The Hamptons at MetroWest, a Case Study of Structural Repairs to Rot Damaged Wood Condominium Buildings

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ABSTRACT

The Hamptons at MetroWest, a wood-framed condominium complex located in Orlando, Florida, suffered extensive long-term large-scale structural rot damage. Defective construction and installation of windows, weather protection systems such as roof flashing, and the exterior wall stucco contributed long-term water intrusion flows into the building envelope and into wood-framed wall and roof cavities, causing extensive rot damage to the buildings' structural wood framing. This paper discusses the forensic investigation undertaken, the rot damage discovered, the temporary emergency shoring and patch repairs needed, and the large-scale repairs undertaken to save the project

This topic would be of relevance in areas of the country where wood construction is used, and particularly those areas that receive a substantial amount of weather precipitation. The target audience would be primarily structural engineers who may come across similarly damaged existing buildings. It plays well upon a theme that existing buildings can be saved, rather than torn down and built anew. The investigative portion of the presentation shows that even when confronted with extensive damage, a thorough forensic investigation can identify the extent of damage and mitigate the potential for future rot.

Attendees would be able to see the potential of forensic investigations of existing buildings in saving existing buildings. Whereas most of an engineer's training is focused on the design of new structures, this presentation provides an alternative path where existing structures are evaluated, repaired and saved, rather than torn down in a waste of natural and economic resources.

PROJECT DESCRIPTION

The Hamptons at MetroWest is a residential condominium development located within a major mixed-use development called MetroWest in Orlando, Florida.

The project consists of seven-hundred-forty-three residential condominium units and thirty retail units, spread over fifty-nine buildings, in addition to a gymnasium, two pool buildings, trash compactor enclosure, mail kiosks, and a guard house/entry gate.

Building types include two-stories, two stories with a basement style parking, three stories, and three stories with an additional basement style level. Although the residential building types differ in appearance from each other, all share the same type and materials of construction, so that the same roof, window, and exterior wall assemblies were used and installed throughout.

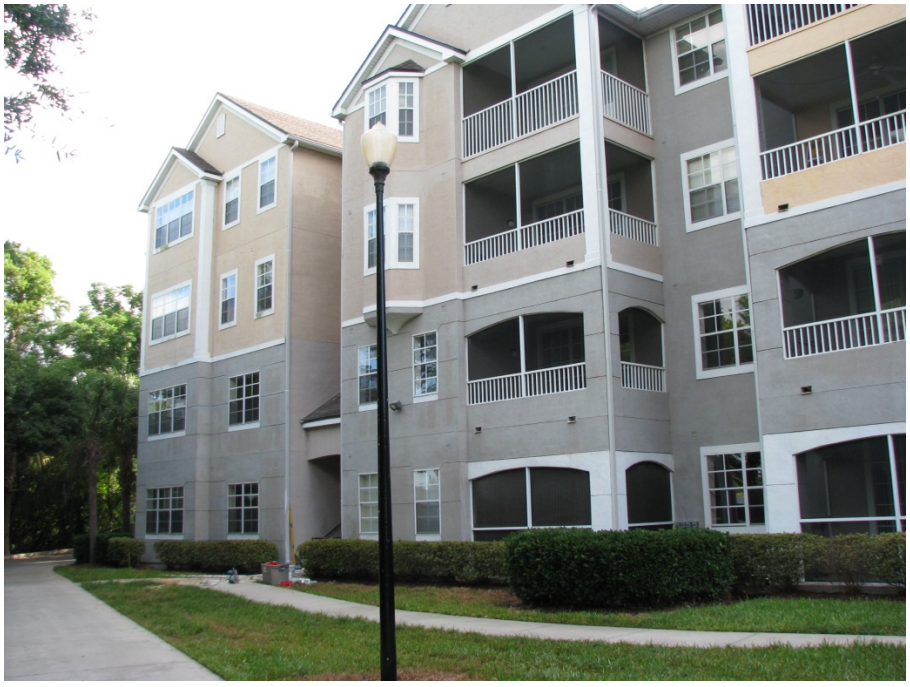

Photo 1 – Building 55 at The Hamptons.

All construction is wood-frame over monolithic concrete slab-on-grade foundations. Exterior finishes are 3/8” thick single coat fiber-reinforced stucco plaster. Roofs are pitched with composition shingles and small areas of standing seam metal roofs. Roof and floor framing consists of gang-nailed trusses. The project was originally designed and built as the Park Avenue at Metrowest Apartments. Construction took place between 2000 and 2001. The buildings were subsequently converted to condominiums in 2005.

