



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

P2 Background

Implementation

Results and
Optimization

2009 Results

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*

P2 Background

Implementation

Results and
Optimization

2009 Results



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 Background

Air-Assisted Airless
(AAA) Paint Delivery
System

Plural Component
Paint Dispensing
System (PCPDS)

Aircraft Surface
Pretreatment

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)



One Gallon Paint Kits



HVLP Paint Delivery Units

P2 Background

Air-Assisted Airless
(AA) Paint Delivery
System

Plural Component
Paint Dispensing
System (PCPDS)

Aircraft Surface
Pretreatment

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

P2 Background

Air-Assisted Airless
(AAA) Paint Delivery
System

Plural Component
Paint Dispensing
System (PCPDS)

Aircraft Surface
Pretreatment

P2 SUCCESS STORY: AAA Paint Delivery System

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*



C-130 Primer Application Utilizing AAA Paint Delivery System

P2 Background

Air-Assisted Airless
(AAA) Paint Delivery
System

Plural Component
Paint Dispensing
System (PCPDS)

Aircraft Surface
Pretreatment

P2 Success Story: AAA Paint Delivery System

- 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)



4-Gun AAA Mobile Unit



6-Gun AAA Mobile Unit

P2 Background

Air-Assisted Airless
(AAA) Paint Delivery
System

Plural Component
Paint Dispensing
System (PCPDS)

Aircraft Surface
Pretreatment

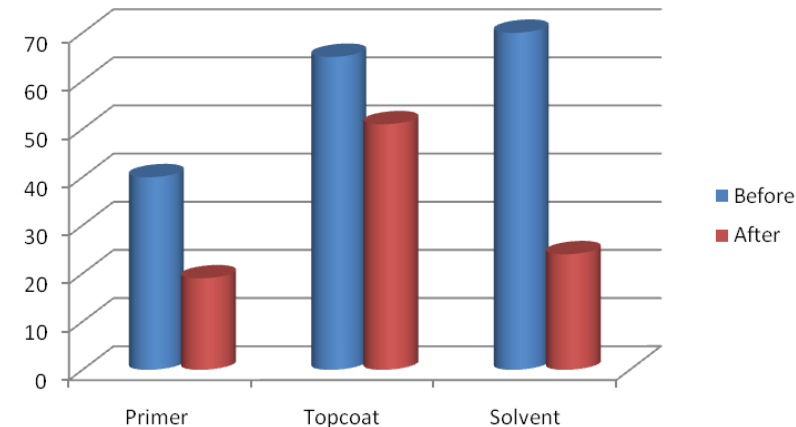
P2 Success Story: AAA Paint Delivery System

- AAA paint delivery system cost savings

P2 Background

— *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)



Air-Assisted Airless
(AAA) Paint Delivery
System

Plural Component
Paint Dispensing
System (PCPDS)

Total material cost savings of \$220,000 per year based on annual average throughput of fifty C-130 aircraft

Aircraft Surface
Pretreatment

P2 Success Story: AAA Paint Delivery System

- AAA paint delivery system
other tangible benefits

P2 Background

Air-Assisted Airless (AAA) Paint Delivery System

Plural Component Paint Dispensing System (PCPDS)

Aircraft Surface Pretreatment

- *Increases paint transfer efficiency*
- *Reduces air emissions*
- *Produces higher-quality finish*
- *Enhances labor productivity and ergonomics*
- *Reduces*
 - Overspray
 - Cleanup time
 - Waste



AAA Improved Transfer Efficiency

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 Background

Air-Assisted Airless
(AAA) Paint Delivery
System

Plural Component
Paint Dispensing
System (PCPDS)

Aircraft Surface
Pretreatment



One-Gallon Paint Can Shaker



One-Gallon Paint Kits

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 Background

Air-Assisted Airless
(AA) Paint Delivery
System

Plural Component
Paint Dispensing
System (PCPDS)

Aircraft Surface
Pretreatment

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 Background

Air-Assisted Airless
(AA) Paint Delivery
System

Plural Component
Paint Dispensing
System (PCPDS)

