



The Power of Behaviour: Non-Technical Skills

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Culture and behaviour



- *‘Culture consists of norms of behavior and the underlying shared values that help keep these norms in place’* (Kotter, 2012 Forbes magazine online).
- So changing behaviours is key to changing the culture:
 - operational staff - non-technical skills
 - senior managers – safety leadership

What doesn't work in changing culture?

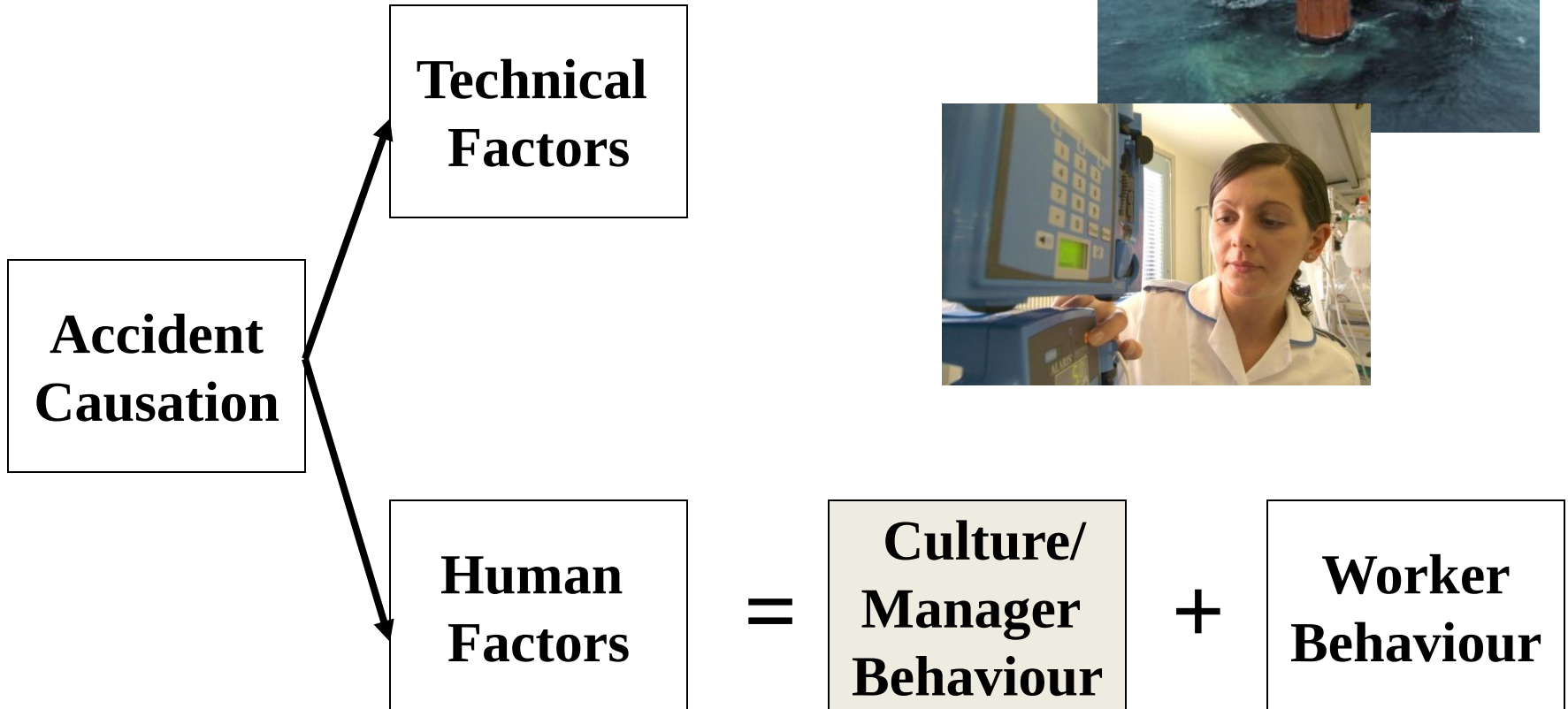
“Some group decides what the new culture should be. It turns a list of values over to the communications or HR departments with the order that they tell people what the new culture is. They cascade the message down the hierarchy, and little to nothing changes.”

(Kotter, 2012)

What works for changing culture?

