One Company's Process Safety journey with hidden cultural improvement rewards

A personal view of the journey..

Martyn Garner, Group SHE Director
Synthomer

Introduction:

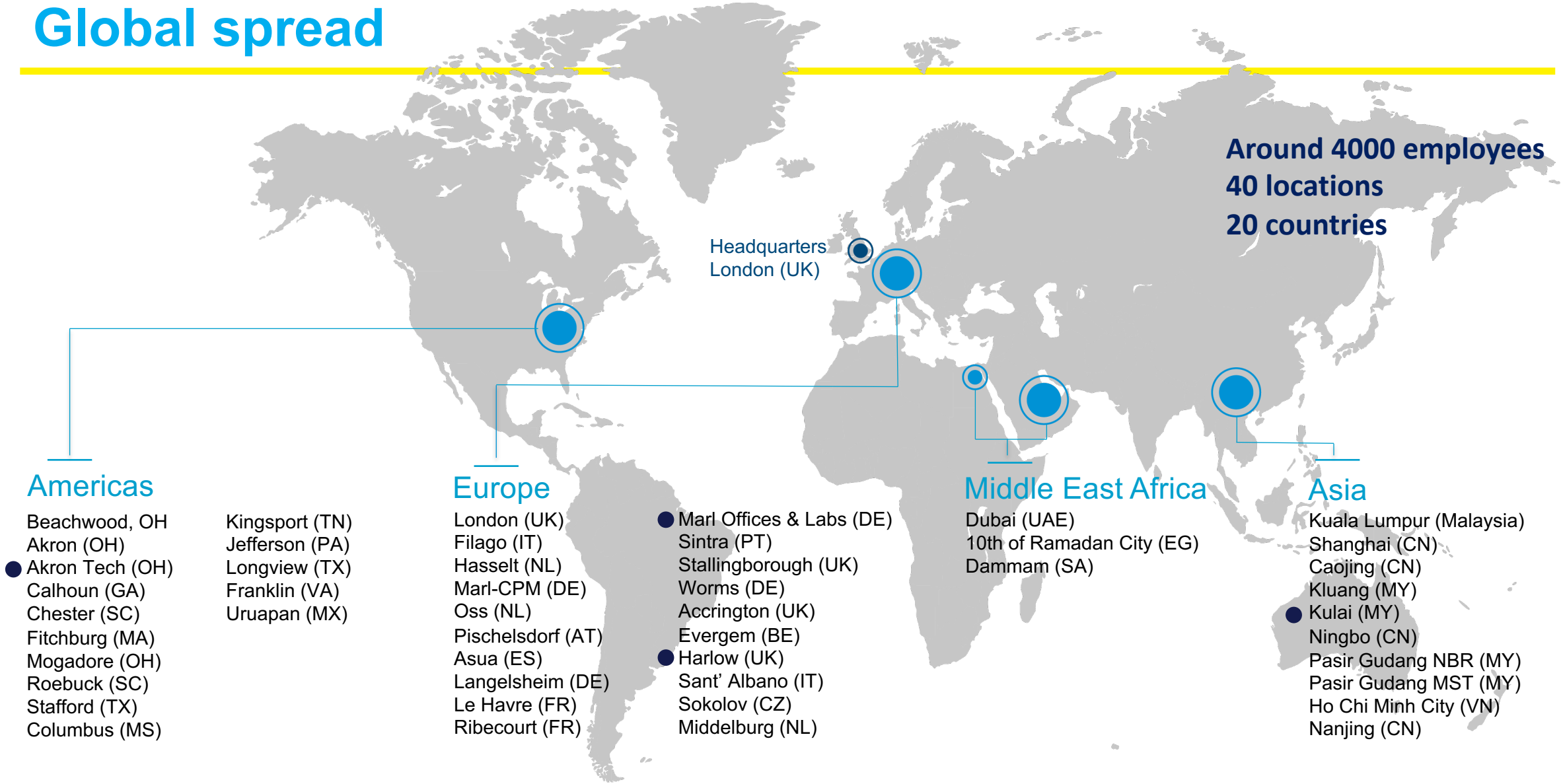
- Chemical Engineer – close to 40 years experience in Chemical Industry, almost 34 years with Synthomer
- UK based, but Global experience – continuous/batch and large/small scale

- 21 years in Operations roles
- Nearly 13 in SHE

- Provide solutions-based support to sites
- Specialist safety and process safety training/processes
- Corporate EHS compliance/assurance

Global spread

● Centres of Excellence



Americas

Beachwood, OH
Akron (OH)
● Akron Tech (OH)
Calhoun (GA)
Chester (SC)
Fitchburg (MA)
Mogadore (OH)
Roebuck (SC)
Stafford (TX)
Columbus (MS)
Kingsport (TN)
Jefferson (PA)
Longview (TX)
Franklin (VA)
Uruapan (MX)

Europe

London (UK)
Filago (IT)
Hasselt (NL)
Marl-CPM (DE)
Oss (NL)
Pischelsdorf (AT)
Asua (ES)
Langelsheim (DE)
Le Havre (FR)
Ribecourt (FR)
● Marl Offices & Labs (DE)
Sintra (PT)
Stallingborough (UK)
Worms (DE)
Accrington (UK)
Evergem (BE)
● Harlow (UK)
Sant' Albano (IT)
Sokolov (CZ)
Middelburg (NL)

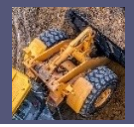
Middle East Africa

Dubai (UAE)
10th of Ramadan City (EG)
Dammam (SA)

Asia

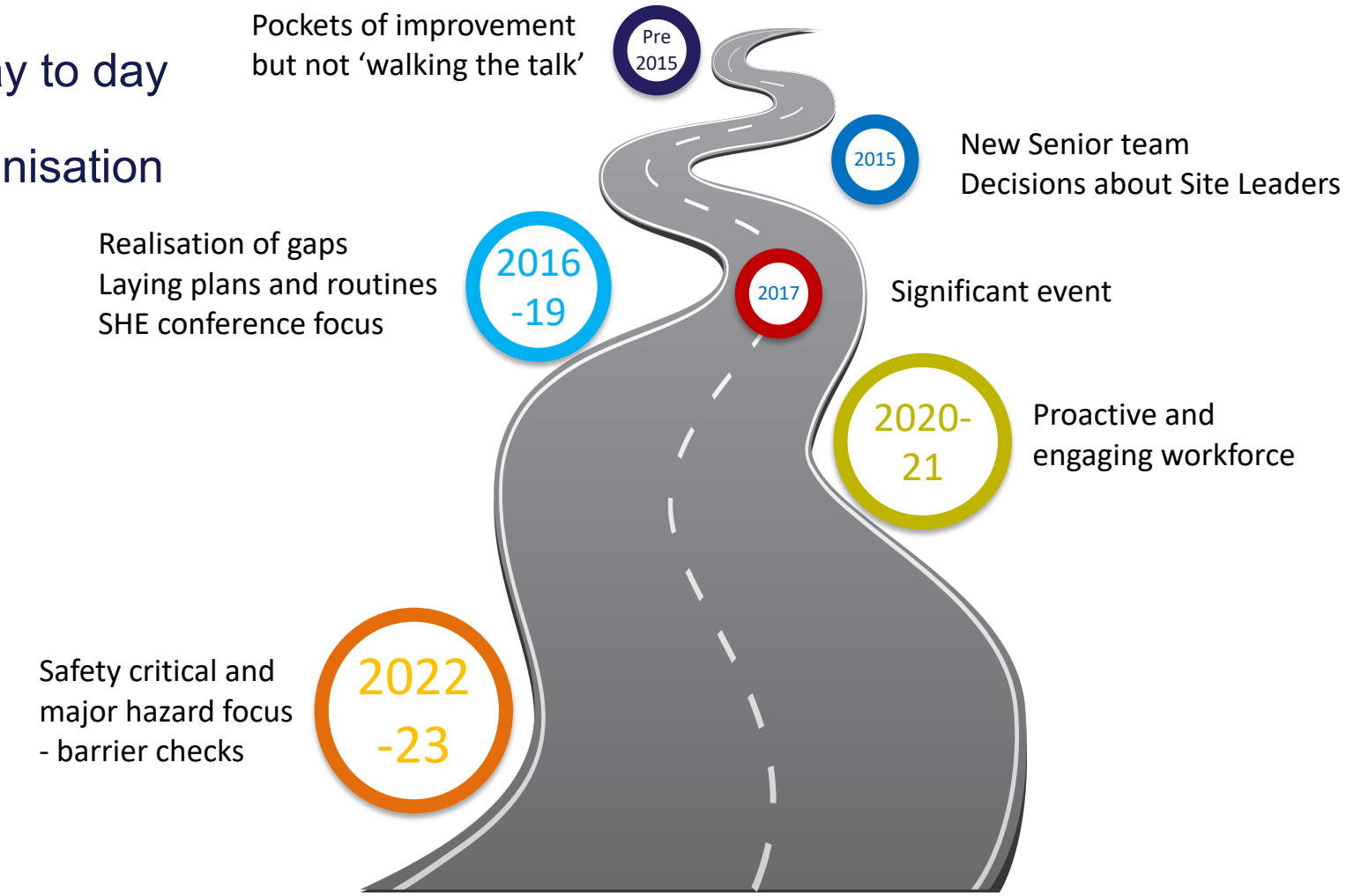
Kuala Lumpur (Malaysia)
Shanghai (CN)
Caojing (CN)
Kluang (MY)
● Kulai (MY)
Ningbo (CN)
Pasir Gudang NBR (MY)
Pasir Gudang MST (MY)
Ho Chi Minh City (VN)
Nanjing (CN)

Our portfolio

Division/chemistry	Product examples
Coatings & Construction Solutions  • Aqueous (acrylic and vinylic based) dispersions	• Various types of architectural, industrial, wood and metal coatings • Binders for tile adhesives, mortar, waterproofing, insulation and fibre bonding
Adhesive Solutions  • Tackifying resins • Aqueous dispersions • Lithene polybutadiene	• Pressure sensitive, contact and hot melt adhesives, sealants, wet glues and other tackifying resins and additives • Used in tapes and labels and packaging
Health & Protection  • Nitrile Butadiene rubber (NBR) latex • Styrene Butadiene rubber (SBR) latex • High solids SBR chemistry	• Key raw material for medical and other latex gloves • Binders for paper coating, carpet, foam
Performance Materials  • Chemical additives • Non-aqueous based chemistry	• Inorganic (copper, iodine and tin-derived) additives • Heavy and light acrylate raw materials

The Synthomer story …

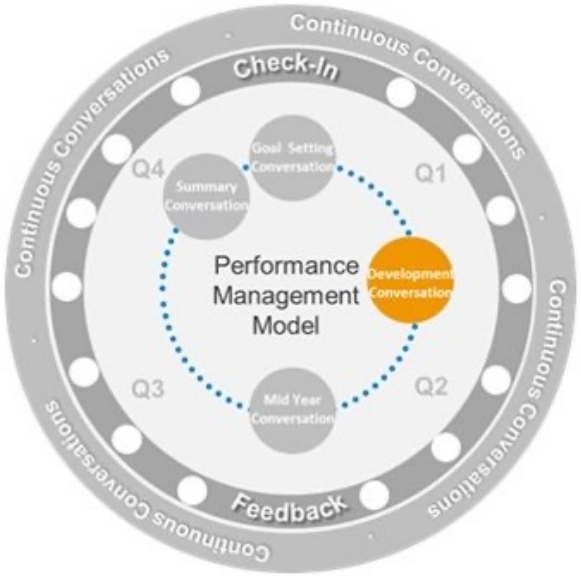
- Building Process Safety into the day to day
- Engaging with all levels of the organisation
- Seeing the benefit in terms of:
  - Performance
  - Perception



