

# Addressing Fatigue within an EASA Part 145 Production Planning Environment

## **Introducing Changes to Production Planning - 145.A.47 (Forthcoming regulation NPA 2019-05 (C))**

Presented by SofemaOnline ([online@sassofia.com](mailto:online@sassofia.com)). SofemaOnline (SOL) is a service provided by Sofema Aviation Services, offering a range of EASA, FAA and other leading regulatory compliant and vocational online courses, many with voice over.

The purpose of the Fatigue Risk Management System (FRMS) is to promote a reduction, as far as practicably reasonable, workplace fatigue and its associated risks, to ensure a safe and error-free work environment for employees, contractors, and clients.

FRMS should ideally be a component of your SMS, commitment from senior and line management together with clear consultation and effective communication with all employees should be ensured to provide a positive safety culture.

An essential obligation affecting all parties is the recognition of the shared responsibility between the Organisation and the individual employee, together with the need for effective oversight by the regulatory authority.

### **145. A.47 Production planning**

(b) As part of the management system, the planning of maintenance tasks, and the organising of shifts, shall take into account human performance limitations, including the risk of fatigue for maintenance personnel.

(c) When it is required to hand over the continuation or completion of maintenance tasks for reasons of a shift or personnel changeover, the relevant information shall be adequately communicated between the outgoing and the incoming personnel.

(d) The organisation shall ensure that any aviation safety hazards associated with external working teams carrying out maintenance at the organisation's facility are considered by the organisation's management system.

**AMC1 145.A.47 (b) Production planning (Fatigue Risk Management)**

(a) Human performance can be affected by excessive hours of duty and shift working, particularly with multiple shift periods, additional overtime or night work.

Induced fatigue is one of the factors that contribute to maintenance errors. In accordance with point 145.A.200(a)(3), these risks should be assessed and managed by the organisation, taking into account the size, nature, and complexity of the organisation and its operational working hours.

(b) In order to manage the risk related to the fatigue of personnel, the organisation should:

(1) as part of its management system, develop, define and maintain a policy for the management of fatigue-related risks, and the related procedures;

(2) define and use work schedules with maximum work and minimum rest hours that comply with the national and, when applicable, EU legislation on working time and taking into account the recommendations of Appendix H to Chapter 3 of ICAO Doc 9824;

**15 recommendations of the ICAO document 9824- Chapter 3, Appendix H**

- 1) No scheduled shift should exceed 12 hours work;
- 2) No shift should be extended beyond a total of 13 hours work by overtime (case of an unforeseeable occurrence);
- 3) Between two shifts, a minimum rest period of 11 hours should be anticipated;
- 4) It is recommended to respect a maximum of 4 hours work before a break;
- 5) A minimum break period should be at least 10 minutes plus 5 minutes for each hour worked since the start of the work period or the last break;
- 6) Scheduled working hours should not exceed 48 hours in any period of 7 successive days;
- 7) The total work should not exceed 60 hours or 7 successive workdays before a period of rest days;
- 8) A period of rest days should include a minimum of 2 successive rest days continuous with the 11 hours off between shifts;
- 9) If possible, a total of 28 days of annual leave should be granted. This period should not be less than 21 days a year;

10) To limit the increase of risks associated to night work, the number of successive night shifts should be limited taking into account the average duration of the shifts (maximum 6 shifts of 8 hours, maximum 4 shifts between 8 and 10 hours, maximum 2 shifts of 12 hours);

11) A working cycle including night work should be followed by a minimum of 2 successive rest days continuous with 11 hours off between shifts (i.e. a minimum of 59 hours off). 3 days of rest should be anticipated after a cycle including 3 shifts with night work;

12) The finish time of the night shift should not be later than 0800 hours;

13) A morning or day shift scheduled to start before 0600 hours should wherever possible, be delayed to start between 0700 and 0800 hours;

14) A series of morning or day shifts starting before 0700 hours should be limited to 4 before a 2 days rest period;

15) If possible, the mechanics' working schedule should be communicated at least 28 days before.

