

HUMAN FACTORS UPDATE

AGSC

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Brett Dorney
Senior Vice President
Member AGSC

Marsh

Contact details

- Brett Dorney SIRM, Cert CII, MRAsS
- Senior Vice President, Aerospace: Europe and Africa
- Aviation Risk Advisory Solutions Group
- Human factors and behavioural risk management speciality
- Degree in Occupational Psychology, Certificate in Risk Management
- Initially HR, Training, then Risk @ Liberty Life (SA), Lloyd's of London, Marsh, exclusively in Aviation since 2005
- Tel: +44 20 7357 5095
- Mobile: +44 7825 7825 63
- Email: brett.dorney@marsh.com



Human factors update

Is this an organisation you know?

- HF? We've done that...
- We published our HF procedures
- We trained everyone in HF
- We comply with all current regulations
- Our regulator audited us and it didn't result in any findings regarding our HF programme
- We fix problems as they occur...



Human factors update

Agenda

- What are the ramp issues?
- The regulatory position?
- What are the HF underpinnings we need to know?
- HF: where to next?

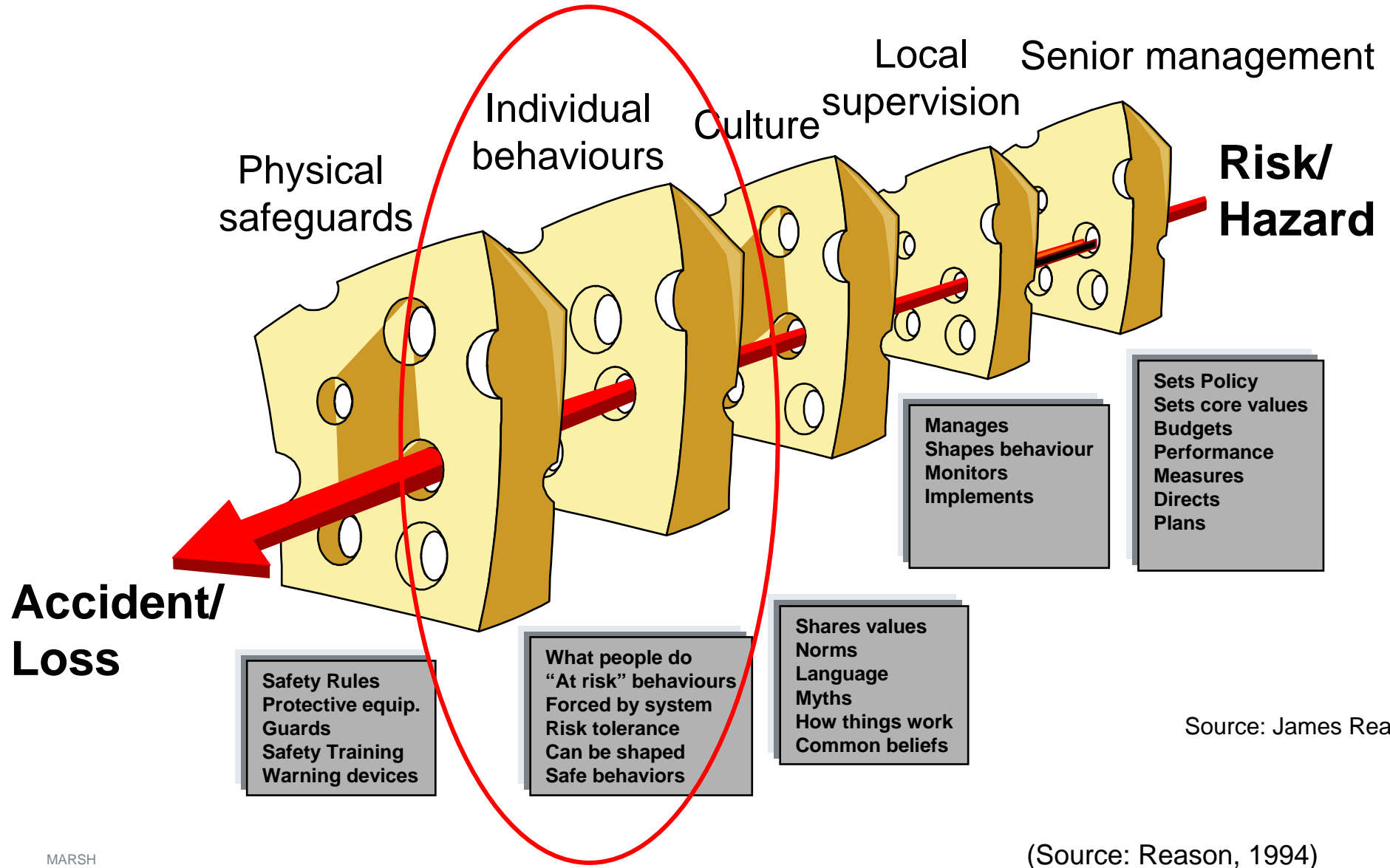
The ramp issues

The commercial imperative

- Variable pax demand globally, particularly premium travellers
- Carriers outsourcing non-core activities, especially ground handling, especially outside home territories
- Carriers under fuel and labour cost pressures, are reporting losses, imposing tighter performance contracts on Ground Service Providers
- GSPs struggle with narrow margins and cost-sensitive airlines still seeking to drive out all other sources of cost..... through skewed SGHAs?
- Damage on the ground estimated in 2003 as a \$4billion annual cost to the sector (Flight Safety Foundation/IATA)...estimates @\$10billion now
- Now the era of expensive complex composite materials in modern aircraft means this cost will grow exponentially (A350, B787)

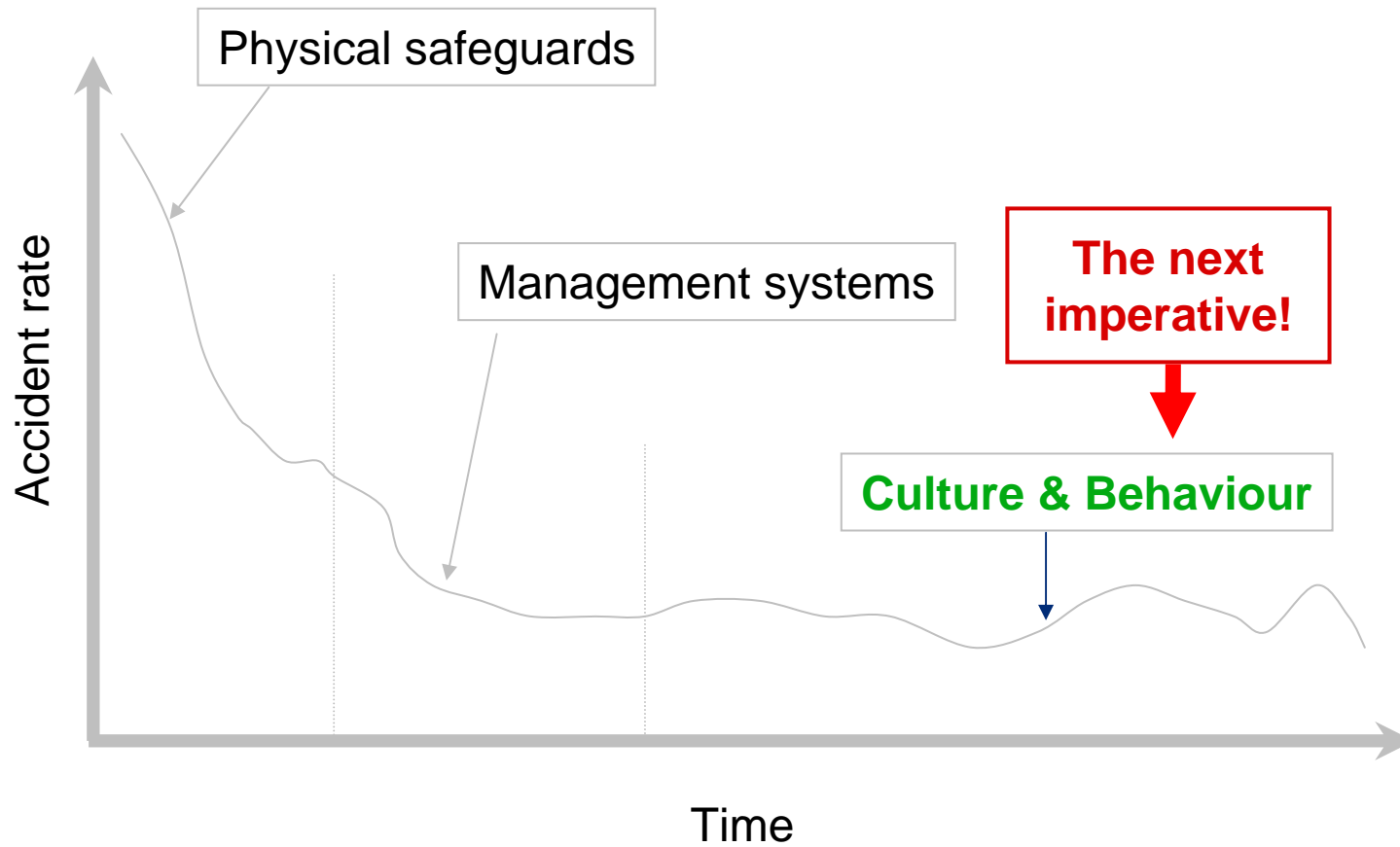
The ramp issues

How does risk become loss?



