/23  
31.8%  
24.3%  
15.9%  
10.3%

SAVE TRACKER

RESET FILTERS

Search: escalator AND (fall OR fell)

Report Filters 165 results

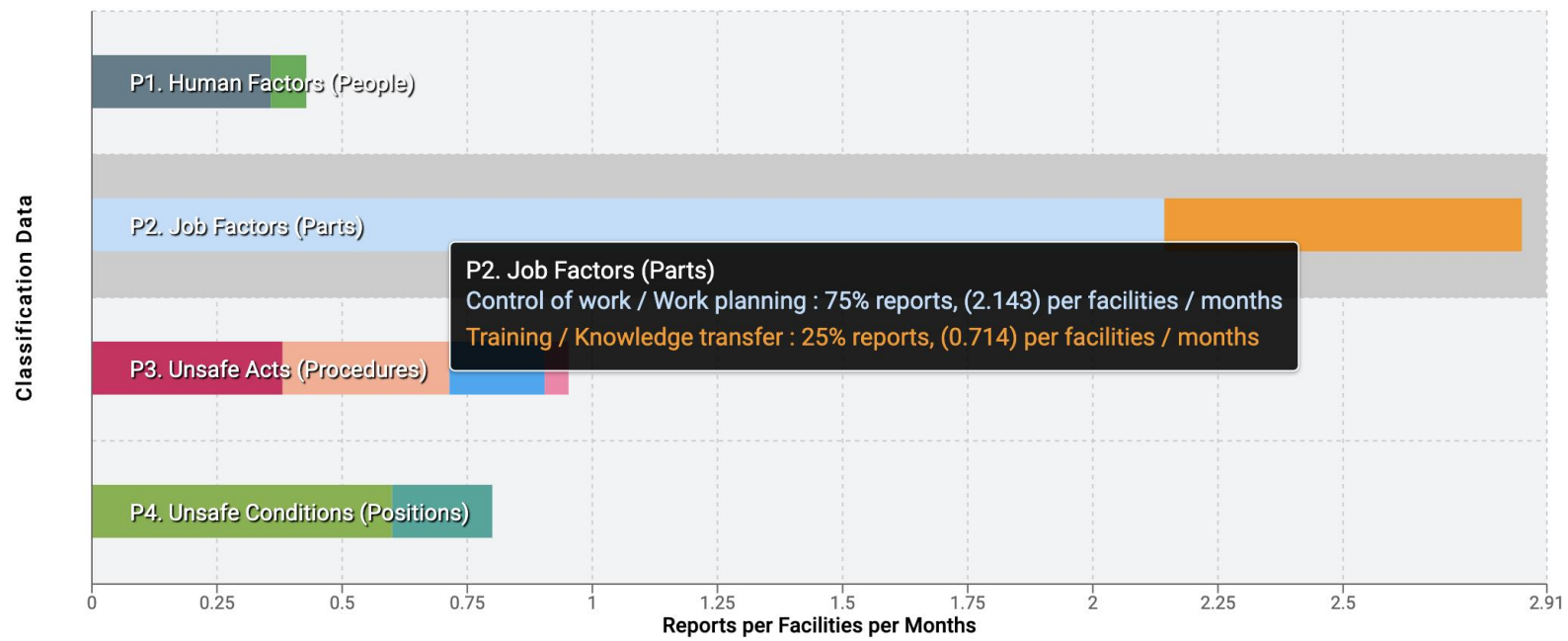
Report Table

Id	Sub Organisation	Organisation	Report Type	Date Occurred
25201	Station A	Stations	Personal Accidents	2/Jan/23
25202	Station A	Stations	Stations	2/Jan/23

