



Research Request:

**Crew Scheduling Regulations and Practices**

Research Response:

**Published Requirements**

**Regulations:**

- CFR 14 Part 121. Regulatory requirements for U. S. FAA registered aircraft flying under Part 121 are undergoing transition to a new FAR part 117, intended to eventually encompass other commercial operators under other regulatory parts (Part 125/135). A comparison table of the current duty regulations for Part 121 carriers and the upcoming new Part 117 regulations are summarized in table 1 on page 2.
- CFR 14 Part 91: No duty or crew scheduling limitations exist for operators flying under this regulation, with the exception of Part 121 air carriers flying ferry flights.
- CFR14 Part 91K: Unique crew and duty scheduling requirements exist for operations under this FAR part, and are separated into non-augmented and augmented crew profiles.
- CFR 14 Part 135: Unique crew and duty scheduling requirements exist for operations under this FAR part, and are separated into non-augmented and augmented crew profiles.

**Standards:**

Business Aviation Standards: IS-BAO requires a fatigue risk management system (FRMS) for flight crew members. This requirement is described in Section 6.13 and specific guideline examples are provided in GM 6.13. This guidance follows the Flight Safety Foundation (FSF) study titled “Principles and Guidelines For Duty and Rest Scheduling in Corporate and Business Aviation.” Most FAR Part 91 flight operations utilize this guidance exactly or use it as a foundation with further specificity for their operation and modify with local parameters that best fit their respective flight operation. Examples are provided in later sections.

**U. S. CFR 14 Part 121 and Upcoming Part 117 Regulations**

Item	"New" FAR Part 117	Current Rule FAR Part 121
Applicability	Applicable to all types of passenger operations - scheduled and non-scheduled, domestic and international.	Different rules for scheduled, non-scheduled, domestic, supplemental and international Part 121 operations.
Flight Duty Periods (FDP)	Limits the length of the FDP based on the time of day the pilot starts the FDP and number of landings the crew is to perform. See table below.	Currently there are no limits in the regulations. The 16-hour limit was obtained through a legal interpretation and does not take into account the time of report and is not adjusted for the number of flights scheduled in the FDP.
Minimum Rest	Minimum rest is 10 hours, which begins when the crew is released from duty. This is designed to ensure an 8-hour sleep opportunity. The crew will be required to notify the company if the rest break needs to be extended to achieve the 8-hour sleep opportunity.	9 hours reducible to 8 hours that starts when the crew is released from duty and ends when the crew reports for duty. Does not factor in a sleep opportunity.
Reduced Rest	Not applicable.	Reducible to 8 hours rest.
Maximum Flight Time Limits, Unaugmented	Hard limit, not extendable. See Table below.	8 hours scheduled that can be extended due to "unforeseen circumstances."
Cumulative Limitations	Cumulative fatigue protections are measured in terms of flight hours... <ul style="list-style-type: none"> <li>• 100 block hours in any 672 consecutive hours (28 days)</li> <li>• 1,000 block hours in any 365-day period ... and duty hours:</li> <li>• 60 flight duty period hours in any 168 consecutive hours</li> <li>• 190 flight duty period hours in any 672 consecutive hours.</li> </ul>	Limits flight hours on the basis of weekly, monthly and yearly basis dependent on type of operations flown and type of equipment operated (e.g. domestic, international or supplemental).
Flight Duty Period - Split Duty	Applied to night operations between the hours of 2200 and 0500 and requires a 3-hour rest in a suitable accommodation during the FDP.	No current limits.

Reserve	<ul style="list-style-type: none"> <li>-Defines short-call and long-call re-serve.</li> <li>-Airport/standby reserve (as defined in Part 117) is part of the pilot's FDP.</li> <li>-Maximum short-call reserve availability period is 14 hours.</li> <li>-Maximum amount of time spent on reserve and FDP is the value in the Table B FDP table plus 4 hours or 16 hours, whichever is less, as measured by the start of the reserve availability period.</li> <li>- May be shifted from long-call to short-call only if pilot receives a legal rest period (10 hours).</li> </ul>	Reserve not defined in current FAR.
FDP Extensions	FDP may be extended by 2 hours with concurrence of PIC. Extension beyond 30 minutes can only occur once before receiving a 30-hour rest period. Any extension cannot violate the cumulative duty limit. Strict reporting requirements on all extensions beyond 30 minutes.	No current rule for extensions or reporting. Everything is based on scheduled operations and flight time.
Fitness for Duty	Joint responsibility between the pilot and the airline for ensuring the pilot is fit for duty. The pilot must sign that he or she is fit for duty to take the flight. If a pilot reports fatigue, he or she must be removed from the flight.	Current FAR is vague in regards to fitness for duty.
Fatigue Risk Management Systems	Provides an option to develop an FAA-approved FRMS.	No current option.