The ramp issues

The safety management journey

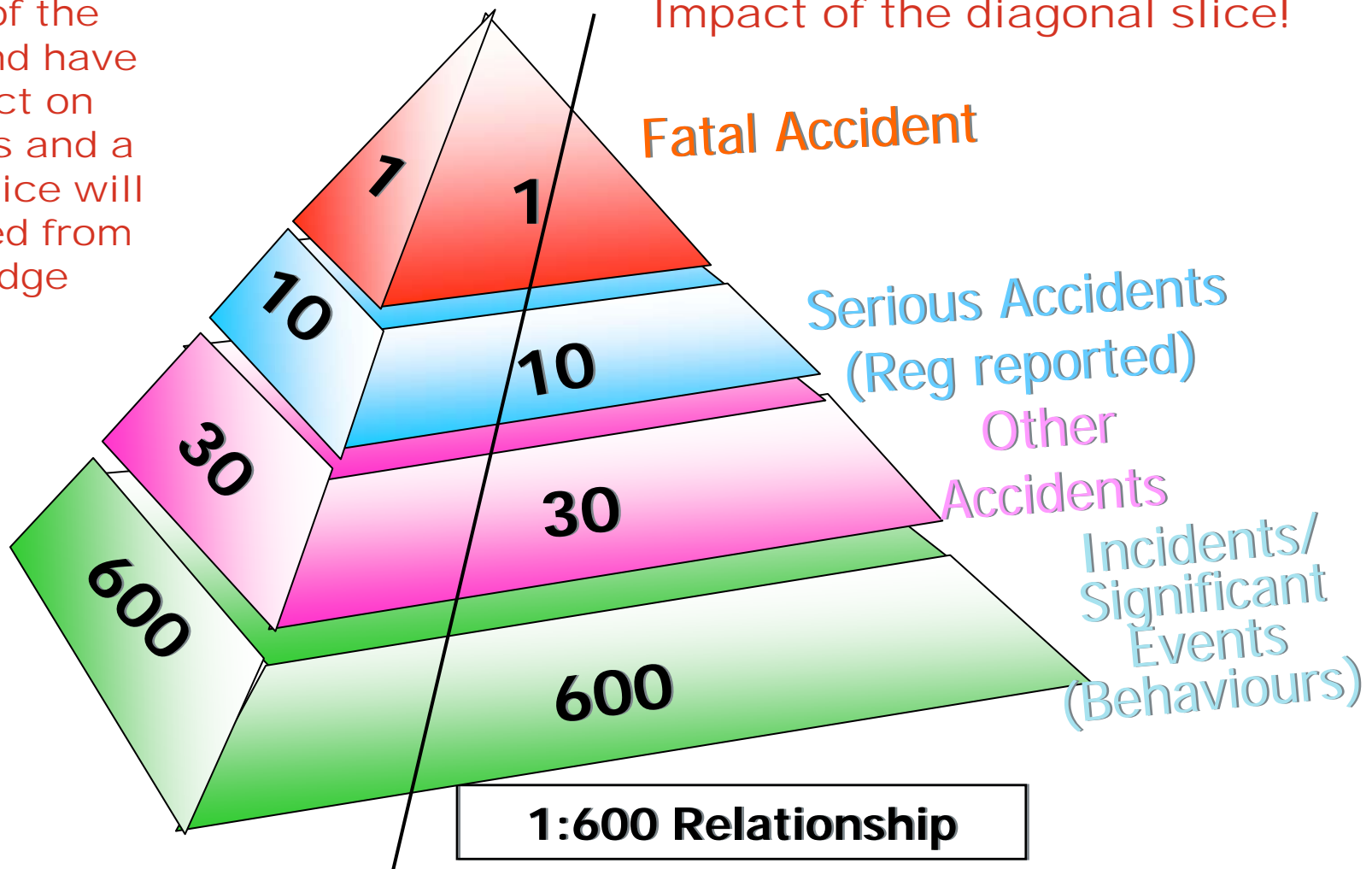


The ramp issues

Accident triangle – what does it tell us? Heinrich ratio

Focus on the bottom of the triangle and have an impact on behaviours and a diagonal slice will be removed from the wedge

Impact of the diagonal slice!