(b) In order to manage the risk related to the fatigue of personnel, the organisation should:

(3) ensure that existing internal reporting systems enable the identification of fatigue-related hazards;

(4) assess and manage the risks raised by these reports in accordance with the organisation's safety risk management procedures (see AMC1 145.A.200(a)(3)), and monitor the effectiveness of the related risk mitigation actions that are implemented;

(5) provide training and safety promotion information/briefings on the management of fatigue.

(c) The work hour limits defined under (b)(2) should not be exceeded merely for management convenience even when staff is willing to work extended hours. Without prejudice to the national and, when applicable, EU legislation on working time, in exceptional circumstances where the maximum work hours are to be exceeded (such as for urgent operational reasons), the organisation should carry out a risk assessment, and with the agreement of the individual staff member, it should be recorded how the increased fatigue risk will be mitigated. This may include:

(1) Additional supervision and independent inspection;

(2) Limitation of maintenance tasks to non-critical tasks;

(3) use of additional rest breaks;

- (4) Permission to nap in accordance with guidelines approved by the organisation.

### **GM1 145.A.47(b) Production planning**

(a) Limitations of human performance, in the context of planning safety-related tasks, refer to the upper and lower limits, and variations, of certain aspects of human performance (Circadian rhythm / 24 hours body cycle) which personnel should be aware of when planning work and shifts.

(b) With regard to fatigue, there are three primary factors that are relevant:

- (1) The amount of proper sleep;
- (2) The amount of time awake;
- (3) The time of day where work is performed.

(c) Fatigue is also impacted by high workloads (mental and/or physical activity) and by the physical and mental health of the staff concerned.

### **Type of Fatigue Background & Understanding**

The term fatigue can refer to several different types, please consider the following:

- a) Physical fatigue (examples include - muscular, lack of oxygen, lack of sleep, illness, poor nutrition);
- b) Mental fatigue (examples include – any activity associated with tasks requiring intense concentration, analysis and process of complex data/information);
- c) Emotional fatigue (examples include - working under constant pressure, undergoing continuous critics).

It is often difficult to determine which of the different types of fatigue are active – when we believe we have a fatigue-related issue.

### **Identifying Fatigue Related Signs**

It is useful and easier to consider the indicators for some classical fatigue-related signs. Often the fatigue is subjective and is not practically quantifiable. With the assessment being made based on the visible effects. The classical symptoms of fatigue are:

- a) Lack of awareness,
- b) Diminished movement capacity,
- c) Diminished vision,
- d) Slow reactions,
- e) Short-term memory problems,
- f) Too limited concentration losing an overview of the situation,
- g) Easily distracted by different things,
- h) Increased mistakes,
- i) Poor judgment,
- j) Inadequate decisions or no decision at all,
- k) Abnormal moods.

One of the prevailing factors playing a role in fatigue is related to working hours and shift working. Noticeable is an increase of the risk of errors in the case of shifts with long working hours and night shifts knowing that these risks increase significantly when these types of shifts are aggregated.

### **Optimising Working Hours / Shift Work within the Organisation**

The main points required to minimise the effects of the fatigue of the personnel working in the shift are as follows:

- a) Avoid excessive shift working periods,
- b) Anticipate enough amount of night sleep,
- c) Minimise sleep loss,
- d) Give the opportunity for extended rest when night sleep has been disrupted,
- e) Take into account reduced physical and mental capacity at night,
- f) Take into account individual situations,

- g) Provide enough support/help to the technicians outside administrative periods,
- h) Give the opportunity for recovery,
- i) Overall minimisation of night shifts,
- j) Provide longer rest periods after night shifts,
- k) Launch the most complex tasks generally during the day,
- l) Ensure that appropriate checks are made after night shifts,
- m) Avoid repetitive tasks over a long period or anticipate intermediary breaks.
- n) Studies enabled to draw great principles, which can be used to implement an organisation of work taking into account human performance and limitations.
- o) To follow the hierarchy of standards, the maintenance organisation must reconcile the requirement related to labour regulations with Human factors related principles and their operational requirements.

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