Effects of Reduced Rest and Early Start on Crew Sleep and Fatigue in French Regional Airlines

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HOP!

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Context and Objectives

- HOP, a French regional airline has requested a deviation from the regulation that reduces rest time on some specific rosters
- To grant this deviation EASA required a scientific study of the impact of this deviation on sleep and in-flight alertness
- Objectives:
  - Assess the impact of reduced rests rosters on the amount of sleep and the level of in-flight alertness
  - Compare the results with early starts rosters

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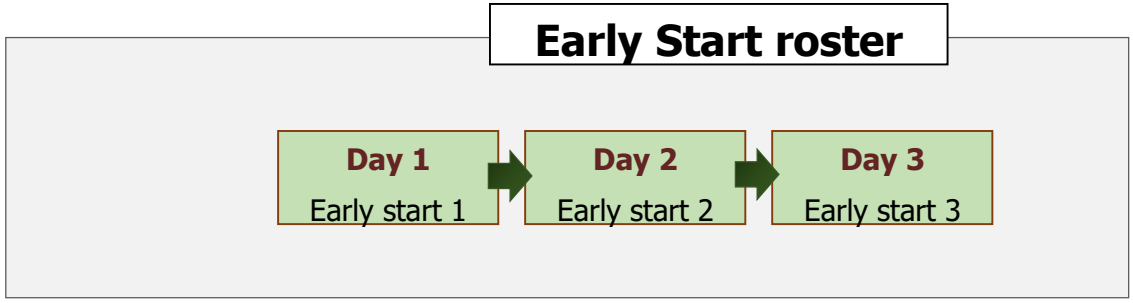
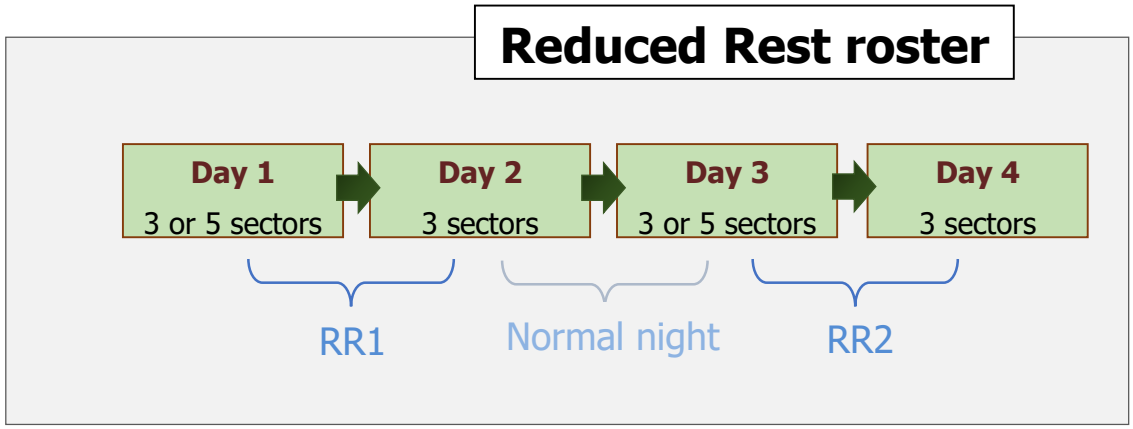
Early start versus reduced rest

Comply with the regulation



Deviation to the regulation: less than 10hrs only on layover



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Method - Data collection

- Individual information
  - Age, function, gender, commuting,
  - Sleep habits, morningness-eveningness questionnaire
- Diary
  - Sleep and activity diary
- Top of descent survey
  - Self rating fatigue (Samn Perelli)
  - Hassle/workload
- Data were collected on pilots and cabin crews over a 7-weeks period on 2 types of rosters
  - Early Starts
  - Reduced Rests

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Results – Sleep time

		N	Means	Standard deviation
Pilots	RR	163	05:44	00:51
	ES	92	06:11	00:54
Cabin Crews	RR	106	05:33	00:44
	ES	70	06:02	01:10

