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Exterior Insulation Finish System (EIFS)

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Abstract

This presentation will concentrate on the Forensic Engineering evaluation of Exterior Insulation Finish System (EIFS). The case involved major leakage in the walls of a very nice condominium located on the Atlantic Ocean beach. The first overall look at the building, the building appeared to be very tight with no obvious paths of water intrusion. Verification of water leakage with moisture meters and visible stains in the units required an answer of why this nearly new building was leaking so profusely. First, the construction must be investigated and compared to the design documents. The design documents must then be compared to applicable code requirements and practical construction considerations. The damage and cause for the failure must be established. Finally, the extent of remedial work required to rehabilitate the structure must be defined. Adequate testing and investigation must be completed to assure the repair will solve the problems that were identified. During each step of the investigation one must be preparing for the ultimate question, *"What specifically is the reason for the failure, who is responsible for that failure, and what is your basis for that opinion"*. The most common recommended solution to serious system water leakage defects is to caulk and repaint, this often exacerbates the problems and makes the ultimate solution much more difficult and expensive.

Conclusion

EIFS is a good system, but is very "workmanship" sensitive. If each part of the system is constructed meticulously, the system will perform very well for many years. However, with the construction procedures usually employed in housing, commercial, and condominium construction, the contractor, or developer provides very little supervisory input and relies heavily on the subcontractors to perform the construction correctly. Unfortunately, subcontractors often hire workers to perform their work on a "price per piece" basis. This lack of supervision and emphasis on speed of construction is detrimental to the overall construction and weather tightness. The coordination with other trades often suffers because of the scheduling conflicts and each trade assuming that the other contractor will provide for the integrity of the system. Often the lack of understanding by the workers of the importance of the various parts of the system lead to more and more cutting of corners without consequences. When a failure finally occurs the workers that installed the system usually never know how or why the system failed, they continue to install the system by "experience".

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General Overview

The basis of most EIFS is that the water must be kept out of the system. Usually no provisions are provided to "drain" water from the insulation system. This presentation will concentrate on the Forensic Engineering evaluation of EIFS. The building cited in this investigation had excessive leaks in many areas such as around doors, windows, plain walls, and even in the lobby ceiling that did not have windows or doors above. In any forensic investigation you must at all times remember that you will have to give an opinion, and the basis for that opinion under oath concerning the specific person or contractor responsible for the problem. It is not good enough to simply state that the wall leaks. You must identify why it leaks, the specific part that leaks, the person or contractor that failed to perform their part of the project properly, and a logical basis for that opinion based on the evidence found concerning this project.

Each different trade involved with the project will try to rationalize the problem as being a failure of some other trade. The designer will often blame the contractor, the contractor will often blame the building plans or the subcontractor, the subcontractor will often blame the lack of maintenance or other trades for the problem. The first priority is to find the specific reason for the leakage and the extent of damage caused by that leakage. Next perform an analysis to determine what was required by the contract documents. The next step must be to determine how the construction was accomplished and if it deviated from the contract documents or manufacturers instructions. Once these items have been identified by research you will be in a strong position to evaluate how it should have been designed and built. This will then give you a basis for opining that either, the plans were deficient, or the subcontractor was negligent and did not perform to the industry standard or a combination of each.

The assessment of liability on any one party is usually very difficult and will produce many opposing opinions on why or why not the individual parties should be liable. The developer will usually be well insulated from liability. The designer will defend because he was only paid and authorized to produce a minimal set of plans, without jobsite observations. The contractor and subcontractor will say they built what was required on the plans and specifications. The building official will say they only are required to assure the minimum code has been met. The manufacturer of a specific part, such as EIFS will often successfully show that it was another trade that failed in their responsibility. The window man will defend the lack of flashing on the basis of no details and normal standard of the industry. The sales person will point to the written contract and it will be difficult to enforce the verbal portions of the contract. The owner will have to bear the substantial cost of collecting enough evidence, and have legal representation to assign liability. Even with the liability established and a "win" in court, it is often impossible to collect the court awarded judgement.

Conflicts of The Parties

DEVELOPER The first driving force for most speculative projects is the developer. The developer must envision a condominium, for instance, and decide if he could buy the land, secure the plans and permits, obtain the financing, build the buildings, sell the units and make a profit on the whole transaction. He is in a very speculative position and will be looking for all possible ways to limit his risk and out of pocket money commitment. One of the ways to limit the outlay of cash is to commission a set of plans that are just well enough defined to obtain a permit. If he can act as the contractor it will eliminate another pocket and potential conflict. All these responsibilities will often be packaged into a limited partnership to limit the risk should the project encounter major legal difficulties.

