IS-BAO Fatigue Management System

Monday, March 23, 2015 | 3:00 p.m. – 4:00 p.m.

PRESENTED BY:
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Polling Question #1

Is your company currently IS-BAO Registered or applying for IS-BAO Registration this year?

- Yes
- No
IS-BAO – Fatigue Management System

Overview

- Auditor’s Perspective
- References and Guidance Material
- Definition of “Fatigue”
- Required elements of the IS-BAO Fatigue Management System
- Acceptable methods for conforming to the Standard
IS-BAO – Fatigue Management System

Overview

• Fatigue Management System as part of a Safety Management System
• What a Fatigue Management System looks like at IS-BAO Stages 1, 2, and 3
• Summary
IS-BAO – Fatigue Management System

Auditor’s Perspective

• Audit is a comparison of a standard to documentation and implementation.
• Auditor has same information and guidelines as operator.
• Auditor’s perspective is the same as the operator’s.
IS-BAO – Fatigue Management System

Auditor’s Perspective

• Active auditor reviews the implementation and documentation of the standard two or three times per month on all ISBAO Stages
• Operator looks at it once every year or two at a single ISBAO Stage
• Auditors have the advantage of exposure to many different approaches to standard conformity and can learn from the operators
• Auditors communicate with IBAC to clarify the meaning of the Standards and review acceptable means of conformity.
IS-BAO – Fatigue Management System

References and Guidance Material

CURRENT

• IS-BAO 2015 Standards
• IS-BAO 2015 Implementation Guide / GCOM
  – FSF Duty/Rest Guidelines for Business Aviation
  – References to FSF 1997 Duty/Rest Guidelines are being updated to 2014

NEAR FUTURE

• Fatigue Management Guidance Manual for General Aviation Operators of Large and Turbojet Aeroplanes (ICAO/IBAC/FSF) – to be issued 2015
FATIGUE

Identify the Hazard: Reduced Efficiency / Degraded Performance

- Physical discomfort after overworking a particular group of muscles
- Concentration difficulties during a monotonous task
- *Slowed reaction time after exposure to long or irregular work hours*
- *Difficulty appreciating potentially important but subtle indications that an undesirable situation may be developing*
- *Difficulty staying awake*

Sources: IS-BAO 2015 GCOM / IG
FATIGUE

Sources of Fatigue and Appropriate Countermeasures

• Physiological fatigue
  – Results from lost sleep
  – Rectified by sleep itself

• Subjective fatigue
  – Can be affected by motivation
  – Can be affected by the amount of stimulation coming from the environment
  – Often poorly detected by individuals
  – Rectified by breaks and/or stimulation

Sources: IS-BAO 2015 GCOM / IG
FATIGUE

AREAS OF CONCERN

• **6.13.1** An operator *shall establish and implement* a fatigue management system that is designed to ensure that operator personnel involved in the operation and maintenance of aircraft do not carry out their duties when fatigued. *(Required)*

• The system *shall* contain the following elements:

  • **6.13.1 a** Fatigue Management Guiding Principles
  • **6.13.1 b** Appropriate Training and Education
  • **6.13.1 c** Flight and Duty Time Limitations for Aircraft Crew
  • **6.13.1 d** Duty Time Limitations for Non-Aircraft Crew
  • **6.13.1 e** Evaluation Process

Sources: IS-BAO 2015 GCOM / IG
FATIGUE

AREAS OF CONCERN

• 4.8 Fatigue Risk Management Program

• 4.8.1 The operator should develop and maintain a program to assess and manage the inherent risks associated with fatigue for all personnel. The program should include all the elements as required for aircrew members and maintenance personnel as described in Section 6.13.

• (Recommended Practice)

Sources: IS-BAO 2015 GCOM / IG
FATIGUE MANAGEMENT SYSTEM

What is a “System”? 

