ROOF REPLACEMENT CONSIDERATIONS and PROJECT MANAGEMENT

SCCA Meeting – February 19, 2022

LEARNING OBJECTIVES

1. Introduction: You need a new roof, now what?
2. Brief history of roofing
3. Roof System Design Considerations
4. Value of the Roof Consultant
5. Construction Project Management
6. Roof Maintenance Considerations
7. Summary

BRIEF HISTORY OF ROOFING

Built-Up Roofing (BUR)

Oxidized Asphalt or Coal Tar

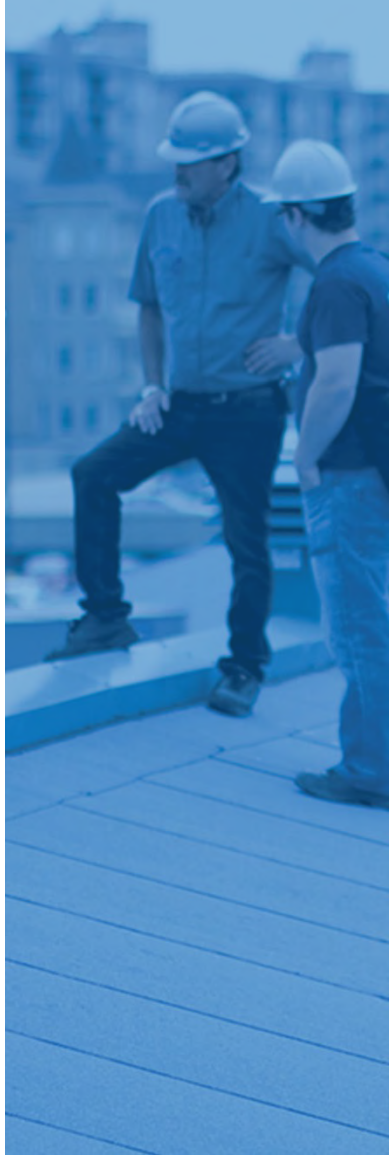
Alternating plies of reinforcement

- Rag, paper, asbestos
- Fiberglass

Typically 3-5 plies of felts installed

1890 1970

USA LOW-SLOPE ROOF HISTORY



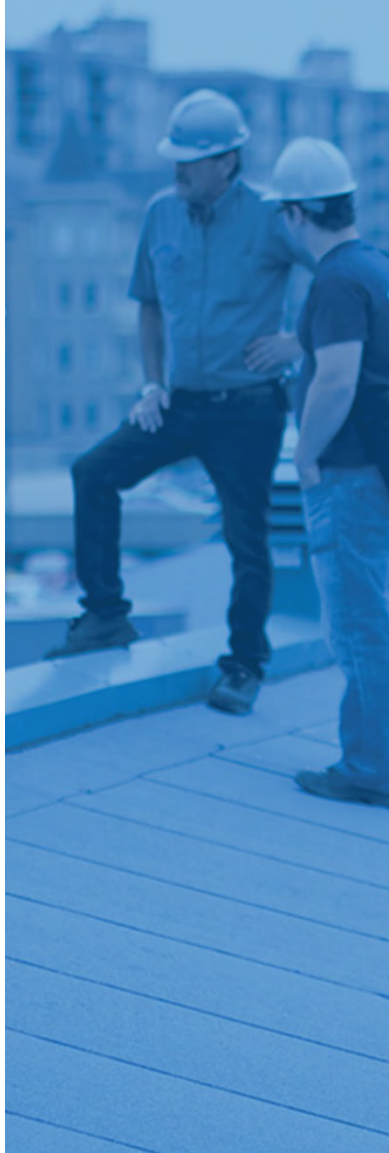
Shift in Design & Construction

Historic Roofs

- Slope 1–3 inches/foot
- Little equipment (vents, AC units, etc.)
- Limited movement (concrete/wood)
- Quality “rag” felts and quality bitumen used to fabricate

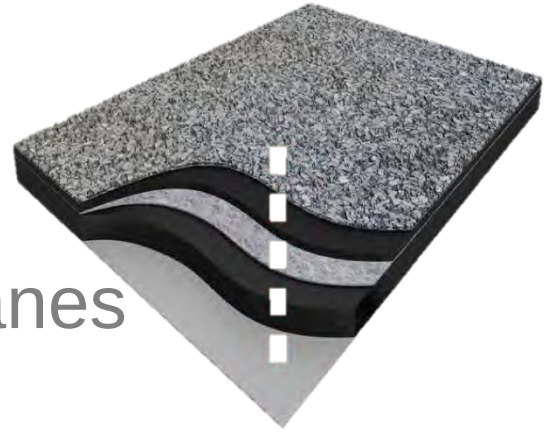
Modern Roofs

- Commonly 1/4 – 1/2 inches
- More equipment & traffic
- Lightweight steel construction
- More deck movement
- Less mass
- Increase in insulation (R-Value)
- Quality of BUR products dropped dramatically

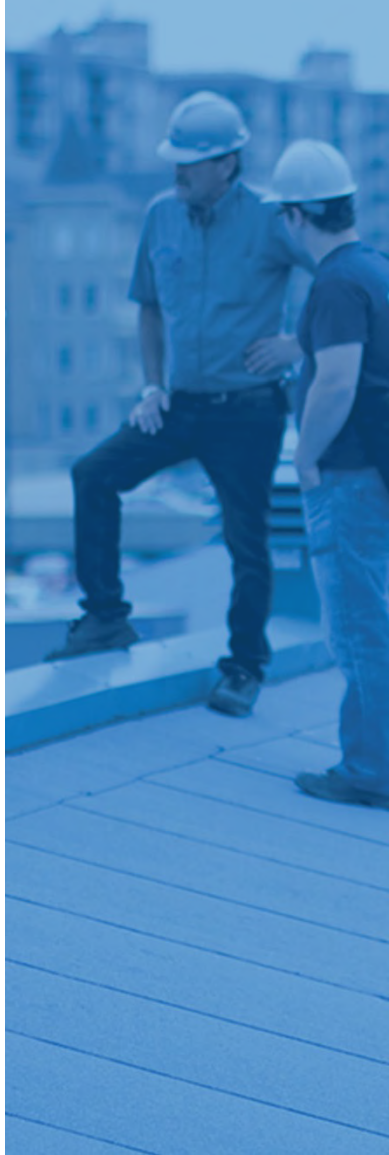


Modified Bitumen (SBS & APP) Enters The Market (1970's)

- Modifiers added to asphalt to improve performance
- Reinforced membranes - Polyester, fiberglass, composite
- Factory controlled, watertight membranes
- Typical multi-ply system > 200 mils



1970 2018



History of Single Ply

1960's

1st PVC European manufacturer

< 10 yrs. later, U.S. production began

1970

Coal tar pitch built-up roof (BUR) system of choice

1973

Oil embargo led to EPDM Roofing

1994

TPO roofing membrane enters U.S. market

How important is the Roof?

- 2% of construction cost
- 40% of all building related problems are due to water intrusion
- 70% of all litigation

- Source: architectmagazine.com

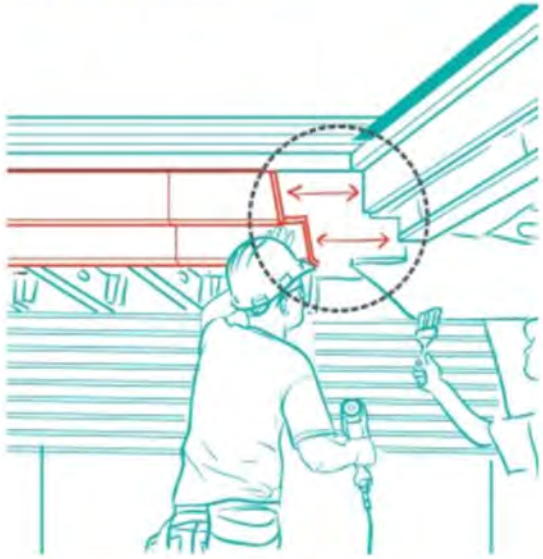
When It Leaks It Pours

Water intrusion makes up more than 70 percent of construction litigation. Roofs are often the culprit, so why aren't architects more careful about designing this most important aspect of any shelter?

