

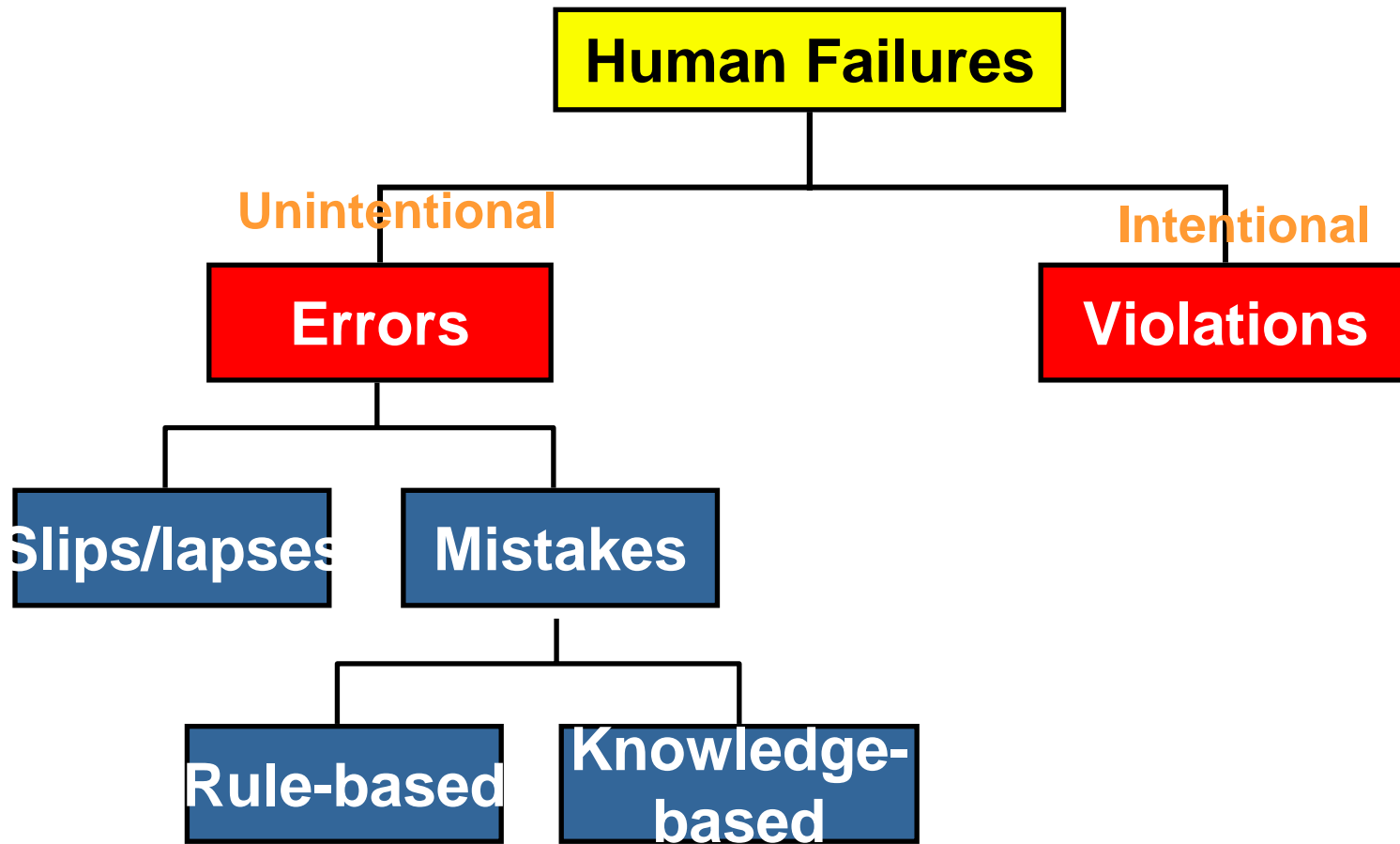
Putting it All Together

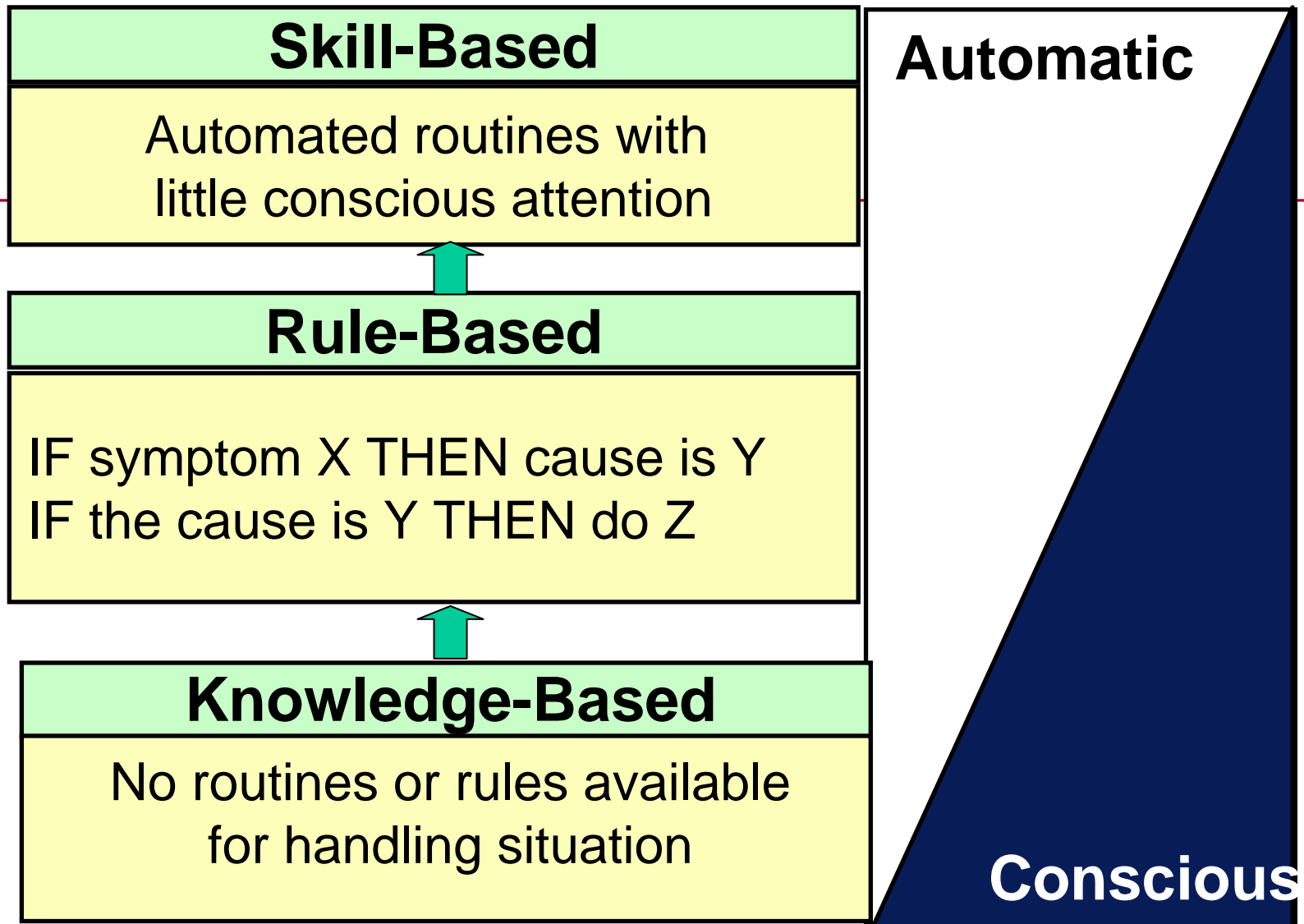
Getting Started

Summary

- Not just ‘human error’
- Types of human failures:
 - Which have different causes
 - Therefore need to be managed differently

Types of Human Failures





Different levels of mental working

Preventing slips & lapses



- Design e.g.
 - Consistency (up always means 'off')
 - Layout (controls operated in sequence placed next to each other)
- Checklists & reminders
- Checking critical work
- Removing distractions & interruptions

Preventing mistakes

- Rule based
 - Increase awareness
 - Improve overview
 - Procedures for abnormal situations
- Knowledge based
 - Competence assurance
 - Job aids (e.g. schematics)