• An organized, purposeful structure regarded as a whole and consisting of interrelated and interdependent elements. These elements continually influence one another (directly or indirectly) to maintain their activity and the existence of the system, in order to achieve the goal of the system.
FATIGUE MANAGEMENT SYSTEM

What is a “Management System”?

• Similar to a Safety Management System
  – Required Elements
  – Interaction of the Elements
  – Method for Determining Effectiveness
  – Continuous Improvement
  – Progressive development can be evaluated according to SMS criteria:
    • Sound
    • Appropriate
    • Effective

IS-BAO 2015 Audit Protocols
FATIGUE MANAGEMENT SYSTEM

REQUIRED ELEMENTS

6.13.1 …… The system shall contain the following elements:

- 6.13.1 a Fatigue Management Guiding Principles
- 6.13.1 b Appropriate Training and Education
- 6.13.1 c Flight and Duty Time Limitations for Aircraft Crew
- 6.13.1 d Duty Time Limitations for Non-Aircraft Crew
- 6.13.1 e Evaluation Process
FATIGUE MANAGEMENT SYSTEM
REQUIRED ELEMENTS - ISOLATED

Guiding Principles
Training Education
Evaluation Process
Flight and Duty Limitations
Maintenance Duty Times
FATIGUE MANAGEMENT SYSTEM
REQUIRED ELEMENTS - INTEGRATED
FATIGUE MANAGEMENT SYSTEM

CONFORMITY

IS-BAO 2015 Standard:

• *IG 6.13 contains an acceptable fatigue management program for the flight crew, and guidance material for aircraft maintenance and other support personnel. Operators are encouraged to use this material as a basis for development of their fatigue management programme for all personnel involved in the operation.*
IS-BAO 2015 IG identifies the “four core operational factors that must be considered in fatigue countermeasures programs”:

- Duty period length
- Rest / Off-Duty periods
- Circadian Factors
- Cumulative Effects
FATIGUE MANAGEMENT SYSTEM

6.13.1a Fatigue Management Guiding Principles

• Other contributing factors:
  – Working Conditions,
  – Physical Environment
  – Operator Workload
  – Environmental Factors
A. Duty period length is related to the continuous hours of wakefulness through a subset. Flight time is a subset of duty period.

- It is generally recognized that extended hours of continuous wakefulness results in impairment due to fatigue.

- **Hazard Identification:**
  - Evaluate duty assignments to include periods of wakefulness prior and subsequent to the assigned duty.
FATIGUE MANAGEMENT SYSTEM

6.13.1a Fatigue Management Guiding Principles - Conformity

A. Duty period length is related to the continuous hours of wakefulness through a subset. Flight time is a subset of duty period.

• **Hazard Identification:**
  
  — **Examples:**
  
  • You are assigned a flight from San Antonio to Rome leaving at 4:00 p.m. The flight will take 9 hours. How long will the crew have been awake by the time they arrive in Rome?
  • You return from Rome to San Antonio, departing Rome at 1:00 p.m. The flight will take 10 hours. After arriving in San Antonio, your drive home takes 1.5 hours. How long will you have been awake when you are driving home?
FATIGUE MANAGEMENT SYSTEM

6.13.1a Fatigue Management Guiding Principles - Conformity

A. Duty period length is related to the continuous hours of wakefulness through a subset. Flight time is a subset of duty period.

Controls:

• Adhere to appropriate FSF Guidelines.
• Bio-mathematical tools used to analyze schedules, especially whenever impairment due to fatigue is suspected.
• Fatigue Reports requested whenever impairment due to fatigue is suspected and when fatigue countermeasures are deployed.
Fatigue Reports

Recommendation: Request or require reports when fatigue is suspected

- Validate your predictions
- Reports not just based on a perception of being fatigued
- Establishes a foundation for a fatigue reporting culture
B. Rest or off-duty periods, are related to sleep opportunity and can affect both acute sleep loss and the creation of a cumulative sleep debt.

