

# AIR CREW DUTY TIME

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Limitation of air crew duty time is very sensitive topic. The article is aimed to determine the stage of meeting specified time limits of the duty, flight duty and rest periods for flight crew in practice. To do this, pilots from several airlines anonymously filled in a questionnaire assembled according to EU OPS. The text of this article contains 2 parts. The first one describes the actual and the most widely used regulations of air crew duty time limitations. The second part is focused on real observance of limit compliance using a questionnaire.

**K e y w o r d s:** circadian rhythm, duty, flight duty, limit, period, sleep

## 1 INTRODUCTION

It is well known that the most aviation accidents were caused by error of human factor. It does not mean that just air crew is responsible for this statistic, but air crew duty time limitations influence this factor directly. It is very important to minimize exhaustion and inattention in the cockpit. Airlines have to keep limitations but there is the question: "How is it working in the reality?" When you keep limits, you have to pay extra money because you have to land more often; you need more members of air crew and so on. What if air safety is moved behind financial profit and the passengers are in danger? Another view on this problem is the intelligibility of legislation. What if airlines keep the limits, but the limits are wrong because of ambiguous terms? Answers for these questions are in the questionnaire, which was filled in by 42 pilots from countries, where EU OPS is mandatory.

## 2 ACTUAL REGULATIONS

Most of the European countries are grouped under EASA. For these states EU OPS legislation is mandatory. Problem of Air Crew Duty Time is integrated into Subpart Q "Flight and duty time limitations and rest requirements". Subpart does not include all limits and airlines have to establish internal documents, which cover whole spectrum. In some countries the state regulations cover these limits including Subpart Q missing parts. This part of article contains the most widely used limits and terms.

### 2.1 Window of Circadian Low - WOCL

Often referred to as the "body clock", circadian rhythm is a 24-hour cycle that rules everything. This internal body clock is affected by external forces, such as sun rise and time zones. The sleep urge is greatest at night with a small increase at noon (Figure 1). Sleep need increases throughout the waking hours and is replenished during sleep. The most important thing is that sleep need and sleep urge are culminated at same time about midnight.

In the aviation, the Window of Circadian Low (WOCL) is the period between 02:00 and 05:59. Within a band of three time zones the WOCL refers to home base time. Beyond these three time zones the WOCL refers to home base for the first 48 hours after departure from home base time zone and to local time thereafter.

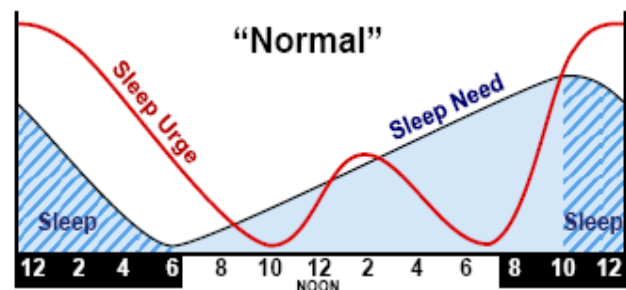


Figure 1 Graph of circadian rhythm

### 2.2 Flight and duty limitations

Flight and duty limitations can be split into the cumulative duty hours and the limit on total block time.

In case of cumulative duty hours the duty period starts when a crew member is required by an operator to commence a duty and ends when the crew member is free from all duties. Total duty period to which a crew member is assigned must not exceed:

- 190 duty hours in any 28 consecutive days, spread as evenly as practicable throughout this period;
- 60 duty hours in any seven consecutive days.

Block time is the time between an aeroplane's first movement from its parking place for the purpose of taking off until it comes to rest on the designated parking position and all engines or propellers are stopped. Total block time of the flights on which an individual crew member is assigned as an operating crew member does not exceed:

- 900 block hours in a calendar year;
- 100 block hours in any 28 consecutive days.

### 2.3 Maximum daily flight duty period

The maximum basic daily flight duty period is 13 hours, which are reduced by 30 minutes for each sector since the third sector onwards with a maximum total reduction of two hours. This limit can be rewritten into a table:

No. of legs	1	2	3	4	5	6	>6
Max. daily FDP	13	13	12,5	12	11,5	11	11

**Figure 2 Maximum daily flight duty period**

When flight duty period starts in the WOCL, the maximum hours stated in table (Figure 2) will be reduced by 100 % of its encroachment up to a maximum of two hours. When flight duty period ends in or fully encompasses the WOCL, the maximum flight duty period stated in table (Figure 2) will be reduced by 50% of its encroachment.

