Two Approaches to Rehabilitation of Metal Roofing at Wheeler Army Airfield Hawaii

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**Two Approaches to Rehabilitation of Metal Roofing at Wheeler Army Airfield Hawaii**

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**Standard Form 298 (Rev. 8-98)**
Proscribed by ANSI Std Z39-18
Corrosion Problem

• Standing seam metal roofs (SSMR) comprise 80% of DoD new roofing
  – 1980’s roofs reaching end of service life
• Early coatings with performance problems
  – Not adequate
  – Not “cool”
• Corrosion around panel-penetrating fasteners
  – Corrosion
• Improper flashing of roof penetrations
Objective

• To demonstrate and implement rehabilitation technologies to extend service life of existing metal roofs identified for replacement due to corrosion related problems
• Two metal roofs at Wheeler Army Airfield, Hawaii
• Two corrosion mitigation technologies
Approach/Technologies

- Polyurea coating over existing metal roof
- New metal roofing system over existing metal roof
Wheeler Army Airfield
Polyurea Coating Restoration

Building 118 - Barracks

- Corrugated metal panel
- 20,000 SF
- 15 + years old
Polyurea Coating Restoration

Existing Conditions

- Overlay with coating
- Some rusting
- Persistent leaking
Polyurea Coating Restoration

Demonstration Metrics

• Must meet established parameters
• Fifteen year warranty
• Must effectively seal around roof penetrations and seams
• Aesthetically acceptable to customer
Polyurea Coating Restoration

Polyurea Roof Coating

- Solids: 98% by weight
- Tensile (ASTM D-412): 1800 psi
- Elongation (ASTM D-412): 500%
- Permanent Set (ASTM D-412): 10% max.
- Hardness Shore A (ASTM D-2240): 60 ± 3
- Tear Resistance (ASTM D-624, Die C): 250 pli
- Water Vapor Perm. (ASTM E-96, BW): 0.025 perm In.
Polyurea Coating Restoration

Preparation

• Pre-work inspection
  – Only minor, peeling, flaking
  – Some missing seam sealant

• Pressure washing
  – Water\bleach\mildewcide

• Cleaning of gutters, sealing of open joints with polyurethane sealant
Polyurea Coating Restoration Training
Polyurea Coating Restoration

Application
Polyurea Coating Restoration

Finished Appearance
Polyurea Coating Restoration

Lessons Learned

- Parking/personnel access to building must be well coordinated
- Maintain fluid lines at established elev. temps.
- Overspray needs to be minimized
  - Gun tip, backpressure & fluid temp.
  - Applicator standoff distance
  - Application angle
  - wind
Polyurea Coating Restoration

Project Cost Savings

• Estimated Cost for Tear-off and Replacement
  – $420,000
  – 30-year service life

• Rehabilitation using polyurea-hybrid coating
  – $118,000
  – 15-year service life
SSMR Re-cover on Existing Metal System

Building 835 – Bowling Center

• Standing seam metal roof
• 10,000 SF
• 22 years old
SSMR Re-cover on Existing Metal System

Existing Conditions

- Severe paint delamination
- Areas of rusting on panel surfaces
- Poor detailing of roof penetrations
SSMR Re-cover on Existing Metal System

Existing Conditions
SSMR Re-cover on Existing Metal System

Demonstration Metrics

- Sub purlins used to re-cover existing metal roof.
- Must meet CERL’s accepted parameters,
- Must have a minimum 2 mil finish.
- Must meet wind uplift requirements (ASTM E1592)
- Flashing details must provide effective seal around vents, stack and seams.
- Must be aesthetically acceptable to DPW and the garrison’s senior leadership.
SSMR Re-cover on Existing Metal System

Retrofit Subpurlin System

Roof Hugger™
SSMR Re-cover on Existing Metal System

Surface Preparation

• Pressure wash surface
• Apply rust inhibitors
• Remove existing fascia and gutters
SSMR Re-cover on Existing Metal System

Application
SSMR Re-cover on Existing Metal System

Application
SSMR Re-cover on Existing Metal System Application
SSMR Re-cover on Existing Metal System

Application
SSMR Re-cover on Existing Metal System

Application
Lessons Learned

• Re-cover installation (vs. replace) greatly reduces work space requirements and minimizing disruptions
• Mock-up and testing of fascia and gutter prior to initiating work can result in improved detailing
• To minimize “oil canning”, consider reducing panel width to 12” and or use lighter color
Rehabilitation of Metal Roofing

Recommendations

- Continue to survey both roofs to determine service life extension
- Collect exposure samples during the next two years to assess performance
- Based on assessments, develop guide specifications, manuals and standards for use by the DoD