Preventing violations

- Improve risk perception
- Increase likelihood of getting caught
- Eliminate reasons to cut corners – address inconvenient requirements
- Address procedures (reflect reality?)
- Involvement

PIFs and the Key HF Issues

Key human factors issues for COMAH sites



**Includes Alarm Management*

We have added new sub-topics

- Behavioural safety
- Supervision
- And we separated out interfaces and safety critical communications post-Buncefield

Topics covered today

Overall: *What to Remember*

Human failures

- Are behind most accidents
- Have a range of types that determine necessary prevention strategies
- Are made more or less likely by predictable performance influencing factors

...So can be managed

...*So should be understood and addressed just as rigorously as 'traditional' technical and engineering safety!*

Understanding the tasks (the 7-step approach)



1. Consider main site hazards (e.g. LPG, chlorine)
2. Identify human activities for these (bulk transfers, maintenance, startup, reactor charging)
3. Outline key steps in these activities – remember to talk to operators!
4. Identify potential human failures for key steps – slips, mistakes and violations
5. Identify Performance Influencing Factors (PIFs) that make failure more likely – job, person, organisation
6. Use hierarchy of control – don't rely on humans as last line of defense, but automation introduces new issues
7. Manage error recovery – make it more likely that errors will be detected by others or the system

Accident investigation

- Preventable accidents involve human failures...
 - Individual, serial or collective
 - immediate or latent

...amongst the root causes

- Human failures are not random...
 - there are *patterns*
 - there are underlying job, personal and organisational *performance influencing factors*

...that need to be understood, investigated & managed

Mirror image of risk assessment!

Procedures: fit for purpose

- Amount of detail in the procedure should support the operator, not replace their competence
- Types of procedures:
 - Background detail
 - Step-by-step written procedure
 - Job aid (e.g. checklist, flowchart, diagram)
- Use of 'Black Books'

