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NOW THAT'S A DIRTY WINDOW JOB

When does a simple window replacement project take a turn and become a complex (dirty) job? The following chronicles a winding tale that started when the owners in a nine (9) story condominium located in Alexandria, Virginia, built around 1965, wanted to replace their original windows and large sliding glass doors. As is typical of older windows, they were drafty, some leaked water, and all were energy inefficient by current standards. Residents even said that the windows and balcony doors shook during storms and high winds. The building was not defined by any particular style of architecture, but the systematic rhythm of ribbons of windows and balconies suggested a thoughtful and modern design of the 1960s.

Concrete balconies, supported by cantilever steel beams are located on the facades. Access to each balcony is provided through a 10-foot wide sliding glass door assembly. The windows of the units are a mix of fixed window panes and horizontal sliders and are consistent among the units. A storefront window system exists on the ground level. All the windows were single-pane assemblies with aluminum frames. The scope of work was envisioned to include replacing all sliding doors and windows on the second through ninth floor, as well as replacing the storefront system and doors at the ground floor lobby.

A visual survey to determine the quantity of windows and doors, as well as the installation means, was performed. It was determined that project costs could be saved, while meeting the goals of the condominium association, if the existing perimeter window frames were left in place when the new windows were installed (a technique also known as "jumping the frame" or flush fin window installation). This process basically entails removing the glass from the existing frames, setting the new window assembly over the existing frame, and fastening the new window to the building walls. The existing window frame would be covered with new interior trim pieces to match the new frame. The original sliding glass doors, however, would have to be removed in their entirety to allow for the new door installation and proper flashings.

The new windows and doors were specified to be certified by the American Architectural Manufacturers Association (AAMA), as gold labeled products. This would help ensure that the window and door quality would meet the Association's needs, manufacturer's stated performance values, and building code requirements.

Prior to starting the window replacement work, the contractor hired professionals to investigate and check for the presence of hazardous materials, such as asbestos and lead based paint, because the building was constructed well before the late 1970s, when asbestos containing building materials and lead based paint were first starting to be banned. Upon selective sampling, asbestos was discovered in the window glazing compound, and caulking around the windows and sliding glass doors. Asbestos in window glazing is somewhat common, but the caulk was not expected to be hazardous. Lead-based paint was found on some layers of the interior paint around the windows and doors, which was expected due to the age of the building.

Additionally, asbestos was found in the popcorn ceiling coating on the ground floor lobby, which was also not a surprise, since this

DID YOU KNOW?

Asbestos has been used since before the Greek and Roman times in pottery and fabrics. In the modern world, asbestos has been commonly used in building industry as late as 1980s for reasons such as fire resistance, insulation, and caulking. However, since the 1890s, the health industry has been researching the effects of asbestos and found lung related diseases such as pulmonary fibrosis, which can be fatal. Eventually in 1973, 1975, 1977, 1978 and 1989, many asbestos related building materials were banned by the Environmental Protection Agency (EPA). Although asbestos is not technically banned from use in building materials, today, it has ceased to be used by many manufacturers.

material is often found to contain asbestos. All team members were immediately notified that asbestos was discovered and the search for an asbestos abatement contractor started. At this point, a simple window replacement project became very involved and much more expensive.

The mere existence of asbestos in the sealant around the window was not enough to trigger the need for abatement work, as the old window frames and sealant were not going to be disturbed due to the "jump the frame" installation method. If two mullions of the fixed windows did not have to be cut out to install the new windows (which would make the asbestos friable, i.e. create airborne dust), the asbestos abatement around the windows would not have been necessary. This is because it is generally acceptable to leave undisturbed asbestos laden materials in place and encapsulate the material. Since the new window frame would have contained the asbestos containing materials, it would be considered a form of encapsulation.

The first step towards asbestos abatement is retaining a consulting firm that offers industrial hygiene services. The industrial hygienist should be licensed, well qualified, and have experience working with the local jurisdictions and condominium associations. Asbestos abatement in Virginia is governed by rules and guidelines set by the Environment Protection Agency (EPA), Virginia Occupational Safety and Health (VOSH), and even the local City or County, therefore the consultant must be well versed with code compliance as well as an understanding of the critical path of the construction work. The work performed by the industrial hygienist for this particular project was divided in two phases, which are summarized below. Phase I was an initial evaluation and inquiries with the City to determine the breadth of the abatement scope, and Phase II was developing and helping implement the abatement removal program.

Phase I

1. Inspecting and collecting asbestos bulk samples by a Virginia Licensed Asbestos Inspector.
2. Using an X-ray Florescence (XRF) analyzer scan work areas for lead paint by a Virginia Licensed Lead Paint Inspector.
3. A Virginia Licensed Asbestos Project Designer consulted with VOSH and the City of Alexandria to confirm abatement procedures and proposed work.
4. The Virginia Licensed Asbestos Project Designer provided a work summary and specifications that clearly defined the scope for asbestos abatement work and helped in acquiring bids from asbestos removal contractors.
5. Assisted in reviewing the bids and selecting an asbestos abatement company for the work.

