EIFS – The Old and The New

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Restoration Project in Gaithersburg, Maryland

Good morning.

I’m here to present a project we restored last year but that we first installed in the 1980s. It is a wood-framed condominium building near to here in Gaithersburg, Maryland. Our work both times was the exterior insulation and finish system (EIFS). We were directed and assisted in this restoration project by Steve Dlugos, a Professional Engineer and President of Thomas Downey, Ltd, structural engineers.

Basically we’ll do a photographic walk through of the project showing the effects of poor design and installation. In addition, we’ll see some of the ways the industry has evolved to provide buildings with a more sustainable and energy-efficient enclosure. Along the way, you’ll see items and issues that are necessary when undertaking a major restoration of a fully occupied building – like logistics and safety.

This is one of four buildings with EIFS in this community. We’re currently bidding the second. We’re also two years into a four-year project on Maryland’s Eastern Shore, with 44 occupied buildings. And we’re doing a complete tear-off and replacement of the exterior enclosure and windows of an 8-story apartment building in Alexandria, Virginia – again fully-occupied.

As you know, it is typically not the cladding itself that fails when air and water intrusion occur – but the penetrations and connections. That makes the coordination of the various exterior elements critical – the cladding, a secondary barrier to control air and water entry, flashings, caulk, and repair and maintenance of the enclosure over the lifespan of the building.

On this project and on the many new and restoration projects we undertake, we have evolved to take on nearly all of the building enclosure elements. When we have to coordinate with and rely on others to do the critical parts of the enclosure, we oftentimes encounter delays and/or poor workmanship that put our work and money at risk.

On this building, the EIFS – after 30 years – was in good shape despite not being repaired or cleaned or maintained. It was the surrounding and substrate work that failed and/or was damaged.
Problems - Planters

Planters were originally designed to be installed into wood balcony rail tops. The water damage below them was significant.
Problems - Wood in contact with concrete

There was no separation of the wood framing from concrete surfaces, enabling the wood to absorb moisture and then rot.
Problems - Inadequate flashings

In this project, and as a rule, we take responsibility for ancillary work to the EIFS or plaster - which are our core talents . If we wait for the waterproofer or caulk or others to do their work, we oftentimes have to break stride and wait for them and/or face poor quality installation. The poor quality of these flashings is apparent as is the damage to other building components.
Chimney caps and crickets inadequate

We like to think that in times past the quality of workmanship was better than much that we see today. That was not always the case. On the left is a chimney cap that was not well fabricated or sealed. On the right, men are fabricating a new cricket to replace the wood and asphalt shingle original.
Problems - Damages not repaired

As with any building enclosure material, if damages are not repaired timely, the system and the substrate are at risk for progressively worse damage. We typically install a heavy-duty fiberglass mesh at areas prone to damage. One might put corner guards on at risk corners as well.
Problems - Door perimeter

The perimeters of windows and doors did not have rough opening protection nor sealant behind the flange and the sealant to adjoining surfaces was not restored when it was beyond its useful life.
Problems - EIFS into grade

EIFS should terminate 8” above finish grade with a premeshed bottom edge or starter track to allow for drainage. This height requirement diminishes the possibility of pest infestation and damage from lawn maintenance equipment.
Problems - Stairway wall

Shown here are stairway walls with dirt/biological growth. Periodic cleaning is important to prevent degradation of most materials. We wash our cars, but few people wash their houses.
Problems - Damaged railing systems

Railing systems were poorly designed and when damaged and not repaired presented life safety issues. Not all wood was pressure treated and was subject to water damage.
Problems - Damaged Site/Retaining Walls

Whether from hydrostatic pressure or inadequate waterproofing or both, the retaining walls were badly damaged.
Problems - Substrates

Brown board gypsum and oriented strand board substrates were used and had no secondary protection against air or water and no pathway for drainage for incidental moisture that might enter the system.
Problems - Wall framing details

In some cases the framing was not structurally sound and with lots of rot evident from the continual water entry.

12/3/2013
Problems - Deck framing details

Sometimes the damage was so extensive that we had to gain access to units to rebuild the structural framing. In this instance, we had to enter the unit and replace or sister framing members.
Problems - Out of date and malfunctioning electrical service and fixtures

We draw the line at doing electrical work, we’re not qualified and don’t want the liability. But this project could have used an electrical upgrade well before we arrived.
Observations

Prior to our beginning work, the interior of all exterior walls were surveyed and photographed so that we would not be accused of damage to them or for permitting water into the building for a preexisting condition.
And now the replacement phase with today’s understandings and technologies.
Restoration - We employed today’s technologies for the replacement work

• For sheathing we used fiberglass-faced exterior gypsum which is warranted for a year exposed to the elements.