Determining level of procedural support

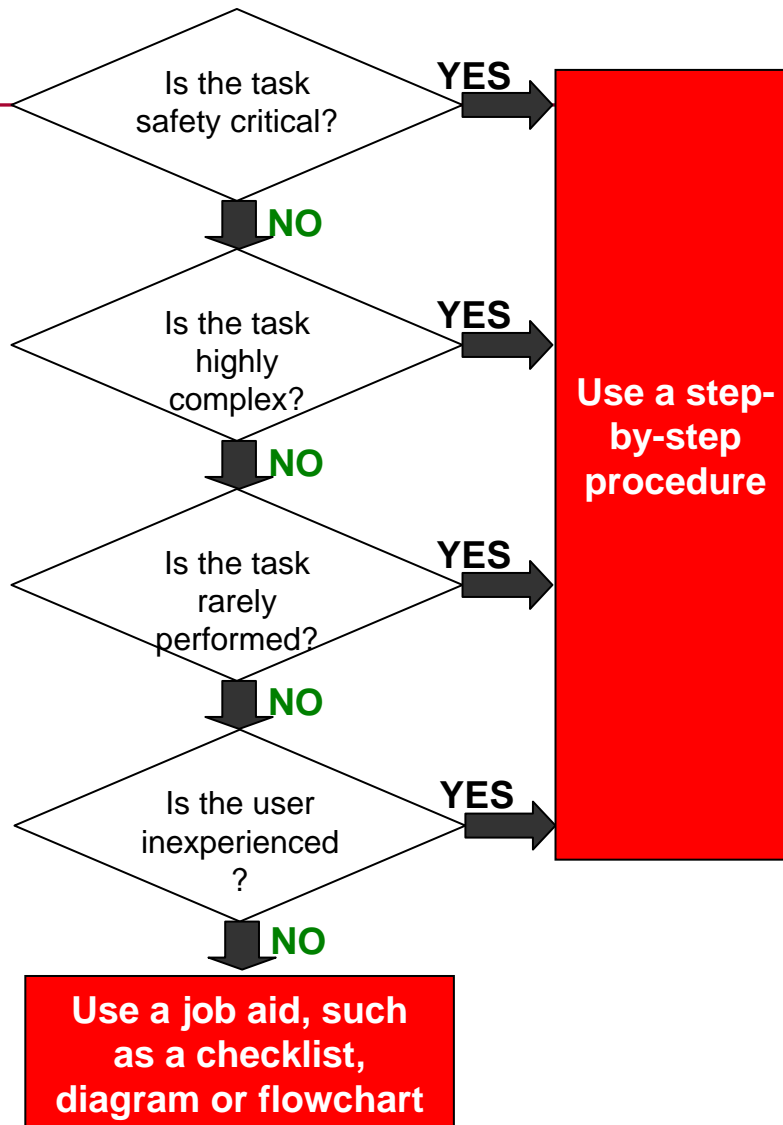


Task Criticality		Low			Medium			High		
Task Familiarity		Freq	Infreq	Rare	Freq	Infreq	Rare	Freq	Infreq	Rare
Task Complexity	Low	Green	Green	Yellow	Green	Yellow	Yellow	Yellow	Yellow	Red
	Medium	Green	Yellow	Yellow	Yellow	Yellow	Red	Yellow	Red	Red
	High	Yellow	Yellow	Red	Yellow	Red	Red	Red	Red	Red