AI Root Cause Analysis

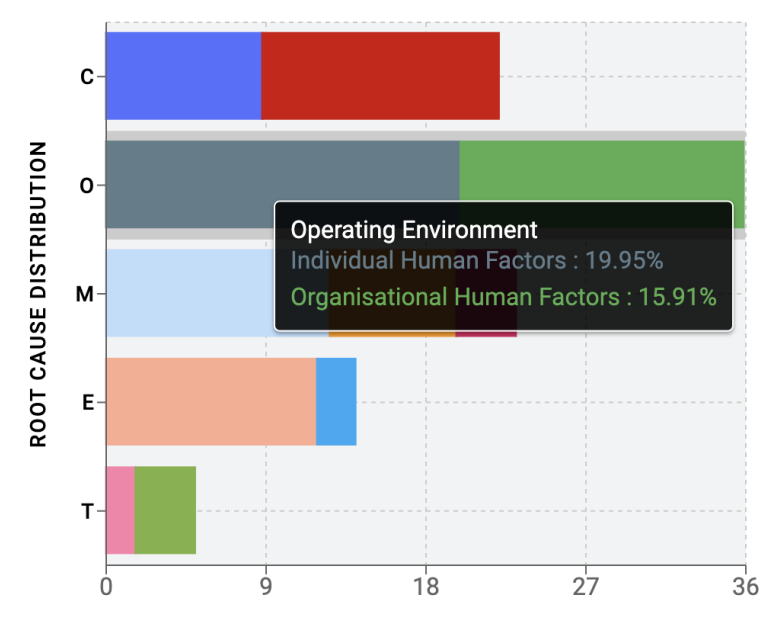
Reports Averages By Classification

Organisations Categories



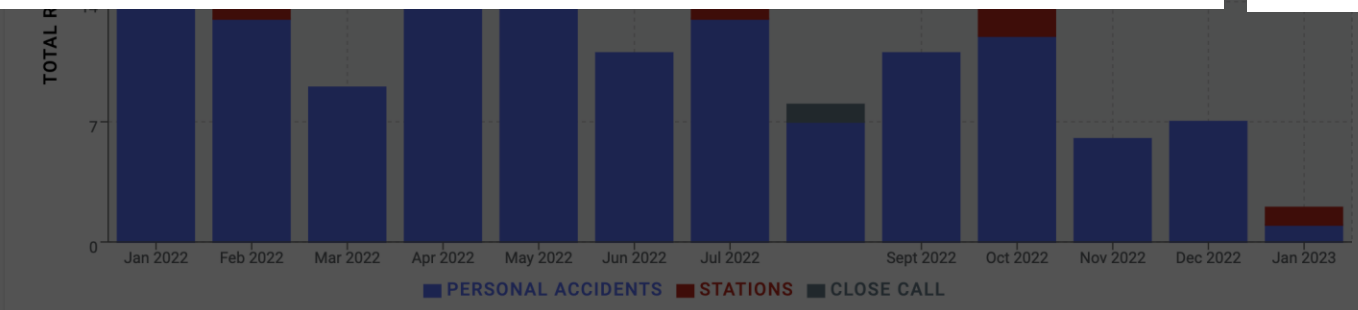
Root Cause Breakdowns

Group by: Organisation Root Cause



Root Cause

SIF/Riddor



platform staff, member public	15.2%	15.9%
ic female, rough sleeper	8.8%	10.3%

SEE ALL

SAVE TRACKER

RESET FILTERS



Report Table ⓘ

**BI** Preventive Guidance

Id	Sub Organisation	Organisation	Report Type	Date Occurred	Affected Party	Sub Type
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Search: escalator AND (fall or ...)

