

Managing Maintenance and Post Construction Issues

Presented by:

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Rick Swart, Post Construction Manager

**BASA School Facilities and Safety Conference
March 15, 2017**



OFCC Post Construction Team

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Maintenance

“Management by Walking Around”

- Do you “Inspect what you Expect”?



Facility Maintenance Record

- FMR

OFCC
OHIO FACILITIES CONSTRUCTION COMMISSION

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Welcome to OFCC

Current Opportunities
Find opportunities for design and construction professionals

Opportunities

- Qualification-based RFQs
- Best Value RFQ/RFPs
- Construction Bidding

Upcoming Events/Webinars

- 04/27/2017 • 1:30 pm - Ohio School Facilities Commission meeting
- 04/27/2017 • 2:30 pm - Ohio Facilities Construction Commission meeting

Guiding capital construction projects for state agencies, state-supported universities and community colleges, including Ohio's comprehensive public K-12 school construction and renovation program.

News & Announcements

Project Management Tools

Password required

Bid Express

OAKS CI

CM Website

Maintenance Plan (FMR)

OSFC Web Apps (prodapp)

Assessment Tool

Facility Maintenance Record

- FMR password from Bill Bibbey
- Can be used as a CMMS
- Record of all components in your building
- Will generate paper work orders
- Helpful for 5 year forecast
- Can drill down to critical assets

FMR

- Helpful for 5 year forecast
- Can drill down to critical assets

Maintenance Worksheet

Category Summary Costs
[Switch to view only critical components](#)

Building area: **271,597**
sq. ft.

Category	Preventive Maintenance					Unplanned Repair				Planned Repair				Total Maintenance		Capital Renewal		CRI		
	Hours	Labor	Material	Cost	\$/ft²	Labor	Material	Cost	\$/ft²	Hours	Labor	Material	Cost	\$/ft²	Cost	\$/ft²	Cost	\$/ft²	Cost	\$/ft²
Life/Fire Safety	1,221.02	\$39,068.36	\$4,377.00	\$43,445.36	\$0.16	\$9,767.09	\$1,094.25	\$10,861.34	\$0.04	10.56	\$566.46	\$15,708.00	\$16,274.46	\$0.06	\$70,581.16	\$0.26	\$6,617.59	\$0.02	\$33,894.45	\$0.12
ADA/Elevators/Lifts	47.14	\$5,962.37	\$1,075.00	\$7,037.37	\$0.03	\$1,490.59	\$268.75	\$1,759.34	\$0.01	4.00	\$605.08	\$455.00	\$1,060.08	\$0.00	\$9,856.79	\$0.04	\$4,830.57	\$0.02	\$1,792.00	\$0.01
HVAC Systems	1,571.54	\$48,247.21	\$8,285.00	\$56,532.21	\$0.21	\$26,053.49	\$4,473.90	\$30,527.39	\$0.11	236.39	\$9,105.74	\$39,447.95	\$48,553.69	\$0.18	\$135,613.29	\$0.50	\$76,163.80	\$0.28	\$3,209.60	\$0.01
Building Envelope	239.38	\$7,417.80	\$4,173.00	\$11,590.80	\$0.04	\$3,857.26	\$2,169.96	\$6,027.22	\$0.02	1,188.61	\$38,042.19	\$42,817.77	\$80,859.96	\$0.30	\$98,477.97	\$0.36	\$103,637.52	\$0.38	\$3,476.27	\$0.01
Plumbing	413.57	\$12,546.20	\$3,945.00	\$16,491.20	\$0.06	\$7,904.11	\$2,485.35	\$10,389.46	\$0.04	45.47	\$1,495.63	\$3,851.11	\$5,346.73	\$0.02	\$32,227.39	\$0.12	\$18,031.10	\$0.07	\$5,404.53	\$0.02
Electrical	775.77	\$23,235.05	\$3,485.00	\$26,720.05	\$0.10	\$10,920.48	\$1,637.95	\$12,558.43	\$0.05	384.68	\$11,694.04	\$44,293.97	\$55,988.02	\$0.21	\$95,266.50	\$0.35	\$92,519.04	\$0.34	\$64,178.63	\$0.24
Misc. Equipment	270.05	\$8,177.77	\$323.00	\$8,500.77	\$0.03	\$4,088.89	\$161.50	\$4,250.39	\$0.02	11.26	\$338.98	\$375.25	\$714.23	\$0.00	\$13,465.38	\$0.05	\$18,669.00	\$0.07	\$11,164.17	\$0.04
Interiors	36.84	\$1,109.55	\$10.00	\$1,119.55	\$0.00	\$576.97	\$5.20	\$582.17	\$0.00	1,341.44	\$39,522.29	\$44,463.99	\$83,986.28	\$0.31	\$85,688.00	\$0.32	\$63,945.59	\$0.24	\$118,585.40	\$0.44
Site	221.02	\$6,493.58	\$1,813.00	\$8,306.58	\$0.03	\$3,376.66	\$942.76	\$4,319.42	\$0.02	314.89	\$9,842.31	\$16,987.57	\$26,829.88	\$0.10	\$39,455.88	\$0.15	\$32,120.69	\$0.12	\$7,726.00	\$0.03
Structure/Support	67.09	\$2,016.11	\$0.00	\$2,016.11	\$0.01	\$1,209.66	\$0.00	\$1,209.66	\$0.00	0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$3,225.77	\$0.01	\$0.00	\$0.00	\$0.00	\$0.00
Kitchen Equipment	428.04	\$12,992.73	\$2,568.00	\$15,560.73	\$0.06	\$6,496.37	\$1,284.00	\$7,780.37	\$0.03	1.12	\$35.84	\$17.50	\$53.34	\$0.00	\$23,394.44	\$0.09	\$19,376.96	\$0.07	\$13,858.63	\$0.05
Total	5,291.46	\$167,266.73	\$30,054.00	\$197,320.73	\$0.73	\$75,741.56	\$14,523.62	\$90,265.18	\$0.33	3,538.40	\$111,248.56	\$208,418.11	\$319,666.67	\$1.18	\$607,252.57	\$2.24	\$435,911.86	\$1.60	\$263,289.67	\$0.97