No Written Instruction required

Job Aid required e.g. checklist/memory aid

Step by Step instruction required



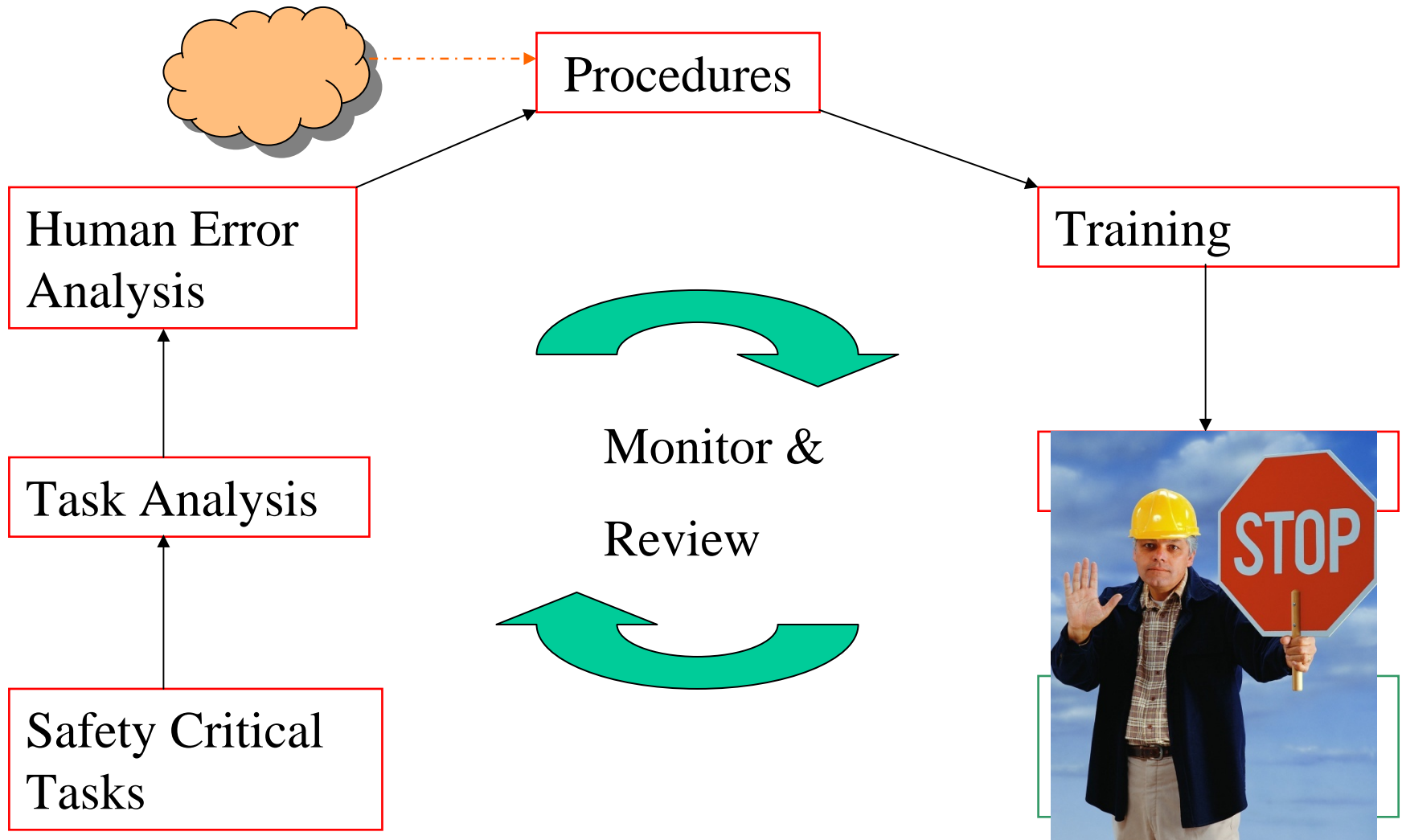
Determining level of detail required

Job Aids

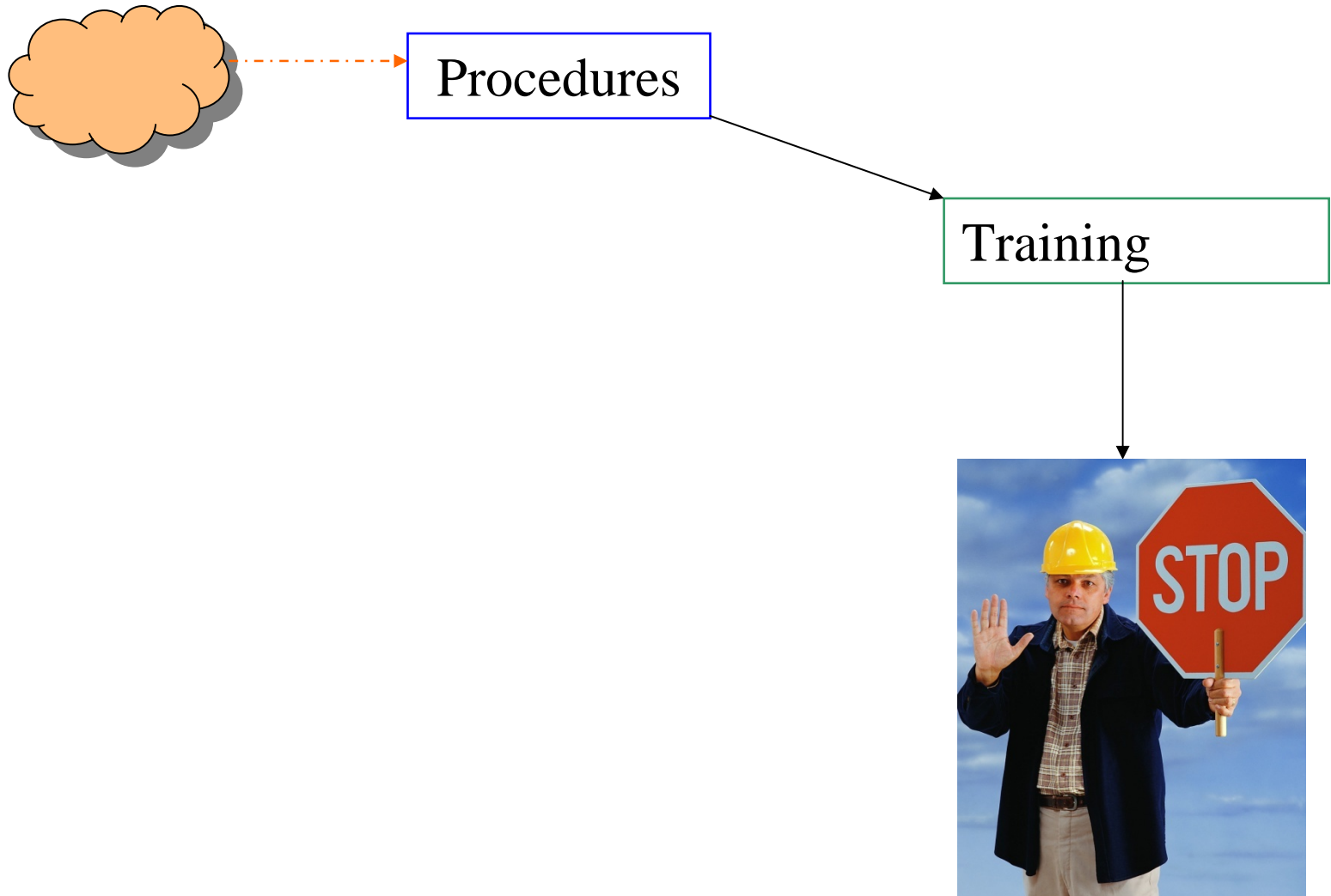
**“Any source of information used to support the successful performance of tasks”
(e.g. reminders and memory aids)**

