

# Getting The Most Out of Your Roof Asset

Program #099 PM



# What We Hope to Accomplish

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- What is the Cost of Neglecting Your Roof Asset
- What is Preventive Maintenance
- Why Preventive Maintenance is Important
- Components of a Preventive Maintenance Program
- Restoration Process
- Garland and Preventive Maintenance

# What is the Cost of Neglecting Your Roof Asset?

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- Depreciation for a Roof is 39 Years, Per the Federal Government
- Average Life Expectancy of Today's Commercial Low-slope Roof is Only 17 Years
- Only 7% of Building Owners Extend the Working Lives of Their Roofs 26 Years and Longer

*- Roof Longevity and Replacement Report Funded by Roofing Alliance for Progress*

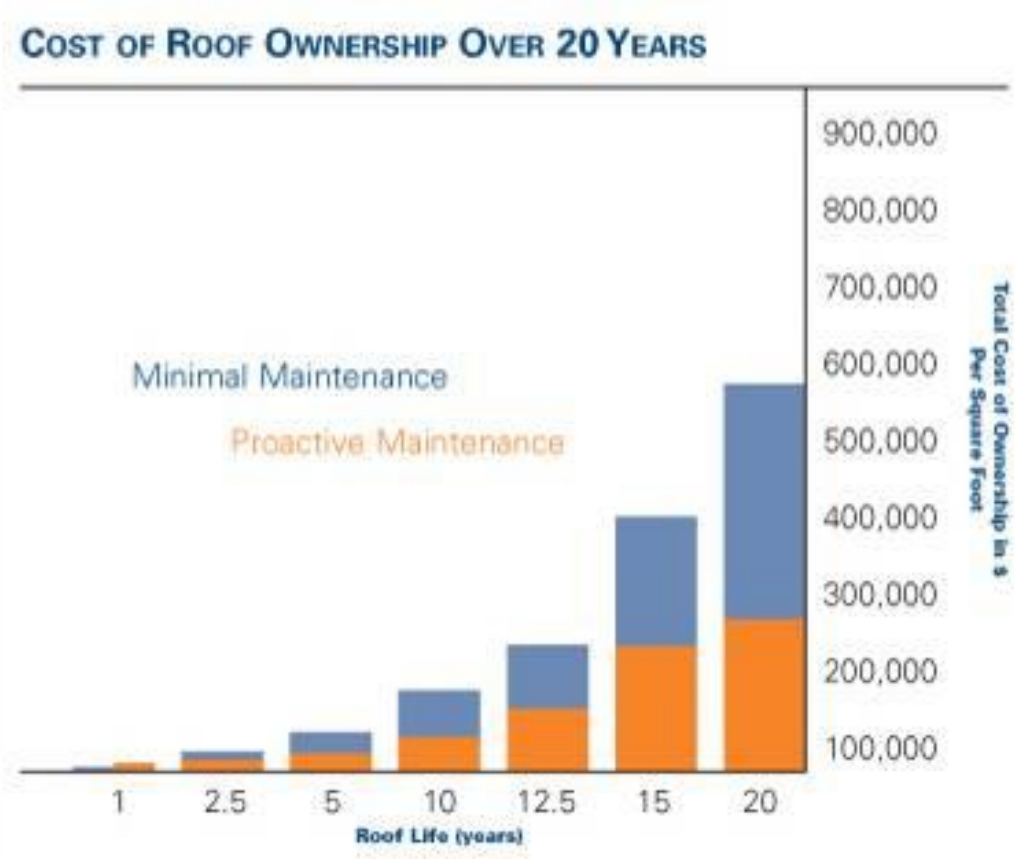
# What is the Cost of Neglecting Your Roof Asset?

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- Roofs That Are Reactively, Rather Than Proactively Maintained, More Than Double the Total Life-Cycle Cost of Ownership Over a 20-year Period

- RSI Magazine, Roof Maintenance, "Try the Math."

# What is the Cost of Neglecting Your Roof Asset?



Based on 100,000 SF roof; Original cost \$350,00 Tear-off and replacement cost \$500,00; Leak repairs \$750 per occurrence. PM costs: Annual inspections - \$1000; Annual Visual Surveys \$1000; Periodic moisture scans \$5,000

# Additional Costs of Roof Neglect

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- Shutdown Time / Internal Damage  
(Computers, Machinery, Stock)
- Safety Issues
- Environmental Issues
- Mold