Aircraft Surface
Pretreatment



C-5 Horizontal Stabilizer Primer Application

P2 Success Story: PCPDS

P2 Background

Air-Assisted Airless
(AA) Paint Delivery
System

Plural Component
Paint Dispensing
System (PCPDS)

Aircraft Surface
Pretreatment

Primer Dispensing System



PCPDS
Batcher/Controller



Paint Dispensing System



AAA Paint Delivery System

P2 Success Story: PCPDS

- PCPDS projected cost savings for C-5

P2 Background

Reduces use of materials

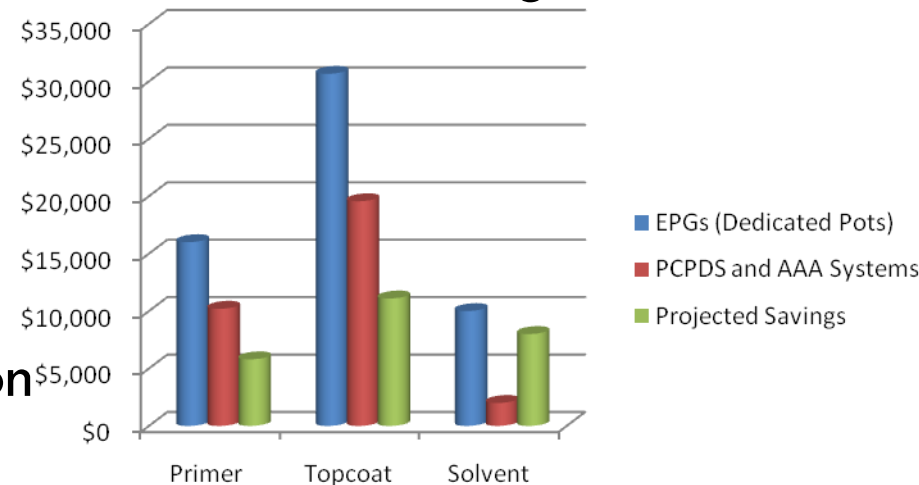
- 36 percent primer reduction (\$5,800 per C-5 aircraft)
- 36 percent topcoat reduction (\$11,096 per C-5 aircraft)
- 80 percent solvent reduction (\$8,000 per C-5 aircraft)

Air-Assisted Airless
(AA) Paint Delivery
System

Plural Component
Paint Dispensing
System (PCPDS)

Aircraft Surface
Pretreatment

Cost Savings

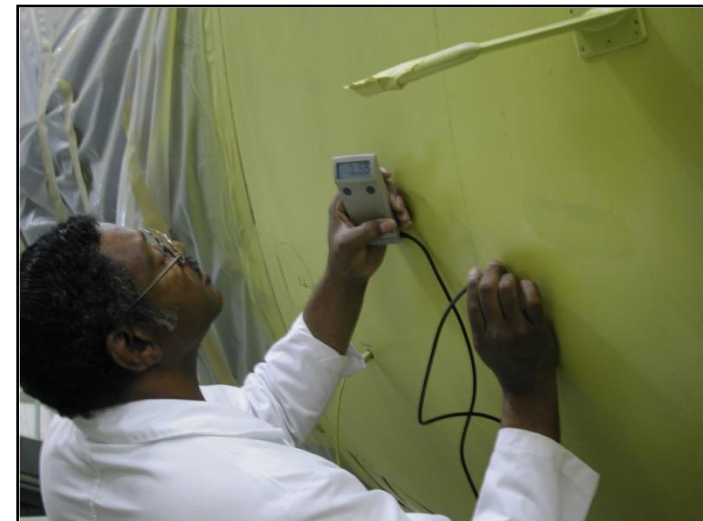


Total material cost savings estimated at over \$600,000 per year based on annual average throughput of 25 C-130 aircraft

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 Background

Air-Assisted Airless
(AA) Paint Delivery
System

Plural Component
Paint Dispensing
System (PCPDS)

Aircraft Surface
Pretreatment

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

P2 Background

Air-Assisted Airless
(AA) Paint Delivery
System

Plural Component
Paint Dispensing
System (PCPDS)

Aircraft Surface
Pretreatment



Chromate Conversion Coating Application

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

P2 Background

Air-Assisted Airless
(AA) Paint Delivery
System

Plural Component
Paint Dispensing
System (PCPDS)