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OFCC Facility Inspections



“Green Roof”?



Contributing Factor/Issue



Vegetation



Vegetation



Shingles Beginning to Curl, Nails Popping on Ridge Cap



Detached Shingles on Ridge Cap



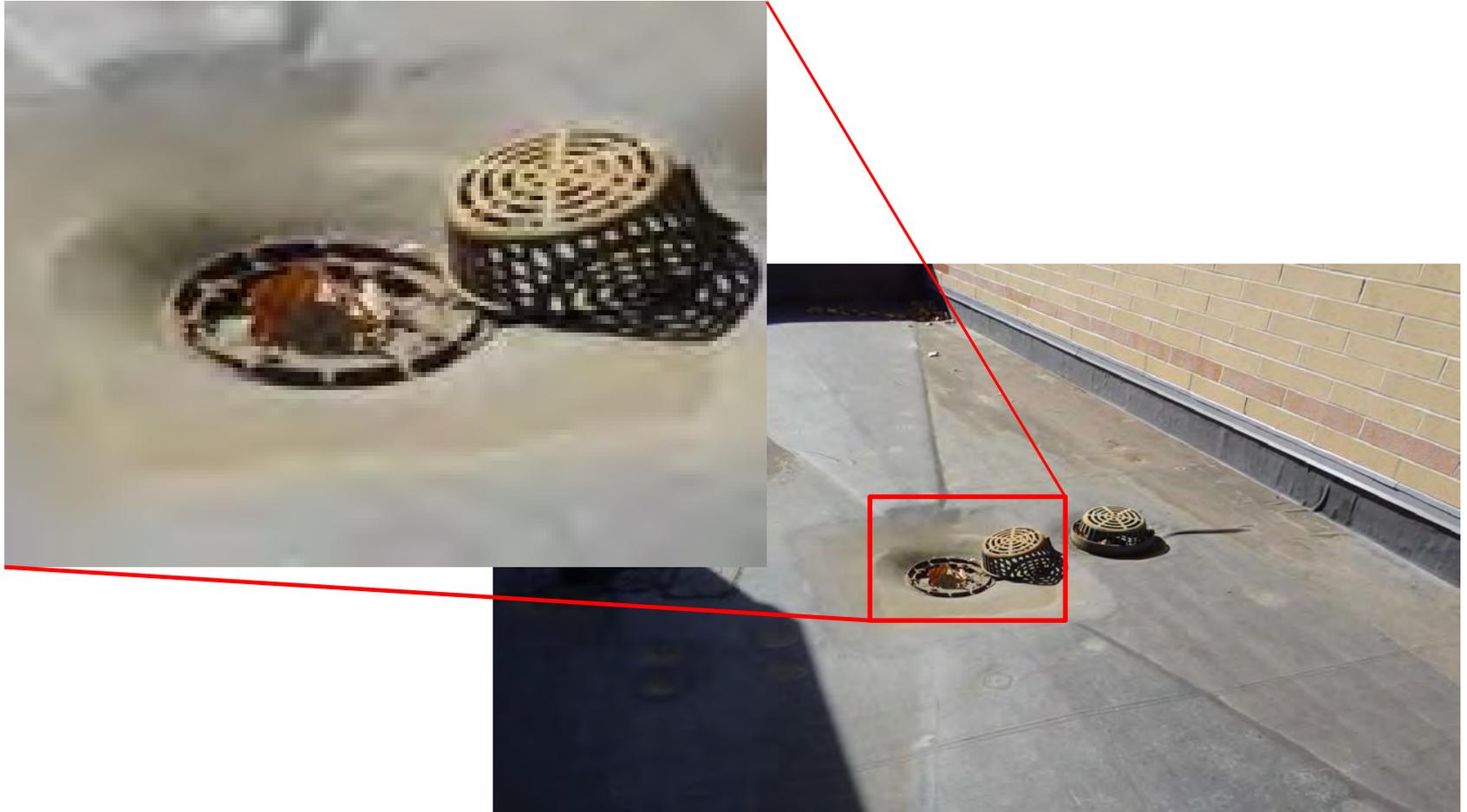
Damaged Downspout



Objects on Roof



Drain Cover



Damaged Flashing



Hole in Membrane



Water Infiltration



Water Infiltration



Items Found During a Roof Inspection



Items Found During Another Roof Inspection



AHU Inspections

All AHUs should be inspected at least once per month. This includes opening the doors looking at filters, heat wheel, coils and motor.

