ACCIDENT INTERVENTION AND SAFETY MANAGEMENT SYSTEMS

Heli-Expo 2013
International Helicopter Safety Team
SMS Committee
WHO’S THIS GUY?

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1. ISHT SMS update
2. Industry Updates
3. Basics of SMS
4. SMS and Accident Prevention

Philosophical purity is easy – the blogosphere is lousy with it – while pragmatic solutions to problems are as rare these days as virgins on Jersey Shore

– Time Magazine
IHST SMS COMMITTEE AGENDA:

- The SMS Committee is focusing on two areas:
  1. Bringing SMS to small fleet and private operators
  2. Continuing the effort for industry wide implementation of SMS in medium and large fleet operators.
Bringing SMS to small fleet and private operators

Still the largest subgroup of the annual accident rate

Sparse usage of SMS products

Need to address training and economic barriers to implementation

Communication (fact sheets, training, etc)

Offering low/no cost solutions

IHST SMS COMMITTEE AGENDA:

Accidents by Highest Injury Level and FAR Part

Note: 86 Fatal Accidents in Red, 437 Non-Fatal Accidents in Yellow

<table>
<thead>
<tr>
<th>FAR Part</th>
<th>Fatal Accidents</th>
<th>Non-Fatal Accidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part 91</td>
<td>65</td>
<td>301</td>
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<tr>
<td>Part 135</td>
<td>43</td>
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<td>Part 137</td>
<td>42</td>
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<td>Part 133</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Public Use</td>
<td>22</td>
<td></td>
</tr>
</tbody>
</table>

U.S. Registered, Operating Outside the U.S.

Total Accidents

Note: 86 Fatal Accidents in Red, 437 Non-Fatal Accidents in Yellow
IHST SMS COMMITTEE AGENDA:

• Continuing the effort for industry wide implementation of SMS in medium and large fleet operators.
  • Facilitating communication between safety officers
  • Collaboration with the FAA on new initiatives
  • Work with commercial SMS providers on meeting continued needs
IHST SMS COMMITTEE AGENDA:

• How can we help you?
UPDATES FROM THE FAA:

- §5.23 (a) The certificate holder must define accountability for safety within the organization’s safety policy for the following individuals:
  - (1) Accountable executive, as described in §5.25.
  - (2) All members of management in regard to developing, implementing, and maintaining SMS processes within their area of responsibility, including, but not limited to:
    - (i) Hazard identification and safety risk assessment.
    - (ii) Assuring the effectiveness of safety risk controls.
    - (iii) Promoting safety as required in subpart E of this part.
    - (iv) Advising the accountable executive on the performance of the SMS and on any need for improvement.
  - (3) Employees relative to the certificate holder’s safety performance.

- AC 120-92A

- CFR 5 is in the process of review and is projected to be released later this year.
- More closely mirrors ICAO language and requirements
- Will only be regulatory requirement for Part 121 operators.
- Emphasis on management accountability
- Can serve as guideline for the rest of us

The SMS office is not going anywhere and they are very willing to share training materials they have developed.
MURPHY'S LAWS OF FLIGHT

Loud, sudden noises in a helicopter WILL get your undivided attention.
WHY DO WE NEED SMS?

Industry-wide Helicopter Stats:

- 41% Loss of Control
- 32% Autorotation
- 3% CFIT
- Average total time 4000 hours
- 237 less than 500hrs in make and model (45%)

*August 2011 JHSAT report
In the 1970’s Occupational Risk Management was implemented to shift safety management from government oversight to individual professions.

Risk Management brought into public sector in late 1980’s – legal, injury

“The program does not employ any policy guidance to aid the pilot in making risk managed decisions with respect to flight scheduling decision making..”

~Excerpt from a NTSB report of a fatal law enforcement IIMC/CFIT accident

“Changes still being implemented. All risk can be mitigated? We are accountable for everything.

• FAA SMS Program implementation 2006

Sources: Gander et al, 2009; O’Hara, 2005; Archbold, 2005
OUR BIGGEST CHALLENGE? PERCEPTION
LIMITS OF TRADITIONAL SAFETY PROGRAMS...

• Limited understanding exactly what the threats are
• No analysis of the nature (prioritization) of the risks that create accidents
• System of ‘educated guesses’ based on personal experiences
• No method of tracking safety implementations (for ROI and Effectiveness)
WORKING TOWARDS A SOLUTION...