• Hazard Identification:
  – Rest or off-duty periods may not provide an adequate sleep opportunity if they do not provide adequate conditions for sleep. Evaluate the quality of the rest environment.
  – Rest or off-duty periods may not provide an adequate sleep opportunity if they do not coincide with normal sleep patterns. Evaluate schedules to ensure they realistically provide sleep opportunity.
FATIGUE MANAGEMENT SYSTEM
6.13.1a Fatigue Management Guiding Principles - Conformity

B. Rest or off-duty periods, are related to sleep opportunity and can affect both acute sleep loss and the creation of a cumulative sleep debt.

• Hazard Identification:
  – Examples:
    • You utilize an augmented crew to conduct a flight from New York to Beijing. How effective is the sleep opportunity for each rotating flight crew member?
    • Prior to a midnight departure, you are given a rest period of ten hours beginning at noon. Evaluate the realistic sleep opportunity.
FATIGUE MANAGEMENT SYSTEM

6.13.1a Fatigue Management Guiding Principles - Conformity

B. Rest or off-duty periods, are related to sleep opportunity and can affect both acute sleep loss and the creation of a cumulative sleep debt.

**Controls:**

- Adhere to appropriate FSF Guidelines.
- Bio-mathematical tools used to analyze schedules for alignment with normal sleep patterns, and the evaluate cumulative sleep debt.
- Fatigue Reports requested whenever the provided resting environment is questionable.
C. Circadian factors can affect both alertness and performance during operations as well as the quantity and quality of sleep obtained during rest periods.

• **Hazard Identification:**
  - Operations conducted during a known WOCL.
  - For complex extended international operations, a means to identify an adjusted WOCL needs to be identified.
FATIGUE MANAGEMENT SYSTEM

6.13.1a Fatigue Management Guiding Principles - Conformity

C. Circadian factors can affect both alertness and performance during operations as well as the quantity and quality of sleep obtained during rest periods.

- **Hazard Identification:**
  - **Examples:**
    - Your flight from San Antonio to Rome leaves at 10:00 p.m. Your arrival will be at 07:00 a.m. San Antonio time. How do circadian factors affect the crew?
    - An augmented crew flies from the East Coast of the US to Singapore. Two days later, the same crew is assigned a daytime trip from Singapore to Sidney, Australia. Where is the crew’s WOCL?
FATIGUE MANAGEMENT SYSTEM

6.13.1a Fatigue Management Guiding Principles - Conformity

C. Circadian factors can affect both alertness and performance during operations as well as the quantity and quality of sleep obtained during rest periods.

Controls:

• Adhere to appropriate FSF Guidelines.
• Bio-mathematical tools used to analyze schedules for operations during a known WOCL and to evaluate circadian shifts.
• Fatigue Reports requested whenever operations are conducted during a known or suspected WOCL.
FATIGUE MANAGEMENT SYSTEM

6.13.1a Fatigue Management Guiding Principles - Conformity

D. Cumulative effects can be relevant for continuous and consecutive duty periods and an accumulated sleep debt.

• **Hazard Identification:**
  – Repetitive long duty assignments.
  – Repetitive ineffective sleep opportunities.
  – Consecutive duty periods with multiple time-zone changes.
FATIGUE MANAGEMENT SYSTEM

6.13.1a Fatigue Management Guiding Principles - Conformity

D. Cumulative effects can be relevant for continuous and consecutive duty periods and an accumulated sleep debt.

• **Hazard Identification:**
  
  – **Examples:**
    
    • A crew is assigned to a 10 day trip which goes around the world eastbound.
    • A crew is assigned to a complex trip which includes three flights daily for 5 days in European airspace.
FATIGUE MANAGEMENT SYSTEM

6.13.1a Fatigue Management Guiding Principles - Conformity

D. Cumulative effects can be relevant for continuous and consecutive duty periods and an accumulated sleep debt.

Controls:

• Adhere to appropriate FSF Guidelines.

• Bio-mathematical tools used to analyze schedules for operations involving more than “#” consecutive days of flying or across more than “#” time zones.

