What we have learnt
What we still need to learn from incidents

TONY GOWER-JONES,
STICHTING TRIPOD FOUNDATION

- 27 years with Shell (Chemicals and Exploration and Production)
- Network Rail Major Projects (West Coast Route Modification and Crossrail/Reading)
- Centrica Energy HSE Director and Capability Director
- Chemring Group
- Board Member of the Tripod Foundation

Aachen Process Safety Conference 17th Dec 2025

The Stichting Tripod Foundation (STF)

- A charity, based in the Netherlands
- Setup by Shell in 1998
- Worked with the Energy Institute since 2012
- Managed by the Tripod Board

The Foundation helps organisations on their journey to become better and safer companies.

- This is best achieved by using scientifically proven methods that push organisations forward.
- The Foundation provides thought leadership.
- The Foundation develops, promotes, and ensures high quality delivery of proven methods to learn from events and sustainably embed learning into your organisation.

Emanuele Cimica | Chair, Stichting Tripod Foundation Board | *General Manager, Business Transformation*, Shell

The Energy Institute

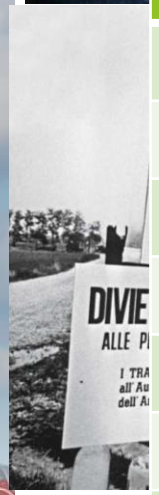
Chartered professional membership body for the energy sector – CEng, Cenv, Ieng, EngTech etc.)

Technical institute - $2million annual research fund, publish 50+ industry guidance documents annually

Training provider – providing training on the energy sector itself, risk management, energy management, and more

Registered charity – to disseminate accurate, scientific, knowledge about energy to wider society

Industry has improved by at least an order of magnitude



Year	
1974	Flixborough
1976	Seveso
1978	Carrington UK
1979	Three-mile Island
1980	Alexander Keiland
1984	Bhopal
1986	Challenger
1986	Chernobyl
1987	Herald of Free Enterprise
1988	Piper Alpha
1989	Exxon Valdez
15 years 10 Major incidents one every 1.5 years	

What changed in the 1980's

Flixborough 74, Seveso 76,Alexander Keiland 80 and Piper Alpha in 88

Prescriptive Rule based approach → Risk based approach owned by the industry

Safety Cases for installations

What can go wrong

What are my controls

What do I have to do the make sure the controls work → Safety Management Systems

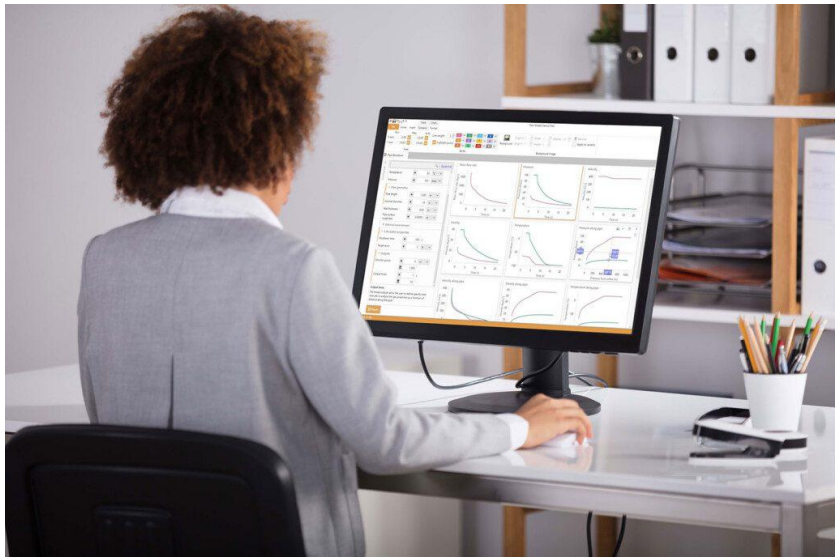
Our first safety cases in the 80's & 90's

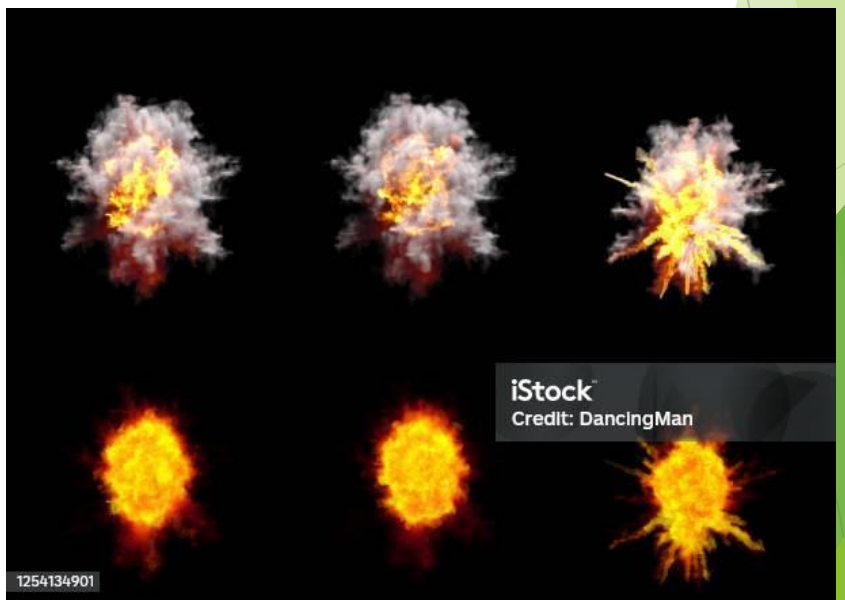
Detailed analysis
Complex terms
Written rather than pictorial
Only understood by NERDs
Great for propping open fire doors

Seems simple question
What can go wrong?
How do I control it ?
What do I need to do to make sure the controls work?

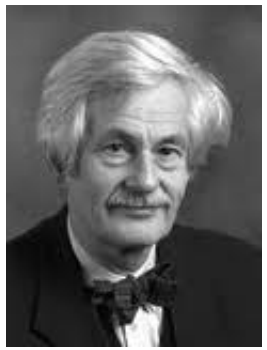
Research into Fire and & Explosion into modelling 1985-?

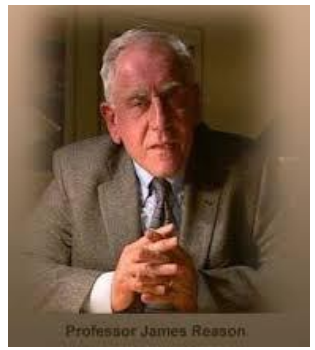
- Shell's fire and explosion modelling tool is primarily **Shell FRED (Fire, Release, Explosion, and Dispersion)**, a powerful consequence modelling software developed by Shell and Gexcon to predict hazards from accidental releases in high-risk industries, offering advanced thermodynamic models, dispersion, fire, and explosion simulations for safety assessment, emergency planning, and risk management. It's used globally and provides detailed visual outputs for clear communication of risks.





