Shiftwork offshore; (Bentley Priory 2002)

Robert Miles

Offshore Safety Div’n

HSE

bob.miles@hse.gsi.gov.uk

Who?

- Mission: “To ensure that risks to people’s health and safety from work activities are *properly controlled*.”
- Land based regulator for occupational health and safety. Rail, Nuclear, Mines, Hazardous Installations (inc Offshore), construction; FOD (Field Ops Div’n)
- Interfaces: CAA, MCA, AAID, MAIB, (?)AIB, Local Authorities
- School trips, bungee jumps, call centers, Police/Fire Service, MOD, motor-sport?
- In my opinion we are at our best with things that don’t move….

Regulation?

- No Regulation
- Self Regulation
- Government Regulation
- *Prescriptive* legislation
- *Goal setting* legislation

When to Regulate

- Does it maintain or improve standards of Health and Safety?
- Is it enforceable?
- Is there Government or Parliamentary pressure?
- Is there Public pressure

The regulatory environment:

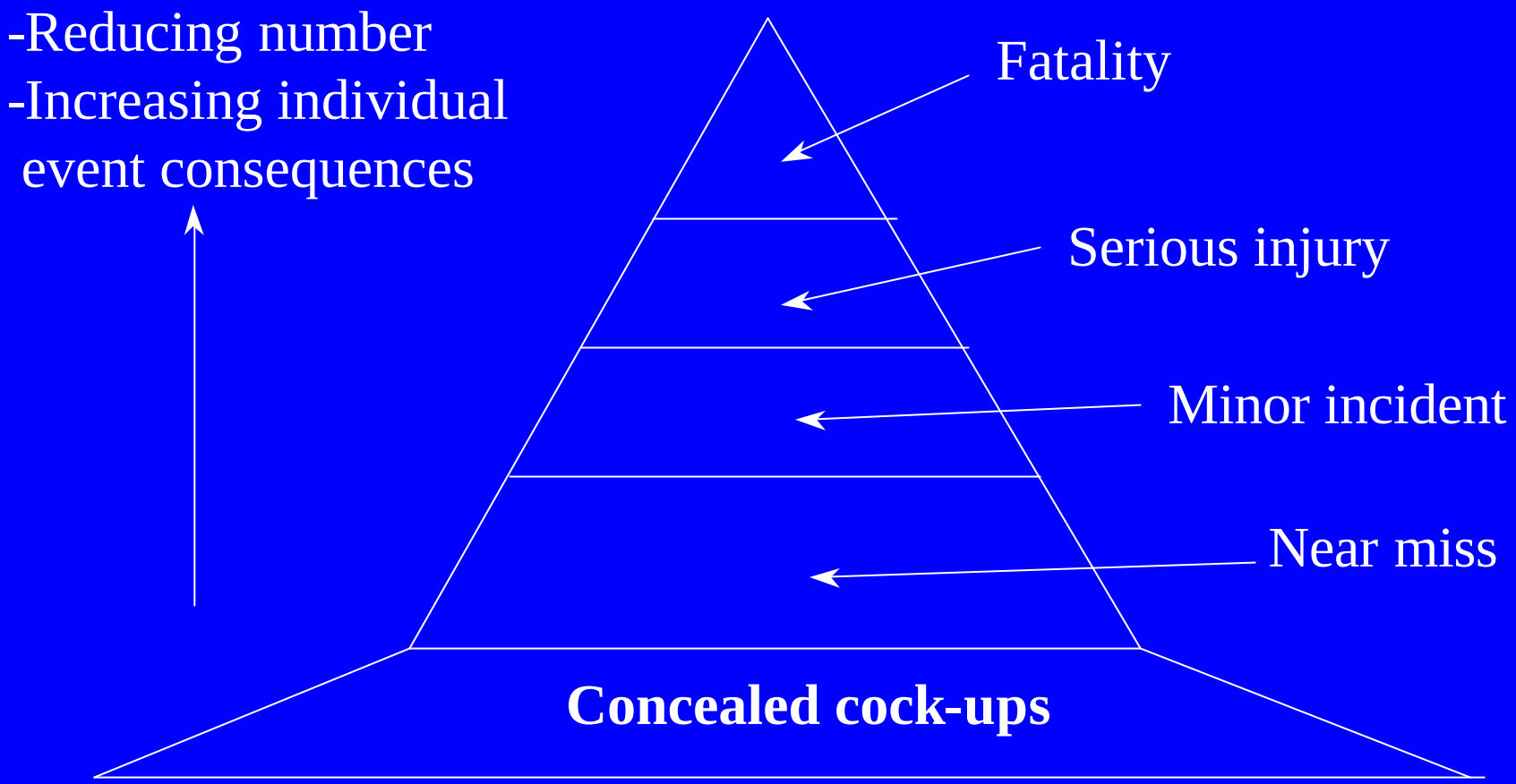
- Regulation is seen as “costly”
- HSE does not regulate working hours
- HSE regulates health and safety by means of GOAL SETTING regulation
- Risks must be controlled, they must be “ALARP”
- We operate within a hierarchy of instruments:

Legal Architecture

- Health & Safety at Work Act 1974
- Regulations
- Approved Codes of Practice
- Guidance (HSG 65: Successful H&S Management, HSG 48 Reducing error: influencing behaviour)
- (Research)
- Information

Why shiftwork?

- Little evidence of an *evidence-based* or *risk based* approach to work hours
- Much ‘real world’ evidence of the negative effects of fatigue (driving, Selby, NHS,)
- Potential affects for everyone
- Implications for health, safety and *performance*
- Occupational safety and *major hazard*


-Reducing number
-Increasing individual event consequences
Fatality
Serious injury
Minor incident
Near miss
Concealed cock-ups

Why shiftwork offshore?

- impinges on the health and safety of virtually every person working offshore.
- is a very significant feature of offshore work which has slipped through the *risk assessment* and *safety management* nets.
- no current scientific basis for the diversity of shift patterns (remember ALARP)
- 12 hours x 14/21 days (84 hours+overtime)

Incident distribution

- Major injuries form 15% of the total over the 0-7 days, rising to 30% at 14 days and 40% at 21 days for drill floor accidents.
- Maintenance accidents show an even more marked distribution with a 10% ratio at over the first 14 days rising sharply to 40% over the third week and beyond.
- 20 well control incidents, very marked seasonal effect 12-12 pattern

Benefits

- small improvements = significant benefits in performance and safety (cost neutral?)
- +ve industry culture and structures: UKOOA, IP, TU
- controlled environment, no external “contamination”.
- 2 x 84 hour working week is a significant “outlier” - Working Time Directive
- separation of offshore from inappropriate (wrong) onshore derived data and advice