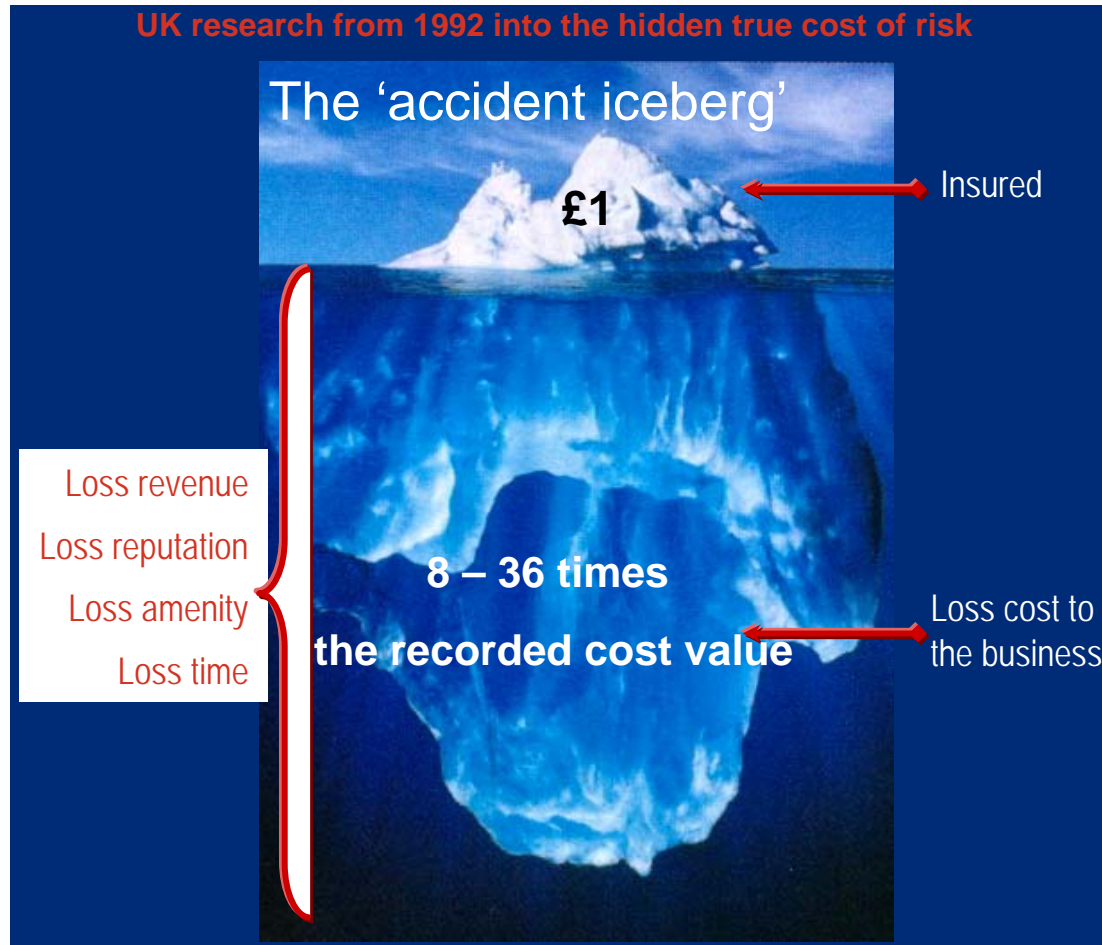


The ramp issues - total cost of risk (TCOR)

The hidden multiplier: $TCOR = \text{Direct} + (\text{Direct} \times 8-36)$

“Doing nothing is all about a race to the bottom of the iceberg” – MD of leading Aviation Services Company

25 May 2010



- Insured/direct cost
 - injury
 - ill-health
 - damage
- Uninsured/indirect costs
 - Uninsured uninsurable damage
 - Delays
 - Financial / contractual penalties
 - Lost experience / expertise
 - Legal costs
 - Loss of customer confidence
 - Investigation time / costs
 - Loss of reputation
 - Management time

One national flag carrying airline computed their multiple as 24X

The ramp issues

Specific examples of direct costs reported by existing clients to Marsh

- Rising number of lost time injuries
- Increasing frequency of aircraft damage by GSE
- Ground damage – vehicles and equipment
- Repair time – aircraft/GSE out of action
- Damaged baggage reimbursement costs
- Rising volume of claims below the insurance deductible
- Carriers seeking recovery for losses incurred (subrogation)



.....COST!