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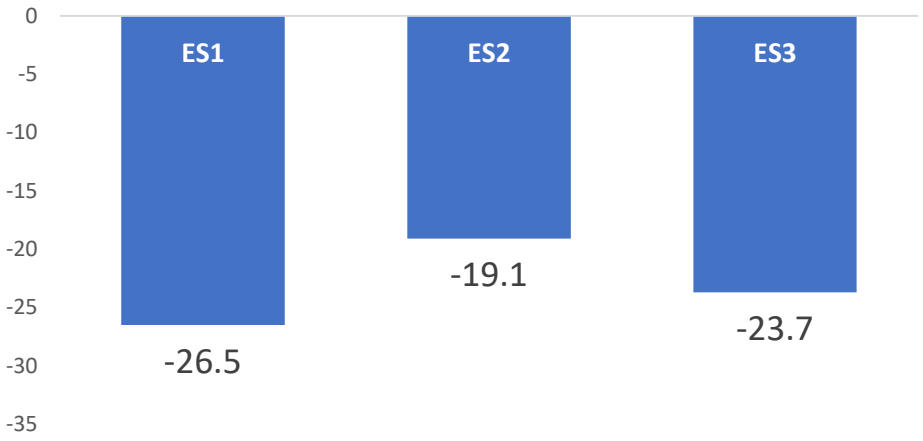
Results – Sleep time