Safety Management Systems

SMS

Full Spectrum
Risk Analysis
Intervention
Recommendations
Prioritized
Implementation

LTE
Pilot
Error
Maintenance

Weather
Fatigue
Training
Mid-air
LEAD VS. LAG

• What is the aim of risk management?
The Pilot...

One day long, long ago, there was a pilot who was not full of shit...

But, it was just one pilot...

...and it was a long, long time ago...

...and it was just one day.

THE END
COMMON GROUND...

- The pillars of a Safety Management System (SMS):
  - Policy
  - Risk Management
  - Assurance
  - Promotion

Definition of SMS: The formal, top-down approach to managing safety risk. It includes systematic procedures, practices, and policies for the management of safety.

“Incomprehensible jargon is the hallmark of a profession.”

~Kingman Brewster Jr.
FOUR PILLARS OF SMS

POLICY

- Risk Management

RISK MANAGEMENT

- Assurance

ASSURANCE

- Promotion

PROMOTION
**FOUR PILLARS OF SMS**

**Safety: Policy**

All operations conducted at Bob’s Helicopter Service will be done in the safest manner possible. No mission or customer is so important as to require deviation from safety policies, procedures, industry standards, or the prudent judgment of our employees. Safe operations are always the priority in every task we undertake.
FOUR PILLARS OF SMS – PRIVATE POLICY EXAMPLE

My Personal Limits:

✓ Daytime local flight - 1000 feet, 4 miles vis.*
✓ Night or Daytime cross country flight - 1500 feet, 5 miles vis.*
✓ *Forecast minimum wx from departure to 1 hr. after arrival
✓ If I did not sleep X hrs the night before, I will ground myself
✓ Personal currency requirements
✓ - 3 takeoff/landings every 30 days
✓ - 1 safety class or seminar every 60 days
...

IHST SMS Toolkit  p. 7, 9, 15  POLICY – RISK MANAGEMENT – ASSURANCE - PROMOTION
**FOUR PILLARS OF SMS**

**Safety: Risk Management**

- Hazard Identification
- Risk Assessment and Control (Mitigation)
  1. Context (scope of inquiry, limits of risk)
  2. ID Hazards (reports, audits, lag data)
  3. Analyze Risk (likelihood x consequence)
  4. Evaluate Risk (Prioritize, compare to accepted risk limits)
  5. Treat the Risks (policy/procedure, training, equipment)
  6. Monitor and Review (Safety Assurance)

IHST SMS Toolkit p. 7, 27  
*POLICY – RISK MANAGEMENT – ASSURANCE - PROMOTION*
Safety: **Assurance**

- Policy and procedure performance monitoring.
- Management of change (impact of new factors, including safety interventions)
- Return on Investment (ROI) tracking
- Requires use of metrics (quantification) to be successful.
- Is your safety program actually preventing accidents, or have you just been lucky?
FOUR PILLARS OF SMS

Safety: Promotion

- Initial, recurrent, general and specific training
- Establish proficiency and currency requirements
- SMS program performance, status
- Management's commitment to the program
- Safety related information

IHST SMS Toolkit p. 68
FLIGHT PLAN...

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Philosophical purity is easy – the blogosphere is lousy with it – while pragmatic solutions to problems are as rare these days as virgins on Jersey Shore

– Time Magazine
Safety: **Policy**

- Make this Safety Policy part of your operation’s SOP, not a separate document
- Employees must be included and their feedback taken seriously – **“Authorization”**
- Cannot be arbitrary (i.e. ‘fly safe’). Need real guidance and specific procedures to follow and train to
- **Power of Just Culture**
Safety: **Risk Management – Hazard Identification**

- If you want to prevent accidents, you need to uncover latent factors.
- Have several barriers in place – don’t rely on a single safety implementation.
- **LEAD INDICATORS** (come to class tomorrow!)
FOUR PILLARS OF SMS – A CLOSER LOOK

Safety: Risk Management – Latent Factors

1. “Why did Thunder Pig hit the side of the hangar with the tailboom?”
   “He lost control during a landing.”

2. “Why did he lose control?”
   “He put the tail in the wind (downwind hover) when heavy and got into LTE.”

3. “Why did he not put in enough control input more quickly or hover into the wind?”
   “He had not flown in those conditions for several months and was ‘rusty’.”

4. “Why had he not flown in unit SOP approved wind conditions in several months?”
   “He set personal minimums that were below the conditions on the day of the accident and turned down flights if the winds exceeded those.”