Report Filters

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SIF/Riddo

Preventive Actions Guidance	Root Cause Type	Short Term Recommended Activity	Long Term Recommended Activity
	Individual Human Factors ⓘ	Consider initiating an exercise to have site /asset-based Leadership teams conduct a localised review of how work is conducted on site, including the ... <a href="#">view all</a>	Consider commissioning an independent Human Factors Review of the organisation's individual performance activities... <a href="#">view all</a>
	Equipment Installation ⓘ	Consider initiating an exercise to have site/asset-based leadership teams conduct an immediate assurance review to probe the following:... <a href="#">view all</a>	The importance of a robust organisational wide maintenance strategy that assures the pre-operational phase of all physical assets including their desi... <a href="#">view all</a>
	Organisational Human Factors ⓘ	Consider initiating an exercise to have site /asset-based Leadership teams conduct a workplace assurance review to probe the following:... <a href="#">view all</a>	Consider commissioning an independent Human Factors Review of the organisational workplace lay out in terms of setting the workforce up for success... <a href="#">view all</a>
	Task Execution ⓘ	Consider initiating an exercise to have site /asset-based Leadership teams conduct a localised Safe System of Work assurance review to probe the follo... <a href="#">view all</a>	Consider commissioning an independent bench marking exercise to identify industry/peer/sector best practice in terms of effective implementation and ... <a href="#">view all</a>
	Verbal Communication ⓘ	Consider initiating an exercise to have site/asset-based leadership teams conduct an immediate assurance review of their regimes in terms of the verba... <a href="#">view all</a>	Consider commissioning an independent bench marking exercise to identify industry/peer/sector best practice in terms of effective verbal briefing of P... <a href="#">view all</a>
	Task Learning ⓘ	Consider conducting an early scoping exercise across the business or within a sample of sites/assets aimed at probing the following:... <a href="#">view all</a>	Consider initiating an independent bench marking exercise to identify industry/peer/sector best practice in terms of Organisational Learning and Impro... <a href="#">view all</a>
	Written Communication ⓘ	Consider initiating an exercise to have site/asset-based leadership teams conduct an immediate assurance review of the written Policies/Procedures/Ins... <a href="#">view all</a>	Consider commissioning an independent bench marking exercise to identify industry/peer/sector best practice in terms of effective written Policies/Pro... <a href="#">view all</a>
	Quality of Training ⓘ	Consider initiating an exercise to have site/asset-based leadership teams conduct a localised training quality assessment to probe the following:... <a href="#">view all</a>	An organisation needs confidence that the quality of training provided to the workforce delivers on corporate standards and expectations... <a href="#">view all</a>
	Task Planning ⓘ	Consider initiating an exercise to have site/asset-based leadership teams conduct an immediate assurance review of work-related planning and assessmen... <a href="#">view all</a>	Given that shortfalls in the planning and assessment of risk related tasks and activities are a strong precursor to incidents consider conducting an e... <a href="#">view all</a>
	Equipment Operation ⓘ	Consider initiating an exercise to have site/asset-based leadership teams conduct an immediate assurance review to probe the following:... <a href="#">view all</a>	The importance of a robust organisational wide maintenance strategy that assures the post operational phase of all physical assets including their mai... <a href="#">view all</a>
	Provision of Training ⓘ	Consider initiating an exercise to have site/asset-based leadership teams conduct a localised training needs assessment to probe the following:... <a href="#">view all</a>	An organisation needs confidence that the training needs of the workforce are being identified and delivered within a consistent and efficient process... <a href="#">view all</a>
	Supervision ⓘ	Consider engagement with site/asset Leadership teams to gain an understanding if gaps in supervisory cover are an issue and if so why. Consider gaugin... <a href="#">view all</a>	Consider the engagement of Corporate HR in a broader organisational wide exercise to identify supervisor gap hotspots and deliver remedial recommendat... <a href="#">view all</a>

Report %

Current Period

1/Jan/22 - 31/Jan/23

31.8%

24.3%

15.9%

10.3%

SAVE TRACKER  
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Search: escalator AND (fall OR fell)

