A new book from the CCPS and the Energy Institute:

Human Factors Handbook for Process Plant Operations

A Guide for Improving Process Safety and Overall System Performance

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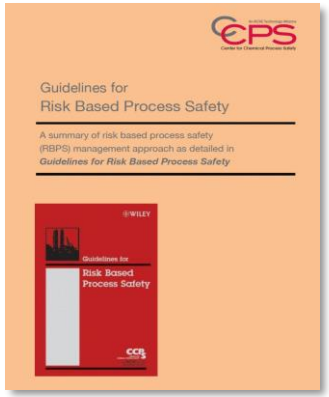
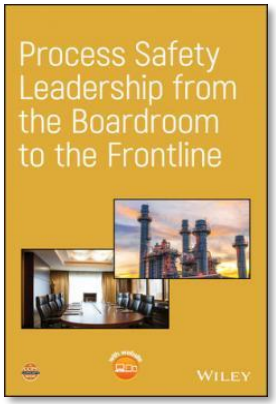
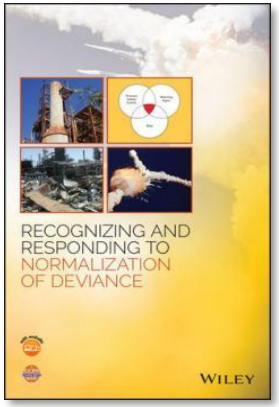
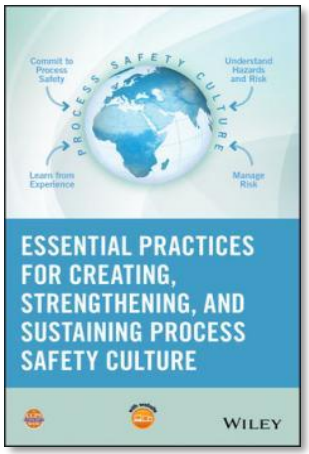
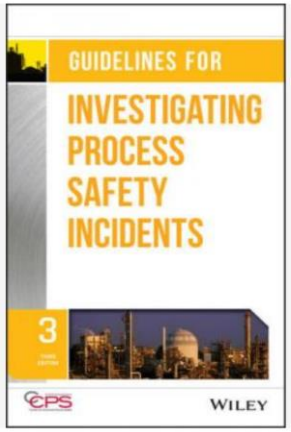
Time tested practical guidance

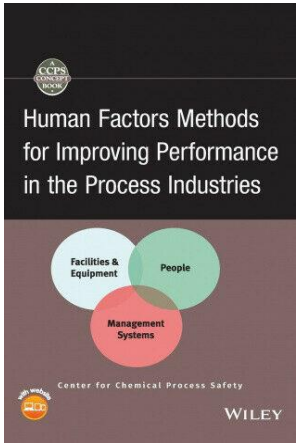






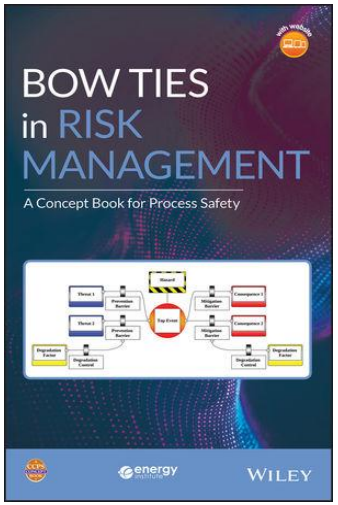






Recent collaboration with

energy institute



Another book about Human Factors?

- Human Factors issues implicated in many / most process safety incidents
- There are numerous textbooks on Human Factors… written in technical language - aimed at HF specialists and engineers…
- We recognize that **FIRST LINE SUPERVISORS** are the vital link between managers and operators / technicians, so they are best placed to bring good HF practices into the hazardous workplace
- Therefore, this handbook has been written primarily for **FIRST LINE SUPERVISORS** working in **Operations** and **Maintenance**
- **The style and format of the book was developed in direct consultation with First Line Supervisors in a range of different process industries**
- It presents the key HF concepts, simply and clearly, written in straightforward language, without technical jargon
- The book follows the principles of 'Crew Resource Management' (CRM) that has been so successful in improving flight safety in commercial aviation over the past 30+ years

Another book about Human Factors?

