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SHE Management for STFC Technical Managers - Day 2

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Risk Assessment

Session objectives

- Refresh the principles of risk assessment
- What makes a RA ‘suitable and sufficient’?
- Good ole horror stories
- Evotix Assure *live*

Session objectives

1. Refresh the principles of risk assessment
2. What makes a RA ‘suitable and sufficient’?
3. Good ole horror stories
4. Evotix Assure *live*



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Risk assessment



3(1) Every employer shall make a suitable and sufficient assessment of -

(a) the risks to the health and safety of his employees to which they are exposed whilst they are at work; and

(b) the risks to the health and safety of persons not in his employment arising out of or in connection with the conduct by him of his undertaking,

(2) Every self-employed person shall make a suitable and sufficient assessment of -

(a) the risks to his own health and safety to which he is exposed whilst he is at work; and

(b) the risks to the health and safety of persons not in his employment arising out of or in connection with his undertaking, for the purpose of identifying the measures he needs to take to comply with the requirements and prohibitions imposed upon him by or under the relevant statutory provisions.

(3) Any assessment such as is referred to in paragraph (1) or (2) shall be reviewed by the employer or self-employed person who made it if -

(a) there is reason to suspect that it is no longer valid; or

(b) there has been a significant change in the matters to which it relates; and where as a result of any such review changes to an assessment are required, the employer or self-employed person concerned shall make them.

(4) An employer shall not employ a young person unless he has, in relation to risks to the health and safety of young persons, made or reviewed an assessment in accordance with paragraphs (1) and (5).

(5) In making or reviewing the assessment, an employer who employs or is to employ a young person shall take particular account of -

(a) the inexperience, lack of awareness of risks and immaturity of young persons;

(b) the fitting-out and layout of the workplace and the workstation;

(c) the nature, degree and duration of exposure to physical, biological and chemical agents;

(d) the form, range, and use of work equipment and the way in which it is handled;

(e) the organisation of processes and activities;

(f) the extent of the health and safety training provided or to be provided to young persons; and

(g) risks from agents, processes and work listed in the Annex to Council Directive 94/33/EC(1) on the protection of young people at work

HSE 5 steps to risk assessment

Health and Safety Executive



Time, money and effort should be proportionate to the level of risk

You may see all types of RA in your role. However, all models must meet this criteria to be **"suitable and sufficient"**

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Different types of risk assessment

This course focusses on activity risk assessments but there are other types:

- Dynamic
- COSHH for chemicals
- DSEAR
- Design
- PEEP
- Machinery
- Personal



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STFC Risk assessment proforma

Ref:	Title:
Assessment Date:	Rm/Building/STFC Site:
Main Assessor:	Department:
Assessment Team involved:	Persons or Groups of people exposed:
Activity/Task being assessed (and any other relevant details, e.g. photos or related risk assessments/COSHH assessments etc. and where to find them):	

Step 1 What are the hazards (activities which may cause harm)? Hazard/Task or Situation	Step 2 Who might be harmed?	How might they be harmed?	Step 3: Existing risk control measures in place?	Level of risk? (see guidance attached) H Harm	L Likelihood	R Risk	Further control measures, if necessary?	Step 4: Who will take these actions forward and completed by when? Action by whom	When	Done
			Eliminate/Substitute: Engineering Controls: Administrative Controls: PPE:							
			Eliminate/Substitute: Engineering Controls: Administrative Controls: PPE:							
			Eliminate/Substitute: Engineering Controls: Administrative Controls: PPE:							

SHE Code 6: Risk Management (revised):

A HAZARD is anything that has the potential to cause harm. Types:

- Physical safety hazards such as working with electricity or working from ladders

- Health hazards such as working with hazardous chemicals, biological agents or allergenic materials. There are also, psychosocial hazards that could lead to work-related mental ill-health issues such as stress, anxiety or depression; or activities where staff may be subject to violence or aggression (e.g. front line, customer or public facing staff)

- Environmental hazards such as activities leading to harmful emissions to atmosphere or contamination of our waste water systems

Definitions - Hazard

- A hazard is any activity or object that has the potential to cause harm to people or the environment.
- Examples:
  - Working at height
  - Manual handling
  - Working with syringes
  - Driving a fork lift truck
  - Operating 3D printer
  - Use of mains electricity to power 'x' equipment
  - Working with liquid nitrogen
  - Working 'out of hours'
  - Working from home

Clue: A hazard never sounds painful!



You will need to research your hazards to identify all significant hazards. You can use: observation of activity; operator consultation; websites, e.g. HSE; Manufacturer's instructions; internal/external experts; incidents/near misses; etc.

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How to address other/untrained people in RA

STFC Risk Assessment template

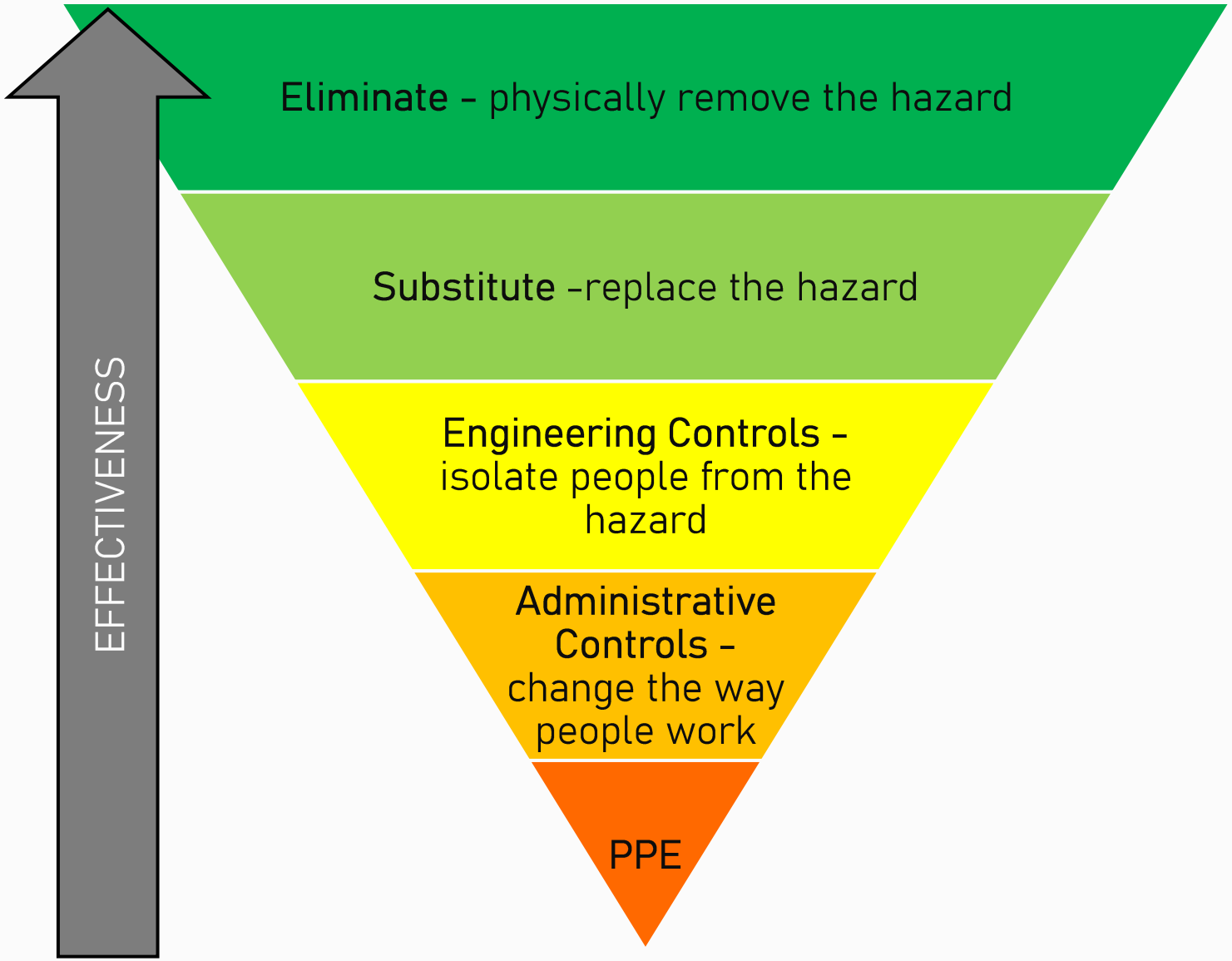
Ref:	Title:
Assessment Date:	Rm/Building/STFC Site:
Main Assessor:	Department:
Assessment Team involved:	Persons or Groups of people exposed:
Activity/Task being assessed (and any other relevant details, e.g. photos or related risk assessments/COSHH assessments etc. and where to find them):	

Step 1 What are the hazards (activities which may cause harm)? Hazard/Task or Situation	Step 2 Who might be harmed?	How might they be harmed?	Step 3: Existing risk control measures in place?	Level of risk? (see guidance attached) H Harm	 L Likelihood	 R Risk	Further control measures, if necessary?	Step 4: Who will take these actions forward and completed by when? Action by whom	When	Done
Please dedicate one row to any 'other/untrained' people present in the area. *(Thereafter these groups and their control measures do not need to be reiterated for other relevant hazards.)* ***[Please delete this row if it is not relevant. If relevant, alter text where necessary and add level of risk]***	*E.g. Contractors, visitors, students, security guards, cleaners, etc. present in the area.*	*They are likely to be un-trained and may not appreciate the full range of hazards present.*	**EXAMPLE**: (Do not delete category if it does not apply, add 'N/A' as it demonstrates consideration of this element.) **Eliminate/Substitute**: N/A **Engineering Controls:** *Access control prevents untrained people entering the area.* **Administrative Controls:** *Visitors are accompanied at all times by a competent person.* *Security and cleaners have their own risk assessment which states no equipment to be touched.* **PPE:** N/A							

Definitions

- Harm (saying ‘injured’ is not sufficient)
  - How the hazard could cause injury. In order to be specific, detail the pathway to the body, e.g:
    - skin contact causing burns
    - hit by projectile after explosion
    - asphyxiation after inhaling nitrogen
    - cut by sharp object
    - absorbed through skin, etc.

Hierarchy of Control Measures



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Language to describe control measures

- Risk asse what is in place to protect safety. Avoid use of words and phrases such as:



ovided with….

provided

uld be available

hly/quarterly/annually

A risk assessment is a statement of fact.

Think in black and white.

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Risk Calculation

Ref:	Title:
Assessment Date:	Rm/Building/STFC Site:
Main Assessor:	Department:
Assessment Team involved:	Persons or Groups of people exposed:
Activity/Task being assessed (and any other relevant details, e.g. photos or related risk assessments/COSHH assessments etc. and where to find them):	

Step 1 What are the hazards (activities which may cause harm)? Hazard/Task or Situation	Step 2 Who might be harmed?	How might they be harmed?	Step 3: Existing risk control measures in place?	Level of risk? (see guidance attached) H Harm	L Likelihood	R Risk	Further control measures, if necessary?	Step 4: Who will take these actions forward and completed by when? Action by whom	When	Done
			Eliminate/Substitute: Engineering Controls: Administrative Controls: PPE:							
			Eliminate/Substitute: Engineering Controls: Administrative Controls: PPE:							
			Eliminate/Substitute: Engineering Controls: Administrative Controls: PPE:							

Priority Matrix

Risk is a function of both the harm and likelihood of a specific hazard being realised.