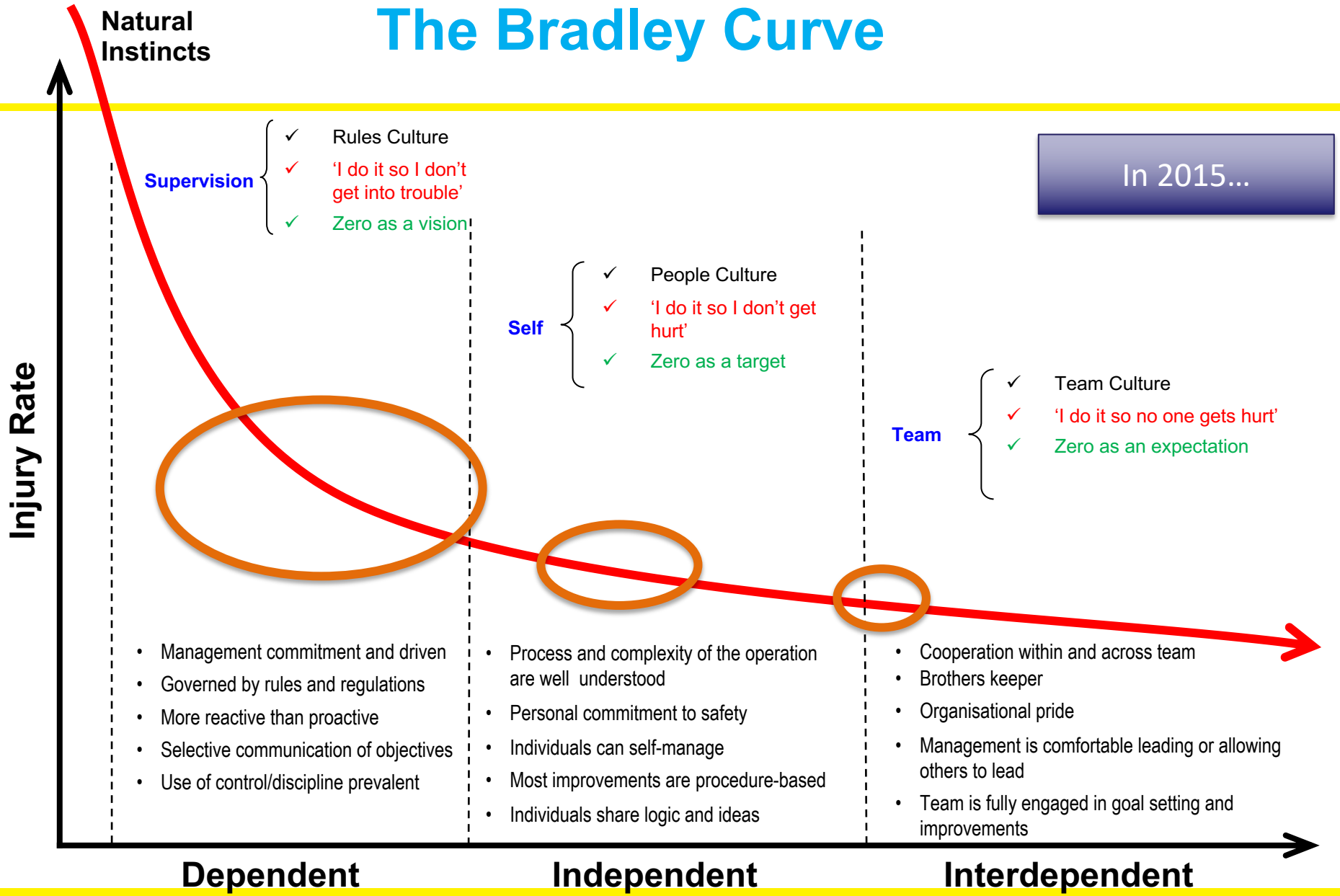
The journey ..

- New people, new ideas, different experiences – challenge the norm! Lead by example!
- Realisation you need good leaders on board – change the leaders or ‘change the leaders’
- Need to set clear expectations – and have consequences understood **and applied**
- Have a proper roll out plan – months of planning, military operation!
- Based on what you see/feel, select focal areas – prepare/deep dive and be ruthless

- **Ensure you have the right people**
  - Leadership competency assurance programme for Leader/Engineer/SHE Managers
  - Formal preparation/ presentation/interview
  - Formal letter of appointment/ development plan



The Bradley Curve



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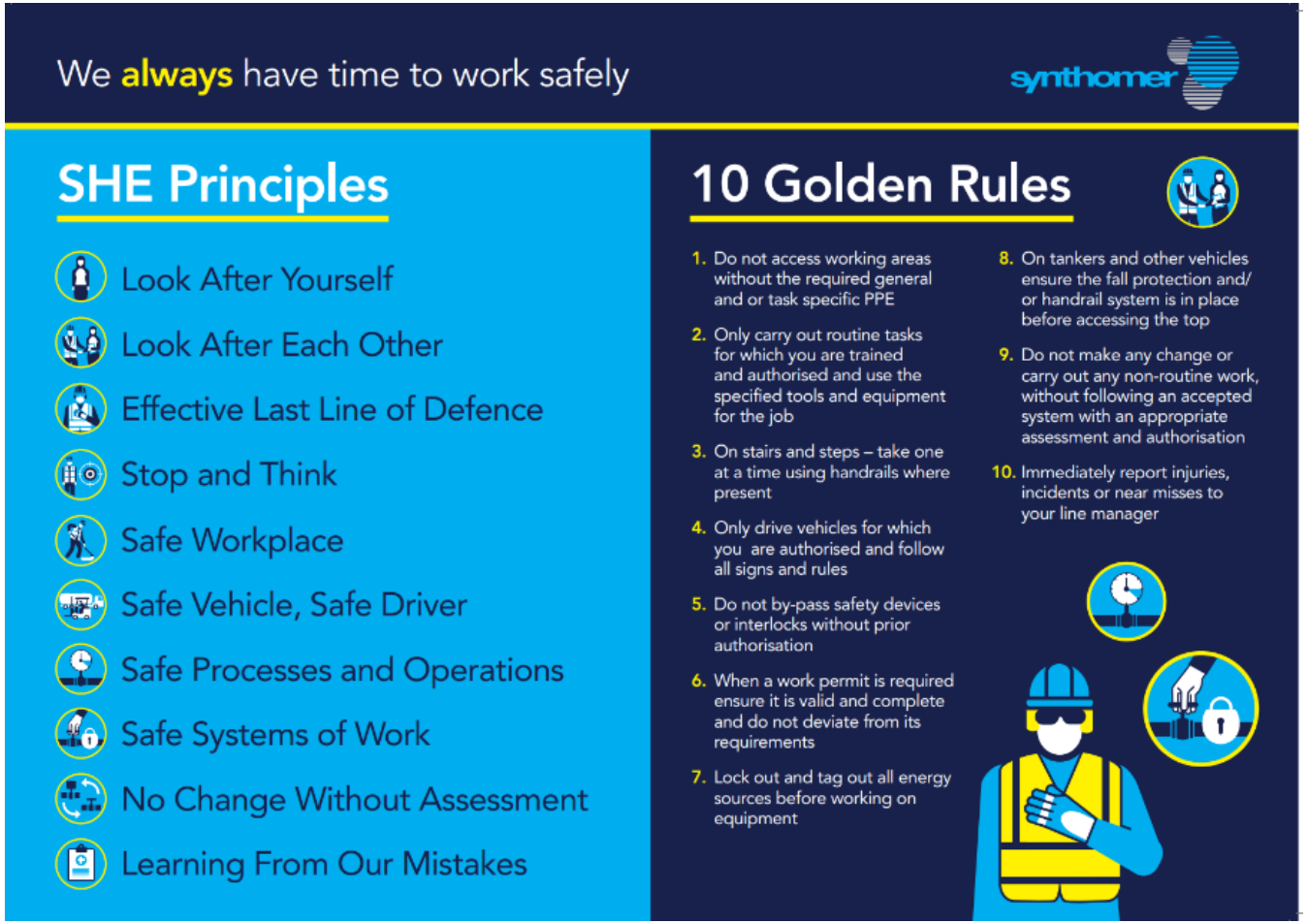
Compliance / Reactive

Choice / Proactive

What did we do first?

- **Back to basics – if you are dependent, then you need rules –**
  - **need to be the same/consistent**
- **Devised our own set of SHE Principles and 10 Golden Rules –**
  - **Typically, broader than (Life Saving Rules)**

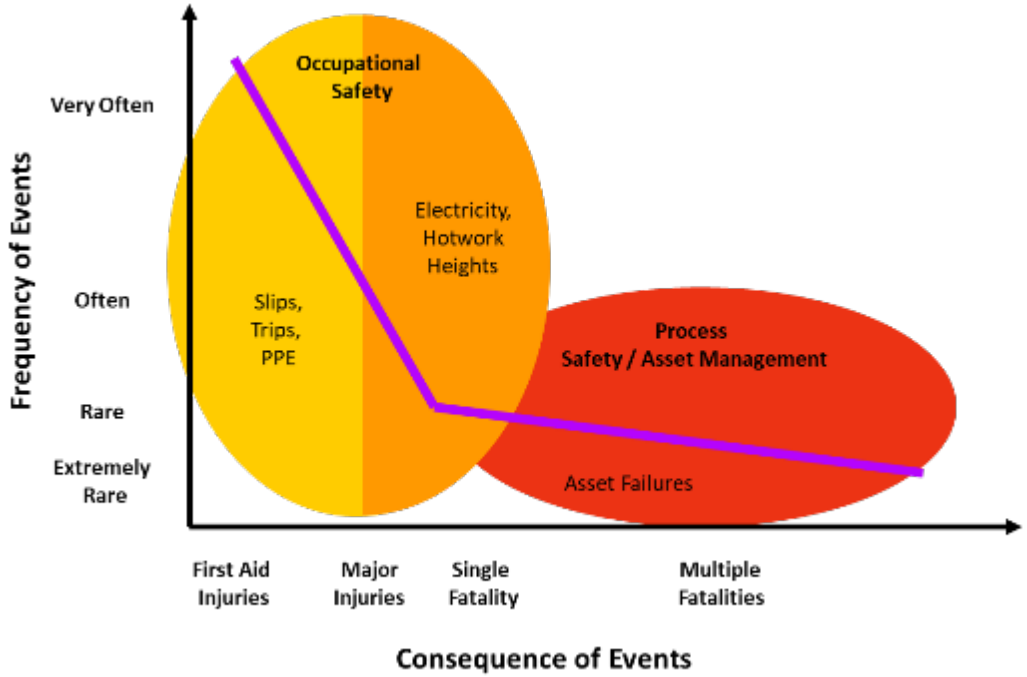


Do it right!

