Successful Demonstration/Implementation of Air Assisted Airless Spray Paint Units

Mr. Todd Lavender, 402 MXW/QPE
Robins AFB, Georgia
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OVERVIEW

• **Background**
• **Project Steps**
  – Step 1 - Baselining
  – Step 2 - Benchmarking
  – Step 3 - Alternatives analysis
  – Step 4 - Integration
  – Step 5 - Demonstration and validation
• **Results**
• **Summary**

C-130 Paint Shop

F-15 Paint Shop
BACKGROUND

• Robins Air Force Base
  – One of three maintenance depots
  – Recoats primarily cargo and fighter aircraft
  – Aircraft serviced per year:
    • 100 F-15’s
    • 50 C-130’s
    • 25 C-5’s
• **Project Purpose**
  
  – Conduct technology review for paint gun applications
  
  – Identify and evaluate alternative paint gun technologies
  
  – Validation through production application
BACKGROUND

• **Project Goals**
  – Technology improvement
    • Efficiency
    • Production
    • Quality
  – Long-term cost savings
    • Reduce
      – Paint usage
      – Cleanup and waste disposal costs
  – Environmental Conservation
    • Reduce
      – Air emissions
      – Waste generation
STEP 1: BASELINING

- “Baselining” determines current activity status
- Reviewed current processes
  - Five paint shops
  - Personnel survey
  - Observed process
  - Collected data

Building 180 Paint Shop

Building 89 Paint Shop
## STEP 1: BASELINING

### Summary of Findings

<table>
<thead>
<tr>
<th>What:</th>
<th>C-130</th>
<th>C-5</th>
<th>F-15</th>
<th>Parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Paint Gun</td>
<td>HVLP</td>
<td>EPG</td>
<td>HVLP</td>
<td>Conventional</td>
</tr>
<tr>
<td>No. of Paint Guns</td>
<td>6</td>
<td>12</td>
<td>2</td>
<td>16</td>
</tr>
</tbody>
</table>

**HVLP:** High-Volume Low-Pressure  
**EPG:** Electrostatic Paint Gun
STEP 2: BENCHMARKING

• “Benchmarking” compares a Robins AFB process against an offsite point of reference

• Offsite process review
  – Five locations
  – Aircraft and transportation industries
  – Observe equipment demonstrations

Offsite Equipment Demonstration
STEP 2: BENCHMARKING

- **Air-assisted airless (AAA) paint system identified as an alternative technology**

- **What is AAA technology?**
  - Paint forced to the gun by hydraulic pressure
  - Air injected at the spray gun nozzle to assist
    - with atomizing the paint into small droplets
    - for spray pattern control
STEP 3: ALTERNATIVES ANALYSIS

- Evaluated alternative paint gun technologies
  - Equipment vendors
  - Spray gun types
- AAA technology was selected for further evaluation
  - Efficiency and cost relationship

<table>
<thead>
<tr>
<th>Spray Gun Type</th>
<th>Spray Gun $</th>
<th>Transfer Efficiency %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional</td>
<td>225</td>
<td>40</td>
</tr>
<tr>
<td>HVLP</td>
<td>400</td>
<td>65</td>
</tr>
<tr>
<td>EPG</td>
<td>4,500</td>
<td>75</td>
</tr>
<tr>
<td>AAA</td>
<td>650</td>
<td>78</td>
</tr>
</tbody>
</table>
STEP 4: INTEGRATION

“Integration” is the design and building of system components

AAA Paint System
STEP 5: DEMONSTRATION / VALIDATION

• “Demonstration / Validation (DEM/VAL)” evaluates a process through testing
  – Demonstration - new concept or technology
  – Validation - prove that new concept or technology works

• Tested in C-130 paint shop
STEP 5: DEMONSTRATION / VALIDATION

• Pre-testing of the equipment
• Personnel training
• Standard set up and cleanup procedures in place

AAA Paint System Pre-Testing and Training
STEP 5: DEMONSTRATION / VALIDATION

- Setup
- Demonstration
- Observation and data collection
- Analysis
- Validation
RESULTS

| AAA gun cost | $650 |
| AAA 4-gun cart | $25,000 |
| AAA transfer efficiency | 78% |

Material cost savings:
- $84K per year (F-15)
- $220K per year (C-130)
- $355K per year (C-5)
SUMMARY

• Results of AAA paint system testing:
  – Enhances
    • coating efficiency
    • labor productivity
    • ergonomics
  – Produces high-quality finish
  – Reduces
    • materials usage
    • air emissions
    • overspray
    • cleanup
    • waste generation
  – Cost savings over other alternative technologies