PROJECT HISTORY

Due to the defective installation of weather protection systems, water intrusion had historically been a problem at The Hamptons. Although attempts were made by maintenance staff to stem the flow of water into the buildings, the problem was treated topically through extensive use of roofing cement and caulking. These repairs failed to address the underlying systemic problems with the weatherproofing systems. Maintenance repairs focused on stemming consequential issues such as mold growth rather than addressing causation. Without a global understanding of how water was entering the building envelope, the extent of structural damage remained largely unknown behind architectural finishes. Because maintenance repairs could not correct the defective construction problems, water continued to enter the building envelope; damaged worsened and became more extensive.

Although financially buffeted by the recession's foreclosure crisis, the association retained an engineering firm to investigate what was becoming increasingly noticeable distress to the buildings, but that investigation did not probe sufficiently for the causes of the water intrusion. As a result, the findings of the report were inadequate in identifying the problems, or of presenting adequate repair recommendations.

By 2008, the existence of visible severe damage to the exterior walls caused the City of Orlando to threaten condemnation of the two entry buildings (Buildings 2 and 41) and to file hundreds of correction notices for problems observed throughout the site. The condition of the floor framing under the open second floor balconies at Buildings 2 and 41 became so dire as to require the installation of temporary (un-engineered) shoring. Ceiling sections over the first floor walkways had collapsed, exposing decayed floor sheathing, framing trusses and wall elements.

TESTING AND FINDINGS

Marcon Forensics' (Marcon) initial visit to the site occurred in March, 2008. Although water intrusion damage to the exterior walls was extensive, Marcon determined that the majority of the damage was to non-bearing walls and that the buildings were in no immediate danger of collapse.

A new engineered shoring system was designed and installed under the damaged second floor balconies of Buildings 2 and 41. Marcon proposed an extensive testing program in order to fully expose all the causes for the water intrusion, as well as the extent of damage. City of Orlando concerns were temporarily addressed by demonstrating the association was actively pursuing solutions.

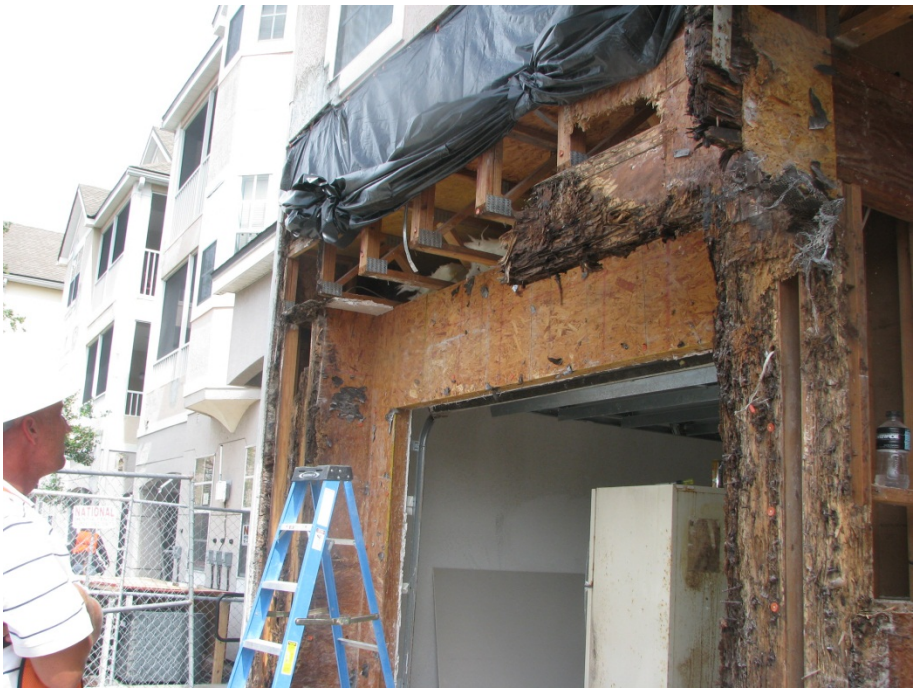

Photo #2 – Rot decayed wall framing at Building 41.

Preliminary testing in the summer of 2008 helped to identify defective construction as the source of the problems, as well as the extent of the necessary repairs. Because the cost for these repairs would be in the millions, a lawsuit was filed by the association against the original builder and developer, seeking funds to repair the defective construction and consequential damage.

Additional destructive testing was done in July, 2008, as well as in April and December of 2010. This testing confirmed that due to similarities in construction materials and the means and methods used, the defective construction problems were systemic and existed at all other buildings in the project, regardless of building type and weather orientation. The expanded testing established the commonality of the defective construction, water intrusion sources, and extent of structural damage throughout the project.