- **Spent months planning**
  - SHE identity
  - SHE Livery
  - Strapline
  - Whole array of supporting materials
    - Flyers, pens, post-its, posters, T-shirts – you name it….
- **Trained the Site teams**
- **Set a launch date in advance**
- **September 1st 2016 - was a smooth day**

Parallel workstream – Annual Conferences

- **In the background we were preparing for post-launch follow up**
- **Important we got to the key movers/shakers –**
  - Site Leaders/SHE Managers
- **Re-focus on the Conference agenda (started in 2015)**
- **We had decided that we wanted to initially focus hard on preventing the big bang**
  - Identified 4 key areas
    - Process safety
    - Asset integrity
    - Permit to work (LOTO)
    - Management of change



These and the Principles and Rules fed into agenda items for **SHE conferences** **and have done ever since**

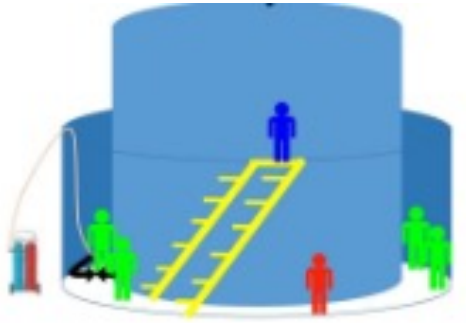
Why is Process Safety important?

How many people use LOTO/SWP systems?
How many people use flammable chemicals, store liquids/ gases under pressure?

- **Trevor Kletz - A well-known loss prevention expert Professor Trevor Kletz asked for an unusual retirement gift – a filing cabinet. He put his collection of accident records in this and when he sorted them into categories, by far the largest category was 'preparation for maintenance'.**

- **Incident Causes**
  - an **inadequate understanding** of the system being worked on
  - operators and/or supervisors **not** being **suitably qualified** or **experienced**
  - plant **not being adequately decontaminated**
  - **lack of supervision** to ensure permits to work are correctly followed
  - **deviations from work plans** not being adequately risk assessed
  - the work area **not** being closely **inspected** prior to the job
  - workers **inadequately briefed** prior to work
  - **inadequate justification and safeguards** for work on live systems

2017 event:
Plant Under Maintenance



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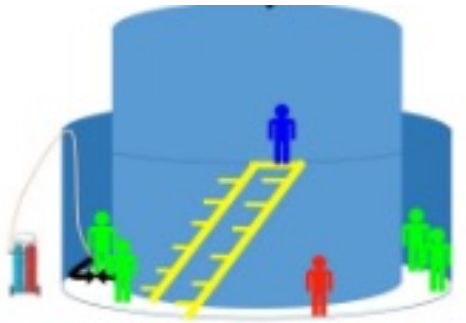
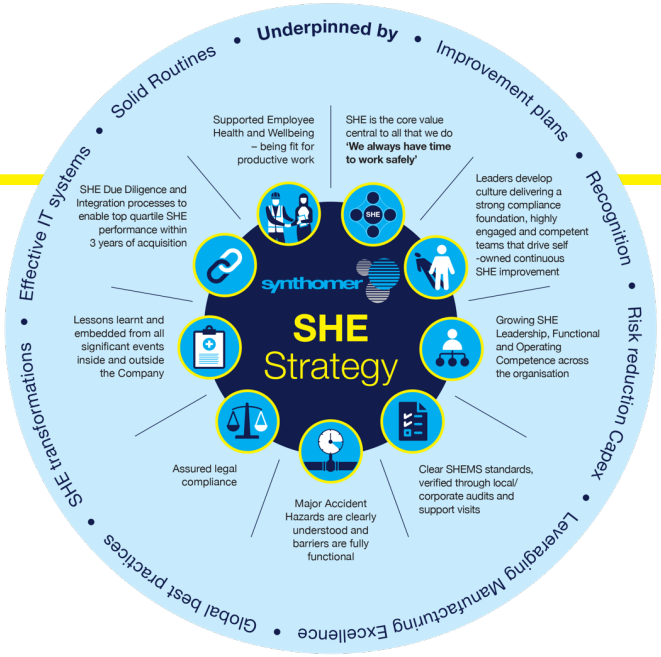
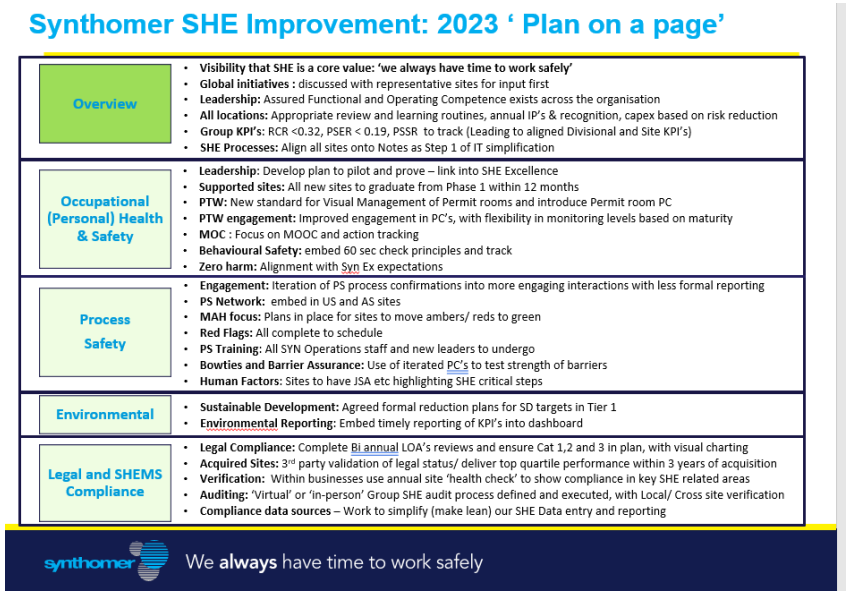


Annual SHE conferences

- **Leaders together**
- **Used to shape our future**
- **Involved/engaged workshops**
- **Outputs are the key drivers for SHE IP's**
- **Latterly – rolling 3 year strategy that links into headline 1 page plans for Company, Businesses and Sites – all are consistent**



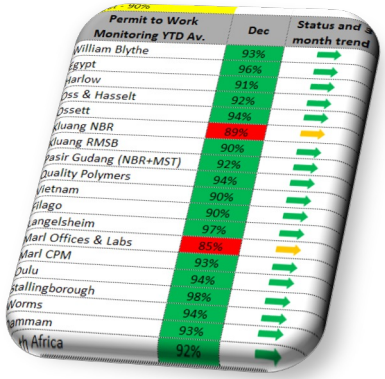


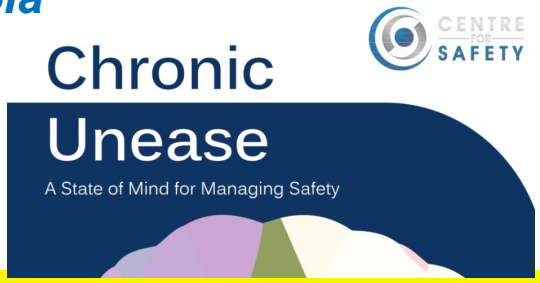
Performance tracking

- **3 Divisions/Businesses – shared central expertise**
- **All our data is available in many cuts/slices**
- **Chiefly**
  - Site >> Business >> Global
  - Can go : Regional, Country, former entities
- **Historically only real focus on lagging indicators**
- **Significant events contributing to:**
  - Recordable case rate (OSHA)
  - Process Safety Event Rate (ICCA - similar to API 754)

Key mindset switch to leading indicators in 2017

- **Had been doing superficial ‘checks and measures’**
- **Typically got lots of ‘greens’ and 95+% scores**
- **Water melon effect**
  - very dangerous!
  - Not as good as you think you are!
- **Shell talk about needing to have a *‘chronic unease’ – unhealthy paranoia***
- **Centre for Safety**

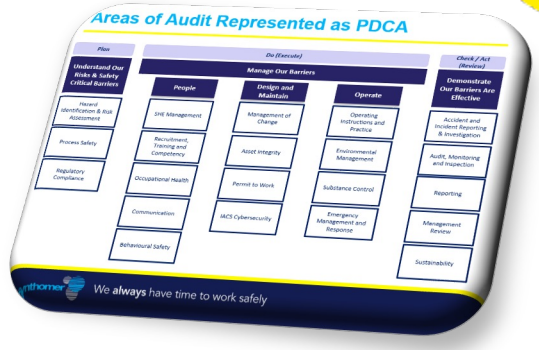


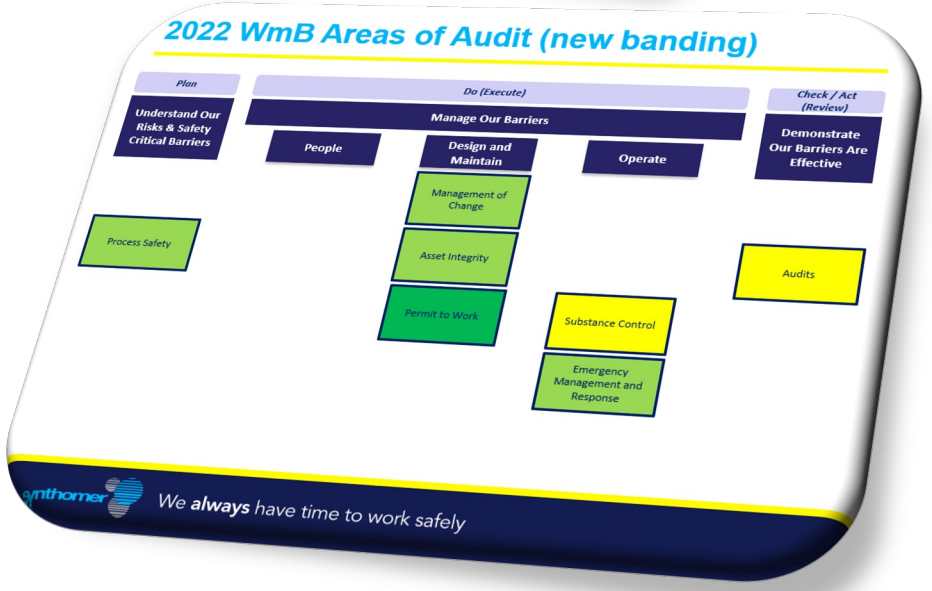


- **2017 formalised some trial thoughts – defined a suite of leading KPI’s**
- **Stuck to our guns – focused on PTW/MOC/PS/AI**
- **Looked at focusing on near misses/ weak signals**
- **Encouraged reporting, introduced engagement tools - to test the strength of our barriers/layers of protection**

Next key point was iteration of Corporate Compliance

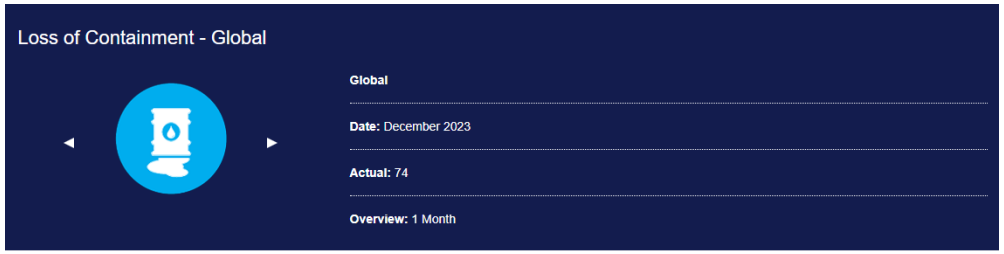
- Had a formal Group SHE (EHS) audit every 3 yrs per site
- High level with 800+ questions – superficial with few real findings
- Wound in the focus, less areas based on our EHS standards – deep dives and found much more (substantial)
- Aligned with our Major Accident Hazards (MAH) – prevention and mitigation
- Went from Word document with 20-30 pages sent to sites 2 months later - to on the day feedback to Senior Leaders with agreed timescales to fix Significant NC's – with short Powerpoint summary, colour banding
- Significant Non Conformances designated as red flags >> SHE IP