		If control measures are not adhered to potential harm is likely to be:				
Harm	**Major**	Fatality	High	High	V High	V High
	High	Fatality or life changing injuries or serious health effects	Med	Med	High	V High
	Moderate	Time off work, e.g. broken bones, stress or musculoskeletal injury	Low	Med	Med	Med
	Slight	Minor injury which may or may not require First-aid treatment	Low	Low	Low	Low
			Very Unlikely	**Unlikely**	**Likely**	**Very Likely**
			Conceivable but difficult to realise. Would require a combination of several failures	Can be envisaged but is unlikely. Never previously happened in STFC	Can be anticipated to happen. Has previously been known to happen in STFC	Can be anticipated to happen. Has previously been known to happen on site
			Likelihood			

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Definition of Risk Levels

Where:

Low Risk	No additional controls are necessary unless they can be implemented at very low cost (in terms of time, money and effort) or there is a mandatory requirement within legislation. Actions to further reduce these risks can be assigned low priority.
Medium Risk	Consideration should be given as to whether the risks can be lowered, where applicable, to a low risk level, but the costs of additional risk reduction measures should be take into account. The risk reduction measures should be implemented within a defined time period.
High Risk	The controls put in place are critical and it is imperative that they are monitored by a line manager (or equivalent) on a regular basis to ensure they are in place. Risk reduction measures should be contemplated as per the hierarchy and favour engineering controls over administrative controls and PPE. Additional controls may require extra resources and these would be justifiable.
Very High Risk	Additional control measures **must** be implemented to reduce the risk, regardless of cost, or a decision taken to terminate the activity until the risk level can be reduced.

Action management

Ref:	Title:
Assessment Date:	Rm/Building/STFC Site:
Main Assessor:	Department:
Assessment Team involved:	Persons or Groups of people exposed:
Activity/Task being assessed (and any other relevant details, e.g. photos or related risk assessments/COSHH assessments etc. and where to find them):	

Step 1 What are the hazards (activities which may cause harm)? Hazard/Task or Situation	Step 2 Who might be harmed?	How might they be harmed?	Step 3: Existing risk control measures in place?	Level of risk? (see guidance attached) H Harm	 L Likelihood	 R Risk	Further control measures, if necessary?	Step 4: Who will take these actions forward and completed by when? Action by whom	When	Done
			Eliminate/Substitute: Engineering Controls: Administrative Controls: PPE:							
			Eliminate/Substitute: Engineering Controls: Administrative Controls: PPE:							
			Eliminate/Substitute: Engineering Controls: Administrative Controls: PPE:							

STFC Risk Assessment proforma

- Further actions (added to Evotix Assure when adding RA, separate tab)

STFC RISK ASSESSMENT PRO-FORMA

Ref:	Description: **Use of the Test cryostat**
Assessment Date: **25 September 2019**	Location/Site: **UK ATC South Building Laboratory**
Assessor: **Neil Campbell**	Department: **UK ATC**
Assessment Team:: **Mark Cliffe (Lab Supervisor)**	Persons Exposed: **Technicians, Lab users (STFC staff and staff of tenant companies), Cleaning staff, Visitors**

Activity/Task:

- **Test Setup and breakdown operations**
- **Operating the cryostat under vacuum and at low temperatures**
- **Warming up and refilling the cryostat to atmospheric pressure**

A Risk Assessment for both general use of this lab area and a building fire risk assessment are held in the SHE database (Ref 1704 / UKATC 019 and Ref 1648/UKATC 094)

Step 1 What are the hazards?	Step 2 Who might be harmed and how?	What are you already doing? (see guidance attached)	What is the level of risk? (see guidance attached)			Step 3: What further action is necessary?	Step 4: How will you put the Assessment into action?		
Hazard/Task or Situation			H Harm	L Likelihood	R Risk		Action by whom	By when	Done
Use of Nitrogen gas for backfilling (venting)	**Technician / Lab users / Cleaning staff / visitors** Fainting, unconsciousness or death resulting from low oxygen levels due to a build-up of nitrogen gas.	**Eliminate/Substitute:** N/A **Engineering Controls:** Given the volume of the lab the volume and flow rate of nitrogen gas should not be sufficient to cause a significant hazard according to the calculation given in SC03 Appendix 3. **Administrative Controls:** Backfilling is carried out only by trained and competent persons. A portable oxygen monitor is available for use. During these operations, lab access is controlled to prevent cleaners/visitors from entering **PPE:** N/A	High	Very unlikely	Medium	An oxygen monitor and alarm should be permanently fitted in this area.	M.Cliffe	31 Oct 2019	

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Common questions

- When should I perform a generic risk assessment for a room with mixed use and when do I do a specific risk assessment for an activity?







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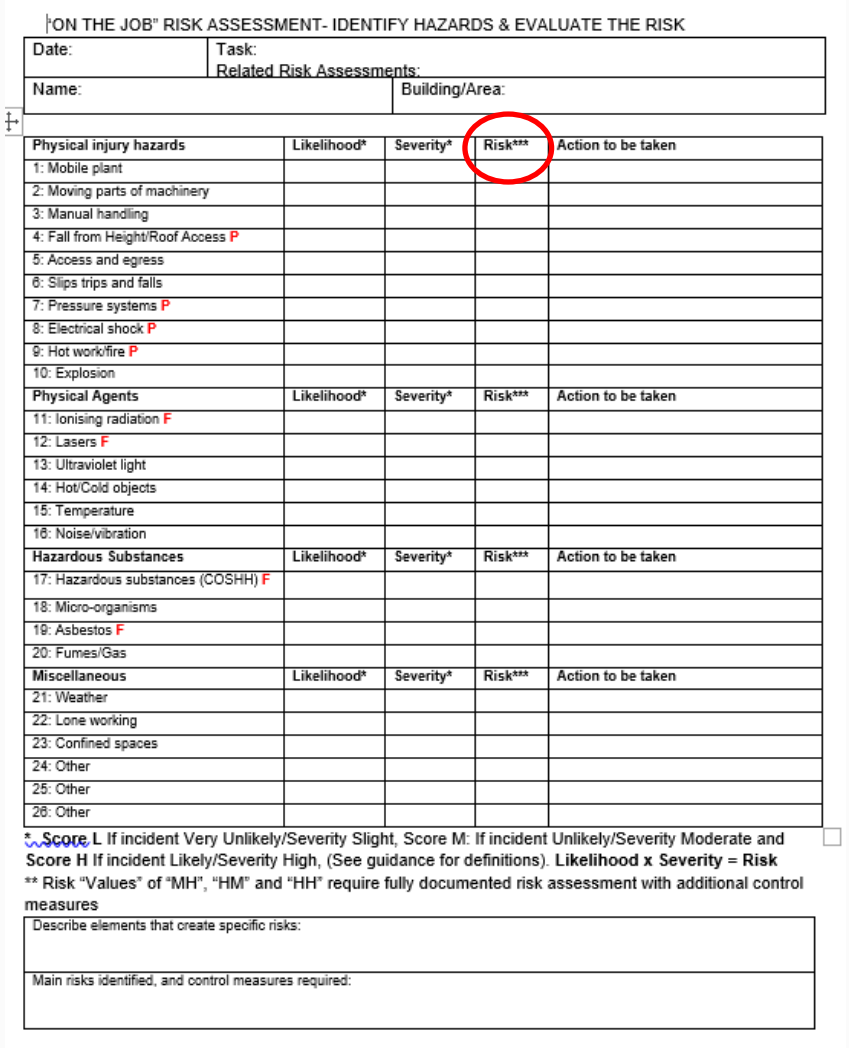
On the job risk assessment

- For use when
  - The task is a change or an addition to an existing planned activity
  - A generic risk assessment needs to be adapted for a specific activity
- Before starting the job, the assessor is required to STOP and THINK, can make use of a simple pro-forma designed to guide and record the risk assessment process
- Part of this process is to check that a fully documented risk assessment is not required. If the work is deemed 'high risk' such as work at height, then work will require to stop until a full documented RA is written and signed off



"ON THE JOB" RISK ASSESSMENT- IDENTIFY HAZARDS & EVALUATE THE RISK

Date:	Task: Related Risk Assessments:
Name:	Building/Area:

Physical injury hazards	Likelihood*	Severity*	Risk***	Action to be taken
1: Mobile plant				
2: Moving parts of machinery				
3: Manual handling				
4: Fall from Height/Roof Access P				
5: Access and egress				
6: Slips trips and falls				
7: Pressure systems P				
8: Electrical shock P				
9: Hot work/fire P				
10: Explosion				
Physical Agents	**Likelihood***	**Severity***	**Risk*****	**Action to be taken**
11: Ionising radiation F				
12: Lasers F				
13: Ultraviolet light				
14: Hot/Cold objects				
15: Temperature				
16: Noise/vibration				
Hazardous Substances	**Likelihood***	**Severity***	**Risk*****	**Action to be taken**
17: Hazardous substances (COSHH) F				
18: Micro-organisms				
19: Asbestos F				
20: Fumes/Gas				
Miscellaneous	**Likelihood***	**Severity***	**Risk*****	**Action to be taken**
21: Weather				
22: Lone working				
23: Confined spaces				
24: Other				
25: Other				
26: Other				

*. **Score L** If incident Very Unlikely/Severity Slight, Score M: If incident Unlikely/Severity Moderate and **Score H** If incident Likely/Severity High, (See guidance for definitions). **Likelihood x Severity = Risk**

** Risk "Values" of "MH", "HM" and "HH" require fully documented risk assessment with additional control measures

Describe elements that create specific risks:
Main risks identified, and control measures required:

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HSE Guidance – is my RA suitable and sufficient

- Have you included the 5 steps to RA?
- Does risk assessment policy match what happens in reality?
- Do you involve the workforce in the development of the RA?
  - Asking for their views
  - Seeking their suggestions
  - Communicating RA to them once complete
- Have control measures for the highest risks been incorporated into a regular monitoring scheme?
- Should the implementation of control measures take time, have interim measures been put in place to minimise the risk?

New Appendix to the Code – Appendix 6 "Aide Memoire for the production of a "suitable and sufficient" RA

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Imagine this live risk assessment is for your mechanical workshop. Are you happy?

