ICAO UNITING AVIATION

FMAS2016

# Fatigue Management Developments for Cabin crew


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**Fatigue Management Approaches Symposium**

5-6 April 2016, Montréal, Canada

# Overview

- FRMS processes for Cabin crew
  - based on Flight crew data
- Comparison of Cabin crew and Flight crew FRMS processes & Fatigue measures
  - South African Airways ULR validation studies*
    - JNB-JFK (16+ hours)
    - JFK-JNB (15 hours)
  - Focus groups with Cabin crew
- Do fatigue mitigations & measures work for Cabin crew?
- Future considerations

*Signal et al. Mitigating and monitoring flight crew fatigue on a westward ultra-long range flight. Aviation Space and Environmental Medicine. 2014; 85 (12): 1199-1208
*van den Berg et al. Monitoring and managing cabin crew sleep and fatigue during an ultra-long range trip. Aerospace Medicine and Human Performance. 2015;86(8):705-713

# FRMS processes for Cabin & Flight crew

| | Cabin crew | Flight crew |
|---|---|---|
| **2 days (3 local nights) free of duty pre-trip** | √ | √ |
| **Scheduled in-flight rest in bunk** | 2 breaks between meal services | 2 breaks during cruise |
| **In-flight napping** | Optional 40-min seat rest on ULR sector | Controlled rest on flight deck, both sectors |
| **2-day layover** | √ | √ |
| **3 days (4 local nights) free of duty post-trip** | √ | √ |
| **Fatigue management training** | √ Based on Flight crew data only | √ |
| **MONITORING: Sleep, sleepiness, fatigue, performance** | √ + workload | √ |

# Data collection process

- To get 50 participants:
  - 183 cabin crew approached; 79 Flight crew approached
- Started data collection:
  - 106 cabin crew; 58 Flight crew
- Completed data collection:
  - 81 Cabin crew; 58 Flight crew
- Useable data:
  - 55 Cabin crew; 52 Flight crew

# Pre-trip preparation

| Pre-trip sleep | Cabin crew<br>Mean (range) | Flight crew<br>Mean (range) |
|---|---|---|
| Total Sleep (hrs) day 1: | 6.4 (2.1-9.5) | 6.9 (4.1-9.7) |
| Total Sleep (hrs) day 2: | 6.6 (3.3-9.4) | 7.1 (3.8-9.9) |
| Total Sleep (hrs) 24 hrs before duty: | 7.0 (4.2-10.4) | 7.5 (3.7-10.0) |

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  - 40% of Cabin crew;
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- **Pre-flight napping:**
  - 40% of Cabin crew;
    54% of Flight crew
- **Possible reasons (from focus groups):**
  - Competing time demands
    - recovery vs commitments at home
  - Demographic differences
    - more domestic and childcare responsibilities

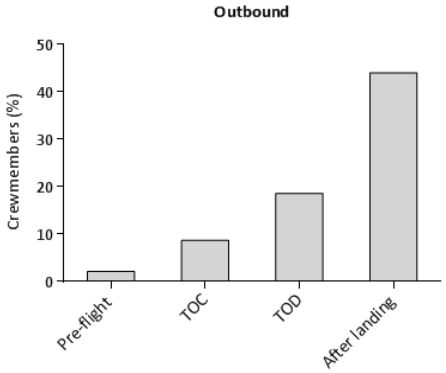
# In-flight sleep

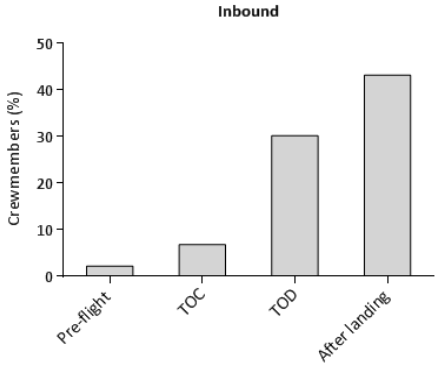
- All Cabin crew tried to sleep in both breaks & slept in at least one break
  - Outbound: 3.6 hrs (range 1.6-5.1 hrs); Inbound: 2.9 hrs (range 0.7-4.3 hrs)
  - Large individual differences (similar to flight crew)
  - Additional/optional 40-min seat rest (outbound only) used by 45% of Cabin crew
    - Of these, 64% obtained some sleep
    - Disturbance from passengers (focus groups)

- Cabin crew sleep less than Flight crew
  - Less time available for sleep (due to meal services)
  - rest facilities less conducive to sleep (noise, light, discomfort; focus groups)