# Shutdown Time & Internal Damage

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# Safety Issues

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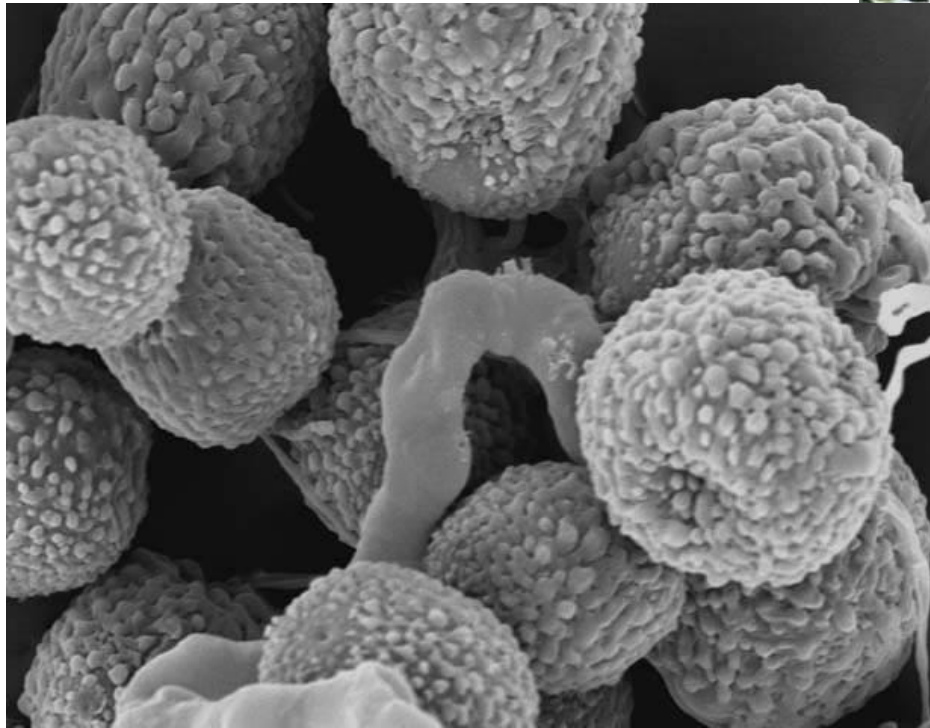


# Environmental Issues



# Mold

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# Mold Signs

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- Water Damage
- Musty Smell
- Relative Humidity Above 55%
- Odors When HVAC System is on



# Mold and Health

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- Breathing Difficulties
- Flu-Like Symptoms
- Loss of Balance
- Memory Loss
- Dizziness
- Chronic Fatigue
- Chronic Sinus Infections
- Allergies
- Asthma
- Bleeding Lung
- Hearing Loss
- Brain Damage

# Mold Prevention

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- “The Only Factor That Can Be Controlled is Moisture.”
  - National Association of Home Builders
- “The Only Way to Control Indoor Mold Growth is to Control Moisture.”
  - US Environmental Protection Agency

# Mold Regulations

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- No Current Standards for Levels of Mold
- No Known Mold Exposure Limits for Indoor Environments
- No State or Federal Agencies Currently Offer Testing of Mold Samples
- OSHA is Developing Standards for Permissible Exposure Limits

# **Preventive vs. Reactive Maintenance**

# What is Preventive Maintenance?

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- System Is Inspected at Least Annually
- Maintenance Is Planned and Scheduled  
Components Are Repaired or Replaced Periodically
- One of the Most Effective Tools to Maximize the Service Life of a Roofing System