• Fatigue Reports requested whenever crews are assigned to more than “#” consecutive days of flying, across more than “#” time zones, or “#” number of operations.
FATIGUE MANAGEMENT SYSTEM

6.13.1a Fatigue Management Guiding Principles - Conformity

ADDITIONAL FACTORS WHICH CONTRIBUTE TO FATIGUE:

• Working Conditions
  – Evaluate the working conditions for adequate lighting and appropriate sound levels.
  – Consider human factors when determining sources of fatigue.

• Physical Environment
  – Consider temperature and physiological altitude when determining sources of fatigue.

• Operator Workload
  – Consider the number of takeoffs and landings, challenging weather conditions, and operations in complex airspace when determining sources of fatigue.
FATIGUE MANAGEMENT SYSTEM

6.13.1a Fatigue Management Guiding Principles - Conformity

REVIEW:

• Consider the hazards presented to your organization by each of the four core operational factors.

• Include these hazards and appropriate controls in the Safety Risk Profile.

• Evaluate the effectiveness of the controls:
  – Conformity to FSF Guidelines
  – Use of bio-mathematical tools to predict and evaluate fatigue.
  – Crewmember Fatigue Reports
FATIGUE MANAGEMENT SYSTEM

6.13.1b Training and Education - Conformity

• IS-BAO 2015 Audit Protocols and Standard: “appropriate training and education regarding preventive and operational fatigue countermeasures”

• IS-BAO 2015 IG: “Scientifically-based training and education for everyone in the organization including scheduling staff on the physiological mechanisms that underlie fatigue (including sleep fundamentals and circadian rhythms), the misconceptions about fatigue, causes of fatigue (including medical conditions that may lead to fatigue), the effects of fatigue on performance, and fatigue countermeasures.”
FATIGUE MANAGEMENT SYSTEM
6.13.1b Training and Education- Conformity

Training:
• Must include the elements listed in the IG.
• Must be delivered to everyone in the organization.
• Must be appropriate to scope and scale of the organization and be modified as necessary to maintain relevance.
• Must be documented.
• Any appropriate method of delivery is acceptable.
• There is no requirement that the training be delivered periodically, but the training must remain appropriate to operations as they change.
FATIGUE MANAGEMENT SYSTEM

6.13.1c Flight and Duty Time Limitations for Aircraft Crew - Conformity

- IS-BAO 2015 Audit Protocols: “flight and duty time limitations for aircraft crew”
- IS-BAO 2015 IG: “Flight and duty time limits based on sound scientific research”
6.13.1c Flight and Duty Time Limitations for Aircraft Crew - Conformity

FATIGUE MANAGEMENT SYSTEM

6.13.1c Flight and Duty Time Limitations for Aircraft Crew - Conformity

Source for information and guidelines:

1.0 Fatigue Factors

2.0 Guidelines and Recommendations

3.0 Fatigue Management

## 6.13.1c Flight and Duty Time Limitations for Aircraft Crew - Conformity

### FATIGUE MANAGEMENT SYSTEM

<table>
<thead>
<tr>
<th>Type of Operation</th>
<th>Duty Period连续每日小时数</th>
<th>Flight Time连续每日小时数</th>
<th>Off-Duty Period连续每日小时数</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard1</td>
<td>14</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>WOCL</td>
<td>12</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>Extended2</td>
<td>14</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>WOCL</td>
<td>No extension recommended</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

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**Table 1: Recommended Guidance for Non-Augmented Crews 24-hour Period**

1. *Extended operations* are defined as operations that do not commences on the WOCL and are not extended operations.
2. *Extended operations* is defined as a flight period that extends beyond the WOCL, the flight parameter that both sides of the WOCL or the duty period (as defined in WCL) are specified in the WOCL and section 2.13.1.
3. *Extended operations* are defined as operations with a duty period longer than 14 hours and flight time longer than 10 hours. Extended operations can involve duty periods that exceed 12 hours.