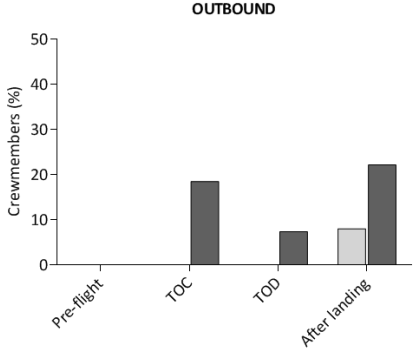
# Sleepiness ratings ≥ 7 across outbound & inbound

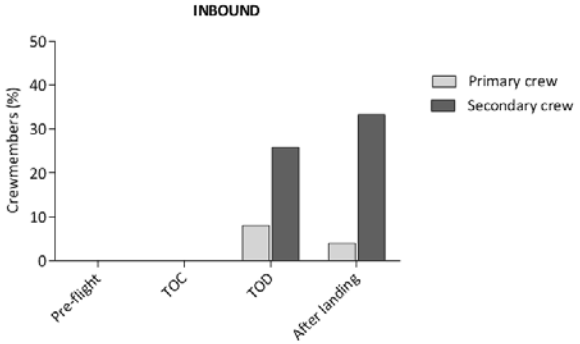
Cabin crew:




Flight crew:



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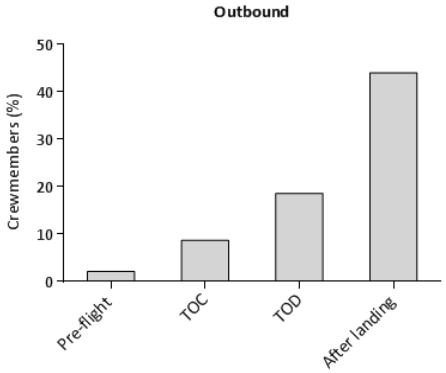


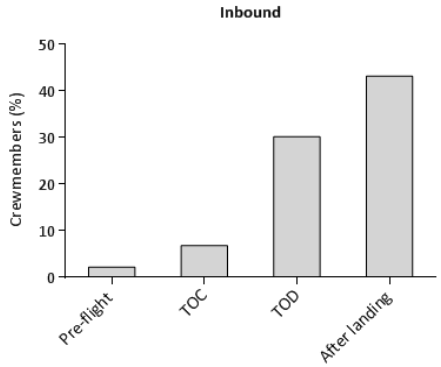


- Possible reasons (focus groups):
  - Inadequate recovery from previous trip
  - Issues with in-flight sleep

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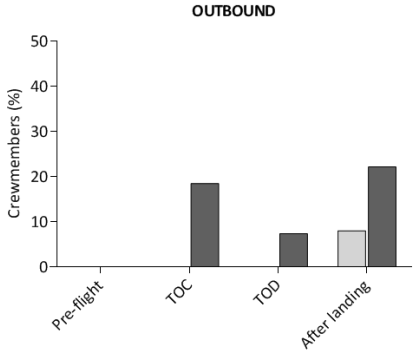


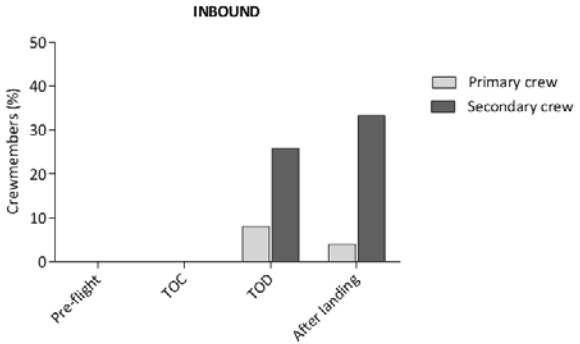

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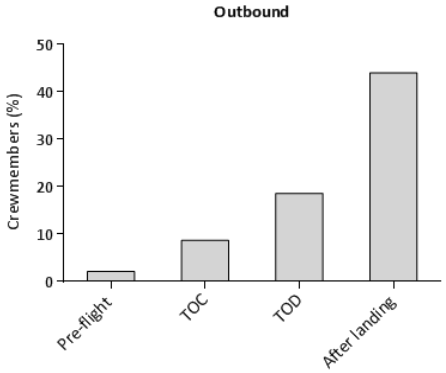