Constraints

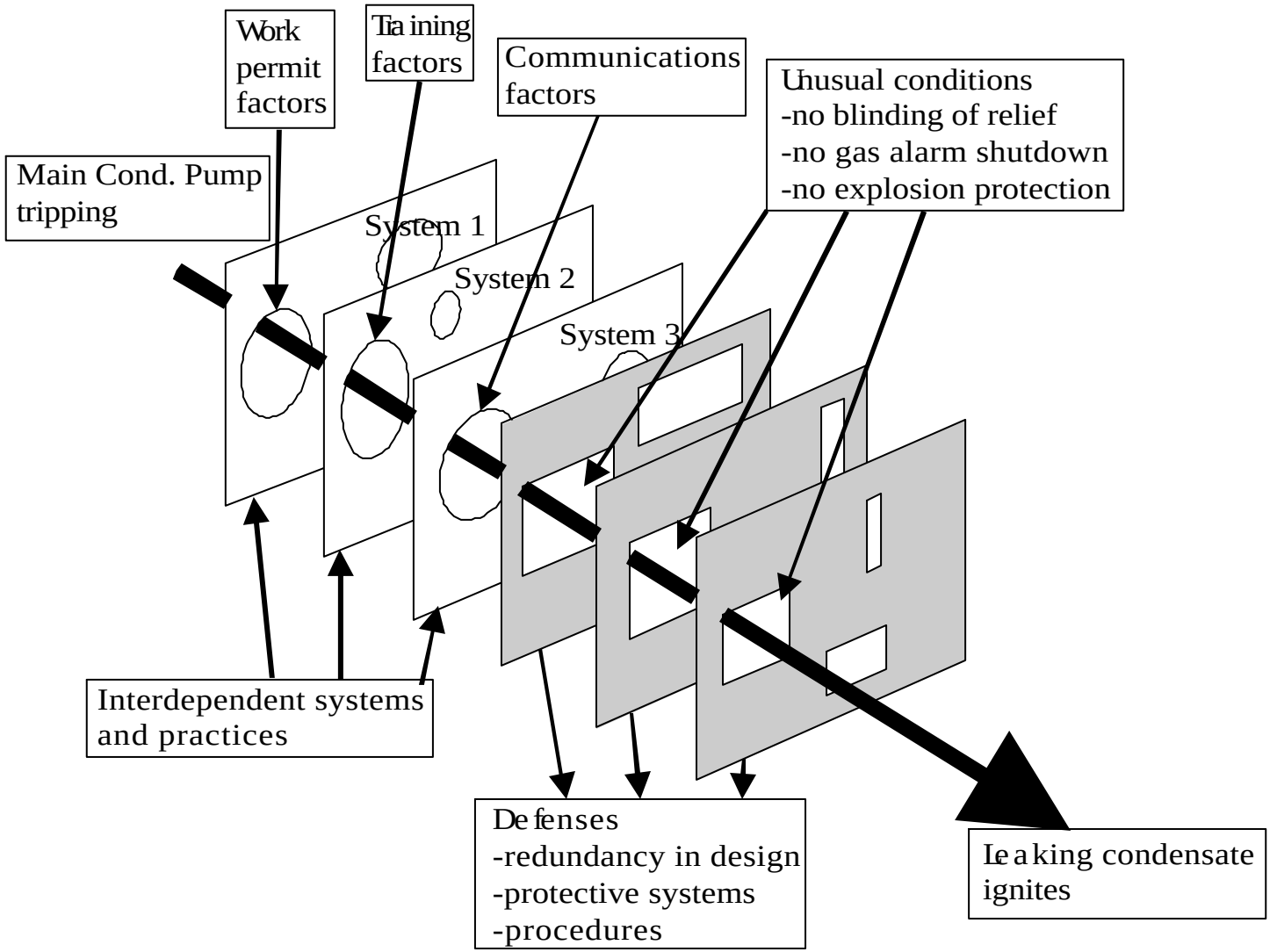
- 2 persons per job
- helicopter travel
- economic & risk pressure on crewing levels
- individual differences
- resistance to change (preferred vs safest)
- We do not believe these barriers are sufficiently substantial to prevent significant action and improvement.

Goals

- recognition of shiftwork/work scheduling as a manageable hazard
- holistic approach to shiftwork, scheduling, manning levels, activities etc.
- integration of shiftwork into SMS
- management responsibility for shiftwork over the whole duty/tour cycle
- scientific, risk-based, fit for task, continuous improvement

The role of human performance:

James Reason's model



Kathy Parkes' research

- night-workers offshore performed better than matched night-workers onshore
- night-workers offshore reported better day sleep than onshore workers
- the performance decrement at the nights/days swing shift was greater than any cumulative effect
- tired at work vs tired at home?
- consultation / involvement matters