Shell research programme late 1980's and early 90's





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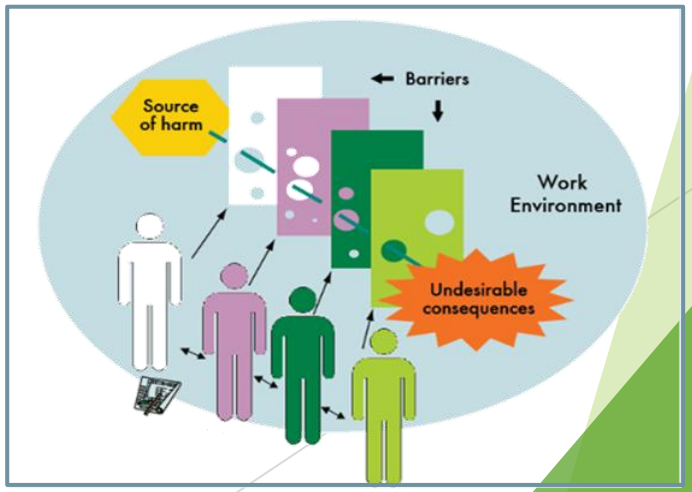
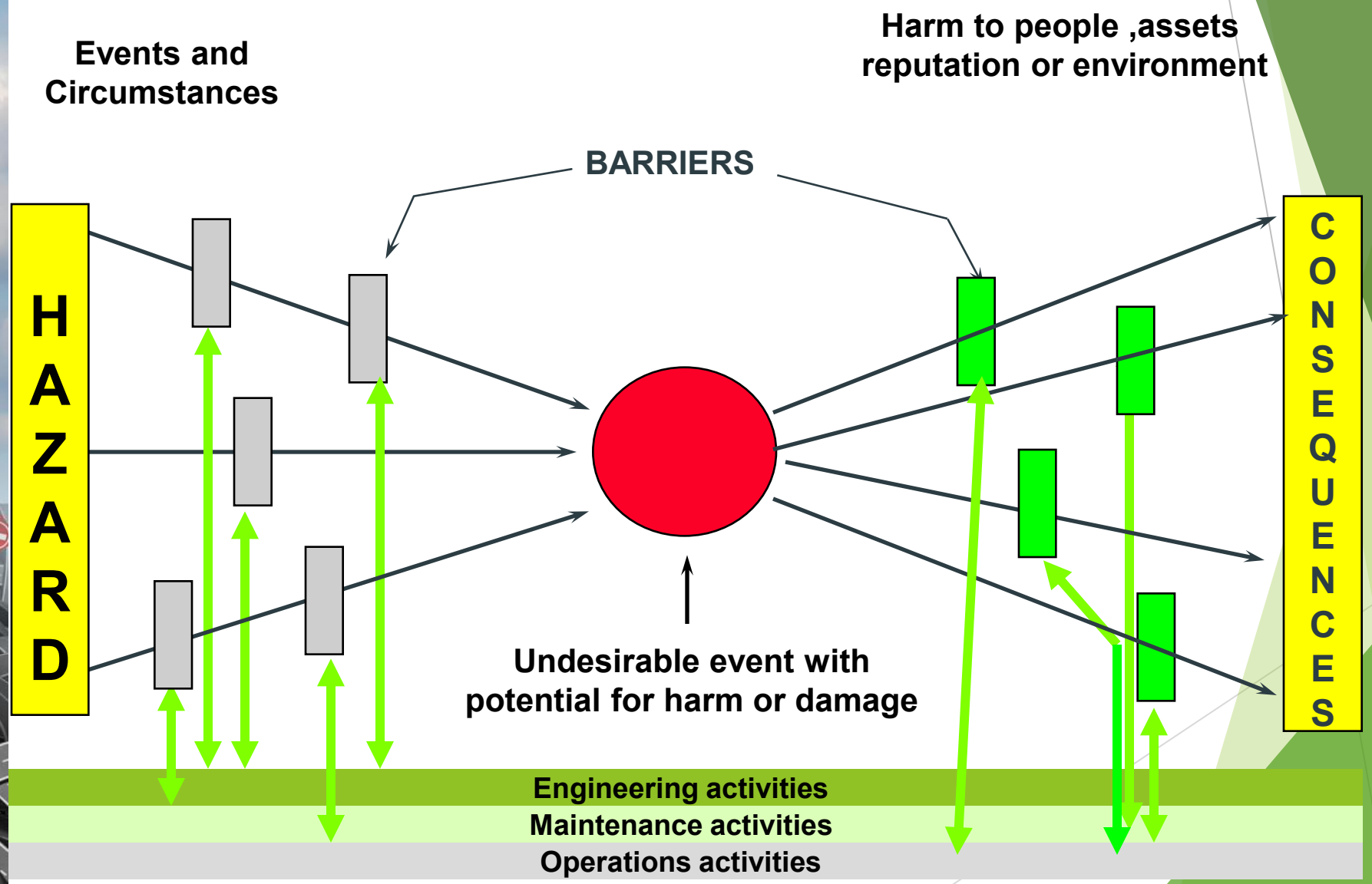
The University of Manchester

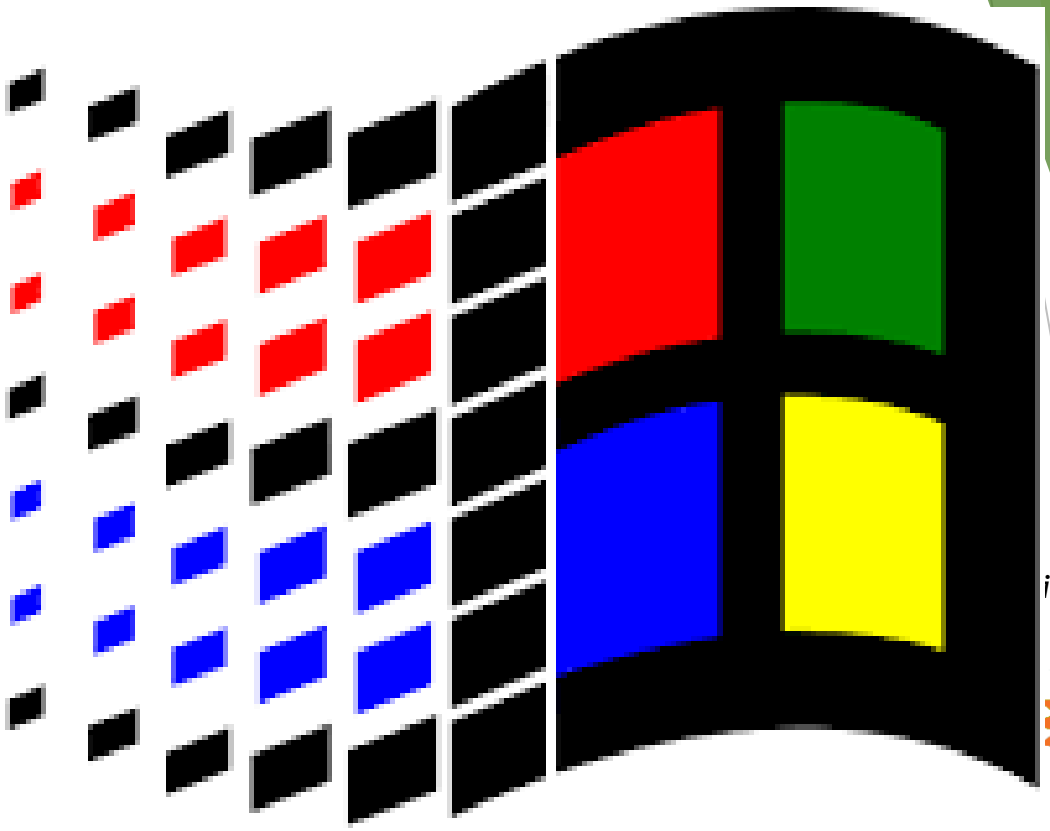
- People are good people
- If they fail it is due to the environment, we place them in
- The factors that create that environment are in place long before the barrier failure occurs



Bow-tie Concept



Tripod Barrie



Underlying causes **Preconditio**

Causes

organisatio
n

Error /
violation
promoting
conditions

Accidents, incidents and business

Undesirable consequences

Underlying cause

Preconditio
n

Event

MICROSOFT WINDOWS

April 1992

By the mid 1990's the Oil & Gas Industry

- Understood the risks
- Knew how to control it
- Had documented this in Safety Case's
- Understood what it had to do to maintain safe operations.
- Was still having serious & fatal accidents

Maybe engineers do not know everything?

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Creating an environment where people instinctively do the right thing

The Hearts and Minds Toolkit 1996-2004

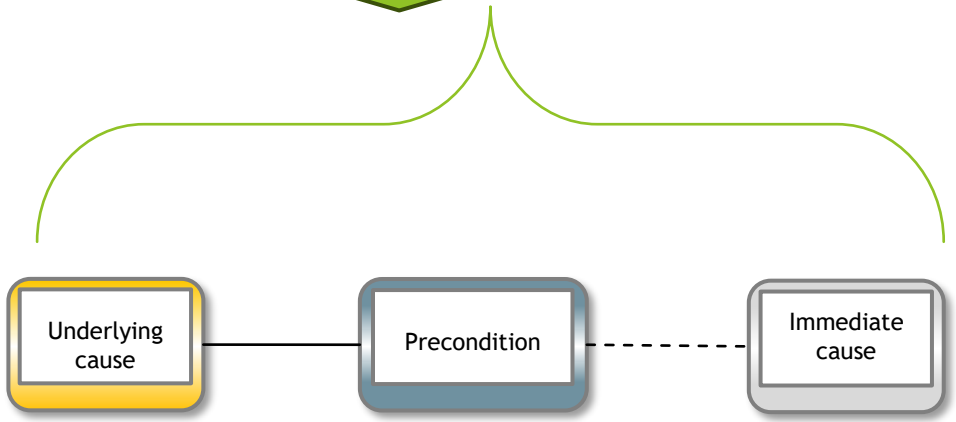
- All of this issues have part to play
- Different issues may play a part at different times
- There is no one silver bullet that will solve all of this issues
- Each one can be tackled if we understand why it is happening
- We need to develop interventions that tackle each issue

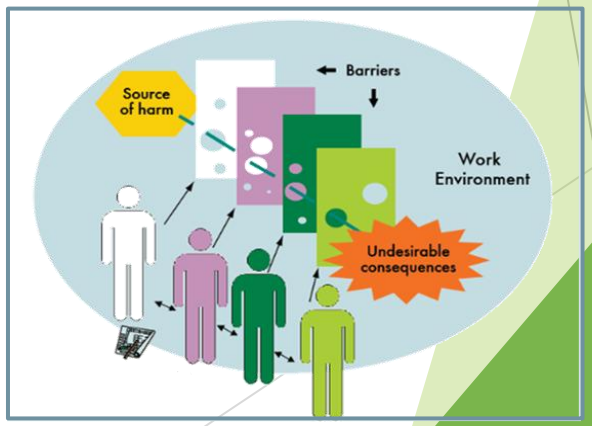
Each intervention needs to:

- Be based on solid academic research and sound theory
- Have a diagnostic that identifies issues
- Have a debate about the issues and potential solutions
- Develop actions that the group can control and implement
- Be able to be run by a non expert who can read the material and run the intervention
- Have an element of fun in it
- Work in different cultures

Focus of research since then

Tools, Techniques, applications to help us mange to and influence the environment that we operate in to maintain barriers and controls.



