Pollution Prevention (P2) Success in the 402 Maintenance Wing at Robins AFB

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**Pollution Prevention (P2) Success in the 402 Maintenance Wing at Robins AFB**

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Presentation Outline

- Pollution Prevention (P2) Background
- 402nd Maintenance Wing Operations
- P2 Painting System Success Stories
  - Air-Assisted Airless Paint Delivery System
  - Plural Component Paint Dispensing System
- P2 Aircraft Surface Pretreatment Success Story
  - PreKote Surface Pretreatment Alternative
- Summary
P2 Background

• P2 is reducing or eliminating waste at the source
  – Modifying production processes
  – Promoting the use of non-toxic or less-toxic substances
  – Implementing conservation techniques
  – Re-using materials rather than putting them into the waste stream

• P2 culture at WRALC/402 MXW

• 85 percent of hazardous materials used in Air Force related to program depot maintenance (PDM) of weapons system
402 Maintenance Wing Operations

- Provides PDM support for major weapon systems
- Repair, modification, reclamation, and rework of over 200 aircraft annually
  - Depainting
  - Surface preparation
  - Painting
Recent P2 Success Stories

- Recent weapon systems P2 success stories
  - Air-Assisted Airless (AAA) Paint Delivery System
    - C-130 (Building 89)
    - C-5/C-17 (Buildings 54/59)
  - Plural Component Paint Dispensing System (PCPDS)
    - C-5/C-17 (Building 59)
  - PreKote Surface Pretreatment Alternative
    - C-130 (Buildings 50/89)
P2 SUCCESS STORY: Previous C-130 Painting Process

- High Volume, Low Pressure (HVLP) spray guns
- 95 one-gallon paint kits per C-130 aircraft (190 containers per A/C)
- Mixing paint cans with shakers
- Dedicated pressure pots
- Pressurized pots difficult to refill
- 190 empty containers per aircraft (hazardous waste disposal)
P2 SUCCESS STORY: AAA Paint Delivery System

- AAA P2 evaluation and implementation process
  - Identify process with potential for improvement vs. HVLP
  - Establish baseline cost and impact data for current process
  - Identify and evaluate alternative technologies
    - AAA
    - Electrostatic Paint Gun (EPG)
  - Benchmark alternative technologies
    - Visited commercial/DoD Sites
      - Honda
      - Gulf Stream
      - PEMCO
      - Fourdel
      - Lockheed Martin
    - Equipment vendor demonstration

AAA Spray Gun System at Lockheed
AAA P2 evaluation and implementation process (cont’d…)

- **Select alternative technology** (AAA paint delivery system)
- **Demonstration/Validation** (Dem/Val)
  - Engineered and integrated equipment
  - Provided training for shop painters
  - Primed and painted five C-130 aircraft
- **Evaluated & presented results**
- **Received Approval**
- **Turned equipment over to C-130 paint facilities**
New C-130 Aircraft Painting Process

- 66 one-gallon paint kits for each C-130
- Still requires mixing paint cans with shakers
- 2-, 4-, 6-gun mobile paint delivery systems with single large capacity paint reservoir (unpressurized)
- AAA paint guns on mobile unit
- Reduced number of empty containers (132 cans versus 190 cans)
P2 Success Story: AAA Paint Delivery System

- AAA paint delivery system cost savings
  - Reduces use of materials
    - 53 percent primer reduction ($2,100 per C-130 aircraft)
    - 24 percent topcoat reduction ($1,700 per C-130 aircraft)
    - 66 percent solvent reduction ($690 per C-130 aircraft)

Total material cost savings of $220,000 per year based on annual average throughput of fifty C-130 aircraft
P2 Success Story: AAA Paint Delivery System

• AAA paint delivery system
  other tangible benefits

  – *Increases paint transfer efficiency*
  – *Reduces air emissions*
  – *Produces higher-quality finish*
  – *Enhances labor productivity and ergonomics*
  – *Reduces*
    • Overspray
    • Cleanup time
    • Waste
P2 Success Story: AAA Paint Delivery System

- EPG paint spray technology
- Mixing 380 one-gallon paint kits (760 containers per C-5 aircraft)
- Catalyst and base are premixed, must be used or discarded
- Twelve EPG paint systems & dedicated pressure pots
- Significant empty container management
- Excessive paint and solvent waste
P2 Success Story: PCPDS

