



SAFETY ALERT 2017-04

Issue 01

Date of issue: 15th February 2017

SUBJECT:

FATIGUE IN AIRCRAFT MAINTENANCE ENVIRONMENT

REFERENCE PUBLICATIONS:

Air Accident Investigation Sector Case AIFN/0016/2012
CAR-145.47(b)
UK CAA CAP 716 (Aircraft Maintenance Human Factors)
FAA AC 120-115

REASON:

The final report of the Annex 13 incident [AIFN/0016/2012](#) determined that the cause of uncontrolled escaping hot engine gases that existed on the inboard side on the right (RH) inboard engine nacelle panel was due to the failure to re-install the left igniter plugs on both of the aircraft's engines following maintenance work.

The maintenance error occurred as a result of 19 identifiable contributory factors, two of these were directly related to engineer's duty periods;

- (a) The effect of fatigue on the engineer's decision making process due to his shift pattern of working an average of 8.5 hours a day for 32 days continuously.
- (b) Lack of guidance provided by the GCAA and the operator, on;
 - 1) the effect of shift duty durations and the management of risk associated with fatigue.
 - 2) man-hour methodology, duty times (including maximum days on duty), working hours, shift patterns, working beyond normal duty times, minimum rest between shifts and rest days.

The above mentioned investigation invited the GCAA to conduct additional research and discussion on the topic of fatigue in a maintenance environment. A Working Group (WG) composed of GCAA and representatives of the UAE Industry was formed to accurately assess the topic. The WG provided the following recommendation for the benefit of the whole industry and complements the current guidance available within CAR 145.

The following definition of fatigue has been agreed and accepted:

A physiological state of reduced performance capability resulting from sleep loss or extended wakefulness, circadian phase or workload (mental and/or physical activity), that can impair an individual's alertness and ability to perform safety related duties.

RECOMMENDATION:

- (a) *Maintenance Organisations approved in accordance with CAR 145 should enhance their Safety Management System by ensuring that:*



- 1) *their safety policy encourages continuous reporting of fatigue-related hazards and errors;*
 - 2) *they continually evaluate their safety-related processes to identify those that may be affected by fatigue and effectively mitigate the risk; and*
 - 3) *they periodically increase awareness to fatigue of all personnel performing safety-related tasks (not only certifying staff or support staff signing-off tasks) and regularly remind them of their responsibilities and liabilities of exercising, under the influence of fatigue, the privileges of the authorisation and/or licence granted to them.*
- (b) The review should in particular enhance the following two processes - (1) the planning of maintenance tasks and (2) the organising of shifts - to proactively take into account human performance limitations. Appendix P to UK CAA CAP 716 (Aviation Maintenance Human Factors) and FAA AC (Advisory Circular) 120-115 may be considered as good practice to mitigate fatigue in those areas with due consideration to the following:*
- 1) *Shifts longer than 12 hours should be considered undesirable;*
 - 2) *Shifts should not be extended by overtime to longer than 13 hours;*
 - 3) *A minimum rest period of 11 hours between shifts should not be compromised by overtime;*
 - 4) *When designing shift schedules the number of days off between shifts should be considered (e.g. after more 2-3 days on night shift, several days of rest time may be required to recuperate/alleviate sleep debt and fatigue);*
 - 5) *Total work , including overtime, should not exceed 60 hours or seven consecutive work days before a period of rest days; and*
 - 6) *All aircraft maintenance personnel should be given at least 14 days notice of schedule.*

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