Common Issues and Answers with Stucco in Houston

Stucco homes have become much more popular the last 30 years in the Houston home market. Stucco allows home designers to introduce a variety of architectural home design themes and features into their design portfolio that would otherwise not be available to capture unique home elevations. During this brief history of stucco's increase in popularity in Houston there have been many reports of adverse incidents with stucco systems failing and leading to expensive home repairs. Many of the issues have resulted in collateral damage to the home, principally associated with water intrusion moisture getting trapped behind the stucco and either leaking through windows or rotting the plywood sheathing that exist behind the stucco and structural timber of the homes structure. We are going to examine the different types of stucco systems, the properties of stucco and many of the root causes that are the origin of many of the problems.

The Nature of Stucco

Stucco is product that has been used for exterior cladding for thousands of years. It is a product that is part of the masonry family of construction products. The more modern version of stucco was created using Portland cement as the main ingredient for strength and durability more than a century and a half ago. The name stucco is interchanged with plaster and is commonly used for interior and exterior decorative veneers for both residential and commercial structures.

When stucco is used over stabilized brick, block or stone it can be directly applied as a finish to the surface. When stucco is applied over a wooden structure, it requires to be reinforced with wire lath to avoid stucco cracking when timber members move under loading or thermo changes. The lath is fastened mechanically to the substructure with staples, nails or screws. This is designed to allow the wood to slightly move independently from the lath and stucco system without cracking the monolithic stucco base.

Stucco by its very nature was developed to be a weather resistant material that could stand up to heat, snow, rain and wind. As with most cementitious products, stucco is very porous and allows water to penetrate its surface. It is a breathable material that lets water in and out. The stucco will absorb water and discharge excess amounts without affecting the integrity of system. The issues which we will discuss in detail further on, is when the water gets trapped behind the system and cannot be naturally discharged.

Masonry Stucco System

The masonry stucco system typically consist of a 3 coat system. They are referred to as the scratch coat, the brown coat and the finish coat. The general thickness of the system can vary from 5/8"to 1"in thickness. The scratch coat is a 1/4" application coat that is uniformly applied to lath or a brick/block surface. Before it sets up hard, it then is raked to create a grooved surface, that allows the brown coat to adhere more effectively when cured. It is essential to allow the scratch coat to cure before applying the next coat.

Once the scratch coat has cured, the brown coat is applied. The brown coat is troweled on in a thickness of nearly 1/2"and a screed is used to create a flat uniform surface. This second coat is designed to be level, flat and a smooth finish. This coat can be temperamental in the curing process. The ideal conditions for curing should be mild levels of humidity and warm temperatures. If the weather is dry and hot, the brown coat surface can experience shrinkage cracks from improper curing conditions. Water should be applied during these conditions. During cold and wet weather conditions, curing will take much longer than the 7 to 10 day normal period. Stucco installation like any new masonry work should be avoided if the temperatures are not at least 42 degrees and rising.

The last coat is appropriately called the finish coat. The finish coat is typically about 1/8" in thickness and can be a variety of textures and colors. The finish coat provides the visible appearance of the stucco. The finish can also include elements like sand or other small aggregate to enhance the appearance of the surface.

EFIS Stucco

Exterior Insulation and Finish System stucco (EFIS) also known as Synthetic Stucco was introduced in Europe shortly after WWII during the reconstruction era to save labor and complete construction faster. In the 1970's EFIS was introduced in the United States. Its appeal to builders was to save money on construction cost and to reduce the required amount of labor that is required in 3 coat stucco systems. If installed properly, it is difficult to visually tell the difference between the two systems.

The modern version of EFIS is now a six layer process. It requires a protective membrane over the wood sheathing acting as a water resistant barrier. The Styrofoam is then mechanically attached over the moisture barrier to the plywood substrate. Then a special polymer base coat is applied to the foam and a fiberglass reinforced mesh is embedded in the base coat while wet. The final coat is then applied for both water protection and decorative appearance. The EFIS system does not breath like the traditional stucco system.