**U. S. CFR 14 Part 91 Regulations**

No regulatory crew scheduling requirements exist for crew scheduling under this part. Other regulations cover fitness for duty requirements.

The vast majority of business aviation operators follow the aforementioned FSF study guidelines as recommended by the IS-BAO. Some operations do make local modifications for their specific operational requirements and also follow a waiver request process when deviations from these standards are necessary.

The following two pages are extracted from the IS-BAO.

**Table 1**  
**Flight Safety Fatigue Countermeasures Task Force**  
**Overview of Guidelines and Recommendations for**  
**Corporate and Business Aviation**

	Off Duty			Duty Period		Flight Time			
	Per 24-hour Period	Per Week	Other	Per 24-hour Period	Weekly, Monthly, Annually	Per 24-hour Period	Per Week	Monthly, Annually	
<b>Two Pilots</b>	10 hours	Minimum 36 continuous hours, including two consecutive recovery nights, in a seven-day period (calculated on a seven-day or 168-hour rolling basis) ... or ... minimum 48 continuous hours in a 10-day period	48 continuous hours on return home following duty period across multiple time zones	14 hours	There are Not sufficient scientific data to provide specific guidance in this area; nevertheless, maximum cumulative duty periods should be adjusted downward over increasing time frames.	10 hours	There are not sufficient scientific data to provide specific guidance in this area; nevertheless, maximum cumulative flight time should be adjusted downward over increasing time frames.		<b>Standard</b>
	12 hours (following extended flight time)			14 hours		Up to 12 Hours (requires that landings, maximum cumulative hours be restricted, with compensatory off-duty time)	Maximum of four cumulative hours of extension		
	<b>Off Duty</b>			<b>Duty Period</b>		<b>Flight Time</b>			
<b>Three Pilots (Augmented)</b>	12 hours	Same as above	Same as above	Reclining seat 18 hours	Same as above	16 hours **	Same as above		<b>Extended *</b>
	12 hours			Supine bunk 20 hours		18 hours **			

\* Extended operations can involve duty/rest cycles longer than 24 hours.

\*\* Each flight crew gets maximum sleep opportunity with minimum four hours total; maximum two consecutive duty periods with 18 hours off duty.

Source: Flight Safety Foundation and U.S. National Aeronautics and Space Administration  
Included with the permission the Flight Safety Foundation

**Table 2**  
**Flight Safety Fatigue Countermeasures Task Force**  
**Overview of Guidelines and Recommendations for**  
**Flight Operations During the Window of Circadian Low**

The “window of circadian low” is best estimated to be the hours between 0200 and 0600 for individuals adapted to a usual day-wake/night-sleep schedule. Guidelines apply to the following operations within this window of circadian low:

1. Landing
2. Flight through both sides of the window of circadian low
3. Duty period that starts at 0400 or earlier in the window of circadian low

	Off Duty			Duty Period		Flight Time			
	Per 24-hour Period	Per Week	Other	Per 24-hour Period	Weekly, Monthly, Annually	Per 24-hour Period	Per Week	Monthly, Annually	
<b>Two Pilots</b>	12 hours	48 continuous hours in seven-day period following multiple duty periods in circadian low (calculated on a seven-day or 168-hour rolling basis)	48 continuous hours on return home following duty period across multiple time zones	12 hours	There are not sufficient scientific data to Provide specific Guidance in this area; nevertheless, maximum cumulative duty periods should be adjusted downward over increasing time frames.	10 hours (requires that landings be restricted)	There are not sufficient scientific data to provide specific guidance in this area; nevertheless, maximum cumulative flight time should be adjusted downward over increasing time frames.		<b>Standard</b>
	<b>No two pilot extensions recommended</b>								
	Off Duty			Duty Period		Flight Time			<b>Extended *</b>
<b>Three Pilots (Augmented)</b>	12 hours	Same as above	Same as above	Reclining seat 18 hours	Same as above	16 hours **	Same as above		
	12 hours			Supine bunk 20 hours		18 hours **			

\* Extended operations can involve duty/rest cycles longer than 24 hours.