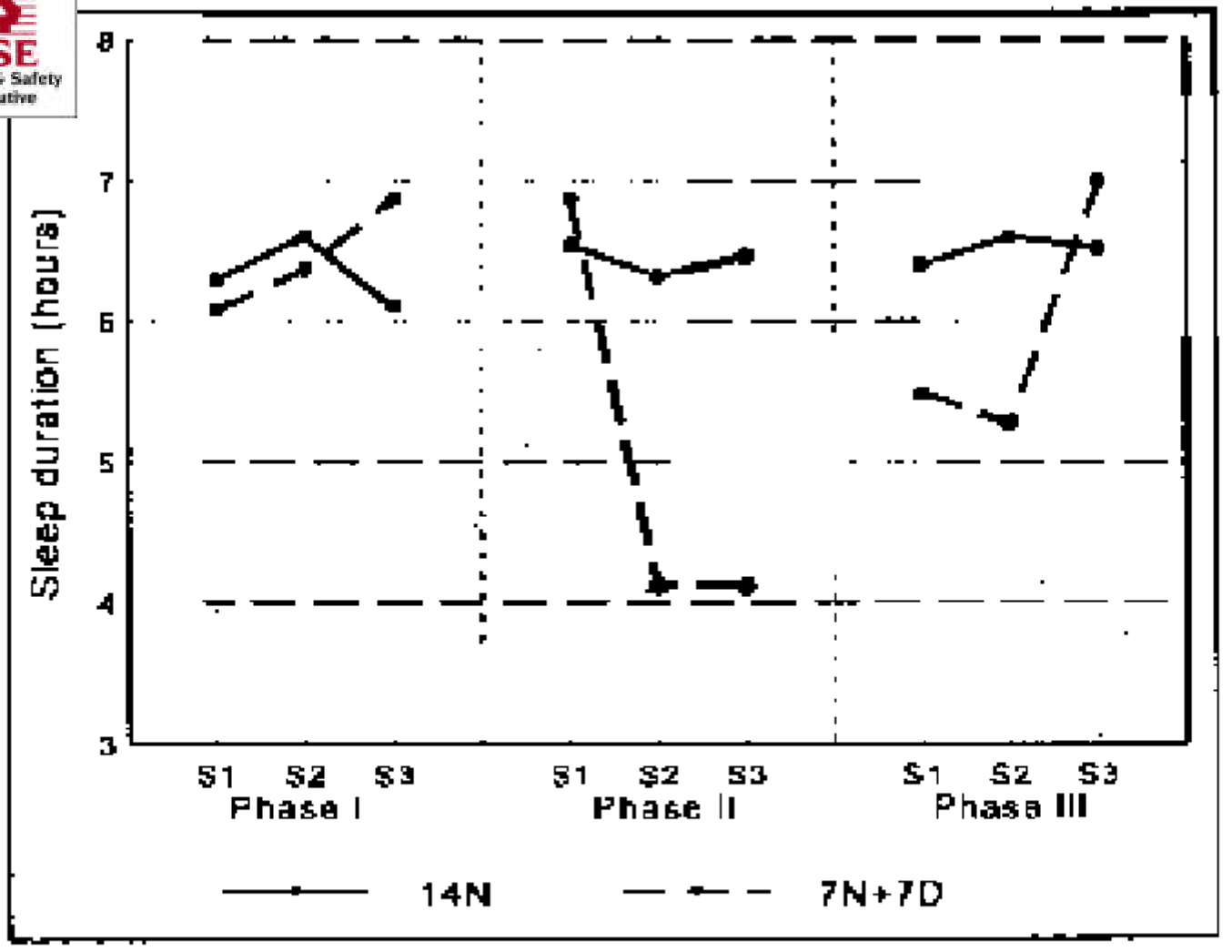


Figure 3.2
Sleep duration in relation to shift rotation: Nights vs. Nights/days

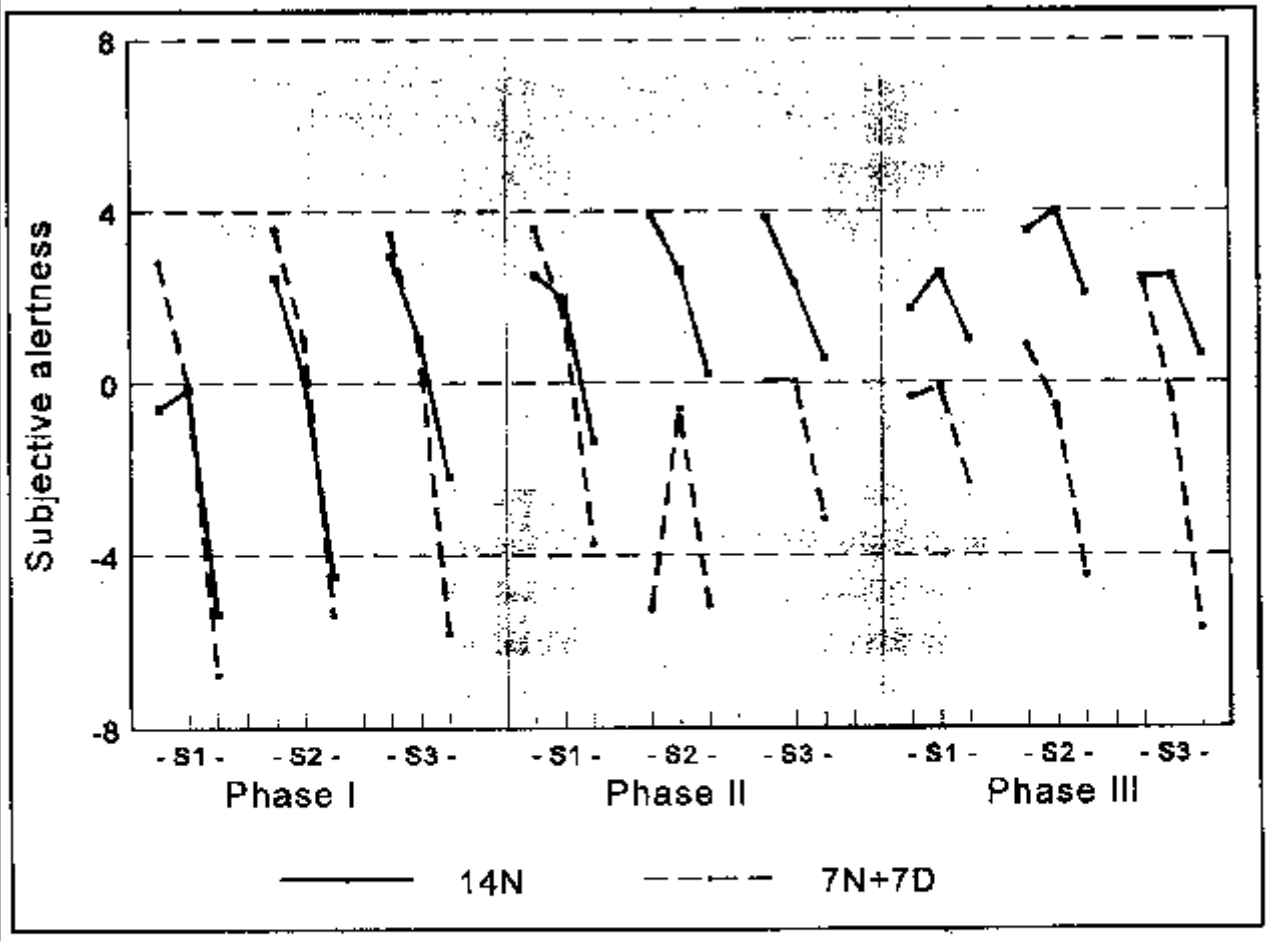


Figure 3.5
Alertness across phases: Nights vs. nights/days

Note. *In these diagrams, three points are plotted for each shift, representing the three times (start, middle, and end of shift) at which assessments were made.*

