



402d Maintenance Wing

P2 (Pollution Prevention) Planes, Prekote, and Paint

Improving Aircraft Programmed Depot Maintenance (PDM) Processes and Painting Efficiency Through Innovation



402 AMXG Pollution Prevention Program

Mr. Todd Lavender, Environmental Engineer

402 Maintenance Wing

Environmental and Ergonomics Office

402 MXW/QPE

March X, 2009



Overview



402d Maintenance Wing

- 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 (Pollution Prevention)



402d Maintenance Wing

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



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





402d Maintenance Wing

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)



Award Winning P2 Program

Sustain the Fight...Quality Depot Maintenance On Time, On Cost



- High Volume, Low Pressure (HVLP) spray guns
- 95 one-gallon paint kits (190 containers per C-130 aircraft)
- 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 SUCCESS STORY

AAA Paint Delivery System

- AAA P2 evaluation and implementation process
 - Identify process with potential for improvement versus 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 SUCCESS STORY

AAA Paint Delivery System 402d Maintenance Wing

- 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 SUCCESS STORY

AAA Paint Delivery System

➤ New C-130 Aircraft Painting Process

- AAA paint spray technology
- 66 one-gallon paint kits (132 containers per C-130 aircraft)
- Still requires mixing paint cans with shakers
- 2-, 4-, 6-gun carts with single large capacity paint reservoir (unpressurized)
- AAA paint guns on mobile unit
- Reduced number of empty containers (132 cans versus 190 cans)

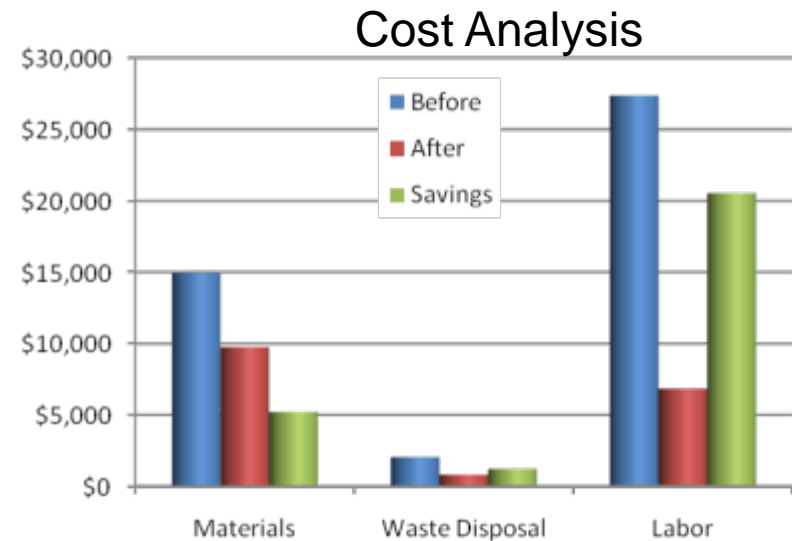


4-Gun AAA Mobile Unit



➤ AAA paint delivery system cost savings for C-130 (\$26,950)

- Material cost savings
-\$5,206
- Waste disposal cost savings
-\$1,224
- Labor cost savings
-\$20,520



Total cost savings of \$1,347,500 per year based on annual average throughput of 50 C-130 aircraft



➤ 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



AAA Improved Transfer Efficiency



- 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



One-Gallon Paint Can Shaker



One-Gallon Paint Kits



- 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
 - Next Steps
 - Implementation plan
 - Training for paint shop personnel
 - Dem/Val at C-5 Paint Shop
 - Present results and obtain approval
 - Turn over equipment to C-5 Paint Shop