\*\* Each flight crew gets maximum sleep opportunity with minimum four hours total; maximum two consecutive duty periods with 18 hours off duty.

Source: Flight Safety Foundation and U.S. National Aeronautics and Space Administration  
Included with the permission the Flight Safety Foundation

**U. S. CFR 14 Part 91k Regulations**

**91.1057**

(e) A flight crewmember may continue a flight assignment if the flight to which he or she is assigned would normally terminate within the flight time limitations, but because of circumstances beyond the control of the program manager or flight crewmember (such as adverse weather conditions), is not at the time of departure expected to reach its destination within the planned flight time. The extension of flight time under this paragraph may not exceed the maximum time limits set forth in § 91.1059.

(f) Each flight assignment must provide for at least 10 consecutive hours of rest during the 24-hour period that precedes the completion time of the assignment.

(g) The program manager must provide each crewmember at least 13 rest periods of at least 24 consecutive hours each in each calendar quarter.

(h) A flight crewmember may decline a flight assignment if, in the flight crewmember's determination, to do so would not be consistent with the standard of safe operation required under this subpart, this part, and applicable provisions of this title.

(i) Any rest period required by this subpart may occur concurrently with any other rest period.

(j) If authorized by the Administrator, a program manager may use the applicable unscheduled flight time limitations, duty period limitations, and rest requirements of part 121 or part 135 of this chapter instead of the flight time limitations, duty period limitations, and rest requirements of this subpart.

**91.1059 Flight time limitations/rest requirements: One or two pilot crews.**

(b) Except as provided in paragraph (c) of this section, during any 24 consecutive hours the total flight time of the assigned flight, when added to any commercial flying by that flight crewmember, may not exceed—

- (1) 8 hours for a flight crew consisting of one pilot; or
- (2) 10 hours for a flight crew consisting of two pilots qualified under this subpart for the operation being conducted.

(c) No program manager may assign any flight crewmember, and no flight crewmember may accept an assignment, if that crewmember's flight time or duty period will ex-

	<b>Normal duty</b>	<b>Extension of flight time</b>
(1) Minimum Rest Immediately Before Duty	10 Hours	10 Hours.
(2) Duty Period	Up to 14 Hours	Up to 14 Hours.
(3) Flight Time For 1 Pilot	Up to 8 Hours	Exceeding 8 Hours up to 9 Hours.
(4) Flight Time For 2 Pilots	Up to 10 Hours	Exceeding 10 Hours up to 12 Hours.
(5) Minimum After Duty Rest	10 Hours	12 Hours.
(6) Minimum After Duty Rest Period for Multi-Time Zone Flights	14 Hours	18 Hours.

**91.1061 Augmented Flight Crews**

(b) No program manager may assign any pilot to an augmented crew, unless the program manager ensures:

- (1) Adequate sleeping facilities are installed on the aircraft for the pilots.
- (2) No more than 8 hours of flight deck duty is accrued in any 24 consecutive hours.

(c) No program manager may assign any flight crewmember, and no flight crewmember may accept an assignment, if that crewmember's flight time or duty period will exceed, or rest time will be less than--

	<b>3-Pilot crew</b>	<b>4-Pilot crew</b>
(1) Minimum Rest Immediately Before Duty	10 Hours	10 Hours
(2) Duty Period	Up to 16 Hours	Up to 18 Hours
(3) Flight Time	Up to 12 Hours	Up to 16 Hours
(4) Minimum After Duty Rest	12 Hours	18 Hours
(5) Minimum After Duty Rest Period for Multi-Time Zone Flights	18 Hours	24 Hours

**U. S. CFR 14 Part 135 Regulations**

**135.265 Scheduled Operations**

(b) Except as provided in paragraph (c) of this section, no certificate holder may schedule a flight crewmember, and no flight crewmember may accept an assignment, for flight time during the 24 consecutive hours preceding the scheduled completion of any flight segment without a scheduled rest period during that 24 hours of at least the following:

- (1) 9 consecutive hours of rest for less than 8 hours of scheduled flight time.
- (2) 10 consecutive hours of rest for 8 or more but less than 9 hours of scheduled flight time.
- (3) 11 consecutive hours of rest for 9 or more hours of scheduled flight time.

