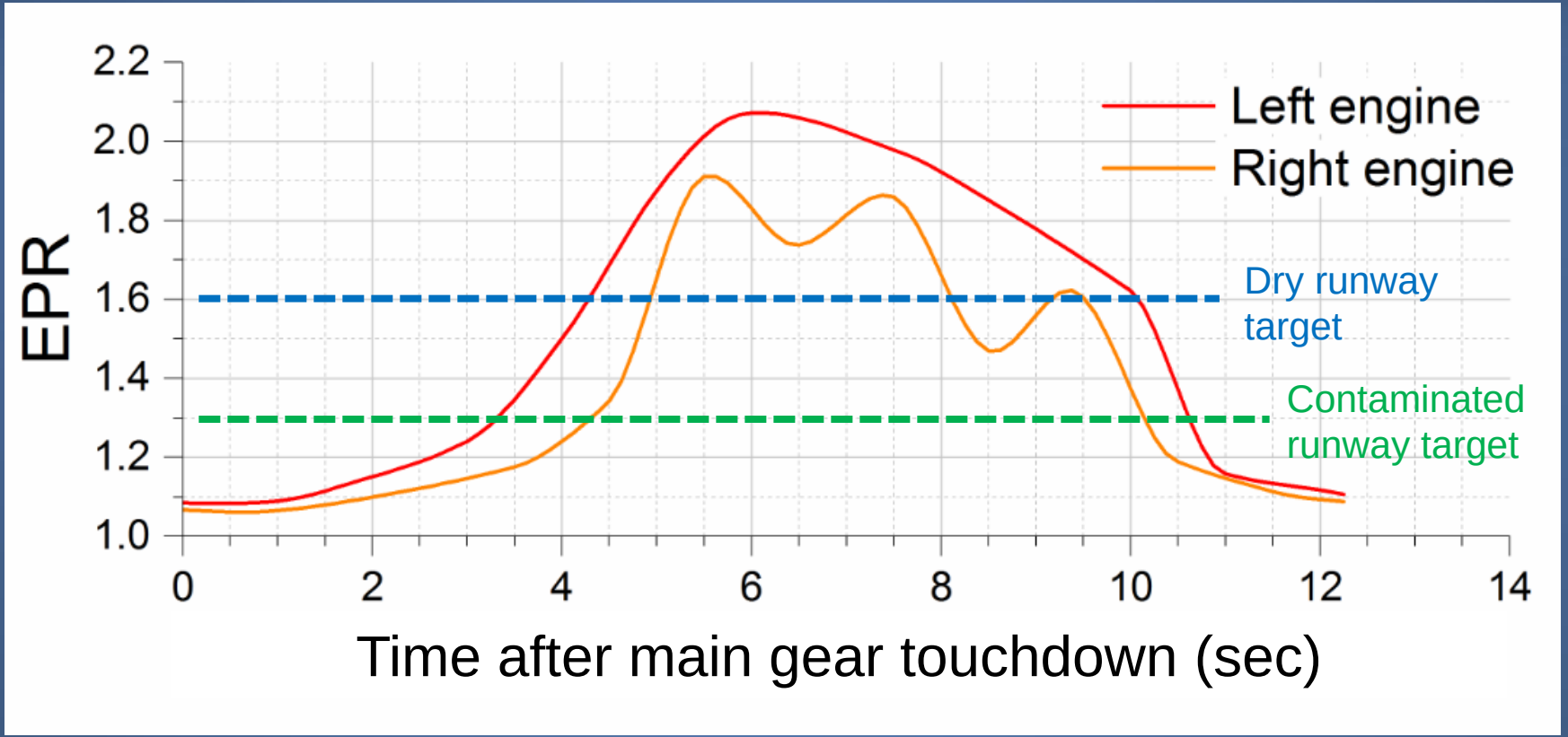
National Transportation Safety Board

Factors Contributing to Use of Excessive Reverse Thrust

Human Performance

Group Chairman's presentation

EPR Exceedances During Landing Rollout



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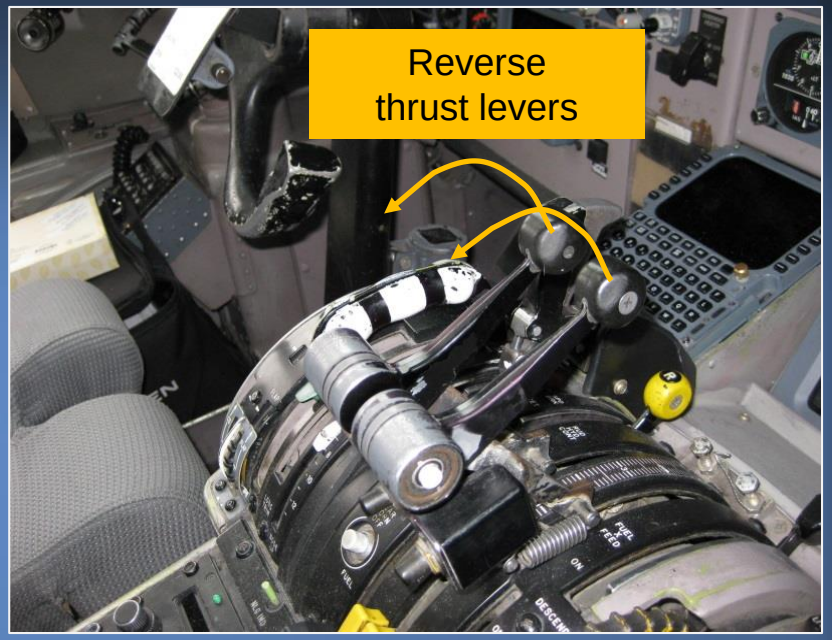
Habit Pattern