Primary target readership:

- **1st line Operations & Maintenance Supervisors and Managers**

Secondary target readership

- Plant superintendents
- Engineers and Process Safety specialists
- Health & Safety personnel

Aims of the handbook

- Help people apply good HF principles in their day to day work
- A source book of tips & techniques
- Directly appliable guidance

What is Human Factors?

The UK HSE document *Reducing error and influencing behaviour* (HSG48) says this:

'Human factors refer to environmental, organisational and job factors, and human and individual characteristics, which influence behaviour at work in a way which can affect health and safety'

What is Human Factors?

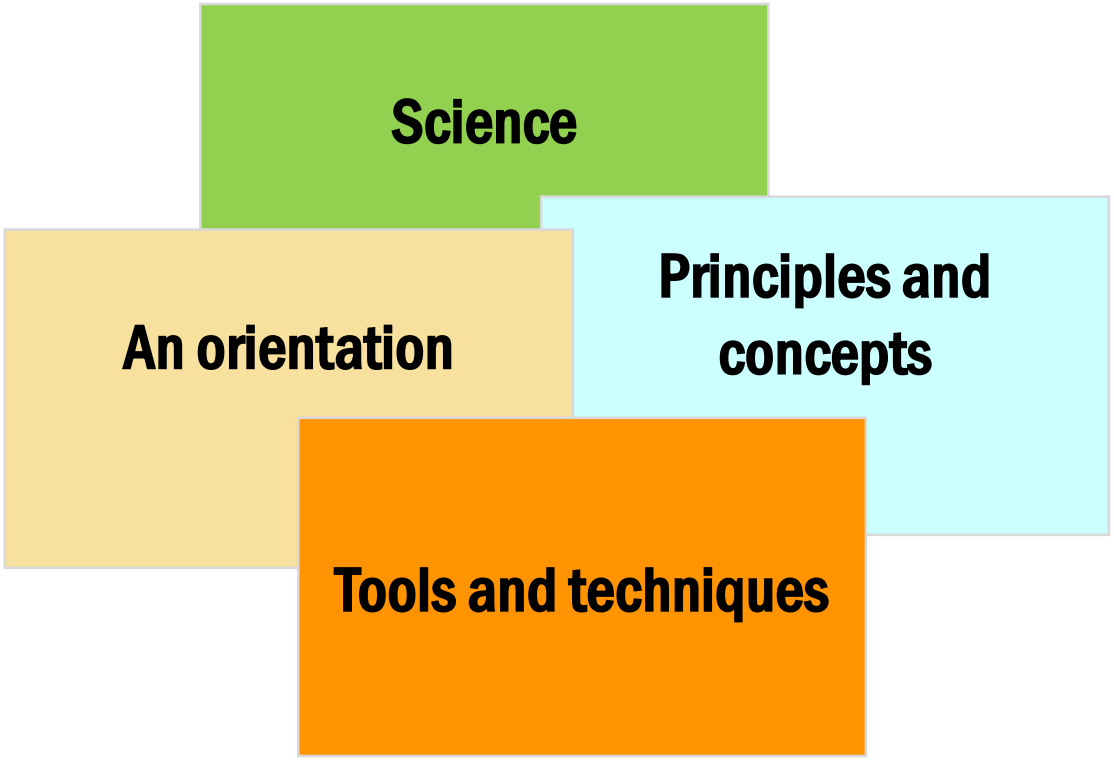
The **UK HSE website** expands on three aspects of Human Factors:

The job: including areas such as the nature of the task, workload, the working environment, the design of displays and controls, and the role of procedures. Tasks should be designed in accordance with ergonomic principles to take account of both human limitations and strengths. This includes matching the job to the physical and the mental strengths and limitations of people. Mental aspects would include perceptual, attentional and decision making requirements.

The individual: including his/her competence, skills, personality, attitude, and risk perception. Individual characteristics influence behaviour in complex ways. Some characteristics such as personality are fixed; others such as skills and attitudes may be changed or enhanced.

The organisation: including work patterns, the culture of the workplace, resources, communications, leadership and so on. Such factors are often overlooked during the design of jobs but have a significant influence on individual and group behaviour.

What is Human Factors?

