

## **“Fatigue in Aviation Inspections: Sleep and Performance Data”**

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### ***Abstract***

A number of highly-visible accidents resulting in failures of the inspection system have led to investigation of issues of fatigue in a complex inspection task. Surveys of inspectors showed that they can work long hours on multiple shifts. Many studies human vigilance have shown that people engaged in tasks requiring sustained attention to detect rare and perceptually-difficult signals show a decrease in performance with time-on-task. Does this body of research provide guidance for fatigue countermeasures in complex inspection tasks such as non-destructive inspection (NDI)? Two experiments investigated Shift (0300 vs. 0900 start time), Period (1 vs. 2 hour task) and Time on Task (each 20 min interval) with potential countermeasures of Breaks (None vs. 3 minute break after each 20 min inspection) and Lights (20 vs. 400 Lux). Experiment 1 used industrially-experienced participants from the local community tested under simulated conditions, while Experiment 2 used aviation inspectors in hangars. Performance (cracks detected, false alarms, throughput) and sleep/fatigue (sleep history and ratings of sleepiness and fatigue) were measured. The two experiments showed a number of similar findings such as the differential effects of breaks for different shifts and periods, but there were differences. The main difference was that a vigilance decrement was found with aviation inspectors but not with community participants. Implications of these experiments, and of vigilance research, for fatigue countermeasures for aircraft inspectors are evaluated.

### ***Main Points***

- Aircraft inspection such as NDI can be performed for long periods and on multiple shifts, raising fatigue concerns.
- Vigilance research appears applicable, suggesting quite short periods of continuous inspection are optimum.
- When tested with aircraft inspectors on a complex NDI task, evidence of performance decrements were found.
- Performance was almost entirely unrelated to sleep or sleepiness measures.
- Specific advice of continuous working time and effectiveness of countermeasures is possible but not simple.

A copy of Dr. Colin G. Drury’s biographical information and presentation slides are provided in Appendix B.