The primary property difference between traditional 3 coat stucco and the EFIS system is that unlike conventional stucco, EFIS is designed as a non penetrating surface. The system is designed to keep water from breaching the surface. It is due to the failure of this innate property that the initial EFIS system experienced large scale failures due to water intrusion between the Styrofoam and the structural substrate. The water would work into cracks and poorly prepared joints and sit behind the Styrofoam and rot out the wood members. This was very common with the early systems and led to massive class action law suits.

Waterproofing Stucco

Waterproofing stucco is an essential element of its long term serviceability. As referenced earlier water intrusion is the enemy. If water gets behind the EFIS system it causes the wood to rot. If water continues to get behind the stucco and moisture barrier it can cause the metal lath to deteriorate. The waterproofing is a different process for each of the two systems.

It is best practices to paint your new conventional stucco system with an elastomeric paint. Elastomeric paint is a latex base paint that contains higher quantities of latex and give the paint flexible and stretching properties that most latex paint do not possess. If this paint is installed in the recommended millage, if the stucco experiences slight movement the paint can bridge the stucco from cracking. With conventional stucco it is important to fill hairline cracks that will materialize over time. Unattended to they provide a conduit for water to the lath.

In the case of synthetic stucco, it is required to keep up the maintenance of caulking windows and doors as well as the perimeter of the system to keep water from finding its way in. Routine inspection of flashing and joints is also required. The systems original finish coat holds up well over time and does not require periodic painting.

Stucco Cracks

Stucco cracks can come from various sources. They can result from too little or too much water to Portland cement ratio during the mixing period. They can come from improper stucco curing, improper expansion joint layout and they can result structural movement. The more severe the cause of action, the more severe the crack.

Stucco cracking from improper mixing will often result in spider web cracking or what is known as crazing. These cracks are a result of too wet of mixture, which can lead to stucco weakening in it strength and over hydrating. Long lateral and diagonal hairline cracks in the stucco surface are often the result of not letting the stucco to fully cure before apply an additional coat.

The improper spacing or use of expansion joints can also cause finish stucco to crack over time. As stucco reacts to thermal temperature change, it expands and contracts. As sections of larger amounts of stucco volume move, it causes stress and causes the stucco to natural create unplanned expansion cracks. Stucco is a very durable exterior finish wall system, but much like brick, if the foundation settles or fails, so will the stucco.

Installation Issues

Most of the problems that develop in stucco are a result of installation problems as we have discussed in cracks symptoms. There are a host of additional issues associated with improper installation. We have previously mentioned water intrusion as one of the more serious problems that can result from improper installation. Another common issue is improper moisture protection for wood sheathing. Protecting window openings with proper techniques and covering all exposed lumber is essential in preserving the structure and preventing unwanted consequences.

The lack of improper installation of weep screed can result in moisture being blocked from exiting the stucco system. That also goes for not fastening the lath per specifications, not trimming the lath and metal trim reglets can result poor bonding and cracking. When stucco abuts items like stone or siding normally warrant the proper use of flashing to mitigate water intrusion. Any of these details not followed for best practices of installation can end in the removal and reinstallation at great cost.

Houston Climate and Stucco

There has been much published about stucco not being a sound choice to use as a home cladding product. The product critics point to the wet humid climate not being favorable for any stucco system. They claim that the rain fall, humidity and general climate are conducive for automatically creating mold and rot issues. My contention is that Florida has been using stucco cladding since WWII vets returned. They have a subtropical climate just like Houston and experience similar amounts of rain, temperatures and seasonal weather changes. They have not had the publication of large amount of stucco failures that Houston has been documented having.

We believe that the majority of stucco issues and failures are a direct result of poor workmanship and careless installation procedures. Much like any permanent building product that relies upon the craftsmanship of installation, the success of the products longevity and problem free serviceability is in the details of installation. The devil is in the details not the product. Stucco has hundreds of years of service proven beauty and durability all over the world.