

# The Science of Sleep

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FAR 117 and the Airline Industry

April 1, 2014

# Agenda

- Sleep science
- Rationale for the rule
- Key elements of FAR 117
- Q/A

## **FAR Part 117 and Fatigue**

- Effective 2014
- Science based to address the risk that fatigue poses to passenger airline operations

## **Key changes from previous rules**

- Scheduled and day-of limits the same (daily duty extension exception)
- Cumulative limits cannot be extended and are rolling in nature
- Measure of legality at takeoff, not pushback
- Crew body-clock a key component of legality calculation
- Rest may not be reduced
- No more Domestic/Flag distinctions – Just a question of augmentation

# FAR 117

Flight  
Time

Flight  
Duty

Rest

# Flight Time Limitations

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# Flight Time

Table A

Daily

Cumulative

Number of Pilots	Flight Time Limit
2	2000-0459 – 8:00
	0500-1959 – 9:00
3	13:00
4	17:00

672 Hours	365 Days
100 hours in any 672 consecutive hours	1000 hours in any 365 consecutive cal. days

# “Legal to start, legal to finish” is no more.

Scheduled Duty Period		
IAH	SAN	3:18
SAN	ORD	<u>4:03</u>
	Total	7:21

Actuals for first leg		
IAH	SAN	4:50
SAN	ORD	<u>4:03</u>
	Total	8:53

A pilot was scheduled to fly 7:21 of flight time.

Under 121, pilot can complete the duty day even though he will exceed the maximum scheduled limit.

Under 117, the *scheduled* limit is the *actual* limit. In this example, the pilot may not be able to operate SAN-ORD.

# Managing Ops

Actuals for first leg; planning the second

IAH	SAN	4:50
SAN	ORD	<u>4:03</u>
	Total	8:53

For our SAN-ORD leg, we nearly exceed the 9-hour maximum flight time limit based on scheduled taxi-out time (good by :07). Let's break down the phases of the flight.

**:10 Taxi-Out + 3:43 In-Route Time + :10 Taxi-In = 4:03 scheduled**

The flight has a built-in (planned) taxi-out time of :10 *and* we're currently expecting to be :07 minutes under the daily limit. Therefore, the flight can taxi-out for a *maximum of :17*.



## More Dynamic than Schedule Construction Compliance; Real-time Evaluation is Required and Difficult to Finalize in Advance

- Example: A flightcrew member reports for an unaugmented FDP at 0700.
- “Table A” Maximum **Flight Time**: 9 Hours
- Since an actionable OFF time is not known until push, a new legality check must be calculated and monitored; e.g. Maximum Taxi-Out Time or (Max Taxi).

SEG	SCHED	ACTUAL	SEG	SCHED	ACTUAL
1	2:00	2:15	1	2:00	2:15
2	2:00	2:15	2	2:00	2:15
3	2:00	?	3	2:00	2:30
4	2:00	[2:00]	4	2:00	[2:00]
<b>TOTAL</b>	<b>8:00</b>	<b>?</b>	<b>TOTAL</b>	<b>8:00</b>	<b>[9:00]</b>

$$\underline{2:15 + 2:15 + 2:30} + 1:40 \text{ (Enroute + Taxi-in time)} = \underline{8:40}$$

$$\text{(Limit) } 9:00 - \underline{8:40} = :20 \text{ Maximum taxi out}$$

# Flight Duty Periods (FDP)

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# Flight Duty Period (FDP) is defined as...

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“...a period that begins when a flightcrew member is required to report for duty with the intention of conducting a flight, a series of flights, or positioning or ferrying flights, and ends when the aircraft is parked after the last flight and there is no intention for further aircraft movement by the same flightcrew member.”

# Flight Duty

Daily

Cumulative

Table B

Report Acclimated Time	Maximum FDP Hours Based on Number of Flight Segments						
	1	2	3	4	5	6	7+
0000-0359	9	9	9	9	9	9	9
0400-0459	10	10	10	10	10	10	10
0500-0559	12	12	12	12	12	12	12
0600-0659	13	13	13	13	13	13	13
0700-1159	14	14	14	14	14	14	14
1200-1259	13	13	13	13	13	13	13
1300-1659	12	12	12	12	12	12	12
1700-2159	12	12	12	12	12	12	12
2200-2259	11	11	11	11	11	11	11
2300-2359	10	10	10	10	10	10	10

Table C

Report Acclimated Time	Class 1 Rest Facility		Class 2 Rest Facility		Class 3 Rest Facility	
	Pilots	Pilots	Pilots	Pilots	Pilots	Pilots
0000-0559	15	17	14	15.5	13	13.5
0600-0659	16	18.5	15	16.5	14	14.5
0700-1259	17	19	16.5	18	15	15.5
1300-1659	16	18.5	15	16.5	14	14.5
1700-2359	15	17	14	15.5	13	13.5