By AARON SEWARD

WHEN IT LEAKS IT POURS

View All 4 Photos >



Play slideshow

When stripped down to its most fundamental purpose, architecture is about sheltering people from the elements. From this point of view, perhaps the most important part of any building is its roof. Roofs keep us dry and, combined with walls, warm. The sheltering function of a roof is a straightforward concept, yet a quick glance at statistics on building failures will show that—in spite of having a good handle on the idea of the roof—those in the architecture, engineering, and construction industries have a rather difficult time putting it into practice in acceptably reliable ways.

Roofs, on average, last only about half of their designed lifetime. Furthermore, 40 percent of all building-related problems are due to water intrusion—and water usually intrudes through roofs. Most startling, though, is the fact that, while roofs only make up about 2 percent of construction costs, water intrusion accounts for more than 70 percent of construction litigation; roof failures and related fallout are often at the root of the issue. So what's going wrong?

ROOF DESIGN CONSIDERATIONS

DESIGN CONSIDERATIONS : TO NAME A FEW

Building Use	Criticality of a Leak	Life Expectancy	Budget	Deck Type(s)	Energy Code: Insulation R Value Requirements
Membrane Preferences	CODE Approvals: Uplift Pressures	Fire Considerations / UL	Slope and Drainage	Odd geometries /flashing conditions	HVAC Considerations
Skylights	Plumbing and Electrical	Anchors for Window Cleaning	Satellite/Cable	Cell Phone Transmitters	Chemical Exposures
		Aesthetics	Green Space / Patio Space	WARRANTY	

ROOF OPTIONS

- **Re-Roof**
  - Complete Tear Off
- **Re-Cover**
  - 2nd Roof over 1st Roof
- **Repair**
  - Buy some time
- **Coating**
  - Extends life of a “GOOD” Performing Roof
- **Insurance and Warranty Considerations**

ROOFS IN FLORIDA NEED TO BE RESILIENT!

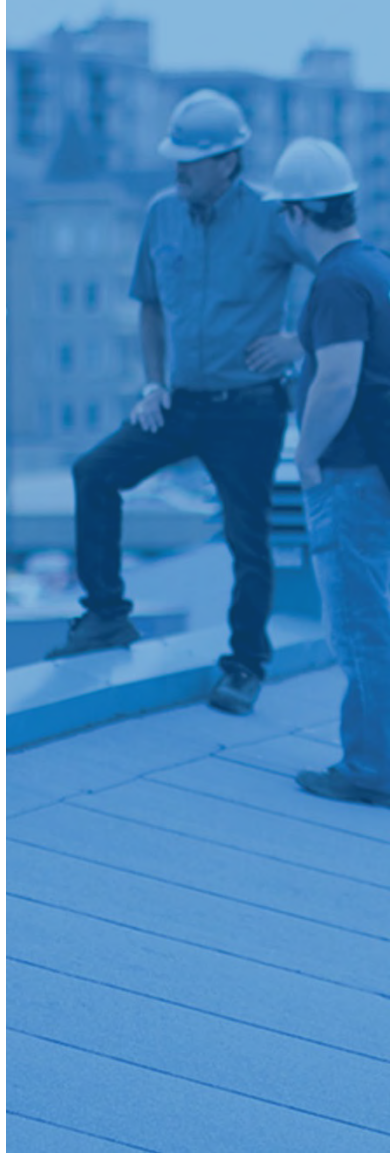
Resilience [rəˈzilyəns]: Noun. *The ability to resist and recover from extreme exposures.*

The three "R's" of resilient low-slope roofing: Robust, Redundant & Resourceful

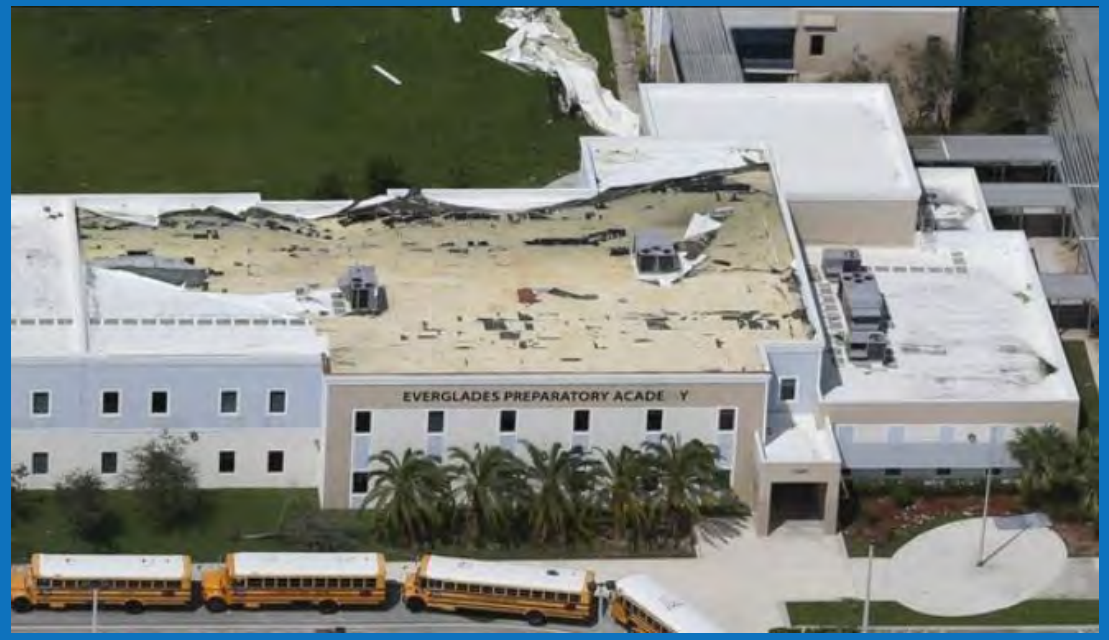
- **Robust**: Resistant to extreme exposures (resist and recover from wind, fire, hail/impact and traffic).
- **Redundant:** Multi-ply redundancy (2-ply SBS modified bitumen, SBS-PMA, SBS-PVC hybrid membranes)
- **Resourceful:** Long service life, and practical to maintain, repair and re-cover.

SBS Modified Advantages

- High elongation & recovery
- Multiply protection - redundancy
- Excellent high and low-temperature flexibility
- Superior long-term aging



Wind resistance:



Lightweight, flexible single-ply membranes are more susceptible to large-scale wind damage.

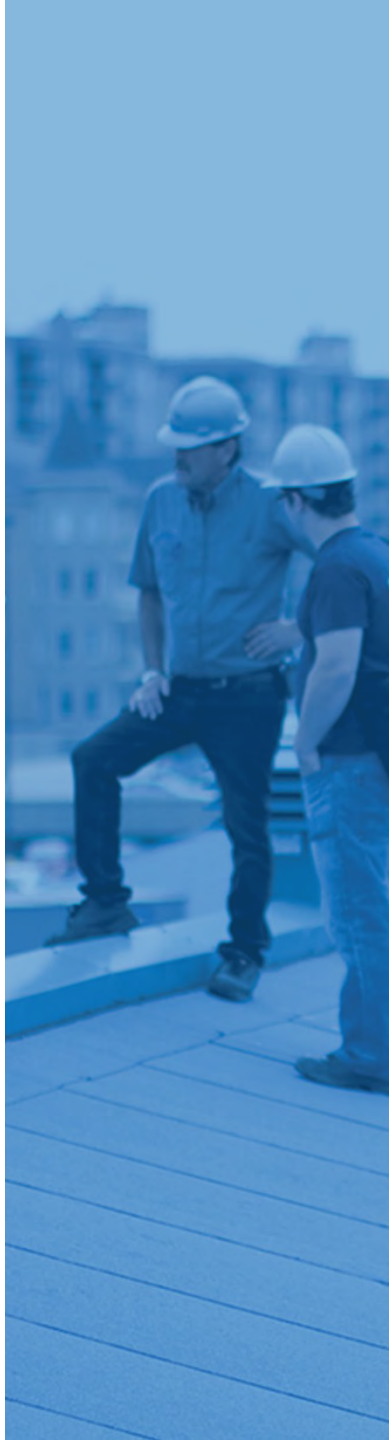
OUT OF SIGHT OUT OF MIND…WHY PAYING MORE CAN COST YOU LESS?

