

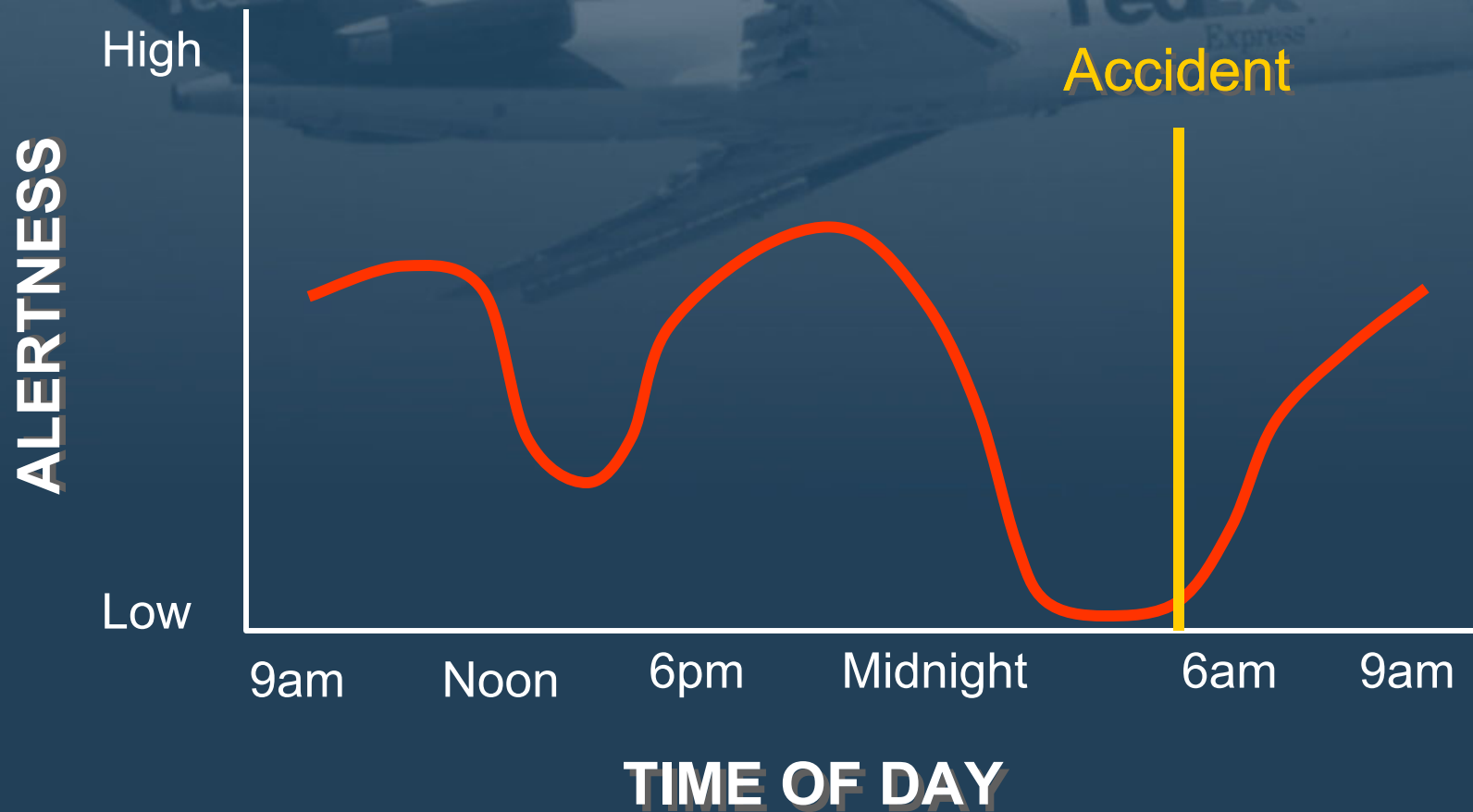


National Transportation Safety Board

Human Performance Presentation

Malcolm Brenner, Ph.D.