Aircraft Surface
Pretreatment

PreKote Aircraft Surface Pretreatment

- New C-130 aircraft surface pretreatment process

P2 Background

- *PreKote application (two-step process)*
- *Final rinse*

Air-Assisted Airless
(AA) Paint Delivery
System

- Chromate conversion coating eliminated from process

Plural Component
Paint Dispensing
System (PCPDS)



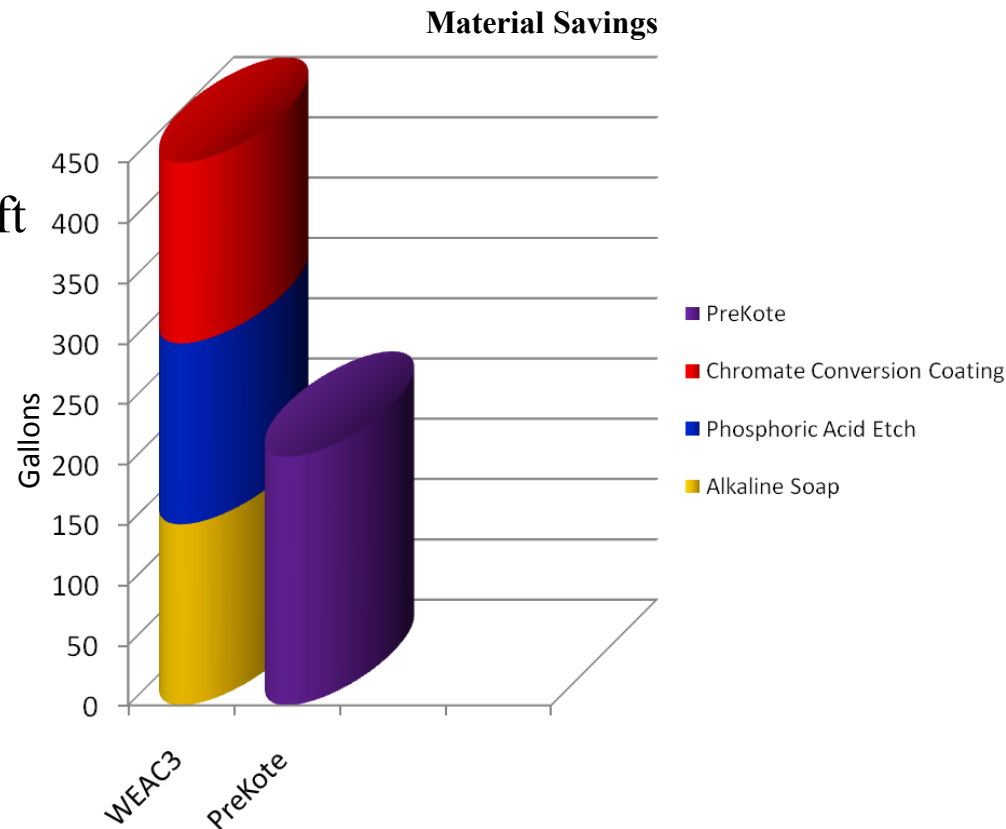
Final Rinse Process

Aircraft Surface
Pretreatment

PreKote Aircraft Surface Pretreatment

■ PreKote surface pretreatment cost savings

- \$12,000 per C-130 aircraft
- \$600,000 annual savings based on fifty C-130 aircraft per year



P2 Background

Air-Assisted Airless
(AA) Paint Delivery
System

Plural Component
Paint Dispensing
System (PCPDS)

Aircraft Surface
Pretreatment

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*

P2 Background

Air-Assisted Airless
(AA) Paint Delivery
System

Plural Component
Paint Dispensing
System (PCPDS)

Aircraft Surface
Pretreatment

Summary



P2 Background

- P2 culture at Robins AFB

- Always looking for a better way
- 2007 recipient of General Thomas D. White DoD P2 Award

Air-Assisted Airless (AAA) Paint Delivery System

- 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

Plural Component Paint Dispensing System (PCPDS)

- PCPDS
 - Annual projected savings in excess of \$650K

Aircraft Surface Pretreatment

- 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

Summary



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