- Job aids decrease
 - the amount of decision making needed
 - the need to memorise procedures and references
 - the need to carry manuals
- Practical - designed to be consulted on the job

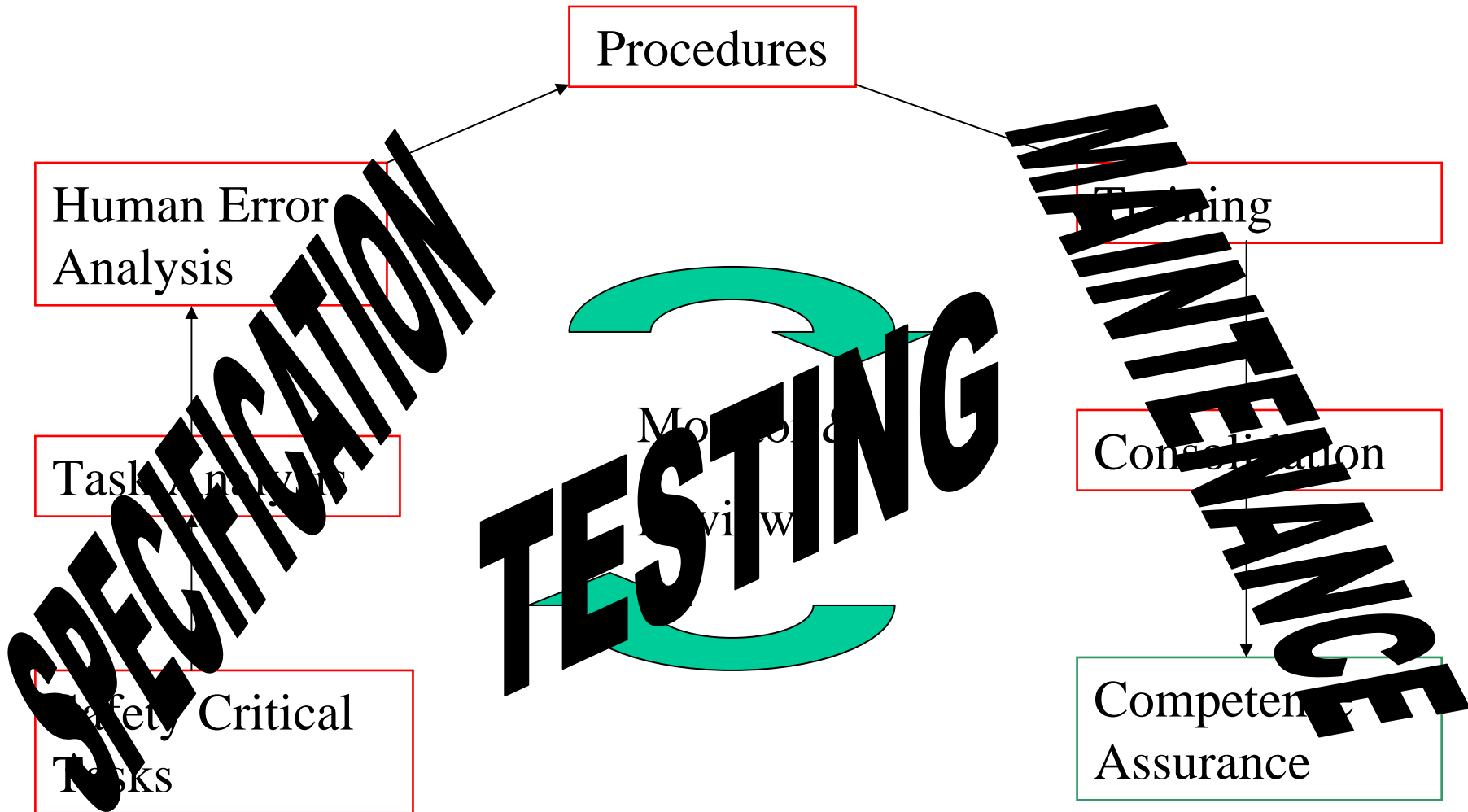
Human Factors and Competence



Human Factors and the Real World?