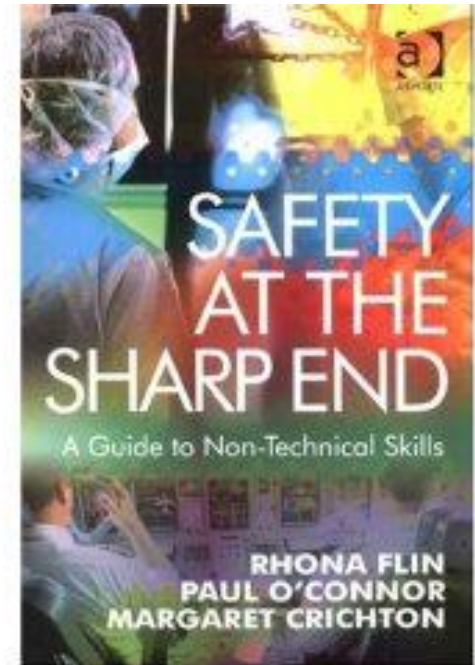
“A powerful person at the top, or a large enough group from anywhere in the organization, decides the old ways are not working, figures out a change vision, starts acting differently, and enlists others to act differently. If the new actions produce better results, if the results are communicated and celebrated, and if they are not killed off by the old culture fighting its rear-guard action, new norms will form and new shared values will grow.” (Kotter, 2012)

Organisational Safety



Non-Technical/ CRM Skills

- Leadership
- Team Work
- Communication
- Situation Awareness
- Decision Making
- Personal Limitations – managing stress and fatigue



Non-Technical Skills

- Term non-technical skills first used in European civil aviation (1990s).
- *‘Cognitive and social skills of flight crew members in the cockpit, not directly related to aircraft control, system management, and standard operating procedures’.*

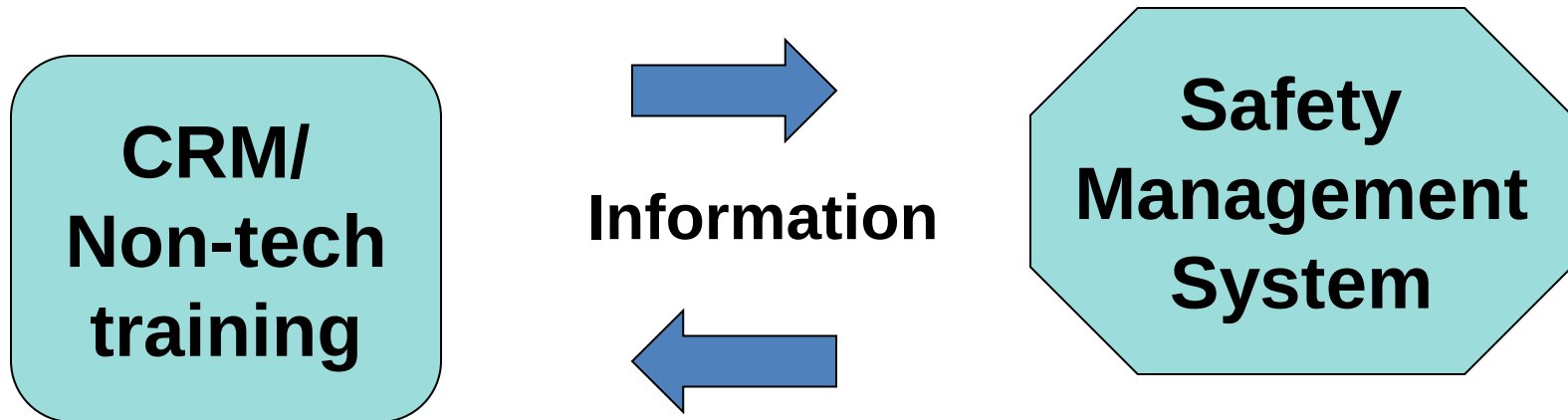


Non-technical skills are the cognitive and social skills that complement technical skills, and contribute to safe and efficient task performance.