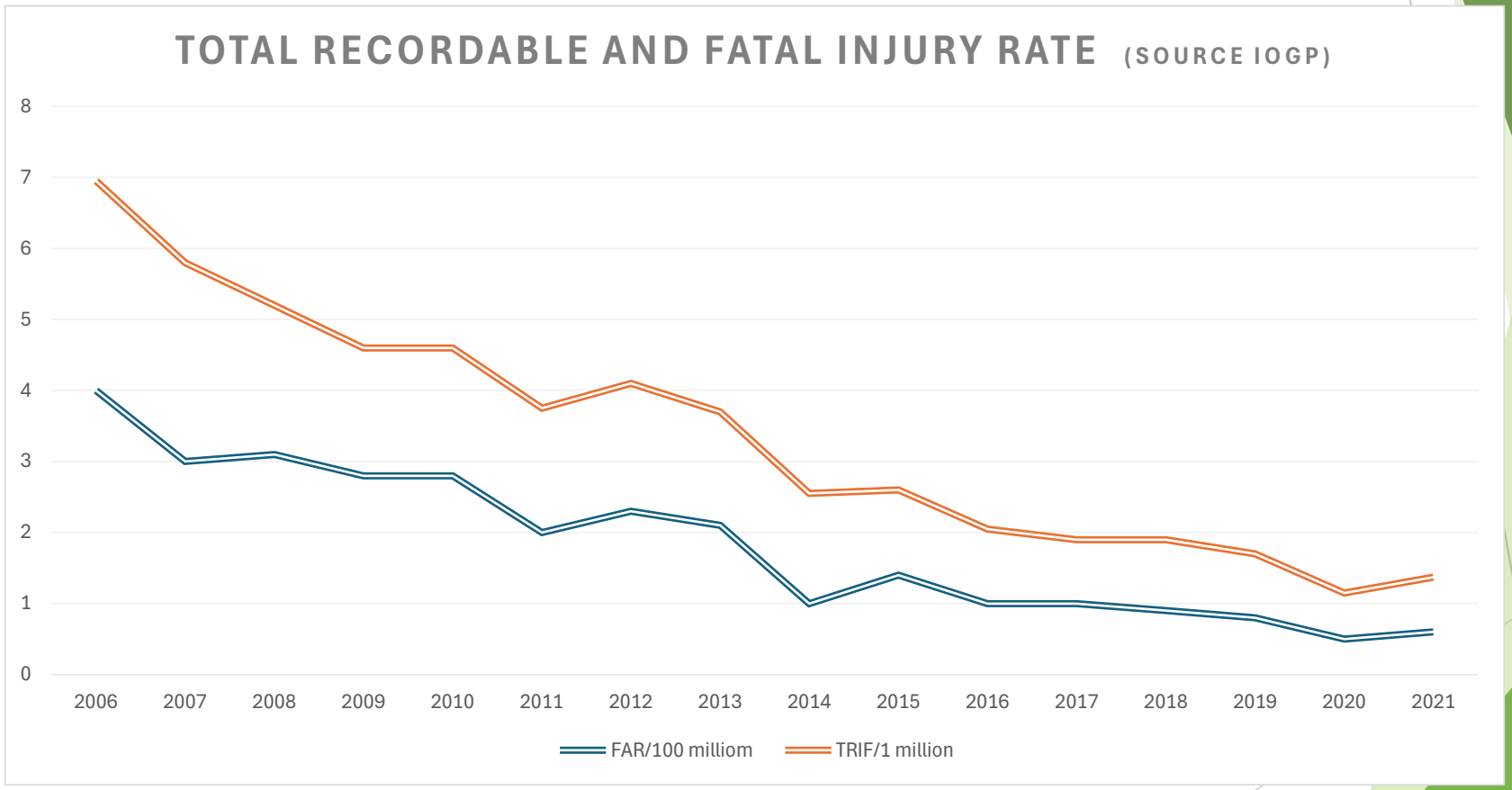


The lifesaving rules 2005-2010

Live Saving rules

- Shell reviewed a large number of fatal accidents (1991-2010) using the Tripod Barrier based
- They found that 8 core barriers were involved in some 40% of fatal accidents
- A further 10 covered 75%
- They developed core and supplemental live saving rules that are well known
- They saw a 70% drop in fatal accidents
- In 2015 IOGP data shows that if the live saving rules were 100 effective 73% of global fatalities would be prevented

Global Oil & Gas Fatal accident rates (last 18 years)



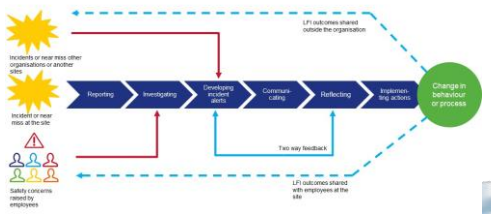
Source IOGP safety data report

Process Safety Fundamentals IOGP 2014

•They are complementary to the organization's Life-Saving Rules, but focus specifically on process safety rather than personal safety incidents.

•The PSF concept originated within Shell and was developed from around 2014 before being adopted and published by the IOGP.