The ramp issues

Cost of risk vs investment in any HF risk management programmes

Annual cost of incidents
\$2000
per annum per employee
X
200 employees

Direct cost = \$400,000

Cost of risk is 8 – 36 times
Even at low end eg 10
times

Indirect cost of risk \$4m

Total COR = \$4.4m



Investing \$100,000 in a risk
management programme

Assume cost of incidents per annum
reduces by 10%

Net benefit as a result = \$340,000 saving year one alone

If hold self insured retention/deductible then saving is yours!

NB: Your insurer might contribute towards any HF programme you implement!

Regulatory position

CAA UK position on human factors for ground operations

- CAA Guidance all relate to Mx Human factors
 - CAP 715 – Intro to A/C Mtce Eng HF
 - CAP 716 – Avn Mtce HF EASA 145
- Human Factors Groups in UK and Europe
 - RAeS HFG
 - UK CHIRP MEMS
 - European HF Advisory Group
- Co-sponsor with FAA of Annual Maintenance and Ramp HF Symposium
 - 22nd conference 2010 was in UK at RAeS
- Gretchen Burrett, ex NATS now CAA Group Director Safety Regulation sees integrating HF into SMS as a global issue and requirement (predictive). Increased individual awareness of human factor issues alone will not be effective in combating projected increases in accidents. A systems approach to human error is required!

Jim Reed

Head of Human Factors and Review Team
Leader.

Civil Aviation Authority
Safety Regulation Group
Group Safety Services

Aviation House

Gatwick Airport South

West Sussex

RH6 0YR

Telephone: +44 (0)1293 573503

Mobile: +44 (0)7823 326687

Underpinning HF knowledge

What influences human performance on the ramp?

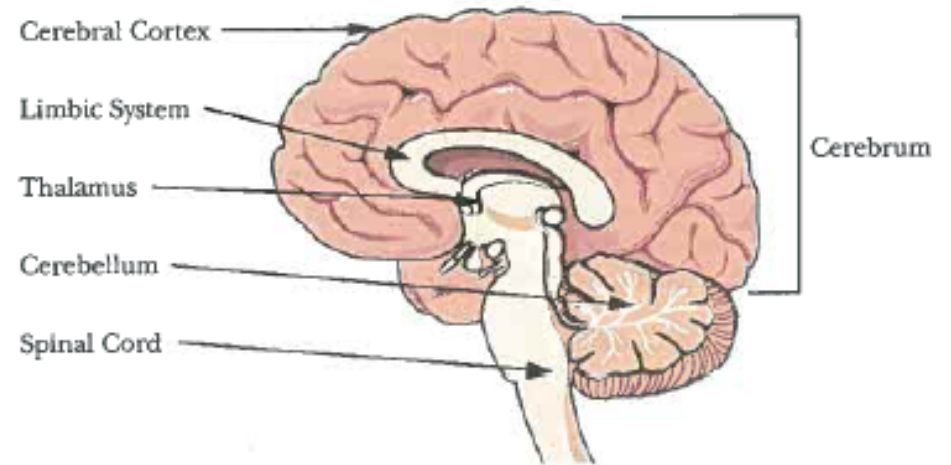
- Equipment design and maintenance (physical safeguards)
- Ramp environment and context (incl. airport influence)
- Organisational factors (SMS, training, management commitment)
- How ramp errors or events are handled (investigation and just culture)
- Ramp operatives themselves (the human factors)

Underpinning HF knowledge

Human physiology

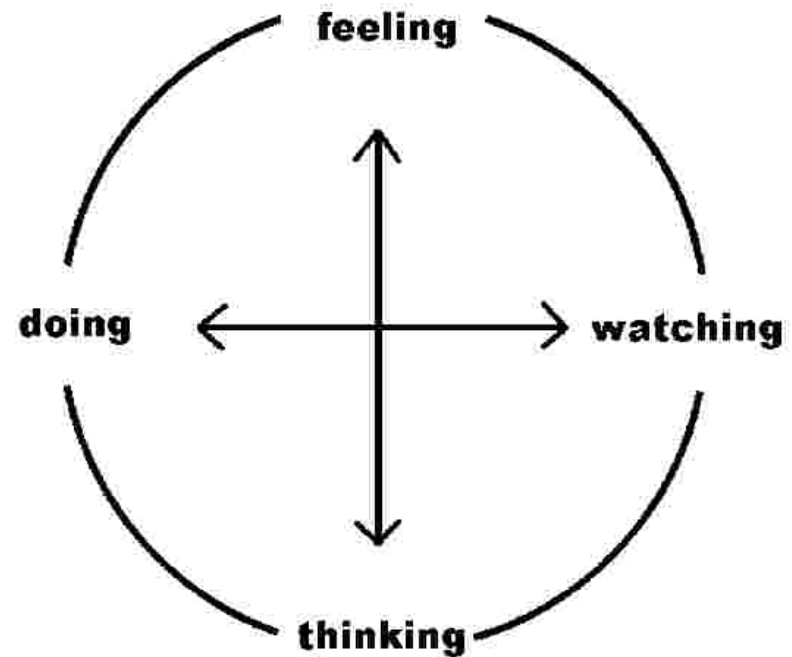
- Brain
 - 4 main components:
 - Cerebellum (balance, co-ord)
 - thalamus (sense organs)
 - limbic system (emotions, seq tasks)
 - cerebrum (thinking, memory, perception)
 - left hemisphere (from above): speech, writing, language, calculation, right visual field
 - right hemisphere: spatial orientation, non-verbal activity, left visual field
- Body: what body takes in; what body is subjected to; how body feels
- Eyes: the tricks our eyes play on us
- Ears: sensitivity of ear and hearing; effect on communication