Aka: Crew Resource Management (CRM) skills/ Safety competencies

Formally trained and assessed in UK aviation and nuclear industries

Linking CRM training to the SMS



CRM: learning from accidents

Air France AF447, Airbus 330
Rio de Janeiro to Paris
1st June 2009
Crashed into Atlantic Ocean
Loss of 228 passengers and crew



The design of training must be such that it generates surprise and startle to teach pilots how to react and work in stressful situations.

Startle Effects

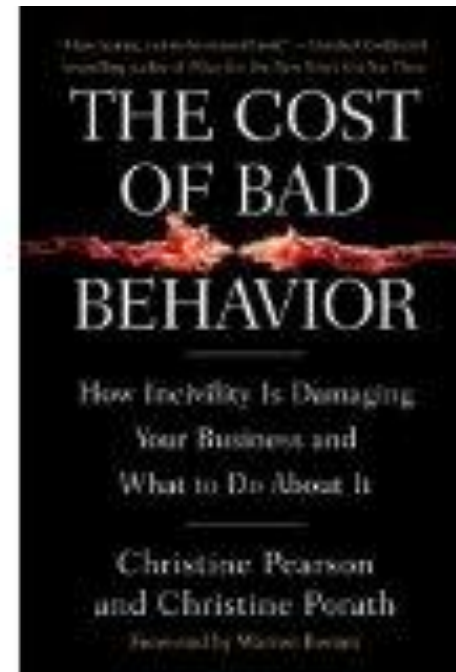


- Distinction: startle/ surprise with fast recovery and startle with associated fear response
- High emotional component from fear disrupts cognition
- Ongoing research into this topic applied to pilots, interviews, simulator studies, training interventions.

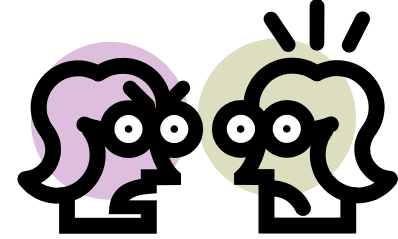
Martin, Murray & Bates, 2011

- Ten week study at New Zealand airline
- Pilots encouraged to discuss novel emergency scenarios during cruise phase of flight.
- Questionnaire with 57 respondents showed that most of them did this occasionally (34) or regularly (15).
- Most said this raised their expectation level for surprise and they had learned new information
- *Aeronautica* , 1, 8-22

- Effects of emotion on cognition (attention, memory, decision making, problem solving)



Effects of Witnessing Rudeness

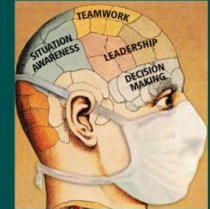


- In an experimental study, two groups of students were recruited to complete a number of personality and cognitive tests.
- A (confederate) student arrived late and was spoken to rudely by a professor or a peer.
- The group who witnessed the rudeness performed significantly worse on cognitive tasks than the control group.
- Being the **witness** of rude or aggressive communication impairs cognitive performance.

CRM/ NTS other industries

- Maritime - BRM/ ERM new IMO regulations
- Nuclear power plants
- Rail
- Mining (Australia)
- Emergency Services

- Energy Institute Report (2013 in Prep)



NOTSS skills taxonomy v1.2

Categories

Elements

Situation Awareness

Gathering Information
 Understanding Information
 Projecting and anticipating future state

Decision Making

Considering options
 Selecting and communicating option
 Implementing and reviewing decisions

Communication and Teamwork

Exchanging information
 Establishing a shared understanding
 Co-ordinating team

Leadership

Setting and maintaining standards
 Coping with pressure
 Supporting others

NOTSS rating form

Hospital Trainer name Date

Trainee name Operation

Category	Category rating*	Element	Element rating*	Feedback on performance and debriefing notes
Situation Awareness		Gathering information		
		Understanding information		
		Projecting and anticipating future state		
Decision Making		Considering options		
		Selecting and communicating option		
		Implementing and reviewing decisions		
Communication and Teamwork		Exchanging information		
		Establishing a shared understanding		
		Co-ordinating team activities		
Leadership		Setting and maintaining standards		
		Supporting others		
		Coping with pressure		

* 1 Poor; 2 Marginal; 3 Acceptable; 4 Good; N/A Not Applicable

- 1 Poor Performance endangered or potentially endangered patient safety, serious remediation is required
- 2 Marginal Performance indicated cause for concern, considerable improvement is needed
- 3 Acceptable Performance was of a satisfactory standard but could be improved
- 4 Good Performance was of a consistently high standard, enhancing patient safety; it could be used as a positive example for others
- N/A Not Applicable