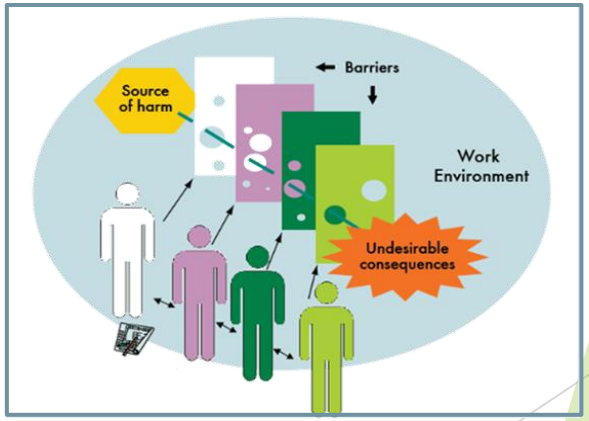
Learning from incidents 2014 to 2020

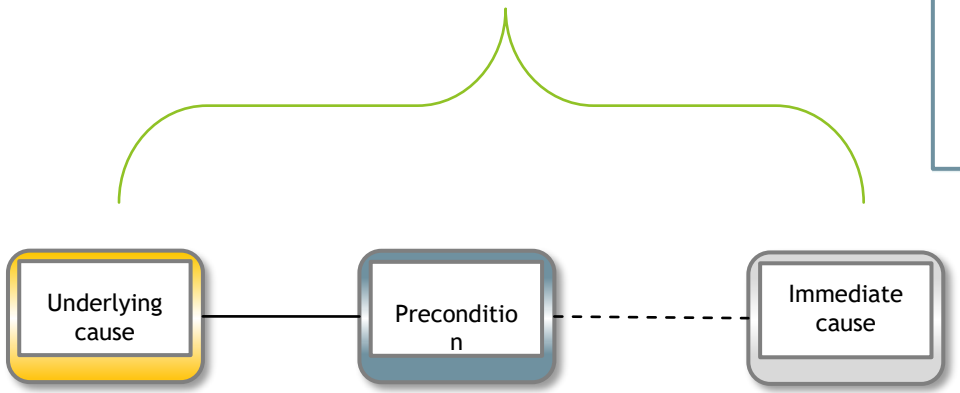


Learning From Incident Guide EI & STF 2016

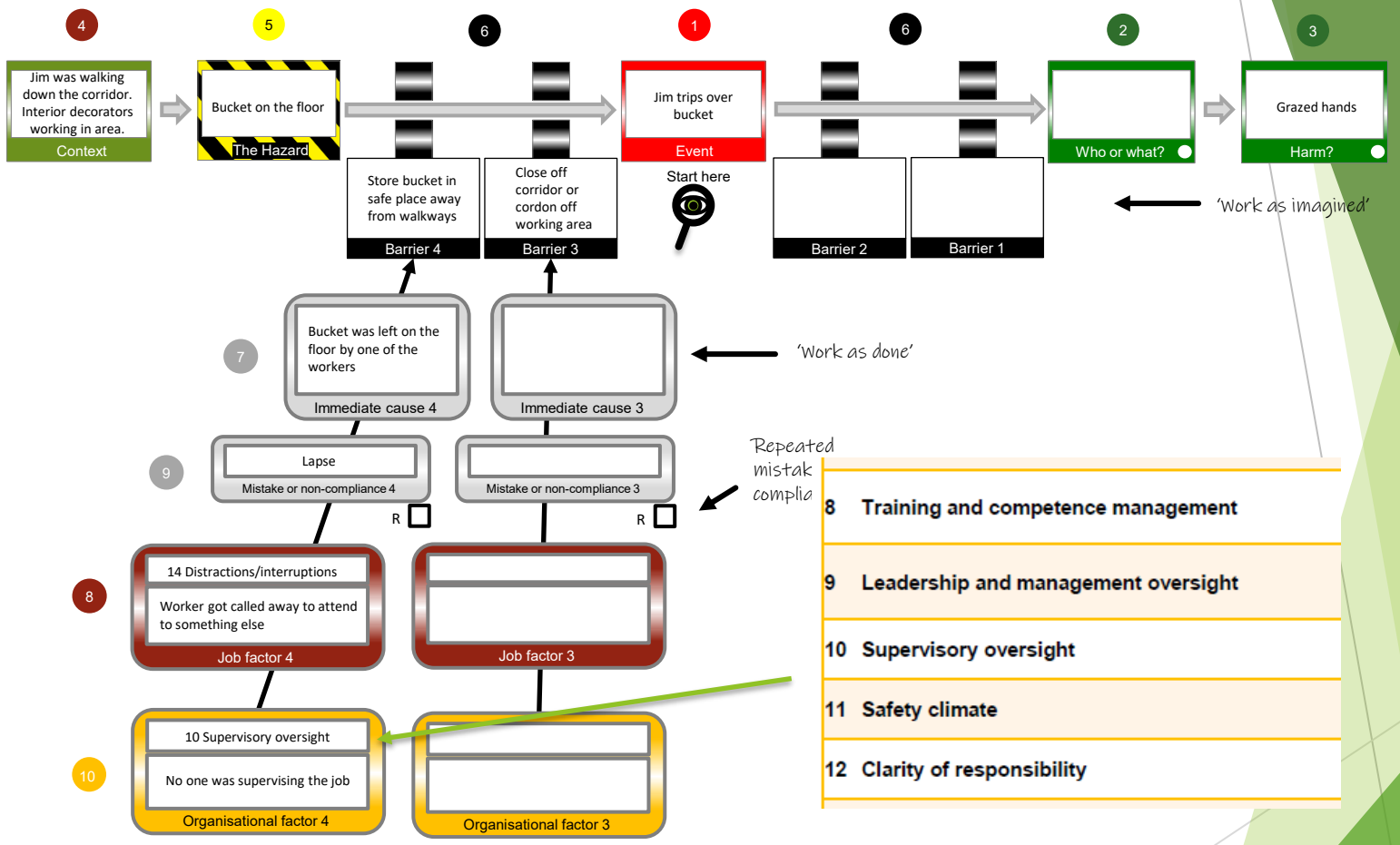
Investigation insights guide STF 2019/20

Tripod Lite 2023





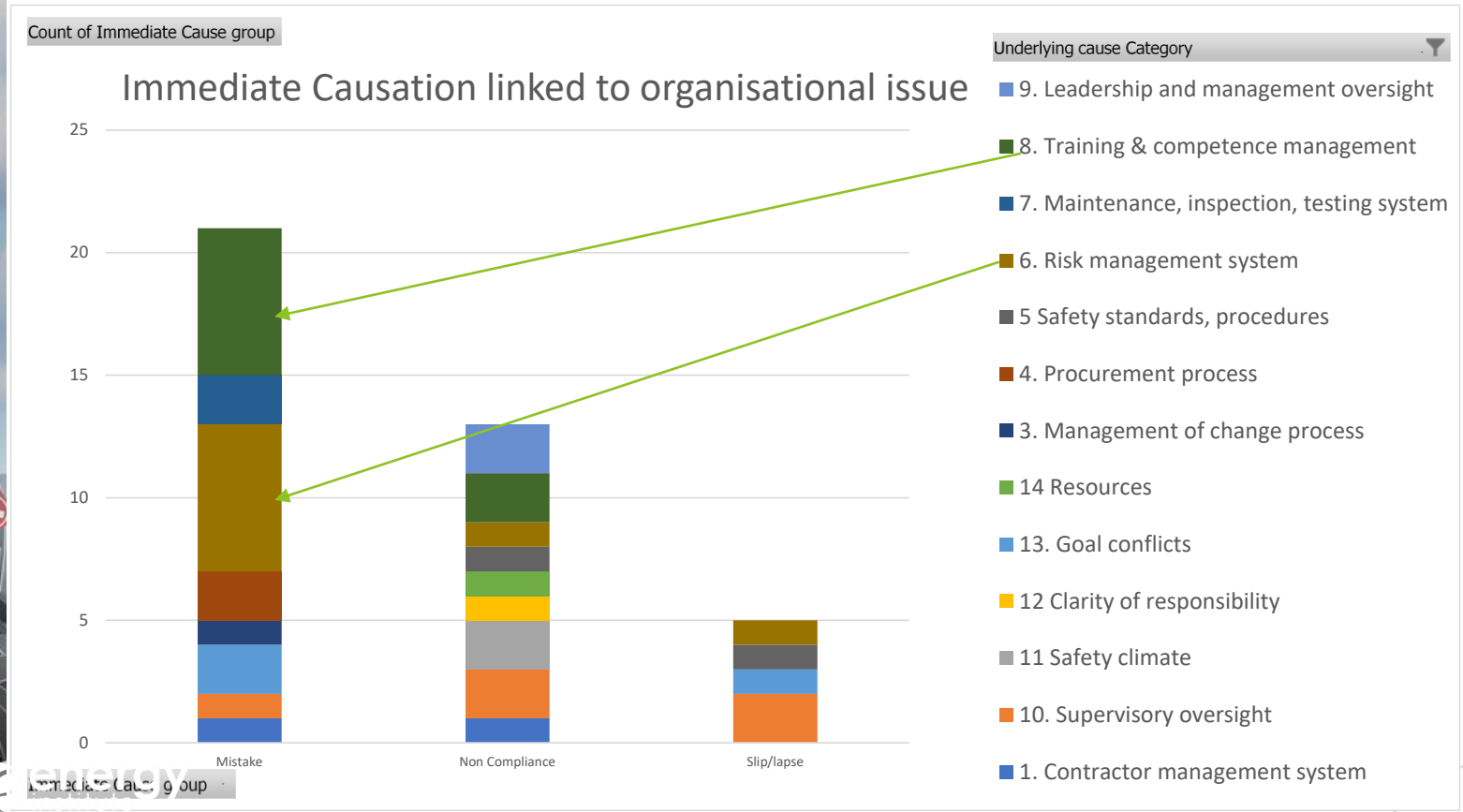
Tripod Lite



Why it happened

Tripod Lite

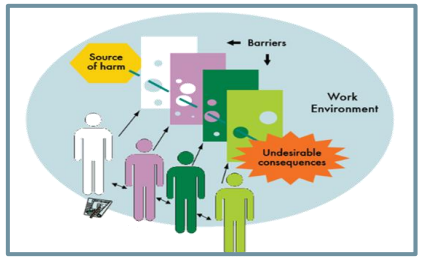
- Correlation of causation



My Challenge to this community

Tools, Techniques, applications to help us mange to and influence the environment that we operate in to maintain barriers and controls.

Fallible Management Decisions



Creating an environment where people instinctively do the right thing

Focus on Leadership how do we create an environment where leaders instinctively do the right thing

Challenge to this community

How can we change the C suite environment

What gets measured gets managed " Peter Drucker, 1955"