Generic Risk Assessment – [redacted]

Hazard	Who might be harmed	Existing Controls
Working at heights	Engineering Staff	All relevant staff trained in the use of access equipment and barrier requirement for working at heights and on roofs as detailed in and in compliance with STFC Safety Code No 9. Where appropriate PPE is provided and must be used.
Installation & Maintenance Works	All employees	All work is to be carried out in compliance with STFC Safety Codes: No2, No 3, No 4, No 9, No 12, No 15, No 18, No 26, No 33 No 35, No 37, No 38, No 41 and The RTF Safety Handbook & Project Handbooks. Where appropriate PPE is provided.
Dust Generation by drilling.	All employees and contractors	Use of hoover with HEPA filter whilst drilling or use drill extraction attachment that contains a HEPA filter. When drilling a suitable facemask must be worn. All residual dust around the drill site will also be removed. Disposal of dust must also be carefully managed with dust being placed in plastic bags before disposal.
Manual Handling	All employees and others involved in moving heavy and or awkward loads.	Staff trained in manual handling. Mechanical means to be used wherever possible (by trained operatives only). Where appropriate PPE is provided.

Better example performed by STFC staff

Ref: 4058	Title: NQCC R129 Power Tools Activity Risk Assessment
Assessment Date: 24/05/2024	Rm/Building/STFC Site: RAL / R129 Goods In Areas & Lab Spaces
Main Assessor: Joe Bloggs	Department: NQCC - STFC
Assessment Team involved: Jane Brown, Daniel Smith.	Persons or Groups of people exposed: NQCC Operations Staff, bystanders
Activity/Task being assessed (and any other relevant details, e.g. photos or related risk assessments/COSHH assessments etc. and where to find them): Safe use of power tools. Any fire risks are covered by the building fire risk assessment held by SHE Group.	

Step 1 What are the hazards	Step 2 Who might be harmed?	How might they be harmed?	Step 3: Existing risk control measures in place?	H Harm	L Likelihood	R Risk	Level of risk? (see guidance attached)	Further control measures, if necessary?	Action by whom	When	Done
Debris & Sharp Edges on tool edges	Operators, staff & bystanders	Cuts, abrasions & other injuries from sharp tool edges or flying debris during operation. Entanglement.	**Eliminate/Substitute:** N/A **Engineering Controls:** Regular tool maintenance. Remove damaged tools from use. **Administrative Controls:** Manage loose clothing and hair to prevent entanglement and remove or tuck away loose items like passes on lanyards when operating hand power tools. **PPE:** Safety glasses/goggles (EN 166). Safety shoes (EN20345). Handling gloves (EN 388). **Relevant SHE Code is No 4.**	M	L	M			N/A	N/A	N/A

Manual Handling of boxes and items in the area. Weight can vary from 1-2 Kgs up to 20 Kgs.	Operators, staff & bystanders	Back injuries or other musculoskeletal disorder from incorrectly lifting or moving heavy equipment, materials etc.	**Eliminate/Substitute:** N/A **Engineering Controls:** Where possible, use mechanical lifting/moving equipment. **Administrative Controls:** Analyse the Task, Individual, Load and Environment. Lifting over short distances, 5m max. Anyone with back problems has a personal RA. Any loads of offset centre of gravity, lift with heaviest side closes to the body. No obstacles in the environment. Staff to have undertaken mandatory safe manual handling operations training. **PPE:** Safety Shoes (EN20345). Handling gloves (EN 388). **Relevant SHE Code is No 12.**	M	U	M		N/A	N/A	N/A
Working at Height Height of 2m. Ladders assessed as best tool for the job as access only is required.	Operators, staff & bystanders	Injuries due to falls from height.	**Eliminate/Substitute**: N/A **Engineering Controls:** After pre-use checks, remove any damaged/faulty equipment from use. **Administrative Controls:** Use equipment in accordance with operator manual. Ladders and step ladders shall be used by trained, competent and authorised staff only. Ladders and step ladders to be used for access only. Staff to have undertaken SC0409 training for Ladder Users. Class 1 or EN131 professional ladders only. All pre-use checks to be completed prior to use. Cordon off area from nearby staff and bystanders. **PPE:** Safety Shoes (EN20345). **Relevant SHE Code is No 4.**	M	U	M		N/A	N/A	N/A
Lone working	Operators.	Risk of accidents without immediate assistance or supervision.	**Eliminate/Substitute:** Lone working is prohibited without prior authorisation from senior line manager. **Engineering Controls:** N/A **Administrative Controls:** Conduct specific risk assessment for solo tasks. Check-in system for lone workers. Provide training on emergency procedures and emergency contact details. **PPE:** N/A Relevant SHE Code is No 1.	M	VU	L		N/A	N/A	N/A

Firms fined for electrician's 35ft fall at Coventry manufacturers - BBC News

Both contractor and company where this took place were prosecuted and fined



£100 padlock would have prevented this contractor from being harmed



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[Scaffold tower collapse caught on car dashcam | Construction Enquirer News]

[Scaffolding Collapse into Oncoming Traffic, Buckingham UK (youtube.com)]



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Method Statements (complex projects or working with contractors) “RAMS”

- Task description
- Known hazards
- Responsible people
- How projects will be monitored
- Structure of tasks
- Environmental issues
- Permits
- Competency of workers
- Deliveries
- Emergency Arrangements



See Appendix 7 of Code 6 for info on Method Statements and Safe Systems of Work

2016 Regime change: a new penalty landscape

- In their first 6 months, the guidelines resulted in as many penalties of £1m or more as there were in the previous 20 years



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Ineos fined £430,000 after worker badly burned in accident

The worker, 47, was attempting to clear a sump that contained a caustic solution. However, he fell into the sump due to inadequate grating and sustained severe burn injuries. The sump had needed emptying as its contents had reached the high-level design threshold the day before.

- No risk assessment had taken place for this activity.
- There was also no safe system of work produced.
- The grating was not secured and there were no barriers in place to prevent a fall into the sump.



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Any risk assessment performed would have identified that the key risk was falling into the caustic solution and that current control measures were severely lacking!

Dyson fined £1.2m after 1.5-tonne machine falls on factory worker

Wiltshire employee's head and chest were injured in 2019, in incident that HSE said 'could have been fatal'



The technology company Dyson has been fined more than £1m after one of its employees was injured when a giant milling machine fell on top of him.

Dyson was ordered to pay £1.2m at Swindon magistrates court for failing to properly train its staff in handling the kit. The firm pleaded guilty to breaching health and safety laws.

He was moving a computer-assisted milling machine with the help of a colleague when the incident happened.

They lifted it up with a five-tonne jack, and were replacing some wheels with wooden blocks when it fell.

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The Guardian
Newspaper of the year

The Health and Safety Executive said that it struck the man, injuring his head and chest.

Its investigators found that Dyson had not provided "suitable and sufficient information, instruction and training" to its staff. It had also not put systems in place to ensure that the machine was moved safely.

The man escaped being crushed only because the machine landed on two toolboxes and the handle of another machine.

"This incident could have been fatal," said James Hole, a Health and Safety Executive (HSE) inspector. "Those in control of work have a duty to assess the risks, devise safe methods of working and to provide the necessary information, instruction and training to their workforce.

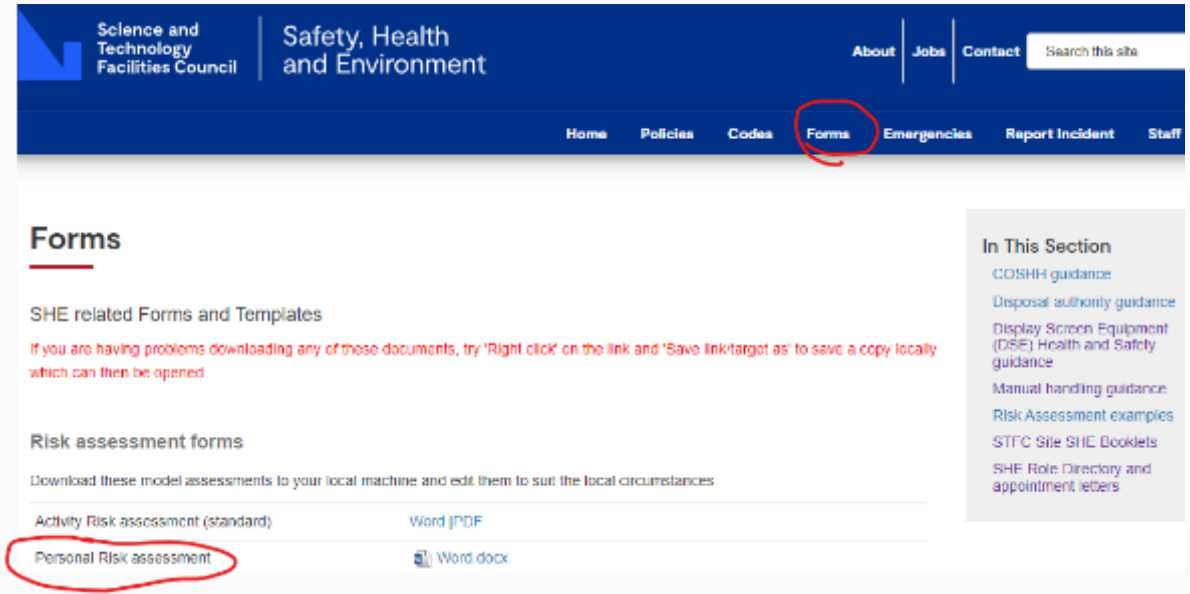
"Had a suitable safe system of work been in place, this incident and the related injuries could have been prevented."

Personal risk assessment

If a line manager becomes aware that one of their direct reports has a medical condition which could be impacted on by their work activities, e.g. epilepsy, severe allergy, eye condition, heart disease, etc. then the manager will need to carry out a personal risk assessment with the person.

This could come from a discussion about time off for hospital appointments or a first aid incident on site. As soon as the line manager is aware, they have a legal duty of care to the direct report. The risk assessment demonstrates this duty of care has been fulfilled.





You can find the proforma on the SHE website under 'Forms'.
If you need medical advice, you can refer them to Occupational Health.

Lord Justice William Davis said:

“We accept that the staircase did not present a risk for almost all members of staff at the store. In our judgement that is not the point.

"It created a material risk to the health and safety of Matthew Gunn.”

Conclusion: STFC needs to assess the risks to staff where their health condition makes them more prone to injury.

Matthew Gunn death: Morrisons supermarket fined £3.5m

17 March 2023



Matthew Gunn suffered fatal head injuries in a fall from a staircase at Morrisons supermarket in Tewkesbury in 2014

By Rhiannon Yhnell
BBC News

Supermarket retailer Morrisons has been fined £3.5m for failing to prevent the death of a store worker with epilepsy.