NOTSS evaluation: Reliability testing

Method

44 consultant surgeons in Scotland trained to use NOTSS and then they rated the behaviours of operating surgeons in 7 video scenarios

Results: *rwg* reliability level

- Situation Awareness & Decision Making: Acceptable
- Communication & teamwork/ Leadership: Good



Yule et al (2008) *World J Surgery* 32, 548-556

Yule et al (2009) *ANZ J Surgery* 79, 154-160

Implementation

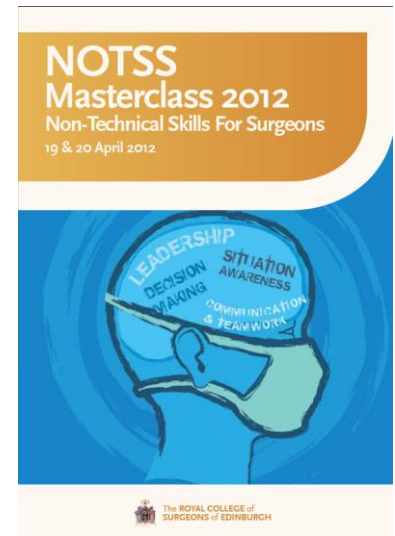
NOTSS Masterclass: 2 days theory/practice

Australian NOTSS training courses

Controlled trial in Japan

“NOTSS in a box” online training for UK ISCP trainers

Feedback in theatre/ simulator, self- reflection, incident investigation, Morbidity and Mortality analysis



How to avoid mistakes in Surgery

Human Factors and Safety

BBC2 Horizon

Thursday 21 March 2013 9pm (UK time)

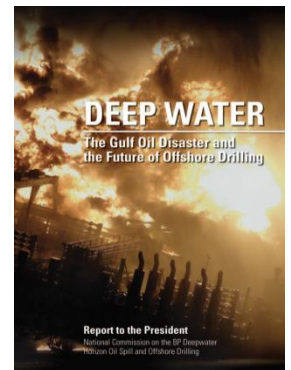
Deepwater Horizon – human factors?

- Situation awareness – of level of risk/ time, understanding of the well, meaning of signals, anticipation
- Decision making – for the well, for the emergency response, between beach and rig
- Fatigue and stress factors?



Deepwater Horizon – human factors?

- Team - coordination, communication; shared ‘mental model’, speaking up
- Leadership – supervisors, managers on rig and on the beach.
- Risk calibration of leaders.
- Companies’ culture/ rig safety culture.



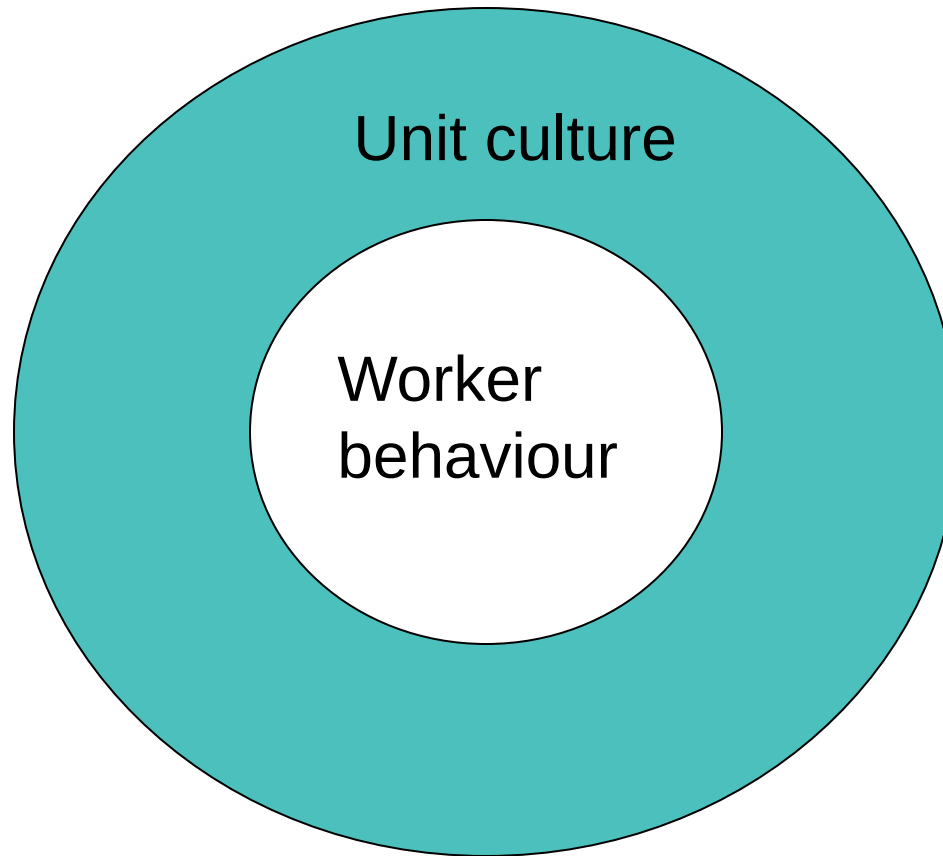
Aim: to develop a **training syllabus**
covering a range of **non-technical skills**
that are considered to be particularly important
for safety and efficiency **in well operations.**