# What is Reactive Maintenance?

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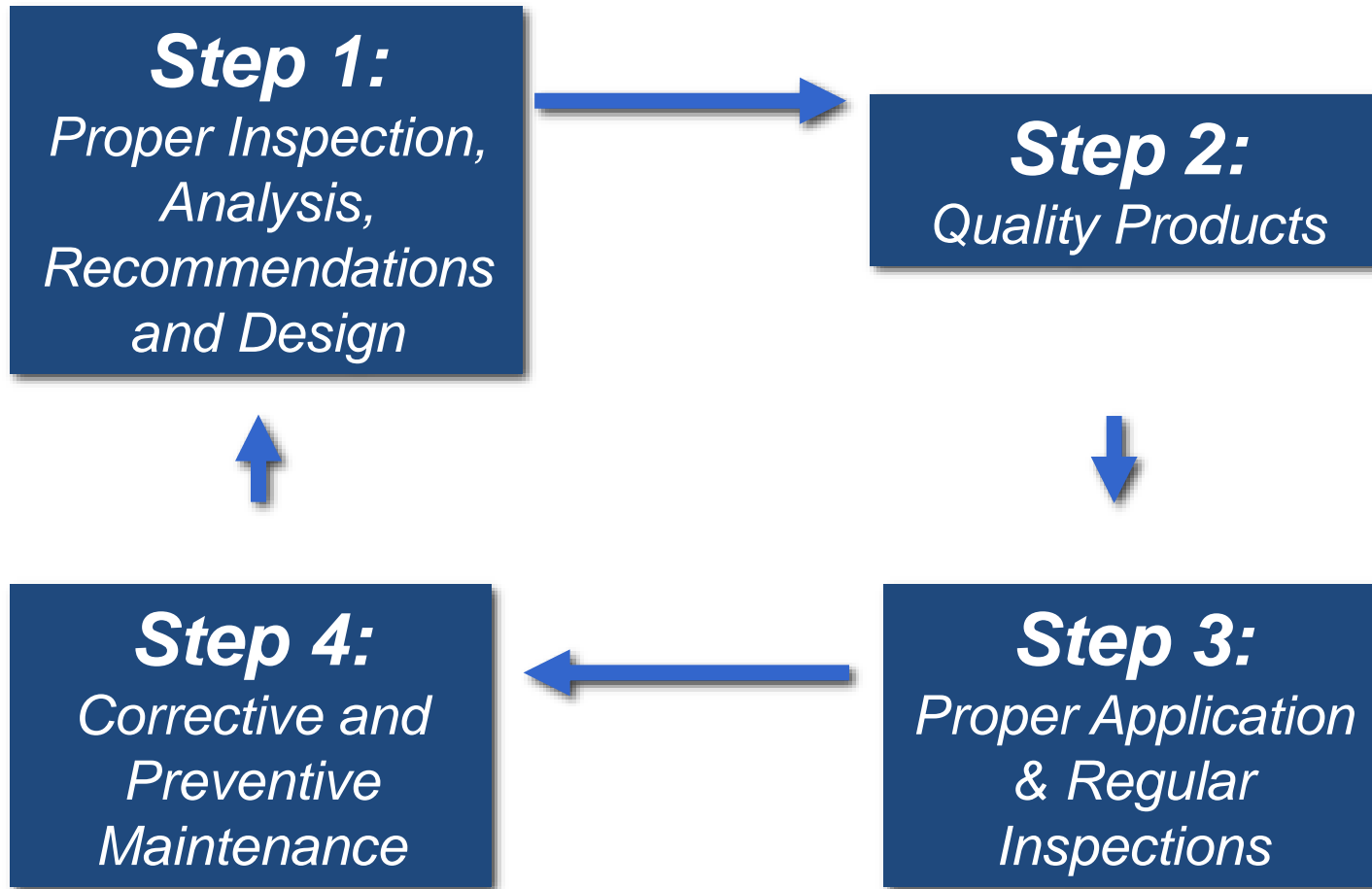
## Definition:

- System is Out of Sight, Out of Mind
- Repairs Only Made When Emergency Exists



# Four Step Process to Successful Roof Management

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# Facts of Preventive Maintenance

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- Every Warranty Contains an Exclusion Stating That if PM is Not Performed, the Warranty is Null and Void
- Approximately 80% of All Roof Leaks Could Be Prevented by Timely and Effective Roof Repairs – NRCA
- Today's Re-roofing Alternatives Actually Provide Long-Term Solutions, Not Just Band-Aid Fixes to Leaks or Problems

**“Car Owners Know That Regular Oil Changes and Tune-ups Are Simply Necessary in Maintaining and Operating a Vehicle. Regular Maintenance and Inspections Are the Same for Roofs.”**

– Karen Kane, Director of Contractor Management, NRCA

# Facts of Preventive Maintenance

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- 52% of Owners Report Their Roof As the #1 Construction Problem (1996 AIPE)
- More Than Half of All Related Legal Claims Brought Against Architects/Consultants Involve the Roofing Part of the Building Envelope (1997 AIA)
- 15% of New Roofs Fail Within First 6 Years (1996 AIPE)



# **Why Preventive Maintenance?**

# Why Preventive Maintenance?

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- Proactive Money Management
  - Allows For a Planned, Organized Approach to Management of a Roof Asset
  - Leads to Responsible, Timely Preparation of Long-Term Capital Expenditures
- Saves Money
- Saves Time

# Why Preventive Maintenance?

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- Increases Life-Cycle of Roof
- Positive Environmental Impact
- Tax Depreciation
  - Roofing Repairs May be Written Off in the Current Tax Year
  - New Roofing is Depreciated Over 39.5 Years



# Life-Cycle Cost of Roofing Asset

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- New Roof System with Proactive PM
  - 50,000 Sq. Ft. X \$7 Per Foot
- Tear off and Replacement = \$350,000
  - 50,000 Sq. Ft. X 10¢ Per Foot
- Annual P.M. Fee = \$5,000 X 25 Years = \$125,000
- Total Investment for 25 Years of Performance = \$475,000\* or \$19,000 Per Year

\*Does not factor in savings in time and lack of frustration

# Life-Cycle Cost of Roofing Asset

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- New Roof System with Reactive PM
  - 50,000 Sq. Ft. X \$7 Per Foot
- Tear off and Replacement = \$350,000
  - 12,500 Sq. Ft. Or 25% of Roof Needs Repair in Year 10 @ \$3.50 Sq. Ft. = \$43,750
- Total Investment for 15 Years of Performance = \$393,750\* or \$26,250 Per Year