Filter Bank in Excellent Condition



Filter in Excellent Condition



Filter Bank in Poor Condition



Filter Bank in Poor Condition



Filter Bank in Poor Condition



Filter Bank in Poor Condition



Filter Bank in Poor Condition



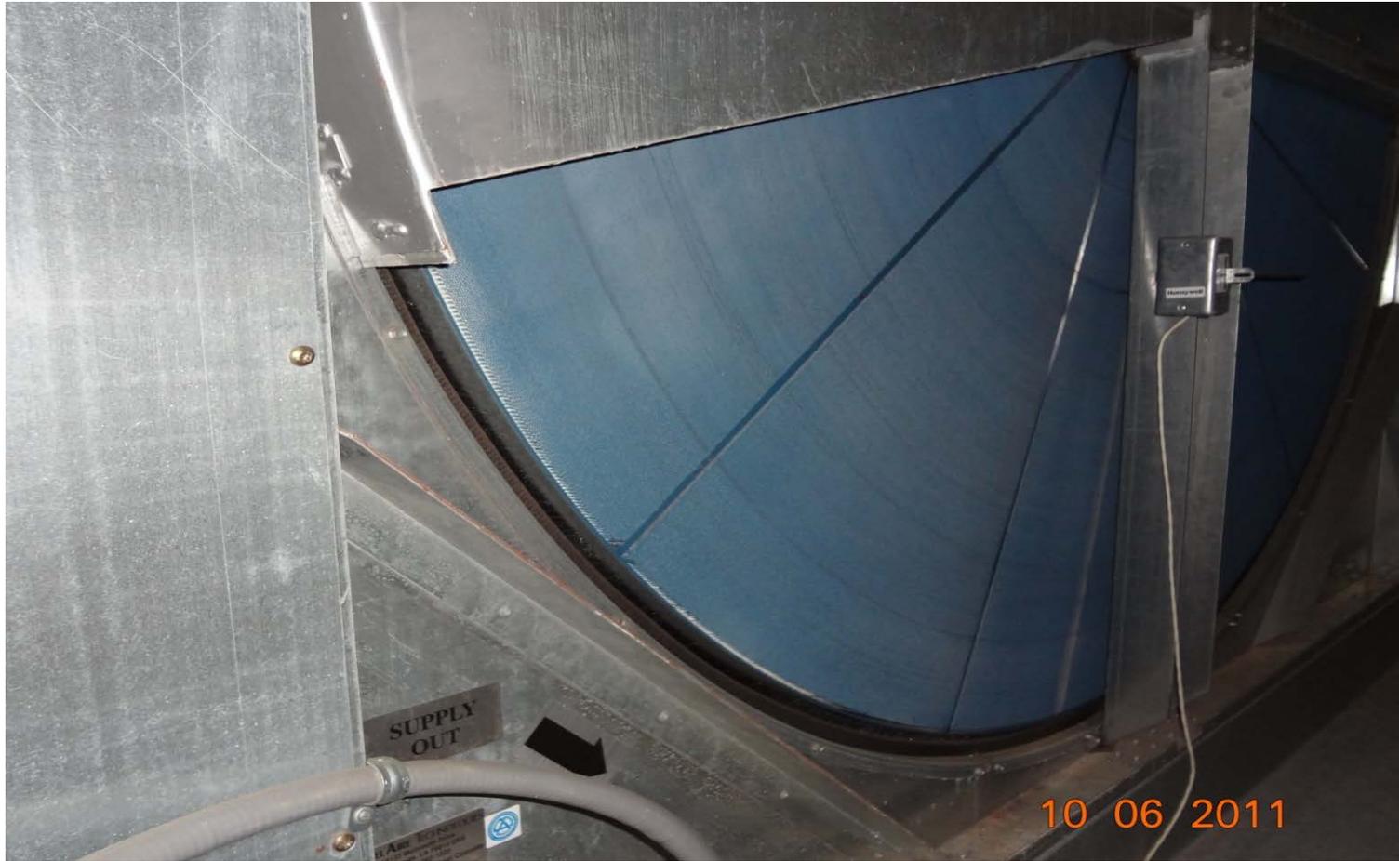
Incorrect Type of Filters for AHU



Heat Wheel in Good Condition



Heat Wheel in Good Condition



Heat Wheel in Poor Condition



Heat Wheel in Very Poor Condition



Inside AHU: Coils Excellent Condition



Sign of a Problem



Inside AHU: Excellent Condition



Inside AHU: Poor Condition



Dirty Filter Thrown Inside AHU. Why?