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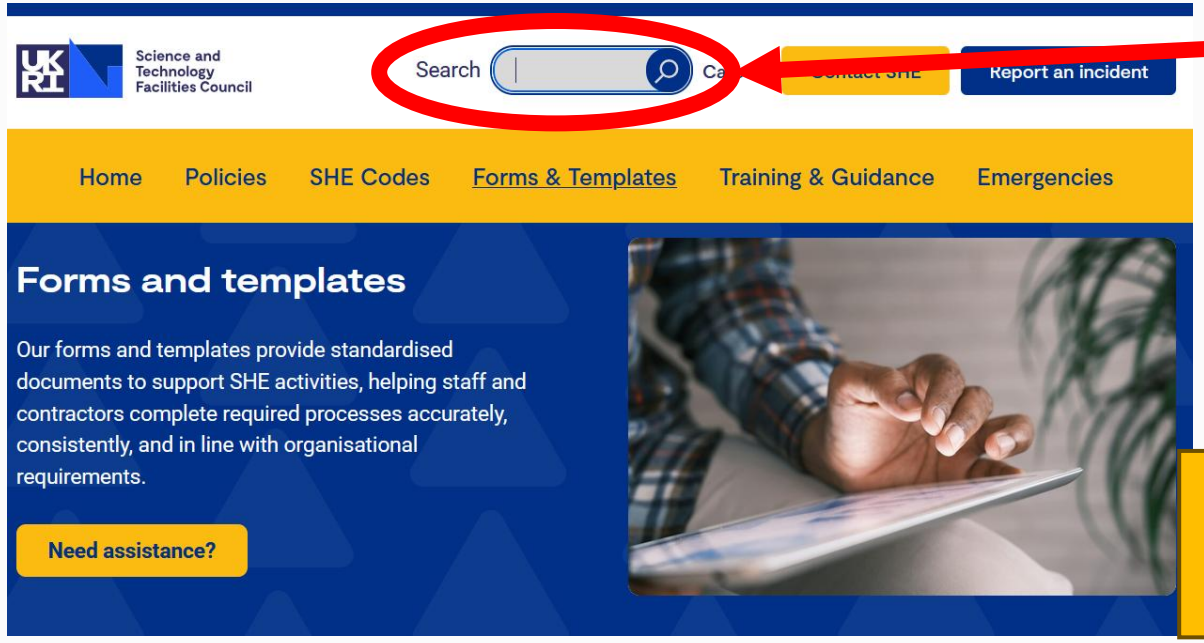
Thoughts to leave you with....

Common problems with risk assessments:

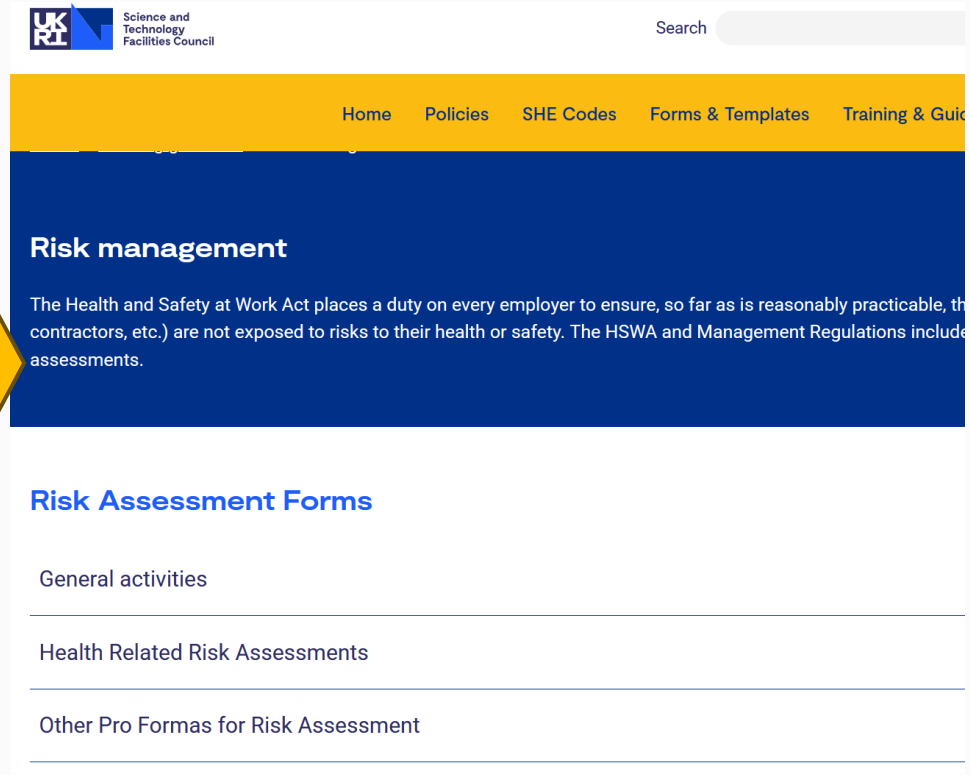
- Confusing hazard (potential) with outcome. Nothing painful in 1st column!
- Failure to consult staff on preparation of RA or brief them on completion.
- Not taking into consideration everyone potentially impacted by the activity.
- Relying on a “generic” risk assessment when a “specific” one is needed.
- Failure to complete the risk calculation correctly.
- Insufficient information for high-risk activities. Level of detail should be proportionate to the risk.
- Failure to take account of individuals’ requirements.
- Lack of clarity on responsibilities – especially in matrixed projects.



Dedicated risk assessment page



Search "Risk Management"



Please bookmark the SHE website on your PC/laptop, it's a one stop shop for all SHE related topics:

https://www.she.stfc.ac.uk/training-guidance/risk-management/

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Risk Assessment awareness







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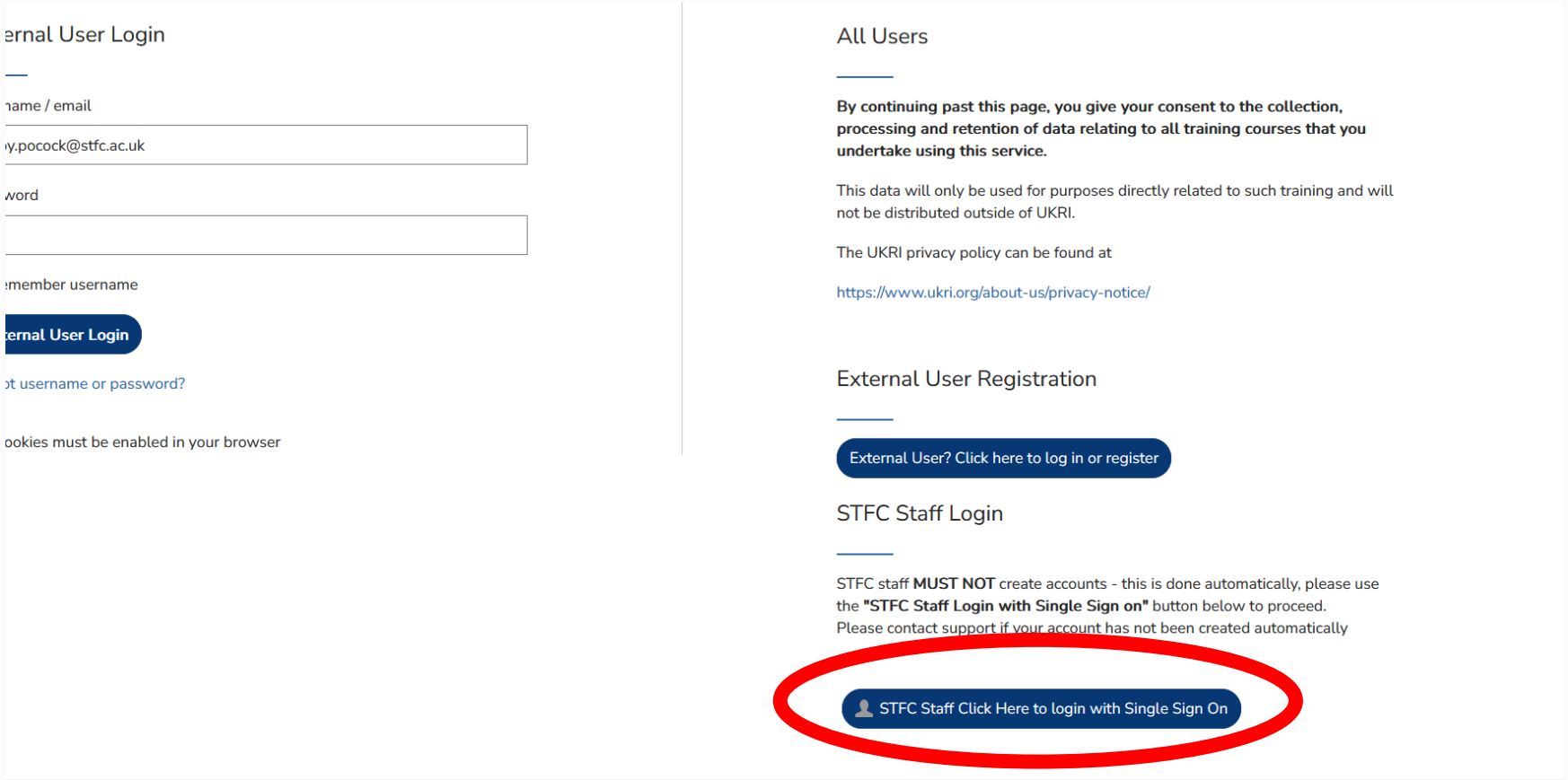
Logging onto Totara



Clicking on 'Single Sign On' will take you direct to your course when you follow a link

Having problems?
Ensure your VPN is connected.

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Evotix Assure Demo Videos

- Risk Assessment
- https://uk.sheassure.net/ukri



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Risk assessment practical

- Develop a risk assessment and submit to SHE Group within 2 weeks

- The risk assessment can be:
  - Activity based travelling for work
  - Area based, office
  - Equipment based CNC machine



Exercise 5: Risk assessment review

- Consider the adequacy of RA coverage in your work areas.

- Consider the standard of RAs relevant to your area given the content of this morning's sessions

- Prepare a 5 minute presentation for the Chairman of your Departmental Safety Committee summarising your findings and making recommendations for actions



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SHE Code 5
SHE Accident Causation and Accident Investigation

Why investigate accidents?