Assuring performance on demand of safety critical personnel



Getting Started

- Education & awareness
 - Need good understanding of human failure
 - How we fail
 - How failure prevented
 - General awareness throughout
 - More specialised knowledge for assessors
- slips, lapses, mistakes, violations
- MAH safety critical procedures are always a good place to start

Getting Started

- Steps 1 to 3 seven steps
 - Do your procedures reflect reality?
- Then look at major hazard error potential
 - Expertise
 - **Operators**
 - Intelligent customer for site
 - Walk throughs, talk throughs
 - Prioritise – top events first, critical steps
 - Can require significant resources

Getting Started

- Can develop/improve competence assurance at same time

BUT

- Need good procedures to fully implement a good competence assurance system
- Can also improve other HF topics – HF website

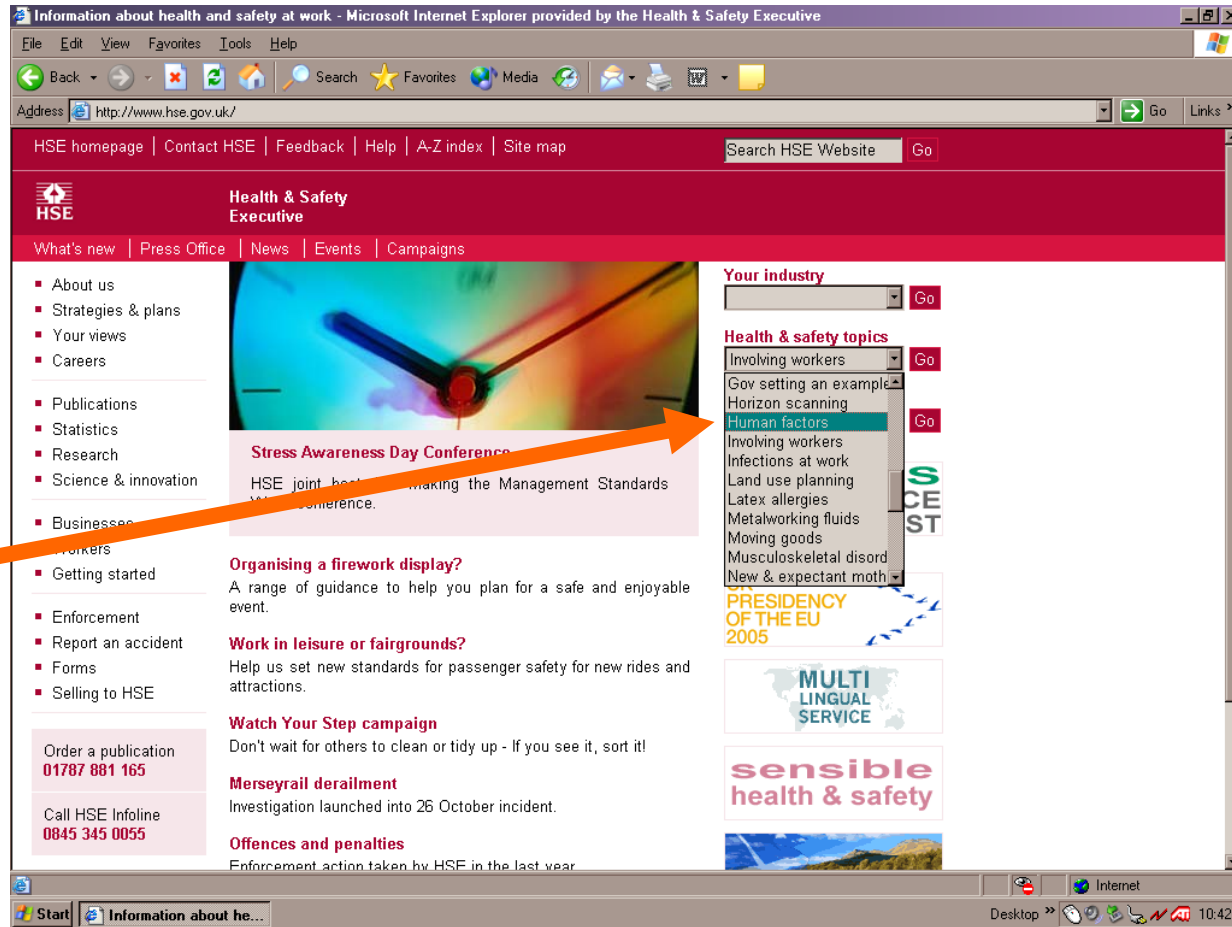
Getting Started

- Remember managers/supervisors
 - Also prone to failure
 - Wider implications (organisational failures)
- Make use of the resources available...