- Most landings on dry runways
- EPR target for dry runways higher than that for contaminated runways
- Stressful, high-workload situations can prompt reversion to well-learned behaviors
- Captain could have reverted to larger, more habitual input



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Situational Stress

- Factors present
  - Snowier-than-expected runway
  - Short runway length
  - Nonstandard runway safety area
  - Water at end of runway
- Contributed to aggressive initial control input

Passenger photo (courtesy of Jason Aspes)

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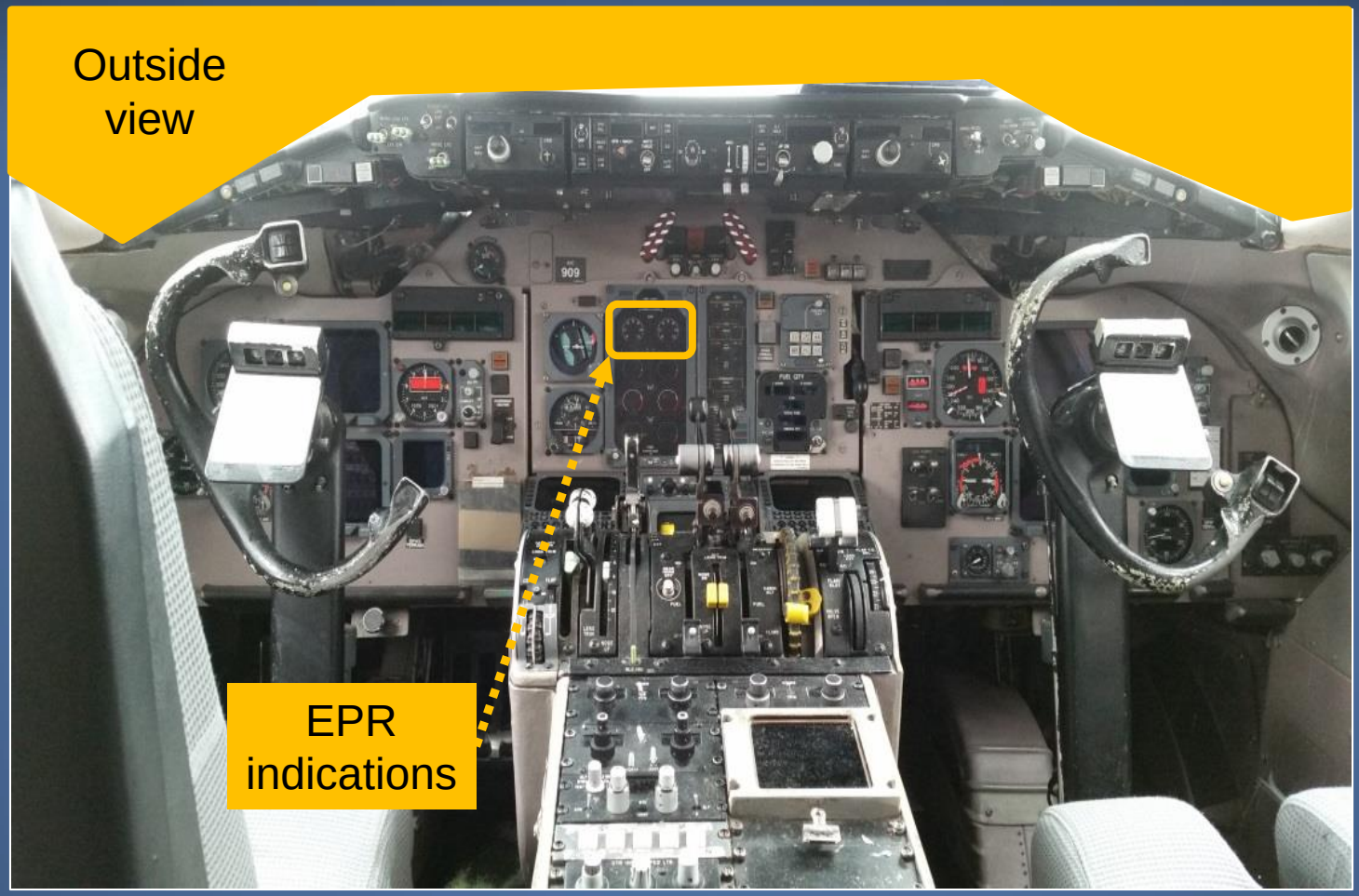
Selective Attention



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Cognitive Limitations

- Human vulnerabilities in selective attention
  - Attentional capture
  - Fixation
- Operational distractions during landing
  - Slide to left
  - Concern about autospoilers
  - Loss of directional control

Exceedances of EPR Targets

- Sample of 80 Delta MD-88 landings
  - 1.6 EPR exceeded 44% of time
- 14 landings with precipitation on runways that were potentially contaminated
  - 1.3 EPR exceeded 100% of time
  - 1.6 EPR exceeded 57% of time

Possible Explanations for Exceedances of EPR Targets

- Pilot decision-making
  - Concerns about stopping versus possibility of losing directional control
- Pilot perceptual and cognitive limitations
  - Selective attention and competing task demands

Strategies for Reducing EPR Exceedances

- Implementing best operating practices
- Improving human performance through design considerations

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