The output will be a recommended syllabus for **Well Operations Crew Resources Management (WOCRM)** training and assessment. This is intended to be used by global providers – IADC and IWCF.

Once it is approved by OGP, the syllabus will be recommended to IADC and IWCF as the basis for development of training courses within the existing Well Certification training structure, to develop the required WOCRM skills and awareness.



Is the culture reinforcing or toxic for safe behaviours/ NTS?



Training CRM (NTS) skills

- UK operating theatre teams

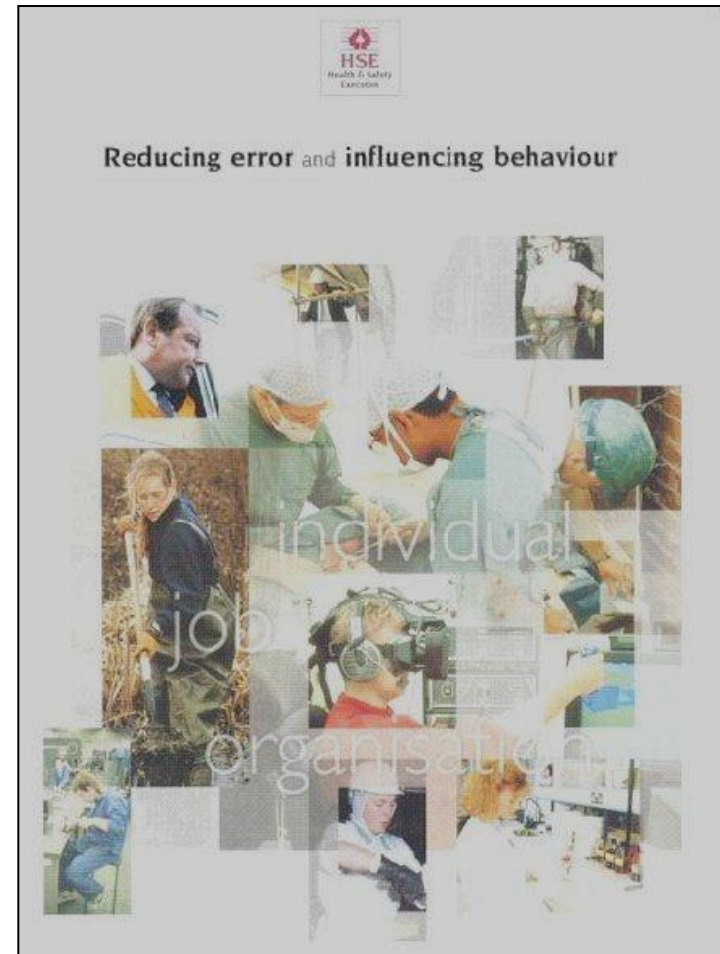


- Investigators noted that “considerable cultural resistance to adoption was encountered, particularly among medical staff”.

McCulloch, Mishra, Handa, Dale, Hirst, Catchpole. (2009) The effects of aviation-style non-technical skills training on technical performance and outcome in the operating theatre. *Qual Saf Health Care*, 18:109-15.