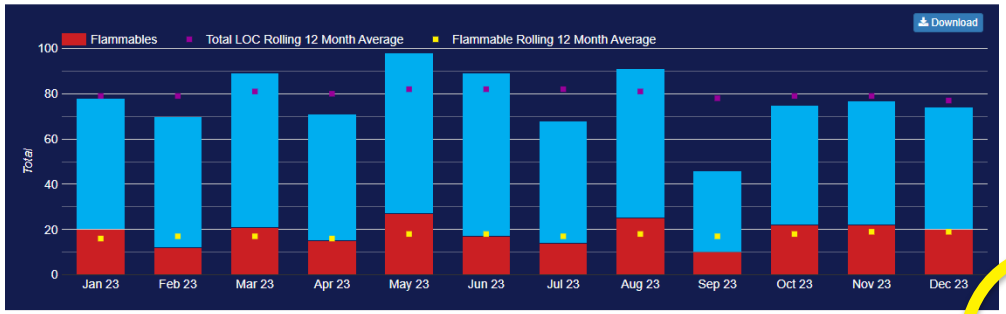




Sharing your findings - simple visualisation is key

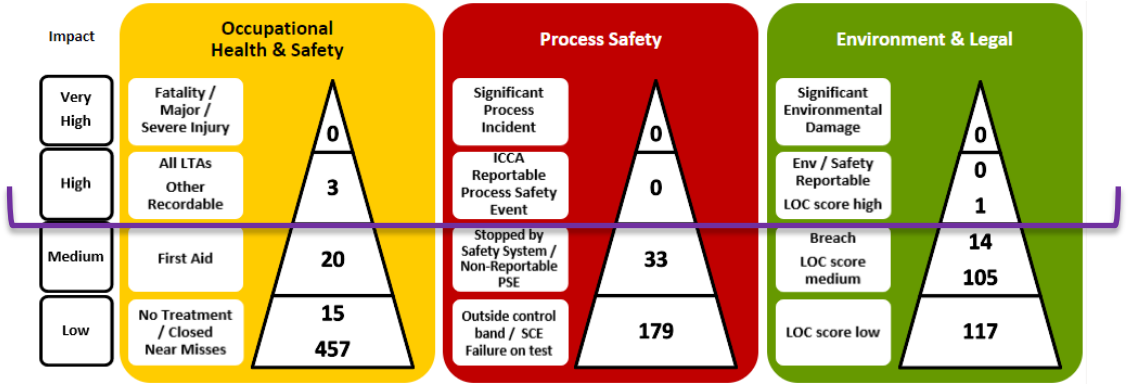
- **Spreadsheets packed with detail – difficult to see the headlines**
- **Took our influence from ‘fitbit’**
- **Designed an interactive drill down dashboard**
- **Layered to see everything – site, business, region, global etc**
- **5 sections**
  - Lagging KPI’s
  - Leading KPI’s for PTW/MOC/PS
  - Small suite of SD targets





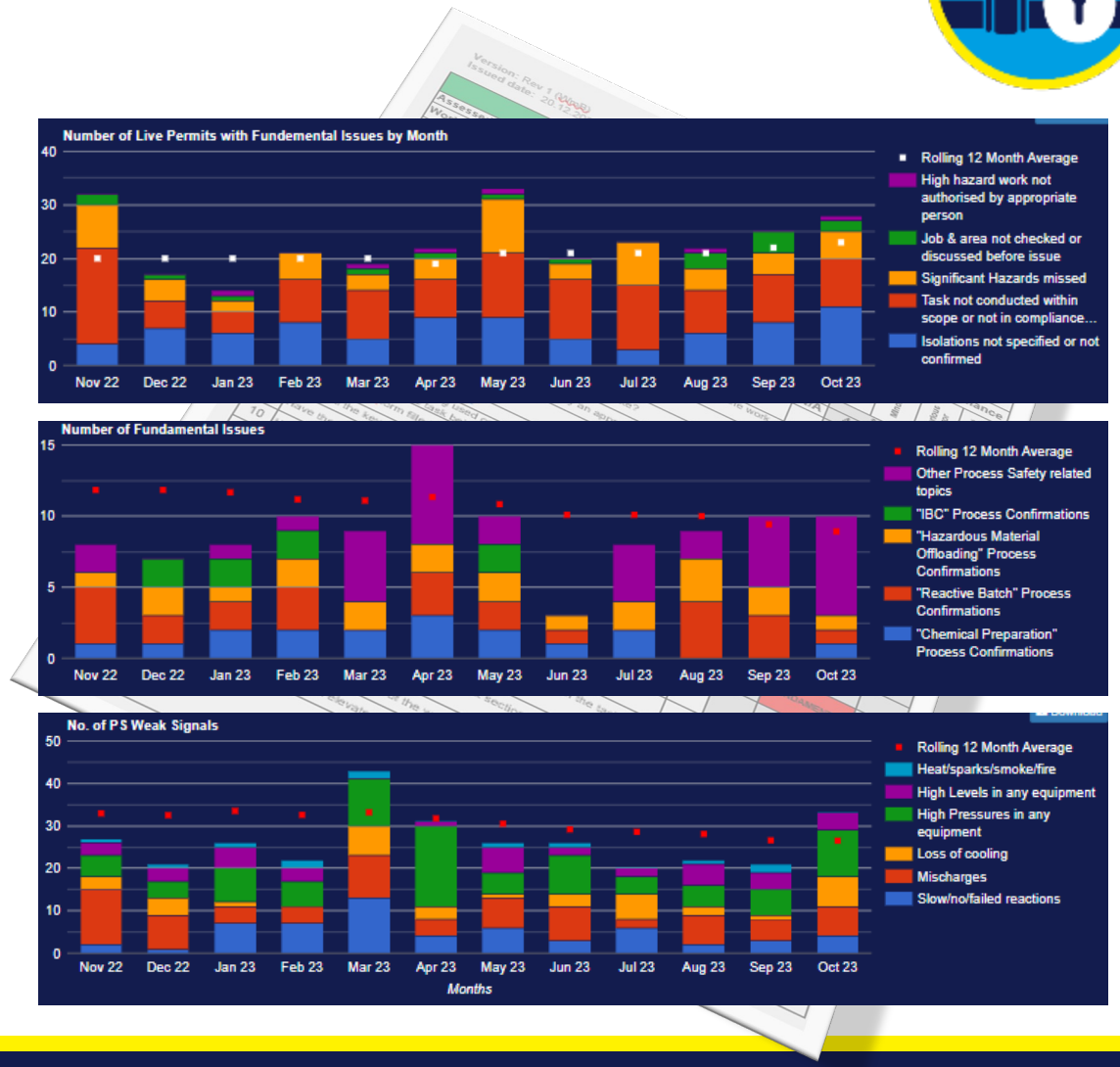
Used coloured triangles for headline event data

- **Based on Bird/Heinrich triangle formats**
- **3 triangles**
  - Occupational Health and Safety - Yellow
  - Process Safety - Red
  - Legal and Environmental – Green
- **Full root cause analysis required for any Tier 1 or 2 events**
- **Key cultural shift came when drilled down below the surface – iceberg effect**



Leading KPI's

- Engagement and information from bottom up is key – **eyes and ears!**
- Process confirmations:
  - **Proforma checklist**
  - **15-20 questions looking to identify 5 or 6 Fundamental Issues (FI's)**
  - **Collate the data/ analyse via dashboard**
- Provide early warning signs or weak signals – trends reviewed at **Process Safety Network** calls



Next was to cement our Process Safety requirements –
OSHA PSM/ Internal SHEMS

Site	Hazard Study Status	Hazard Study Action Status	Bowties	SCE Assessment	All SCE in PM System	Current SOP	Trained operators
Le Havre							
Langelsheim							
Stall							
Asua							
Dammam							
Ribecourt							
Worms							
Sintra							
Gent							
Sant Albano							
Filago							
Marl							
Pisc.							
Sokolov							
William Blythe							
Harlow							

Hazard Studies | Bowties | Safety Critical Equip. | Training & Procedures

- Based on a question from a new Ops Exec member…. *"How can I show we are in control of the things that really matter?"*
- Highest level and key are PHR/Hazard studies
- When we reviewed our requirements we took a project approach – developed MAH dashboard
- Again visual – easy to interpret and track improvements, with detail at levels behind
- Again, involved shopfloor and maintenance technicians
- A lot of this was pulling together things we already were doing

One sites story …

You have to walk the talk!

MST, Malaysia

- Storage facility that offloads ships and loads road trucks of Butadiene
- After acquisition, was effectively re-built from scratch apart from the spheres in 2015/16
- Opportunity to set the bar high in terms of:
  - Procedures
  - Training
  - Validation
  - Records

2x 3000mt spheres
Approx 2x 800,000 US gals

Push knowledge/ understanding as far down as you can

- **Process safety training based on Synthomer examples being rolled out**
- **Human Factors analysis**
  - Step by step process to look at tasks to identify where human error leads to a high consequence event