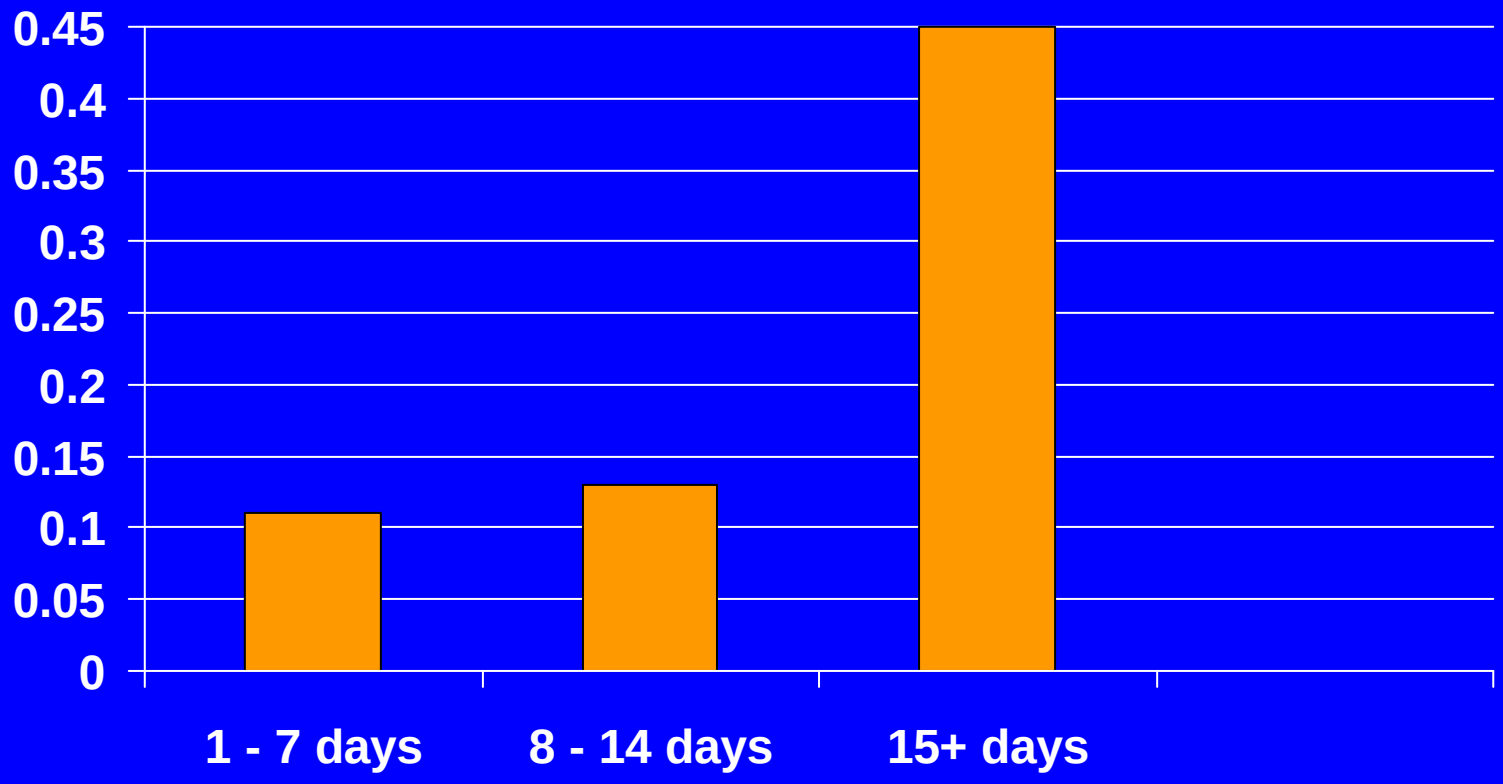
Fatigue

- long hours
- too much work / not enough people
- stretch targets (note recent Govt interpretation - “aims?”)
- lack of tools / equipment?
- mental and physical exhaustion
- past accident investigations
- very easy to assess: *are you tired at work?*

Ratio of serious to minor injuries.

Taken from OIR9 reports bruises, sprains etc vs. amputations, fatalities

(Parkes & Swash)



Operational pressures

** performance indicators*

- manning levels that are too low resulting in long hours (overtime) or call - outs*.
- swapping shifts to meet additional demands*
- training in off-duty time*
- provision for no-shows*
- consecutive tours of nights
- consecutive tours (i.e. shutdown contract staff)
- abuse of power
- very early check - in times
- moonlighting, attitudes to?*