THE VALUE OF THE ROOF CONSULTANT

The Process Without the Roof Consultant

- 3 or 4 bids from contractors
  - *Apples – TPO*
  - *Oranges – PVC*
  - *Pineapples - SBS*
  - *Grapes – Other*
- How do you know which to go with?

- Let's review a real life, recent project case



The “Cost” of Doing it on Your Own

- Failed project photos

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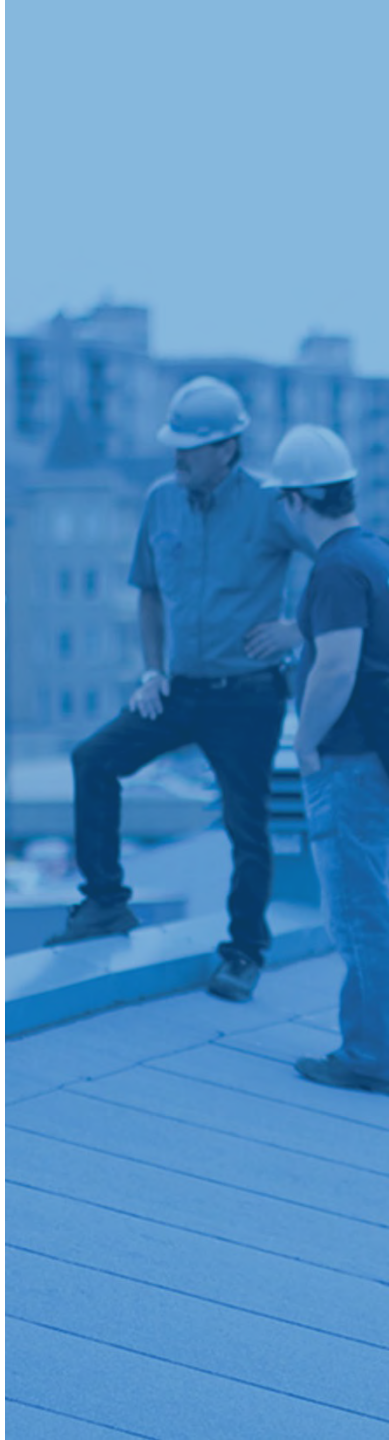

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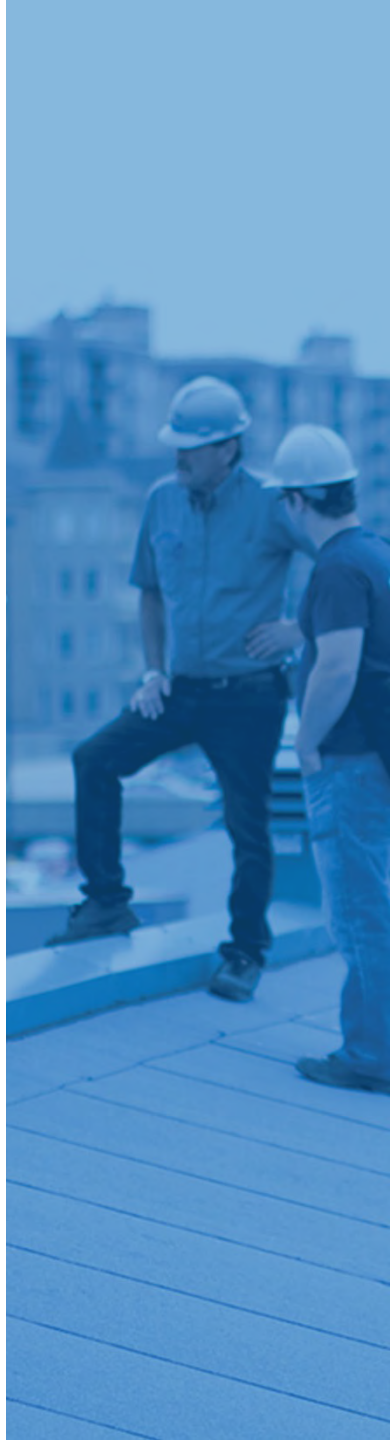
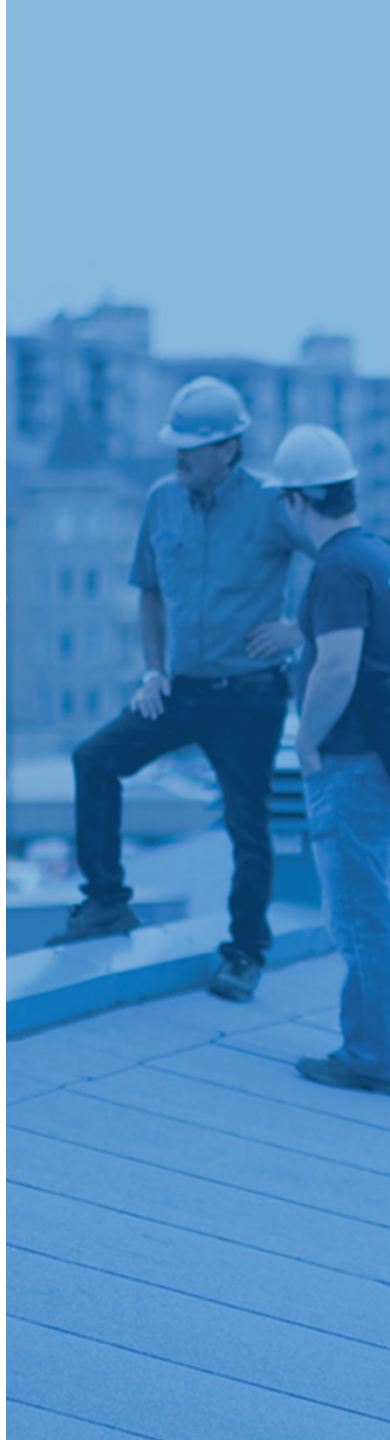