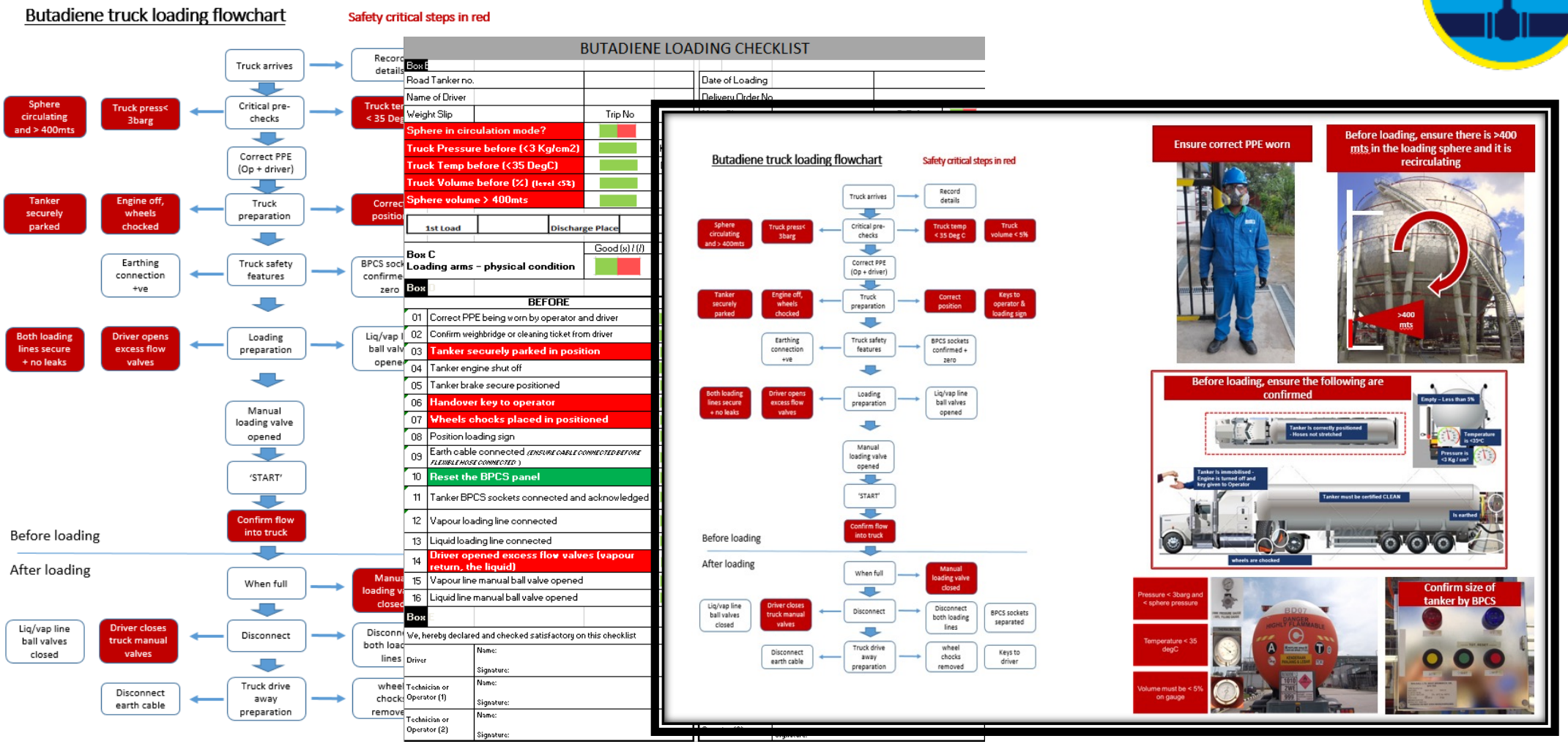
Step No.	Step Description	Who?	How?	Why?	Confirmation (where applicable)	Likelihood	Severity	Risk Rating
1.15	Observe and record the tanker temperature.	Field Operator	By monitoring the temperature gauge on the tank.	The temperature must be < 35degC.	Check tanker T-gauge and record in Box B. If the temperatue is higher, do not proceed and call Terminal Manager for investigation and further instruction. Terminal Manager shall inform Site Manager for agreement on the next course of action. Note: Higher temperatures may be due to self-polymerisation of Butadiene in the road tanker. The tanker must be isolated and returned to Transporter for internal inspection. 	3	4	12

Extract from large spreadsheet

  - Typically takes 2 days per study
  - Generates a number of visual aids for 'point of use'

HFA asks what errors could be made and what would the consequences be?
Can you recover? – if not and consequence high and rely on a person not making a mistake – you're in trouble!!

Visual Job Aids



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Next piece in the jigsaw…

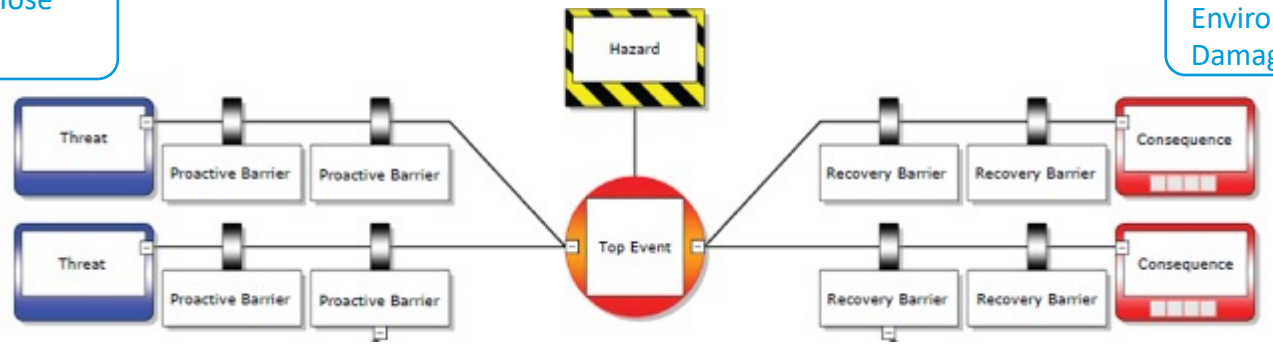
- **The next piece for us – again visual**
- **Create bowties for MAH scenarios**
- **Look for the weak signals**
- **Look for early warning signs of issues**
- **Talk to the shopfloor**
- **Review the data**

BOWTIE

Example: Road Tanker offloading

Example: Hose leak

Example: Fire, Environmental Damage



Example: Visual pre-use checks

Example: Containment Bund

Example: Loss of Containment of Styrene

There will be a mix of people and engineering barriers

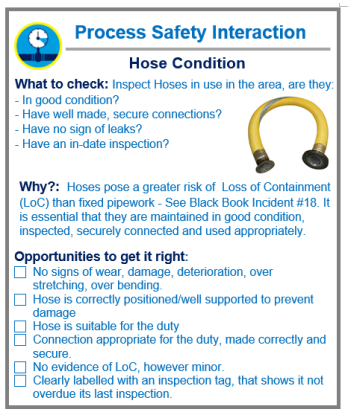
Proving your layers of protection work…

Engineering barriers

- Identifying safety critical alarms, trips etc
- Checking we have them on PM schedules
- Ensuring clear task plans with ‘as-found’ reporting
- Routines to check effective
- Identification in the field

Human barriers

- Checking for SOP’s, training and validation
- Also, but most importantly about spot checking – a little and often
  - Process confirmations
  - Flash cards
  - Short open question prompts



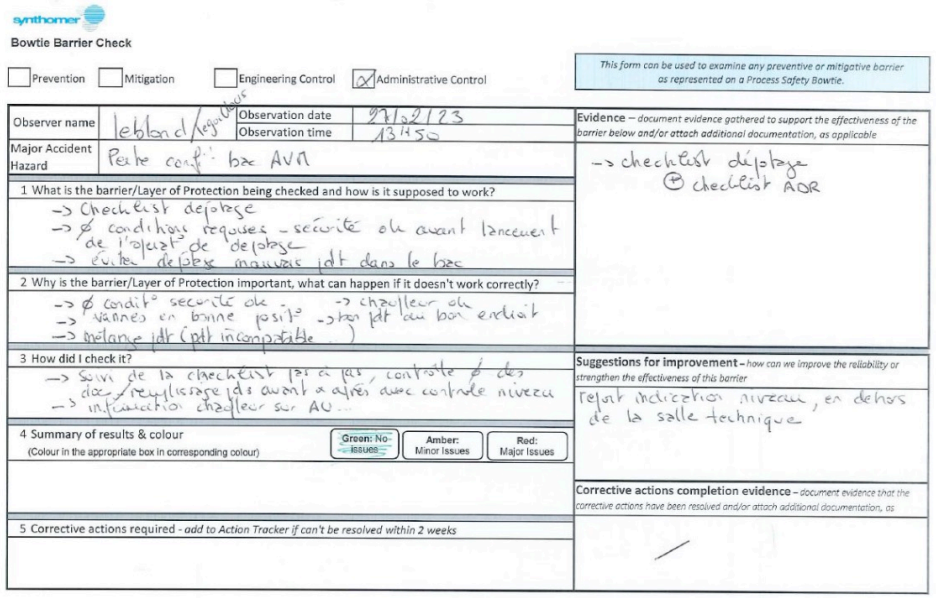
Process Safety Interaction

Hose Condition

What to check: Inspect Hoses in use in the area, are they:
- In good condition?
- Have well made, secure connections?
- Have no sign of leaks?
- Have an in-date inspection?

Why?: Hoses pose a greater risk of Loss of Containment (LoC) than fixed pipework - See Black Book Incident #18. It is essential that they are maintained in good condition, inspected, securely connected and used appropriately.

Opportunities to get it right:
- ☐ No signs of wear, damage, deterioration, over stretching, over bending.
- ☐ Hose is correctly positioned/well supported to prevent damage
- ☐ Hose is suitable for the duty
- ☐ Connection appropriate for the duty, made correctly and secure.
- ☐ No evidence of LoC, however minor.
- ☐ Clearly labelled with an inspection tag, that shows it not overdue its last inspection.



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Bowtie Barrier Check

☐ Prevention ☐ Mitigation ☐ Engineering Control ☒ Administrative Control

This form can be used to examine any preventive or mitigative barrier as represented on a Process Safety Bowtie.

Observer name	leblanc/[illegible]	Observation date	27/02/23
		Observation time	13h50
Major Accident Hazard	Perte confi bac AVR		

Evidence – *document evidence gathered to support the effectiveness of the barrier below and/or attach additional documentation, as applicable*

→ checklist déplâtage
Ⓟ checklist AQR

1 What is the barrier/Layer of Protection being checked and how is it supposed to work?
→ Checklist déplâtage
→ Ø conditions requises - sécurité ok avant lancement de l'objet de déplâtage
→ éviter déplâtage mauvais jdt dans le bac

2 Why is the barrier/Layer of Protection important, what can happen if it doesn't work correctly?
→ Ø condit° sécurité ok - → chauffeur ok
→ vannes en bonne posit° → bon jdt au bon endroit
→ mélange jdt (pdt incompatible)

3 How did I check it?
→ Suivi de la checklist jdt à jdt, contrôle Ø des doc, recyclissage jdt avant + après avec contrôle niveau
→ information chauffeur sur AV...

Suggestions for improvement – *how can we improve the reliability or strengthen the effectiveness of this barrier*

Rejet indication niveau, en dehors de la salle technique

4 Summary of results & colour (Colour in the appropriate box in corresponding colour)

Green: No issues	Amber: Minor Issues	Red: Major Issues

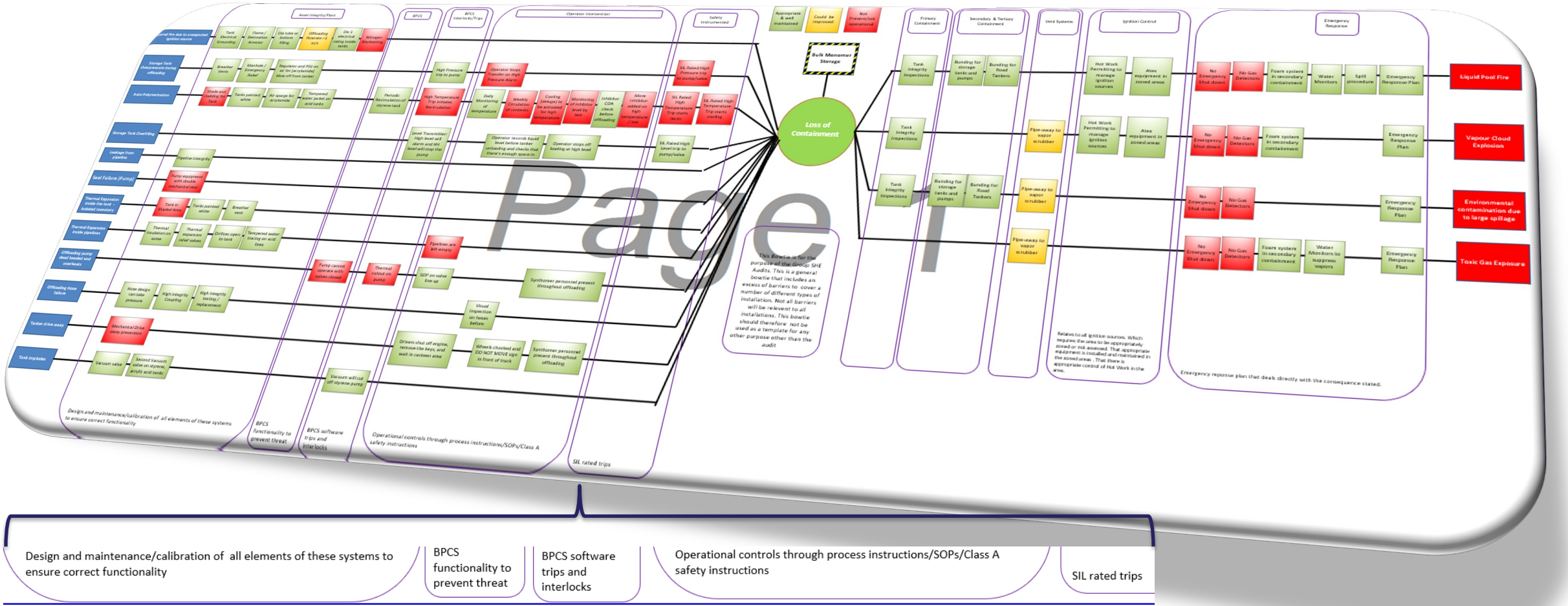
Corrective actions completion evidence – *document evidence that the corrective actions have been resolved and/or attach additional documentation, as*