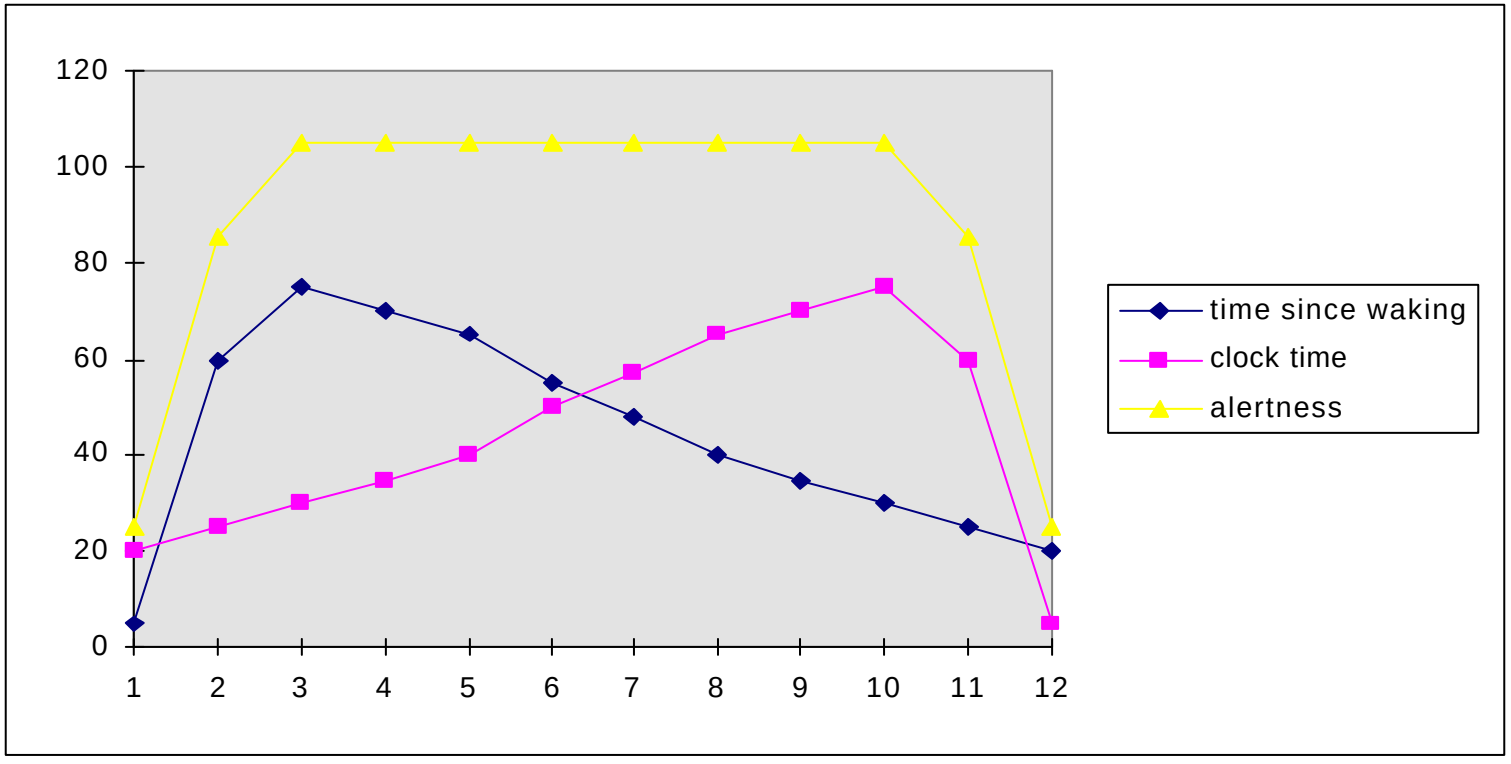
Fatigue risk assessment

- look for causal hazards in the work place
- no need to assess individual harm
- assess exposure / prevalence (little / often)
- control measures, risk control hierarchy
- joint responsibility
- focus on outcomes/actions
- is there a history of fatigue related incidents?