- Its the Law, the Management of Health and Safety at Work Regulations, Section 5 under ‘Monitoring

  - ..... (b) includes adequately investigating the immediate and underlying causes of incidents and accidents to ensure that remedial action is taken, lessons are learnt and longer term objectives are introduced

- Its STFC H&S Management Arrangements, Section 3 : Principle H&S responsibilities of managers includes:

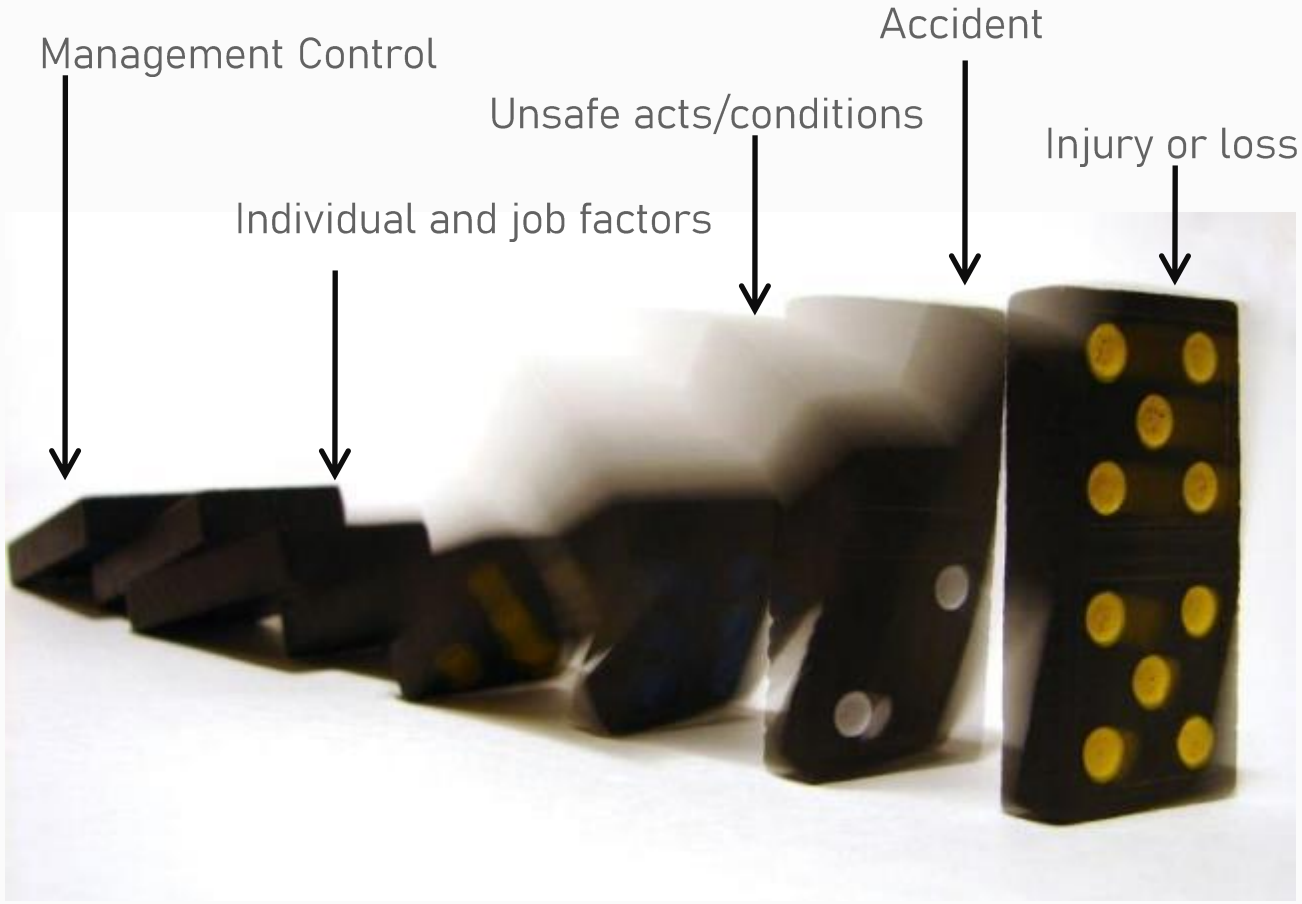
  - Investigating injuries, incidents and near misses in their areas of responsibility to determine root causes and identify and introduce measures to reduce the likelihood of an incident’s recurrence

Reasons to investigate incidents

- Prevent future incidents and accidents
- Demonstrate concern
- Identify weaknesses in management systems
- Prevent business losses
- Collate data and establish trends
- Identify costs
- Defend claims for compensation and criminal prosecution

Accident Causation

Domino Theory



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Immediate Causes

- Equipment Design
- Working environment
- Inspection and maintenance
- Risk perception
- Motivation
- Pressure
- Fatigue
- Compliance
- Competence

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Organisational Causes

- Management/supervision
- Communications
- Recruitment/selection
- Training
- Planning
- Procedures
- Incident management and feedback

Corporate influences

- Research budgets
- Research timescales
- Ownership and control
- Safety management system
- Procurement

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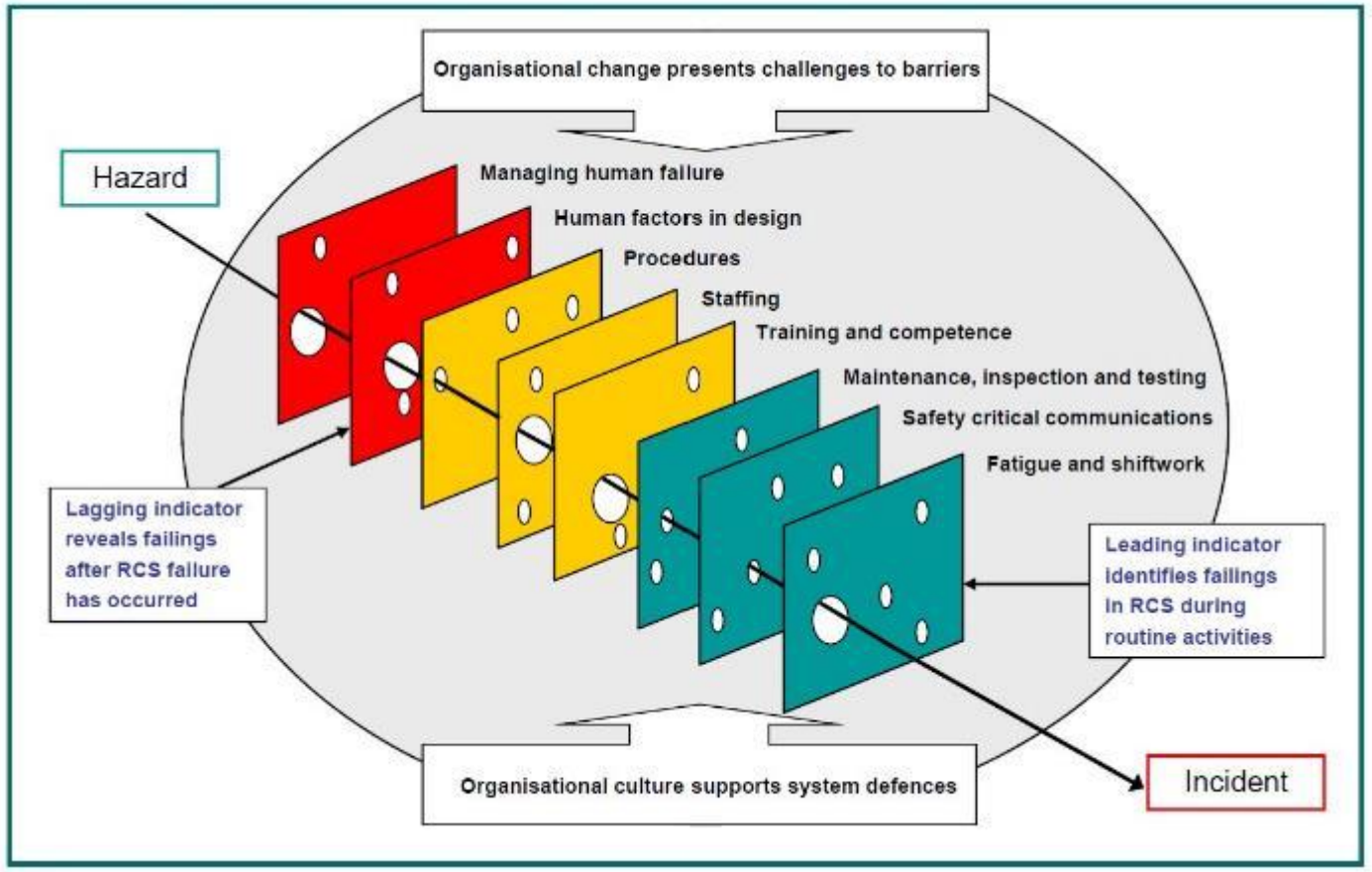
External Influences

- Political environment
- Customers
- Public perception
- Economic factors
- Global research drivers
- University agendas
- Tenant business plans

Reason's accident causation model

Also referred to as the "Swiss Cheese Model"



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Energy Institute Briefing No 17: Human Factors aimed at the on-shore and off-shore chemical and fuel process industry, 2011

Conclusion

- Avoid blame!
- All accidents whether major or minor are caused, there is no such thing as an accidental accident!!
- Very few accidents, particularly in large organisations and involving complex technologies are associated with a single cause
- The causes of accidents are usually complex and interactive



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Human error: Active failures

- Have an immediate consequence
- Are usually made by front-line people such as drivers, control room and machine operators
- Immediately precede, and are the direct cause, of the accident



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Human error : Latent failures

- Those aspects of the organisation which can immediately predispose active failures

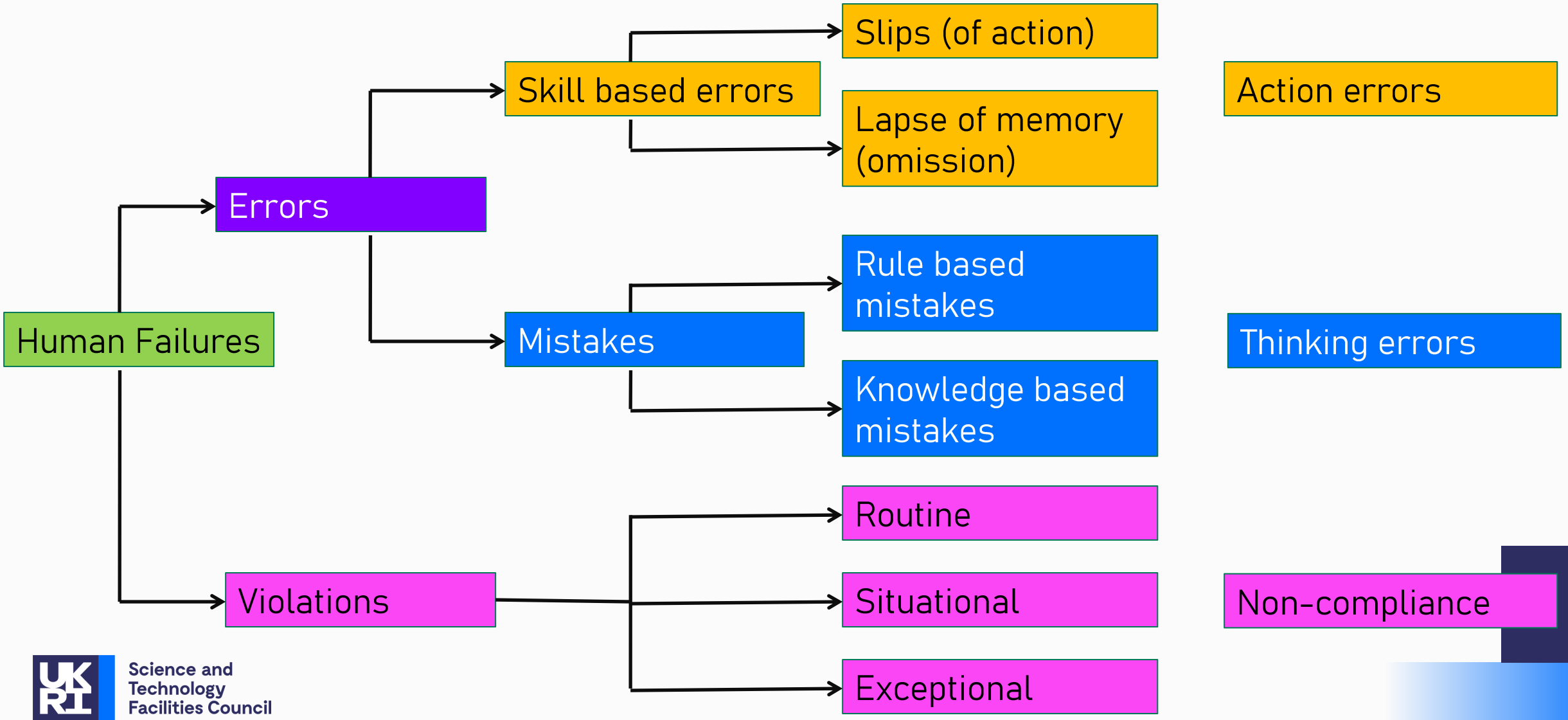
- Common examples of latent failures include:
  - Poor design of plant and equipment
  - Maintenance schedules not followed
  - Ineffective training
  - Inadequate supervision
  - Ineffective communications
  - Uncertainties in roles and responsibilities.