\*Does not factor in lost dollars in time and lack of frustration

# Life-Cycle Cost of Roofing Asset

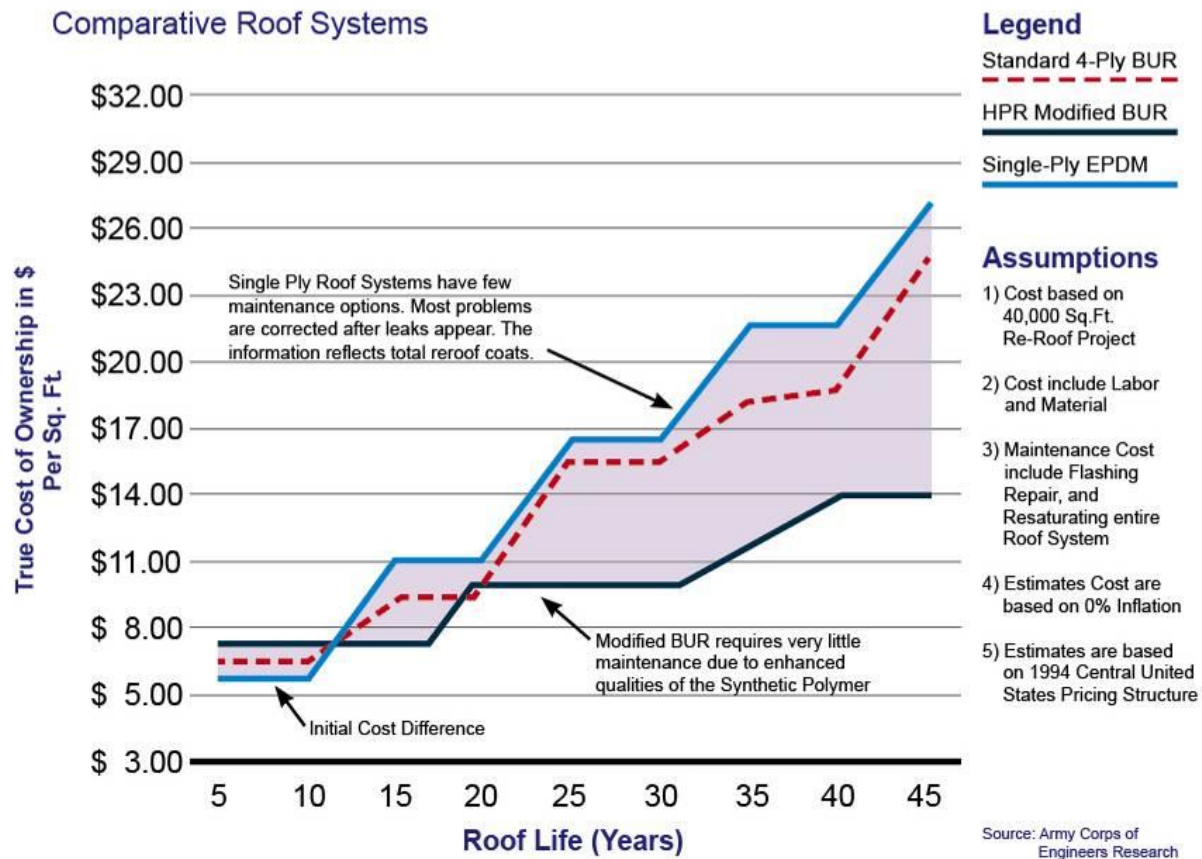
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## **New Roof System with no PM**

- 50,000 Sq. Ft. X \$7 Per Foot  
Tear off and Replacement = \$350,000
- Total Investment for 10 Years of Performance  
= \$350,000\* or \$35,000 Per Year

\*Does not factor in lost dollars in time and lack of frustration

# Life-Cycle Cost



Periodic restorations improve return on roofing investment by significantly extending the interval between replacements. Aggressive maintenance and periodic restoration can prolong the working life of even an inferior roof, reducing or eliminating replacement-related costs.

# **Components of a Preventive Maintenance Program**

# Preventive Maintenance Program Components

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- Survey/Testing
- Document and Record Findings
- Results
- Appoint Preventive Maintenance Program Team
- Schedule Repairs and Inspections

# Survey

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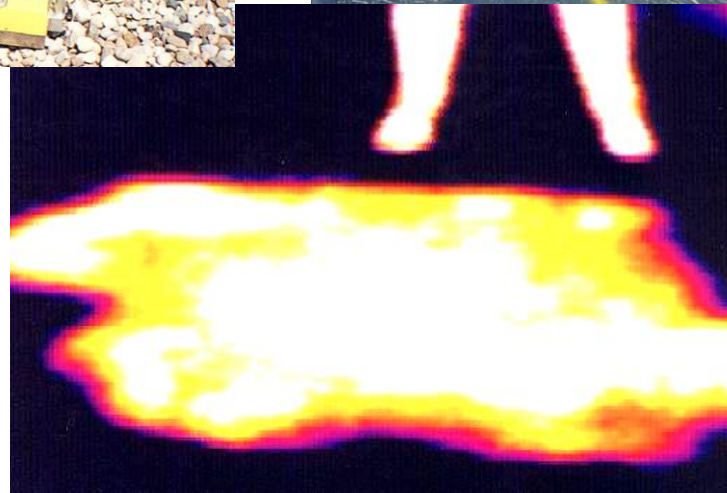
- Analysis of Roof Construction (core cuts)
- Thorough Inspection of all Roof Components
  - Membrane Field
  - Flashings
  - Perimeter
  - Penetrations
  - HVAC and other equipment
  - Parapet Walls
  - Seams
  - Fasteners