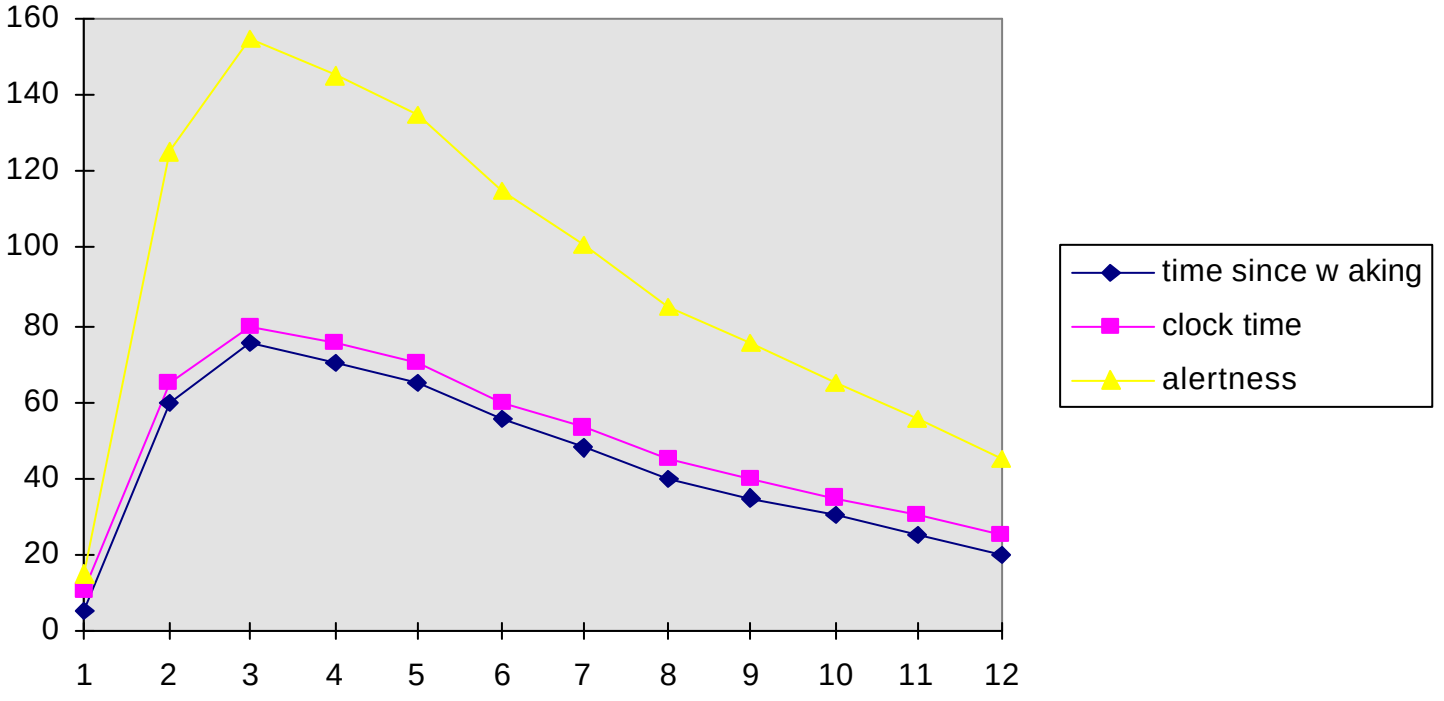
The DERA fatigue index

- designed for rail industry
- validated on large multi-industry data set
- 2 factor model:
- factor 1: time of day
- factor 2: time since waking
- factors add

The DERA model: day worker



the DERA model: night worker



the DERA results

- two factor model did not explain all of the variance in the historical data
- a correction factor has been added for cumulative nights (not as bad as expected)
- some occupational groups did not fit the model; i.e. workers on an offshore supply vessel

The work of Jo Arendt and Andy Smith (actually Michelle!)

- measuring physiological and psychological indicators, bio-markers (metabolites of melatonin) and cognitive performance
- offshore tour, nights, days, return home
- vast amount of work!
- workers adjust to nights, large performance effects
- very significant individual differences
- evidence of individual strategies

The HS(G) 65 Approach

- Successful Health and Safety Management
- 1 Policy
- 2 Organising
- 3 Planning and implementing
- 4 Measuring performance
- 5 Reviewing performance and Audit

Benefits of this approach

- focused on management of risk
- clear framework for integrating disparate data
- places accountability with management
- does not require full understanding
- monitoring; encourages dynamic approach

Policy (suggestion)

- To provide staff where & when required.
- To promote alertness.
- To minimise tiredness and fatigue
- To recognise individual variability
- To control occupational exposure

Organising:

- high light levels in work and eating areas
- daytime sleeping arrangements?*
- interfaces: management and sub-contractors
- public transport providers
- Local Authority and Enterprise Agencies
- Community and occ medical providers
- Other support groups i.e. Trades Unions.

Planning: hazard

- no back-up for “no-shows”
- physiological variation “owls vs. larks”
- travel distances
- age
- marital status and no. young children
- remuneration mechanism
- season of the year
- early starts before 6 am
- disturbed sleep
- overtime beyond 12 hours
- off duty call outs
- too long without breaks
- long periods of attention
- task difficulty
- other employment (“moonlighting” etc)

Measure performance

- Develop leading indicators; quality, near-miss etc.
- Use “rich” accident reporting; multi-discipline teams.
- Use medical and sickness data
- Integrate with other monitoring, i.e. bonus or appraisal.

Drugs & Medication

- we refer to mitigation of decrements, not increases in performance
- evidence of amphetamine use in other industries (complicit management / bonuses)
- monitoring of over-the-counter medication, particularly sleeping pills
- education regarding hypnotic vs sleep effects
- home is not regulated

The 6 Objectives

1 The recognition by managers, engineers and technical staff that shiftwork and work scheduling are manageable hazards.

2 A unified approach to shiftwork in which work scheduling, manning levels and the nature of the activity form part of a single fatigue management system.

3 The integration of shiftwork into the Safety Management System (SMS).

4 Management is responsible for the shift work over the whole duty or tour cycle.

5 Working patterns and schedules are determined using research and operationally derived data combined with risk assessment.

6 Working patterns and schedules are fit and appropriate for the tasks being undertaken and performance is monitored within a culture of continuous improvement.