(c) A certificate holder may schedule a flight crewmember for less than the rest required in paragraph (b) of this section or may reduce a scheduled rest under the following conditions:

- (1) A rest required under paragraph (b)(1) of this section may be scheduled for or reduced to a minimum of 8 hours if the flight crewmember is given a rest period of at least 10 hours that must begin no later than 24 hours after the commencement of the reduced rest period.
- (2) A rest required under paragraph (b)(2) of this section may be scheduled for or reduced to a minimum of 8 hours if the flight crewmember is given a rest period of at least 11 hours that must begin no later than 24 hours after the commencement of the reduced rest period.
- (3) A rest required under paragraph (b)(3) of this section may be scheduled for or reduced to a minimum of 9 hours if the flight crewmember is given a rest period of at least 12 hours that must begin no later than 24 hours after the commencement of the

reduced rest period.

(d) Each certificate holder shall relieve each flight crewmember engaged in scheduled air transportation from all further duty for at least 24 consecutive hours during any 7 consecutive days.

### **135.267 Unscheduled Operations One and Two Pilot Crews**

(b) Except as provided in paragraph (c) of this section, during any 24 consecutive hours the total flight time of the assigned flight when added to any other commercial flying by that flight crewmember may not exceed--

- (1) 8 hours for a flight crew consisting of one pilot; or
- (2) 10 hours for a flight crew consisting of two pilots qualified under this Part for the operation being conducted.

(c) A flight crewmember's flight time may exceed the flight time limits of paragraph (b) of this section if the assigned flight time occurs during a regularly assigned duty period of no more than 14 hours and--

- (1) If this duty period is immediately preceded by and followed by a required rest period of at least 10 consecutive hours of rest;
- (2) If flight time is assigned during this period, that total flight time when added to any other commercial flying by the flight crewmember may not exceed--
  - (i) 8 hours for a flight crew consisting of one pilot; or
  - (ii) 10 hours for a flight crew consisting of two pilots; and
- (3) If the combined duty and rest periods equal 24 hours.

(d) Each assignment under paragraph (b) of this section must provide for at least 10 consecutive hours of rest during the 24-hour period that precedes the planned completion time of the assignment.

(e) When a flight crewmember has exceeded the daily flight time limitations in this section, because of circumstances beyond the control of the certificate holder or flight crewmember (such as adverse weather conditions), that flight crewmember must have a rest period before being assigned or accepting an assignment for flight time of at least--

- (1) 11 consecutive hours of rest if the flight time limitation is exceeded by not more than 30 minutes;
- (2) 12 consecutive hours of rest if the flight time limitation is exceeded by more than 30 minutes, but not more than 60 minutes; and
- (3) 16 consecutive hours of rest if the flight time limitation is exceeded by more than 60 minutes.

(f) The certificate holder must provide each flight crewmember at least 13 rest periods of at least 24 consecutive hours each in each calendar quarter.

### **135.269 Unscheduled Operations Three and four Pilot Crews**

(b) No certificate holder may assign any pilot to a crew of three or four pilots, unless that assignment provides--

- (1) At least 10 consecutive hours of rest immediately preceding the assignment;
- (2) No more than 8 hours of flight deck duty in any 24 consecutive hours;
- (3) No more than 18 duty hours for a three-pilot crew or 20 duty hours for a four-pilot



crew in any 24 consecutive hours;

(4) No more than 12 hours aloft for a three-pilot crew or 16 hours aloft for a four-pilot crew during the maximum duty hours specified in paragraph (b)(3) of this section;

(5) Adequate sleeping facilities on the aircraft for the relief pilot;

(6) Upon completion of the assignment, a rest period of at least 12 hours;

(c) When a flight crewmember has exceeded the daily flight deck duty limitation in this section by more than 60 minutes, because of circumstances beyond the control of the certificate holder or flight crewmember, that flight crewmember must have a rest period before the next duty period of at least 16 consecutive hours.