➤ New C-5 aircraft painting process

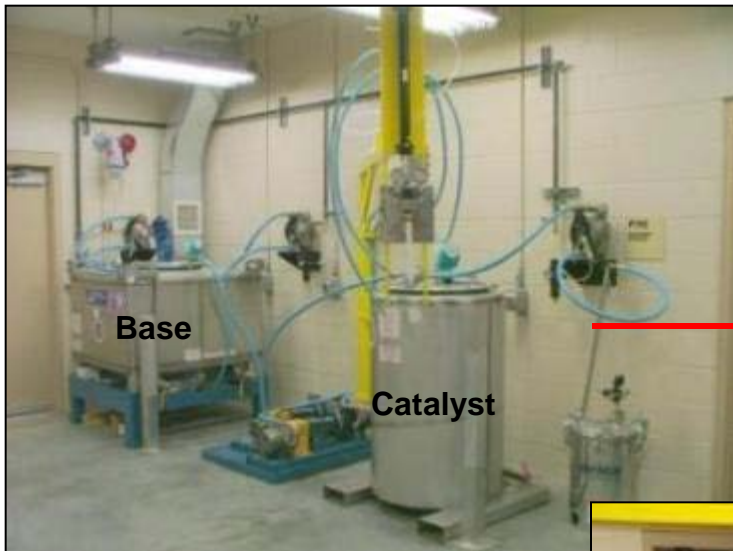
- Combination of PCPDS and AAA painting technology
- Catalyst and base supplied in 55-gallon drums
- Catalyst and base remain segregated in 80- and 250-gallon storage vessels until used
- Mixing of components is automated
- Components delivered to two 6-gun AAA delivery systems
- AAA units mobilized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



C-5 Horizontal Stabilizer Primer Application



Primer Dispensing System



PCPDS
Batcher/Controller



Paint Dispensing System

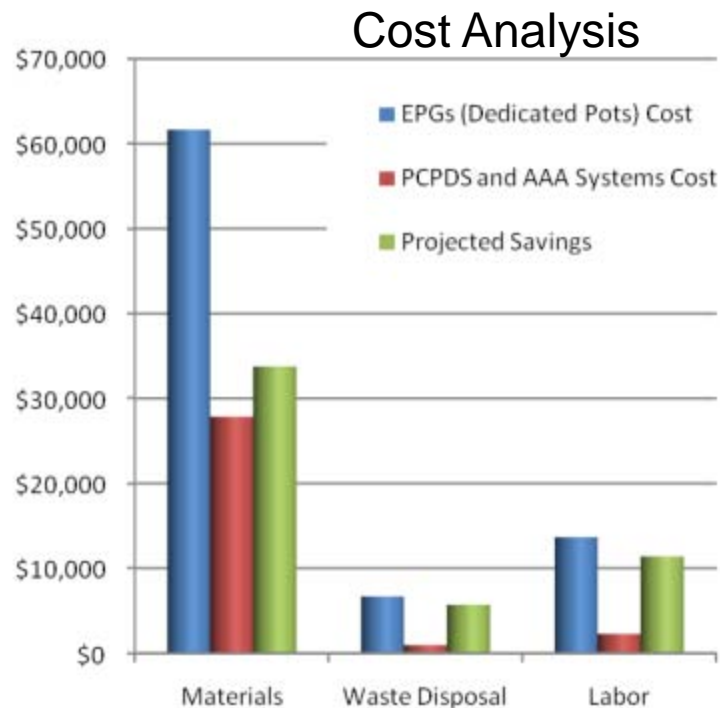


AAA Delivery System



➤ PCPDS projected cost savings for C-5 (\$50,923)

- Material cost savings
 - \$33,794
- Waste disposal cost savings
 - \$5,729
- Labor cost savings
 - \$11,400



Total cost savings estimated at over \$1,273,000 per year based on annual average throughput of 25 C-5 aircraft