• We installed a liquid-applied continuous water-resistant air barrier on the entire vertical enclosure. A recent paper from Building Science Corporation indicates that the water resistant air barrier is more important to the performance of the wall than the type of insulation in the wall. At transitions we employed rubberized-asphalt self-adhered flashings.

• We created drainage capability with vertically-grooved adhesive to permit drainage between the air/water barrier and the backside of the EPS.
Flashings and copings

We used .032 Kynar-coated base-of-wall and step flashings which extend up behind the EIFS at least four inches so EIFS can be held up the that the manufacturer-recommended 2” from the roof. We oftentimes see flashing with only 1-1/2” upstand which is inadequate when we are to hold the EIFS up 2”
Roofing
We reworked all roof/wall connections with proper flashing and EIFS detailing, which left only the infill roof work such that if/when the roof is replaced all the perimeter detailing is already performed. The Association is strapped for funding to do everything needing work. Some is deferred until a later date – like the re-roofing.
Head flashings

Head flashings to shed water away from windows and doors and louvers below.
Since the windows were not replaced, we could not install legitimate sill pans, but tucked a quasi sill pan up under the window and out over the EIF system.

Silicone sealants – with backer rod and primer – provide a 20-year warranty. Today we are instructed to caulk to the basecoat, not the finish which can soften with heat and/or prolonged moisture exposure.
Base of wall protection at decks

Cement board sheathing was installed to one foot above the decks to provide an even more moisture-resistant substrate. The moisture resistant air barrier was extended down over it as well as over the starter track below.
Base of wall at grade

Where the substrate was masonry, we removed the dabs of adhesive from the old ribbon and dab method of applying adhesive behind the EPS and then coated the bottom foot of the wall with a highly water-resistant coating to protect against rising damp.
Downspout attachments

Downspout attachments that provide structural strength and water resistance.

**Notes:**
1. Mark the location of the fastener on the finish.
2. Drill hole through EIFS to sheathing.
3. Line up with sealant and insert PVC sleeve 1/8” (3 mm) longer than the thickness of the EIFS.
4. Tool the excess sealant around the PVC sleeve.
5. Fill the PVC sleeve with sealant and immediately fasten downspout strap with screw through the wet sealant into the substrate. Tool sealant around screw head and remove excess.
Trellis rebuild

We rebuilt the trellises which had been simply toenailed into the band board. We also used pressure treated lumber in lieu of the original which was not. We installed a flashing over the ledger board.
Replacement railings

New aluminum railings were installed at balconies and stairs. As much as possible, we attached them to the face of the balcony decks so that there would not be penetrations of the tops which could allow water entry and degradation of the concrete.
Tenting and Heating

In the winter months, we had to tent and heat the work area to keep our water-based coating materials from freezing. The men always enjoy that as well. It is important to provide sufficient ventilation so we don’t asphyxiate the workers.
Communication

Prior to starting the work, we met with the tenants, the management company, and the engineer/construction manager to introduce ourselves, cite prior similar projects, describe the work upcoming, and convey our anticipated durations.

Similarly, we would advise tenants of when we anticipated beginning work on their units and asked that they remove their personal effects from balconies so they would not be lost or damaged.
Access

System scaffold lent tremendous flexibility to access the cut-up structure. Sometimes we ran scaffold through the deck which was to be replaced anyhow. And the structural integrity of the existing decks to support the weight of scaffold and workmen was suspect.
Protection

Debris netting was used. This is of particular concern today when many jurisdictions are requiring that we capture our expanded polystyrene beadboard rasping. So too, when there is the risk of materials or tools falling from scaffold, we want to protect the public.
Safety

In the interim between removing balcony rails and replacing them, we provided temporary railings for the life safety of the tenants.
Site Suggestions and Maintenance

The grading sloped to the building and there is a below-grade unit at that end. We recommended that the association’s landscape contractor grade the earth away from the building.

We provided silt fencing to contain dirt and debris.
Diligence

Change requests were submitted for additional non-contract work based on unit prices we provided on bid day.
Clean Up

Our contract included pressure washing and restriping the parking lot where we had our compound for storage and sani-can.
The Finished Product

Finally, we offered to provide annual inspections of the property to be sure that there are no trees growing from the rain gutters, damages that would allow water entry or degradation of the system, caulk that is failing, ivy growing up the side of the wall and anything else that might compromise the integrity of the exterior enclosure.

We’ve left a building that if maintained will endure for even longer than the original did and with less air and water infiltration and resultant damage.
EIFS - The Old and The New (Before and After)

While this building was clad with EIFS, the same building enclosure design principles apply no matter what the cladding. The addition of the water resistant air barrier behind the replacement EIFS and the sealing of all penetrations will provide improved energy efficiency for the tenants and value for the building.