### 2.4 Rest

The minimum rest which must be provided before undertaking a flight duty period starting at home base shall be at least as long as the preceding duty period or 12 hours, whichever is greater. In case of a flight duty period starting away from home base the rest shall be at least as long as preceding duty period or 10 hours, whichever is greater plus there must be at least eight hour sleep opportunity. Because of changing time zones, there must be an additional rest time, which will ensure complete rest. In case of in-flight rest national civil aviation authority must decide.

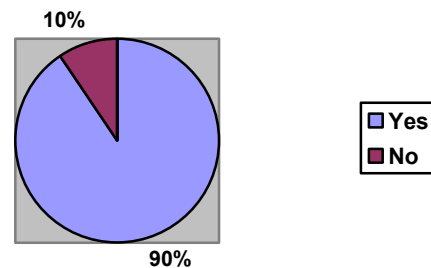
## 3 QUESTIONNAIRE

Regulation in any area of human activity should be strictly adhered, especially in aviation, where even the smallest mistake can mean loss of life. A questionnaire was designed to determine the status of observance the time limits. It was fully anonymous and filled in by 42 pilots from airlines where the EU OPS is mandatory. Results are shown in the next graphs.

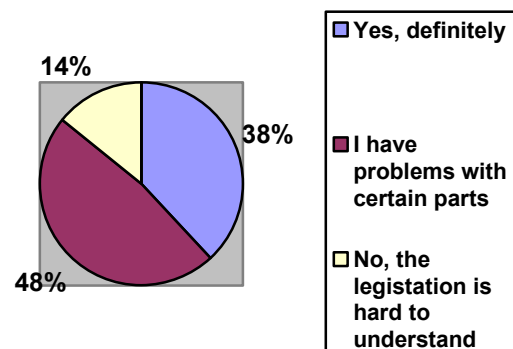
### 3.1 Intelligibility of legislation

In the first graph (Figure 3) 90% pilots said, that they sufficiently understand current legislation, but in the second graph (Figure 4) just 38% pilots think that legislation is explained clearly. After comparison of the results, the fact is that 52% people who filled in the questionnaire know the limits, but they are not sure what the legislation is talking about. When it comes to regulation compliance, it is all about the collaboration of

controller and carrier himself. In this sense the carrier is responsible for the application of regulations in place, their implementation and verification of employees in their knowledge on the subject. The controller is responsible for defining clear and understandable limits without the possibility of unambiguous explanation. There are two solutions for this problem. The first one is to rewrite legislation and eliminate problematic phrases. The second one is to publish a manual with some practical examples.



**Figure 3 Do you sufficiently understand current legislation?**

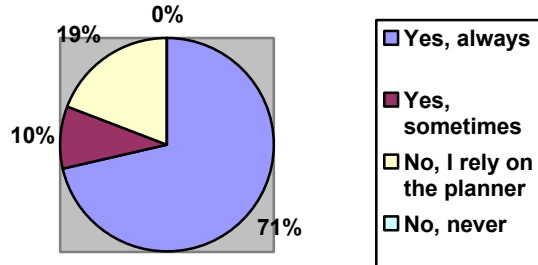


**Figure 4 In your opinion is the current legislation about flight crew duty time explained clearly?**

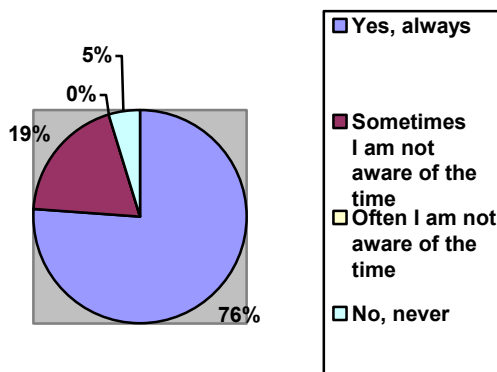
### 3.2 Preflight limit information

In Figure 5 and 6 shown graphs are talking about preflight information. Regulation does not tell that pilot is not required to count and check this information. It only says that pilots must not to exceed limit. Mostly the flight planner is responsible to check all types of limits. The fact

that more than 70% pilots check limits is the sign of their professionalism.