SALES The sales staff are usually very adept at verbally assuring the potential buyer of the great reputation and "guaranteed" response of the developer to each complaint. The sales pitch usually includes many vague assurances of quality for the buyer. However, the official paperwork for the sale carefully negates most of the assurances the customer felt during the pre-sale conversations.

DESIGN PROFESSIONAL Most large condominium or commercial developments require an Architect or Engineer to produce and "seal" the project plans. If the Architect produces a minimal set of plans, just barely sufficient to obtain a permit, he can charge less money than producing a full set of working drawings. The Engineers are in the same position, if they produce a minimal set of plans, they can charge less money and get more of the work. Many suppliers of building products will "design" the system and specify the details for the professional. This is where you will see a lot of superfluous specifications such as: store the material in a dry location, off the ground, mixed with potable water, ad infinitum. This is a "boilerplate specification". Specific details, like how thick the finish coat should be, are not included. The manufacturer is usually reluctant to help the investigator establish their material was not installed correctly: because this would alienate the developer, contractor and sub-contractor.

BUILDING OFFICIAL The building official is generally charged with assuring the project meets the local building code requirements. In Florida it is required that each project meet the minimum requirements of a major building code. The building official, by state statute, is required to see that the plans and building construction at least minimally meet those standards. EIFS is not defined in the Standard Building Code, therefore it must be a special approved system. The manufacturer must submit testing to prove their system will meet the requirements of the building code. Once the system is approved, it is assumed the system will be installed correctly. If you try to compare the system

submitted and tested to the construction, you will find only parts of the tested system concern that particular manufacturer.

CONTRACTOR Assuming the developer does not act as the contractor will need to build the project with the least amount of time and labor. In many instances the contractor provides only minimal coordination and quality control. Furnished with a minimal set of plans, and no professional observation, he is not tightly controlled in the details of construction. If he keeps the local inspector happy the project will go along pretty well. Normal items like concrete cylinders, fill compaction, electrical, mechanical, and plumbing, are usually pretty standard and take place with regular consistency. The trades using less known procedures suffer under this type system. EIFS is a prime example of misunderstanding among the various parties in the building system. The interface with the window, door and other penetrations of the finish are often poorly understood by the trade workers performing the actual construction.

SUB-CONTRACTOR The subcontractor must bid the project to the contractor or developer, with a strong emphasis on the low bidder being awarded the contract. He now is forced to hire workers to build the project that will allow him to make a profit. Extra screws in the gypsum backer-board, for instance, slows down the production and since no specification is available, nobody usually challenges his decision. If they do challenge his decision for the number of screws, he simply cites his "experience", that is the way it is always done.

THE WORKER The worker putting on the backer-board is generally being paid by the number of boards installed, not a great concept for installing extra fasteners to hold the backer-board in place. Without inspections, specifications and quality control, this detail often fails to gain much attention. When you finally establish that the attachment is insufficient, you are faced with trying to establish the parties that are legally liable.

EIFS MANUFACTURER The manufacturer will gladly furnish the design professional all the boilerplate specifications they want to make their plans and specifications look adequate. If questioned about the number of fasteners in the drywall, they quickly state they attach their material to the substructure available. Usually the number of screws in the backer-board is not specified, this is a time consuming detail for the engineer to determine. The experienced designer just ignores the question. If asked later he simply refers them to the architect, gypsum manufacturer or the EIFS manufacturer. The EIFS manufacturer wants to be an easy system to install and therefore will be very careful with help for a forensic engineer investigating the failure of a building. It is difficult to get the manufacturer to give you details on how thick the finish coat

should be, for instance. If they furnish information for a lawsuit they will quickly be black listed on future projects.

EIFS TESTING The laboratory that tests the adequacy of the EIFS is being paid by the EIFS manufacturer to test their system, not the structural substrate. With this in mind they do not want the backing material to fail and waste time that they won't get paid for by the manufacturer. Therefore the substrate is generally over designed to test the adhesive and the EIFS, not the substrate. This is not generally clearly defined in the test results. If you obtain the actual test report approved by the Standard Building Code, the substructure is not necessarily the one used in the building. If the EIFS manufacturer makes it difficult for the sub-contractor to apply the system, they will loose out to their competitor that does not have such strict guidelines.