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### 6.13.1c Flight and Duty Time Limitations for Aircraft Crew - Conformity

**Table 2: Recommended Guidance for Augmented\(^1\) Crews**

<table>
<thead>
<tr>
<th>Type of Operation</th>
<th>Duty Period (maximum hours)</th>
<th>Flight Time (maximum hours)</th>
<th>Off-Duty Period (minimum hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reclining seat available for rest</td>
<td>18</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>Supine bunk available for rest</td>
<td>20</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maximum of two consecutive duty periods with 18 hours off duty after the two consecutive duty periods</td>
<td></td>
</tr>
</tbody>
</table>

**WOCL\(^3\)**  
No extensions recommended

**Multiple time zones**  
48 continuous hours off duty on return home following a duty period crossing multiple time zones

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**Notes:**

1. Augmented crew is a flight crew that comprises more than the minimum number required to operate the aeroplane so that each crewmember can leave his or her assigned post to obtain in-flight rest and be replaced by another appropriately qualified crewmember.
2. Augmented operations can involve duty/rest cycles longer than 24 hours.
3. Window of occlusion (WOCL) operation is defined as a flight in which landing occurs during the WOCL; the flight passes through both sides of the WOCL, or the duty period starts at 0400 or earlier in the WOCL (see Section 2.1).

Source: Flight Safety Foundation and U.S. National Aeronautics and Space Administration

6.13.1c Flight and Duty Time Limitations for Aircraft Crew - Conformity

3.2.4 Fatigue Management Tools

These should be both strategic and tactical for a multi-layered approach. For example, operators can include a number of the following tools:

- Flight Risk Assessment Tool that includes fatigue factors commonly found in the flight operation;
- Flight crew surveys that focus on specific types of trips, use of countermeasures, etc.;
- Use of biomathematical models to assess the potential fatigue levels of various trip scenarios, the effectiveness of crew prepositioning or augmenting strategies, and insights for layover and recovery planning; and,
- Objective data collection in cases in which scheduled duty periods exceed recommended guidelines and additional empirical information can help design mitigations and countermeasures.

<table>
<thead>
<tr>
<th>Prescriptive Limitations (FSF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational Experience</td>
</tr>
<tr>
<td>Bio-mathematical Tools</td>
</tr>
</tbody>
</table>
FATIGUE MANAGEMENT SYSTEM

6.13.1d Duty Time Limitations for non-aircraft crew

IS-BAO 2015 IG

In developing their fatigue management system for aircraft maintenance personnel operators may wish to consider the following items:

a. Work Schedules
b. Night Shifts
c. Morning/Day Shifts
d. Weekly Limits
FATIGUE MANAGEMENT SYSTEM

6.13.1d Duty Time Limitations for Non-Aircraft Crew - Conformity

<table>
<thead>
<tr>
<th>Prescriptive Limitations</th>
</tr>
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<tr>
<td>Operational Experience</td>
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<tr>
<td>Bio-mathematical Tools</td>
</tr>
</tbody>
</table>
FATIGUE MANAGEMENT SYSTEM

6.13.1e. Evaluation Process - Conformity

IS-BAO 2015 Audit Protocols:

• “an evaluation process that assesses the effectiveness of the fatigue management system”.

IS-BAO 2015 Audit Protocols / GCOM
FATIGUE MANAGEMENT SYSTEM

6.13.1e. Evaluation Process - Conformity

IS-BAO 2015 GCOM 4.16.4 Evaluation Process

- As fatigue is a recognized hazard and the limitations contained in this section is the mitigation designed to manage the associated risks to an acceptable level, the limitations and any extensions of duty time, shall be regularly evaluated as part of the company SMS evaluation. Additionally, company personnel are encouraged to provide feedback on the fatigue management program, as well as report any situations where fatigue became an issue via the SMS risk reporting process.