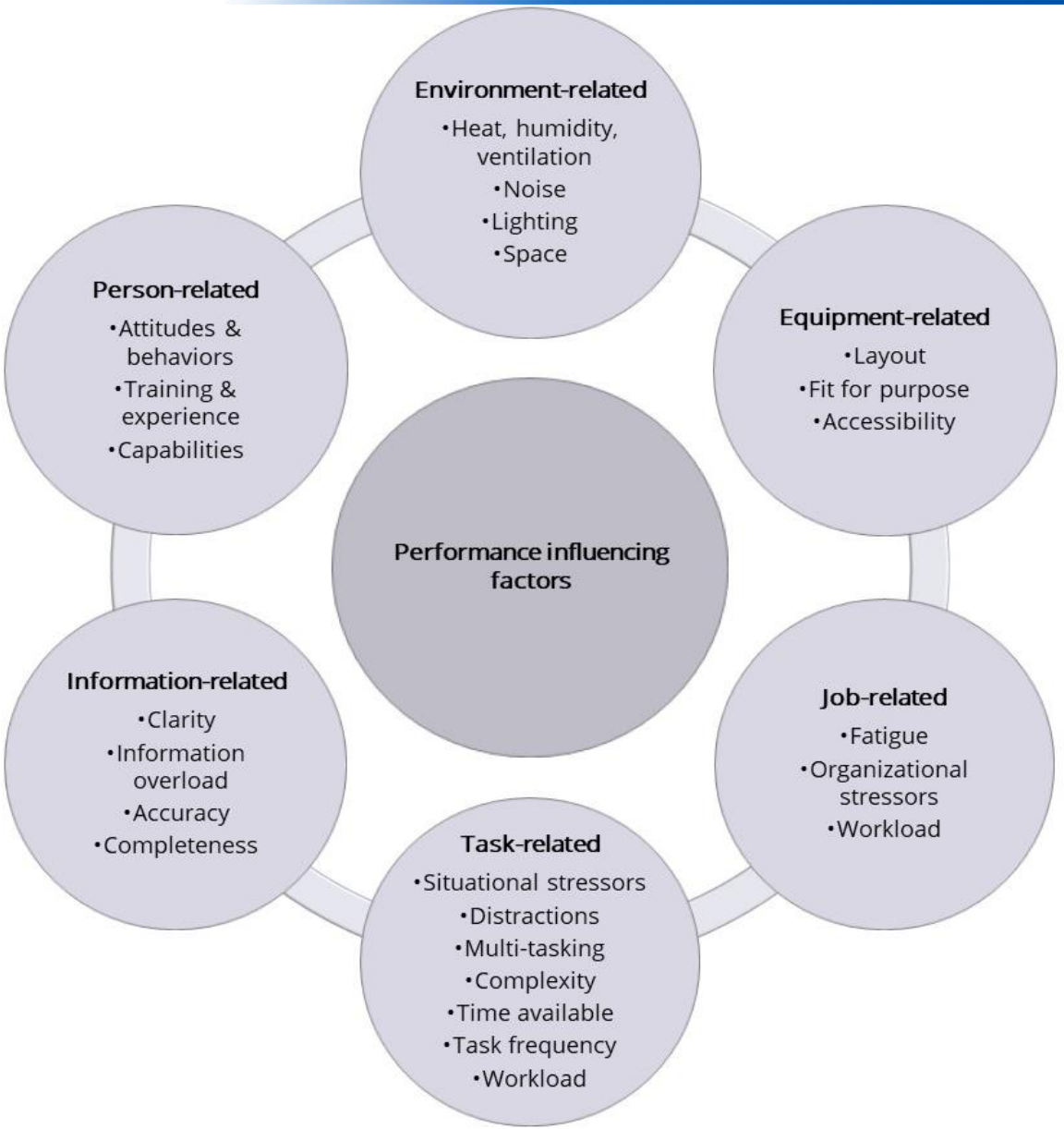


Key principles - 1:
Human error is not a cause of accidents

A key Human Factors principle is that errors occur due to a combination of problems in the working environment and the support, or lack of it, provided by the organization