(d) A certificate holder must provide each flight crewmember at least 13 rest periods of at least 24 consecutive hours each in each calendar quarter.

### Example Reports From Business Aviation Operations

**Report 1- RECOMMENDATION:** 1. GOM indicates we need to discuss our schedule if given less than 12 hrs rest. Enforce Mission Control discussing with pilots the feasibility of the shorter crew rest and state of both pilots. 2. Duty day should never be longer than rest periods to the greatest extent possible. 3. When transitioning to the East Coast try to limit next day to a later show time whenever possible to allow pilots time to adjust to the new time zone.

**Report 2-** Flight mechanic needs to be crew changed with the pilots. This will prevent working while fatigued if there is a mechanical delay, or issue upon arrival into Brazil. This is the safest option and allows an entirely fresh new crew. This issue presented itself following a mechanical on one aircraft which resulted in the need to swap aircraft for the trip. This extended the duty day for the flight tech an additional 2 hours. By the time they got to Brazil, they were quite fatigued. Therefore, I would like to include the Flight Tech in the equation when doing a crew changed for the above statement. Preposition a flight mechanic with the pilots. This will allow a whole new fresh crew to continue the trip to Brazil and have plenty of available duty time upon arrival to address any mechanical issues and not be fatigued. Advised the Flight Operations Coordinator that the new department policy is to change out the flight mechanic with the pilots when a crew change is required for a Brazil shuttle.

**Report 3-** Add new procedure to FOM: When departure time is prior to 0800 local time, crew members required to travel to the other airport shall normally preposition the night prior, in order to be well rested and avoid adding transit time to the duty day. When departure times change at the last minute, or the duty day is short, the flight crew in collaboration with the Chief Pilot and Scheduling, may elect not to preposition. A risk assessment shall be performed prior to making the final decision. The FOM will also be changed to state: Crew transportation between airports is not considered local in nature and shall be considered part of the duty day.

**Report 4-** Look up the Flight Safety Foundation Guidelines for duty and rest and make sure our manual is compliant. Consider augmenting flight crew for the last day of the relevant trip. The ASAP submitted was evaluated and determined to address in 2 parts. Part 1 required quick resolution to address the concern of the PIC regarding the assigned duty day. Part 2 required further evaluation to determine if there was a need to revise any existing guidance or policies in the FOM. Part 1- A fresh flight crew was positioned to ATL to fly the last leg home as suggested by the PIC. – CLOSED Part 2- The Safety Coordinator and the Aviation Director discussed the existing FOM guidelines at length and determined that it would be appropriate to revise the department FOM in accordance with the Flight Safety Foundation guidelines. This was the recommendation of the Safety Coordinator in the original submission. Therefore, the Safety Coordinator worked with the Flight Operations Coordinator to revise the flow chart to be more in alignment with the FSF Guidelines. More specifically, the reference of International was removed, the leg segment limits were removed, the duty day extension allowance was revised to 4 hours in a hotel, and the 20 hour duty day with augmented crew was inserted with required provisions. This new guidance was rolled out in a pilot meeting. An operation bulletin was issued to ensure everyone fully understands the new policy. It is understood that trip requests will fit into the defined guidance of the FSF Guidelines. It is further understood, that the FSF Guidelines for Corporate and Business Aviation are exactly that, guidelines, and are sometimes necessary to amend or deviate from with consideration of coordination with the Aviation Director, Flight Services Coordinator, Flight Crew and the Safety Coordinator to mitigate any potential risks. This is further supported by the IS-BAO Standard for deviations to FOM Policies. There are no federal regulatory requirements for flight crew rest and flight duty per CFR 14, FAR Part 91 Operations. CLOSED-

**U. S. CFR 14 Upcoming Part 117 Regulations\***

\*As planned to apply to FAR Part 121 Operations.

**Maximum Flight Time Limits– Unaugmented Operations**

Time of Report (Acclimated)	Maximum flight time (hours)
0000-0459	8
0500-1959	9
2000-2359	8

**Maximum Flight Duty Period Limits—Unaugmented Operations**

Time of Start (Acclimated Time)	Maximum Flight Duty Period (hours) for lineholders 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