Human error : Latent failures

- Latent failures are important to accident prevention because:
  - If they are not resolved, the probability of repeat accidents remains high regardless of what other action is taken
  - As one latent failure often influences several potential errors, removing latent failures can be a very cost-effective route to accident prevention

Types of human error



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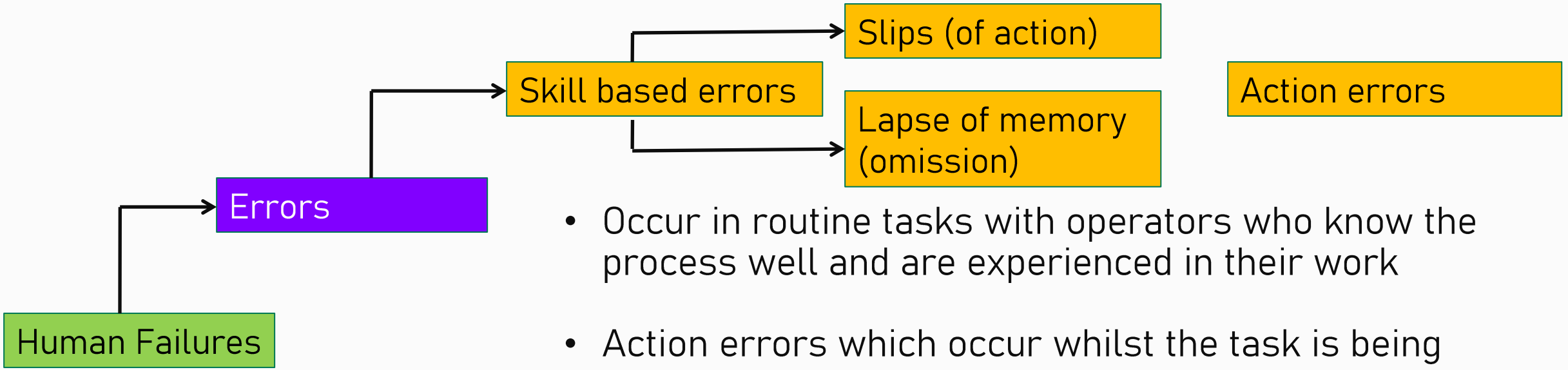
Slips and lapses – action errors

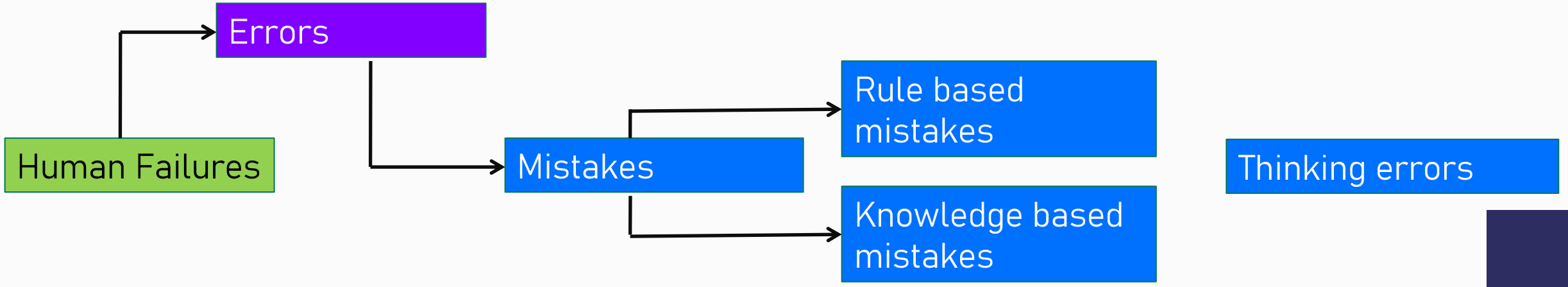


- Occur in routine tasks with operators who know the process well and are experienced in their work
- Action errors which occur whilst the task is being carried out
- Often involve missing a step out of a sequence or getting steps in the wrong order and frequently arise from a lapse of attention
- Typical examples: Driving – operating the wrong control through a lapse in attention or accidentally selecting the wrong gear

Mistakes – thinking errors

- Inadvertent errors that occur when the elements of a task are being considered by the operator

- Decisions that are subsequently found to be wrong, although at the time the operator would have believed them to be correct



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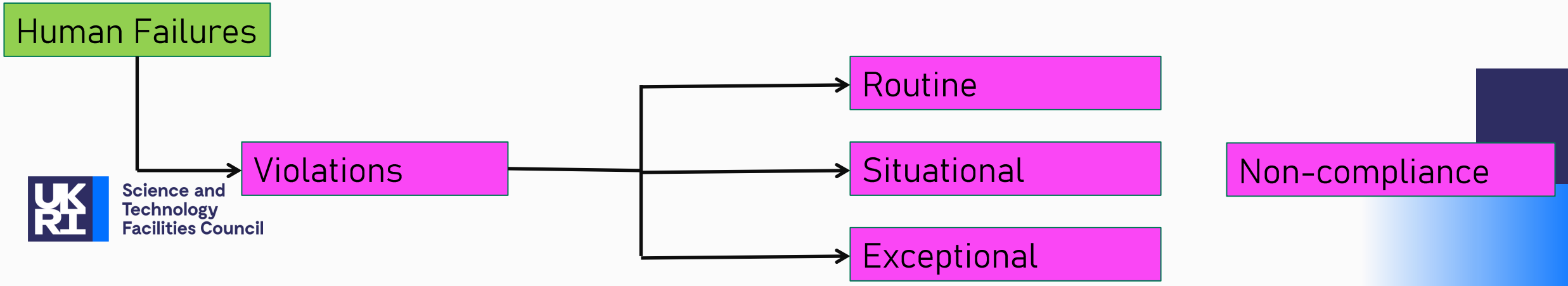
Violations – non-compliances

- Deliberate deviations from the rules which are deemed necessary for the safe operation of equipment

- Violations are seldom wilful acts of sabotage or vandalism

- The majority stem from a genuine desire to perform work satisfactorily given the constraints and expectations that exist



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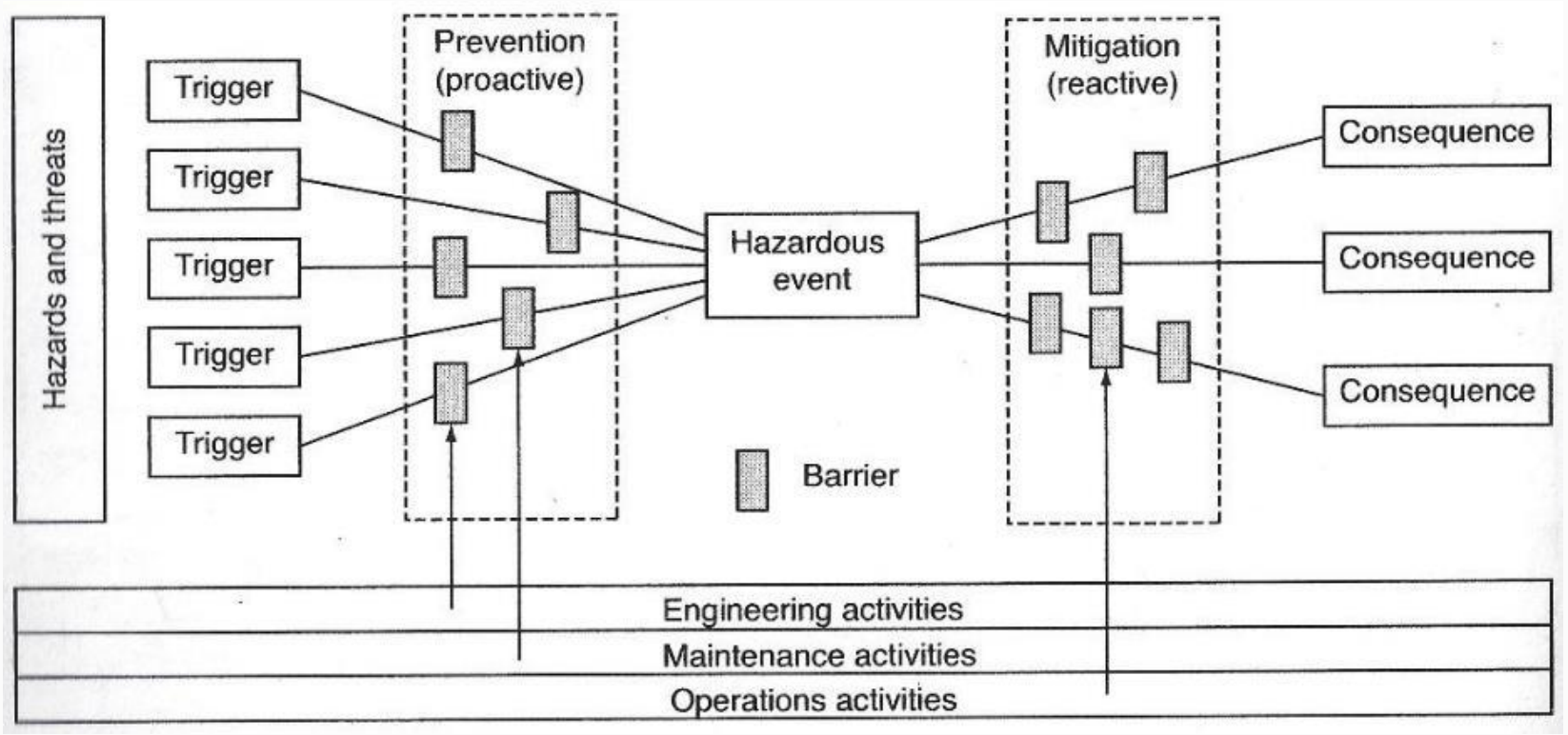
Bow-tie diagram