Resource materials

- New (much improved) website

– /http://www.hse.gov.uk/humanfactors/index.htm





- [Human factors home](#)

- **Human performance home**

- [Organisational change](#)
 - [Workload](#)
 - [Managing human failures](#)
 - [Fatigue](#)
 - [Procedures](#)
 - [Training and competence](#)
 - [Communications and interfaces](#)
 - [Organisational culture](#)
 - [Integration](#)
 - [Design](#)
-
- [Briefing notes](#)
 - [Human factors toolkit](#)
 - [Further guidance](#)
 - [Research](#)
 - [COMAH safety report](#)
 - [Links](#)



Managing human performance

Human factors are environmental, organisational and job factors as well as human and individual characteristics which influence behaviour at work and can affect health and safety. A more detailed introduction to human factors is provided [here](#)

Human factors has been "operationalised" as a list of Key Topics. Each of the topics below link to a topic-specific page where you can download Briefing Sheets and extracts from an Inspectors Toolkit.

- ▶ **Organisational Change**
- ▶ **Staffing levels and workload**
- ▶ **Managing human failures**
- ▶ **Fatigue from shiftwork and overtime**
- ▶ **Procedures**
- ▶ **Training and competence**
- ▶ **Communications and interfaces**
- ▶ **Organisational culture**
- ▶ **Integration of human factors into risk assessment and investigations**
- ▶ **Human factors in design**



- Human factors home
- Human performance home
- Organisational change
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- COMAH safety report

Human factors: Managing human performance





Inspectors Human Factors Toolkit

A Toolkit is available for use by HSE inspectors to support the consideration of human factors in site inspections, accident investigations and assessment of company documentation such as COMAH Safety Reports.





You can open the complete [Toolkit by clicking here](#) , or select a topic from the list below:

[Introduction](#)

Core Topics

- ▶ [Competence assurance](#) 
- ▶ [HF in accident investigations](#) 
- ▶ [Identifying human failures](#) 
- ▶ [Reliability and usability of procedures](#) 

Common Topics

- ▶ [Emergency response](#) 
- ▶ [Maintenance error](#) 
- ▶ [Safety critical communications](#) 
- ▶ [Safety culture](#) 

Specific Topics



- Human factors home

- Human performance home

- Organisational change

- Workload

- Managing human failures

- Fatigue

- Procedures

- Training and competence

- Communications and interfaces

- Organisational culture

- Integration

- Design

- Briefing notes**

- Human factors toolkit

- Further guidance


- Research













- COMAH safety report

- Links

Managing human performance - Briefing notes

A series of Briefing Notes are available covering the Key Topics, ranging from 2 to 4 pages in length. There is also an introductory sheet, and for major hazard sites, guidance on human factors in the MAPP (Major Accident Prevention Policy).

You can open the complete set of briefing notes by clicking [here](#)  (large file), or select a topic from the list below:

- ▶ **Introduction to human factors** [PDF 256Kb] 
- ▶ **Competency assurance** [PDF 243 Kb] 
- ▶ **Humans and risk** [PDF 132 Kb] 
- ▶ **Procedures** [PDF 75Kb] 
- ▶ **Emergency response** [PDF 137Kb] 
- ▶ **Maintenance error** [PDF 183Kb] 
- ▶ **Safety culture** [PDF 86Kb] 
- ▶ **Communications** [PDF 102Kb] 
- ▶ **Alarm handling** [PDF 79Kb] 
- ▶ **Fatigue** [PDF 88Kb] 
- ▶ **Organisational change** [PDF 71Kb] 
- ▶ **Human factors in the Major Accident Prevention Policy** [PDF 81Kb] 

These documents are all in pdf format.