Sleep deprivation expressed as the % of individual sleep need

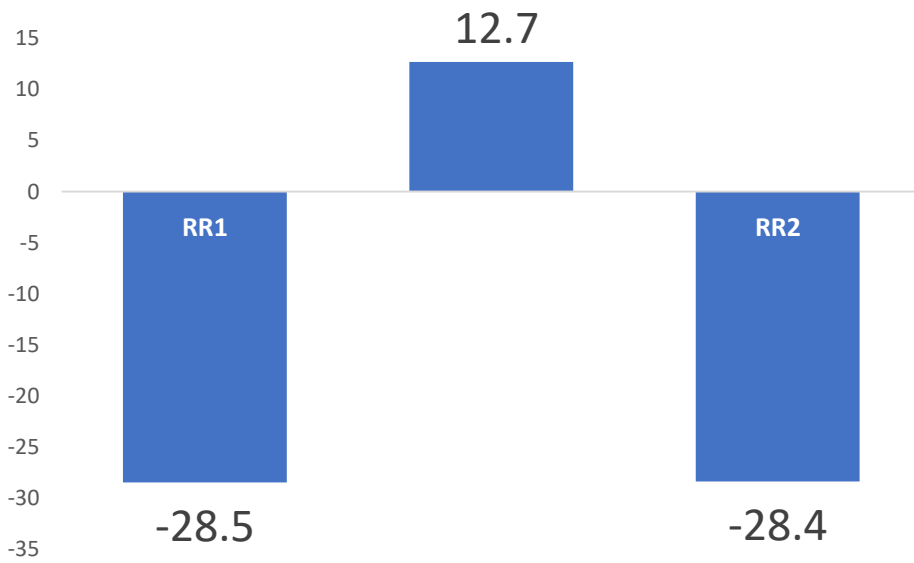
Early Starts



Sleep times

05h53	06h24	05h56

Reduced Rests



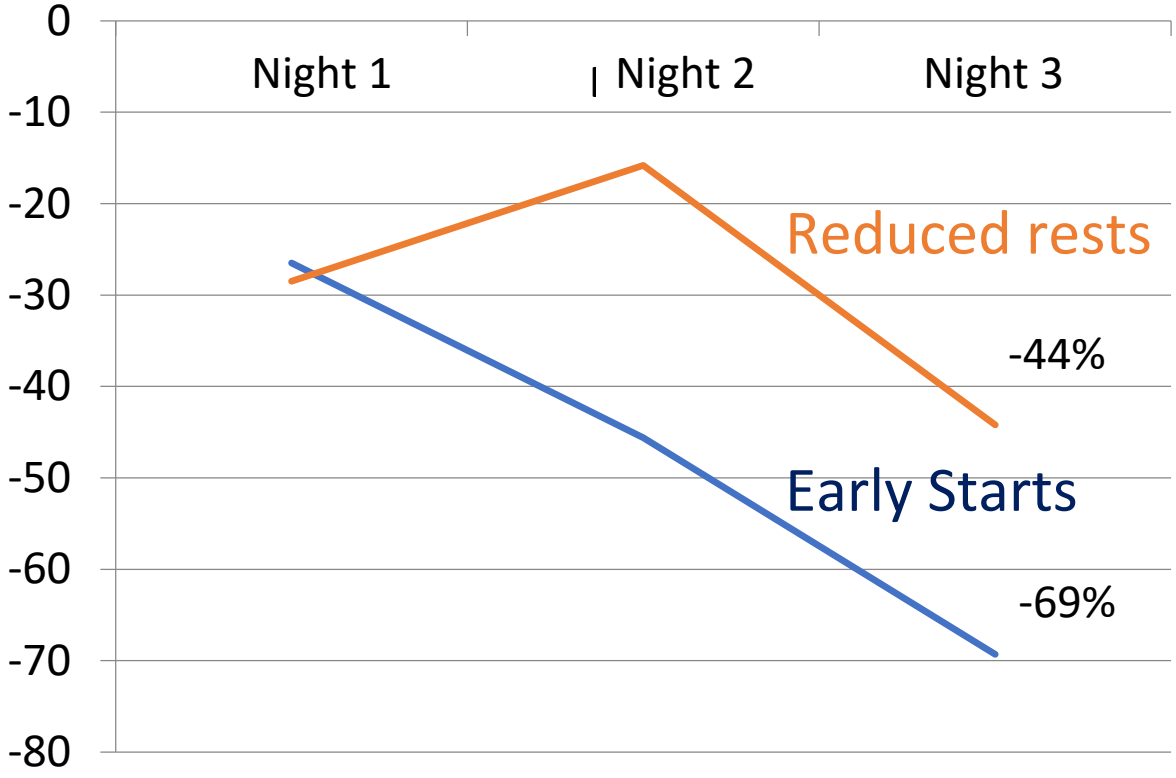
Sleep times

05h40	09h00	05h41

Results – Cumulative sleep debt over the 3 consecutive days

Higher for early start compared to reduced rests

The “normal” night between RR1 and RR2 decreases the cumulative sleep debt



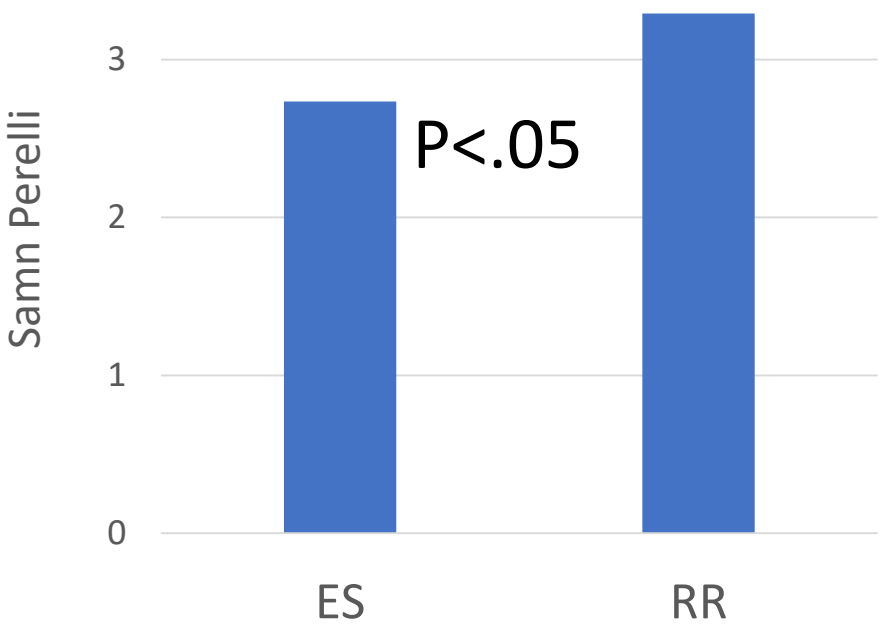
Mean sleep time over the 3 consecutive days
- Reduced Rest: 06:47
- Early Start: 06:04