UNIT OWNERS The unit owners want to find a way to have their living unit salable and livable. Many people have allergies to mold and mildew, they are looking for a way to recoup their investment and quality of life. The owners see their investment seriously devalued by a lawsuit about the building leaking and perhaps not fully repairable. The owners with a minor part of the problem, such as the middle units, do not want to see the problems fully addressed and would prefer to caulk and paint if possible.

BUILDING INSPECTOR The building inspector usually checks for things that are normal, like reinforcing laying on the ground, electrical, plumbing, or other minimum code requirements. They are not generally knowledgeable enough to know all the different trades and their interaction. They do not get on multistory scaffolds and count the screws in the backer-board, or check the window installer to assure the flashing is properly installed.

CONDOMINIUM ASSOCIATION The association must represent the interests of all the owners. If part of the building has more serious problems than the rest of the building, they should try all avenues to find the all the problems and pursue a solution. There will be many different opinions concerning how to best "fix" the problems. Even if the association wins a large settlement, they are often induced to try the more economical approaches first. If this fails they can always pursue a more aggressive solution, meanwhile the funds are invested and should gain interest.

FORENSIC INVESTIGATOR The forensic investigator first must try to establish the scope of the failure. Once the scope of the failure has been established he must gather information to support that conclusion. The interface of the many parties will be one of the problems that the client will want to have clearly defined. The attorney will need to establish liability and how the case

will likely play out in court. The investigator must be able to define the amount of damage, the cost to repair that damage, the parties responsible for the construction failure. In defining the original problem it is not uncommon to discover many other failures caused by the original problem. If the wall leaks it could involve the application of the EIFS, the window installation, the flashing, rotted wood or metal sub-structure, exterior gypsum attachment to the sub-structure, electrical, mechanical, plumbing, finish drywall, carpets and other interior damage. Often times the original leak may be the fault of unidentified damage, caused by window cleaners, painters or other maintenance personnel. You must realize that most of the above parties will not want to cooperate when they realize you are investigating for a possible lawsuit.

Construction Contract Evaluation

Study the project permit plans and contracts to determine the responsibilities of the different parties. You should obtain a set of dated "permit plans" for the project and determine the applicable code and the designer responsible for the project. Read the specifications for the detail instructions for the EIFS. Often several different sections will be involved such as; exterior insulation finish systems, metal studs, sealants, paint, concrete, and gypsum wallboard. If the specifications simply state "follow manufacturer's instructions", that is usually a red flag the designer was not confident enough to specify the correct details for the system. The structural engineer of record must size the wall structure and determine the attachment required to meet the wind load requirements for the building, if this has not been included on the contract documents it is another indication of lack of detail instructions to the construction trade. You must then determine if the structure is adequate, if not, why not and the person liable for the oversight.

Example: It is not unusual for the specifications to cite; "follow EIFS manufacturer's recommendation for installing the system". The manufacturer of the EIFS will not specify the number of screws or the spacing to attach the gypsum board to the metal studs. The manufacturer will refer that question to the gypsum division, however the gypsum section will refer that question to the engineer of record for that determination. The engineer of record must identify the loading required to size and space the studs. Once the stud spacing has been selected the spacing of the screws may be calculated. When the engineer of record asks the gypsum manufacturer for the safe loading per screw, the gypsum representative will usually refer him to the EFIS manufacturer or the engineer of record. This can be very frustrating for the engineer of record and the forensic investigator.

Another logical place for the determination of screw spacing of the backer-board is the manufacturer's technical submittal for approval of the code agency for the EIFS to be used in their jurisdiction. This is often in the form of a test report by an independent laboratory and the system is meticulously detailed for the size of studs and spacing of the screws. They typically will give test data and show how their system meets or exceeds the requirements of the code from which they desire approval. However if you try to use the spacing of screws used in the test for approval, for the building construction, the manufacturer will advise they over specify screws in the test because they are testing the adhesive and the EIFS, not the structural system or attachment of the substrate. They will typically refer you to the gypsum manufacturer's recommendations for the screw spacing. Of course the gypsum manufacturer will not give you the spacing and most likely will not even give you guidelines for the load carrying capacity for each screw. I talked to the testing laboratory and determined the load they used to prevent the backer-board from coming loose from the frame.