# Non-Destructive Testing

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- Infrared Testing
- Moisture Probes





# Documentation

**GARLAND** Home Client Listing New Client User Admin Wes Van Autreve

## City of Columbus

- City of Columbus
  - Columbus Police Academy
  - Dublin Road Water Plant
  - Fire Training Academy
  - Grange Insurance Audubon Center
  - Granville St. Pol Sub
  - Granville St Sub Station
  - Hap Cremean
  - Hoover Dam
  - Jerry Hammond
  - Maloney Health Center
  - McKinley Avenue Storage Building
  - New Police Property Room
  - Parsons Avenue Water Plant
  - Traffic Control
  - Winchester Pike Police Sub
  - Police Sub 5
  - Police Sub 12

[+ New Facility](#) [Dashboard](#)

### Client Information

City of Columbus [>](#)

### Attachments

[+ New Attachment](#)

- No attachments have been added [>](#)

### Summary Reports and Charts


Summary Reports	Charts & Graphs
<ul style="list-style-type: none"><li>Executive Summary</li><li>Cost Estimate</li><li>Priority Summary</li><li>Yearly Budget Summary</li><li>Work Summary</li><li>Warranty Summary</li></ul>	<ul style="list-style-type: none"><li>Square Footage</li><li>Budget Summary</li><li>System Type</li></ul>

[>](#)

### Report Builder

[+ Create New Report](#)

# Documentation

Home Client Listing New Client User Admin Wes Van Autreve

## City of Columbus

- City of Columbus
  - Columbus Police Academy
  - Dublin Road Water Plant**
  - Fire Training Academy
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  - Hap Cremean
  - Hoover Dam
  - Jerry Hammond
  - Maloney Health Center
  - McKinley Avenue Storage Building
  - New Police Property Room
  - Parsons Avenue Water Plant**
    - 2012 Roof Restorations (Roof Section)
  - Traffic Control

### Parsons Avenue Water Plant


Eagleview + Move + New Asset 📍 📄 Dashboard

#### Facility Information

Parsons Avenue Water Plant 5600 Parsons Avenue, Lockbourne, OH 43137 Facility Type: Municipal Square Ft: 0	Contact: Mike Hurd mjhurd@columbus.gov	>
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#### Photo & Drawing

Edit Photo Edit Drawing >



No Drawing

#### Warranties

# Documentation



## City of Columbus

Find Facility or Asset

- City of Columbus
  - Columbus Police Academy
  - Dublin Road Water Plant
  - Fire Training Academy
  - Grange Insurance Audubon Center
  - Granville St. Pol Sub
  - Granville St Sub Station
  - Hap Cremean
  - Hoover Dam
  - Jerry Hammond
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  - McKinley Avenue Storage Building
  - New Police Property Room
  - Parsons Avenue Water Plant
  - Traffic Control
  - Winchester Pike Police Sub
  - Police Sub 5
  - Police Sub 12

## 2011 Shingle Roof Installation

Progress Reports

[return to report list](#)

Summary Photos

+ Upload Photos

Edit



Remove all debris from the gutters and install the leaf guards as specified.



Sheet metal counter flashing should be installed around the roof vent on the West roof elevation. New #12 or #14 1.5" fasteners need to be installed in order to properly secure and waterproof the roof vent.



Install new caulking around the chimney counter flashing that extends to the vertical edge of the copper and that is neatly tooled to the vertical face of the brick just below the reglet joint.

# Documentation

## City of Columbus

City of Columbus

- ▶ Columbus Police Academy
- ▶ Dublin Road Water Plant
- ▶ Fire Training Academy
- ▶ Grange Insurance Audubon Center
- ▶ Granville St. Pol Sub
- ▶ Granville St Sub Station
- ▶ Hap Cremean
- ▶ Hoover Dam
- ▶ Jerry Hammond
- ▶ Maloney Health Center
- ▶ McKinley Avenue Storage Building
- ▶ New Police Property Room
- ▶ Parsons Avenue Water Plant