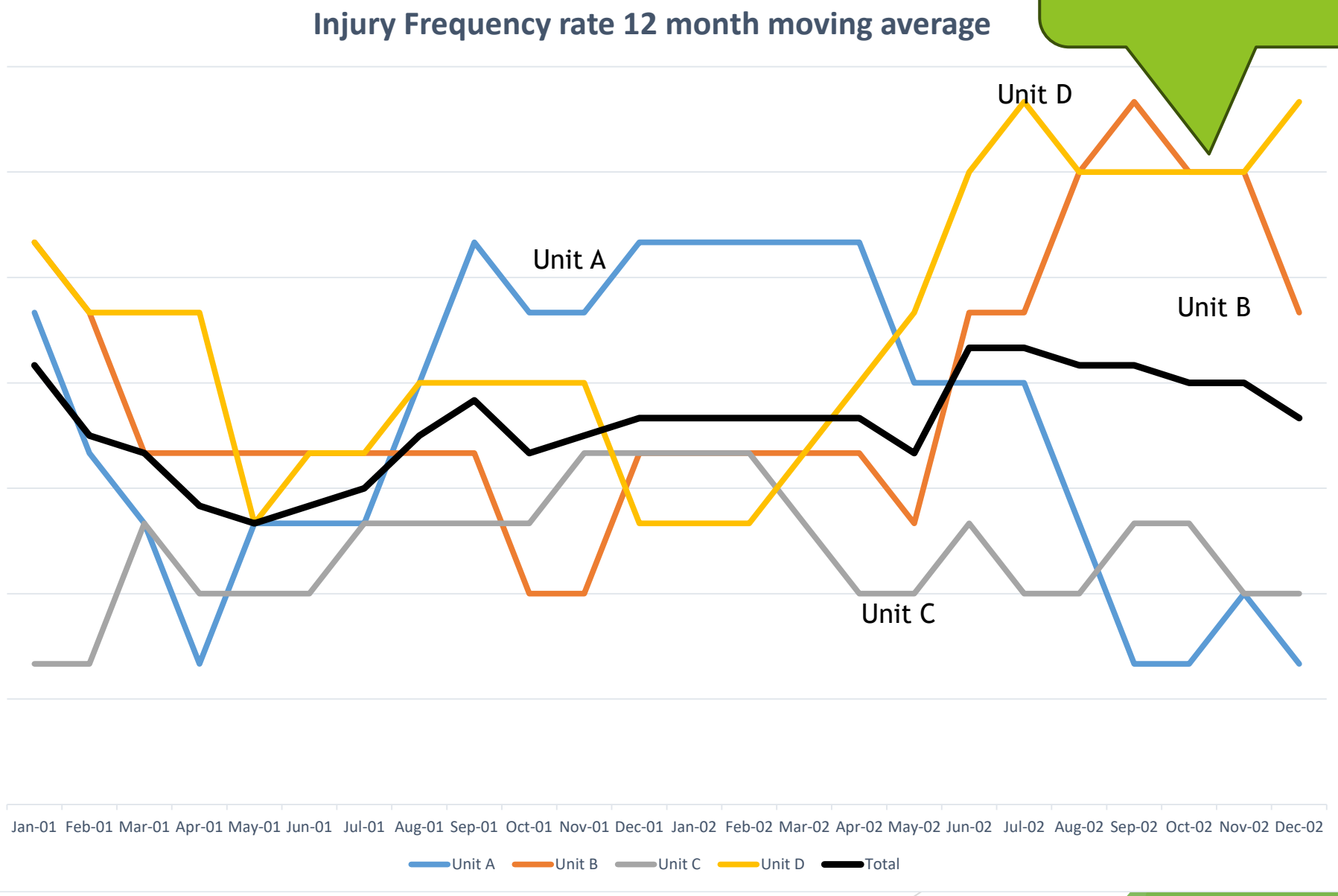
"What gets measured gets managed — even when it's pointless to measure and manage it, and even if it harms the purpose of the organisation to do so". **V. F. Ridgway 1956**

"There's a risk that trusts will focus only on the measures that immediately boost their ranking, even if it's not necessarily best for patients,"
Nuffield Trust CEO on the 2025 publication of hospital league tables in the UK

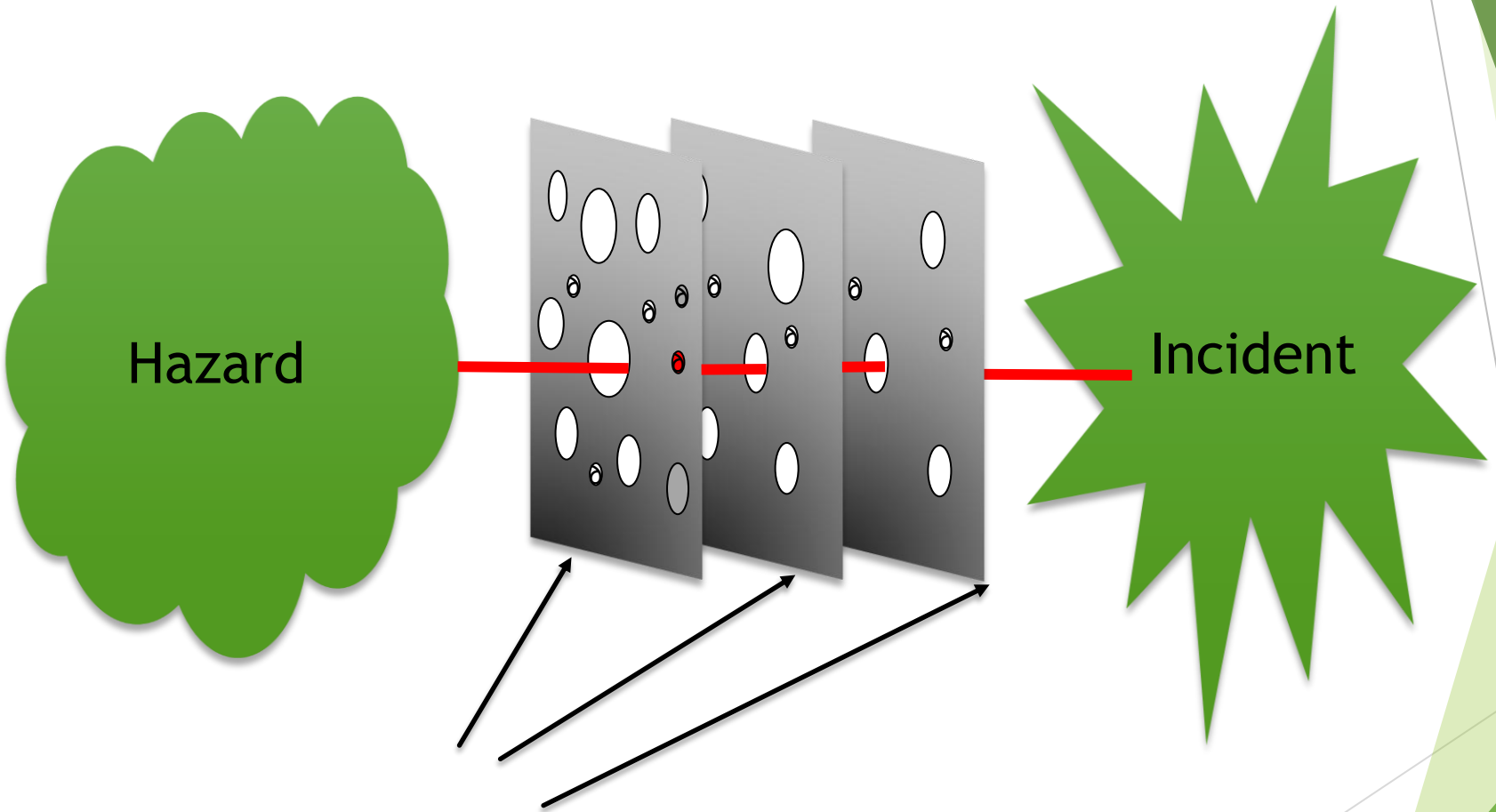
- Improvements to organisations come from
- Leaders looking at *Data*
- Having discussion
- Creating plans and actions from that *Data*

How should we measure safety?

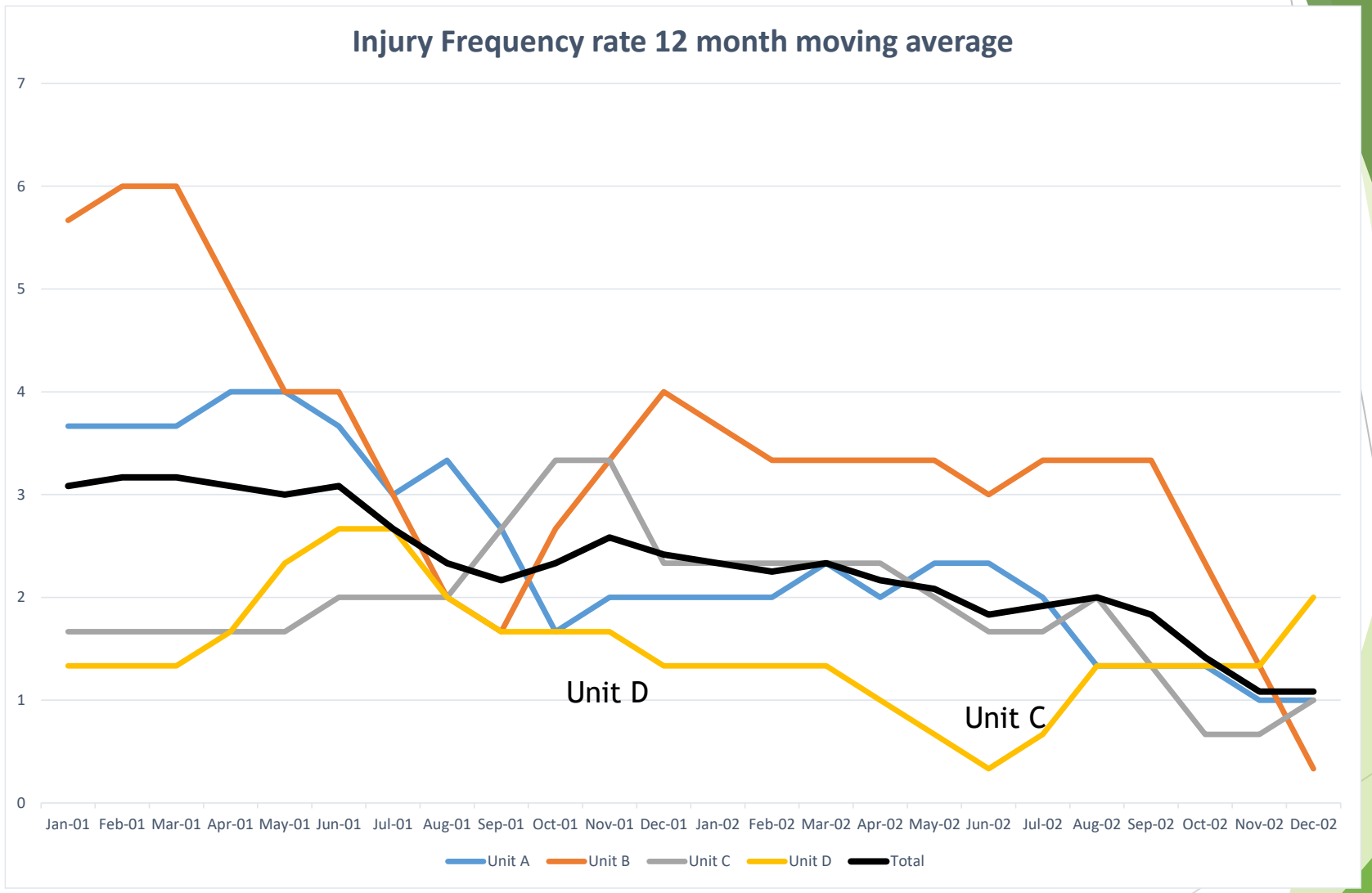
Let's image the conversation?