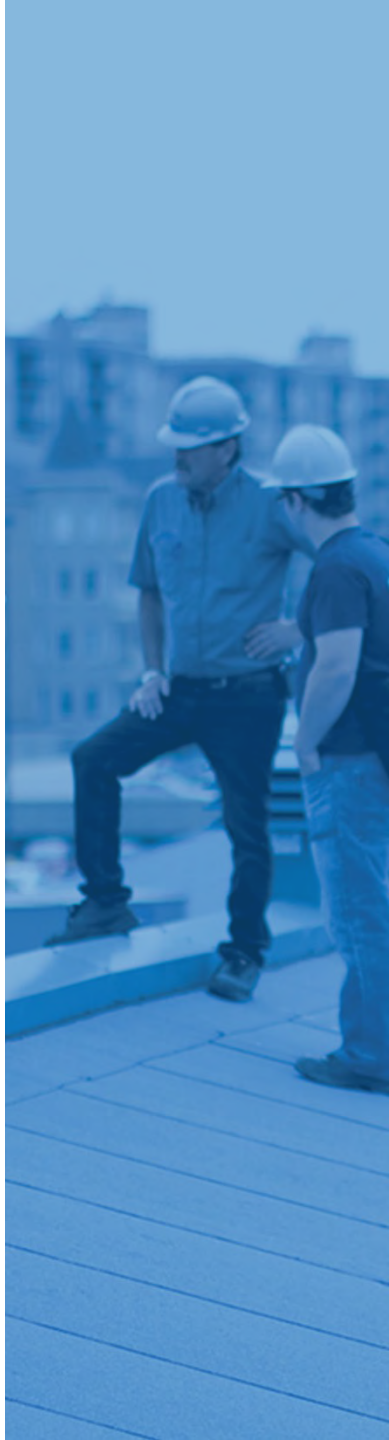
The “Cost” of Doing it on Your Own

- Failed project video



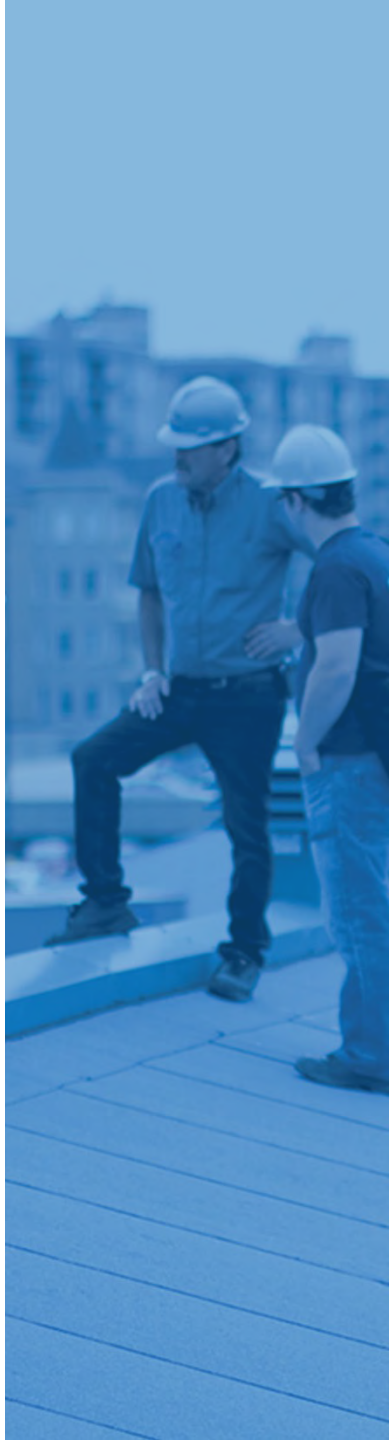
The “Cost” of Doing it on Your Own

- In Summary
  - *No paper trail*
  - *The board didn’t even know who hired this contractor*
  - *Board members no longer there*
  - *Permit pulled after the roof was installed*
  - *No oversight during installation*
  - *No warranty issued*
  - *Not a Florida Building Code approved assembly*
  - *Major negligence and malfeasance*
  - *Lawsuit*



The Process With the Roof Consultant

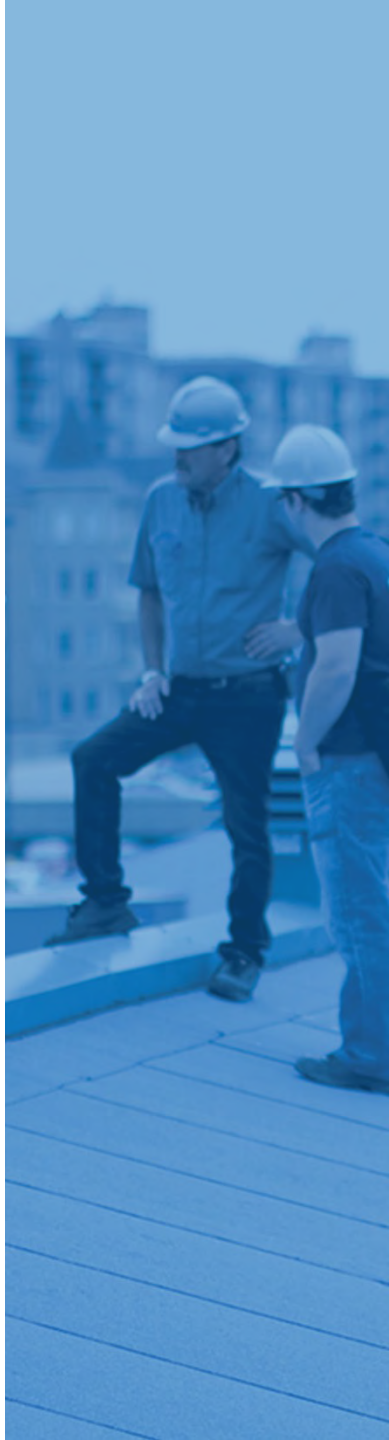
- Roof Investigation
  - *Infrared Scans, Core cuts, etc.*
- Budget Review
- System Selection and Design
  - *Pre-qualified system manufacturers*
  - *Project Manual*
  - *Covers all trades – HVAC, plumbing, electrical, roofing, lightning protection*
- Bid Process
  - *Pre-qualified contractors*
  - *Apples to Apples bids!*



The Process With the Roof Consultant

- Post bid process
  - *Interviews*
  - *Is low price always best?*
- Project Management
  - *Unforeseen conditions*
- Quality Control
  - *Inspections*

- END RESULT – PEACE OF MIND!

