

# Practical Human Factors Integration

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Presentation to IE&HF Conference  
April 2011

# Overview of the presentation

- HFI in a nutshell
- Failures...
- The sociotechnical system
- What is it good for?....the primary goal of HFI
- Benefits of HFI for the elements of the sociotechnical system
- Practical HFI
  - Mapping objectives to the major project phases
  - HFI questions
- Data management
- Conclusions

# Constraints to successful application

The screenshot shows the BBC News website interface. At the top, there's a navigation bar with 'BBC Mobile', 'News', 'Sport', 'Weather', 'iPlayer', 'TV', 'Radio', 'More', and a search box. Below this is a red banner with 'NEWS' and 'LIVE BBC NEWS CHANNEL'. A sidebar on the left contains a 'News Front Page' menu with categories like World, UK, England, Northern Ireland, Scotland, Wales, Business, Politics, Health, Education, Science & Environment, Technology, Entertainment, and Also in the news. The main content area features an article titled 'What did go wrong at Terminal 5?' with a sub-headline: 'Almost 300 flights in and out of Heathrow Airport were cancelled during the first five days as teething problems at the new Terminal 5 caused chaos. But what went wrong on that fateful first day?'. The article text discusses technical issues with baggage handling and mundane problems like staff parking. An image shows passengers waiting at an airport. To the right, there's a 'HEATHROW EXPANSION' section with 'LATEST NEWS' and 'NEWS STORIES' lists. At the bottom, there's a 'Clean Air' campaign link and the Lloyd's Register logo with the tagline 'LIFE MATTERS'.

**THE INDEPENDENT**

**BBC** Mobile News Sport Weather iPlayer TV Radio More Search BBC News

**NEWS** LIVE BBC NEWS CHANNEL

Page last updated at 08:29 GMT, Sunday, 30 March 2008 09:29 UK

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## What did go wrong at Terminal 5?

**Almost 300 flights in and out of Heathrow Airport were cancelled during the first five days as teething problems at the new Terminal 5 caused chaos. But what went wrong on that fateful first day?**

The problems appear to be due to a combination of factors.

Some were technical, involving glitches with the sophisticated new baggage set-up, which is designed to handle 12,000 bags an hour.

But other issues were more mundane. Employees arriving for work, for example, could not find their way to the staff car park.

Passengers at T5 have not been getting the expected prompt service

**HEATHROW EXPANSION**

**LATEST NEWS**

- Heathrow plans scrapped
- Plans for a third runway at Heathrow are cancelled by the new government.

**NEWS STORIES**

- Opponents win challenge
- Heathrow expansion plan 'unfair'
- Heathrow expansion 'boost to UK'
- Heathrow expansion e-mails probed
- Protesters plan runway 'fortress'
- Actors stage third runway protest
- BAA to buy 700 homes near runway
- Go-ahead for new Heathrow runway

**FEATURES AND ANALYSIS**

- Fight goes on

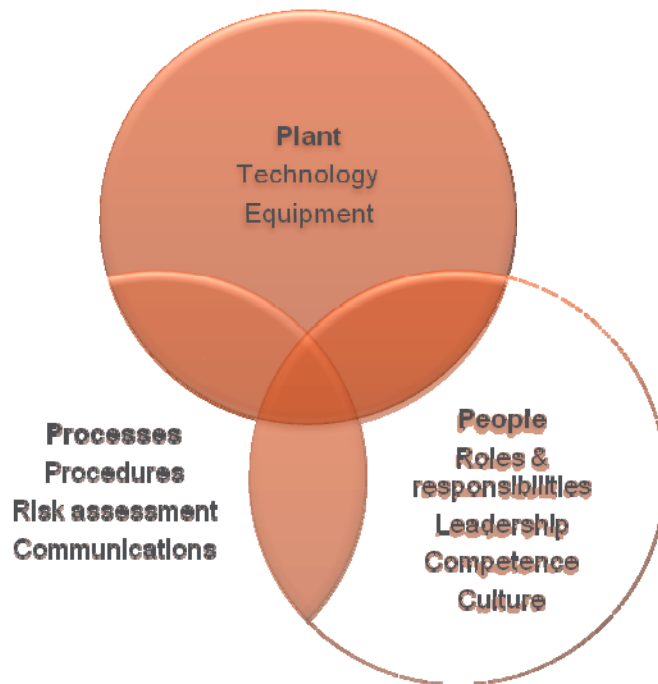
**Clean Air**  
Reject May steps on transport. : campaign r www.clean

**Lloyd's Register**  
LIFE MATTERS

# HFI for the sociotechnical systems

## The Sociotechnical Approach

A system comprises assets, processes and people, and the interactions between these three components.



