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**ABSTRACT**

<b>Title: EXTENDED FLIGHT DUTY PERIODS AND ALERTNESS-RELATED FLIGHT SAFETY</b>	
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<p><b>Introduction:</b> When max. permissible Flight Duty Periods (FDPs) are extended, effectiveness of crew augmentation depends on the length of the FDP, quality and quantity of in-flight rest, and circadian factors. We performed a field study involving 14 hr-FDPs with 1 extra pilot and in-flight rest facilities consisting of 3 adjacent economy seats.</p> <p><b>Method:</b> During one duty roster, 36 pilots performed tests at wake-up, pre-duty, pre-rest, post-rest, and top of descent (TOD). Sessions involved completion of fatigue and sleepiness ratings, a 5-min vigilance task (VigTrack), and questions about sleep, comfort, and operational conditions. Objective sleep data were collected using an actigraph device.</p> <p><b>Results:</b> The mean onboard rest period was 135 min. Mean in-flight sleep efficiency was 16%, while 42% of the pilots could not sleep at all. Sleep was disturbed by light, noise, and passengers. Compared with pre-duty scores, fatigue and sleepiness at TOD had doubled and vigilance was impaired with 32%. Longer FDPs showed higher fatigue and sleepiness levels and lower vigilance at TOD.</p> <p><b>Conclusion:</b> Conditions in the onboard rest facility were not conducive to sleep. Fatigue, sleepiness, and vigilance levels at TOD approached the safety risk zone. In 20% of the pilots the level of alertness was considered as insufficient to safely perform flying tasks. Recommendations to improve in-flight sleep and criteria to assess alertness-related flight safety will be discussed.</p>	
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