Organisational factors associated with a safety culture (HSE, 1999)

- Senior management commitment
- Management style
- Visible management
- Good communication between all levels of employee [management action]
- A balance of health and safety and production goals [management prioritisation]



‘..a single overarching failure – a failure of management’ (p90)



“When you became CEO of BP, you promised to focus "like a laser on safe and reliable operations.””



"We have begun to change the culture."

"It is a thing that I talk about every time I talk internally or externally."

"I wasn't part of the decision-making process... I wasn't involved in any of the decision making... I simply was not involved in the decision-making process"

Waldman, Javidan and Varella (2004)

observed that most management experts support the notion that senior managers “have a substantive effect on the overall performance of the firms they lead. However, questions remain as to exactly **how such effects come about (and) little empirical evidence exists** regarding the performance-stimulating potential of CEOs,” (p.356).

Minimal research evidence

- Management commitment is one of the main drivers of employees' safety performance (Michael, Evans, Jansen & Haight, 2005)
- “[...], managers can change and improve existing corporate culture by establishing safety – recognisable for all staff members – as high priority. ” (German Federal Bureau of Aircraft Accidents Investigation, 2004)
- Only 5% of the existing leadership literature focuses on senior level management (Horn & Zaccaro, 2003)
- In the safety research literature senior managers are a ‘neglected species’ (Flin, 2003)

Safety Intelligence of Senior Managers



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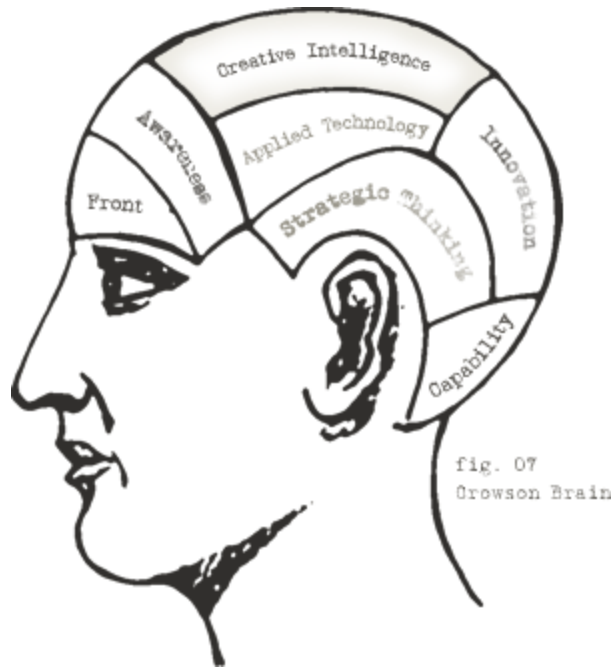
Prof. Kathryn Mearns

Prof. Rhona Flin

Prof. Barry Kirwan



What is Safety Intelligence?



- Skills and traits of senior managers in relation to safety
- Abilities and Understanding regarding
 - Information
 - Safety risks to the organization
 - Decision making

Safety Intelligence

(Fruhen et al, under review)

Interviews with 60+ ATM senior managers

- *Problem Solving*
- *Safety Knowledge*
- *Social Competence*

Eurocontrol White Paper (2013 in prep)





Senior managers and safety leadership

Literature review, 59 interviews, analysis of major accident reports.

Isabella Roger, Rhona Flin and Kathryn Mearns,
University of Aberdeen

PhD Studentship sponsored by the Energy Institute

Safety Leadership Behaviours

(Rogers, Flin & Mearns, in prep)

1) Maintaining risk awareness

- Promotes exchange safety information
- Monitors the reality of operations

2) Leading by example

- Incorporates safety into decision making
- Acts as safety role model

3) Setting and managing standards

..... *Examples of good and poor behaviour*

Conclusion



- A Crew Resource Management/ Non-Technical Skills approach focuses on behaviour at an operational level – changing norms of behaviour – changing culture
- Need to also focus on managers' behaviours, especially senior managers' safety leadership, to reinforce culture change from the top.

Further information

- r.flin@abdn.ac.uk
- www.abdn.ac.uk/iprc

lists of projects and papers and reports