This is but one example of the difficulty of determining what the screw spacing should be for attaching the gypsum backer-board to the structure. It is then left to the contractor to instruct the subcontractor, the contractor merely refers the subcontractor to the specifications. The subcontractor asked that question because it was not detailed on the plans but he must now instruct the workers how many screws to put in each backer-board. Keep in mind the worker is usually being paid by how many boards they install. The subcontractor must buy the screws, so they have no incentive to furnish extra screws to attach the gypsum board to the studs. The worker is being paid by the piece, and nobody can tell how him how many screws to use, so the installer will use barely enough screws to hold the gypsum backer-board in place for the next operation. Besides the worker has done many other jobs so the worker is "experienced" and knows how many screws to use in attaching the backer-board.

You must be prepared to detail the steps required by each trade and participant in the process and the responsibilities of each participant to be able to fairly establish the liability of each of the participants. Remember each of the participants will be represented by different attorneys, all trying to place the blame on someone else. You must have all the different defects and construction procedures clearly in mind and be able to clearly explain each if you are to survive the intense questioning by all the participants trying to convince the jury that they should not share in the blame for the failure.

If we prove the gypsum backer-board has been attached sufficiently, what effect will water intrusion have on the holding power of the screws in wet gyp-

sum board. This question must be asked and answered in the case of a leaking EIFS. No one will give you an answer on the holding power for screws attaching wet or damp gypsum board to the structure. They simply tell you the system is not to be used wet. You must establish the extent of the leakage and wetting of the backing material. The only logical method for determining the safety of the in-place system is a load test of test panels in the actual system. A testing agency must be engaged to actually pull samples from the wall in a controlled manner, and certify the results. You must then calculate the load carrying capacity of the installed system to compare with the code mandated requirements for the system. This brings along another interesting question of what load must be sustained for the test to be valid. Most codes provide that if a load test to be used to certify the capacity of the system, the load sustained must be twice the required load of the code. You must be ready to convincingly answer the questions about testing only a small sample of the wall and using that test for rejecting the whole wall or building. Another question will be why should the system be able to withstand twice the load specified in the applicable code.

A good way to identify the water leak location is to use a moisture meter. The meter I use has a calibration confirmation and registers percentage up to 50% moisture content. It is not necessary for the percentage to be the actual wet to dry percentage. We are interested in the relative moisture content. I generally test along the base board, carpet tack strip, drywall above the base and a grid pattern on the wall. With this information I can plot a moisture topographic map of the wall and the high moisture content will generally indicate the leak location. With this information, look outside at and above this location for a breach of the finish system. After you are satisfied that the leak location has been located, it is a good idea to remove some of the interior finish (drywall) to see the condition of the substrate and framing. This will also allow you to identify the nailing pattern in the location removed for inspection.

When you have tested the wall, in multiple locations, and have found the system to be inadequate you must be able to answer why the system leaked in the first place. Was it the failure of the EIFS, maintenance, the flashing around the doors or windows, or damage from unknown sources that was to blame for the failure. You must be able to pinpoint the extent of the water damage and identify each of the offending parties to have a chance of prevailing in the final liability assessment.

Common Failure Problems

Many subtle deficiencies can cause the system to leak, do not assume anything. Always check, verify and document investigation of your hypotheses. Do not be satisfied with one place or condition to make your case, always have multiple places and conditions to verify it was not a single occurrence and

therefore not representative of the whole building. Some of the most common problems are:

1. *Cracking of the surface* will often be a cause of water intrusion. Was the crack caused by deficient construction or an unknown object propelled into the system? Is the crack similar in many areas of the building? Should the crack have been anticipated? Is the crack due to a lack of proper installation techniques or a lack of design details to guide the subcontractor?

2. *Lack of joint integrity*. Often the joints at a change of direction of the finish, such as an interior corner, is a place for the joint to crack. Aesthetic joints in the finish are also a point of thin finish coat and may cause cracks that will allow water to intrude into the system. In a multistory wall, the accumulation of water at the bottom can be significant, even though each crack only allows a small amount of leakage. The insulation boards must be abutted closely to avoid a crack at the joint of the insulation boards.