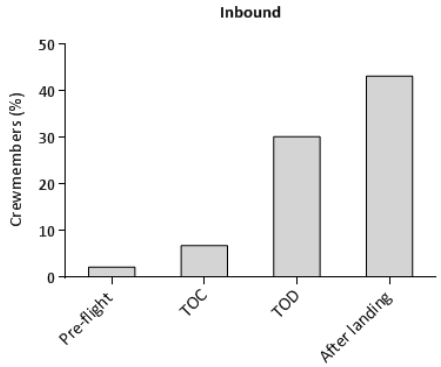


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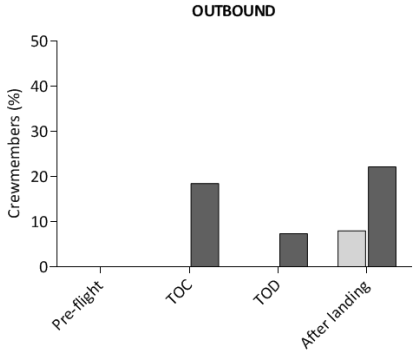
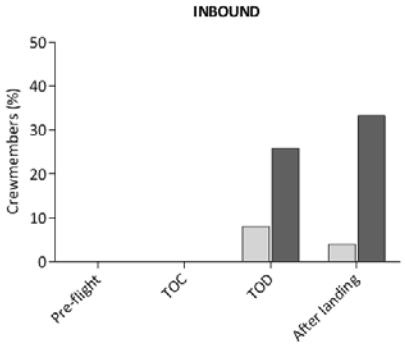
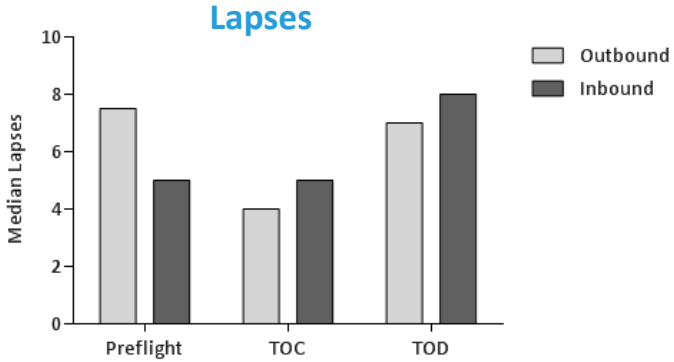



- Possible reasons (focus groups):
  - Inadequate recovery from prior trip
  - Issues with in-flight sleep
- Safety issues (focus groups):
  - Falling asleep during landing
  - Falling asleep while driving home

# PVT performance

## Cabin crew

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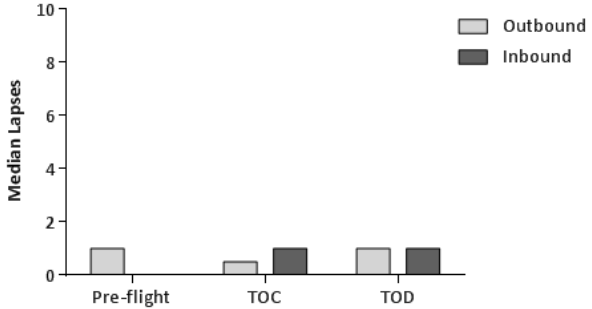

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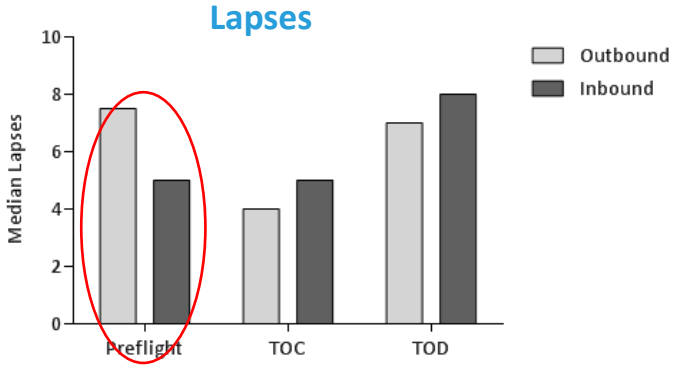


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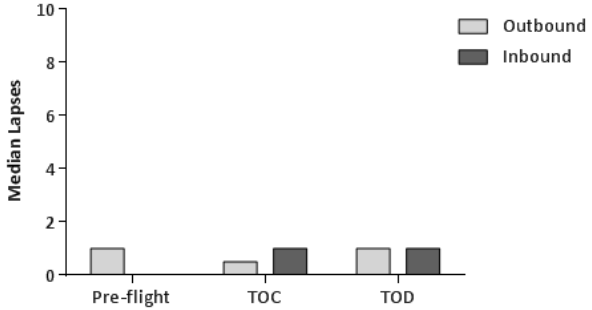