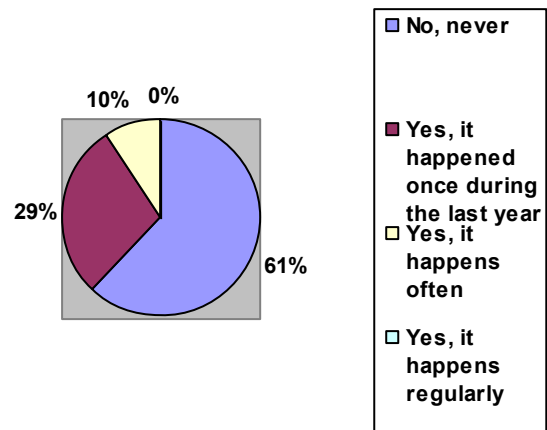
**Figure 5** After being assigned for flight crew duty, do you check, whether you will have sufficient rest at the beginning of your duty?



**Figure 6** Before starting flight crew duty or duty, are you aware what is the maximum time you can spend in duty without violating the allowed limits?

### 3.3 Exceeding of cumulative duty hours

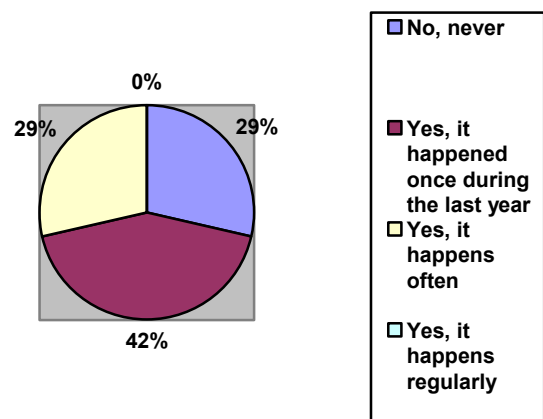
10% of pilots answered that they exceed the cumulative hours often. Cumulative hours are determined for the sake of compliance with the day off. In the situation without this regulation, air crew could be on duty every day for 13 hours. It means 364 hours during 28 ongoing days or 91 hours during 7 ongoing days. But theoretically there is no place for a day off and any limit was violated.



**Figure 7** Did you exceed the cumulative duty hours, i.e. 190 hours of duty in 28 ongoing days, or 60 hours of duty in 7 ongoing days?

### 3.4 Exceeding of basic daily flight duty period

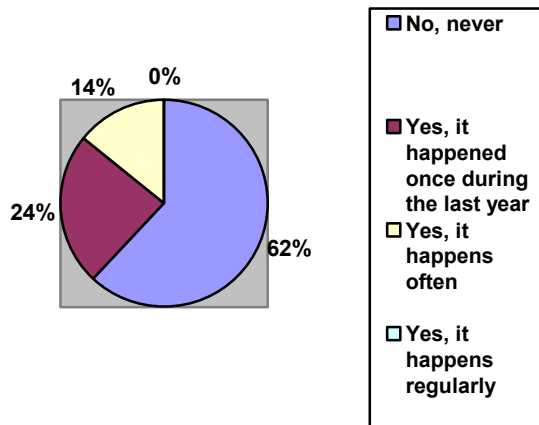
Maximum basic daily flight duty period limit is 13 hours (without modification). 29% answers are talking about frequent crossing of these limits. This percentage is unacceptable because of the sleep debt. When sleep debt rises above a certain level, person may suffer from fatigue, inattention and depression, what is in air traffic highly hazardous. The fact is that air crew can exceed limit for specified time when the special situation is created. Special situation means weather or traffic problems. Exceeding has to be confirmed by all crew including stewards. In the model situation where 150 persons are on board, air crew is composed of 2 pilots, every day 50 000 flights are performed and 29% of the pilots are tired at same time there are 2 175 000 passengers in danger.