Reduced Air Flow Inside the AHU



Always Date the Filter Change



10 17 2011

Gauges/BAS Alarms DO NOT Replace Need for Inspection



Filters Placed in Backwards



HVAC AHU Issue



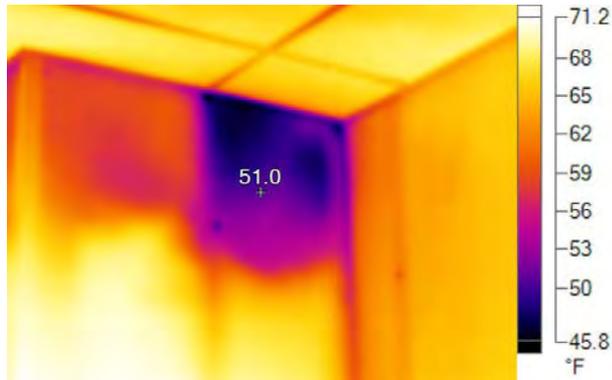
HVAC AHU Issue



HVAC AHU Issue



OFCC Diagnostic Equipment IR Camera



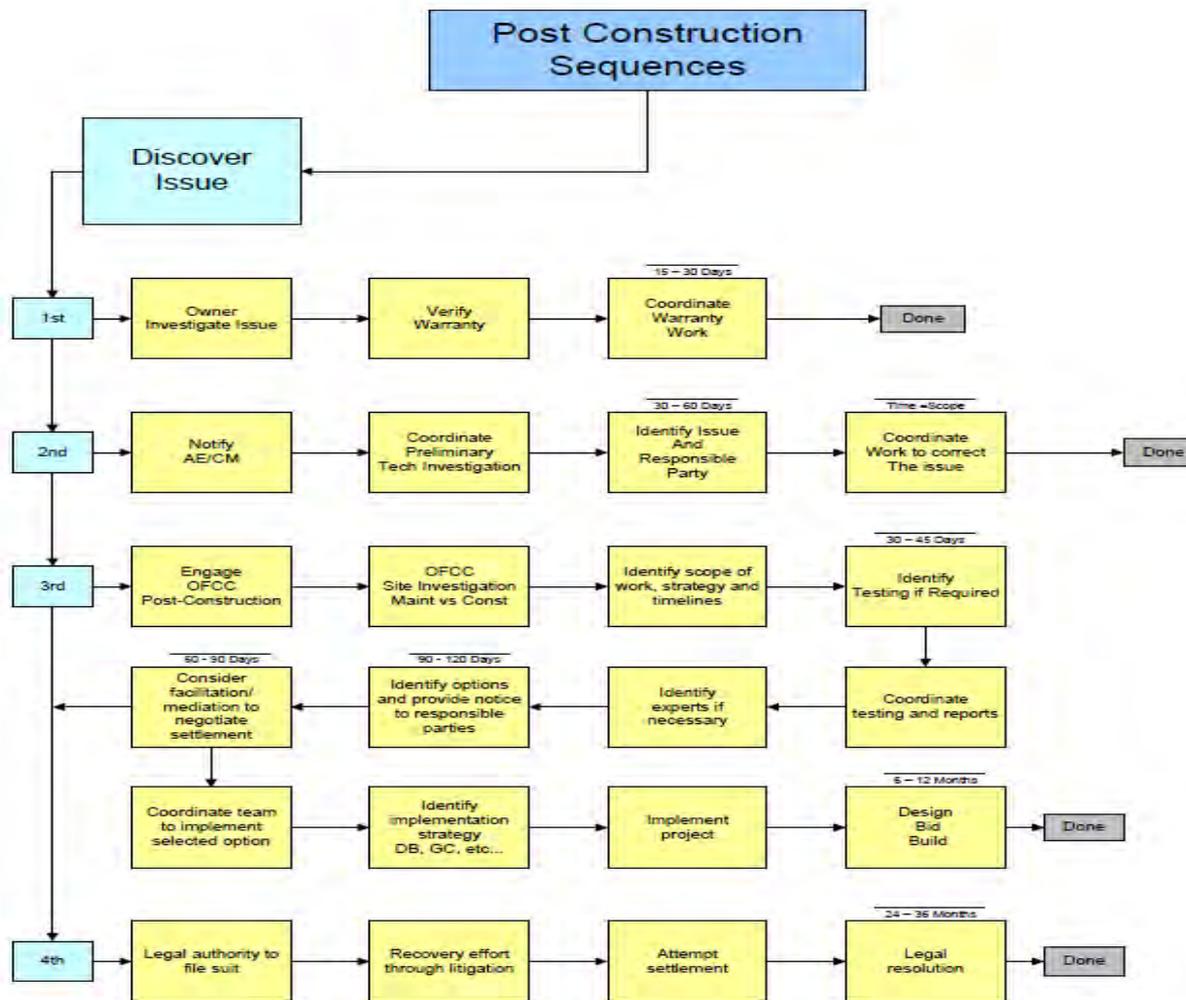