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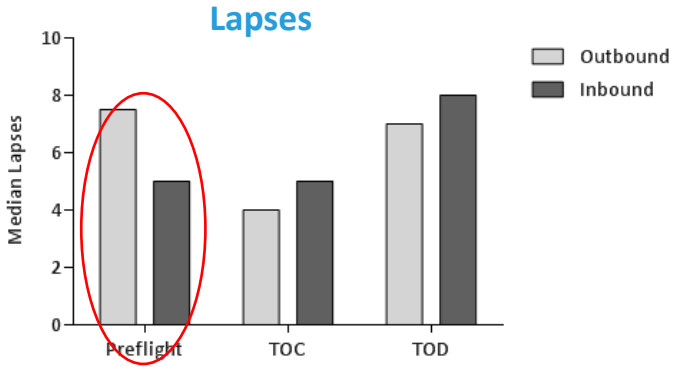


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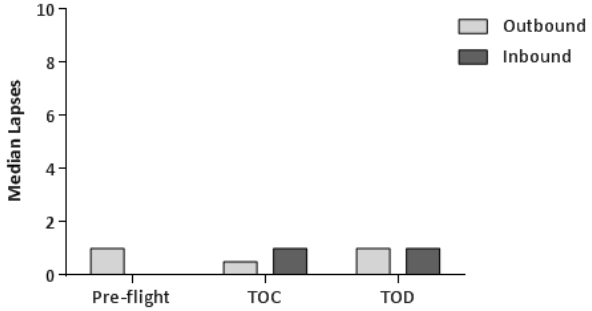


| Useable PVT tests | Cabin crew | Flight crew |
|---|---|---|
| Pre-flight | 0% | 77% |
| Top of Climb | 56% | 81% |
| Top of Descent | 70% | 77% |

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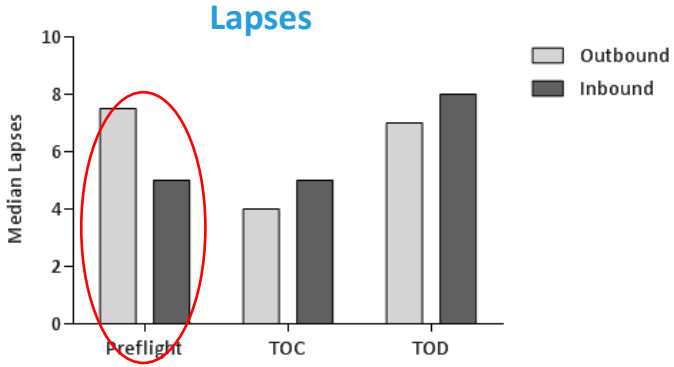


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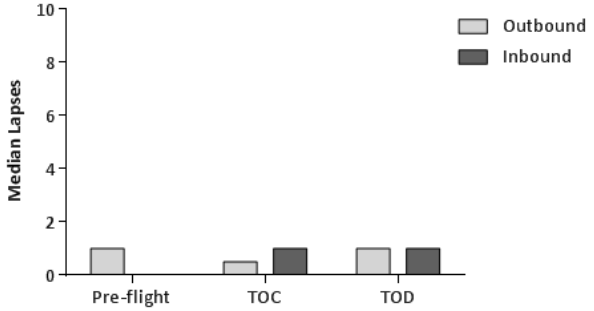


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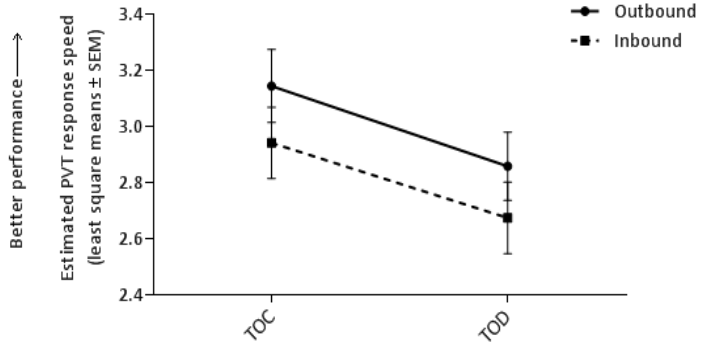
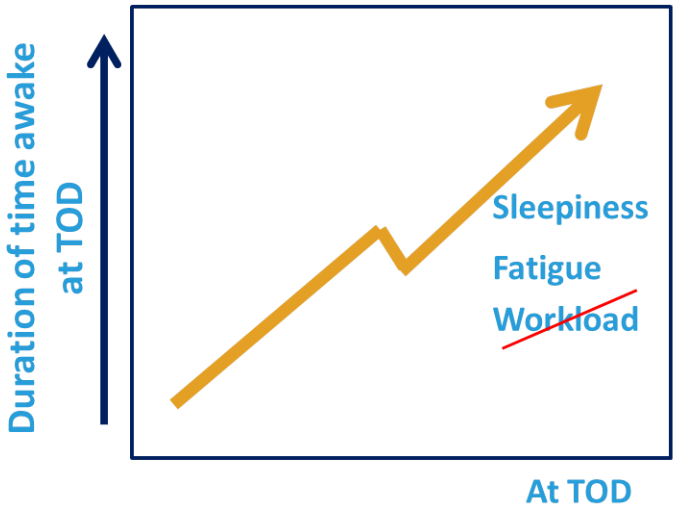
## PVT speed (responses/sec) for Cabin crew