**Figure 8** Did you exceed the maximum basic daily flight duty period?

### 3.5 Violation of minimum rest period

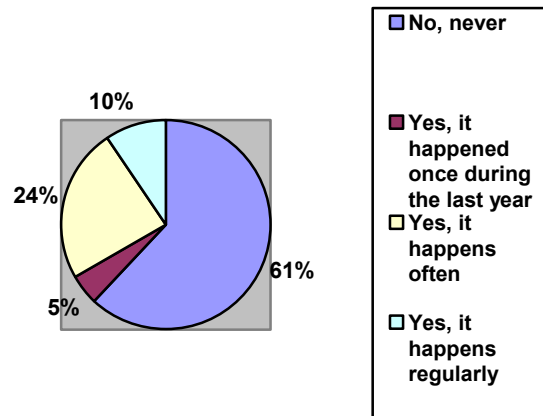
Situation is similar as in Figure 8. There are 14% pilots who often do not keep minimum rest period. Their sleep debt can rise above a certain level again. In the same model as in the previous paragraph, there is more than 1 000 000 passenger on board in danger. Few months ago, captain fell asleep when his co-pilot left the cockpit and airplane flew a few minutes just in autopilot mode. It is important to keep all limits to prevent situations like this.



**Figure 9 Did you violate the minimum rest period after duty?**

### 3.6 Forced start of duty

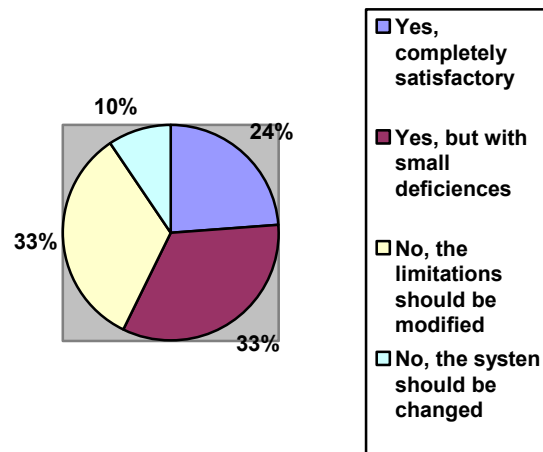
Question, where everyone expected 100% for “No, never” in reality brought just 61%. In this case other replies are unacceptable. The flight crew would in any case not be pressured to enter the duty, if they feel ill or they feel too tired. There could be a situation, when the pilot will be forced to enter the duty with a slight headache and during flight will develop a stroke with serious consequences. But is anyone able to say “no”? This “no” can mean financial loss or dismissal from job.



**Figure 10 Were you pressured to start your duty even if you were medically disabled or after previous duty did not feel rested enough?**

### 3.7 Pilots' opinion on limits

43% pilots think that current limitations should be changed or modified. The question is: “Why such a big percentage wants the limits to change? “ Reason can be intelligibility of legislation. The first and second question confirmed that legislation is hard to understand. It is true, legislation is written by terminology, but someone out of office does not know what is going on, especially the greenhorns.



**Figure 11 In your opinion according to your experience, are the current flight crew duty limitations satisfactory?**

## 5 CONCLUSIONS

The goal of this article was to highlight the actual filling time limits on air crew duty time. As is clear from the questionnaire, the situation is not as good as it may seem. The biggest problem could be considered that the regulating text itself is written in an unclear style which makes limits uncertain and it causes a problem to understand them for 62% of pilots who participated in the questionnaire. There are two solutions for this problem. The first one is to rewrite legislation and eliminate problematic phrases. The second one is to publish a manual with practical examples.

It should be noted that the safety of air traffic was placed behind financial gain. This conclusion comes from 39% pilots who indicated that they were sometimes pressured to enter service, despite the fact that they did not feel in good physical condition or suffer from fatigue. Such a practice is unacceptable. It would be suffice that the pilot was only once forced to sign on with a mild headache of which a stroke would develop and it would seriously endanger the safety of the flight and all persons not just on board.

## BIBLIOGRAPHY

- [1] EU OPS Subpart Q. Dostupné na internete: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:254:0001:0238:EN:PDF>
- [2] JAVORKA, Kamil a kol.: Lekárska fyziológia. Banská Bystrica: Osveta, 2001. 680 s. ISBN 80-8063-023-2.

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