3. *Thin finish coat* can be a path of water intrusion. This often occurs when the finish coat is applied too thin in the field of the EIFS. Manufacturer's rarely identify the finish coat as a minimum thickness, but rather the amount of material per square foot. This fails to give the investigator a definitive minimum thickness that constitutes a substandard condition. While the thickness of material can be calculated or a sample system constructed, this is a tenuous position to base your opinion. They will point to the lack of a minimum thickness specification. Your best position then becomes a controlled water leak test, a more difficult and costly test to identify a leaking finish coat. You are then faced with a less conclusive and convincing argument for the leaking finish coat because of the thickness. These defects are rarely found in a convenient place to test, more often they occur in areas that require expensive scaffolding or hoists to get to the potential leak area. You may be faced with trying to figure out where to scaffold to test the potentially leaking thin finish coat.

4. *Detachment* of the insulation of the system is probably the second most likely cause of failure for the EIFS. The insulation is either mechanically, or adhesively attached to the substrate. This is another place that is difficult to properly supervise construction and must be dependent on the worker to provide a proper amount of adhesive or mechanical fasteners for attachment of the insulation. The tell-tale signs of attachment failure is usually after the failure has progressed to catastrophic situation. The question then becomes, was this a typical example of improper attachment or an isolated portion of the building?

5. *Flashing* is probably the number one cause of major water intrusion into buildings. A typical example is the "pan" flashing below the window. This flashing must be a "Z" type flashing. This is not too difficult at the middle portion of the window or door. However, to be effective the ends also must be turned up in a "Z" fashion to provide a dam against water intrusion that occurs through the window system. Fixed glazed windows (see Figure 1) will often use aluminum sections that are not water proof, therefore, these window sections depend on the sill flashing to direct the water to the exterior. If this water escape path is blocked by the exterior finish or sealant, the water will enter the building. Re-caulking the area will not stop the water leak unless all paths of water intrusion are caulked. This includes window to gaskets, gaskets to aluminum, aluminum joints to aluminum joints and aluminum to the wall finish. If this option is selected the aesthetic appearance of the building is seriously compromised and usually will not solve the water intrusion problem. Again it is very dependent of the skill and tenacity of the worker. In this investigation the sill flashing was butted to the finish coat of the system. The area below the flashing is unprotected insulation. Very quickly the differential movement between the finish and the flashing produced a

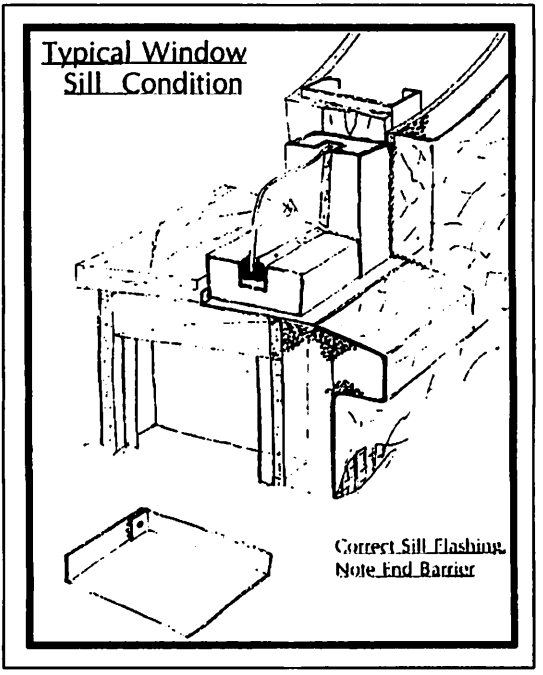

Figure 1
The flashing below the window must be turned up at the ends.

crack that was an opening directly to the interior of the wall. When the joint between the flashing metal and the sill of the window was caulked, the water trying to exit over the "Z" flashing was forced to exit into the wall at the ends of the flashing. This was a common occurrence at all windows and door flashing.

6. *Base and counter flashing* is also a very common place for the system to leak even though it looks sufficient. "Z" flashing at the top of a base flashing for a flat roof will usually cause a leak if not properly handled. Since the bottom of the EIFS is sealed and will not let water escape, it only needs to build up enough water in the insulation to flow over the "Z" flashing, usually about 2". Keep in mind the insulation used for the EIFS is permeable and will leak water easily. This allows the water to flow down through the insulation to a point of blockage, in this case the "Z" flashing at the top of the base flashing above the lobby. The lobby would leak the next day after a hard blowing rain. My investigation showed many places for water to enter the EIFS above the bottom "Z" flashing. The water simply flowed down through the insulation until it was blocked at the bottom. After building up to the height of the "Z" flashing the water simply leaked into the wall cavity and down into the lobby ceiling, usually the day after a rain.