Fatigue: time of day

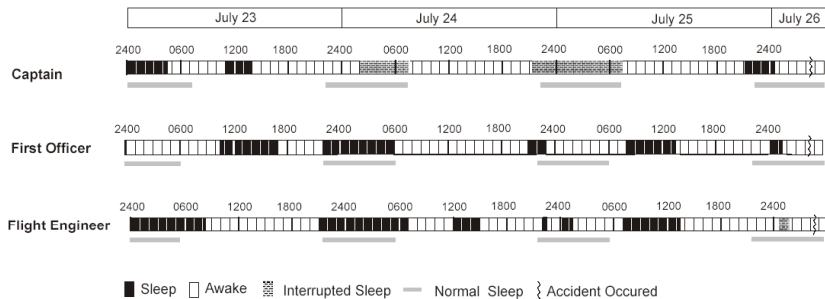


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FedEx Flight 1478, Boeing 727-232 (N497FE)

Fatigue: sleep histories

Estimated Sleep Schedule



- Captain
 - Family issue
 - Interrupted sleep
- First Officer
 - Alternating day/night schedule
 - Change of schedule
- Flight Engineer
 - Maximized available sleep



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Fatigue: Performance deficiencies related to fatigue

- Poor runway choice
- Failure to discontinue approach



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Color Vision Deficiency

- First Officer held waiver for defective color vision
- Post-accident testing determined a severe color deficiency
- Evidence indicated he would have difficulty discriminating the PAPI colors