Results – Fatigue at Top of Descent

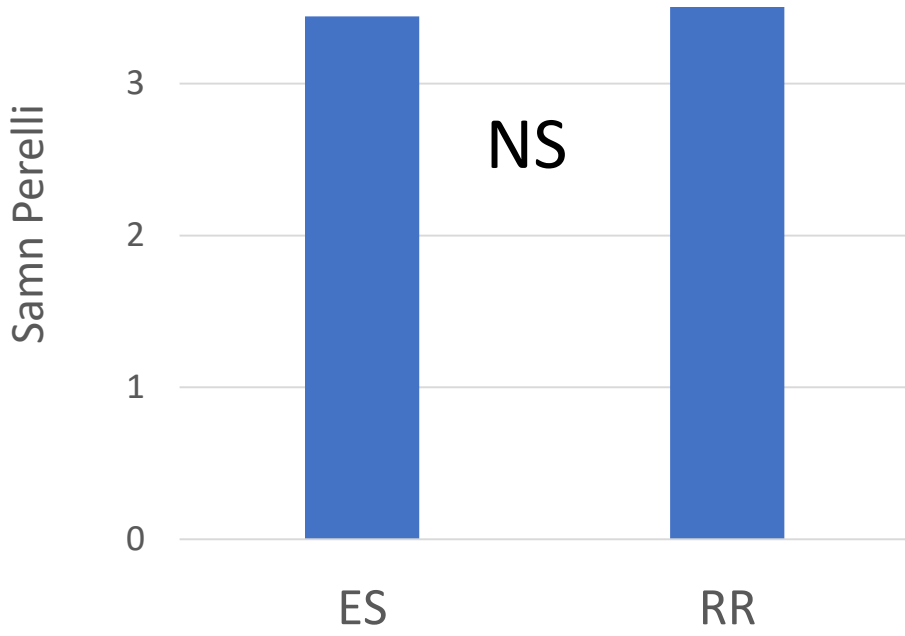
Mean fatigue levels are moderate(< 4) for RR and ES