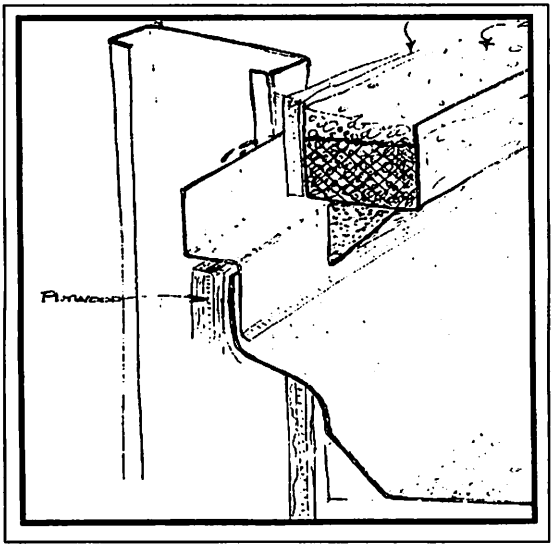

Figure 2
This is a condition of the "Z" flashing above the roof base flashing.

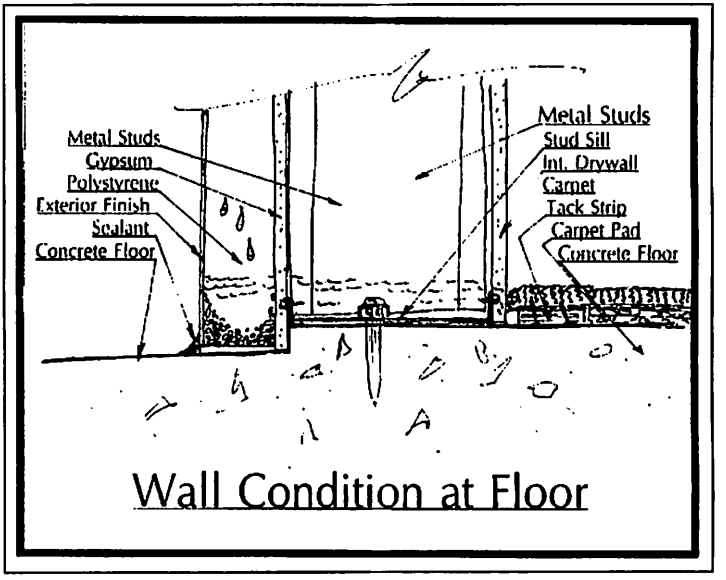

Figure 3
A typical manufacturer specification of sealant from the wall to the floor, causing leakage into the living unit.

7. *Wall to walkway* joint at the bottom of an exterior wall along a common walkway or private balcony is another common place for the water blown against the wall on the open balcony to build up and flow into the living area of the condominium unit. The common detail by the EIFS manufacturer is to wrap the bottom of the insulation board with the reinforcing mesh and seal with the finish material. They then recommend a putting a bead of caulking between the face of the finish wall to the concrete floor. This is to keep water from blowing under the bottom of the wall and into the base of the wall structure. However if water enters the system above this point it will simply drain down to the floor and cannot exit to the exterior because of the sealant to the floor. Therefore the trapped water will be forced to flow toward the inside of the living area. This is a common condition below bedroom windows to the balcony or cracks in the wall above the floor. In this condition the water only needs to build up to the level of the floor to intrude into the living area.

8. *Wall penetrations* are a primary cause of water leakage. This is perhaps the most difficult and prevalent cause of water intrusions. These penetrations include vents, windows, doors and all other penetrations. Typically the workers place an inordinate amount of trust in the sealants on the

market today. Most windows and doors are not flashed properly in anticipation of sealant failure, but rely totally on the sealant for weather tightness. This is the most prevalent cause of water intrusion. The simple solution, it seems, is to re-caulk and paint the exterior. This rarely solves the problems that are already in progress in the building.

9. *Sealants* are extraordinarily good in sealing two materials together. However this seal will be breached long before the useful life of the system has been realized. Without the secondary flashing to provide a backup deterrent, the system will start to leak. This usually starts to happens within two or three years on many buildings. However, if the installers of the remaining portions of the system do not understand the significance of the flashing, they will often "seal" their finish to the flashing or window frame, thereby assuring the system will start to leak very quickly, because the water path to the exterior has been blocked by the sealant.