## Upper New Addition

Progress Reports ▾

+ Add Report

<input type="radio"/>	Report Date	Report Title	
<input type="radio"/>	7/23/2012	Progress Reprt	>
<input type="radio"/>	7/25/2012	Job Progress Report	>
<input type="radio"/>	7/26/2012	Job Progress Report	>
<input type="radio"/>	7/27/2012	Job Progress Report	>
<input type="radio"/>	7/30/2012	Job Progress Report	>
<input type="radio"/>	7/31/2012	Job Progress Report	>
<input type="radio"/>	8/1/2012	Job Progress Report	>
<input type="radio"/>	8/2/2012	Job Progress Report	>
<input type="radio"/>	8/3/2012	Job Progress Report	>
<input type="radio"/>	8/6/2012	Job Progress Report	>
<input type="radio"/>	8/15/2012	Job Inspection Report	>
<input type="radio"/>	8/22/2012	Job Progress Report	>

# Solution Options

- Berger Health System
  - ▶ Ashville PMG
  - ▶ Berger Health Foundation (Laundry)
  - ▶ Laurel Run Medical Center
  - ▼ Medical Office Building
    - Front Canopy (Roof Section)
    - Maternity (Roof Section)
    - Patient Tower (Roof Section)
    - Rehab (Roof Section)
    - Upper Main Roof (Roof Section)
    - Upper Stainwell Roof (Roof Section)
    - Section #1 (Roof Section)
    - Section #2 (Roof Section)
    - Section #3 (Roof Section)
    - Section #4 (Roof Section)
    - Section #5 (Roof Section)
    - Section #6 (Roof Section)

## Solution Option - Replace

[Return to Options List](#)

[Solutions](#)

[Edit](#)

### Option Information

Category	Replace
Cost	\$20,000.00
Expected Life	30
Action Year	2011

### Scope of Work

Install a new, environmentally friendly, **Stressply** high performance modified bitumen roof system with an **Energy Star Rated White Surface**

\*Determine if the customer is FM insured and has to use prevailing wage rates.

\*Remove all of the old roofing, flashings and insulation down to the concrete deck. Prime the concrete deck with asphalt primer

\*Replace any damaged decking with like materials. Include a per sq. ft. cost for deck replacement.

\*Install a base layer of 2" polyisocyanurate insulation in Insulock HR. Use 4' x 4' insulation boards when using insulation adhesive

\*Install a top layer 1" minimum, 1/4:12" tapered polyisocyanurate insulation in Insulock II. Stagger joints. Use 4' x 4' insulation boards when using insulation adhesive

# PM Program Team

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- In-House Personnel
- Roofing Contractors
- Manufacturer's Representatives That Offer Help in Coordinating PM Programs

# Schedule Repairs and Inspections

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- Fill Out Roof Plan and Survey Plan Form
  - Breakdown into Manageable Sections
- Begin a Semi-Annual Maintenance Inspection Checklist
  - Minimum Two Inspections Per Year
  - Always Inspect After Bad Storms

# Schedule Repairs and Inspections

The screenshot displays the Dry Zone web application interface. The browser address bar shows the URL [www.thedryzone.com/gforce/main.jsp](http://www.thedryzone.com/gforce/main.jsp). The page title is "Welcome to Dry Zone".

**Navigation Menu (Left Side):**

- Home
- Client / Facility / Roof
  - FACILITY OPTIONS
  - Appleton Area School District (SHARED)
  - Applied Industrial Technologies (SHARED)
  - Athens Regional Medical Center (SHARED)
  - Atlanta Gas and Light (SHARED)
  - Bandag Inc. (SHARED)
  - Bayonne Medical Center (SHARED)
  - California State University Channel Islands (SHARED)
  - Capital One - Austin/San Antonio Area (SHARED)
  - Celanese Acetate (SHARED)
  - Cherry Hill School District (SHARED)
  - Chester Academy (SHARED)
  - Chester County School District (SHARED)
  - City of Bradenton (SHARED)
  - City of Clearwater (SHARED)
  - City of Coral Springs (SHARED)
  - City of Orlando (SHARED)
  - City of Roswell (SHARED)
  - City of Waco (SHARED)
  - Clermont County (SHARED)
  - Cobb County Government (SHARED)
  - Cogdell Spencer (SHARED)
  - Columbia Empowerment Zone (SHARED)
  - Dayton Heart Center (SHARED)
  - Drexel University (SHARED)
  - Duke Energy - Florida (SHARED)
  - Elko County School District (SHARED)
  - Elko County School District (SHARED)
  - Emerson Electric Co. (SHARED)
  - Federal Express (SHARED)
- Summary Reports & Charts
- Report Builder
- Client Access / Rep Collaboration

**Main Content Area:**

**Welcome to Dry Zone!**  
Use the left-hand navigation to get started...

**DBS**

**Action Buttons:**

- Create New Client
- Submit Service Request
- RAMP Checklist
- G-Force Support

**Taskbar (Bottom):**

- dbprojectsbilling.zip
- GreenFrog\_Invoice\_...pdf
- 2013 WMP form.pdf
- 2014 Safety Form.doc
- AECI Insurance Requ...pdf
- Show all downloads...