THE FOUR MAIN COMPONENTS OF THE BRAIN



Underpinning HF knowledge Learning styles

- Pragmatist – learn by feeling
- Reflector – learn by watching
- Theorist – learn by thinking
- Activist – learn by doing



Underpinning HF knowledge

Human fallibility

- Human error – inadvertent action, inadvertently doing other than what should have been done; slip, lapse mistake
- At-risk behaviour – behavioural choice that increases risk where risk is not recognised or is mistakenly believed to be justified
- Reckless behaviour – behavioural choice to consciously disregard a substantial and unjustifiable risk

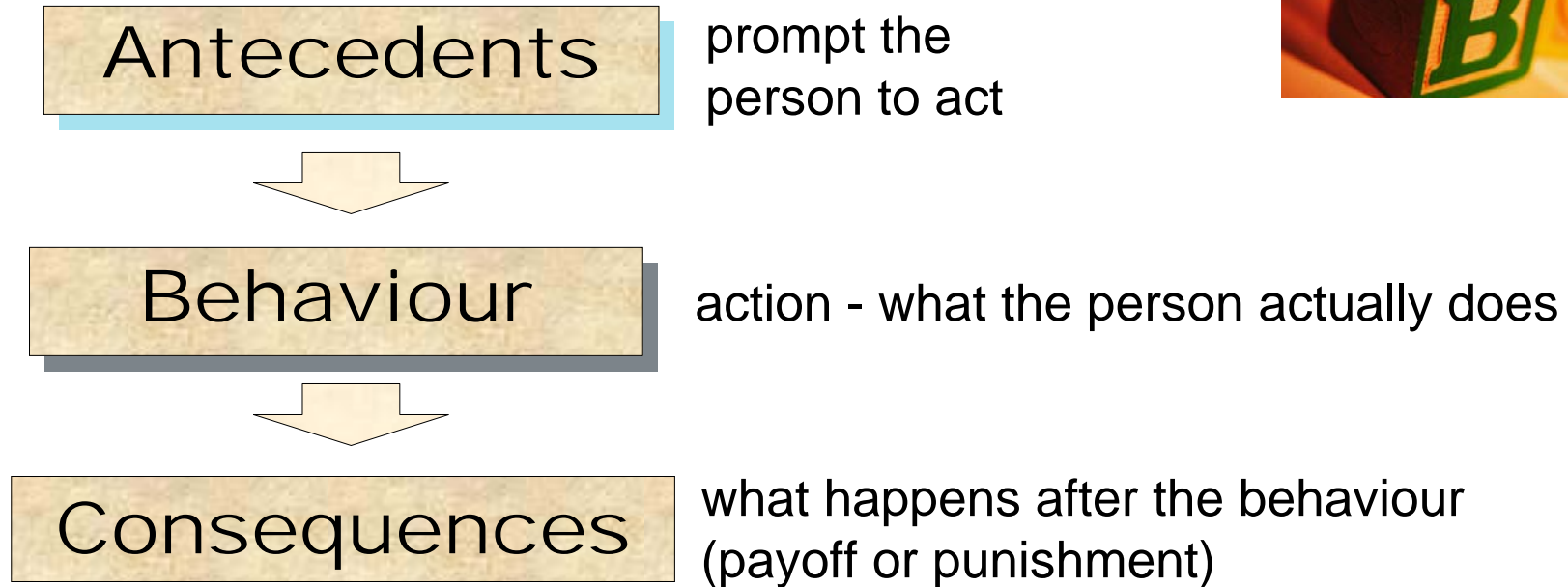
Underpinning HF knowledge

Gordon DuPont's "dirty dozen" common causes of HF errors

1. **Complacency** – overconfidence from repeated experience on a specific activity
2. **Lack of knowledge** – failure to have training, information, and/or ability to conduct a task
3. **Lack of teamwork** – failure to work together to complete a shared goal
4. **Distraction** – an unlimited number of possible events/conditions that interrupt one's ability to focus on a specific task
5. **Fatigue** – physical or mental exhaustion threatening work performance
6. **Lack of resources** – Lack of people, equipment, documentation, time, parts, etc to complete a task
7. **Pressure** – external or internal forces demanding high-level job performance, real or perceived
8. **Lack of assertiveness** – failure to speak up or otherwise declare concerns about instructions /orders or actions of others