**Thermal image
indicating a void**

Humidity Meter

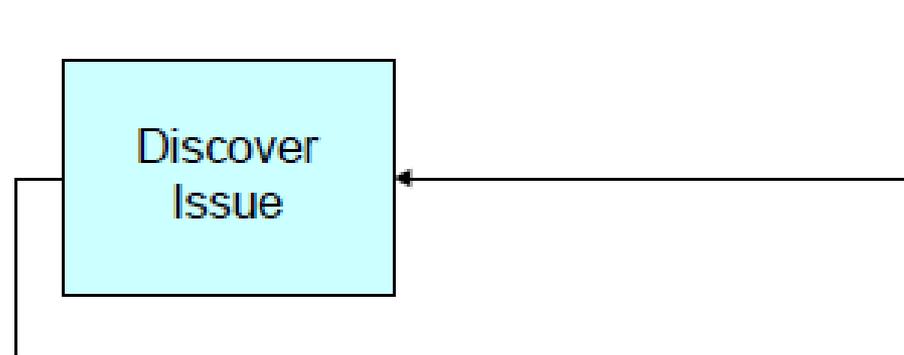


Detecting a moisture issue under gym floor

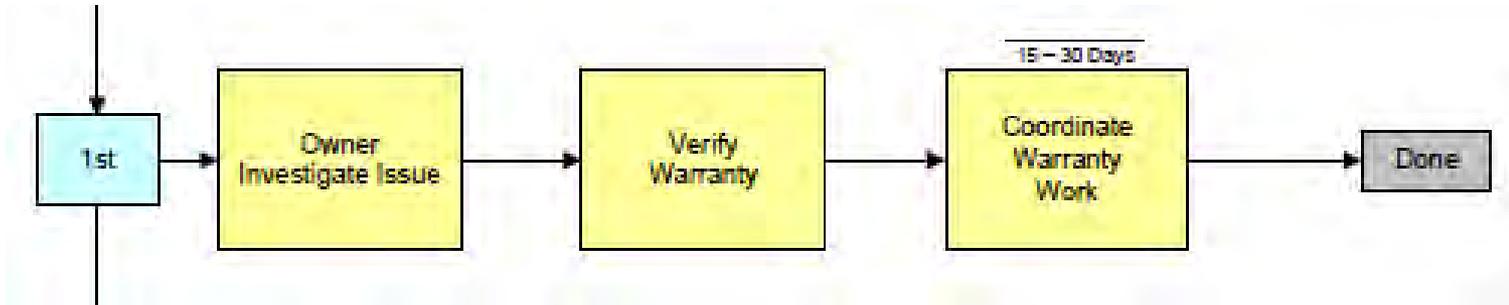
The Post Construction Process



Identify the Issue



1- Owner



- Document, Document, Document...
 - Email
 - Photos
 - Leak Logs
 - Screen Shots
 - More is better