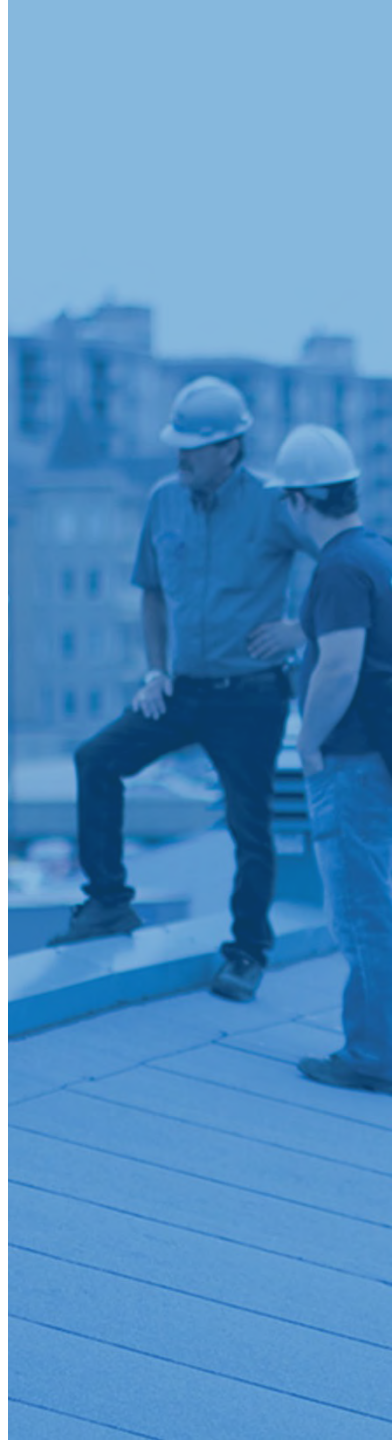


Same Project: After Consultant Involved

VAPOR

BARRIER

INSTALLATION

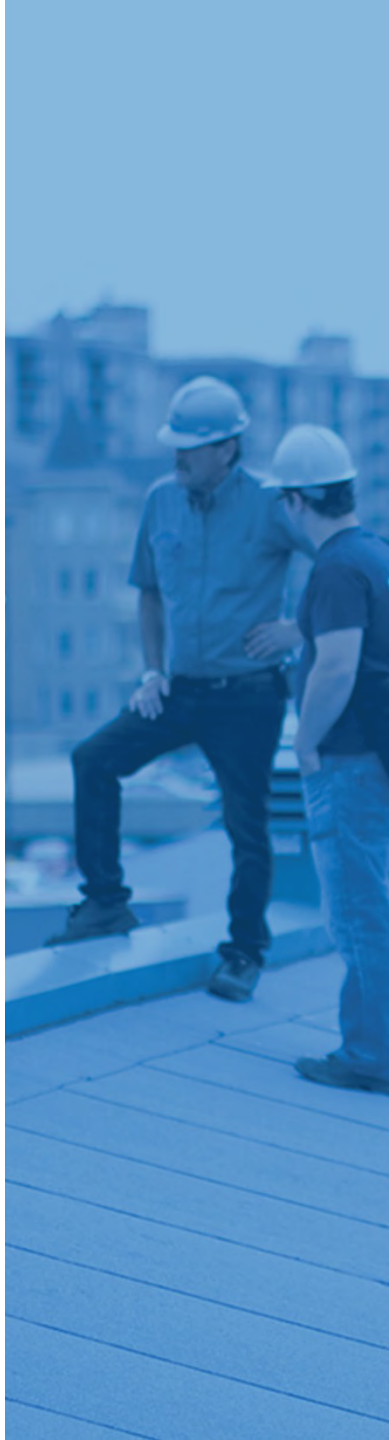


Same Project: After Consultant Involved

LIGHTWEIGHT

CONCRETE

INSTALLATION



Same Project: After Consultant Involved

RIBBON

ADHERED

BASE PLY

Same Project: After Consultant Involved

TORCH

APPLIED

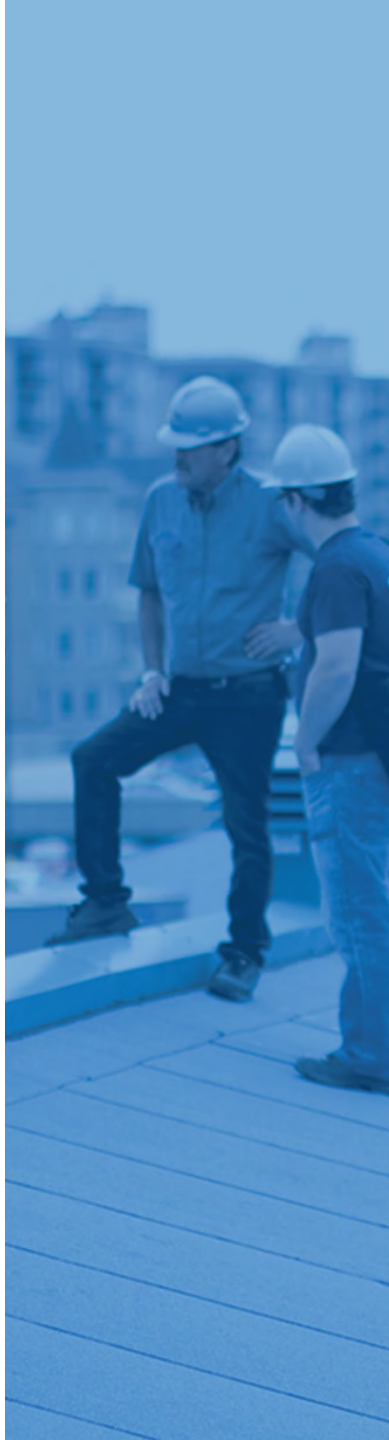
CAP PLY

Same Project: After Consultant Involved

PREMANUFACTURED

EDGE

SYSTEM



Same Project: After Consultant Involved

NEW, 20 YEAR NDL

SOPREMA SBS 2 PLY

“RESILIENT” ROOF SYSTEM

CONSTRUCTION PROJECT PROCESS

Construction Project Workflow

Your roof is assessed, and a plan is developed to determine the necessary course of action; then, the best products and services are recommended, and a timeline is established.

Proposal Request

Roof Survey Prepared

Estimate and Proposal Prepared

Proposal Presentation

Contract Signed

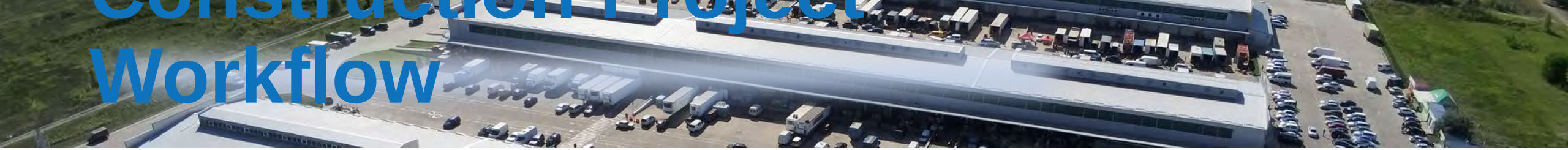
Start-up Package:

Certificate of Insurance,

Contact List, Permit Applications, etc.

Job Added to Schedule

*Not all steps are required for every job.



Construction Project Workflow

At regular stages along the way, you are updated on the project and supplied with appropriate reports and photographs.

- **Project Team Assigned**
- **Engineering + Testing Performed**
- **If Required:** Subcontractor Coordination
- **Permitting**
- **Internal** Pre-planning
- **Manufacturer Warranty Registration Submitted**
- **Invoice**
- **Pre-Construction Meeting**

*Not all steps are required for every job.

Construction Project Workflow

Safety is always a part of every project and incorporated into every facet of the job.

- **Job Safety + Staging Area Set-up**
- **Pre-Interior Documentation**
- **Material + Equipment Delivery**
- **Commence Work**
- **Daily Progress Inspections**

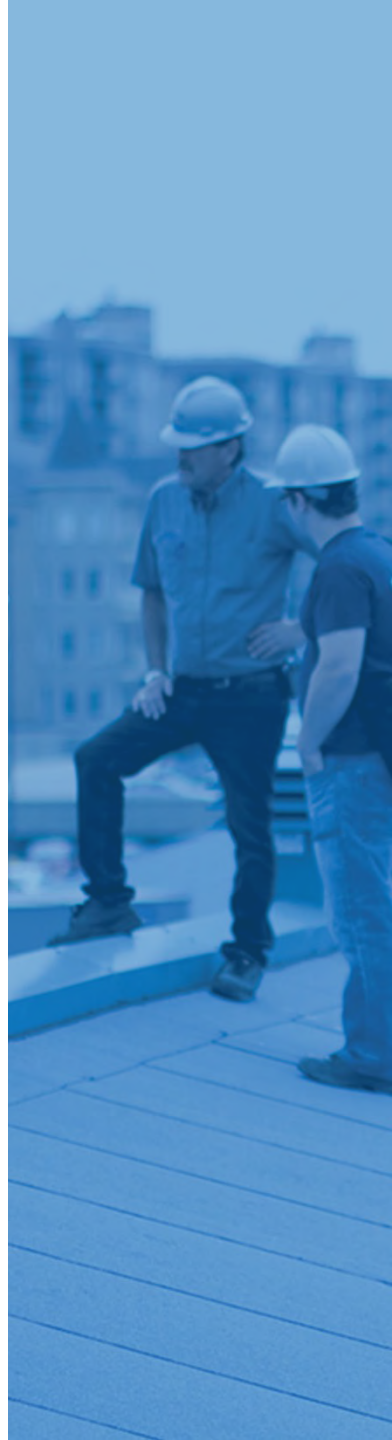
Progressive Billings and Collections

- Manufacture/ Consultant inspections
- Safety Meetings
- Photos
- Safety Inspections

- **Finals**
- **City, Manufacturer, Owner**
- **Walk-through**
- **Close Out Package Prepared**
- **Preventative Maintenance Proposal Prepared**

*Not all steps are required for every job.