Phase II

1. Reviewed asbestos abatement submittals and requests for information.
2. Virginia Licensed Asbestos Project Monitor managed and conducted Phase Contrast Microscopy (PCM) air sampling and analysis during the asbestos abatement to ensure that the work zone was properly cleaned before the windows were installed.
3. A written report was provided, that documented observations, findings, and recommendations.

Prior to beginning abatement work, asbestos notification letters and permits were filed with the City and Commonwealth of Virginia by the asbestos abatement contractor.

The cost of the permits and applications can be very expensive, sometimes up to 30 percent of the cost of the asbestos abatement work. This additional cost can be a surprise both for the association and its residents. Additionally, some jurisdictions require notice be provided at least 20 calendar days prior to start of asbestos removal. Due to the liability related to the work, insurance for professional liability and workmanship should be submitted by all professionals.

Performing asbestos abatement work can be quite disconcerting to the building residents. Just the mere mention of the word "asbestos" can strike fear in people. So, when they see workers dressed like they are going to space, the concerns can be magnified. Work by an industrial hygienist must be well coordinated between the community, board members, contractor, and the asbestos abatement company. Detailed notices to building residents should be provided by the consultant that outlines the extent of work and describes the length of time that unit occupants will be required to vacate their living space. In this case, the required time to vacate the unit was no more than eight hours so that the abatement work could be performed.

The time needed to abate the asbestos nearly doubled the original estimated project duration required to remove and replace the windows. Half of the typical construction day was dedicated to building a containment chamber with polyethylene sheets, on the interior and exterior of the window openings, before asbestos containing materials could be removed. HEPA ventilation exhaust units were installed, inspected, and tested for the duration of the abatement process. For protection, workers wore air filtering respirators, googles, and protective clothing at all times (which are disposed of along with the asbestos) to comply with the very strict requirements and protocol, as specified by the industrial hygienist.

For this particular project, asbestos containing materials were removed by the certified asbestos abatement company using the "wet method." Asbestos related items were sealed and double bagged in polyethylene bags. Bags were further decontaminated by wet wiping or showering before being removed from the site in secondary storage waste containers. All bags and containers were sealed tightly with duct tape and were pre-labeled with warnings, the Virginia abatement contractor's license number, and the date. After the asbestos was removed, the work area was HEPA-vacuumed and wet-wiped. Then the industrial hygienist performed a final visual inspection per industry standards (ASTM E1368), and final clearance air sampling, as required. After the air sampling is reviewed under a microscope on-site, and only after the work zone is determined to be free of asbestos, the workers could remove the containment chamber and dispose of it in the dedicated waste containers.

Another area of renovation at the building was the replacement of a storefront window system and entry doors for the ground floor lobby. The storefront and doors were located adjacent to original popcorn ceiling, which is a textured gypsum board and plaster ceiling. Upon discovery of asbestos and lead paint in the popcorn ceiling, limited disturbance up to the ceiling valance was recommended for the replacement of storefront and doors. The protocol for construction of a containment chamber, HEPA exhaust units, wet method asbestos removal, and air sampling was similar to the procedure used for the windows and sliding doors, except the containment chamber and asbestos waste containers were larger.

The necessary protocol to address the lead based paint were included in the scope of asbestos abatement work. The United States Department of Housing and Urban Development has mandated that Lead-Safe Work Practices be followed in cases where lead based paint is identified. In general, these include containing the work area, minimizing dust, and a thorough clean up. In this case, the primary concern was over loose paint chips that might be formed during the demolition of the existing window mullions. The clean-up of the asbestos abatement work zone was thorough enough to remove any loose paint chips that might have been created.

Once the hazardous material protocols were developed and approved by the proper authorities, mock-ups of the windows and sliding glass doors were installed. This allowed the team to verify existing conditions and that the specified window/door installation approach and asbestos abatement methods would work, as intended. During the mock-up installation, one area that was found to be more difficult than expected was the removal of the old asbestos containing sealant from the surface of the bricks around the sliding glass door opening. It took some time to develop the right approach to remove the stubborn sealant while not damaging the bricks, which would have left visible scars on the building after the new door was installed.

The mock-up installation was also a good way for the condominium board to inspect the new window and door products, test their operation, and confirm their choice of materials. It was found that a few adjustments needed to be made to the windows, such as adding extra bumper stops, adjusting the color of a few parts of the window to be more aesthetically pleasing, and obtaining a more robust sliding glass door screen so that the condominium board would be pleased with their selection.

To confirm that the actual performance of the new windows and doors met the published values, water and air infiltration testing was performed by an independent laboratory on the mock-up windows. Additionally, the testing would verify that the installation methods resulted in a leak free condition. The test results indicated that the window and door installation was water tight and they exceeded the published performance values.

This seemingly straight forward project became far dirtier and much more involved, expensive, and longer to perform than originally envisioned due to the unplanned presence of hazardous materials that had to be addressed. Through open communication and a team (board, consultants, and contractors) dedicated to get the job done in a professional manner, the result was a much more attractive and energy efficient building that should serve the unit owners well for at least the next 20 years or more. Q