The interactions between:

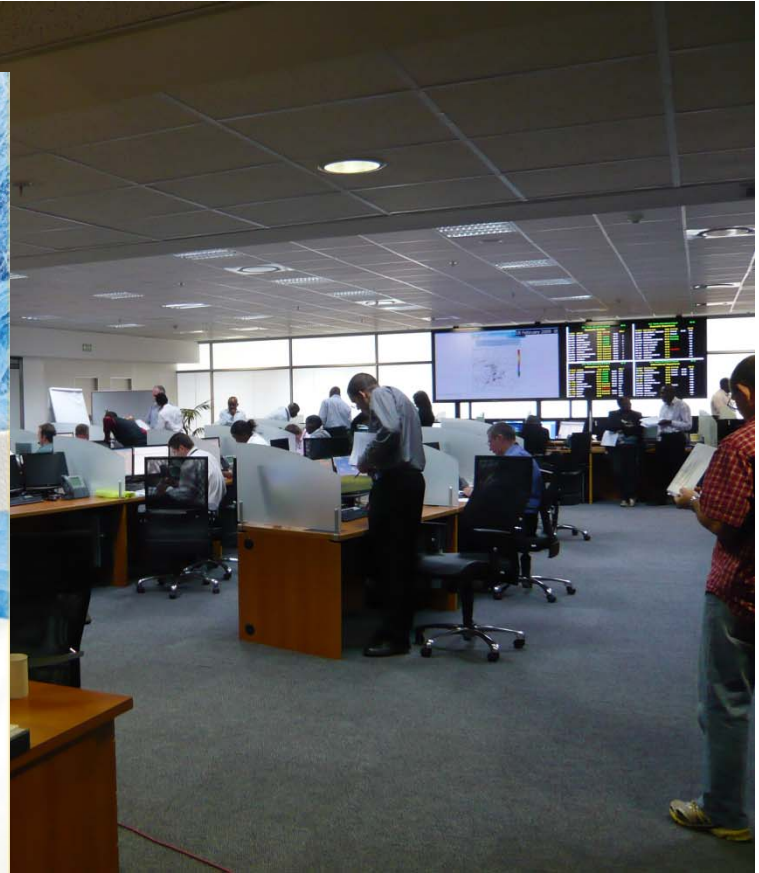
- People and people,
- People and plant, and
- People and processes

Are crucial to the success of the asset.



Lloyd's Register: Human Engineering Services

# Optimise skilled behaviour



# Further objectives for HFI



People: To define a feasible role for people

- HFI helps to specify the role for people, the manpower requirements, job design and training plans.



Plant: To specify usable interfaces and equipment

- HFI helps to define requirements for the usability of workspaces, equipment and control system interfaces and to support their verification during construction leading to lean commissioning and sustainable performance.



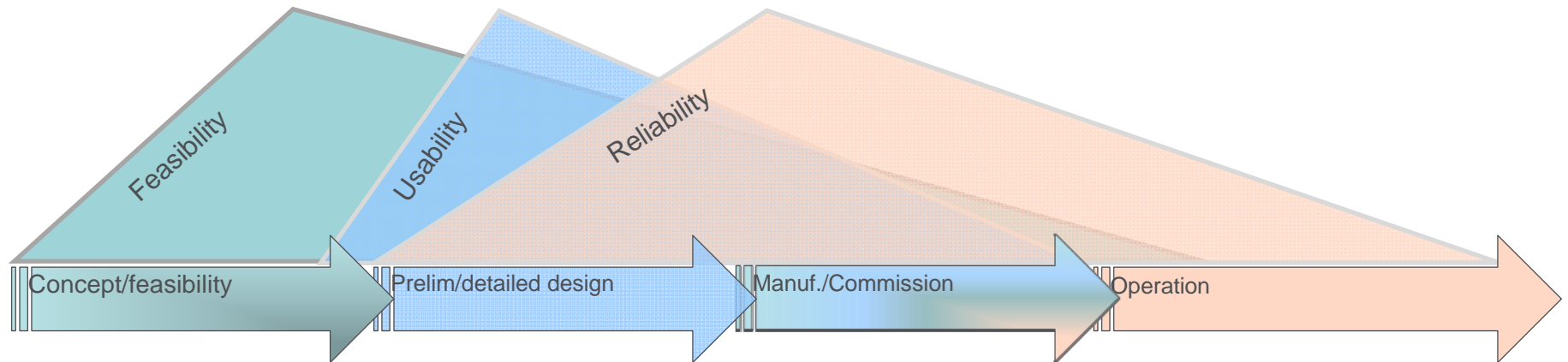
Process: To ensure the reliability of human performance

- HFI helps to assess the human error potential within the system, its processes and procedures, and to identify workplace hazards for personnel; and so to meet the human factors requirements for regulatory compliance as well as providing operational assurance.

# HFI Objectives for project phases

Key questions:

- Is the role of people in the system feasible?
- Are the human-machine interfaces usable?
- Will the required level of human performance be sustainable?
- Will the organisation support the business objectives for the system?