Mistakes are **not** root causes of incidents

Key principles - 2:
Performance Influencing Factors

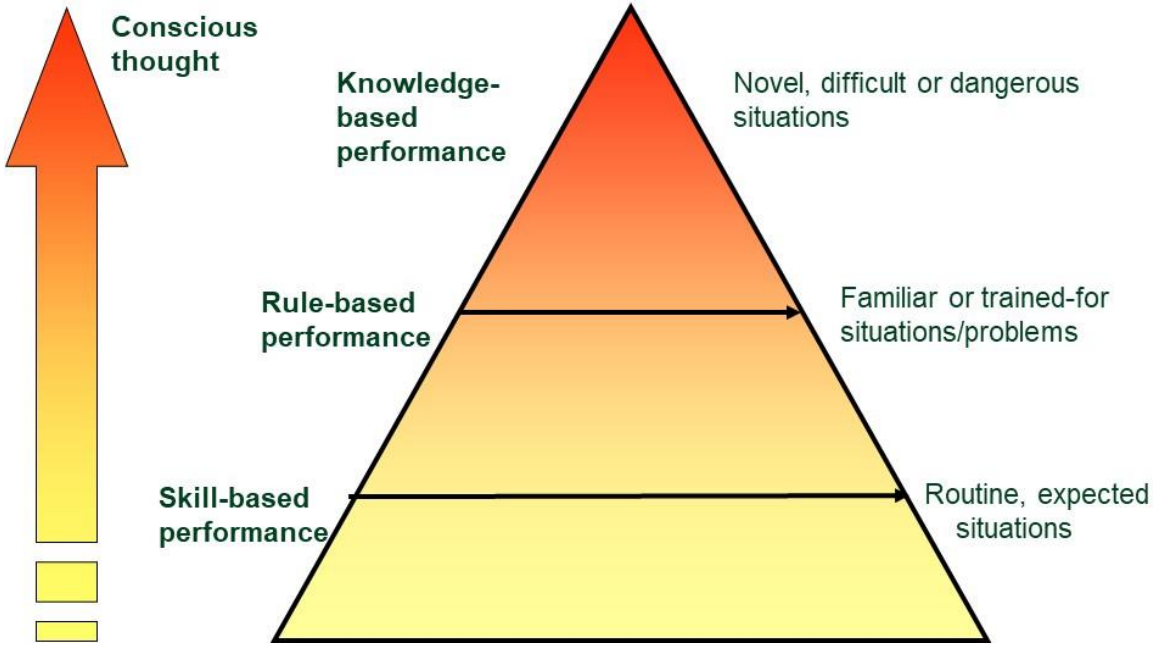


"Performance Influencing Factors (PIFs) are the characteristics of the job, the individual and the organization that influence human performance."

UK Health and Safety Executive

Key principles - 3:
Supporting human performance

High standards of human performance are first developed by identifying the **demands of a task** and **the support that people need**



Examples of Human Factors tools:
a - Error Management

Error management involves foreseeing the potential for human error in a specific task, and the conditions that may increase the likelihood of errors

People planning tasks - such as team leaders, supervisors and senior engineers – are **error managers, s**o should look out for potential errors and reduce their likelihood by effective task planning

- **Analyse the task**
- **Identify potential errors**
- **Re-design the equipment or procedure to reduce likelihood of error**

Examples of Human Factors tools:
b - Avoiding Distractions

Task design and planning

Do not require people to multitask or switch from one task to another.

Schedule low priority tasks in low workload periods.

Heads down announcement

Declare a "heads down" period, where interruptions and distractions should be limited to high priorities or emergencies only.

Distracting activities

Cordon off work areas. Limiting access. A physical barrier to prevent sight of distracting activities can help. Assign person to prevent entry of unauthorised persons.

Questions and requests for advice

Filter requests for help or advice. Route all questions to a coordinator who is not directly involved in the task. They can judge if the question or request justifies interrupting the task.

Conversations

Limit conversations to the task.

Noise reduction

Wear hearing protection, use temporary sound barriers, and use noise muffling equipment.

Use hand signals and written communication.

Low priority alerts

Minimize low priority alerts and alarms.

Communication

Limit communication within the team to critical points. Use brief and formal communication to minimize duration of interruption and level of attention required.

Examples of Human Factors tools:
c - Fatigue Management

- No more than 12 hours in a day shift. No more than 10 hours if an early start or night shift.
- Regular rest breaks – every few hours. 12 hours rest between day shifts, 14 hours after consecutive night shifts, two nights rest between night and day shifts.
- Maximum number of consecutive shifts before a rest day – seven day shifts, three night shifts, five early shifts.
- Shifts should be forward rotating – day shifts, night shifts, then rest days.
  Either fast rotating every two to three days, or slow rotating every three to four weeks.
- Shifts should start at or around 08.00am.
- Maximum working week should not exceed 48 hours, on average.
- Avoid permanent nights.