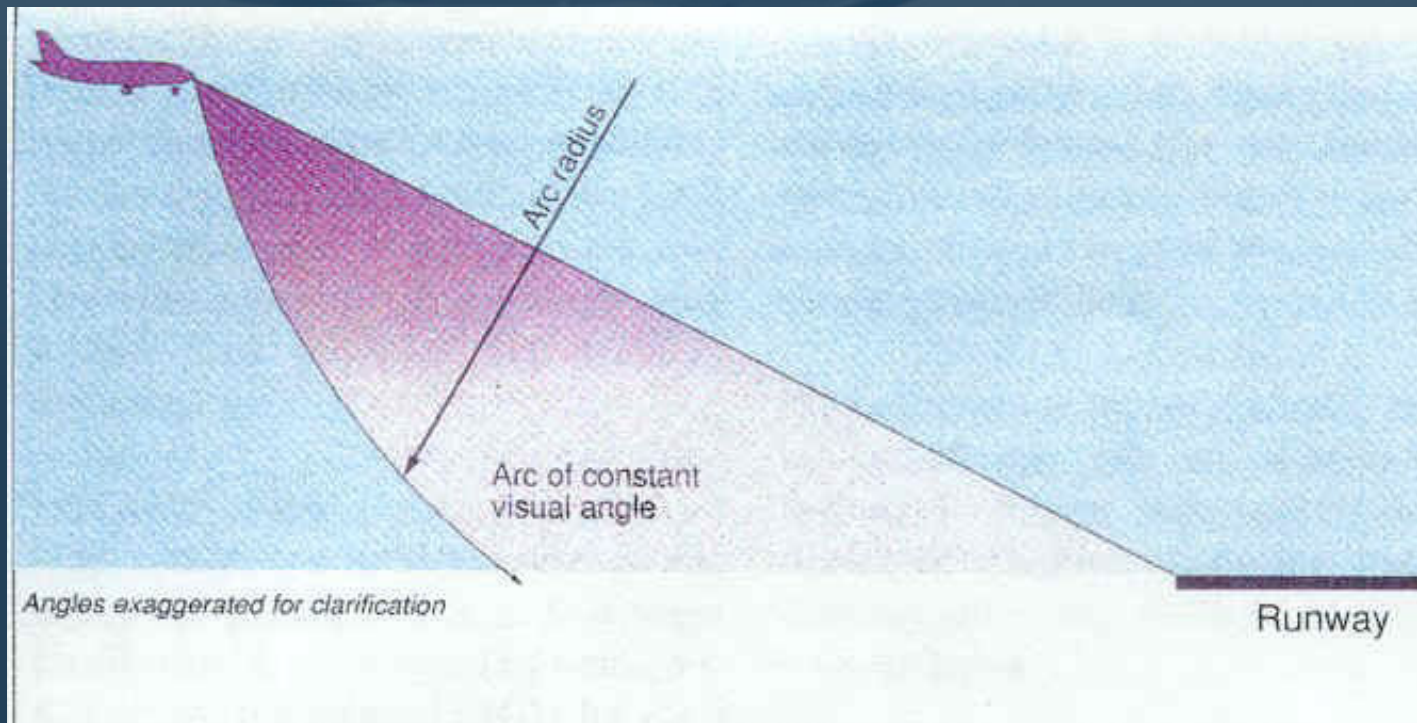


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Color Vision Deficiency

- Failed to follow color guidance on final approach

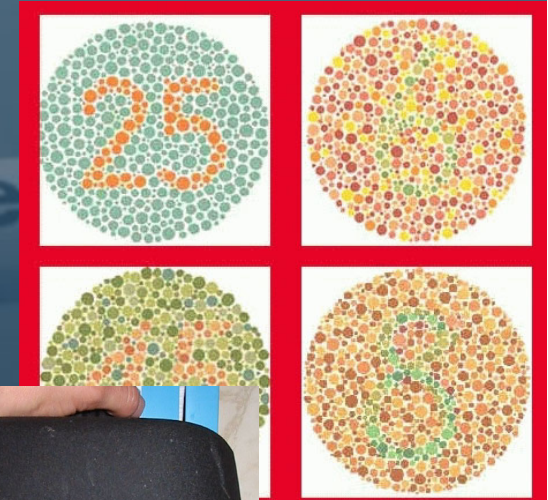


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Color Vision Testing

- FAA Standard:
 - “Ability to perceive those colors necessary for the safe performance of airman duties.”
- Methods
 - Pseudo-isochromatic plates
 - Farnsworth lantern
 - Signal light test
- Over 2,700 first and second class certificates to individuals who failed initial screen in 2002



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Crew coordination

- Selective attention can be increased by workload and fatigue
- Crew had never flown together before

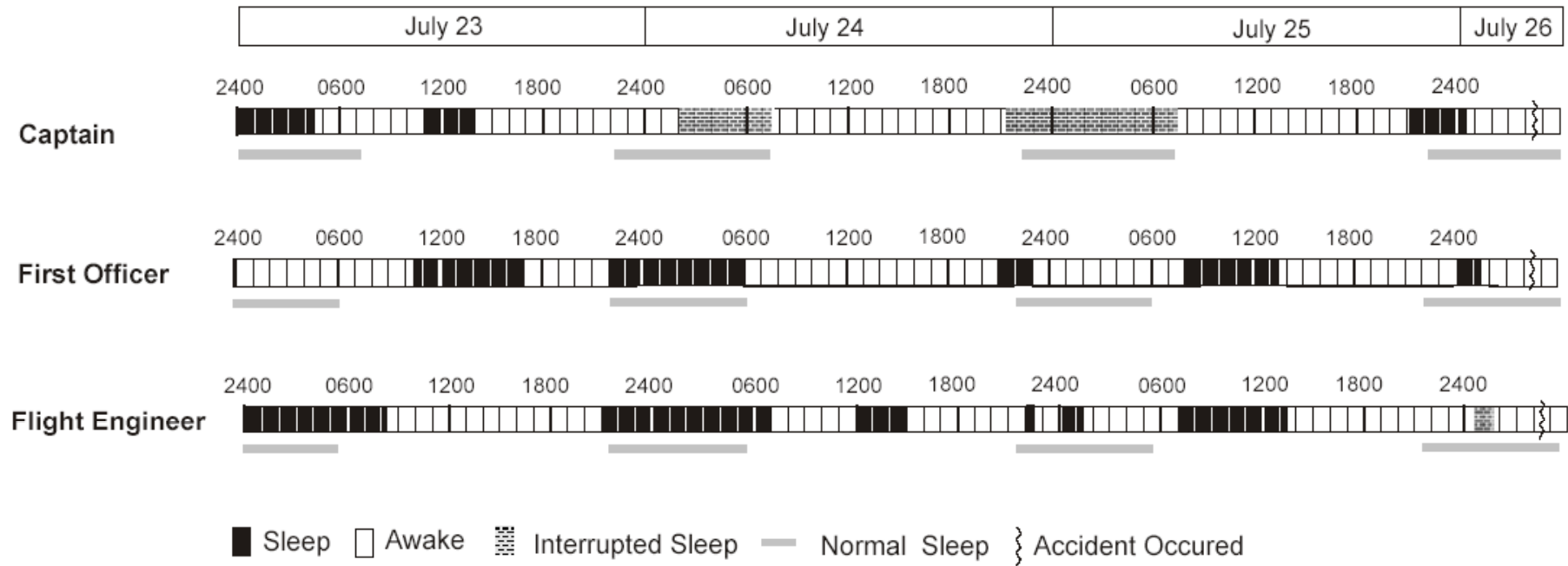


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Fatigue: Sleep Histories

Estimated Sleep Schedule



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