Pilot fatigue

Fatigue Kills !

- 1993 DC8 @ Guantanamo Bay
- 1994 Air Algerie 737 @ Coventry
- 1997 Korean Air 747 @ Guam
- 1999 American Airlines MD82 @ Little Rock
- 2001 Crossair BAe 146 @ Zurich
- 2002 Challenger 604 @ Birmingham
- 2004 MK Airlines 747 @ Halifax
- 2004 Corporate Bae Jetstream 31 @ Kirkville
- 2004 Med Air Lear 35a @ San Bernardino
- 2005 Loganaira BN Islander @ Machrihanish
- Colgan Air 2008 @ Buffalo
- Air India 2010 @ Mangalore
- Afriqiyah Airways 2010 @ Tripoli

The New York Times

http://www.nytimes.com/ GLOBAL EDITION - Since 1879

LACK OF FATIGUE LEGISLATION KILLS 300 IN RUNWAY EXCURSION

Even after aviation authorities were gathered in safety seminar, early this year in Brazil, nothing was done. There is no fatigue legislation and no one is even preoccupied for the increased work hours for pilots and crewmembers. Market is dictating new labor rules everyday and authorities around the world are too startled to react, or play the game of the capitals.

In efforts to cut costs, pilots are asked to be more productive, or they will be left jobless.

Manufacturers are suggesting bizarre solutions too, they are offering new harnesses for passengers to travel standing up, and went as far as proposing only one pilot in the cockpit during long-range flights.

Corporate Airlines Flight 1566 Crash

The flight crashed short of the runway on approach in 2004 after its fatigued pilots had been on their sixth consecutive day of flight and on duty for 14 hours that day

The NTSB found:

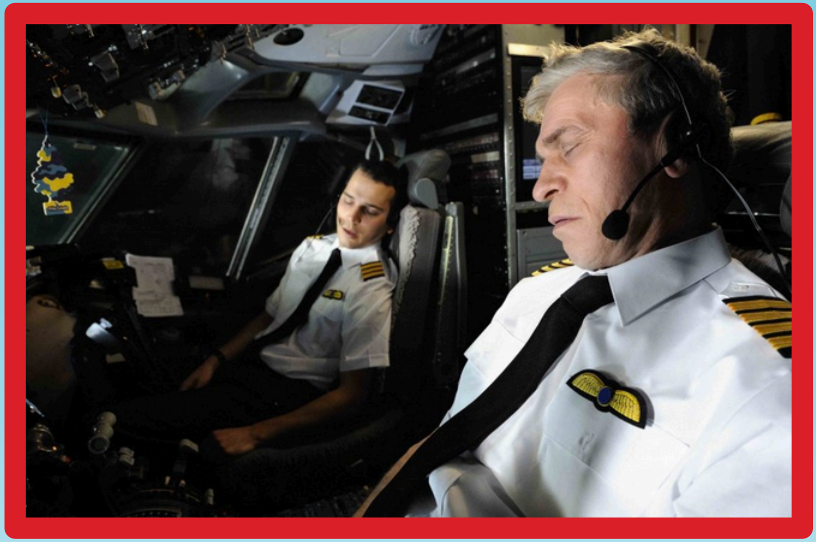
Accident was caused by the pilots' failure to follow established safety procedures, while conducting a non-precision approach in IMC and that "...**<u>their fatigue likely contributed to their degraded performance</u>**"

Both Pilots are napping …

Both Pilots operating Go Airlines Flight 1002 in October 2008, a 36 (Thirty – Six !) minute leg from Honolulu to Hilo, fell asleep and overshot their destination by 30 nautical miles !

Subsequently, they woke up and landed the airplane safely.

The day the incident occurred was the third consecutive day pilots started duty at 5:40 AM !



NTSB

"The effects of fatigue are particularly prevalent when all these three factors overlap..."

The crew had:

- limited sleep in the previous 48 hours
- been awake more than 19 hours during both day and night periods
- to be at a high level of alertness during a period of time (3-5 PM) associated with sleepiness.

What is fatigue

- “Inability to function at one’s optimum level, because physical and mental exertion exceeds existing capacity” (P. Gander)
- Multifactorial:
  - Work duration and intensity (time on task fatigue)
  - Inadequate recovery sleep, which has cumulative and dose dependant effects
  - Working at inappropriate times in the circadian cycle

Medical Evidence

- Overtime → higher injury rate
  - >12 h per day → 37 % increase
  - >60 h /week → 23 % increase
    (Dembe A & al, Occup Environ Med 2005:62:588-595)

- Safety and productivity reduced at night

- Bhopal, Three Mile Island, Chernobyl, Exxon Valdez: **all at night !**

- Junior doctors: 70% more than 50 h/week, 13 % more than 70 h per week.
  - **42%** clinical error in past 6 months !!!

