Is maintenance training an important profit source for airlines?

BY DR. WILLIAM COX
CEO, MANAGEMENT & EXCELLENCE
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Why is maintenance training valuable?

MT is cheap (costing $50 an hour*) while airplanes are expensive (e.g. $2,550/block hr for 757-200**)

Even small impacts on reliability due to training easily generate high ROI

* Pratt & Whitney CTC, Line & Base course for NB, 2018
** ICAO, 2017
## Quick ROI of a Line & Base Training for A320 Engines

<table>
<thead>
<tr>
<th>Operating Efficiency</th>
<th>Events</th>
<th>Unscheduled Engine Removals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total L&amp;B Course Cost: $6,700 (incl. $3,200 tuition)</td>
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<tr>
<td>6 Hours Reduced Downtime: $22,200</td>
<td>One D&amp;C Prevented: $18,500</td>
<td>One UER Prevented: $1,068,000</td>
</tr>
<tr>
<td>= Simple ROI +231%</td>
<td>= Simple ROI +176%</td>
<td>= Simple ROI +15,840%</td>
</tr>
</tbody>
</table>

*Within 1 year of L&B training for NB: adjusted by M&E Training Effectiveness Indicator*
Maintenance training could save airlines $116 billion by 2036

- 648,000 new airline technicians by 2036*
- Avoided events (D&C’s, ATB, ABTO)**
- Avoided unscheduled maintenance (UER)**

* Boeing, 2017  
** Within 1 year of L&B training for NB: 2 events and 1 UER adjusted by M&E Training Effectiveness Indicator of SMART ROI™
Is cheap training inexpensive?

ROI per person (sample 10 maintenance engineers) 7 months after completing BSI course using M&E Training Effectiveness Indicator. Includes prevented events and unscheduled maintenance, process efficiencies. Considers direct costs (course costs, transport) and indirect costs (missed maintenance opportunities from being off the job). Bad programs: 50% of all values using data comparing online vs. classroom teaching, salary data of graduates from top colleges vs. less respected institutions. Even so, the 50% discount is for illustrative purposes. Actual data only exists on top courses for NB aircraft at an OEM.
# Types of Training Costs

<table>
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<tr>
<th>Training Cost Type</th>
<th>Type of Cost</th>
<th>Typical % of Total Training Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact on Fleet Reliability, AOG Times</td>
<td>Indirect</td>
<td>70% - 80%</td>
</tr>
<tr>
<td>Course Fee</td>
<td>Direct</td>
<td>10-15%</td>
</tr>
<tr>
<td>Travel Oops</td>
<td>Direct</td>
<td>5-10%</td>
</tr>
<tr>
<td>Internal Processes of Team</td>
<td>Indirect</td>
<td>5%</td>
</tr>
</tbody>
</table>
Skills most impacted by MT

Impact on Operating ROI

- **Improve Maintenance Efficiency**: 30%
- **Save costs**: 33%
- **Work with flight deck instruments**: 34%
- **Troubleshooting**: 44%

Source: Pratt & Whitney Customer Training Center and Management & Excellence, 2017
Impact of MT on New vs. Old Equipment

Skills Most Impacted by MT in %: Old vs. New Equipment

- **New**
  - Work with flight deck instruments: 61%
  - Troubleshooting: 64%

- **Old**
  - Work with flight deck instruments: 34%
  - Troubleshooting: 48%

Source: Pratt & Whitney Customer Training Center and Management & Excellence, 2017
Training More Mechanics = Fewer Events

Source: Pratt & Whitney Customer Training Center and Management & Excellence, 10 airlines 2008-2017
MT: Issues to Decide

- Which personnel to train when
- In which areas
- Curriculum, skills needed
- Whom to train with: OEM, in-house, or contractor?
- Build own training center?
- Maintenance allocation plan
- = Maintenance training and maintenance strategy
Calculating ROI: How it works

Training
Pre-training Baseline survey

Impacts of Training
Post-training Baseline survey

Real Time ROI of training
Data on financial impacts of training
Track Realities: Real Time ROI
Thank You & Questions