1- Owner

- Within the 11 mo. Warranty/Guarantee period?
 - Notify the AE, CM, Contractor

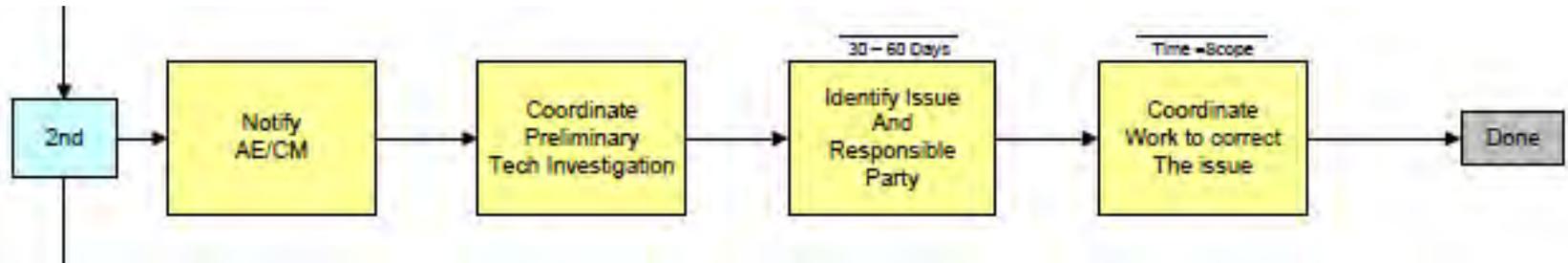
1- Owner

- After 11 Warranty/Guarantee Period?
 - Owner takes ownership
 - Warranties may still apply
 - Refer to O&M Manual /Cert. of Warranty Commencement
 - Contact appropriate vendor
 - Avoid third-party contractors (voiding warranty)

“Sorry, your warranty has expired.” ☹️

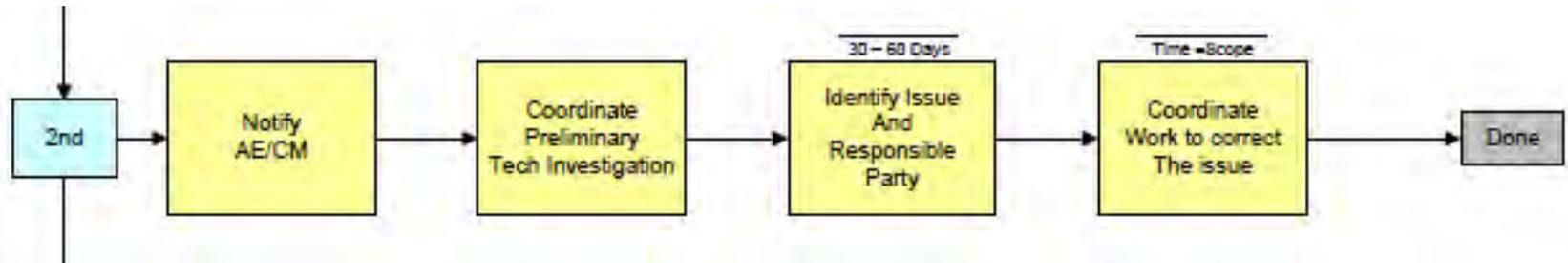
- Not so fast!
 - Your problem may be a result of workmanship, design, or faulty material
 - It may be a result of improper maintenance
 - Let AE/CM help make that determination

2- Notify AE and CM



- If you can't resolve the issue
- You feel the vendor is avoiding responsibility
- Notify the AE/CM