Factors influencing fatigue

- Sleep loss, i.e < ~ 8 h per day
- Continuous hours awake
  - 17 h awake ~ 0.05 alcohol
  - 22 h awake ~ 0.08 alcohol – legal limit
  - 24 h awake ~ 0.10 alcohol
- Sleep quality: sleep apnoea, micturition, pain, infant crying etc.
- Circadian cycle upset [jet lag – night duty]

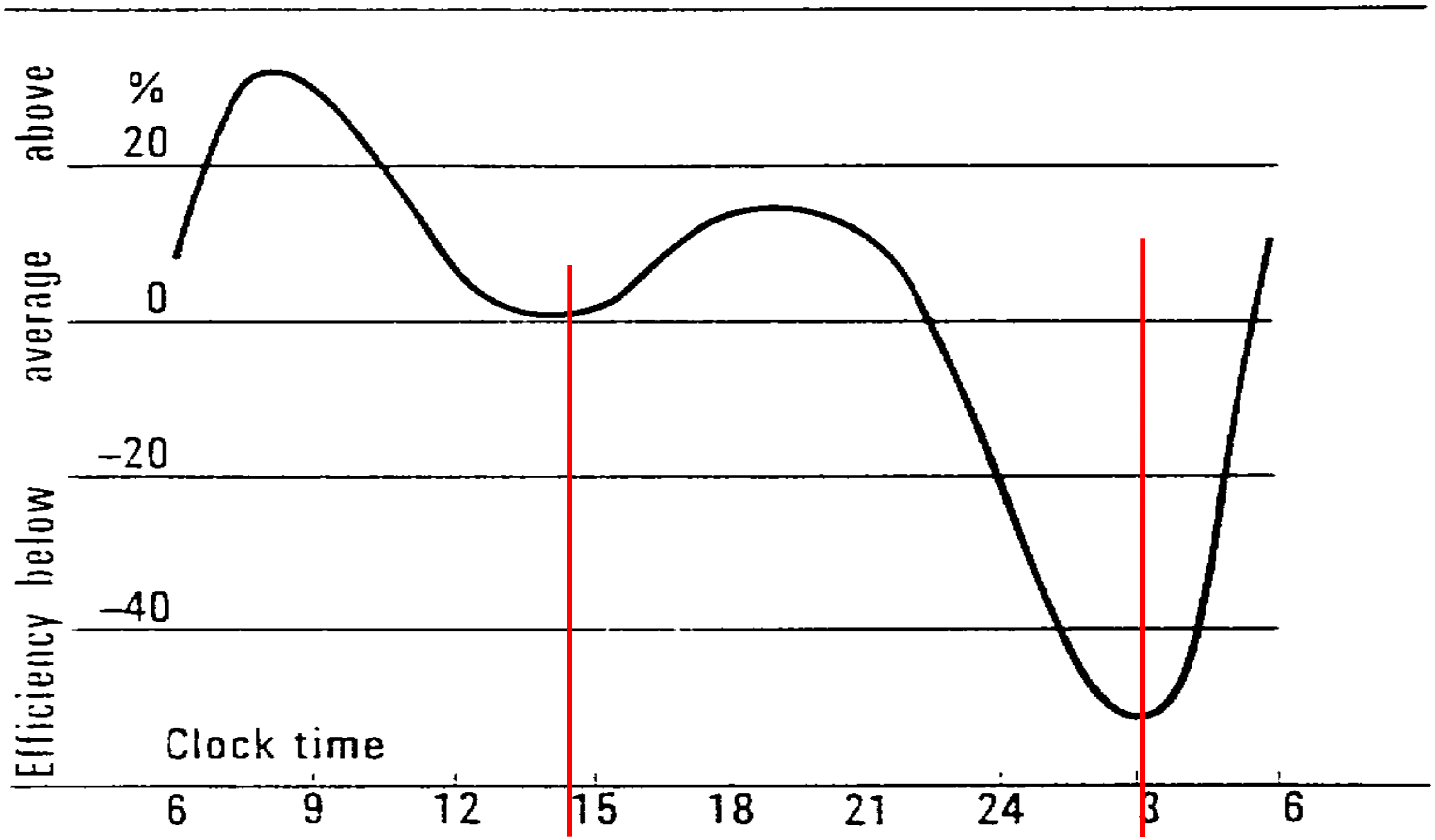
Fatigue and flying

- Lack of patience / snappy
- More forgetful
- Instrument cross check breaks down
- Reduced Situational Awareness
- Slows reaction time
- Reduced G tolerance
- Micro-sleeps

Factors Affecting Sleepiness

- Prior sleep
- Prior wakefulness / stress
- Alcohol / coffee / tea /coca
- Environmental/work conditions
- Medications
- Age
- Circadian phase