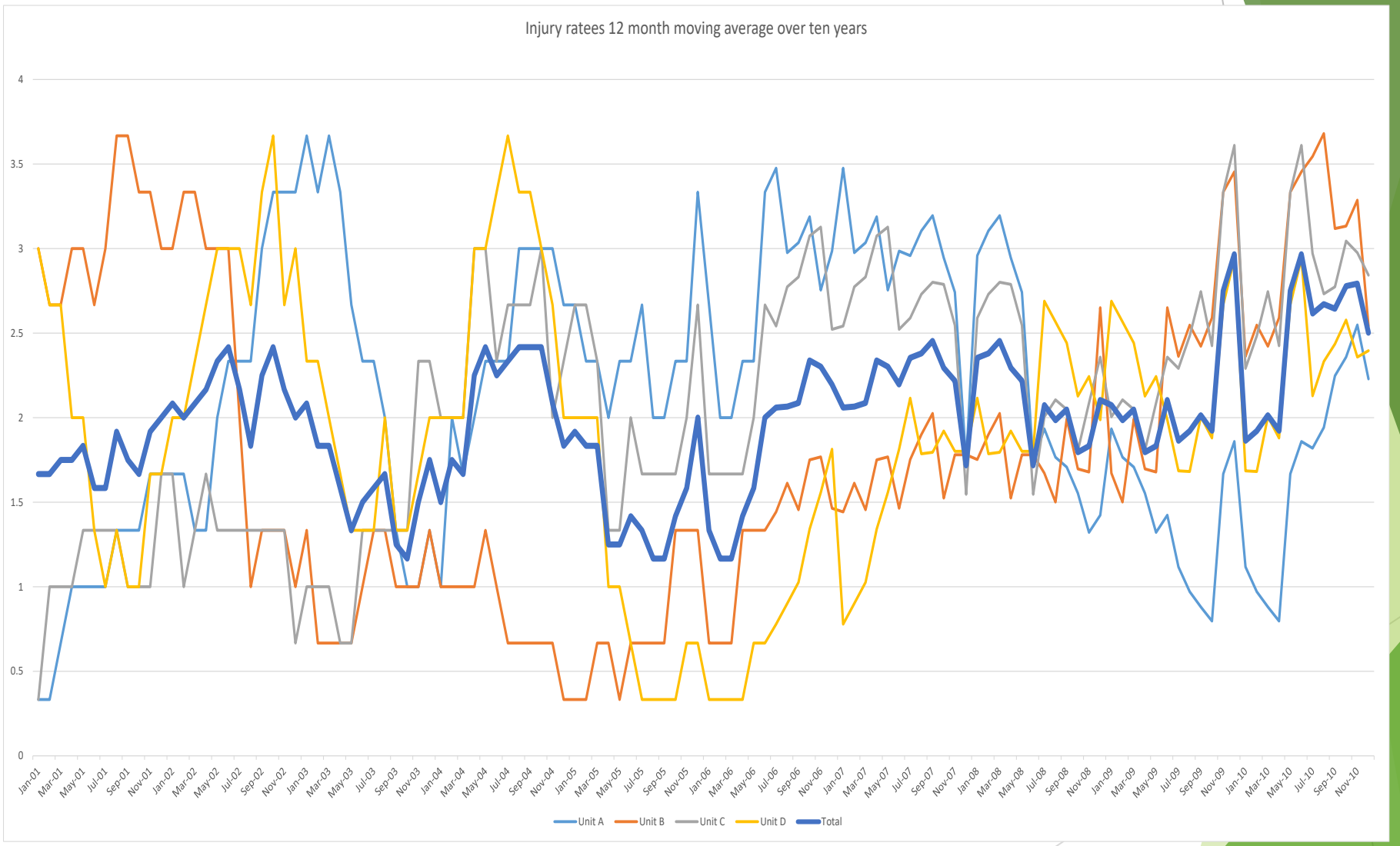
Jim Reason's Swiss Cheese Model



Reliability of barriers Reliability > Randon number barrier works

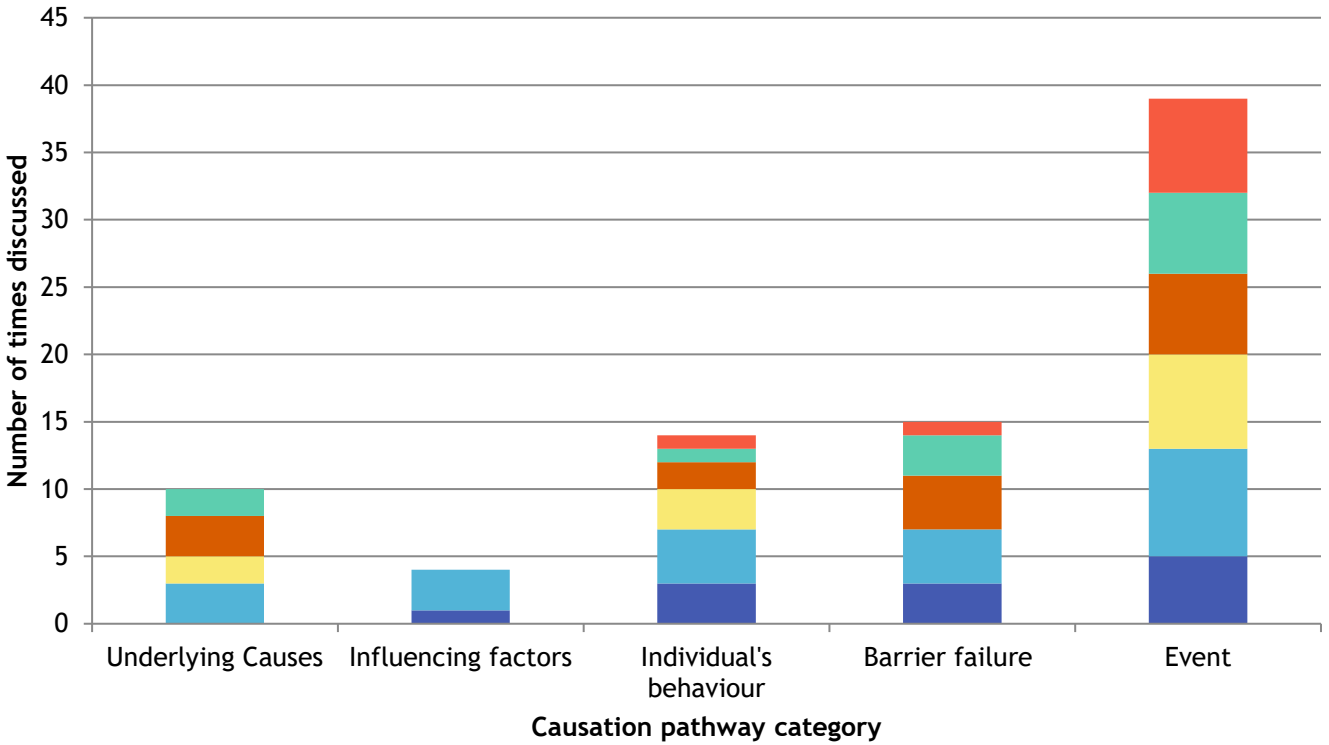


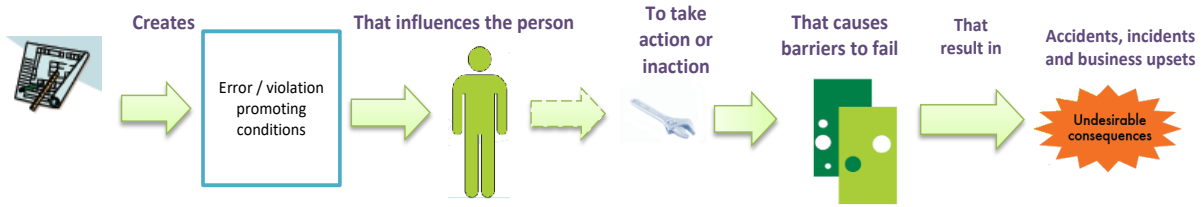
Press f9 and get a different result



20-30 Injuries per year and 12 million hours worked per year

Conversations about safety in leadership meetings



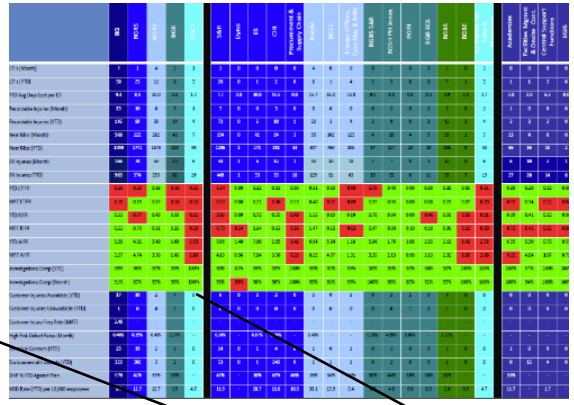


Dashboards

Unit 1

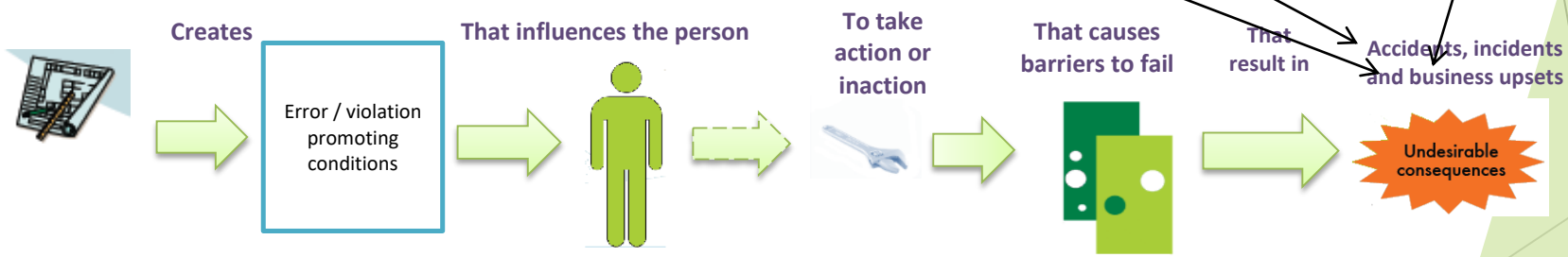
May-15	GLENS	LID O&M	LINCS	Grimsby Base	Total
High Potential Events	0	0	0	0	0
Major	0	0	0	0	0
Significant	0	0	0	0	0
Important	0	0	1	0	1
Minor	0	0	3	3	6
Near Miss	1	1	5	1	8
LTIs	0	0	1	0	1
Reportable	0	0	1	0	1
Unsafe Items	4	35	115	26	180
Safe Items	4	24	44	16	88