9. **Lack of communication** – failure to transmit, receive or provide sufficient feedback in order to complete a task
10. **Norms** – standard practices, usually undocumented, adopted by an organisation or group
11. **Stress** – physical or mental condition resulting from external forces. May affect health and quality of work
12. **Lack of awareness** – failure to see a condition, understand what it is, and predict the possible results.

Underpinning knowledge

Behavioural modification ABC Model



Prior consequences have the greatest influence on future behaviour

Source: Tavistock Institute

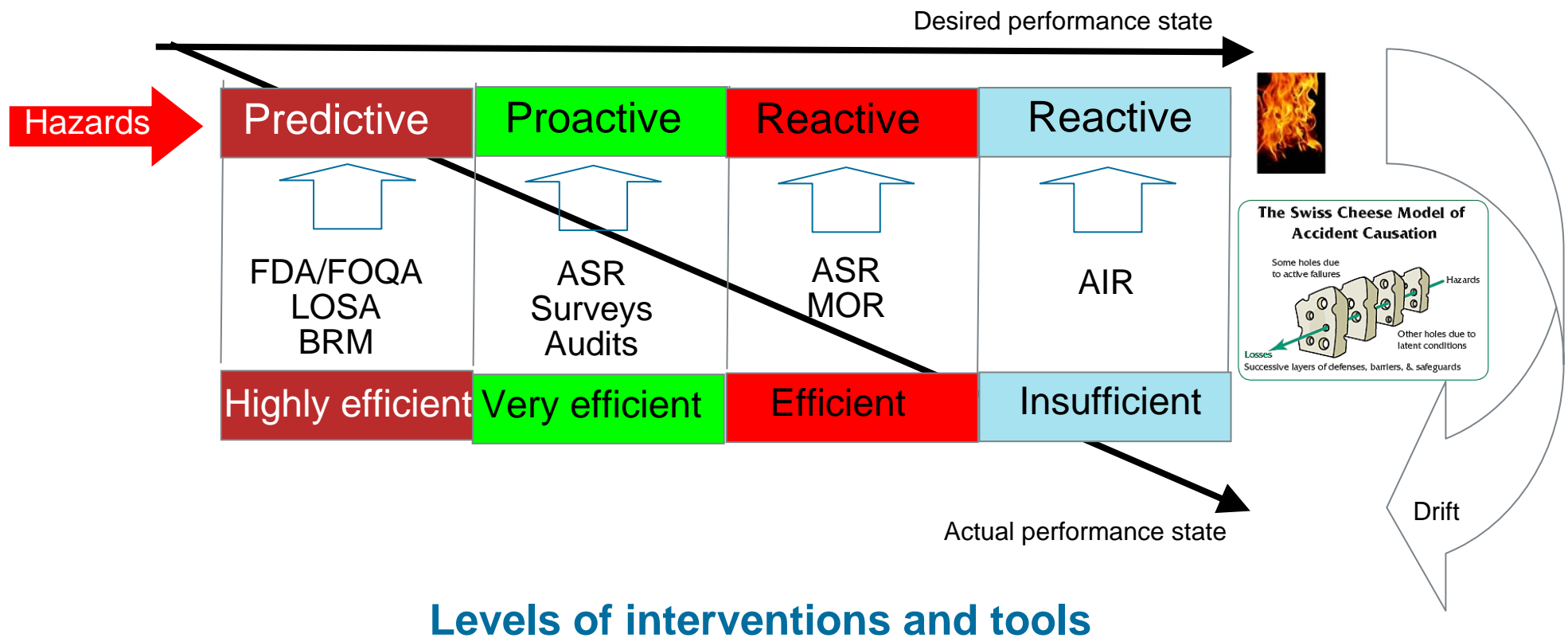
Underpinning principles

Behavioural risk 101

- Continuous improvement process applied to safety (SMS compliant)
- Importance of identifying and communicating SMART safety improvement goals, establishing a baseline and monitoring progress (data-driven!)
- Targeting the most critical safety behaviours (7 ± 2) (George Miller 1956)
- Power of peer to peer feedback to change behaviour
- Behavioural modification – change behaviours to shift attitude
- Collect observation data to know “how we are doing” (data-driven!)
- Regular communication of the results to keep people motivated
- Importance of recognition and reinforcement of positive
- Safety owned by everyone in the workforce

Understanding the issues

The value of incorporating human factors



Levels of interventions and tools

Our HF challenge

Where are we now in relation to HF on the ramp?