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SIF/Riddor

AI Saved Tracker

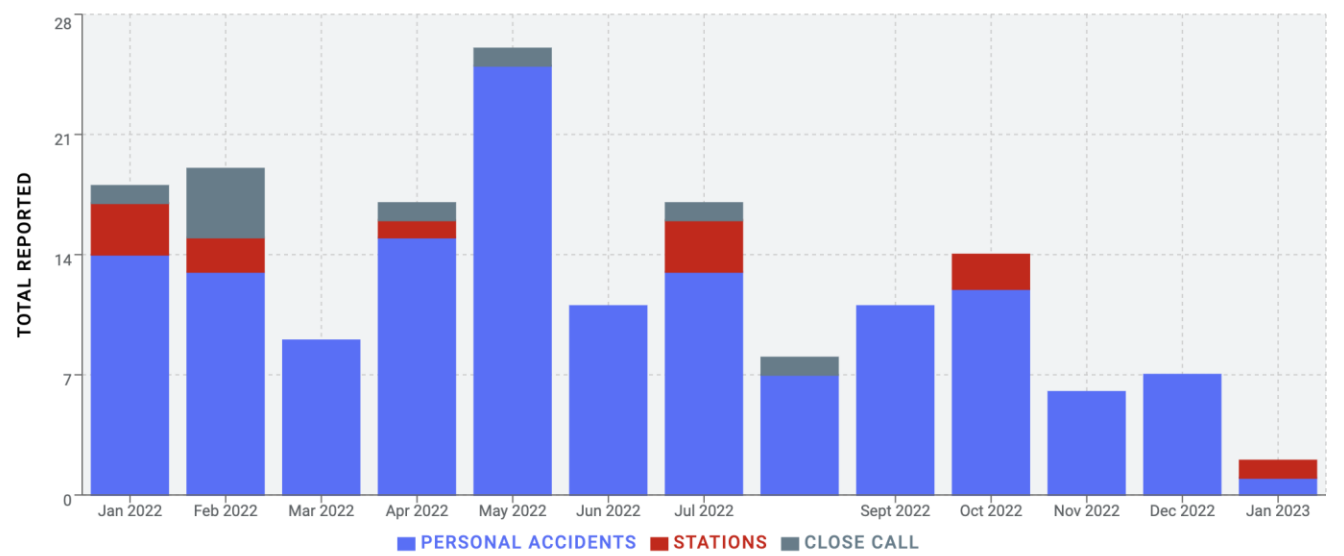
BI Configurable Filtering

Report Table

Id	Sub Organisation	Organisation	Report Type	Date Occurred	Affected Party	Sub Type
		Stations	Personal Accidents	2/Jan/23	Member Of The Public	Passenger or Public Injuries or shock
		Stations	Stations	2/Jan/23	Member Of The Public	Escalator, lift or passenger conveyor runaway
25112	Station A	Stations	Personal Accidents	21/Dec/22	Member Of The Public	Passenger or Public Injuries or shock
25083	Station A	Stations	Personal Accidents	20/Dec/22	Member Of The Public	Passenger or Public Injuries or shock
25017	Station A	Stations	Personal Accidents	15/Dec/22	Member Of The Public	Passenger or Public Injuries or shock
24922	Station F	Stations	Personal Accidents	10/Dec/22	Member Of The Public	Passenger or Public Injuries or shock
24843	Station A	Stations	Personal Accidents	4/Dec/22	Member Of The Public	Passenger or Public Injuries or shock
		Stations	Personal Accidents	3/Dec/22	Member Of The Public	Passenger or Public Injuries or shock

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Reports By Dates



Latest Trends

Up Down Flat

Topics	Report % Previous Period	Report % Current Period
fell backwards, boarded escalator	36.0%	31.8%
network rail, member public	16.8%	24.3%
platform staff, member public	15.2%	15.9%
ic female, rough sleeper	8.8%	10.3%