The testing also established that because of the global nature of the water intrusion streams (i.e., damage may exhibit far from where the water has penetrated), local “spot” repairs would not provide permanent relief. Spot repairs would deplete association funds without providing permanent solutions. The most cost-effective permanent repair would be a global repair, where all defective conditions would be repaired at one time.

A risk assessment was made and a decision reached that local damage would not be repaired over the expected term of the lawsuit, as long as no danger of

general structural collapse existed. Local failures, if and when they occurred, would be repaired only if they represented a threat to life safety. The presence of water intrusion, mold, or rot, would not necessarily qualify for repair. Over the life of the lawsuit this created some tense moments when tenants were told problems would not be repaired pending final resolution of the case.

Over one hundred and thirty-six units were visually inspected (roughly eighteen per cent) and over seventy-six units were destructively tested (roughly ten per cent). Additional data was collected from those units that required emergency repairs.

As a result of the visual inspections and destructive testing, Marcon concluded that the buildings suffered from systemic defective installations of weather protective systems. These included defective installation of roof, window and balcony flashing, lack of flashing at other wall penetrations such as at dryer vents and balcony scuppers, plus the defective installation of the 3/8" thick single coat stucco system.

One positive finding was that the extent of the decayed wood damage was largely confined to the exterior building envelope. Interior walls and floors were mostly undamaged. The design of the buildings made extensive use of the interior walls as bearing and shear walls, so that the loss of the exterior walls to wood decay damage did not severely compromise the buildings structurally.

EMERGENCY REPAIRS

While the lawsuit made its way through the legal system (the lawsuit settled after four years of litigation), ongoing water intrusion continued to cause damage to the buildings' structural systems. In some instances, this damage was deemed life-threatening and emergency temporary repairs had to be implemented.

The extensive wood decay to the three and four-level exterior walls of the buildings facing the lake became problematic when they reached a damage level that was believed life-threatening. This led in 2010 to the decision to install emergency shoring under the damaged bearing walls. Because the worst decay damage occurred in the lower levels, shoring was required at the basement and first levels only. In order to control the cost of these temporary repairs and to allow continued occupancy of the units, new temporary shoring walls were built six inches inside the face of the old walls. The new walls were finished with drywall, and electrical, phone and cable outlets were relocated to the new interior wall face. This temporary shoring was relatively inexpensive (compared to a full repair, for which funds were not available), and it provided a temporary means to safely continue occupancy of the compromised units.

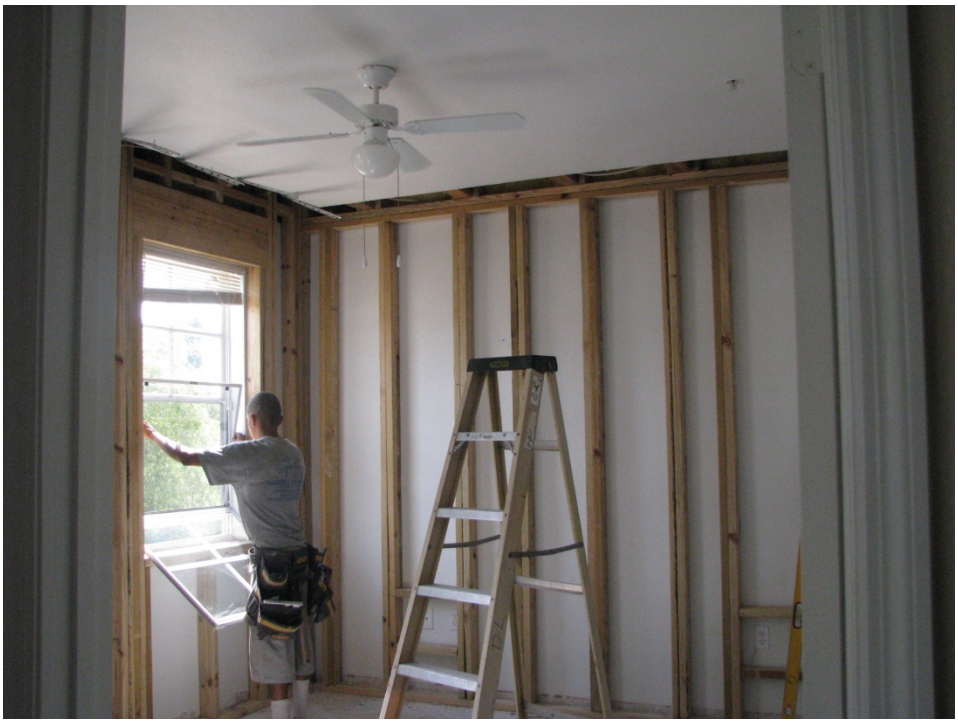

Photo #3 – Installation of interior shoring walls at Building 24.