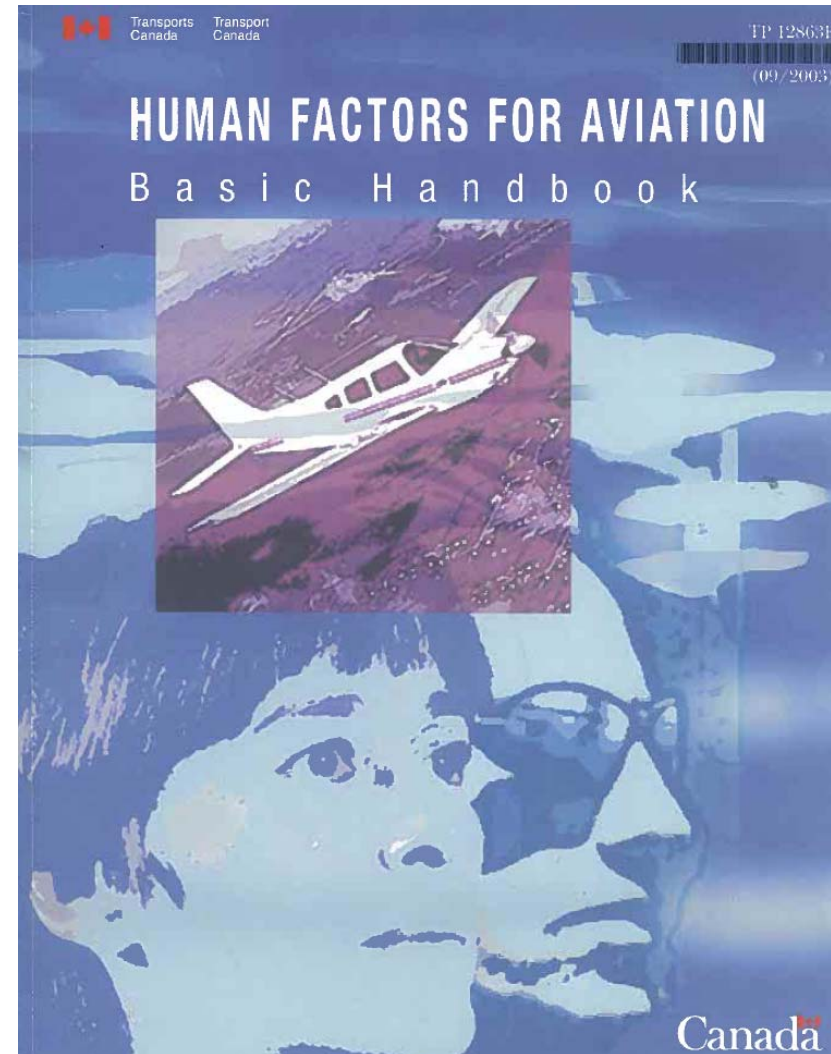
- Driven out of progress made in Flight Operations and then Maintenance due to some significant aviation accidents
- No specific ramp focused HF regulation (yet?) so not progressed uniformly
- Treated as training initiative (legacy from CRM in Flight Ops and EASA 145 for Maintenance Operatives!)
- Not a clear enough view on what good looks like for aviation operations and in particular for ground operations
- HF exists (sometimes in some organisations) in the classroom but not necessarily in the workplace
- So the challenge remains to implement it and find a systems (SMS) conformant data-led approach to ensure it is effective on basis what gets measured, gets done!
- Key messages from 2010 RAeS HF conference for safety focused personnel like us:
 - identify the real cost to the business of NOT tackling human factors
 - Talk in language the FD/CFO will understand - find the financial KPI's!
 - Hold yourselves and any business partners to account for cost improvement

To follow at the December 2011 meeting...

- Line Operations Safety Audit (LOSA Ramp)
- Ramp Safe ® - the Marsh Behavioural Risk Management solution

Sources

- **Human Factors for Aviation**
- Basic Handbook
- 2003
- Air Canada Human Factors Project Team
- Prepared for Transport Canada
- ISBN: 0-660-16655-0
- Also available:
 - Advanced Handbook
 - Instructor's Guide
- **<https://hfskyway.faa.gov>**





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