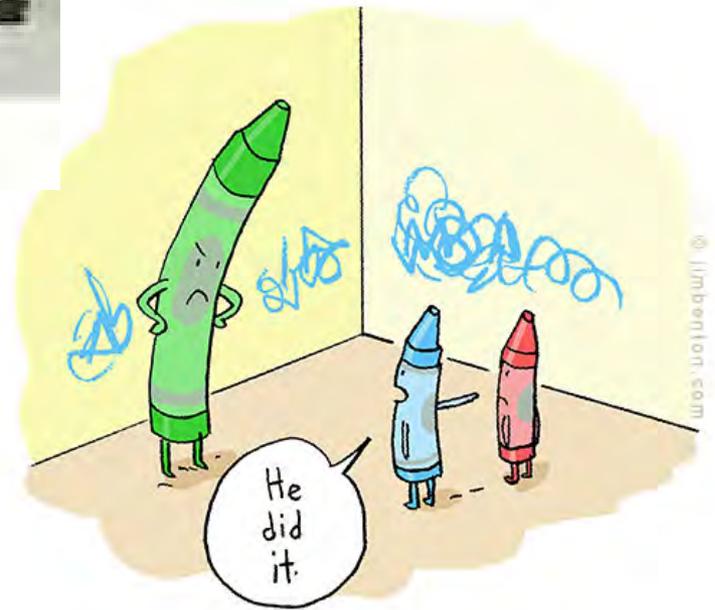
2- Notify AE and CM



- AE/CM lead the investigation
- Identify the issue
- Assign responsibility
- Coordinate the work
- Resolved?

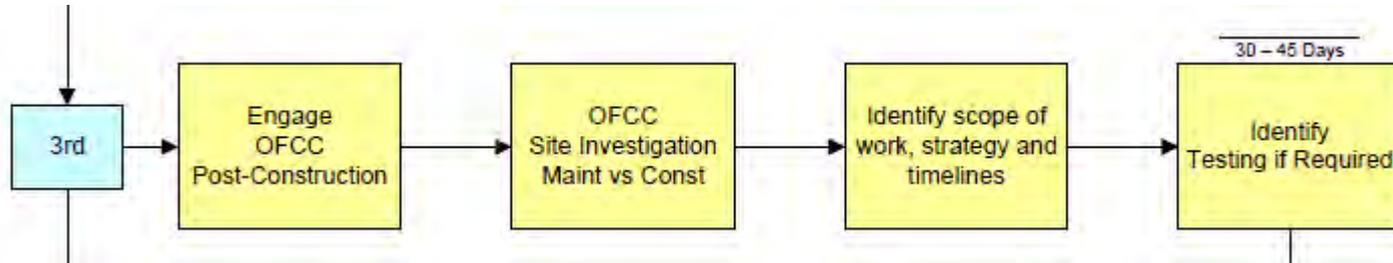


SO, NOW WE HAVE ASCERTAINED WHO IS RESPONSIBLE...



© jimbenilton.com

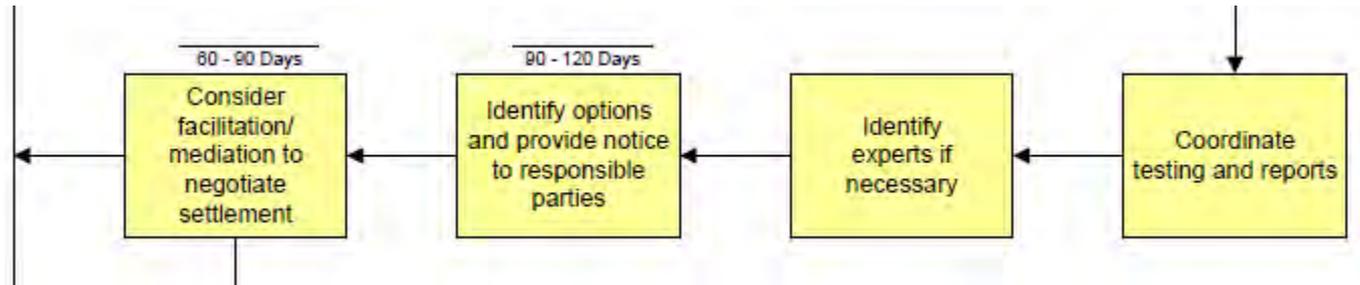
3 – Engage OFCC Post Con



OFCC will:

- Perform Site Investigation
- Maintenance/Construction/Design/Manufacturer
- Help Identify Scope
- Help Identify Testing Requirements
 - Destructive testing
 - Water infiltration
 - Soils – fatty clay, expansive shales...

