Risk Management Lessons from the Aviation Industry

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FAA Private Pilot - SEL, SES
Disclaimer

- I am not an aviation risk management expert (sad but true)

- I did not come up with all of this information myself

- Most of this can be found in the FAA’s Risk Management Handbook: FAA-H-8083-2
Tenerife, Canary Islands

- 1977 - Two 747s
- Deadliest aviation accident in history
- 583 dead 61 survivors
- Breakdown in communication and an attitude of invincibility
CRM

Crew Resource Management

• Human Resources
• Hardware
• Information
Aeronautical Decision Making

• Is a systematic approach to the mental process used by airplane pilots to consistently determine the best course of action in response to a given set of circumstances.
Decision Making Process

- define the problem
- choose a course of action
- implement the decision
- evaluate the outcome
“Say ... what's a mountain goat doing way up here in a cloud bank?”
DECIDE

Detect a change (or lack thereof)
Estimate the need to counteract the change
Choose a desirable outcome
Identify actions that would result in successful results
Evaluate the effect of the action
Risk Management

There are four common risk elements associated with every flight/trip.

They are... ???
Risk Elements

- Equipment
- Environment
- People
- Program
Pilot/People

- Competency
- Health
- Fatigue
- Mental/Physical State
- Etc.
Airplane/Equipment

- Performance
- Accessories
- Airworthiness
- Age
- Functionality
Environment

- Weather
- Remoteness
- Terrain
- Depth
- Currents
Mission/Program

- Purpose of...
- Outside Pressures
- Get-there-itis
- To Complex
- To Challenging
Risk Elements

People

Equipment

Environment

Program
In order to maintain situational awareness, an accurate perception must be attained of how the pilot, airplane, environment, and operation combine to affect the flight.
Decision Making Factors

- Pilot/Leader Self-Assessment
- Recognition of the Hazardous Attitudes
- Workload Management
- Operational Pitfalls
Pilot Self Assessment

The I’M SAFE Checklist

- Illness
- Medication
- Stress
- Alcohol
- Fatigue
- Eating
Certain attitudes can impinge on the pilot’s ability to make sound decisions before and during flight operations.

<table>
<thead>
<tr>
<th>Hazardous Attitudes</th>
<th>Antidote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-Authority – “Don’t tell me”</td>
<td>Follow the rules, they are usually right</td>
</tr>
<tr>
<td>Impulsivity – “Do it quickly”</td>
<td>Not so fast, think before you act</td>
</tr>
<tr>
<td>Invulnerability – “It won’t happen to me”</td>
<td>It could happen to me</td>
</tr>
<tr>
<td>Macho – “I can do it”</td>
<td>Taking chances is foolish</td>
</tr>
<tr>
<td>Resignation – “what’s the use”</td>
<td>I’m not helpless, I can make a difference</td>
</tr>
</tbody>
</table>
Workload Management

- Staying ahead of the plane
- N2t – Next two things
- Aviate, Navigate, Communicate
- Lead, Deal, Reach-Out
Operational Pitfalls

- Peer Pressure
- Tunnel Vision
- Get-there-itis
- Duck-Under Syndrome
- Scud Running
- Flying outside the Envelope
- Neglect of Flight Planning, Preflight Inspections, and Checklist

Ahhh.... Checklist!
Checklist

- Incredibly Handy
- Often Resisted
- Why???
# Risk Assessment Matrix

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Catastrophic</th>
<th>Critical</th>
<th>Marginal</th>
<th>Negligible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probable</td>
<td>HIGH</td>
<td>HIGH</td>
<td>SERIOUS</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>Occasional</td>
<td>HIGH</td>
<td>SERIOUS</td>
<td>MEDIUM</td>
<td>LOW</td>
</tr>
<tr>
<td>Remote</td>
<td>SERIOUS</td>
<td>MEDIUM</td>
<td>MEDIUM</td>
<td>LOW</td>
</tr>
<tr>
<td>Improbable</td>
<td>MEDIUM</td>
<td>MEDIUM</td>
<td>MEDIUM</td>
<td>LOW</td>
</tr>
</tbody>
</table>
Aviation Risk Assessment Matrix
Civil Air Patrol Model

### Exercise:

Take handouts and using this matrix and the next example from the sailing industry work with two other partners to develop a rough outline of one for your own program.
### Operations Risk Assessment

#### 1. Human Factors

<table>
<thead>
<tr>
<th>Factor/Hazard</th>
<th>Low Risk</th>
<th>Pt</th>
<th>Moderate Risk</th>
<th>Pt</th>
<th>High Risk</th>
<th>Pt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience</td>
<td>&gt;5 yrs, command time</td>
<td>X 2-5 yrs</td>
<td>First Command</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training</td>
<td>License higher than required</td>
<td>Minimum license</td>
<td>Unlicensed or new min. license</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time in type</td>
<td>Previous season in same ship</td>
<td>Previous time in similar</td>
<td>New to this rig</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health</td>
<td>Athletic level of fitness</td>
<td>Health ok, but sea legs not current</td>
<td>Illness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rest</td>
<td>Well rested</td>
<td>Some fatigue</td>
<td>Very tired</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 2. Mission and Environmental Considerations

<table>
<thead>
<tr>
<th>Factor/Hazard</th>
<th>Low Risk</th>
<th>Pt</th>
<th>Moderate Risk</th>
<th>Pt</th>
<th>High Risk</th>
<th>Pt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circadian Timing</td>
<td>Day sails</td>
<td>Passage-making 24hr/day ops.</td>
<td>X Unscheduled night operations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schedule</td>
<td>Plenty of con-tigency time</td>
<td>Adequate but little slack</td>
<td>Unrealistic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voyage length</td>
<td>Day sails</td>
<td>2-5 days</td>
<td>Longer than a week</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Route</td>
<td>Protected waters</td>
<td>Partially protected or coastwise</td>
<td>Oceans</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Familiarity</td>
<td>Regular route recent experience</td>
<td>Have been here before—long ago</td>
<td>New</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traffic</td>
<td>Low volume/recreational</td>
<td>Some rocks &amp; shoals, but ample room, and well marked</td>
<td>Congested area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navigational Hazards</td>
<td>Open water</td>
<td>Exposed shore, shelter available</td>
<td>Lee shore, no good ports</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geographic</td>
<td>Weather shore alt. to leeward</td>
<td>4-24 hours</td>
<td>Over 24 hours</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time to shelter</td>
<td>Less than 4 hrs.</td>
<td>Clear</td>
<td>Haze, vis. &lt;5 NM.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visibility</td>
<td>Clear</td>
<td>Fog/Heavy rain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Season</td>
<td>Summer</td>
<td>Spring or Fall, long nights/cold</td>
<td>Winter/hurricane</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weather forecast</td>
<td>Favorable Beaufort Force 1-4</td>
<td>X Won't be too bad, Beaufort 5-6</td>
<td>Batten down, Beaufort &gt;6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Thank You!

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