Fatigue is significantly higher for Reduced Rests only on the first sector

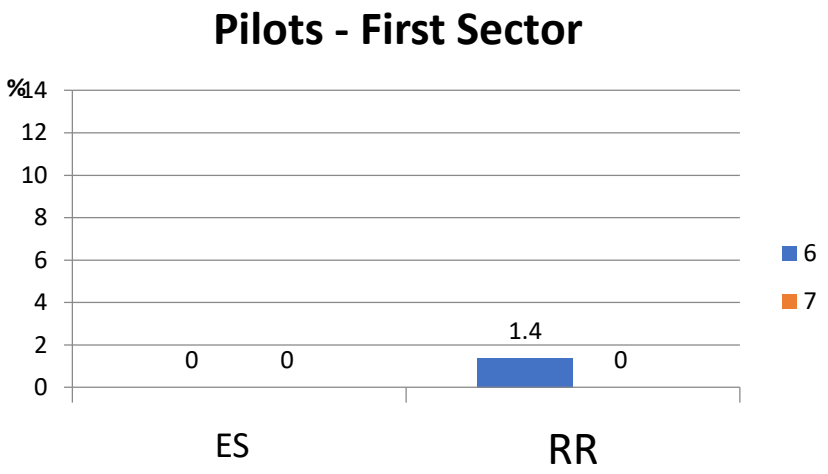
Mean fatigue on first sectors

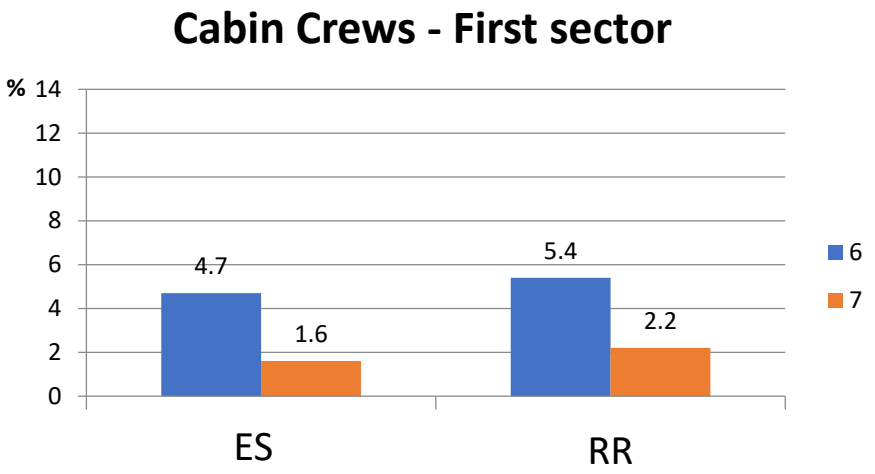


Mean fatigue on last sectors

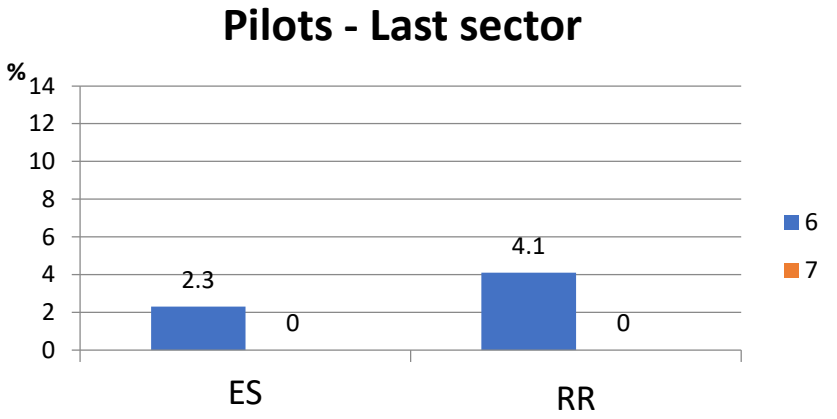


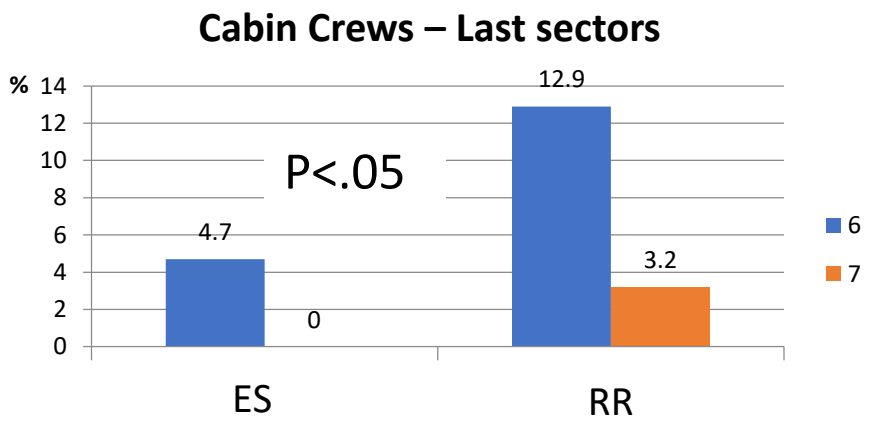
Results – Fatigue >5 at Top of Descent





From crew comments: highes fatigue scores are mainly associated with stand-by duties





Conclusion

- Mean sleep times are slightly lower for Reduced Rests compared to Early Start
- However, cumulative sleep debt on 3 consecutive days is higher for Early Start (-69%) compared to Reduced Rest (-44%) due to a rebound effect on sleep between the two Reduced Rests
- Mean levels of fatigue are moderate but significantly higher for reduced rests for the first sector, not for the last sector
- Based on these results the airline has obtained a derogation, subject to the implementations of mitigations measures and a systematic monitoring

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