5. “Why did he take a flight in conditions that exceeded those personal limits on the day of the accident?”
   “The call was for a missing 2 year-old and he felt compelled to go.”
Risk Management – INTERVENTIONS

- Must be realistic – or will produce normalized deviation or hesitation.
- Consider liability effect of new procedures (good and bad)
- Must keep attention of those who use the system
- Must minimize negative effect on ops
- Must be marketed well – enabling system, not crippling to mission
- Must be on the belt, not in the trunk
- Part of everything we do, not a special ‘add on’
- Cover all aspects of ops (LOC is not normal emergency procedure)
Analytical Decision Making

Ideal for the following conditions:

• Clear goal or outcome
• Plenty of time
• All conditions, factors are known

From this, the decision maker can:

• Develop wide range of options
• Evaluate and compare options
• Choose the optimal path

Source: Dave Huntzinger & Fred Brisbois - IHST 2012 Heli-Expo SMS Presentation
Risk Management – INTERVENTION DESIGN

Intuitive Methods

- Fast
- Simple
- Memory based
- Work with limited information
- Option chosen probably OK, but not optimal

Better suited to real time decision making (flying) and other dynamic, fast paced situations: car driving, sports, combat

Source: Dave Huntzinger & Fred Brisbois - IHST 2012 Heli-Expo SMS Presentation
Safety: Risk Management – Interventions

- Rely on Intuitive Decision Making in Emergencies, not Analytical
- Train to build up reliable Intuitive Decision Making when needed
- Use SMS to focus your efforts where they will have maximum effectiveness
## PRE-FLIGHT RISK MANAGEMENT CHECKLIST

### MULTI CREW

<table>
<thead>
<tr>
<th>CAPTAIN</th>
<th>Initial Score</th>
<th>Final Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PERSONAL CONDITIONS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No problems. Physically in shape.</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Nausea, not completely in shape.</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Headache, cold, fever, toothache.</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Medication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No medications in the last 24 hours.</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Over the counter medication.</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Prescription medication. Attention and driving impairing medication.</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Sleep</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well slept.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Moderate sleep or no sleep in the last 13 hours.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Poor sleep.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fatigue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No fatigue.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Moderate fatigue.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mentally or physically fatigued.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Food &amp; drink</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adequately nourished and hydrated.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Flight conducted during breakfast, lunch or dinner time. 4 to 6 hours without eating. 2 to 4 hours without drinking.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>More than 6 hours from last meal. More than 4 hours without drinking. Hot weather and no drinking water on board.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Physiological</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physiologically relieved.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Medium mission duration with no rest facilities available.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Long mission duration with no rest facilities available.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Emotion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not emotionally involved.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Emotionally involved. Little private problems.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Emotionally stressed. Legal, financial or family problems.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Recency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total flight time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 3000 hours total flight time.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Between 2000 and 1500 hours total flight time.</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**MITIGATION**

- Stop!! Get released from duty
- Take a break - Get some rest before next flight
- Take a break - Get something to eat and drink before next flight
- Stop!! Report the flight
- Particular strong briefing before the flight

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**POLICY – RISK MANAGEMENT – ASSURANCE - PROMOTION**
EASIER TO CHANGE THE SYSTEM OR THE PEOPLE?
DECISION MAKING THEORY

sleep deprivation = unstable cognitive state

consecutive RTs across a 10-min PVT performance task
ENVIRONMENTAL SAFETY INTERVENTIONS

• Use SMS generated interventions in your checklists
• Train to minimize human error and minimize the opportunity to make a bad decision
Safety: Promotion

- Training and testing must be separated by definitive lines. i.e. If every flight with an IP seems like a test, the pilot will never be comfortable asking for instruction on something they are not 100% sure about.

- Safety Management and Training cannot operate independently of each other.
TRAINING PAYS OFF…

- Outside audits are essential to a safe training program
- ‘Brother-in-law’ checkrides are training time-bombs
Helicopter makes emergency landing in Chesterfield park

Published: Saturday, March 02, 2013

A pilot out of the Selfridge Air National Guard Base had to land a helicopter in Brandenburg Park on Feb. 16 because the weather became too extreme, according to a Chesterfield police report. The helicopter was able to land safely in the parking lot and there was no damage.
• There are no new ways to crash an aircraft...
• ...but there are new ways to keep people from crashing them...

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