PCPDS P2 evaluation and implementation process

- Empty container management evaluation
  - Identified excessive hazardous waste generation
- Identified and evaluated bulk mixing options
- Designed new paint dispensing system utilizing plural component technology
- Built prototype PCPDS for Proof-of-Concept
- Engineered permanent full-scale PCPDS
- Developed Implementation Plan
- Next Steps
  - Training for paint shop personnel
  - Dem/Val at C-5 Paint Shop
  - Evaluate/Present Results
  - Receive Approval
  - Turn over equipment to C-5 Paint Shop
P2 Success Story: PCPDS

- New C-5 aircraft painting process
  - Combination of PCPDS and AAA painting technology
  - Catalyst and base supplied in 55-gallon drums
  - Catalyst and base remain segregated in 80- and 250-gallon storage vessels until used
  - Mixing of components is automated
  - Components delivered to two 6-gun AAA delivery systems
  - AAA units mobilized to aircraft paint bay
P2 Success Story: PCPDS

Primer Dispensing System

PCPDS Batcher/Controller

Paint Dispensing System

AAA Paint Delivery System

Air-Assisted Airless (AAA) Paint Delivery System

Plural Component Paint Dispensing System (PCPDS)

Aircraft Surface Pretreatment
P2 Success Story: PCPDS

- PCPDS projected cost savings for C-5

  Reduces use of materials

  - 36 percent primer reduction ($5,800 per C-5 aircraft)
  - 36 percent topcoat reduction ($11,096 per C-5 aircraft)
  - 80 percent solvent reduction ($8,000 per C-5 aircraft)

Total material cost savings estimated at over $600,000 per year based on annual average throughput of 25 C-130 aircraft
P2 Success Story: PCPDS

- PCPDS other tangible benefits
  - Enhances labor productivity and ergonomics
  - Eliminates handling and mixing of numerous small containers
  - Mixes and provides paint and primer materials on-demand
  - Superior quality paint finish
  - Reduces cleanup time
  - Reduces hazardous waste
    - Less paint waste
    - Less solvent waste
    - Fewer empty containers
    - Empty containers recycled by vendor

Paint Quality – Thickness Confirmation
P2 Success Story: Previous C-130 Aircraft Surface Pretreatment Process (WEAC³)

- Wash
  - Initial Rinsedown
  - Alkaline Soap Application
- Acid Etch
  - Phosphoric Acid Etch Application
- Chromate Conversion Coating Application
- Final Rinse
PreKote Aircraft Surface Pretreatment

- PreKote P2 evaluation and implementation process
  - Researched other Air Force and commercial facility processes
  - Identified PreKote as potential alternative to WAEC³

- Dem/Val PreKote process at C-130 paint shop
  - Partnered with Corrosion Control Office and C-130 paint shop
  - Developed Implementation Plan
  - Provided personnel application and safety training
  - Pretreated three C-130 aircraft

- Successful Dem/Val leading to implementation of PreKote process at C-5 and C-17 paint shops
PreKote Aircraft Surface Pretreatment

- New C-130 aircraft surface pretreatment process
  - PreKote application (two-step process)
  - Final rinse
- Chromate conversion coating eliminated from process

Final Rinse Process
PreKote surface pretreatment cost savings

- $12,000 per C-130 aircraft
- $600,000 annual savings based on fifty C-130 aircraft per year
PreKote Aircraft Surface Pretreatment

- PreKote surface pretreatment other tangible benefits
  - Streamlined process and improved production
  - Better paint adhesion to aircraft surface
  - Reduced surface corrosion
  - Reduced worker exposure
  - Reduced personal protective equipment (PPE) requirements
  - Reduced environmental impacts
Summary

• **P2 culture at Robins AFB**
  - Always looking for a better way
  - 2007 recipient of General Thomas D. White DoD P2 Award

• **Painting system P2 initiative success stories**
  - **AAA Paint Delivery System**
    • Annual projected savings for C-130, C-5, C-17, F-15 in excess of $800K
  - **PCPDS**
    • Annual projected savings in excess of $650K
  - **PreKote Surface Pretreatment Alternative**
    • Annual projected savings for C-130 and C-5 in excess of $1.65M

• **Total annual projected savings for these P2 initiatives in excess of $3M**
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