# Influence of workload on fatigue at TOD




van den Berg et al. Greater subjective workload is associated with higher cabin crew fatigue on ULR flights. SLEEP, 2015; 38: A87

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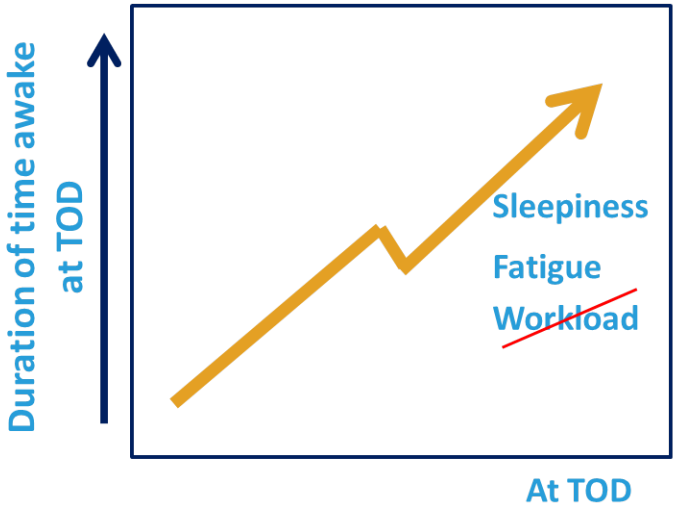


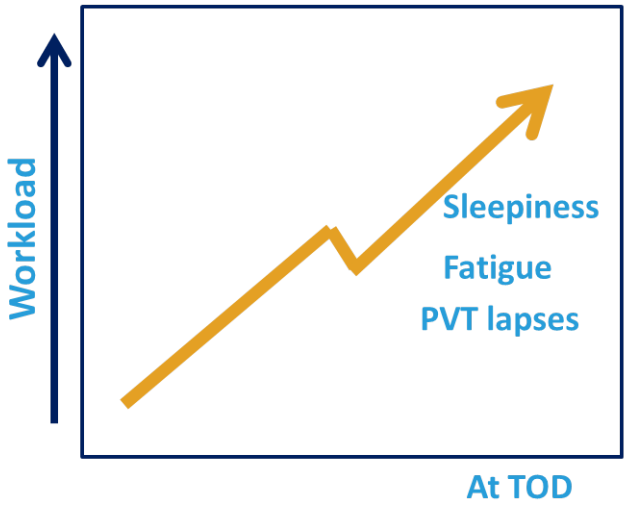


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# Future considerations for Cabin crew

- Fatigue Mitigations:
  - Recurrent fatigue training
    - benefits of pre-flight napping
    - importance of recovery sleep
    - Individual differences
  - Improve in-flight rest
    - Crew rest facilities – noise, light, comfort
    - Location of seat rest
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    - Ongoing monitoring, e.g. fatigue reports
- Monitoring:
  - Data collection process
    - Find ways to improve (get more 'buy-in')
    - Share experiences
  - PVT distractions
    - Test location & timing
    - in consultation with Cabin crew
  - Need representative data!

# Acknowledgements


- All participating crewmembers
- Sleep/Wake Research Centre research team: Philippa Gander, Leigh Signal, Hannah Mulrine, Alex Smith
- Wynand Serfontein, Fatigue Specialist at South African Airways
- Research assistants at South African Airways
- Hannah Timms & Tracy Sanderson at the Sleep/Wake Research Centre
- Prof Antonia Lyons, School of Psychology, Massey University

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# THANK YOU


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