P2 SUCCESS STORY

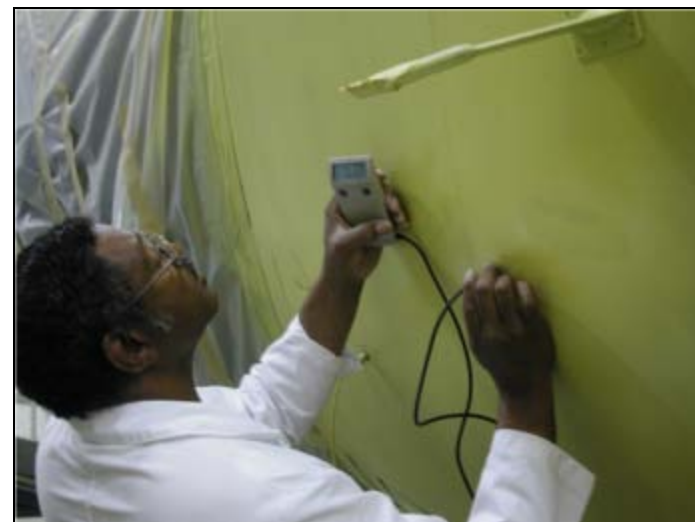
PCPDS



402d Maintenance Wing

➤ 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 402d Maintenance Wing

➤ WAEC³

- Wash
 - Initial Rinsedown
 - Alkaline Soap Application
- Acid Etch
 - Phosphoric Acid Etch Application
- Chromate Conversion
Coating (Alodine)
Application
- Final Rinse



Alodine Application



- 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



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



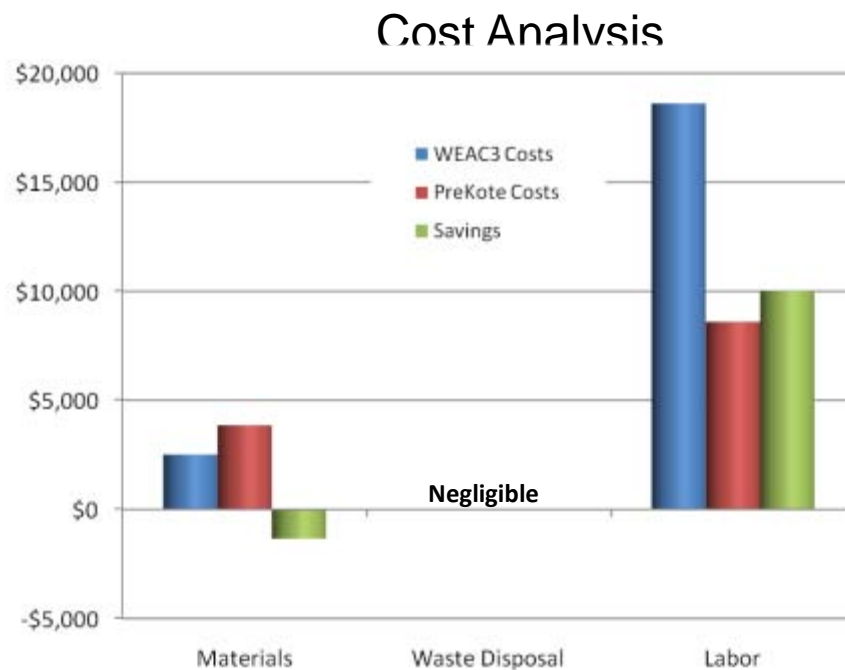
Final Rinse Process



➤ PreKote surface pretreatment cost savings for C-130 (\$8,700)

- Material cost savings
 - \$1,344 (Loss)
- Waste disposal cost savings
 - \$32
- Labor cost savings

Total cost savings estimated at over \$435,000 per year based on annual average throughput of 50 C-130 aircraft





- 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 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 in excess of \$1.3 Million
 - PCPDS
 - Annual projected savings for C-5 in excess of \$1.25 Million
 - PreKote Surface Pretreatment Alternative
 - Annual projected savings for C-130 in excess of \$435,000
- Total annual projected savings for these P2 initiatives approximately \$3 Million



402d Maintenance Wing

Contact Information:

Todd Lavender
Environmental Engineer
todd.lavender@robins.af.mil
(478) 327-4589