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EIFS: History and Review of the 'Failure' Mechanisms
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While no one may truly know when stucco was first developed or installed, it is known that stucco type applications where applied as early as 5,000 years ago when the Egyptian's and Meso-American cultures utilized gypsum and lime mortars to surface the exterior stone or block faces of the pyramids. Exterior plaster/stucco applications and advancements in mix developments can also be dated back as far as the Greeks and Romans.

Jumping ahead a few thousand years to the advent of "Portland" cement in the lat 1800's, stucco mixes became a more prevalent building façade material here in the United States due to more durable and versatile characteristics allowing a wider range of applications. From the early 1900's to the present, traditional stucco and stucco like products have become a popular exterior façade that is utilized in just about every major building market in the United States.

EIFS (exterior insulation and finish systems) were invented in Europe after World War II when many advancements in building technology were accelerated in an effort to re-build war torn countries. The fundamental design of EIFS incorporates an insulation layer on the outside wall of a structure to maintain a closer to equilibrium temperature between the building interior and the structure itself. This reduces subsequent differential movement between building components in addition to providing greater energy efficiency. While the original European EIF systems were installed over masonry substrates and primarily consisted of a thicker cement plaster, the development of polystyrene insulation in the 1960's prompted discoveries of polymer modified synthetic plasters resulting in the types of EIF systems on the market today.

Upon the arrival of EIFS to the United States in 1969, EIF systems were marketed primarily to the commercial sector where there is commonly more architectural/engineering involvement, front end design (plans / specification), project oversight and third party quality assurance compared to that of the residential construction project. While there were some small EIFS manufacturers focused on the residential market (primarily Southern suburban and vacation properties) throughout the 1980's, it was not until the fall of the commercial real estate market in 1991, the government's direction of funds into small businesses, and the rapid growing housing market that prompted the large EIFS manufacturers to focus marketing efforts on the residential arena. Nearly exploding overnight, EIFS gained a strong foothold in the residential market throughout the Southern States and elsewhere during the mid 1990's.

As stated by the Exterior Design Institute EIFS 3rd Party Inspector Certification Course Manual, "The year 1996 and Wilmington, North Carolina will go down in EIFS history as the time and location of the epicenter of the EIFS industry's fall from fame." Prompted by complaints, Wilmington jurisdictions began to investigate and examine what were deemed to have been EIFS failures.

Prior to 1996, the EIF systems being installed in the residential market were what is considered in the industry as a "barrier" system; meaning that the EIFS and its interfacing components are 100% responsible for providing the weather proofing characteristics of the façade. In a perfect world this assumption would be fine; however, if you would like reassurance of the non-

perfect world we live in, just visit a construction site. Up until this time, "barrier" EIF systems in the residential market were being installed over common construction building products such as plywood, OSB (oriented strand board), exterior gypboard sheathing and wood stud framing with no secondary line of defense to prevent moisture intrusion into the structure. Therefore, any deficient installation conditions such as improper system terminations, missing and improperly installed sealant joints, missing expansion joints, missing flashing, insufficiently sloped horizontal surfaces, inadequate clearance from grade and other common deficiencies and be possible sources of moisture infiltration behind the system.

With the nationwide scare of what appeared to be failing EIFS in the eyes of the public, EIFS manufacturers re-visited the drawing boards and developed "water managed" EIF systems. Interestingly enough, while traditional stucco systems installed over wood framed structures and sheathing have incorporated a two (2) ply weather resistive building paper behind the stucco and latch for who knows how may years it took the EIFS industry several decades to realize the necessity for having a secondary line of defense. Today, the development of EIF systems has extended beyond just providing a weather resistive barrier over the sheathing, but many also include the incorporation of grooved insulation boards and/or a composite drainage layer to facilitate the release of water from behind the systems.

While most (not all) of the EIF systems on the market today are specified to incorporate some form of a "water managed" design, this does not necessarily mean that a structure is not prone to having moisture intrusion and possible resultant damages such as deterioration and rot of the sheathing and framing, along with the likelihood for an environment that will foster and support mold/biological growth.

The proper detailing of system penetrations and terminations to dissimilar materials, in addition to the presence and incorporation of flashings and sealants are still vital in a successful EIFS installation. The same thing can be said for both traditional and one (1) coat stucco systems in addition to brick and other types of facades.

With the advent of one (1) coat stucco systems and the wide variety of materials and façade components on the market today, it is also not uncommon to see hybrid systems that may incorporate one (1) or more of these stucco or synthetic stucco (EIFS) products and installation methods. These are often location for problems as detailing of the systems may differ from one area to another on a single wall or building.

Analyses of the EIF system's failures are similar to those of a roofing system. How often do you really have a leak occurring in the field of the roof? Under most circumstances, water leads are the result of improper system termination to dissimilar materials (parapet walls, perimeter metal edge, etc.), missing or improperly installed sealants, missing or improperly installed flashings, system terminations such as roof drains, conduit lines, curbs, scupper openings, vents and other miscellaneous penetrations and openings. Sound familiar?

Marc Bitner, Claims Manager with Cunningham Lindsey said, "I can foresee EIFS related claims becoming a significant issue to Colorado's insurance industry in the near future. In the early and mid 1990's EIFS was in wide use by commercial contractors and installed on numerous mall, office and church projects."

No matter the type of system or façade (EIGS, Stucco, Stone, Brick, Siding, Etc.), the performance of that system is dependent on not only the proper installation of the systems, but also the detailing of penetrations, transitions and interfaces with adjacent façade materials or allied exterior building envelope components, Without attention to detail, all façade systems are prone to failure

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