5 Corrective actions required - *add to Action Tracker if can't be resolved within 2 weeks*

/

You can use this ‘visual’ to help drive improvements, Capex requests etc

Traffic light your barriers…



Final piece:

Don’t forget about the ‘Learning lessons’ from the past!

Blackbook Lessons Learnt #1

Stallingborough, Reactor Mischarge,14th November 2002

Site: Stallingborough, UK
Incident: Loss of containment due to runaway reaction following monomer overcharge.
Material: Methyl Acrylate (MA)
Quantity: Estimated < 250kgs
Consequences: Ejection of solid ‘golf balls’ through vent and a ‘solid’ reactor.

Solid reactor

‘golf balls’ in surrounding area

What Happened?

- An uncontrolled reaction resulted from a significant overcharge of a monomer to the Polyacrylate Reactor.
- This resulted in a small amount of polymer (in the form of small ‘golf balls’) being ejected from the manual vent system as the temperature and pressure increased.
- The bursting disc and relief remained intact.
- The remaining contents solidified in both the reactor and the catch pot and took almost 3 weeks to high pressure jet out.
- The initiating event was the fact that an operator keyed in 15840 kg instead of 1584 kg of Methyl Acrylate, being confused by the decimal point position.
- Issues around bad information and communication then further contributed to the incident.

Why Did It Happen?

- Meter pre-set parameters too wide, allowing charge greater than the receiving vessel.
- The relevant SOP provided for Reactor charging did not include how to set the meter.
- The Operator did not work in the area on a regular basis. This task was therefore only carried out occasionally, hence he had not received suitable and sufficient instruction and training.
- The Operators realised that they had a problem when they couldn’t get vacuum to the Polyacrylate Reactor, they assumed a blocked knockout pot was causing the issue and therefore failed to do any further root cause analysis
- Based on the above, a decision was taken to abort the batch and add catalyst.
- The overcharged reactor then began to runaway.
- Working procedures had never been devised on what to do in event of an anomalous batch, and working practices were inadequate.

Lessons Learnt

- Ensure that it is not possible to pre-set addition values in excess of receiving capacity of the vessel
- For large volume charges, avoid charges with decimal point accuracy
- Ensure that only fully trained and competent operators run reactions. This means that it has to regularly be part of their working routines.
- Assessed refresher training should be provided where operators have not worked on a particular task for a long time, (suggest > 3 months).
- Ensure up to date SOP’s exist for reactor control.
- Ensure operators are trained to look for and act on anomalous conditions and importantly stop feeds when a problem is encountered
- Ensure good communication channels with those required to provide technical advice to ensure before crucial decisions are made, an adequate root cause investigation has been conducted.

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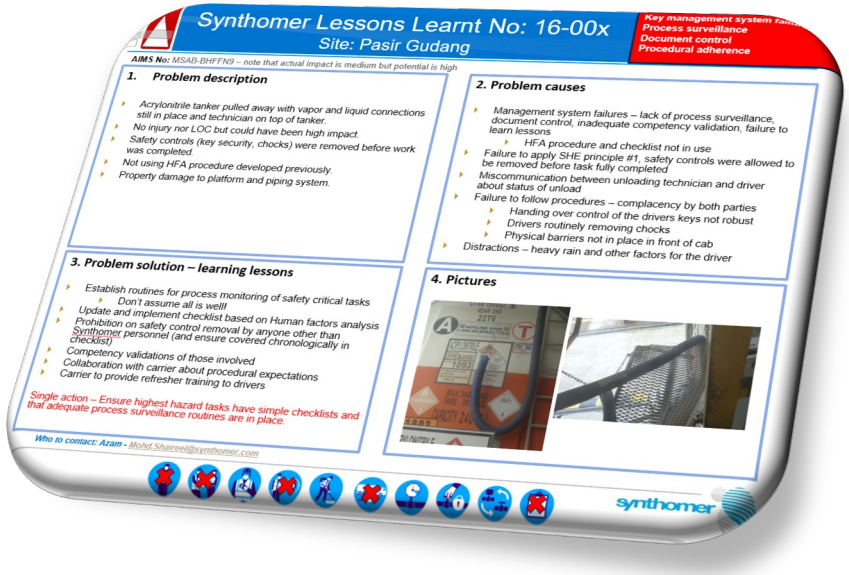
Mis-charge | Maximum charge exceeded | Operator competence / Batch monitoring | Technical advice | High feed trip | Reaction: Run-away reaction | High T/P trips | Retarder | Relief system | Dump tank | Environment | Dump tank | Reactor Contents Solidified

We always have time to work safely

Famous PS guru, Trevor Kletz once said
”Organisations have no memory, only people have memory”

- **We set out to look to learn lessons from the present, our own internal past and from the wider industry**
- **4 processes, all requiring formal review/involvement**
  - **Recent Tier 1 and 2 events**
  - **Most significant PS events within SYN over last 25 years**



Synthomer Lessons Learnt No: 16-00x
Site: Pasir Gudang

Key management system failure
Process surveillance
Document control
Procedural adherence

AIMS No: MSAB-BHFFN9 – note that actual impact is medium but potential is high

1. Problem description
- Acrylonitrile tanker pulled away with vapor and liquid connections still in place and technician on top of tanker.
- No injury nor LOC but could have been high impact.
- Safety controls (key security, chocks) were removed before work was completed
- Not using HFA procedure developed previously.
- Property damage to platform and piping system.

2. Problem causes
- Management system failures – lack of process surveillance, document control, inadequate competency validation, failure to learn lessons
- HFA procedure and checklist not in use
- Failure to apply SHE principle #1, safety controls were allowed to be removed before task fully completed
- Miscommunication between unloading technician and driver about status of unload
- Failure to follow procedures – complacency by both parties
  - Handing over control of the drivers keys not robust
  - Drivers routinely removing chocks
  - Physical barriers not in place in front of cab
- Distractions – heavy rain and other factors for the driver

3. Problem solution – learning lessons
- Establish routines for process monitoring of safety critical tasks
  - Don’t assume all is well!
- Update and implement checklist based on Human factors analysis
- Prohibition on safety control removal by anyone other than Synthomer personnel (and ensure covered chronologically in checklist)
- Competency validations of those involved
- Collaboration with carrier about procedural expectations
- Carrier to provide refresher training to drivers

Single action – Ensure highest hazard tasks have simple checklists and that adequate process surveillance routines are in place.

Who to contact: Azam - Mohd.Shairee@synthomer.com

4. Pictures

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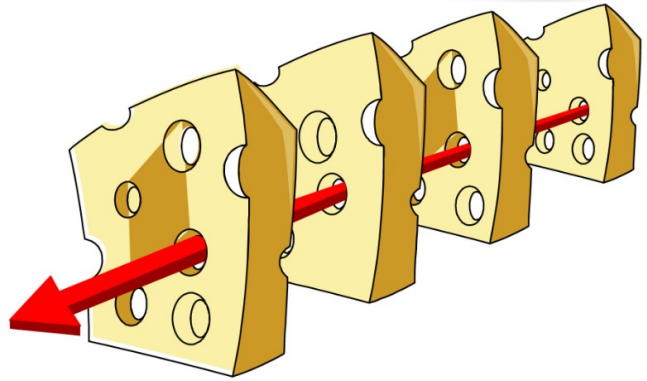
Our own findings….

‘There is no such thing as a new incident or injury, only those that we as leaders have failed to learn from’

(paraphrased comment by Trevor Kletz)

On average we had 5 chances of stopping the 25 ‘worst’ events we’ve had!

You will be the same!!!



Black Book - Major Industry Events

Index of events

Organisation's have no memory; only people have memories, and they move on.

Trevor Kletz

INDEX:

- **We broadened our learning knowledge base on wider related industries**

ocess Safety - Learning from major incidents #10

Synthron Runaway Reaction, 31st January 2008

Site: *Synthron, Morganton, North Carolina, USA*

Incident: *Runaway Reaction*

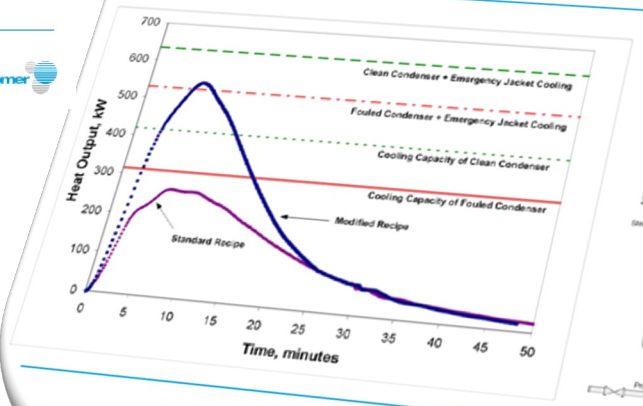
Deaths: *1*

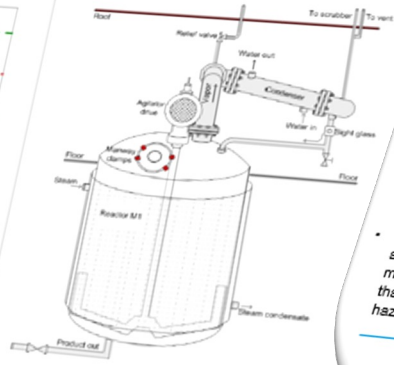
Injuries: *14 including 2 members of the public*

Consequences: *Plant Destroyed, one fatality, two people seriously burned, 12 others injured, churches/houses in local community condemned due to damage*

What Happened?