- (Safety Manager) shall review all fatigue-related reports considering core physiological factors, develop mitigation actions to preclude future occurrences, and provide feedback to employees.
FATIGUE MANAGEMENT SYSTEM

6.13.1e. Evaluation Process – Conformity: SMS

IS-BAO 2015 IG:

• “The risks normally associated with this hazard are mistakes, incidents and accidents. Strategies to manage this hazard and the associated risks should be developed by operators and included in their safety management system. The management strategies should include processes to involve all employees, and include:
FATIGUE MANAGEMENT SYSTEM

6.13.1e. Evaluation Process – Conformity: FATIGUE REPORTS

• D. Mechanisms that ensure that employees report on situations where fatigue became an issue,

• E. Processes to empirically analyse all reports considering core physiological factors\(^1\), and provide feedback to employees and effect change to preclude future occurrences (e.g., safety bulletins, lessons learned, recurrent training).
FATIGUE MANAGEMENT SYSTEM

6.13.1e. Evaluation Process – Conformity: FATIGUE REPORTS

IS-BAO 2015 IG:

• “The employee reporting, analysis and feedback mechanisms should be a component of the organization’s safety management system.”

Sources: IS-BAO 2015 IG
FATIGUE MANAGEMENT SYSTEM

6.13.1e. Evaluation Process – Conformity: SMS / Fatigue Reports

RECOMMENDATIONS:

• Include the Fatigue Management System as a subsection of the SMS
• Include Fatigue Reports as a subsection of Safety Reports
• Request Fatigue Reports any time Fatigue is suspected or mitigated
• Process Fatigue Reports in the same way as Safety Reports:
  – Hazard Analysis
  – Root Cause Analysis
  – Mitigation
  – Review of Mitigation
FATIGUE MANAGEMENT SYSTEM

6.13.2 Deviations

If deviations from the flight and/or duty time limitations are permitted, the system shall include provisions to:

- a. assess the associated risks and applying appropriate mitigation to maintain an acceptable level of risk for that operation,
- b. identify the management person who is authorized to approve the deviation, and
- c. record the deviations, the risk assessment and related mitigation.
FATIGUE MANAGEMENT SYSTEM

6.13.2 Deviations

Risk Assessment Tools

- Compare to the FSF Guidelines
- Bio-mathematical Tools

IS-BAO 2015 Standard
FATIGUE MANAGEMENT SYSTEM

6.13.1e. Evaluation Process – Conformity

IS-BAO 2015 IG:

• “The employee reporting, analysis and feedback mechanisms should be a component of the organization’s safety management system.”

• Let’s see how a FMS integrates into an SMS at all 3 identified stages:

Sources: IS-BAO 2015 IG
Polling Question #2

How many are planning to be audited to IS-BAO Stage 1 this year?
IS-BAO FATIGUE MANAGEMENT SYSTEM

Stage 1 SMS – SOUND:
Documented, Trained, Foundation in Place to Effectively Manage Fatigue Risk

- Safety Policy – Fatigue Management identified as a management concern
- SRP – Specific fatigue-related hazards identified along with their controls
- Goals and Objectives – Specific, measurable fatigue-related goals are developed
- Training – Fatigue training program developed for all personnel
- Scheduling – Prescriptive limits established in accordance with FSF or other appropriate guidelines
IS-BAO FATIGUE MANAGEMENT SYSTEM

Stage 1 SMS – SOUND:
Documented, Trained, Foundation in Place to Effectively Manage Fatigue Risk

- FRAT – Fatigue-related risks included in the FRAT
- Reports – A mechanism is developed for making unsolicited fatigue reports and assigned fatigue reports
- IEP – Fatigue management is included in all of the departmental and SMS checklists
- Management Review – The annual SMS review includes a review of the FMS
- Continuous Improvement – New fatigue-management tools are reviewed for potential improvement to the FMS
Polling Question #3

How many are planning to be audited to IS-BAO Stage 2 this year?
IS-BAO FATIGUE MANAGEMENT SYSTEM

Stage 2 SMS – APPROPRIATE:
Properly Targeted, Well-Designed to Effectively Manage Fatigue Risks