As time passed, second level cantilevered exterior walls of the three story buildings began to fail and sag. Temporary shoring was added under those when they reached a level of damage deemed dangerous. Balconies were particularly susceptible to rot damage. Some of them required complete basement-to-third level removal and replacement of the balcony stack. This repair included the complete replacement of corner box columns and handrail walls, and partial replacement of the balcony floors.

Shoring had to be added to some exterior rear wall locations at the Townhomes, where the garage header was judged too damaged by decay to provide unaided support. A number of the buildings required the removal and replacement of stucco sections that had either through poor anchoring of the lath to the framing, or because of the decayed nature of the wood substrate, become detached from the building and were in imminent danger of collapse.

FINAL REPAIRS

Given the extent of defective construction and structural damage, the repair concept required the removal and replacement of building envelope components currently allowing water to penetrate and damage the wall and floor cavities. This included

- The removal of sections of roof to install proper flashing along the edges.

- The removal and replacement of the entire exterior stucco system.
- The removal and replacement of all windows and balcony doors.
- The removal and reinstallation of a balcony waterproofing system.

In addition, all decay damaged framing was required to be removed and replaced. This was expected to include 100% of the exterior wall framing at the lower floors, with diminishing replacement required for the upper floors. This assumption, based on representative sampling during testing, was the source of much disagreement between experts during the litigation. Experts for the developer, general contractor, and sub-contractors, argued that the damaged framing estimates were exaggerated. Their damage estimates ranged between 10% to 20% of the existing exterior wall framing.

Photo #4 – Damaged balcony at Building 41.

Outside of the exterior wall repairs, the exterior balconies were estimated by Marcon to require complete removal and replacement. This estimate was based on test results and the full emergency replacement of some balcony stacks that had already taken place.

All tested windows leaked, typically at the sill corner and center mullions. The water intrusion thus generated was directly diverted into the wall cavity. Marcon extrapolated that all windows on the site were leaking, and that this would require the removal and re-installation of all existing windows. The re-installation would include the use of building wrap (omitted as a cost-saving

during original construction), and the installation of a peel-and-stick water dam over the framed sill of every window.

The lawsuit was settled in the summer of 2012. The association immediately tasked Marcon to develop a repair protocol and repair plans for the community.

Due to the large size of the project and in order to minimize impact on the community, it was decided that the best approach would be to proceed with the repair in phases. Although this would lengthen the time required to complete the repairs, it would also allow smaller sections of the site to be used as construction zones. Repairs would start with the most heavily damaged buildings on site (Buildings 2 and 41), then proceed with the next most heavily damaged (the three-story and three/four story buildings, fourteen in total), then move on finally to the two-story buildings.

Photo #5 – Repair scaffolding.

From the beginning the concept was to allow tenants to stay in their units during the repairs. The community was still recovering from the effects of the recession and the foreclosure crisis. The money recovered from litigation would be insufficient to provide for relocating residents, and it was seen as less disruptive to their lives if they could remain in the units during repairs.

Fortunately, the design of the units placed most of the kitchen and bathroom plumbing away from the exterior walls, which were typically adjacent to

living rooms and bedrooms. Because most of the repairs involved only the exterior wall and balconies, the repair concept included the erection of a privacy wall directly behind the exterior wall. This privacy wall was covered with plastic sheathing to minimize the intrusion of weather and construction dust.

The repairs were designed to be done in unit stacks. Scaffolding would be erected, and removal of stucco would begin on a vertical stack of units. Once that was completed, repairs would commence on that stack, while the stucco removal crew would move to the adjoining unit stack. Once the removal and replacement of windows and damaged lumber was completed, that crew would move to the adjoining stack, while a new crew installed new flashing and new stucco. As the work progressed, work teams would move around the building, demolishing, removing and replacing, and finally finishing.

A protocol was developed to notify tenants 48 hours prior to the start of an exterior wall repair. This gave an opportunity to remove items from the walls to be tested, take care of pets, and to generally give tenants time to prepare for the noise and disruption to come. All work had to be done during normal work hours and none on the weekend or holidays. Bidders were told the expectation was that disruption to tenants was expected to take around six weeks per unit.

The windows and sliding doors required full removal and replacement with new units. The association negotiated the purchase directly with a window supplier and received a price break. In addition, by replacing the original single pane windows with new, energy efficient units, the association received a rebate for the utility company, accomplishing a betterment for no additional cost.