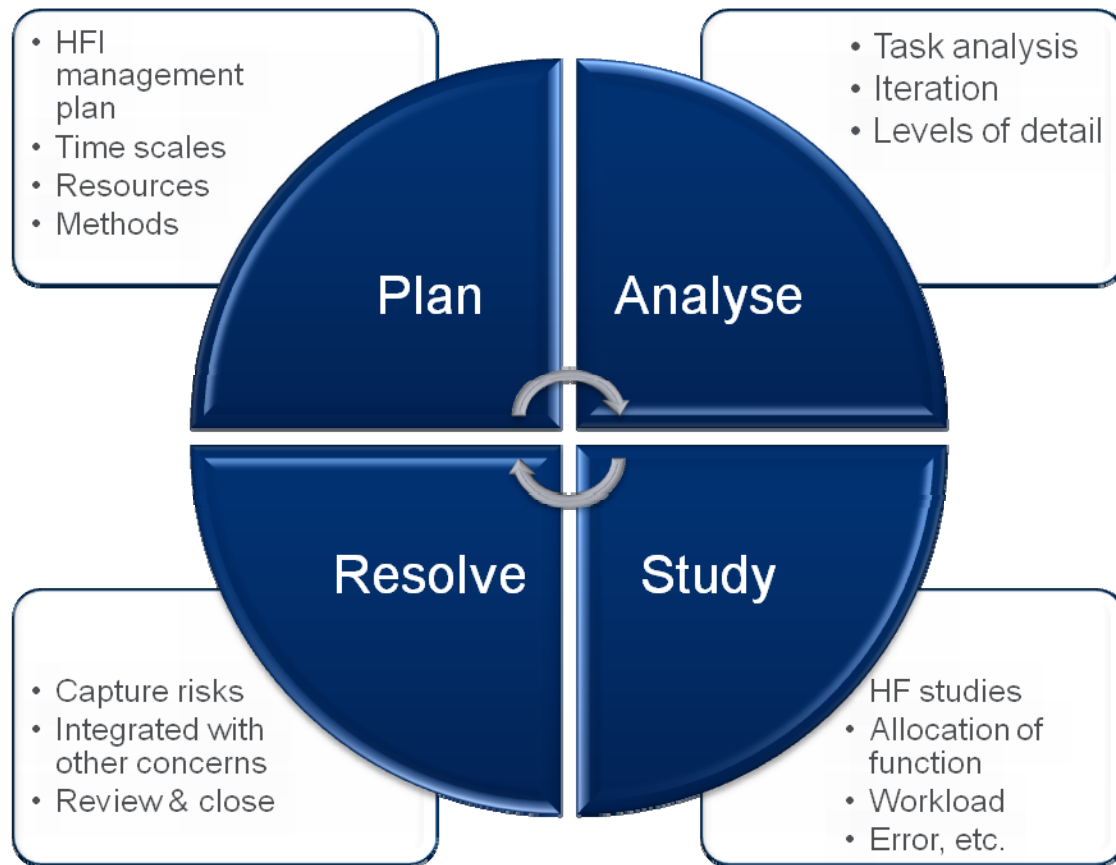
# HFI goals for project phases

System lifecycle or maturity stages	HFI goals
All phases	Primary goal for HFI: The optimisation of skilled behaviour.
Concept definition Feasibility engineering	Main goal 1: To define a feasible role for people.
Preliminary engineering Detailed engineering	Main goal 2: To specify usable interfaces to workspaces, equipment and technology.
Manufacture/fabrication Commissioning Operation	Main goal 3: To assure the reliability of human performance.

# HFI questions related to main goals

HFI goals	Key questions
To define a feasible role for people.	<p>Is there a concept of operations for the role to be performed by people?</p> <p>Has the target workforce been defined?</p> <p>How many people are needed?</p> <p>What will be their jobs?</p> <p>What are the knowledge and skill requirements?</p> <p>Is there a training plan?</p> <p>How will competence be assured?</p> <p><b>Stopping rule:</b> The human role is shown to be practicable</p>
To specify usable interfaces to workspaces, equipment and technology.	<p>Are reference anthropometric data available?</p> <p>What are the requirements for facilities and workspaces?</p> <p>Are the requirements for physical interfaces defined?</p> <p>Is the user population defined?</p> <p>Are the requirements for HCI defined?</p> <p>Is there a plan for testing and acceptance by users?</p> <p><b>Stopping rule:</b> The facilities and interfaces are fit for purpose.</p>
To assure the reliability of human performance.	<p>Have occupational hazards been identified?</p> <p>Is there a risk control plan for hazards?</p> <p>Have all safety critical tasks been identified?</p> <p>Have the opportunities for human error in critical tasks been identified?</p> <p>Has the risk from human error been controlled?</p> <p>Have the requirements for a safety culture been defined?</p> <p><b>Stopping rule:</b> The risks from human error and health hazards are ALARP.</p>

# HFI data management



# Conclusions

- The elements of the sociotechnical system can be optimised
- Each objective has a set of evidence-based questions to ensure that:
  - The role of people will be feasible
  - All facilities and interfaces are fit for purpose
  - The risks from human error and hazards to health are controlled
- The HFI solutions therefore support optimum performance and safety.

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