- *The Synthron plant produced Acrylic Polymers (similar to those produced at Synthomer) using a typical process; initial monomer reaction followed by gradual addition and reaction of remaining monomer in a 5m³ 5barg reactor.*
- *Preceding the incident the management received an order for a larger than normal quantity and decided to increase the size of the batch by 12% in order to fulfil the order.*
- *They also decided to add all the monomer at the beginning of the reaction and alter the ratio of high boiling point/low boiling point solvents due to the availability in storage of one of the solvents.*
- *The combined changes increased the heat output of the reaction by 2.3 times.*
- *The changes caused the reaction to exceed the cooling capacity of the reactor, cooling capacity that was already compromised due to fouling of the condenser, and a runaway reaction occurred.*
- *The runaway caused the temperature and pressure to rapidly increase; the excess pressure vented through a poorly sealed manway sending flammable vapours into the plant.*
- *One operator re-entered the plant, putting himself in the line of fire, in order to manually send Emergency Cooling water to the reactor but at this point it was too late.*
- *Flammable vapours found an ignition source and a Vapour cloud explosion occurred destroying the plant and causing damage to the local community.*
- *One worker who had remained inside the plant was fatally burned.*
- *6 other people who had evacuated the plant, but remained just outside a doorway, were injured, 2 severely.*
- *A further 8 people were injured, including two from the local community.*





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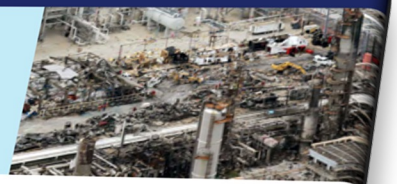

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Why Did It Happen?

- ***Reaction Hazard Identification:*** *Synthron had not identified the hazards of its reactive chemical operations; no formal hazard review had taken place and no calorimetry had been carried out to understand the nature of the reactions and to define the safe operating envelope.*
- ***Lack of Experience:*** *Most of the management and operations personnel had been in the job for less than a year and lacked previous polymer manufacturing experience, none were Chemical Engineers.*
- ***Lack of Training:*** *Synthon's training program was informal and did not include Reaction Hazard training*
- ***Management of Change:*** *Due to lack of understanding of the reaction hazard risks, no adequate assessment of the impact of the recipe changes had taken place; no scale up risk assessment has been completed.*
- ***Lack of diverse barriers:*** *Layers of protection were solely procedural, there were no alarms, trips, relief systems installed to prevent or mitigate runaway reaction.*
- ***Poor work practices:*** *Long standing practice at the facility was to close the manway and secure it with only 4 of the 18 clamps (meaning it could only withstand 1.5barg) the risks posed by this had not been recognised because the reactor normally ran at near atmospheric pressure.*
- ***Maintenance Inadequate:*** *The condenser was fouled due to lack of cleaning in 30years of operation and nobody had identified this as an issue; a clean condenser coupled with the Emergency Cooling could have prevented the runaway.*
- ***No Emergency Procedures:*** *None of the employees evacuated to a safe location; they were stood outside the doorway to the plant when the explosion occurred.*
- ***Lack of Parent company leadership:*** *There was no auditing of the site by the parent company and when making changes to the organisation they failed to ensure that there was necessary experience with reaction hazards.*

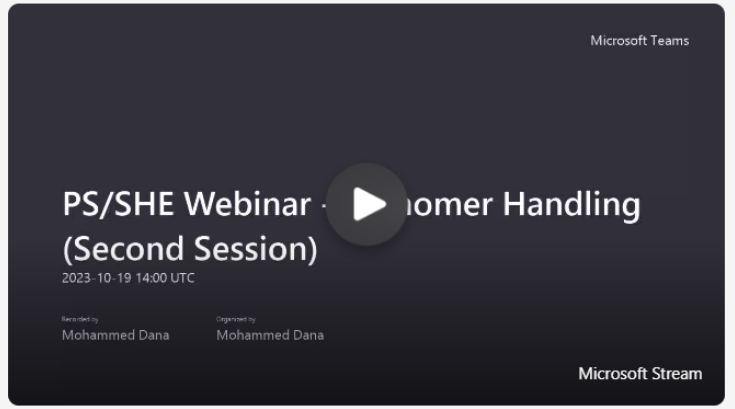
What Can We Learn?

- *In this incident the runaway reaction occurred because intentional changes to the way the batch was made caused the reaction to exceed the cooling capacity of the reactor. The same effect could also be experienced unintentionally due to mischarges or monomer accumulation.*
- *Personnel should be trained on Reaction Hazards.*
- *Sites should understand reaction hazards; evaluate what can go wrong including mischarging, monomer pooling, loss of cooling, and other credible failure scenarios. This knowledge should be used to define the safe operating envelope and basis of safety for the reactive system.*
- *Multiple and diverse layers of protection (operator procedures/monitoring, trips, alarms, pressure relief, emergency cooling & retarder injection) should be put in place to prevent and mitigate the effects of Runaway Reactions. The emphasis should be put on preventative measures, as mitigation methods can be unreliable.*
- *Mitigation measures should be designed so as not to put operators in the line of fire in an emergency; e.g. remote/automatic initiation of emergency cooling water or retarders*
- *Operating procedures should be put in place that include recognition of abnormal batches and appropriate responses to control or mitigate their effects.*
- *No changes should be made to reactive batches unless a thorough assessment against the basis of safety has been made by personnel with adequate training and experience of reactive processes.*
- *Reactor manways should always be properly sealed before any reactive chemistry is run within the reactor.*
- *Process equipment and barriers to Runaway Reaction should be adequately maintained; this should include the preventing of fouling reducing cooling capability*
- *Emergency plans should be put in place for foreseeable emergencies; personnel should be trained on these and drills should be carried out.*

Didn't forget about personal injuries…

- Also, a summary of the 16 most frequent injury categories we've experienced – Yellow Book
- Require Supervisors to brief out frequently to their teams

Yellow Book Event Contents
1. Struck/Hit by Fork lift and electrical pallet trucks
2. Chemical contact during manual handling
3. Fall from tanker tops/ tanker ladders
4. Slips, trips and falls at same level
5. Manual tool injuries
6. Steam and other burns
7. Injuries associated with drain covers and gratings
8. High Pressure Water Jetting
9. Falls from ladders, steps and stairs
10. Chemical contact during maintenance and cleaning
11. Electrical Contact
12. Workplace injuries: hands/arms cuts/trapping
13. Maintenance work injuries – hit/struck by
14. Glass handling injuries
15. Overexertion
16. Confined Space Entry Death

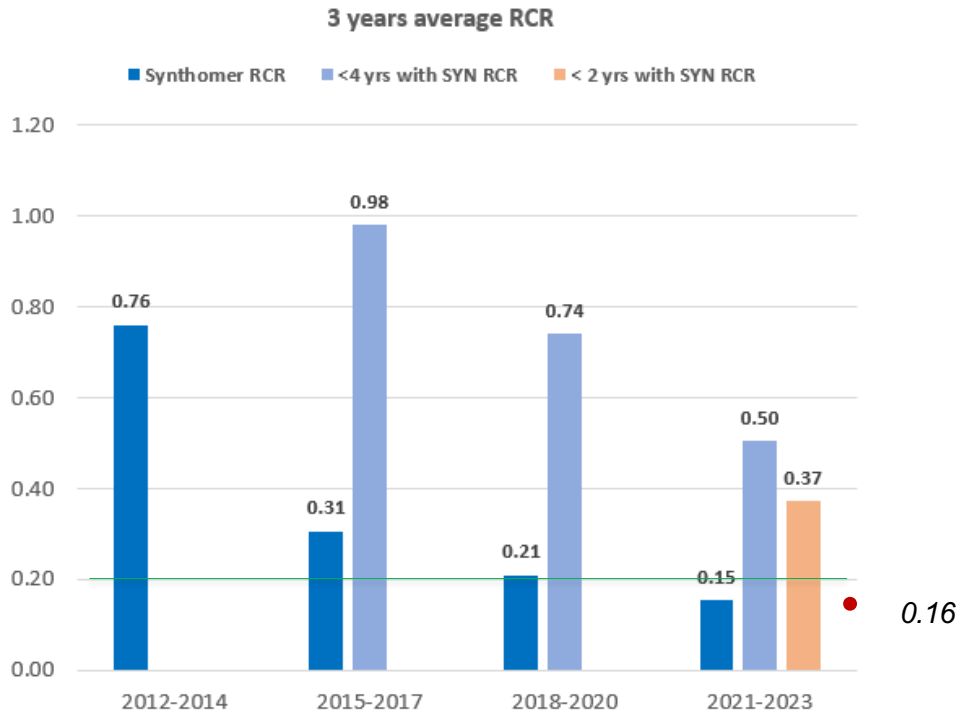


Finally – monthly Webinars

Results of our endeavours

Green lines indicate top quartile

Data presented per 100k hrs worked (staff+contractors)



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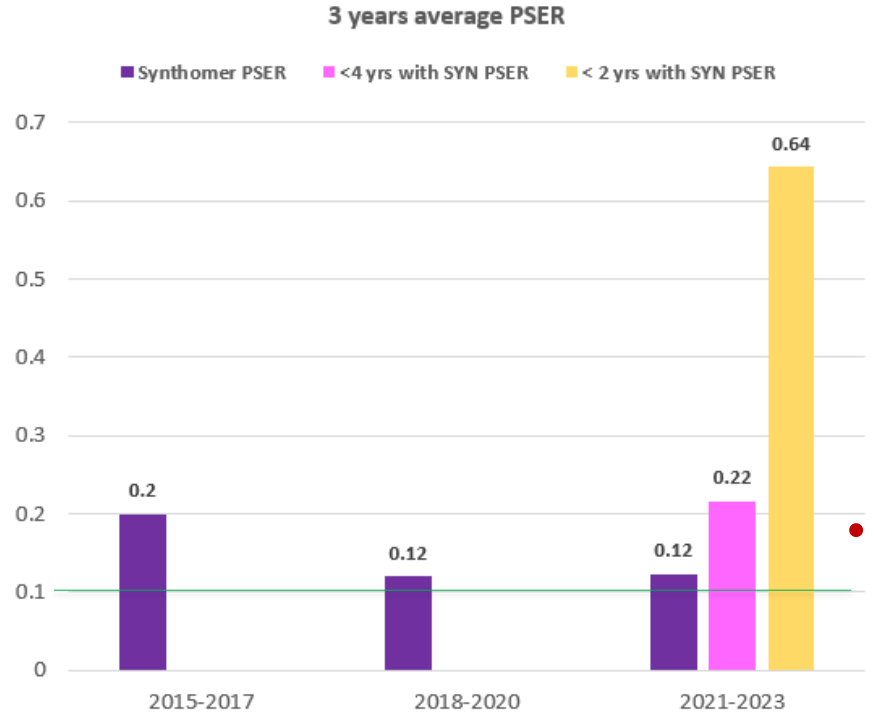
- OHS data goes back a lot further
- PS data relatively new, flatter but with tighter definitions since 2020

- Over blocks of time – can clearly show improvements
- Legacy sites at different stages of ‘maturity’