# Roof Inspection Report

**Roof Inspection Reprt**

**Garland SINCE 1895**

Project: \_\_\_\_\_ Date: \_\_\_\_\_  
Location: \_\_\_\_\_

TYPE OF BUSINESS \_\_\_\_\_ TITLE \_\_\_\_\_  
INDIVIDUAL \_\_\_\_\_ FIRM NO. \_\_\_\_\_  
TEL. NO. \_\_\_\_\_

COMPANY \_\_\_\_\_  
ADDRESS \_\_\_\_\_ DATE \_\_\_\_\_ BY \_\_\_\_\_  
CITY \_\_\_\_\_

**ROOF DATA**  
ROOF SECTION \_\_\_\_\_  
AGE OF ROOF \_\_\_\_\_  
DECK TYPE \_\_\_\_\_  
VAPOR BARRIER \_\_\_\_\_

**INSULATION**  
TYPE \_\_\_\_\_ THICKNESS \_\_\_\_\_  
WET \_\_\_\_\_ DRY \_\_\_\_\_

**ROOF MEMBRANE**  
NO. OF PILES \_\_\_\_\_  
TAR \_\_\_\_\_ ASPHALT \_\_\_\_\_  
GRAVEL \_\_\_\_\_ SMOOTH \_\_\_\_\_  
METAL ROOF \_\_\_\_\_ SINGLE PLY \_\_\_\_\_

**CONDITION OF ROOF BATT**  
DRY \_\_\_\_\_ ALLIGATORED \_\_\_\_\_  
BULTERED \_\_\_\_\_ SPLITS \_\_\_\_\_  
GRAVEL ADHESION \_\_\_\_\_  
INSULATION ATTACHMENT \_\_\_\_\_

**ROOF DATA**  
ROOF SECTION \_\_\_\_\_  
AGE OF ROOF \_\_\_\_\_  
DECK TYPE \_\_\_\_\_  
VAPOR BARRIER \_\_\_\_\_

**INSULATION**  
TYPE \_\_\_\_\_ THICKNESS \_\_\_\_\_  
WET \_\_\_\_\_ DRY \_\_\_\_\_

**ROOF MEMBRANE**  
NO. OF PILES \_\_\_\_\_  
TAR \_\_\_\_\_ ASPHALT \_\_\_\_\_  
GRAVEL \_\_\_\_\_ SMOOTH \_\_\_\_\_  
METAL ROOF \_\_\_\_\_ SINGLE PLY \_\_\_\_\_

**CONDITION OF ROOF BATT**  
DRY \_\_\_\_\_ ALLIGATORED \_\_\_\_\_  
BULTERED \_\_\_\_\_ SPLITS \_\_\_\_\_  
GRAVEL ADHESION \_\_\_\_\_  
INSULATION ATTACHMENT \_\_\_\_\_

**CONDITION OF ROOF**

**NEARBY DETAILS**

ROOF DATA: ROOF SECTION, AGE OF ROOF, DECK TYPE, VAPOR BARRIER, INSULATION (TYPE, THICKNESS, WET, DRY), ROOF MEMBRANE (NO. OF PILES, TAR, ASPHALT, GRAVEL, SMOOTH, METAL ROOF, SINGLE PLY), CONDITION OF ROOF BATT (DRY, ALLIGATORED, BULTERED, SPLITS, GRAVEL ADHESION, INSULATION ATTACHMENT).

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NEARBY DETAILS: Grid area for recording details.