Examples of Human Factors tools:
d - Non-technical skills: Situation Awareness

Awareness and understanding of what is happening and what you and others should be doing

Typical SA skills training

Regularly checks key sources of information including alarms and other prompts.

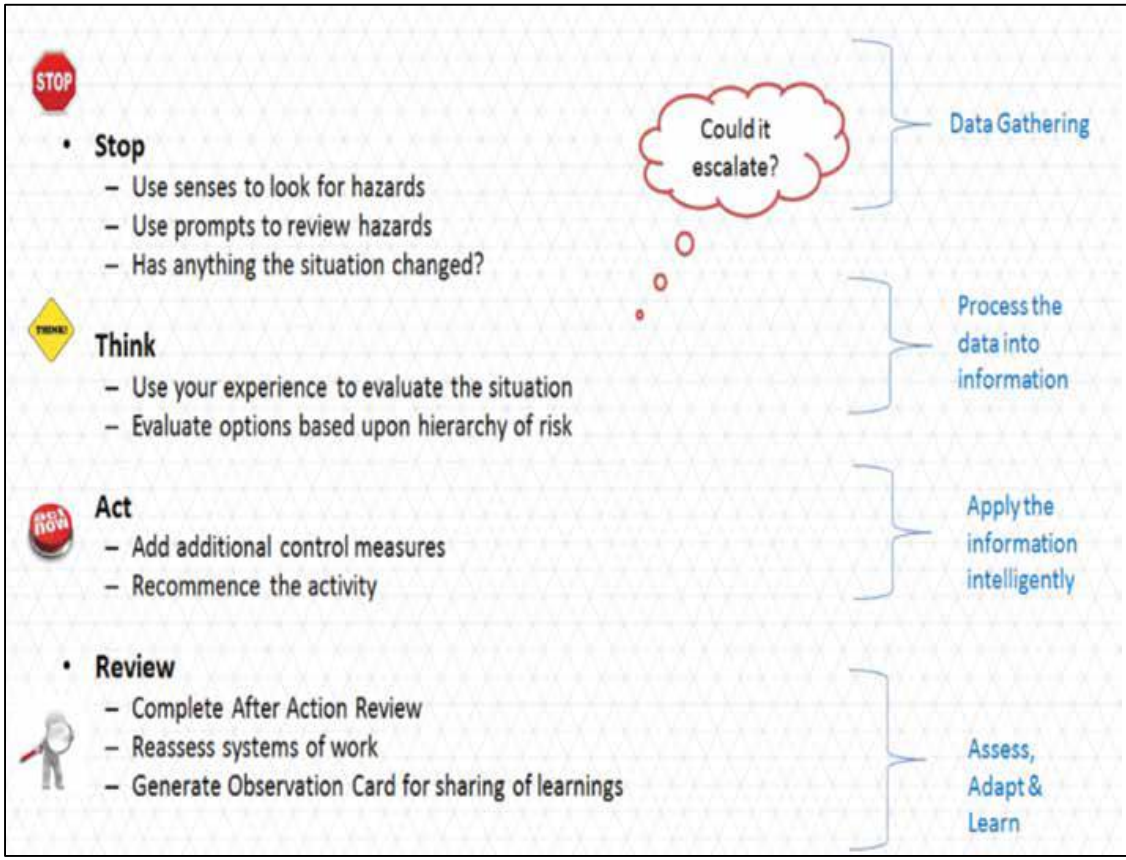
Makes use of all available information sources – e.g. instruments and colleagues – to check the status of the operation or assumptions about the operation.

Shows concern and takes action if important information is not available when it is needed.

Asks for regular updates from colleagues who may have relevant information.

Is proactive in addressing missing relevant information.

Dynamic human performance tools



Examples of Human Factors tools:
e - Psychological safety

The willingness of people to express an opinion, admit mistakes or unsafe behaviours, without fear of being embarrassed, rejected or punished

Error seen by the team and the organisation as:

- **A learning opportunity**
- A shared experience about what works and what doesn't work
- Learning from error seen as a collective responsibility.

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Contracted Technical Author

- We contracted greenstreet berman as technical author
- Greenstreet Berman Ltd are Human Factors experts:
- and Chartered members of The British Psychological Society
- The Project Team reviewed each chapter and retains ownership of the content

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