HUMAN FACTORS IN AVIATION MAINTENANCE SYMPOSIUM (HFIAM)

SAFETY MANAGEMENT AT P&WC

RONALD F. TRUMPER
CHIEF ENGINEER
PRATT & WHITNEY CANADA
AGENDA

• PWC OVERVIEW
• DATA COLLECTION SYSTEM
• PWC DRIVE TO REDUCE I.F.S.D.
• ASSEMBLY HAZARD ANALYSIS
<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$2,105</td>
</tr>
<tr>
<td>Employment</td>
<td>8572</td>
</tr>
<tr>
<td>Facilities</td>
<td>2.7 million sq. ft.</td>
</tr>
<tr>
<td>R&amp;D investment</td>
<td>$320</td>
</tr>
<tr>
<td>Capital investment</td>
<td>$106</td>
</tr>
</tbody>
</table>
PRODUCT LINE

- Turboprops
- Turboshafts
- Turbofans (to 16,000 lbs)
- Auxiliary Power Units (APU’s)
PRODUCT LINE

PT6A
- 1970: 580 SHP
- 2000: 2000

PT6T/T400
- 1980: 1800 SHP
- 2200

PT6B/C
- 1990: 980 SHP
- 2300

JT15D
- 2000: 2200 THRUST (LB)
- 3350

PW100
- 1970: 2180 SHP
- 6680
PWC GLOBAL ACTIVITY
1999

Airlines 768
Operators 7,337
Countries 183
Aircraft 19,255
Engines 48,194
Operating hours 341,510,000
PWC DATA COLLECTION SYSTEM

• All events involving PWC products are collected & processed and the data is stored in the company Database

• Sources:
  • FAA, NTSB, CTSB
  • FSR (OVER 100 WORLDWIDE)
  • OEM, Customers
• A 24 Hours Customer Help Desk (CHD)
• A dedicated Service Investigation (SI) Department
• CHD and SI are notified of all Level 1 (crash, hazardous) and Level 2 (IFSD) events
PWC DATA COLLECTION SYSTEM

• SI retains ownership of all Level 1 events until final investigation report is issued

• Technical Support Manager retains ownership of all Level 2 events until closure
PWC DATA COLLECTION SYSTEM

• All IFSD, unscheduled engine removals, technical and quality matters are forwarded to a Screening Team.

• The Screening Team determines the severity of the event and identifies an owner for tracking and follow-up until closure.
PWC DRIVE TO REDUCE I.F.S.D.’s

- I.F.S.D. is an Overall indicator of the Engine Reliability
- Loss of Power is critical for all Single Engine Installation
- 4500 PWC Engine are Singles out of 48,000 total
- All engines will benefit from the changes made on Singles
Total powerplant IFSD rate .0084 per 1000 hours.  
Engine basic IFSD rate .0024 per 1000 hours.  
In 1999 49 IFSD, ALL CAUSES in 2.5 Million hours.
PWC DRIVE TO REDUCE I.F.S.D.’s

- PWC set an Y2K Objective to drive IFSD rate to ZERO for all Single Engine application

- Two category of issues were identified:
  - Issues at Assembly and Test (A&T)
  - Field issues
PWC DRIVE TO REDUCE I.F.S.D.’s

- A dedicated Integrated Product Team (IPT) addresses the field issues with VP Product Integrity assuming the overall ownership.

- Some of the field issues have been successfully addressed by:
  - periodic inspections
  - SB incorporation
  - limitation in use of Manual Mode
ASSEMBLY HAZARD ANALYSIS AND MISTAKE PROOFING

- Assembly Hazard Analysis (AHA) and Mistake Proofing are carried out to address issues at OEM and A&T
- All changes in assembly procedures are incorporated into Overhaul and Maintenance Manuals
BEFORE MISTAKE PROOFING

Variable clamp size

Variable spacer

Possibility of missing clamps

Spacer
AFTER MISTAKE PROOFING

- Single clamp size
- Spacer eliminated
- Variable spacer eliminated
- Red bands flag clamp locations
- Torque reaction points