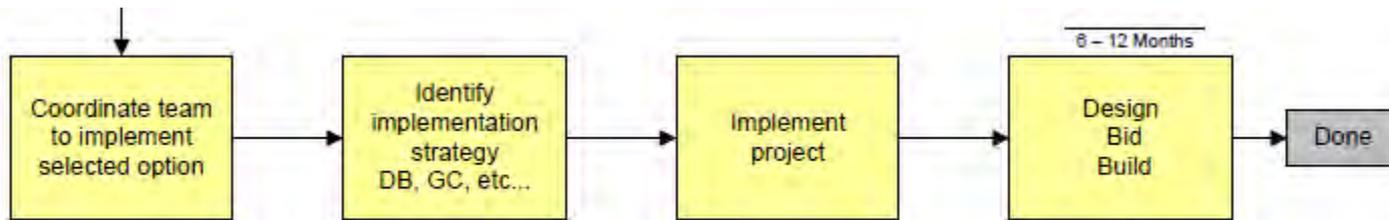
3 – Engage OFCC Post Con



OFCC will:

- Coordinate Testing/Reports
- Help procure experts
- Identify/Notify Responsible Parties
- Develop plan to resolve

3 – Engage OFCC Post Con



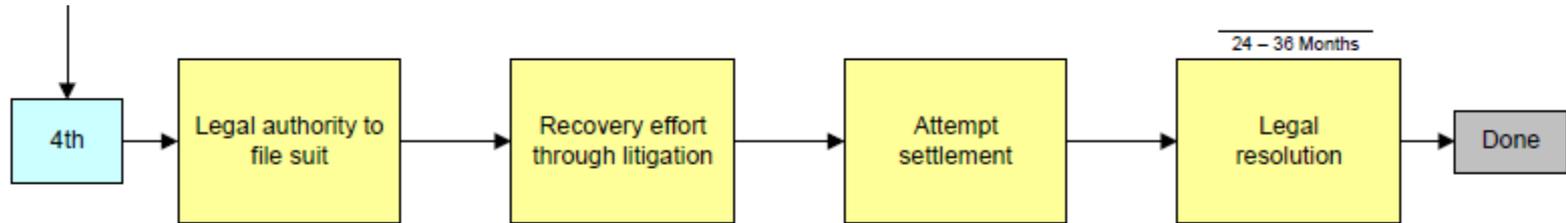
OFCC will:

- Coordinate the Team
 - Identify the Strategy for Remediation
 - Help Implement the Project
-
- How long? **It can be a lengthy process**

3 – Engage OFCC Post Con

1. Identify the issue and cause
2. Determine the cost to repair the issue
3. Determine who is responsible
4. Develop a plan to address the issue

4 - Legal

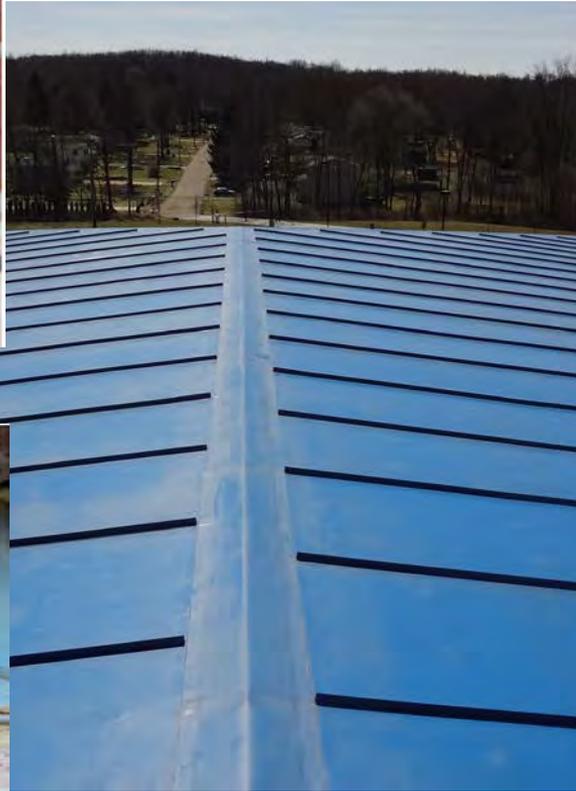


- Last resort
- Involve OFCC Legal Counsel
- Break a stalemate
- Attempt a settlement
- Seek recovery through litigation

Post Construction Case Studies

- Report
 - Roof fasteners do not meet spec
 - Flashings over windows improperly installed
 - Incorrect masonry expansion joints – distressed brick
- Conclusions
 - Replace roof?
 - Remove and re-install all window head flashings?
 - Re-do expansion joints?

Post Construction Case Studies



Post Construction Case Study

- 280,000 SF Jr/Sr High
- One chiller 600 ton
- Chiller would not stay running – low load
- Worked great with high load
- Re-piped, re-valved, controls...
- Conclusion: Chiller was improperly sized
- Settlement with Engineer
- Replaced with 450 ton

Questions?

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