• Safety Policy – Reviewed and updated relative to fatigue risks
• SRP – Fatigue-related hazards added from multiple sources: Fatigue Reports, IEP, External Sources; Controls Reviewed
• Goals and Objectives – Specific, measurable fatigue-related goals are reviewed and revised
• Training – Fatigue training program revised to include new risks, strategies, and tools
• Scheduling – Bio-mathematical tools may be used to evaluate fatigue-prone schedules
IS-BAO FATIGUE MANAGEMENT SYSTEM

Stage 2 SMS – APPROPRIATE:
Properly Targeted, Well-Designed to Effectively Manage Fatigue Risks

• FRAT – FRAT fatigue-related risks modified to improve appropriateness to current operations. Bio-mathematical tools may be integrated with the FRAT.
• Reports – Fatigue reports are reviewed for frequency and content, and as a measure of the fatigue awareness culture
• IEP – IEP Results for Fatigue Management are consolidated to understand the effectiveness of the FMS
IS-BAO FATIGUE MANAGEMENT SYSTEM

Stage 2 SMS – APPROPRIATE:
Properly Targeted, Well-Designed to Effectively Manage Fatigue Risks

• Management Review – The FMS has been reviewed by the Safety Manager and Top Management
• Continuous Improvement – New fatigue-management tools have been reviewed and evaluated for their effectiveness in managing fatigue risks
Polling Question #4

How many are planning to be audited to IS-BAO Stage 3 this year?
IS-BAO FATIGUE MANAGEMENT SYSTEM

Stage 3 SMS – EFFECTIVE:
Measured, Desired Results Being Achieved, Risks are Effectively Managed

- Safety Policy – Reviewed and updated relative to fatigue risks
- SRP – Reviewed to determine sources of additional fatigue risks as a measure of the effectiveness of utilizing each source (Reports, IEP, External Sources)
- Goals and Objectives – Effectiveness of the FMS is measured by the measurable results of the fatigue-related goals.
- Training – Effectiveness of the fatigue training is measured by using IEP or survey data
- Scheduling – Bio-mathematical tools may be integrated into the scheduling platform for all operations
IS-BAO FATIGUE MANAGEMENT SYSTEM

Stage 3 SMS – EFFECTIVE:
Measured, Desired Results Being Achieved, Risks are Effectively Managed

- FRAT – Trends in fatigue-related FRAT elements are analyzed. Bio-mathematical tools may be integrated with the FRAT.
- Reports – Trends in fatigue reporting are analyzed to measure the effectiveness of the reporting system and the health of the fatigue-management culture
- IEP – Trends from IEP reports are used to measure the effectiveness of the FMS
IS-BAO FATIGUE MANAGEMENT SYSTEM

Stage 3 SMS – EFFECTIVE:
Measured, Desired Results Being Achieved, Risks are Effectively Managed

• Management Review – Measurable trends in Fatigue Management are reviewed by Top Management

• Continuous Improvement – Data from evaluations of new tools are reviewed to determine if the FMS is effectively assimilating new opportunities for fatigue management
SUMMARY

FATIGUE MANAGEMENT AS PART OF SAFETY MANAGEMENT

• Identify the Fatigue Risk among the other Safety Risks

• Manage the Fatigue Risk:
  – FSF Guidelines
  – Bio-mathematical Tools
  – Fatigue Reports

• Continuous Improvement
  – Look for ways to improve the management of fatigue risk
FATIGUE MANAGEMENT SYSTEM
REQUIRED ELEMENTS - ISOLATED

Guiding Principles
Training Education
Evaluation Process
Flight and Duty Limitations
Maintenance Duty Times
FATIGUE MANAGEMENT SYSTEM
REQUIRED ELEMENTS - INTEGRATED

Fatigue Reports
Flight and Duty Limitations
Guiding Principles
Evaluation Process
Training
DEDICATED TO HELPING BUSINESS ACHIEVE ITS HIGHEST GOALS.