- Another analysis device which distinguishes between factors influencing the outcome before and after the actual accident



SHE Code 5 - Incident Reporting and Investigation

- Safety Code 5 defines the processes to be used for the reporting and investigation of incidents and the responsibilities of individuals and managers

- To satisfy the legal duty under the Management of Health and Safety at Work Regulations and Reporting of Injuries Regulations (RIDDOR) and others

- Apart from legal duty, it is widely recognised that analysis of incidents and potential incidents provides essential information in the process of continually improving safety performance and safety management systems

Immediate response on witnessing an incident

- Raise the alarm and call for assistance immediately

- As appropriate, providing it is safe for you to do so and in priority order:
  - Assist in taking care of casualties
  - Take action to prevent further casualties
  - Take action to prevent further damage
  - Prevent access to the area
  - Inform Line Management
  - Gather information including photographs

- Report the incident on Evotix Assure

All staff: What to report

- All the following must be reported by any person involved in or witnessing any incident from the following list:

  - Accident (Incident with actual injury or damage to property)
  - Near Miss (Incident or circumstance that may have resulted in an accident)
  - Includes hazardous condition dangerous occurrence or failure of a safe system of work
  - Occupational Ill Health (Work related abnormal condition or disorder)
  - Environmental Incident (Actual or potential damage to the environment)
  - Fire (including smoke, sparks and false alarms)
  - Vehicle Incidents
  - Radiation incidents

All staff: How and when to report

- Use Evotix Assure, the STFC online incident reporting database
- Alternatively use the portal on the SHE website or send an email to the SHE group
- Inform the Line Manager/Contract Supervisor/Employer of any person involved in the incident
- Report serious incidents or emergencies at the earliest opportunity and always in less than 12 hours
- Report all other incidents within 2 days

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All staff: Investigation

- Co-operate with STFC management or external agencies in any investigation to identify root causes and prevent recurrence

- Note that apart from a number of specific circumstances below, STFC encourages a no blame culture and does not include disciplinary action as a response to an incident report:

  - Repeated occurrence despite re-training and mentorship
  - Malicious intent
  - Action far from acceptable practice
  - Deliberate unauthorised over riding or tampering with safety interlocks
  - Non reporting of a significant event and attempt to conceal

Responsibilities of managers and supervisors

- Ensure that any incident in an area for which they are responsible is reported through Evotix Assure

- Using the guidance in appendix 4, conduct a local investigation of the incident within two weeks of the incident occurring

- Where SHE Group classifies an incident as Serious or Potentially Serious (SoPS), management must complete a SoPS Investigation Report (See appendix 6)

- Note: SHE Group will determine the severity of an incident and if is reportable to HSE under RIDDOR

Responsibilities of managers and supervisors

- Ensure that all actions arising from incident investigations are implemented in a timely manner

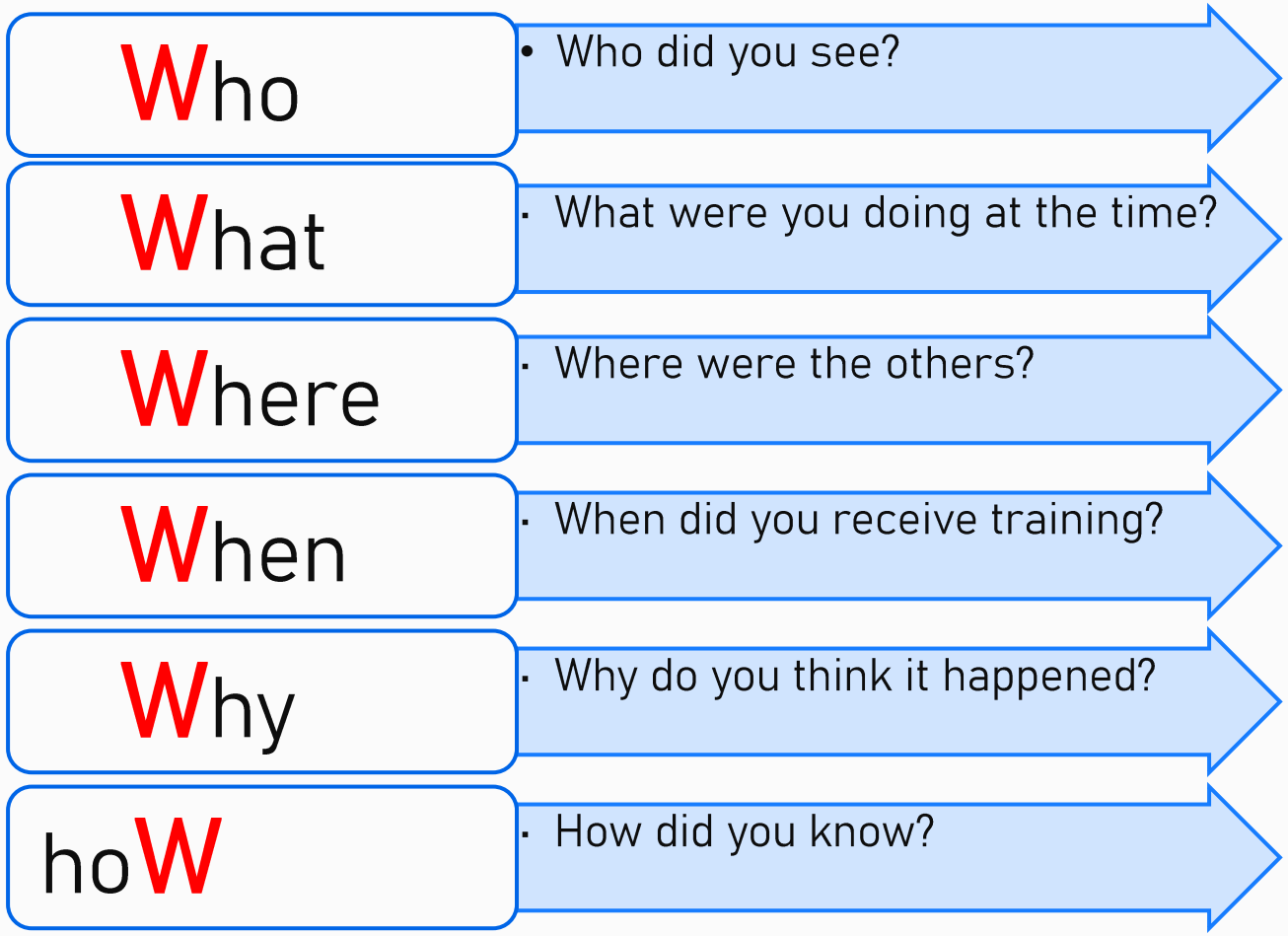
- Note that Head of SHE Group will decide if an incident requires an STFC formal investigation rather than a Departmental local investigation

- As appropriate inform relatives of staff and the employers of visitors, tenants or contractors

- Discuss the causes of the incident and the learning derived from it with any STFC employee involved

Effective Questioning

- Ask the right questions



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Exercise 6: Accident investigation

- Accident investigation case study

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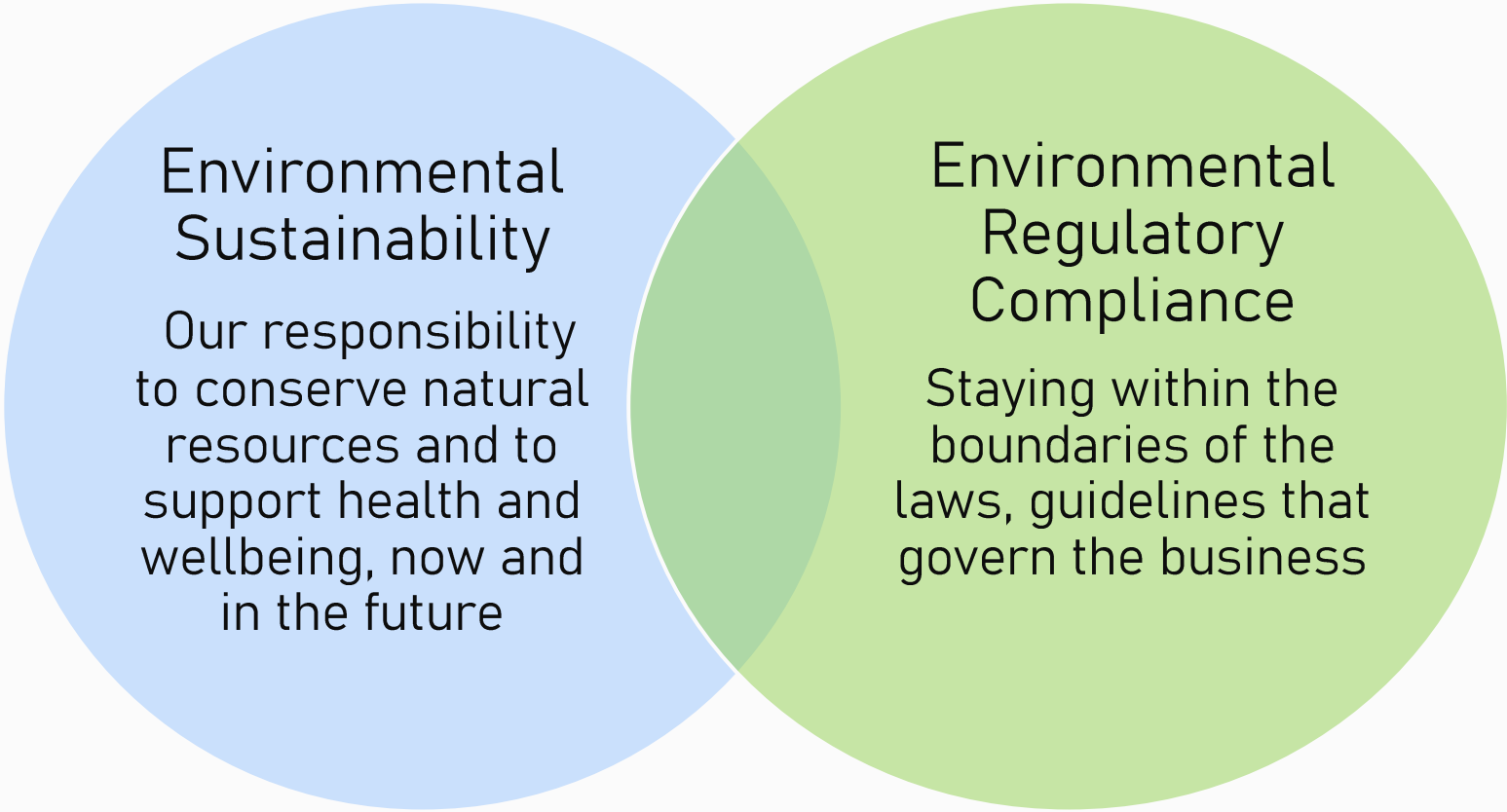
Environmental Management and Sustainability (Part 1)

Environmental compliance & sustainability

- What's the difference ?