10. *Detail plans and specifications* Unfortunately most plans produced for the housing and general commercial construction are marginally detailed to meet only the minimum requirements of the local building department. This lack of detail is desired by many developers because they will have a wider range of potential subcontractors to perform the work. The subcontractor that intends to build the project correctly, will usually be "overpriced" and thereby fail to get the work. It is very difficult to hold the less qualified subcontractor liable, because he is usually working on a very low margin and will often be out of business, or operating under a different corporation before the problems are identified.

Remedial Action

When you are asked to evaluate the remedial action necessary you must consider the scope of the problem. Usually there are several different degrees of repair that may be acceptable. While I often define the scope and general rehabilitation required I do not perform the actual design or supervision of the reconstruction.

Sealant is the least expensive method of stopping the water leakage, because it is simply trying to seal the obvious water entrance paths and hope this will be an acceptable solution. Generally this is the least controversial approach and you will not be challenged by the contractors that may have constructed the project wrong in the first place. You must make it clear to your client that this is the least expensive and the least durable solution. And that this may or may not fully solve the problem. More sealant can be added as new problems arise, however this can

become very unsightly as the water intrusion continues. This approach is generally acceptable by the association or owners that have a small reserve or source of funds to completely resolve all the problems. You must make it clear to the client the risk associated with this solution. If you have not fully investigated the extent of the problem, you may be enticed to recommend this solution.

Sealant and Paint is the next level of avoiding the water intrusion problems. This is a very risky solution to a water leakage problem. Generally this solution is proposed by a painting contractor trying to solve a more serious leakage problem. This in my experience is a very dangerous trial solution for a more serious problem. This solution is a favorite for the owner that does not want to spend the required amount of money to fully analyze the reason for the water intrusion. Many times the leakage problem will be in the window and door sill flashing that were not constructed properly in the original construction. If, for instance, the end dam was not provided in the original sill flashing, it cannot be fixed by sealing the edges and painting. This will trap the water that will get into the "wet window" system and now cannot get out. This solution will usually cause further damage that cannot be seen for several years, making the future problem will be much worse.

Removal and reinstallation of new Doors and Windows and all other penetrations and changes in the direction of the finish plane is the proper way to successfully rehabilitate the construction that was not performed correctly in the original construction. This is a very expensive and disruptive approach to solving the leakage problems. If the building is occupied at the time of remodeling, it can be very difficult to perform this level of reconstruction and keep the owners happy. If you work on small parts at a time the cost of rehabilitation will be higher. However, if you perform major amounts of reconstruction at a time it can take a tremendous amount of labor and money. While this is the most positive and sure approach the owners generally will not agree to this at the outset.

Partial Solution can be attempted by performing work only on the parts that have been identified to be a leakage problem. While this will satisfy the most affected owners, the other areas will likely have the same problems caused by inappropriate construction. It is amazing that owners without problems will find similar problems once the rehabilitation has started.

Structural rebuilding can be the most difficult and expensive solution of all the problems associated with a leaking EIFS. Once the wall starts to

leak it can rust metal studs or rot wood structure. The backing for the EIFS is most generally oriented strand board or moisture resistant gypsum board. Either of these structural systems will quickly deteriorate with water leakage. Often the water will enter the EIFS and come our lower in the building or at the ground level. While this may not show up in the units, it can be very detrimental to the structural integrity of the building. If the sheathing or insulation board has not been fastened adequately to meet the wind load requirements of the code, it can be very costly to attach the sheathing or insulation, after the fact, during rehabilitation. Removal and rebuilding of the entire EIFS is the only sure way to fully assure the system has been constructed correctly. This is very time consuming, intrusive and expensive and is rarely selected by the owners. However if you have identified a lack of proper fastening, you cannot assure the building's integrity without massive tests or removal of material.

Remember the construction must be fully investigated and compared to the design documents. The design documents must be compared to applicable code requirements and practical construction considerations. Finally the extent of remedial work required to rehabilitate the structure must be defined. Adequate testing and investigation must be completed to assure the repair will solve the problems identified. The most common solution to serious system defects is to caulk and repaint, this often exacerbates the real problems and makes the ultimate solution much more difficult and expensive in the future.