168 Hours

672 Hours

60 hours in any 168 consecutive hours

190 hours in any 672 consecutive hours

# Unaugmented Daily FDP Limits

Table B

Report Acclimated Time	Maximum FDP Hours Based on Number of Flight Segments						
	1	2	3	4	5	6	7+
0000-0359	9	9	9	9	9	9	9
0400-0459	10	10	10	10	9	9	9
0500-0559	12	12	12	12	11.5	11	10.5
0600-0659	13	13	12	12	11.5	11	10.5
0700-1159	14	14	13	13	12.5	12	11.5
1200-1259	13	13	13	13	12.5	12	11.5
1300-1659	12	12	12	12	11.5	11	10.5
1700-2159	12	12	11	11	10	9	9
2200-2259	11	11	10	10	9	9	9
2300-2359	10	10	10	9	9	9	9

# Augmented Daily FDP Limits

Table C

Report Acclimated Time	Class 1 Rest Facility		Class 2 Rest Facility		Class 3 Rest Facility	
	3 Pilots	4 Pilots	3 Pilots	4 Pilots	3 Pilots	4 Pilots
0000-0559	15	17	14	15.5	13	13.5
0600-0659	16	18.5	15	16.5	14	14.5
0700-1259	17	19	16.5	18	15	15.5
1300-1659	16	18.5	15	16.5	14	14.5
1700-2359	15	17	14	15.5	13	13.5

# Onboard Crew Rest Facilities

Class 1 Rest Facility	Class 2 Rest Facility	Class 3 Rest Facility
<p><b>Bunk</b>  <b>Separated from Flight Deck</b>  <b>Temp/Light Control</b></p>	<p><b>First Class</b>  <b>Near Flat Position</b>  <b>Curtain (Sound/Darkness)</b></p>	<p><b>First Class</b>  <b>40 Degree Recline</b>  <b>Leg/Foot Support</b></p>

**Class 1:** A bunk or other surface that allows for a flat sleeping position and is located separate from both the flight deck and passenger cabin in an area that is temperature-controlled, allows the flightcrew member to control light, and provides isolation from noise and disturbance.

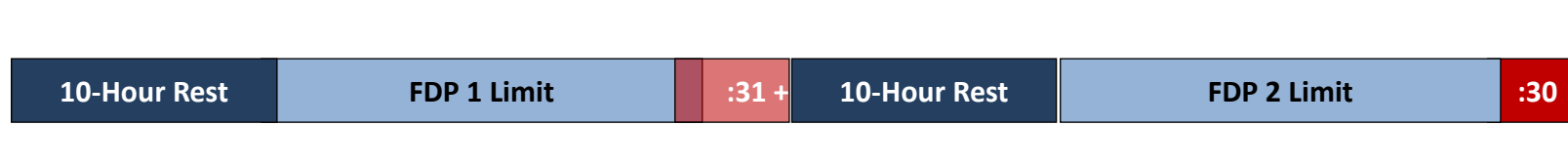
**Class 2:** A seat in an aircraft cabin that allows for a flat or near flat sleeping position; is separated from passengers by a minimum of a curtain to provide darkness and some sound mitigation; and is reasonably free from disturbance by passengers or flightcrew members.

**Class 3:** A seat in an aircraft cabin or flight deck that reclines at least 40 degrees and provides leg and foot support.

# FDP Extensions

Under certain conditions, a daily FDP (Table B or C) limit may be extended by up to two hours.

**One condition** is that a pilot may only have one extension *greater than 30 minutes* prior to receiving a 30-hour rest break.



Above, FDP 1 exceeded the table limit by 31+ minutes. Since there was not an intervening 30-hour break, FDP 2 has a hard stop at FDP + :30. This is true *even if the second extension were due to unforeseen circumstances that occurred after takeoff.* (Possible diversion to avoid the violation)