Mechanical Equipment (HVAC)



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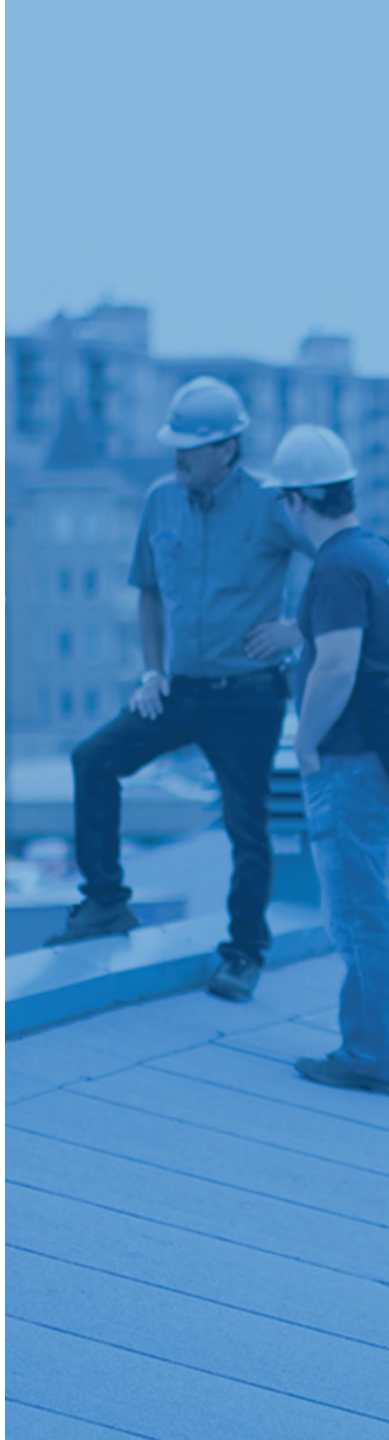

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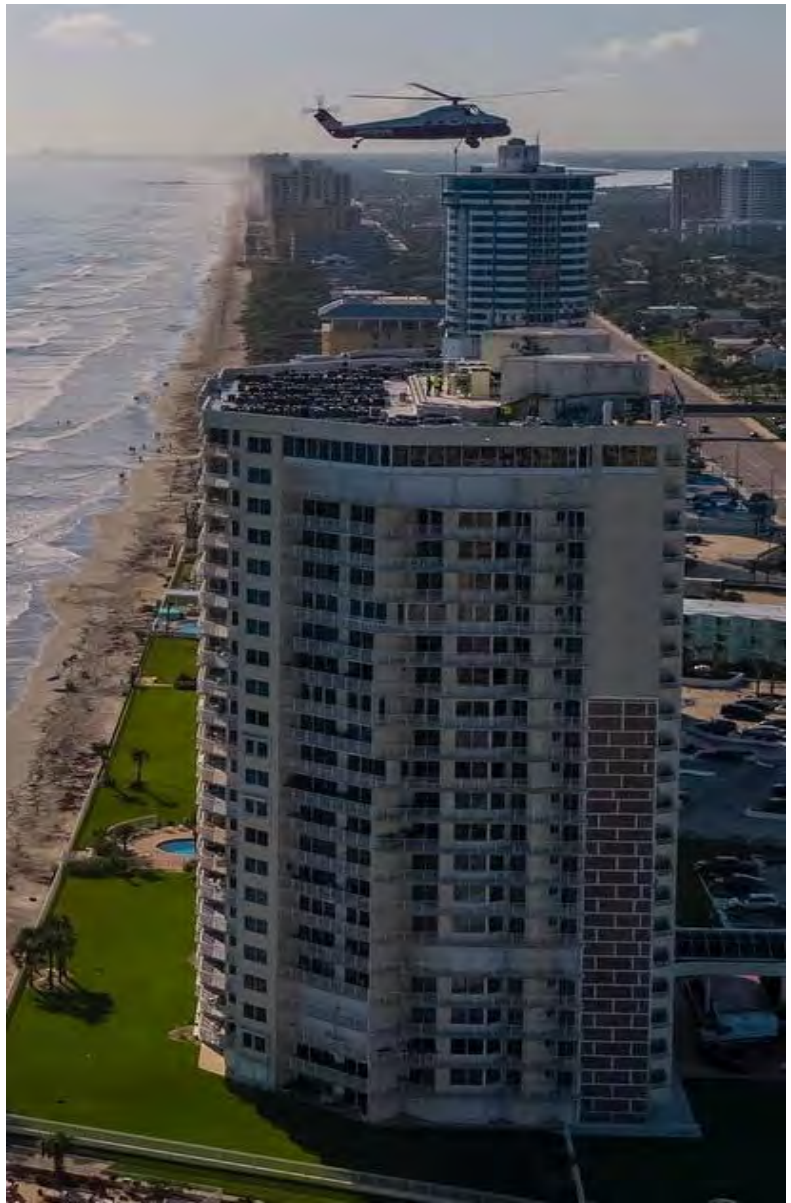
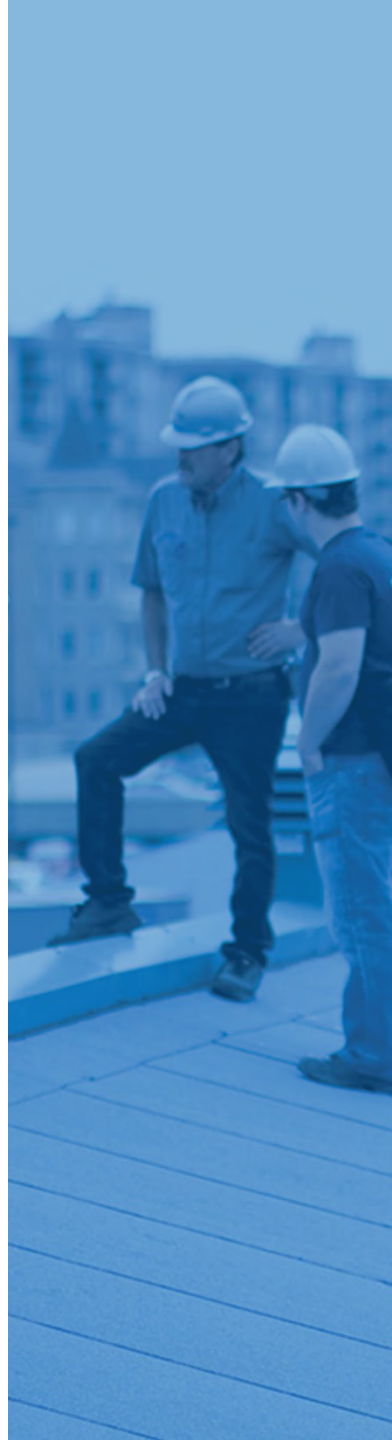
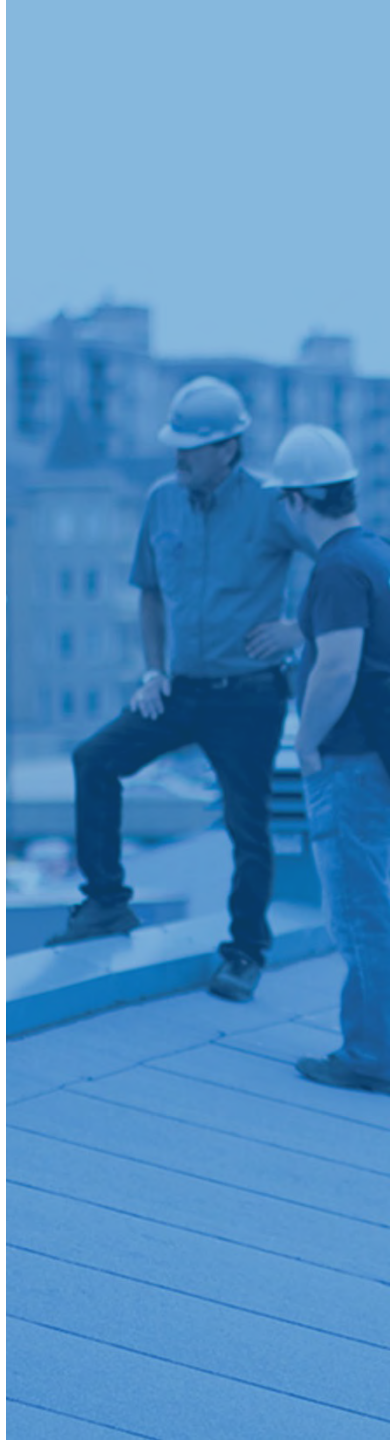