Open Actions	1	32	36	37	106
Overdue Actions	0	1	3	2	6
Actions closed in month	6	22	37	32	97
Open Investigations	0	0	3	1	4
Overdue Investigations (Over 1 Month)	0	0	0	0	0

Unit 2

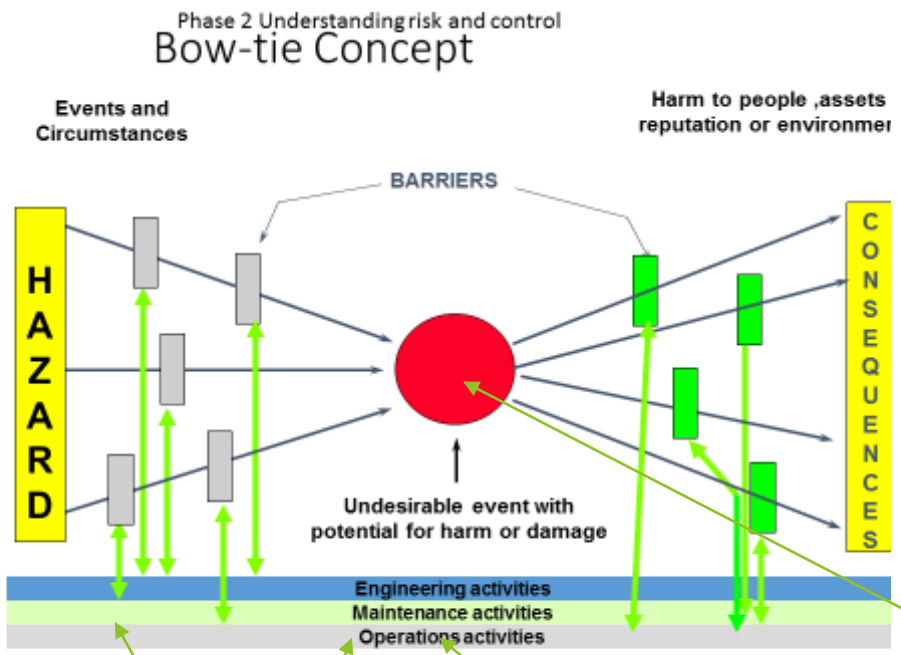


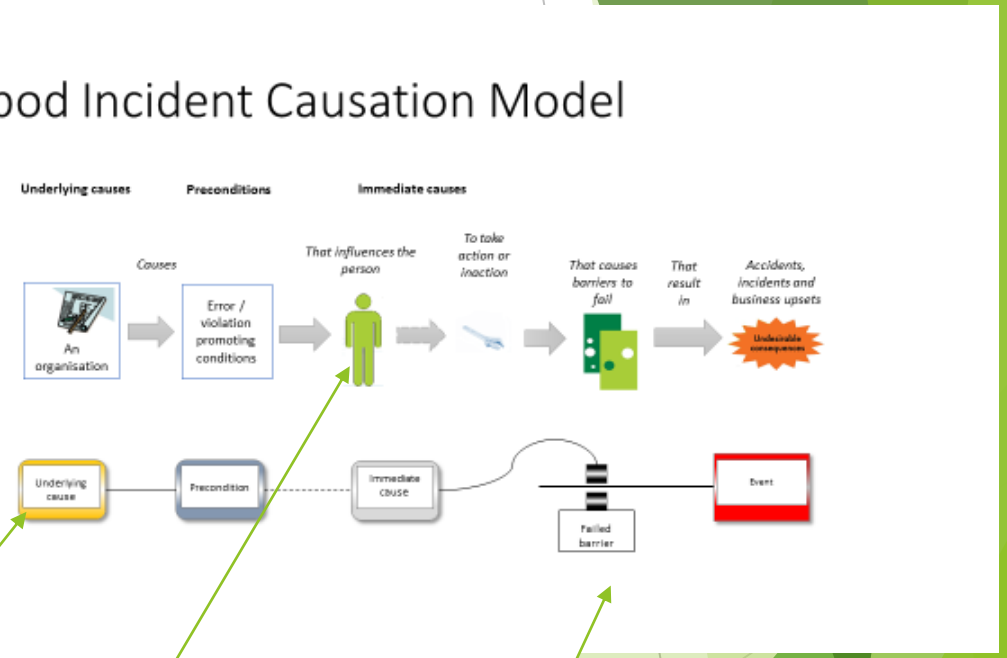
Unit

	May 2015		YTD 2015		FYF 2015	
	Actual	Plan	Actual	Plan	Forecast	Plan
People						
Lost time injuries (month) / LTIF (YTD)	0	0	0.09	0.07	0.09	0.07
Recordable Incidents (month) / TRIF	0	0	0.47	0.16	0.28	0.16
Tier 1 events	0		0			
Tier 2 events	1		2			
Near Misses	10		41			
HiPos	0	0	2	0	2	0
PSPI Reds	2	0				
Mindfulness Safety Contacts	30		169			
Environmental						
Reportable Hydrocarbon leaks	2	0	3	0	3	0
Breaches and Non Conformance	0	0	8	0	8	0



What could we measure?





