

## The Minnesota Lath and Plaster Bureau Repairing Cracks in Stucco



### Disclaimer:

This guide contains general information on stucco installation and related materials. It is provided as a guide only and is not intended for any specific construction project. The Minnesota Lath and Plaster Bureau makes no express or implied warranty or guarantee of the techniques, construction methods, materials and details identified herein, nor does it assume any liability for the use of this information.

The Minnesota Lath and Plaster Bureau suggests that building owners consult with a stucco professional for the procedure best suited to the circumstances of the repair. It is the sole responsibility of any plastering industry professional to apply their professional knowledge in utilizing the information contained in this publication. These procedures have been determined based upon the current state of the technology as of January 2010.

### Introduction

It may be hard to believe, but a national standard for the repair of cracks in stucco does not exist. The reasons for this are varied:

- Every job has its own characteristics that make it unique in its undertaking.
- Depending on the severity of the cracking, a procedure for one type of repair may not be acceptable in another situation.
- The scope of the repairs are generally dependent upon the economy of cost.
- Repair materials and methods continue to evolve. What might have been acceptable in the past may not be as good as what is available today.
- Local conventions and practices differ by climate. What may be acceptable in a moderate climate such as California may not be acceptable in a severe climate such as Minnesota.

### The Reasons for Cracking

Cracking occurs because stress exceeds the restraint capacity of the stucco. Once this has happened the stress is relieved by splitting/ cracking open of the stucco membrane. Because stucco is exposed and other components of the wall assembly are concealed, the stucco is often blamed for cracking that may in fact be the direct result of problems behind it. Some of these problems that may identify themselves as cracks in stucco are the following:

- Deflection, racking, twisting, cupping, warping and shrinkage of framing.
- Expansion and contraction of wood sheathing.
- Truss uplift from structural loading or wind.
- Structural settling from foundations on unstable soils.
- Thermal expansion and contraction of interfacing materials such as plastic or metals.
- Planes of weakness created by reentrant corners of windows and doors.
- Fast changes in temperature sometimes referred to as "Thermal Shock".
- Abnormal ground vibration.

## **Types of Cracks**

Cracks in stucco fall into these general classifications:

- Shrinkage Cracking – Most common. Sometimes referred to as “craze cracking” it is often times seen in the brown coat, however at times they can show up in the finish coat as well. In appearance shrinkage cracks look much like map cracking except that there usually is only an inch or less of separation between the cracks. Shrinkage cracks are the result of the volumetric change stucco undergoes as it hardens and gains strength.
- Map Cracking – As the name implies, map cracking resembles a roadmap divided into random areas by interconnecting roads. Much less prominent than structural cracking, the stress force is usually derived from differential movement between dimensionally unstable sheathing substrates such as plywood or Oriented Strand Board and the stucco membrane.
- Structural Cracking – Large open cracks that appear to extend across the surface of the stucco. Cracking tends to be directional in nature. Stress caused by a single warped stud could identify itself as a vertical crack along the length of the stud. A deflection crack would be characterized by a long continuous horizontal crack generally at mid height along a wall plane. A reentrant crack would define itself projecting diagonally from the corner of a square penetration such as a window.
- Thermal Cracking – Upon first inspecting a thermal crack, it may be misidentified as a crack induced by blunt force such as a hammer. This is because thermal cracks are usually characterized as partially concentric circles with radial cracks extending out from the center. They are attributed to sudden changes in temperature.

## **The Severity of the Cracks**

According to the Portland Cement Association, “the maximum width of a crack (in plaster) that will neither impair a surface appearance or alarm the viewer is probably in the range of 0.010 to 0.015 in., but wider cracks may be tolerable.” Cracks of this size normally decrease in width as the temperature of the plaster increases or as the newly applied plaster ages.

Visual tests have shown that cracks less than 0.002 of an inch wide in relatively smooth, flat surfaces are rarely noticed. The viewing distance, nature of the surface and prestige of the structure affect objections. At a distance of three feet, a crack as wide as 0.013 inches is not readily noticed if the surface has a moderate texture.

## **Assessing the Wall Areas to be Repaired**

Before any repairs can be attempted the wall area should be assessed as to its condition. Any stucco that is loose, crumbly, bulging or separated from the sheathing should be removed and replaced (see Minnesota Lath and Plaster Bureau recommendations for patching stucco). Close inspection should also be made in these areas of the lath and fastener attachments, the sheathing and framing. Any corrective action necessary should be taken to ensure the integrity of the overall wall assembly.

The stucco should be clean of any dirt, mildew, algae or other substances and residues that may inhibit the bond of any new repair or finish materials. This generally can be accomplished by power washing at approximately 1000 psi, or scrubbing with a solution of trisodium phosphate (TSP), bleach and water. TSP is available at most hardware supply stores. Mix one (1) cup of TSP and one (1) quart of household liquid chlorine

bleach into one gallon of warm water. Wet the affected area with water prior to applying the solution with a bristle brush. Be sure to **rinse thoroughly** with clean water. Multiple applications can be tried if necessary.

In some cases a new acrylic finish coat can be installed over well-adhered acrylic latex painted surfaces. If however the surface is not acrylic latex or it appears chalky, peeling, or has multiple layers of paint, sand blasting or water blasting may be necessary to remove the paint. If one of these methods is employed it is suggested that 90% of the existing paint be removed prior to proceeding with any repairs.

