A Survey of Human Factors in International Maintenance Organizations

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Agenda

Who responded?

Why have an Human Factors Program

Regulator Support & MEDA

Training Program

Recommendations
**Survey Goals and Methods**

- **Purpose:** Assess international status of maintenance HF
- **Look at:** HF programs, fatigue management, error management, and training.
- **Comparison:** Compare by regulators, Does it make a difference if there is a rule?
- **Distribution:** Online survey (80 items) to 630 addresses.

**Summary Findings**

- Transport Canada and EASA countries have the most robust programs.
- Strong regulations promote strong HF programs.
- Fatigue issues are perceived to be important but little action.
- When companies have programs they are similar.
- Companies record event data but do not use it enough.
Responding Countries

Argentina 4  Germany 6
Australia 19  Greece 10  Peru 1
Austria 1  Greenland 1  Philippines 4
Bahrain 1  Guatemala 2  Poland 1
Belgium 3  Hong Kong 6  Portugal 2
Bolivia 3  Hungary 1  Romania 1
Brazil 3  Ireland 2  Singapore 12
Canada 36  Italy 1  Slovenia 1
Chile 3  Japan 3  South Africa 5
China 3  Korea 2  Spain 8
Columbia 3  Kuwait 1  Sweden 4
Cyprus 1  Luxembourg 1  Switzerland 4
Denmark 1  Malaysia 6  Taiwan 9
Ecuador 1  Malta 1  Thailand 1
El Salvador 1  Mexico 4  Turkey 1
Finland 1  Netherlands 2  United Arab Emirates 3
France 3  New Zealand 3  United Kingdom 29
Germany 6  Norway 12  United States 160

54 Countries
414 Total Respondents (66% response rate)
200 Organizations (Estimated based on 66%)
Experience: 65% > 20 yrs. maintenance experience
### Who is your Regulator? (N=404)

<table>
<thead>
<tr>
<th>Regulator</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal Aviation Administration (FAA) N=182</td>
<td>45%</td>
</tr>
<tr>
<td>European Aviation Safety Agency (EASA) N=95</td>
<td>23.5%</td>
</tr>
<tr>
<td>Civil Aviation Safety Authority (CASA) N=19 Other</td>
<td>17.8%</td>
</tr>
<tr>
<td>Transport Canada N=36</td>
<td>8.9%</td>
</tr>
<tr>
<td>Civil National Aviation Authority N=72</td>
<td>4.7%</td>
</tr>
</tbody>
</table>

### What type of Maintenance Organization?

- Airline Maint. 35.0%
- Repair Stn 27.3%
- Mili/Gov’t 8.2%
- GA/Biz 8.9%
- Manu 4.9%
- Sch/Tng 10.1%
- Other 5.6%
### Respondent Job/ Role/Responsibility

<table>
<thead>
<tr>
<th>Job Role Title</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervisor/Manager/ Coordinator</td>
<td>37.1</td>
</tr>
<tr>
<td>Quality Assurance/Quality Control/Airworthiness</td>
<td>28.4</td>
</tr>
<tr>
<td>Training</td>
<td>11.9</td>
</tr>
<tr>
<td>Engineering</td>
<td>6.2</td>
</tr>
<tr>
<td>Technician/Mechanic</td>
<td>4.4</td>
</tr>
<tr>
<td>Consultant/Professor</td>
<td>3.9</td>
</tr>
<tr>
<td>Inspector/Investigation</td>
<td>3.4</td>
</tr>
<tr>
<td>Labor Representative</td>
<td>3.1</td>
</tr>
<tr>
<td>Safety Analyst</td>
<td>1.8</td>
</tr>
</tbody>
</table>

### Flight/Worker Safety and Compliance Motivate HF Programs

Bar chart showing the motivation of HF programs by Flight Safety, Worker Safety, and Regulatory Compliance.
Support from your Regulator?