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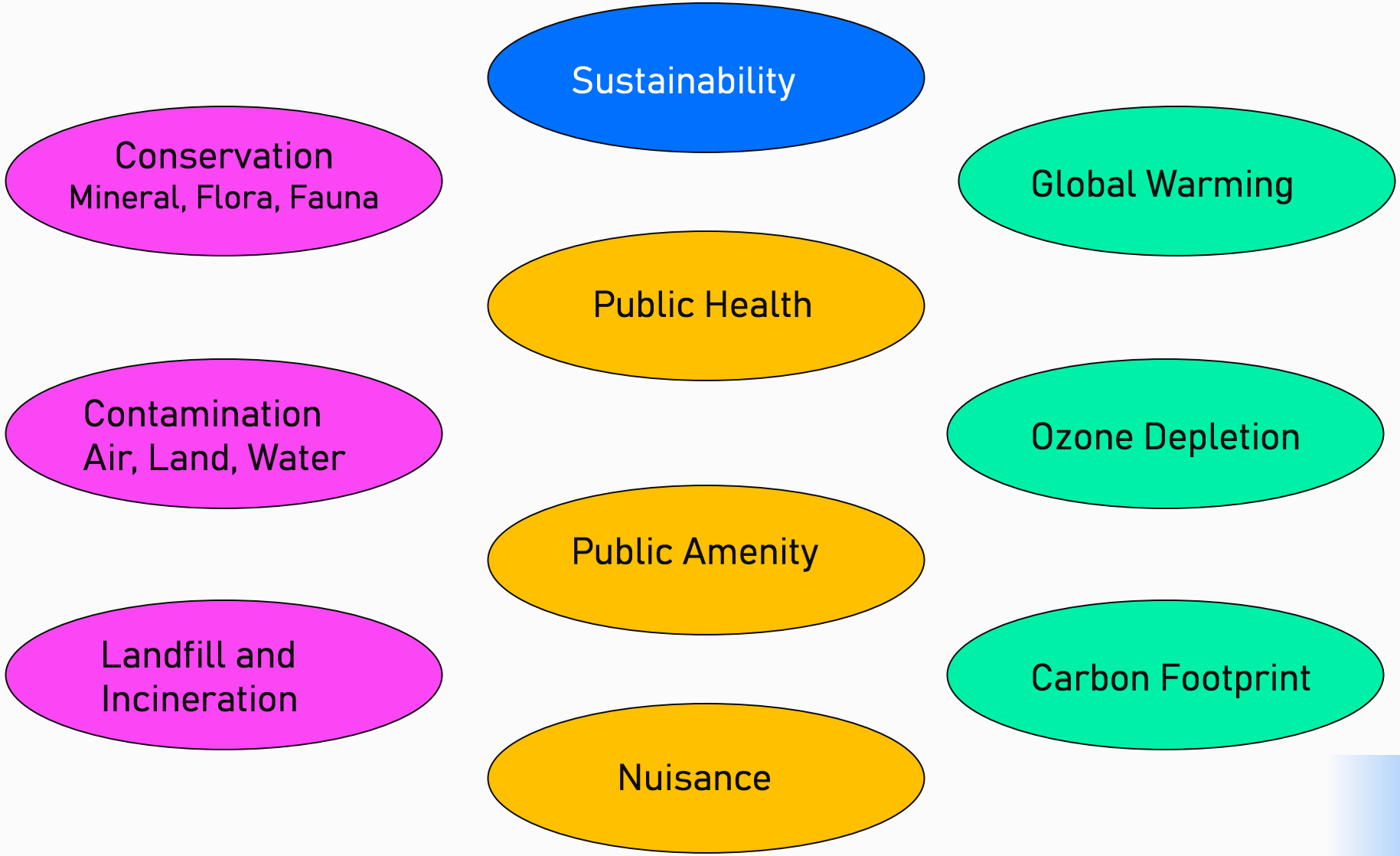
What are the issues to worry about?



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Timeline to a sustainability plan

- The UKRI Environmental Sustainability Strategy was launched in May 2020 and set out the ambition of 'embedding sustainability in everything we do' and achieving net zero carbon by 2040

- STFC's action plan was launched in 2021 and updated in 2022. It aims to deliver key outcomes in:
  - Leadership, Staff Empowerment, Physical Environment, Science Delivery, Collaboration and Procurement.



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The 2025/2026 figures

Solar panels on all sites generated **4,696,093** kWh of electricity

We emitted a total of **29,216** tonnes of CO_2
This equates to the emissions of ~233,823 flights between Heathrow and Edinburgh

We consumed 129,137,967* kWh of electricity
= to **37,443** average UK homes
*total electricity from the grid, onsite solar and gas-powered CHP (combined heat and power plant)

Waste and Recycling

We produced **769** tonnes of waste
= weight of **55** double decker buses

Water Usage

We consumed **139,965** m^3
This equates to **~ 56** Olympic-sized swimming pools
30-40% of this water was linked to cooling experiments

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The challenge

- Big science requires vast resources
- Quantifying the positive impact of enabled research (as part of any carbon calculation) is significantly challenging
- Sustainable technical solutions may be a long way from realisation (still only conceptual) and may require a global collaborative approach
- Significant funding could be required to investigate, develop and implement sustainable solutions
- Embedding environmental sustainability thinking in every aspect of our work is a major culture change for us ALL



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Green laboratory

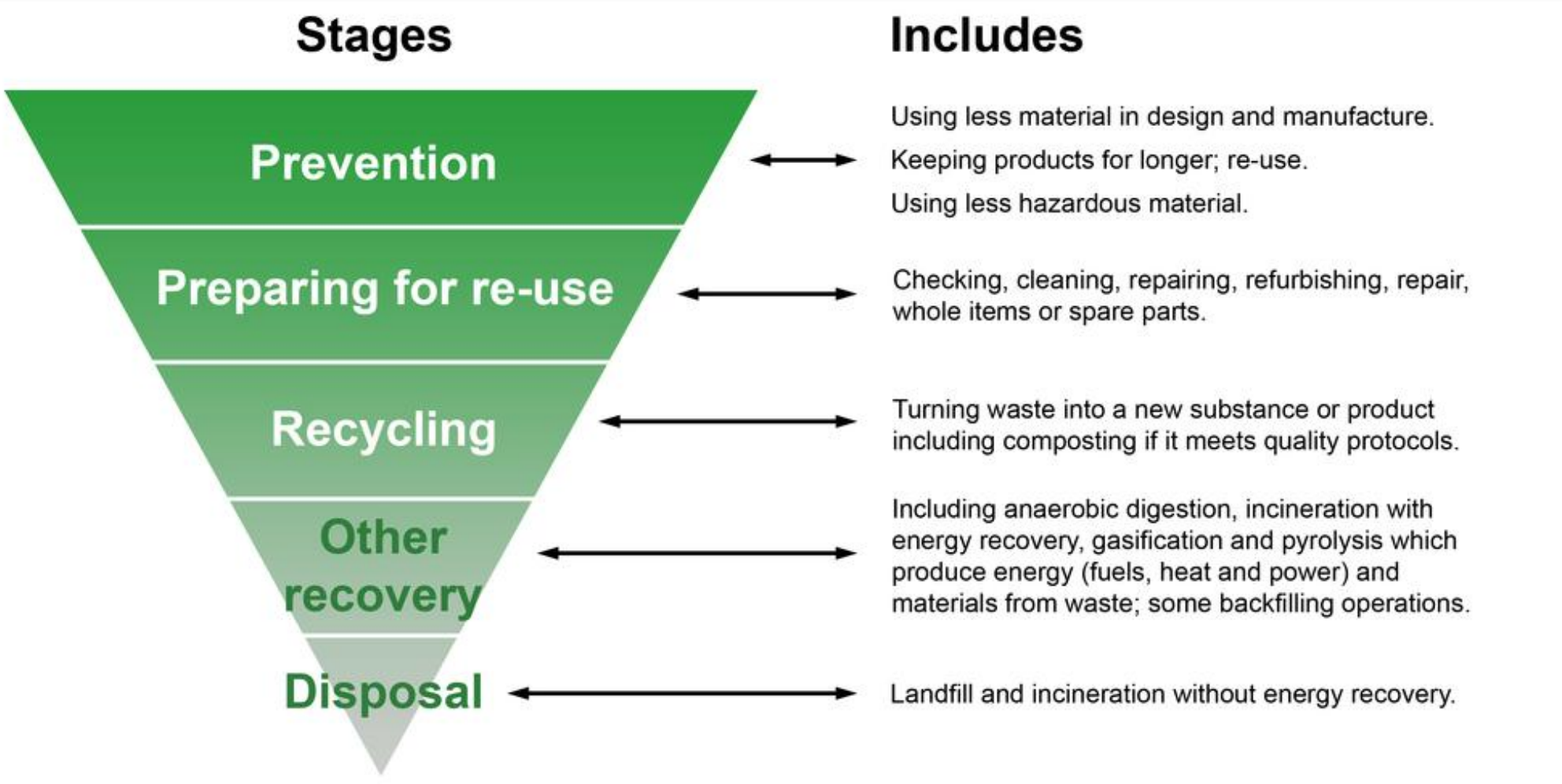


- Waste management & Water usage
- Net Zero by 2040 will profoundly impact how a science lab works

  - Do we know the carbon footprint of common Laboratory equipment: freezers, refrigerators, water baths, fume hoods, furnaces, X-ray sets, autoclaves etc.
  - Extensive use of single use plastics to prevent contamination, assure H&S etc.
  - Water usage, cleaning and sterilising
  - Disposal, scrapping of redundant equipment
  - Microscale chemistry techniques, hazardous chemical substitution
  - Hazardous waste management: handling, packaging, storage and disposal, & clinical and radioactive waste management …

Waste management heirachy

- It's everyone's duty to follow the hierarchy



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Motivators for good environmental control

- Potential for legal sanction arising from non-compliance with environmental legislation
- Government greening commitments:
  - Mitigating climate change: working towards net zero by 2050
  - Minimising waste and promoting resource efficiency
  - Reducing water use
  - Procuring sustainable products and services
  - Nature recovery – making space for thriving plants and wildlife
  - Adapting to climate change
  - Reducing environmental impacts from Information Communication Technology (ICT) and digital
- Savings arising from reduced resource costs and reduced waste
- Financial consequences of 'the polluter pays' principle
- Major moral and reputational image consequences in both directions



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Thank you

SHE website: https://staff.she.stfc.ac.uk

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