# **Areas to Examine When Inspecting a Roofing System**

# The Deck

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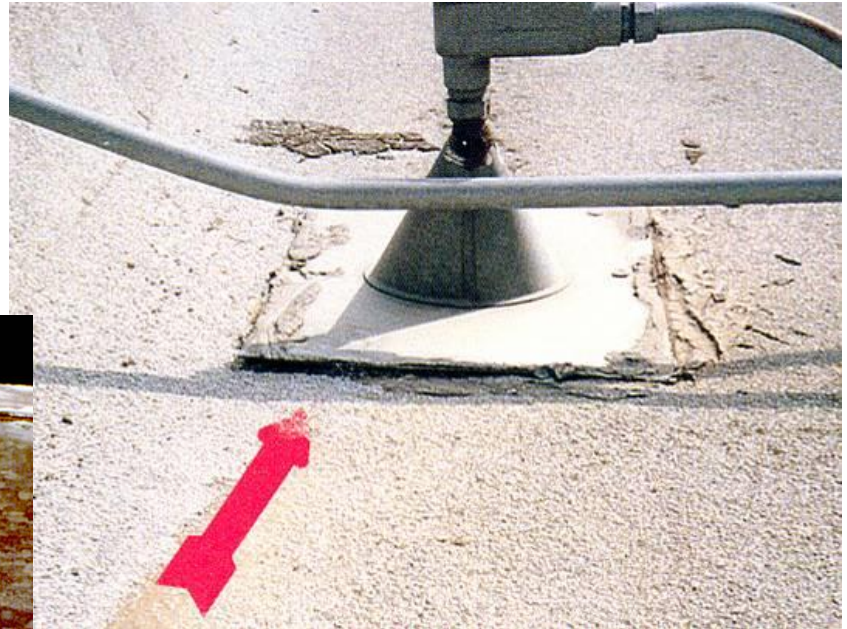
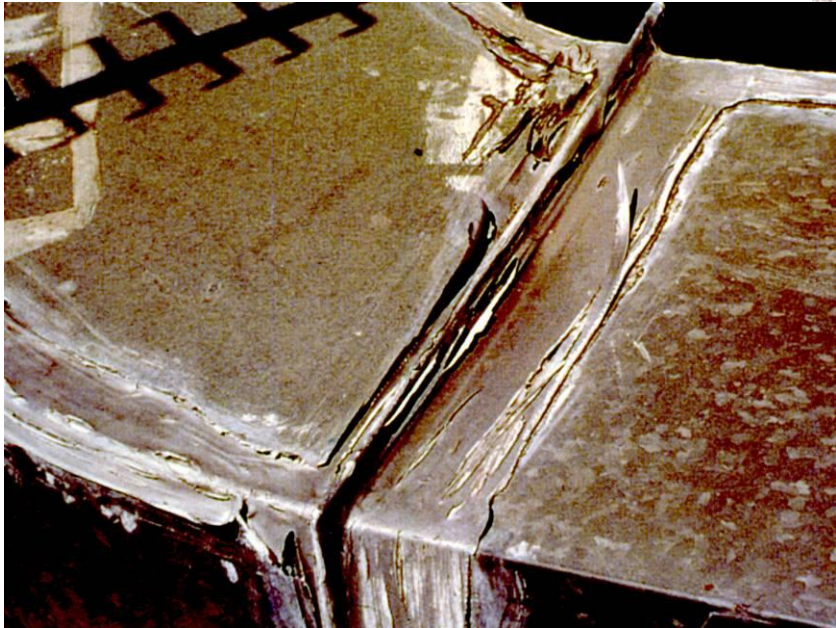
# Perimeter Flashing (Parapet Wall, Metal Edge)

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# HVAC Units, Pipes, Supports, Signs, Etc.

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# Bare Spots on Gravel Surface System

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# Improper Installation

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# Wet Insulation

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- Wet Insulation Raises Energy Costs
- Can Cause Structural Damage to the Deck
- A Non-Destructive Scan of Roof May Be Needed to Locate Wet Areas



# Ponding Areas

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# Pitch Pans

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# Clogged Drains

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# Blister, Splits & Alligatoring

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# Structural Damage

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# Restoration

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- Proactive Preventive Maintenance Process
- Recommended Within Second Decade of Roof's Life-Cycle
- Reconditions and Corrects Imperfections in an Existing, Functioning Roof
- Cost-Effective, Maximizes Roofing Asset
- Delays Replacement, Keeps Building Dry Longer
- Warranted Systems

# Restoration - Steps

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- Roof Inspection
- Analytical Testing
  - Infrared Moisture Scan
  - Core Evaluation
- Repair Defects
  - Flashings
  - Penetrations
  - Membrane Faults
- Restore Weatherproofing Integrity
  - New Top Coat to Protect From UV and the Environment

# Systems Covered

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- Single Ply
- Built-Up
- Modified Bitumen
- Metal
- Masonry Walls



# Restoration

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# Restoration



# Restoration

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# Restoration Advantages

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- Reuses Existing System
- Upgrade Weathering and UV Resistance
- Improves Aesthetic and System Strength
- Recognized As a Maintenance Expense
- Limits Building Occupant Disruption
- Extends the Interval Between Roof Replacements
- Not Considered Re-roofs

# The Garland Company, Inc

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- A Full Service, ISO Certified, Roof Asset Management Company, Established in 1895
- Manufactures a Full Line of High Performance Products:
  - Modified Bitumen Roof Systems
  - Built-Up Roofing
  - Standing Seam and Flat Seam Metal Roofing
  - Liquid Membranes
  - Full Line of Maintenance Products
  - Green Roofing and Sustainable Design

# Garland & Preventive Maintenance

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- Inspections, Analysis, Recommendations, Options
- Dryzone PM Program:
  - Comprehensive Baseline Analysis of All Roofs and Building Envelope
  - On-line Database, Documenting Roof and Building Envelop Conditions, Including Photos
  - PM Tracking and Reminders
  - Real-time Work History
  - Emergency Leak Notifiaction
  - Managed by Local Garland Representative & Implemented by Garland Select Contractor

# Garland & Preventive Maintenance

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- Comprehensive Services, Continued
  - Specifications and Details - CSI Format
  - Pre-Bid, Pre Construction Meetings
  - Job Inspection/Reports
  - Post Evaluation
  - Preventive Maintenance Programs
  - Continuing Education
  - Technical Support









**Thank you**

**Booth 518**