Marcon prepared the repairs plans as well as the Request For Proposal (RFP) for the first phase of repairs, the two entry buildings (Buildings 2 and 41). Marcon also pre-qualified four general contractors in the Orlando metropolitan area to submit bids, based on experience with repairs of this type and size of project, as well as in bonding capacity.

Although Marcon was to remain involved during the repairs, attending jobsite meetings and performing spot inspections for general compliance with the repair plans, a construction manager was also retained by the association to review the work done and to represent the association’s interests. His work included verifying work progress, compliance with the repair plans and specifications, and inspecting the work.

The two lowest bids were very close to each other. The third bid was substantially higher and the fourth was far higher. Although not required to choose the lowest proposal, the association chose the lowest bid based on the

pre-qualification process and with the confidence that all bidders were experienced.

However, work on the first phase of repairs (the two entry buildings, Buildings 2 and 41), quickly became fraught with quality control issues and delays. The general contractor chosen (Contractor R), although experienced and active in the Orlando metropolitan area, began having serious scheduling, supervisory, and installation problems.

For example, the stucco subcontractor selected for the job by Contractor R did not have much experience as a stucco installer. His installation of stucco flashing was thoroughly defective and required the removal and replacement of many sections of the weather barrier and flashing, multiple times at some locations. In many instances the installation of components was done in the reverse order from that shown on the approved plans. The installation of stucco flashing and the weather protective barrier began before a roofing contractor had been retained, resulting in a lack of coordination between his work and that of the roofer.

Similarly, the installation of the new sliding doors was not done according to the installation specifications, and leaked after the first rain. The sliders had to be removed and reinstalled, in some cases several times.

Worst of all was the installation of the water proofing at the balcony decks. The construction consisted of a wood deck, with a waterproofing membrane and a concrete walking surface. The system included a dual drain system providing drainage at the top of the concrete and at the waterproofing layer. The original scuppers had been replaced with a conventional “T” edge system. The installation of the waterproof membrane was fraught with problems, and decks began to leak immediately. Problems were traced to workers walking on and damaging the waterproof membrane prior to installation of the concrete, to an apparent inability to install the membrane so that it was actually waterproof. Some decks were replaced three times.

The question of the amount of damaged framing to be replaced remained a concern. The association decided to request bidders to not include the cost of removing and replacing framing, but instead provide a lineal cost they would be paid based on actual quantities replaced. Once the work started, it became clear this was not a good cost decision. The replacement of damaged framing was higher than originally hoped by the association. On some elevations, 90% of the framing had to be removed and replaced, consistent with Marcon’s expectations from testing.

The repairs of the first phase (Buildings 2 and 41), continued to be problematic throughout the construction period. Instead of the original six weeks per unit expected construction disturbance, the time stretched to

months, with corresponding frustration on the part of tenants. The entire construction period for the first phase, originally expected to last about four months, lasted over a year.

For the second phase of the repairs (fourteen three and three/four story buildings), Marcon again developed the repair plans and the RFP. Three contractors were pre-qualified to bid (which included Contractor R from the first phase, hope existed within the association that he could change his ways). A new low bid resulted and the second phase was awarded to another contractor (Contractor S).

The work has been proceeding on the second phase with hardly any problems. Where they occur, Contractor S resolves the issues quickly and properly. The only work delays to date are weather related. It could be said that the buildings in the first phase were more complicated, and that the first phase was a learning experience for everyone. The balcony weatherproofing system was changed to another suggested by Contractor S and appears to be installing satisfactorily. However, other work problems commonly repeated by Contractor R in the first phase just have not appeared in the currently ongoing work of Contractor S during the second phase.

For bidding purposes in the second phase the amount of damaged framing to be removed and replaced was set at 60%, with a lineal cost for percentages above and below that. Repairs were begun at the worst damaged building of the second phase, and the removal and replacement of the damaged framing has been running at a higher percentage. However, as the repairs move on to the less damaged buildings, that percentage is expected to drop.

CONCLUSION

The repair of the rot damage at Hamptons at MetroWest provides a case history of the special care required to protect wood framing in wet climates. Following a multi-year investigative and legal process to recover costs for defective construction, problems again arose during the repair phase with the installation of systems intended to provide protection for the structural framing. The selection of a seemingly qualified contractor proved to be no guarantee that the installations would be properly done. In a climate where constant exposure to weather should require a higher standard of care, inexperienced or inattentive builders instead responded with a lower standard of practice. Without constant supervision by the construction manager and the repair design team, a cycle of water intrusion and rot damage would have been repeated. For the homeowners of the Hamptons at MetroWest, it paid to have someone minding the store.