**Diversions** and fuel stops are not exempt.



# Acclimation and Theater

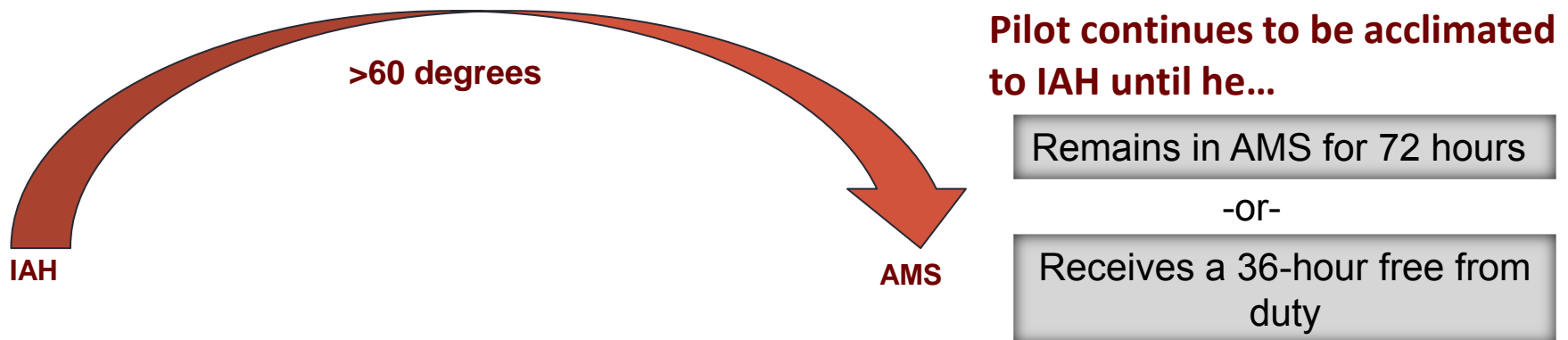
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# Acclimation & Theater

**Acclimation** gives consideration to a pilot's *body-clock* or the *time zone* in which he is *acclimated*.

**Acclimated:** A pilot becomes *acclimated* when he has been in a theater 72 hours or has been given at least 36 consecutive hours free from duty in that theater.

**To change Theaters,** a pilot must travel more than 60 degrees longitude in an FDP or series of FDPs. Below, a pilot, acclimated to IAH, flies **IAH – AMS**.



- Maximum FDP limit is reduced by 30 minutes when unacclimated

# Augmented Daily FDP Limits

Table C

Report Acclimated Time	Class 1 Rest Facility		Class 2 Rest Facility		Class 3 Rest Facility	
	3 Pilots	4 Pilots	3 Pilots	4 Pilots	3 Pilots	4 Pilots
0000-0559	15	17	14	15.5	13	13.5
0600-0659	16	18.5	15	16.5	14	14.5
0700-1259	17	19	16.5	18	15	15.5
1300-1659	16	18.5	15	16.5	14	14.5
1700-2359	15	17	14	15.5	13	13.5

# Rest

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# Rest

Rest

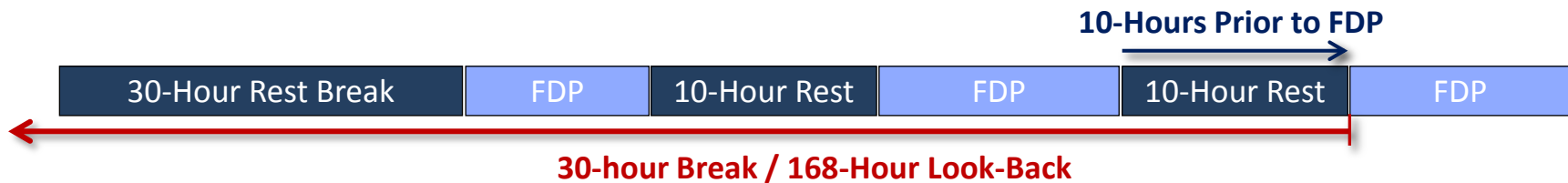
10  
Hours

30/  
168

# Rest Requirements

**10 CONSECUTIVE HOURS** minimum and may not be reduced. This rest must provide a minimum of eight uninterrupted hours of sleep opportunity.

**30 CONSECUTIVE HOURS** free from all duty within the 168 consecutive hour period prior to beginning an FDP. This is a look-back from the start of an FDP.



**Note:** All FAA-mandated rest periods must be prospective

# Reserve Duty

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- Long Call
- Short Call
- RAP + Trip (FDP)

# Fitness for Duty

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# Fitness For Duty

**Fit for duty means physiologically and mentally prepared and capable of performing assigned duties at the highest degree of safety.**

## FAR 117

- Each flightcrew member must report for any flight duty period rested and prepared to perform his or her assigned duties.
- The pilot must sign that he or she is fit for duty to operate each assigned flight.
- If a pilot reports fatigue, he or she must be removed from the flight.

## FAR 121

- More vague with regard to fitness for duty

# Summary

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## **FAR 117 introduces a new paradigm in crew legality management**

- Limits for the actual operation are the same as limits for schedule (extension exception).
- Legality is measured at the takeoff roll, adding more dynamics to legality considerations.
- Rest is required immediately before a Flight Duty Period (FDP); that is, rest is measured prior to reporting for an FDP.
- Cumulative clocks are rolling clocks and cannot be extended.
- Crew body-clock a key component of legality calculation
- Each crew member must certify their individual fitness for duty prior to every segment

# Open Discussion Q/A

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