<table>
<thead>
<tr>
<th>Regulatory Model</th>
<th>% Support</th>
<th>% Work Closely</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC</td>
<td>57.1</td>
<td>35.7</td>
</tr>
<tr>
<td>CASA</td>
<td>46.2</td>
<td>28.6</td>
</tr>
<tr>
<td>O-NAA</td>
<td>39.3</td>
<td>44.4</td>
</tr>
<tr>
<td>EASA</td>
<td>39.1</td>
<td>28.6</td>
</tr>
<tr>
<td>FAA</td>
<td>38.3</td>
<td>31.9</td>
</tr>
</tbody>
</table>

MEDA is Event Investigation Tool

Which of the following approaches does your operation use to investigate human error? Select all that apply

- MEDA
- HFACS
- MOD-MEDA
- Other

Overall EASA FAA Transport Canada Other NAA
Do you check that suppliers have a QA program?

**HF Program Elements: Fatigue Management**

- 82% said fatigue was an issue.
- 25% had Fatigue Management Systems.
- 36% had Training on Fatigue Management
### Canada and EASA have the most HF Training

<table>
<thead>
<tr>
<th>% Respondents</th>
<th>Overall</th>
<th>CASA</th>
<th>EASA</th>
<th>FAA</th>
<th>Transport Canada</th>
<th>Other NAA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>existing course</td>
<td>60%</td>
<td>50%</td>
<td>40%</td>
<td>30%</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>developing a course</td>
<td>40%</td>
<td>30%</td>
<td>20%</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>send employees</td>
<td>20%</td>
<td>15%</td>
<td>10%</td>
<td>5%</td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td>no course</td>
<td>10%</td>
<td>5%</td>
<td>5%</td>
<td>2%</td>
<td>1%</td>
</tr>
</tbody>
</table>

### HF Training for Instructors?

<table>
<thead>
<tr>
<th>Requirement</th>
<th>% Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Degree in HF or Related Field</td>
<td>16.3%</td>
</tr>
<tr>
<td>University Diploma</td>
<td>39%</td>
</tr>
<tr>
<td>Attended short course in HF</td>
<td>61%</td>
</tr>
<tr>
<td>Attended short course on HF Instructor Training</td>
<td>46.8%</td>
</tr>
<tr>
<td>Maintenance Work Experience</td>
<td>68.5%</td>
</tr>
<tr>
<td>Licensed Mechanic/Engineer</td>
<td>48.5%</td>
</tr>
<tr>
<td>No formal training</td>
<td>12.9%</td>
</tr>
</tbody>
</table>
Preparation of HF Trainers

- 2-5 day 2-5 day course
- 50%
- 60%
- 70%
- 80%
- 90%
- 100%

- 2-5 day Instructors course
- 40%
- 50%
- 60%
- 70%
- 80%
- 90%
- 100%

- MX/Eng Work Experience
- 50%
- 60%
- 70%
- 80%
- 90%
- 100%

- No Formal Overall
- CASA
- EASA
- FAA
- TC
- O-NAA

Canada and EASA have the most Continuation Training

- Overall
- CASA
- EASA
- FAA
- Transport Canada
- Other NAA

% Saying Yes

- 0%
- 20%
- 40%
- 60%
- 80%
- 100%

13th Annual Middle East Engineering and Maintenance Conference
Abu Dhabi, UAE
March 13-14, 2007
Recommendations (1)

- Worker safety, flight safety, regulatory compliance are important motivators when implementing an HF program.

- Strong Regs. make strong programs.

- Continue with existing HF content.

- Address Fatigue as an international issue.

Recommendations (2)

- Improve Instructor HF training

- Must capitalize on MEDA-like Data

- Conduct ROI

- Apply HF to technical documentation issues
2007 HF Conference - Your Invitation

2007 HF Symposium

19th FAA/ATA International Symposium

Human Factors in Maintenance and Airport Service Safety

September 5-6, 2007
Evening "Kick-off" Reception on September 4, 2007
Hyatt Regency Orlando International Airport Hotel
Orlando, Florida, USA

www.airlines.org