Infrared Scan Technology

EAGLE HAWK

DRONE POWERED DATA FOR BETTER DECISIONS



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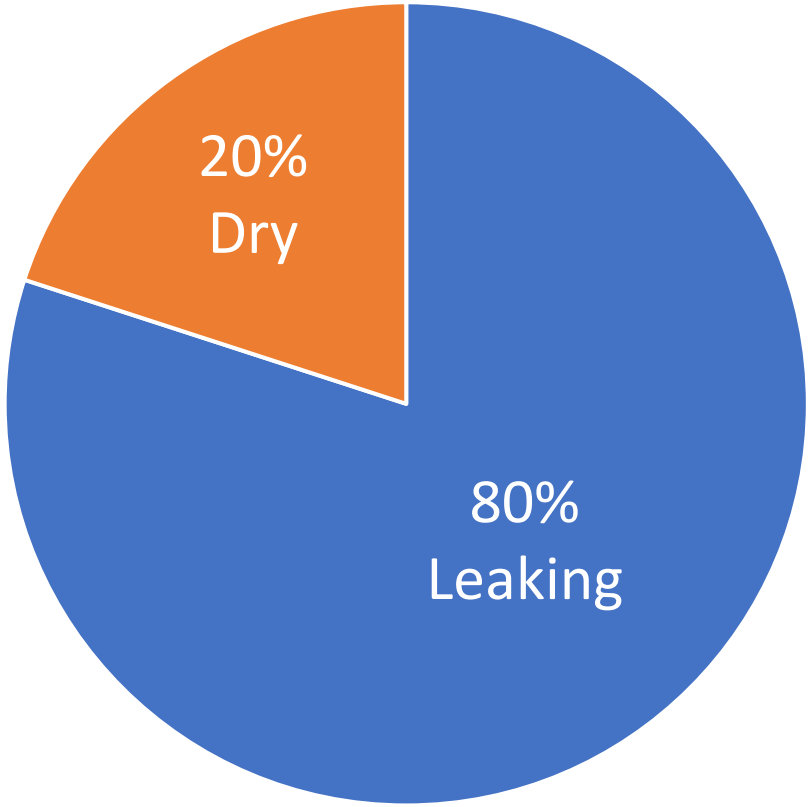
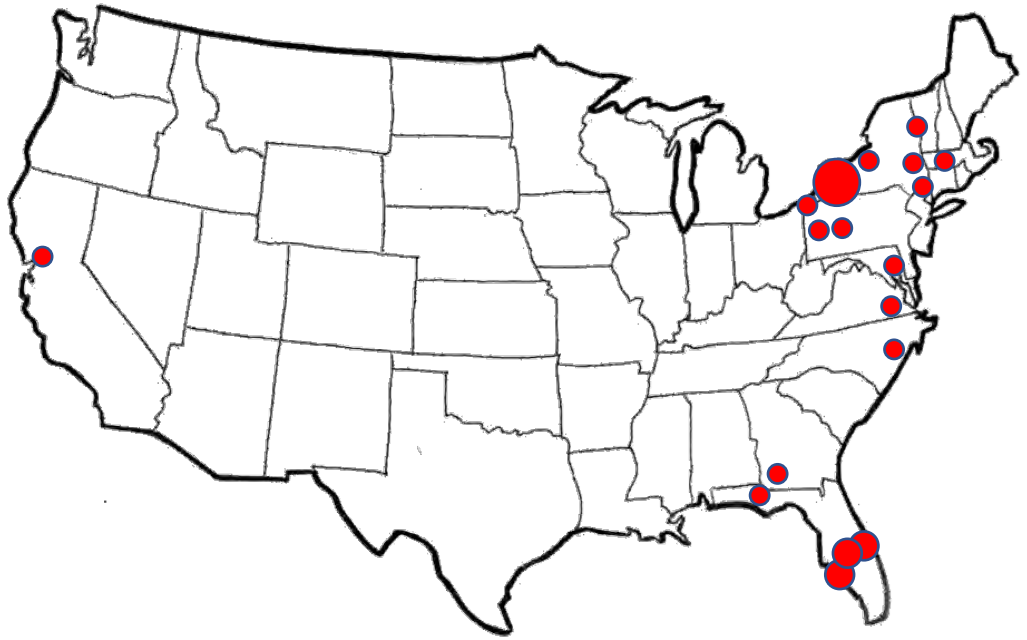
www.eaglehawk.io

Did you know?

Flat / Low Slope Roofs Inspected





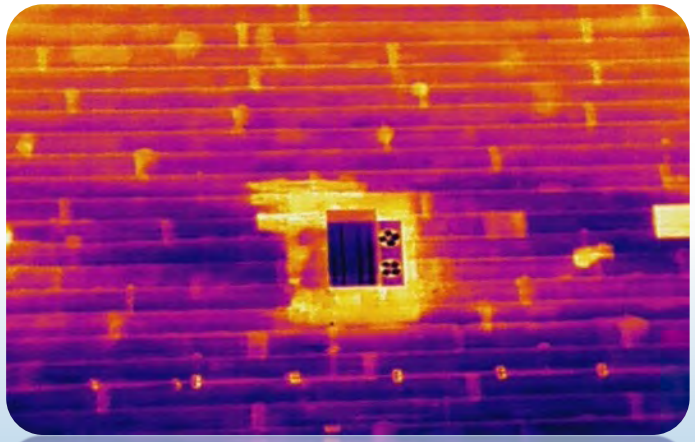
N = 500+ Buildings Inspected

EagleHawk Collected Data

80% of Roofs Inspected Leak and Most People Don't Know It!

Roof Inspection – Proactive vs Reactive

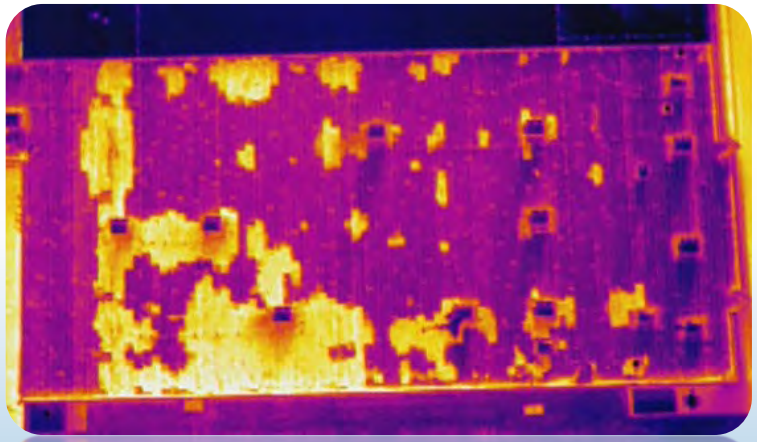
Proactive



Minor Repair

VS

Reactive



Major Replacement

<u>> 80% of Roofs Inspected Show Signs of Wetness</u>

<u>REACTIVE:</u> Years may go by before a roof failure is detected and by then water is typically coming through the ceiling.