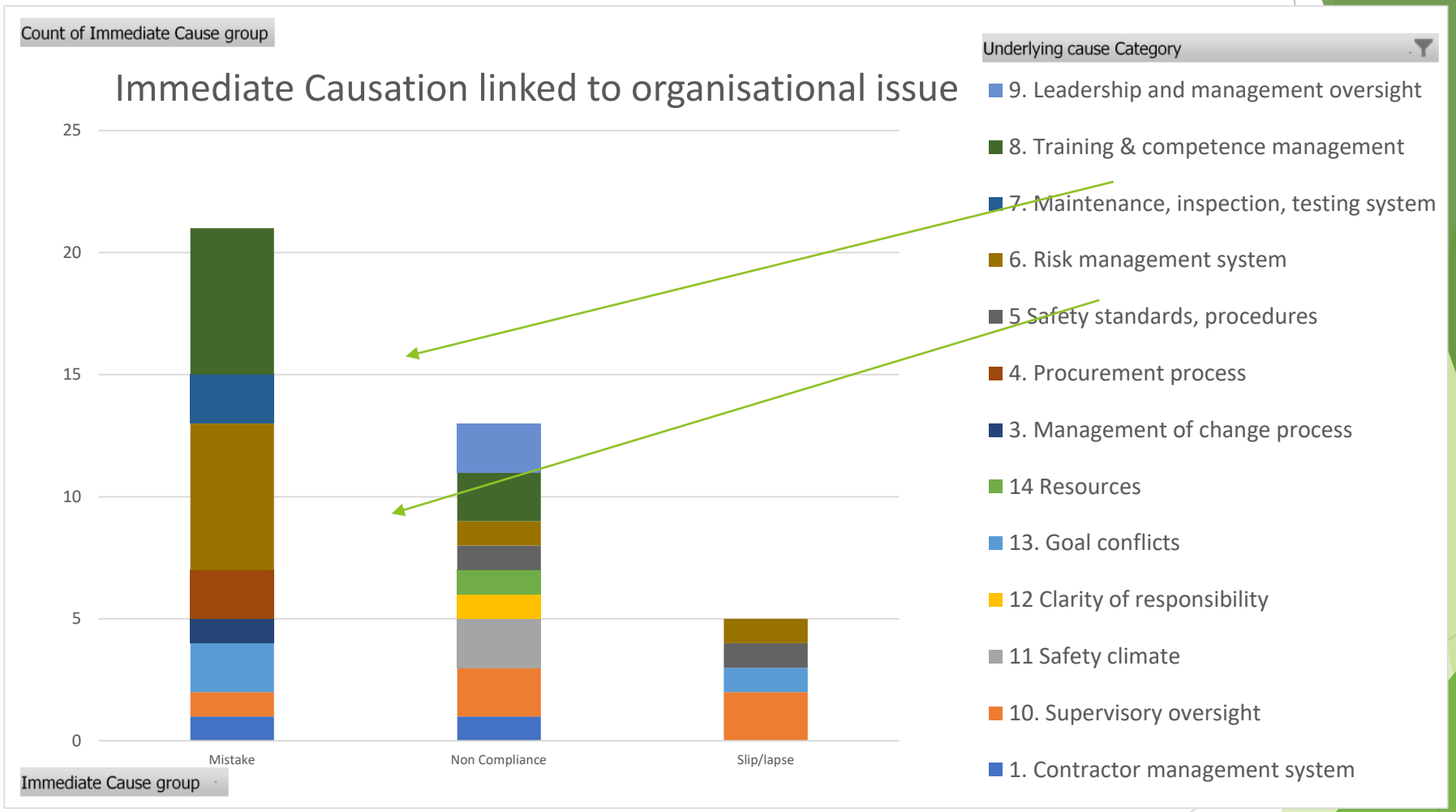
Completion of safety critical activities

Management activities and behaviours

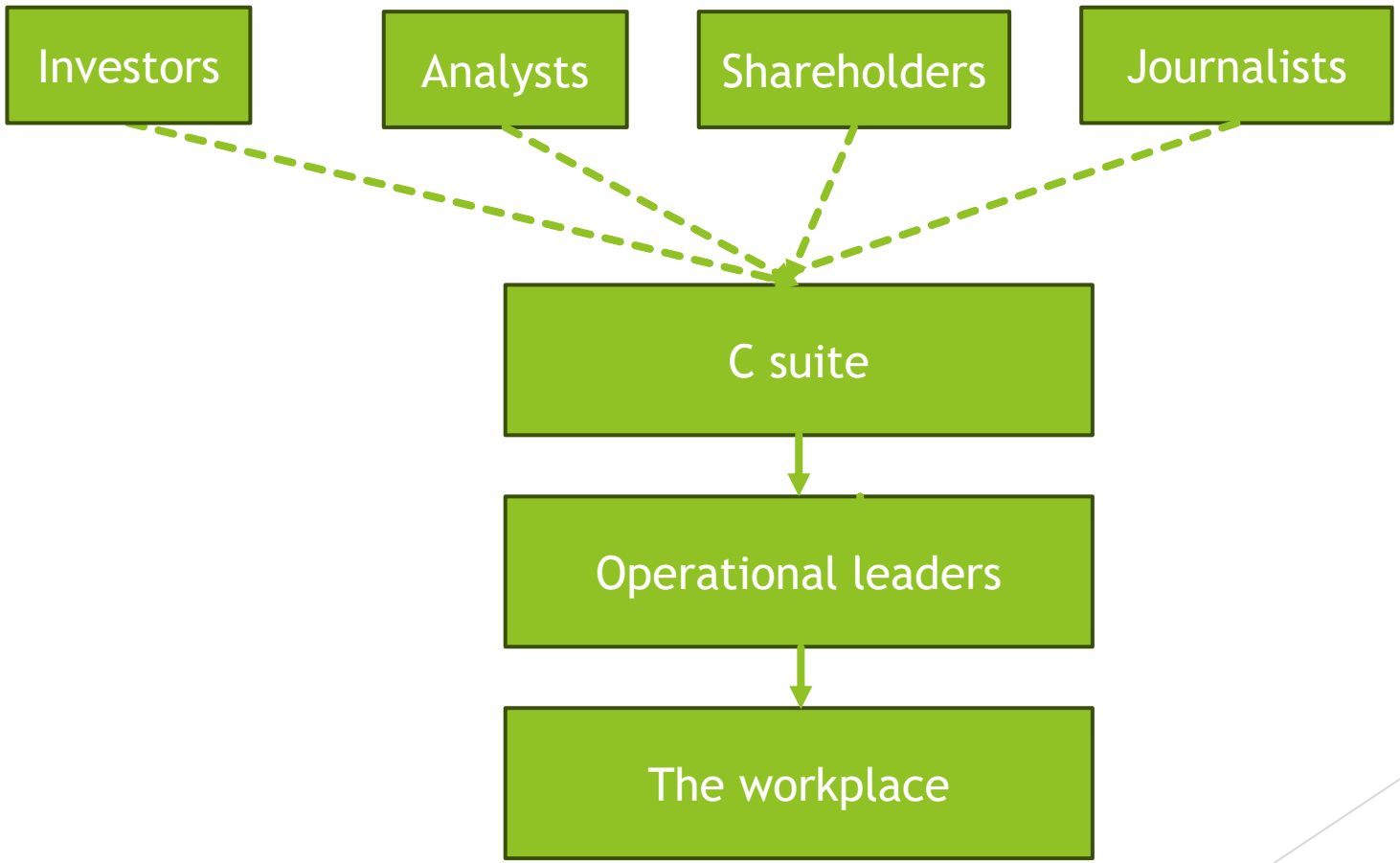
Classification of Human Error

Barrier reliability

Correlation of causation



Why we need to rethink how we measure safety

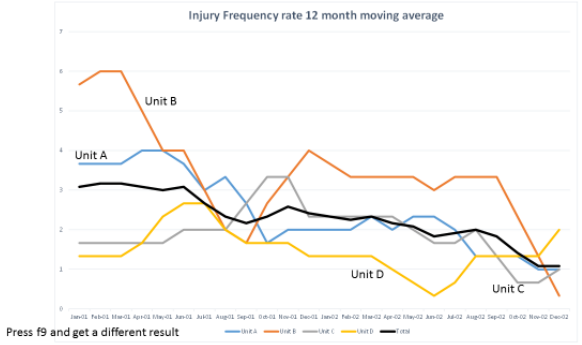


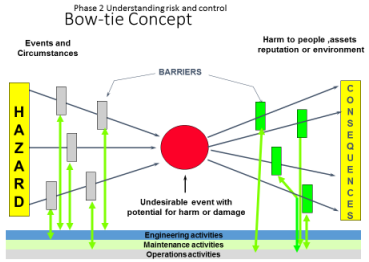
Challenges to change behaviour at the C suite level

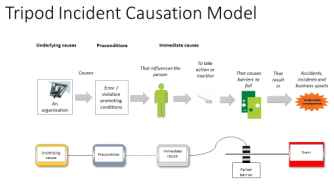
- What would a good conversation look like
  - Board meetings
  - CEO/CFO to analysts/ key investors
  - At an AGM

- What information do we need to provide to support those conversations?

Conclusions







- Celebrate the amazing success we have achieved in both people and process safety
- Start researching what a good conversation would look like at different levels at different levels
- Use our understanding of accident causation to generate new measures to create encourage and support positive conversations