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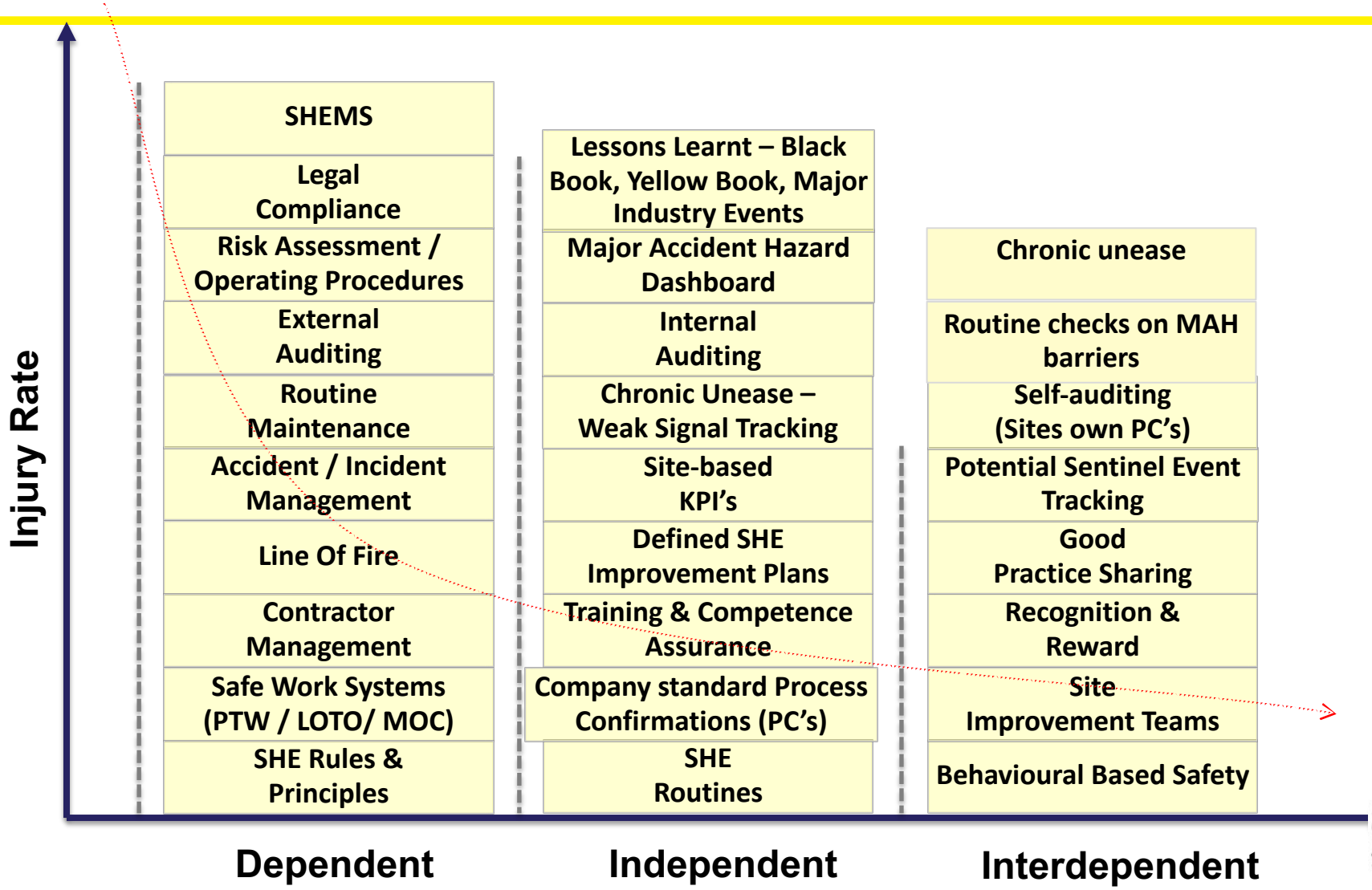
Rates are per 100,000 man hrs worked
Around 15 events per year of each for 4000 staff

Where are we now?

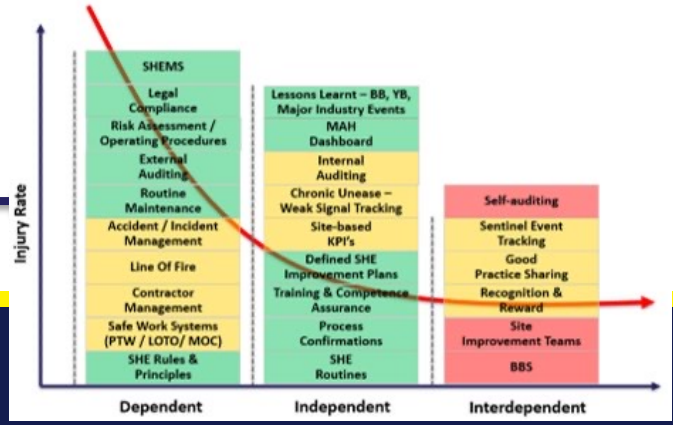
- Stronger leaders
- Embedded Principles and Rules
- Embedded SHE routines/processes
- We look and we find!- so we can improve
- We have clear visual indicators – discussed at all levels of organisation
- We know our safety critical sensitivities – again we check and report

- Above all – we engage our teams

Foundations of the Journey to World Class

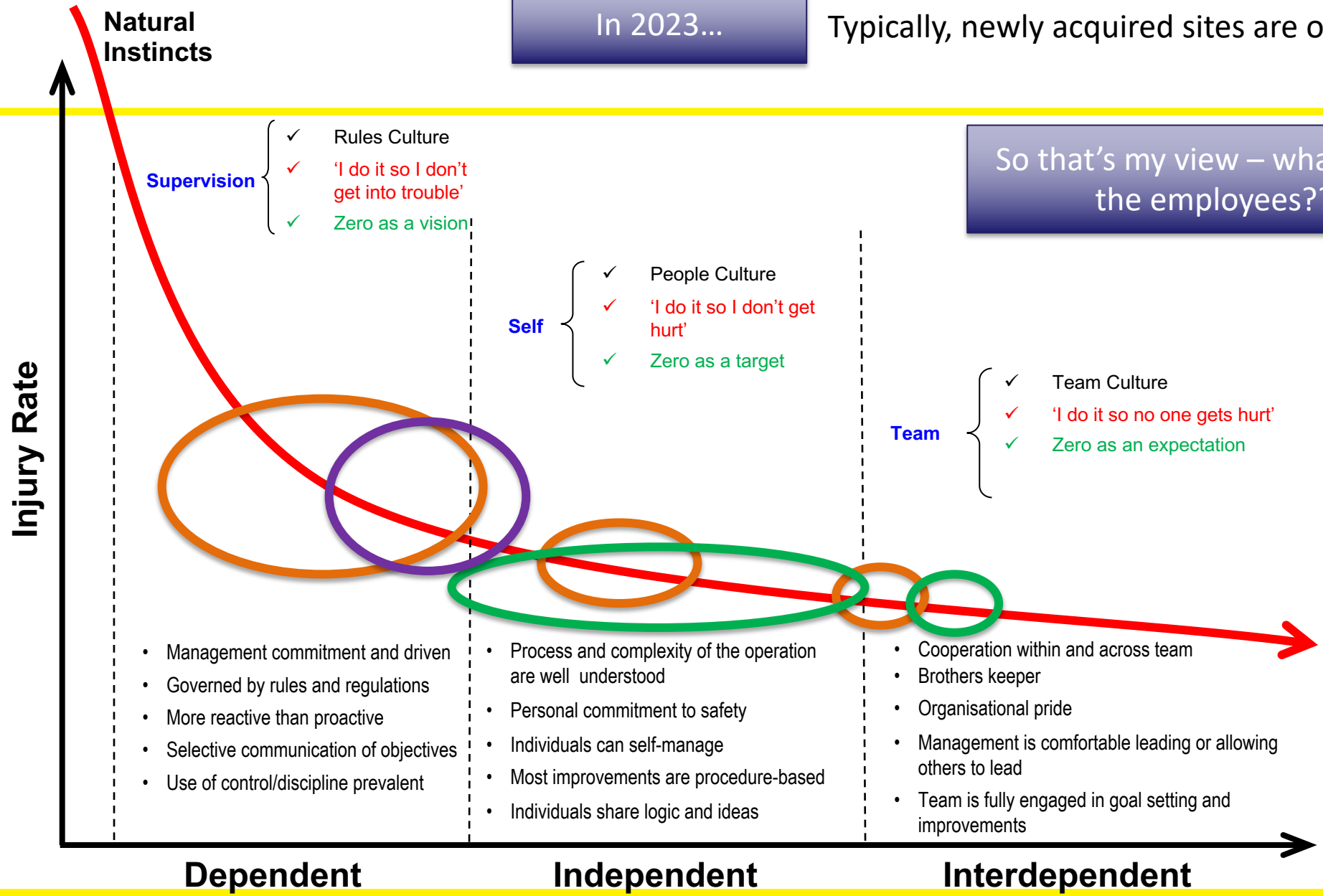


- Combination of sound practices covering OHS and PS



In 2023…

Typically, newly acquired sites are on left hand side



So that's my view – what about the employees??

Compliance / Reactive

Choice / Proactive

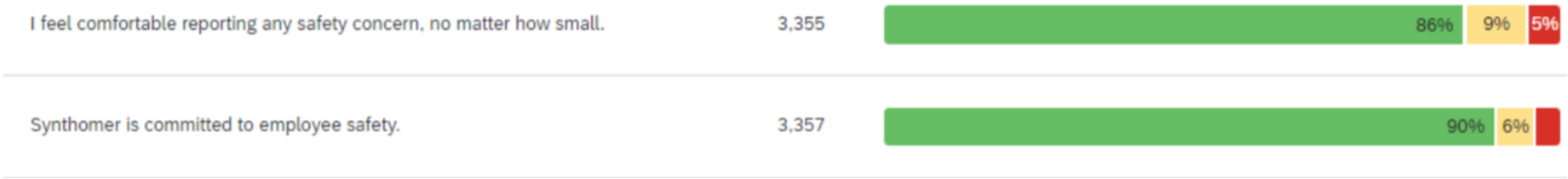
My Voice survey 2019/2021

- Autonomy & Empowerment
- Career Progression
- Work Enablement
- Collaboration
- Communication
- Company Leadership
- Strategy Alignment
- Managing Change
- Safety
- Ethics
- Diversity Inclusion
- Engagement

- **As a department/area – Safety scored highest across the Company from employee responses**
- **Quote from survey organisers – "*Very positive scores for both safety questions. Scores are above the global benchmark average for the general safety category "***

2019

2021



Synthomer Timeline

2015 — 1st SHE Conf

New Senior Leadership
Bradley Curve
Site Leadership competence assurance

2016 — Rules and Principles

Rules and principles introduced
SHE livery/identity

2017 — Leading KPI's

PS event + focus
Launch of SHE KPI Dashboard – a mix of lead/lag indicators

2018 — Weak signal monitoring

Proactive looking
Formalised sharing lessons learnt

2019 — SHE Routines

Data review
Team/staff engagement

2020/21 — Deep dives into Layers of Protection

Preventive barrier checks
Down to shop floor level

2022/23 — Major Accident Hazard dashboard

Focus on preventive steps involving site teams

Penultimate slide - some numbers for last year….

- **For 35 manufacturing facilities across the world:**

Area considered: (2023 full year data)	Number	%
PTW issued	47850	
Number of permits audited live	7000	14%
Number/% permits found with FI's	1900	4%
Process safety weak signals	400	
Process safety process confirmations	265	
Number/% process confirmations with FI's	10	3.5%

- **All of these involved some form of 1:1 engagement**

Don’t be afraid to push it own!

- **Your people know**
- **Talk to them, involve them, trust them**

- **Keep them informed**
- **Be clear on expectations, enforce and don’t waver!**
  - Unless you cycle round again properly
- **Report positively (as well as negatively)**

- **Most important of all – have the right leaders!**

Thank you and any Questions?