SEE ALL

### My Trackers

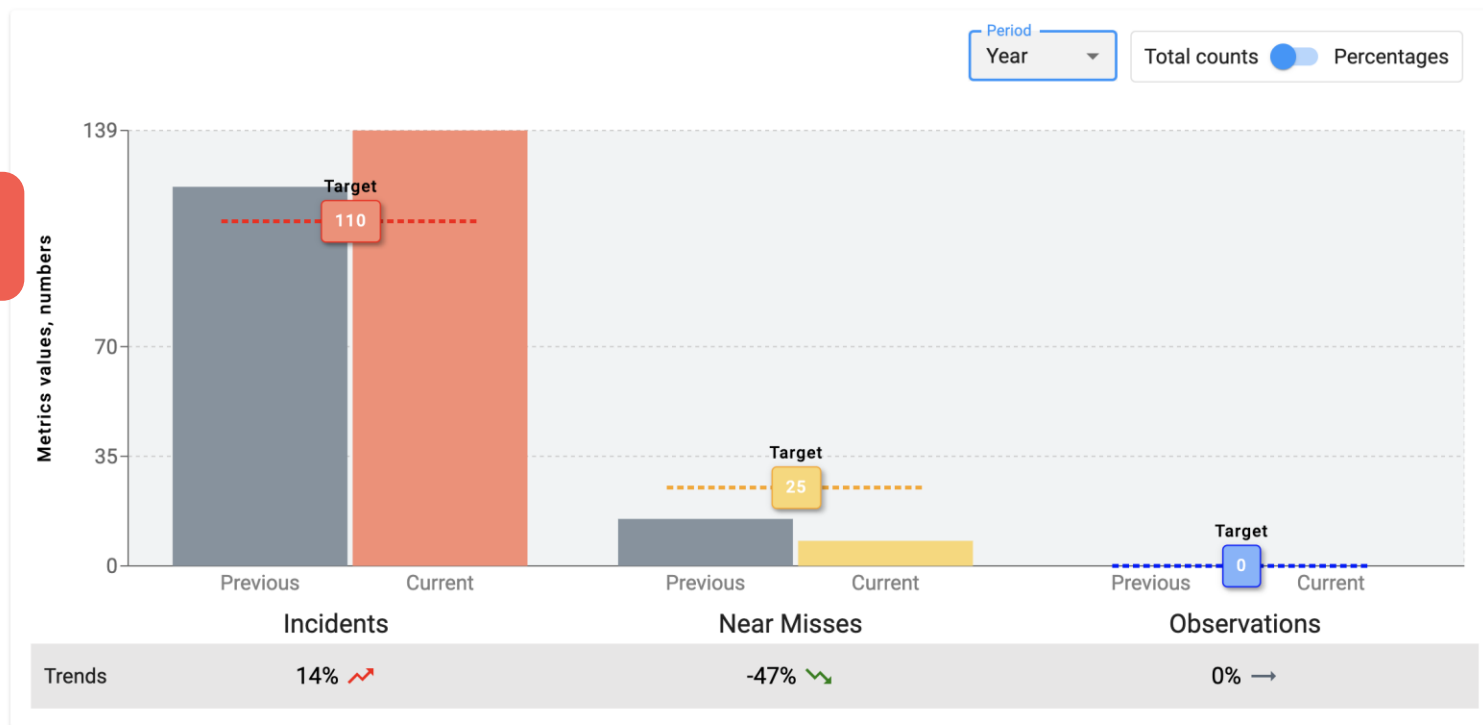
**Escalator Incidents**  
Created: 01/02/2023  
Last updated: 01/02/2023

**AI** Tracking Performance

## Performance tracker: Escalator Incidents

Created: 01/02/2023 | Last updated: 01/02/2023

Period end date  
01 Feb 2023



🔔 SET ALERT

🔄 UPDATE TRACKER

📄 EXPORT TO PDF

🗑️ DELETE TRACKER

✎ EDIT MODE ON

📺 DISPLAY IN DISCOVER

📄 EXPORT TRACKER DATA

### Filters

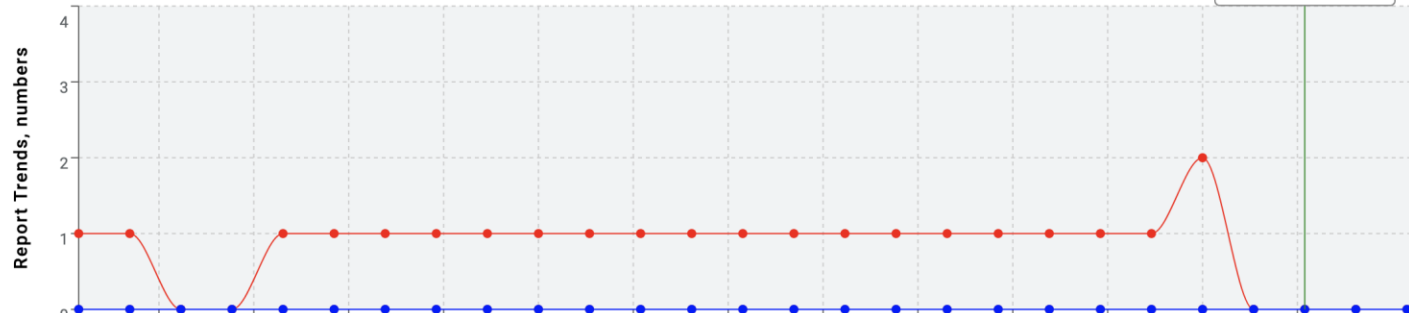
Search: escalator AND (fall OR fell)

## Mitigation activity tracker

MANAGE ACTIONS

Total counts:  Percentages:

Data Review of I...



# Q&A