### **Repair Procedures**

Because of the variety of circumstances and severity of cracking scenarios encountered on any repair, the procedures described here are presented in a good, better, best format.

#### **Fine or Hairline Width Cracks:**

##### **Good**

If existing stucco finish is smooth, fine or medium texture, re-dash with fog coat of similar stucco finish or EIFS standard acrylic finish (Dryvit, Senergy, STO, Parex).

##### **Better**

Paint with a compatible vapor permeable acrylic elastomeric paint. Read manufacturer's data sheets to determine vapor transmission characteristics, mil thickness and special instructions. Two coats may be necessary.

##### **Best**

Option 1: Prepare the cracks by brushing on a coat of bonding agent such as Larsen's Weld Crete, TK Products Tri Bond or equal. Mix a brush coat or paste of portland cement stucco (mixed with silica sand) using a solution of half water with half acrylic admixture compatible with the bonding agent (Thoro Acryl 60, Larsen's Acrylic 101, TK 225). Typical mixes by volume include: 1 part portland cement, 1 part masonry cement and 6-10 parts sand. Mix enough of the paste to accommodate the job plus 20% extra for waste. Brush paste into cracks or pack with a putty knife or margin trowel. Remove all excess paste with damp (not wet) sponge from around the affected areas. There should be no visible build-up of the paste material. Allow 7 days curing before fog coat/ re-dashing with EIFS acrylic finish.

Or Option 2 (heavier textures): In lieu of painting or re-dashing with EIFS acrylic finish. Prepare as above except apply brush coat over entire wall area then fog coat /re-dash with like portland cement stucco finish all in the same day.

#### **Fine with Larger Cracks (1/8" or less):**

##### **Good**

Same as "**Best**" procedure for fine or hairline cracks.

### **Better**

Trowel EIFS cementitious acrylic polymer base coat (Dryvit Primus, Senergy Senerflex, STO BTS, Parex 301, 121) approximately 3" on either side of the crack. Embed 5" wide strips of EIFS fiberglass reinforcing mesh into the base coat, bridging the crack equally on both sides. Feather out base coat material evenly. Brown out over entire wall area with base coat and allow to dry for 24 hours or longer if necessary. Install new EIFS finish coat.

### **Best**

Follow "**Option 1 Best**" procedure for Fine and Hairline Cracks (sans the painting or re-dashing with acrylic finish) to fill all large cracks. Then, brown out the entire wall area with a tight layer (approximately 3/8") of acrylic modified portland cement stucco while embedding an alkali resistant, EIFS fiberglass mesh. Mix proportions of dry materials by volume usually include 1 part portland cement, 1 part masonry cement, and 6-10 parts sand. Mixing water proportions – 3 parts water and 1 part liquid acrylic additive (TK Products 225, Acryl 60 or equivalent). Mesh can be obtained from an EIFS supplier in 39" rolls to cover the wall areas. Lap mesh approximately 2.5" at all meeting ends and edges. Allow to cure 7 days prior to installing new stucco finish or EIFS acrylic finish.

### **Extensive Fine Cracking with Larger Cracks and a Few Very Large Cracks (1/8"-1/4")**

#### **Good**

Install new lath fastened to framing supports. Install new stucco approximately 3/8" thick. Mix proportions of dry materials by volume usually include 1 part portland cement, 1 part masonry cement, and 6-10 parts sand. Mixing water proportions – 3 parts water and 1 part liquid acrylic additive (TK Products 225, Acryl 60 or equivalent). Allow to cure for 7 days prior to installing new stucco finish or acrylic EIFS finish.

#### **Better**

Follow "**Option 1 Best**" procedure for Fine and Hairline Cracks (sans the fog coating/ re-dashing with acrylic finish) to fill all large and very large cracks and allow to dry. Trowel EIFS cementitious acrylic polymer base coat (Dryvit Primus, Senergy Senerflex, STO BTS, Parex 301, 121) approximately 3" on either side of the crack. Embed 5" wide strips of EIFS fiberglass reinforcing mesh into the base coat, bridging the crack equally on both sides. Feather out base coat material evenly. Brown out with same EIFS base coat, embedding fiberglass reinforcing mesh over the entire wall area. Lap mesh approximately 2.5" at all meeting ends and edges. Allow to dry for 24 hours or longer if necessary. Install new EIFS finish coat.

#### **Best**

Follow "**Option 1 Best**" procedure for Fine and Hairline Cracks to fill all large and very large cracks (sans the fog coat/ re-dashing with acrylic finish). Trowel EIFS cementitious "**flexible**" acrylic polymer base coat (Dryvit Dryflex, Senergy Xtra-Stop, STO Flexyl, Parex Parflex) approximately 3" on either side of the crack. Embed 5" wide strips of EIFS fiberglass reinforcing mesh into the base coat, bridging the crack equally on both sides. Feather out base coat material evenly. Brown out with same EIFS flexible base coat and embed EIFS fiberglass mesh over entire wall area. Lap mesh approximately 2.5"

at all meeting ends and edges. Allow to dry for 24 hours or longer if necessary. Install new EIFS elastomeric finish coat (Dryvit Weatherlastic, Senergy Senerlastic, STO Silco Flex, Parex 415 Elastomeric Finish).

Note of Caution: The flexible base coats listed above are used in situations where greater water resistance or water proofing is required. Although these materials are very flexible and crack resistant they may also be much less permeable to water vapor. Please check with the manufacturer of these products for specific performance characteristics or limitations.

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