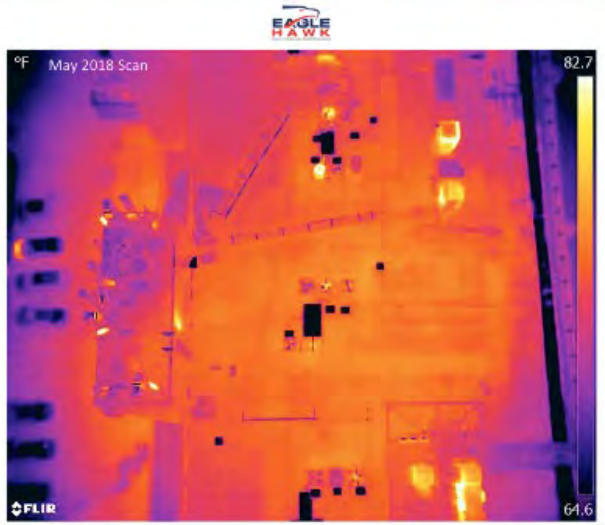
<u>PROACTIVE:</u> By utilizing Drone Technology, we can detect problems EARLY and EFFICENTLY to help avoid expensive roof repairs or replacements.

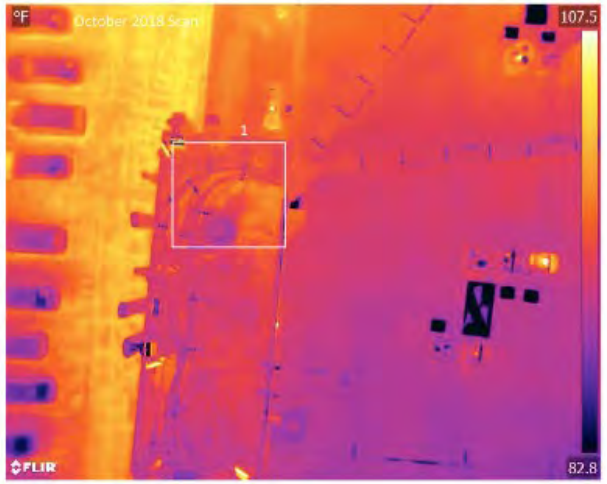
Routine Roof Inspections Allow for Better Control Over Roof Maintenance

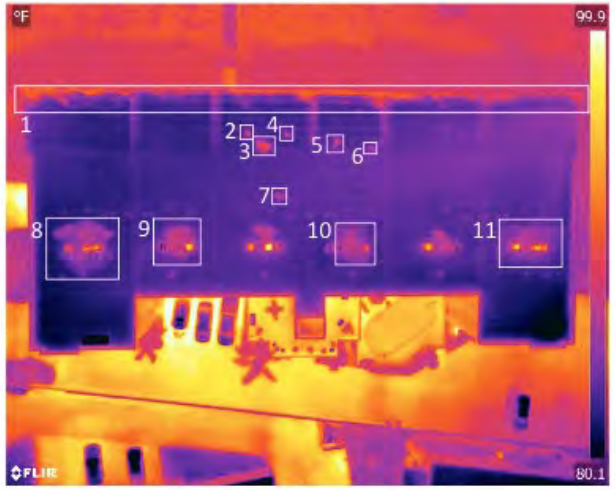
Trend Analysis and the Danger of “Fake News”

Area #	Approximate Size (sqft)	Description
1	40	This area shows evidence of wetness in the insulation propagating from a material failure.
2	10	This area shows evidence of wetness in the insulation propagating from a material seam failure
3	10	This area shows evidence of wetness in the insulation propagating from a material failure.
4	50	This area shows evidence of wetness in the insulation propagating from a material failure.
5	20	This area shows evidence of wetness in the insulation propagating from a material failure.
Total	**130**	

EagleHawk One Inc. www.eaglehawkllc.com Page 6



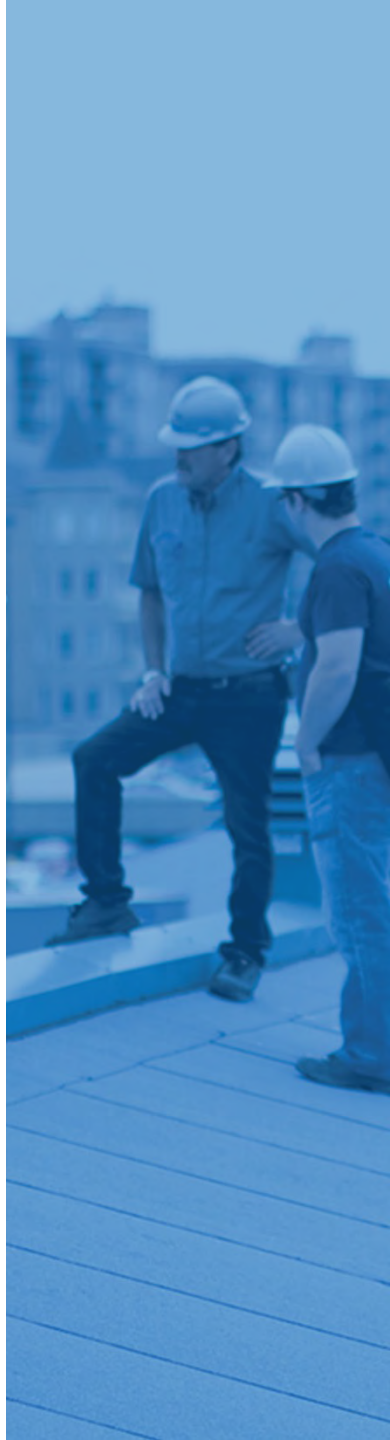




Looking for ”trends” and collecting data frequently ensures savings

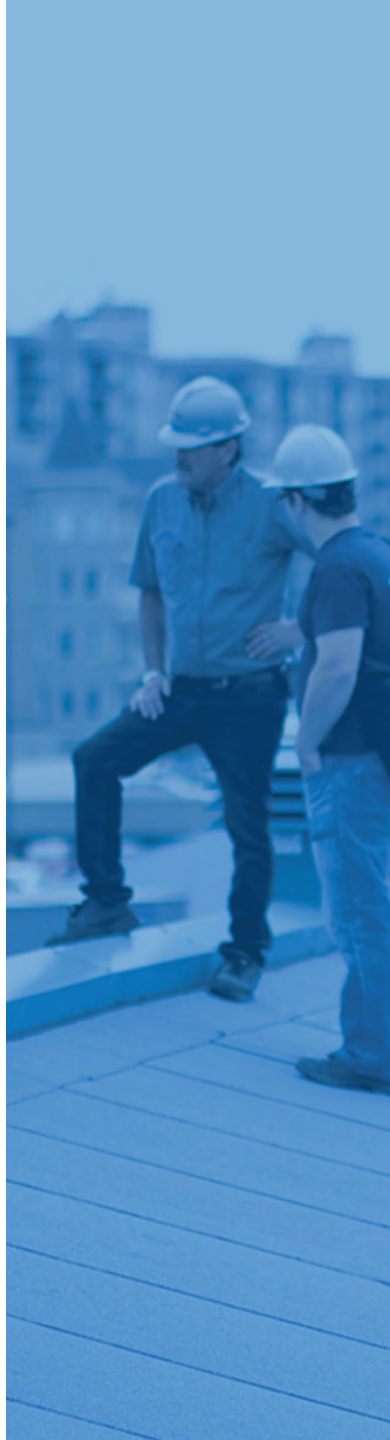
Maintaining Your New Roof

- Strongly recommend Preventative Maintenance agreements – directly with the contractor
- Keep your warranties where you can find them
- Maintenance requirements are included with warranty paperwork
  - *Document your activity*
- Leak process
  - *File claim with manufacturer on your warranty*



In Summary

- Roof projects are complicated
- Hire a professional roof consultant
  - *Thorough Investigation*
  - *The right roof system option for your building*
  - *Pre-qualified, vetted contractors and manufacturers*
  - *Project manual addresses all trades*
  - *Apples to apples bids*
  - *Management and Quality Control*
- You get what you pay for = Peace of mind!



QUESTIONS?