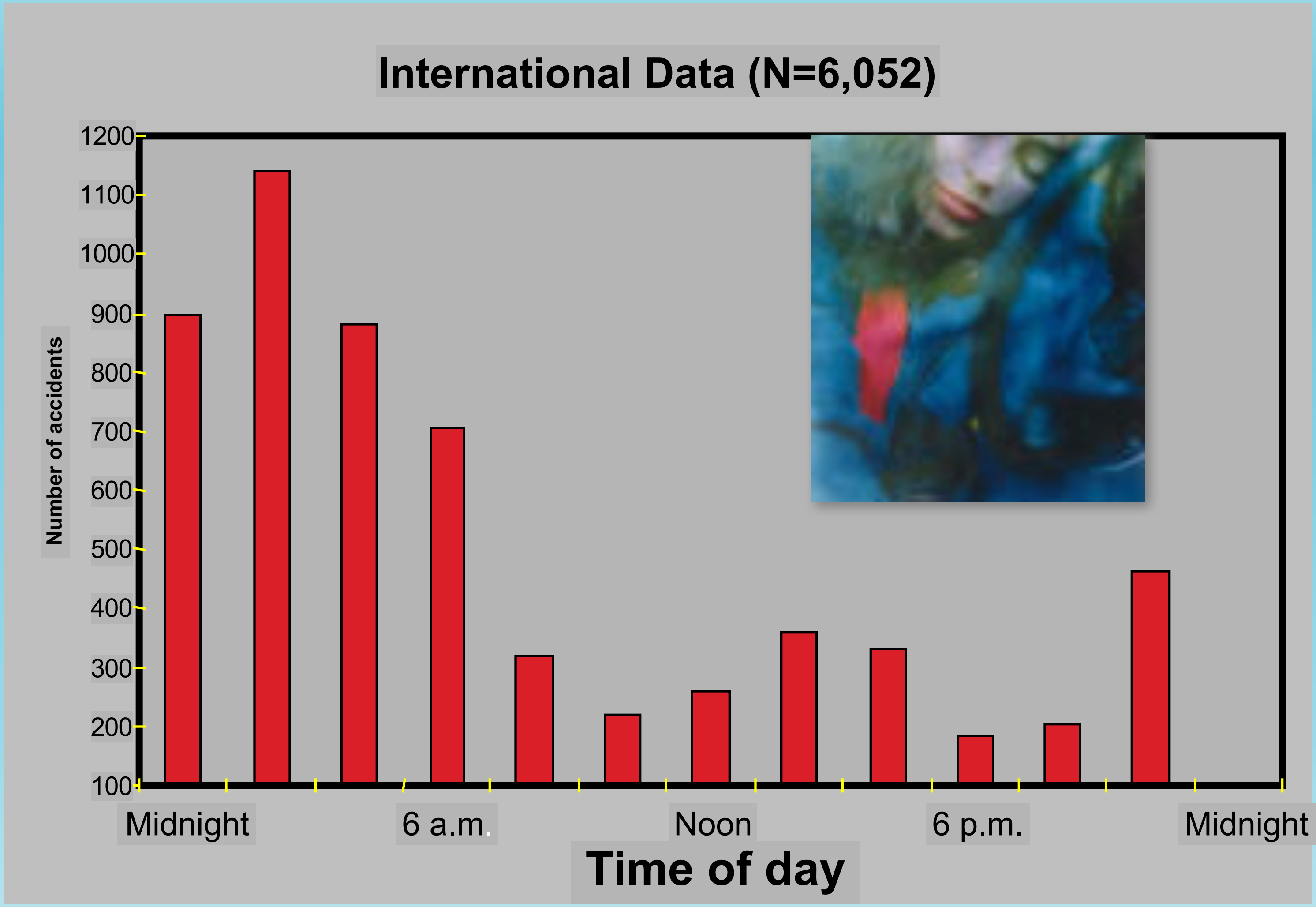
Circadian Rhythm – Efficiency



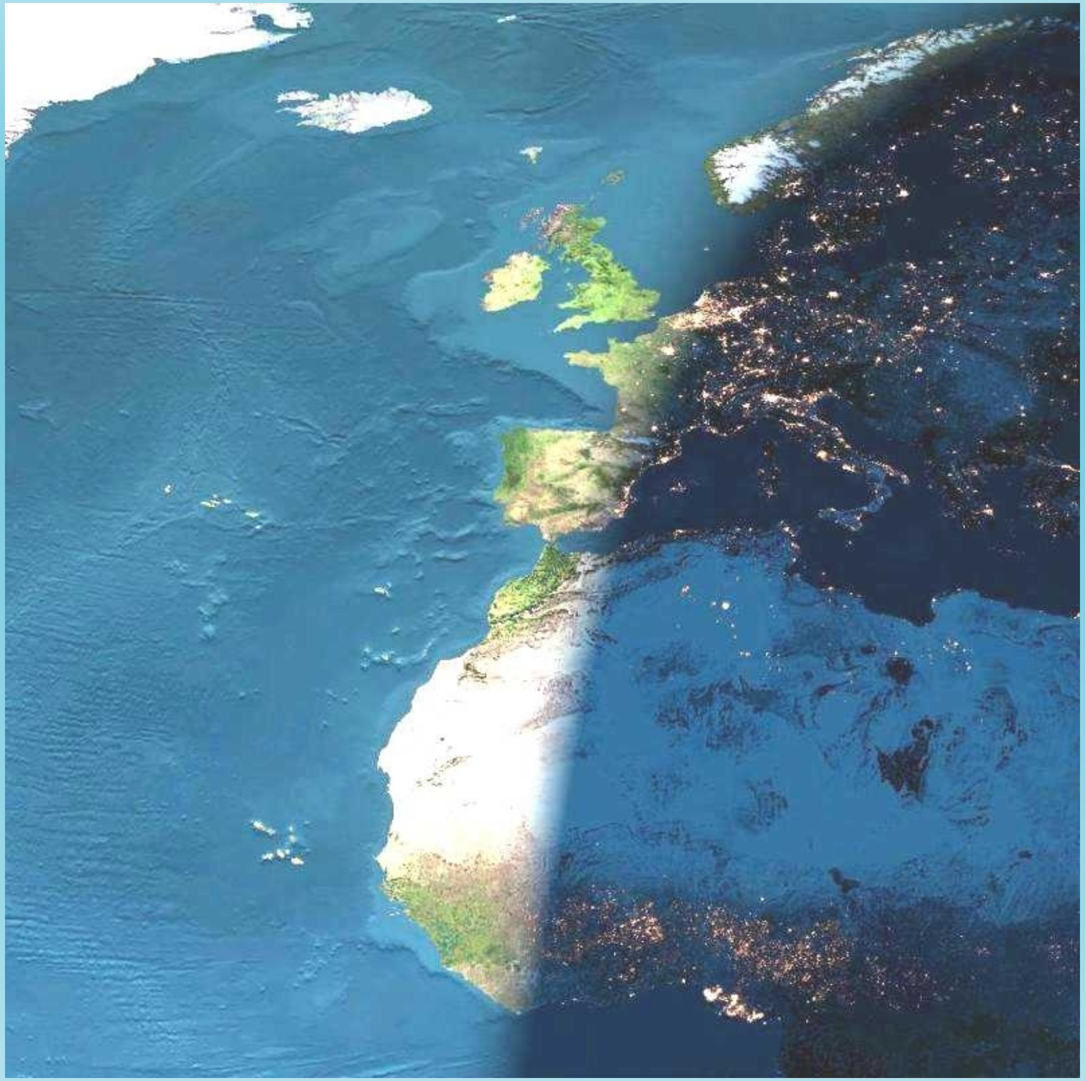
Human efficiency curve in the course of 24 hours (after *Graf*).

Asleep at the wheel car accidents

The distribution, by time of day, of **<u>6,052 vehicular accidents</u>** that were judged by investigators to be fatigue related.



Circadian Rhythm Disruption



Shift work

Jet Lag

Factors Affecting Circadian Adaptation

- Different people adapt at different rates
- “Evening-people” adapt faster than “morning-people”
- Ability to adapt decreases with age

Prescriptive Flight/Duty Limits

- Address:
  - Duration of work (time on task fatigue)
  - Duration of rest
- Do not generally address:
  - Workload
  - Circadian rhythms disruption
  - Sleep opportunities
  - Schedules
  - Life away from work
  - Safety risks associated with fatigued crewmembers

Preventive Strategies

- Begin a trip /a shift as rested as possible
- At home & Layovers
  - Maximize sleep 1-2 days before departing on trip
- Strategic napping can be very effective
  - 45 minutes or less, if just before duty

Preventive Strategies

- Alcohol consumption can have “major disruptive effects” on sleep quality
- Exercise regularly, but avoid just before bedtime
- Avoid TV or thrillers before bedtime
- If you can’t fall asleep in 30 minutes, get up and engage in some relaxing activity – Don’t just lay in bed and be frustrated

Summary

- A fatigued pilot has nothing to do in cockpit
- A pilot will – at best – declare himself unfit for duty due to fatigue one day too late
- A pilot should be nearly as alert for duty on the last day as on the first

https://www.youtube.com/watch?v=LmqSdRfEaeU


Pilot Fatigue – To Report Or Not To Report, That Is The Question...
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