TROWEL TIPS

an aid to the masonry industry

Tuckpointing

Tuckpointing, also termed "repointing" or "pointing" is the replacement of cutout or defective mortar joints with new mortar. There are two basic reasons why tuckpointing may be necessary: (1) leaks through the mortar joints and (2) deterioration of joints. Properly executed, tuckpointing will produce a weather resistant wall and help to preserve the structural integrity and the appearance of the masonry.

If a wall is being repointed to improve its resistance to water penetration, it is recommended that all mortar joints be repointed. Minute cracks that could pass a visual inspection might still allow moisture to pass through the masonry. Before the start of any tuckpointing intended to produce weathertight masonry, a thorough inspection of all flashings, lintels, roofing, sills, and caulked joints should be made. Any defects in these components that may contribute to water penetration of building walls must be corrected.

If it is obvious that water is leaking through only specific cracks or a section of the masonry, it may be sufficient to repoint only the mortar joints in the vicinity of the leakage.

Preparation of Joints

Mortar joints should be cut out to a depth of at least 5/8 in. (16 mm), and in all cases the depth of mortar removed should be at least as great as the thickness of the mortar joint (see Fig. 1). If the mortar is unsound, the joint should be cut deeper until only sound material remains, but not more than 1/2 the total depth of the joint. Shallow (Fig. 2) or furrow-shaped (Fig. 3) joints are not acceptable.

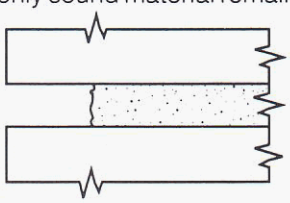

Fig. 1. Properly prepared joint.

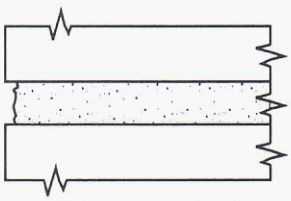

Fig. 2. Improperly prepared joint — too shallow.

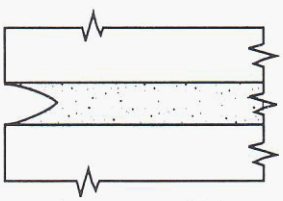

Fig. 3. Improperly prepared joint — furrow should be eliminated.

The method employed to remove mortar should be compatible with the existing masonry. For soft and crumbly mortars, a hooked mortar rake may be quite efficient. Where mortar is harder, a hammer and plugging chisel or a power grinder may be required. A grinder with an abrasive blade is usually more efficient than hand chiseling for cutting out defective mortar, but requires intense concentration and control to avoid damaging the units. All loose particles must be removed from the joint. An air jet or a water stream is effective for that purpose.

The joints should be dampened to reduce absorption of water from the freshly placed mortar. However, free standing water on the joint or unit surfaces will impair bond. Avoid extensive wetting of concrete masonry units before or during tuckpointing, since saturated concrete masonry units shrink as they dry.

Mortar Ingredients

Foremost among the factors that contribute to good mortar is the quality of the mortar ingredients. The following material specifications of the American Society for Testing and Materials (ASTM) or the Canadian Standards Association (CSA) are applicable:

- Masonry cement - ASTM C91 (Type N), CSA A8 CAN/CSA-A8-M
- Portland cement - ASTM C150 (Types I, IA, II, IIA, III,or IIIA), CAN/CSA-A5-M (Type 10 Normal)
- Blended hydraulic cement - ASTM C595 [Types IS, IS-A, IP, IP-A, I(PM), or I(PM)-A], CAN/CSA-A362-M (Type 10S)
- Hydrated lime for masonry purposes - ASTM C207 (Types S, SA, N, or NA)*
- Quicklime for structural uses (for making lime putty) - ASTM C5
- Sand - ASTM C144, CSA Standard A82.56M

For mortar joints that are less than the conventional 3/8 in. (10 mm) in thickness, 100% of the sand should pass the No. 8 (2.5 mm) sieve and 95% the No. 16 (1.25 mm) sieve.

If only portions of a wall are repointed, the color and texture of new mortar should closely match that of the old mortar by careful selection and proportioning of mortar ingredients. Admixtures should not be used unless specified.

Preparation of Mortar

Tuckpointing mortar should have a compressive strength equal to or less than that of the original mortar or should contain approximately the same proportions of ingredients as the original mortar. Recommended mortar types are shown in Table 1. Masonry applications with structural concerns or severe frost or environmental exposure (such as

* Types N and NA lime may be used only if tests or performance records show that these limes are not detrimental to the soundness of mortar.

Table 1. Tuckpointing Mortar (Vertical Surfaces)

	Mortar type (ASTM C270)*	
Type of service	**Recommended**	**Alternative**
Interior	O	N or K**
Exterior, above grade, and exposed on one side. Unlikely to be frozen when saturated, and not exposed to high wind or significant lateral load.	O	N or K
Exterior, other than above	N	O† or mortar type based on structural or durability concerns

*Structural concerns dictating mortar type supercede these mortar recommendations. For pavements, mortar Types M or S with applicable frost resistance should be considered. Some air entrainment improves freeze-thaw durability.

**Type K mortar consists of 1 part portland cement, 2 1/2 to 4 parts hydrated lime, with a sand content of 2 1/4 to 3 times the sum of the volumes of cement and lime.

†Type O mortar is recommended for use where the masonry is above ground and is unlikely to be frozen when saturated or unlikely to be subjected to high winds or other significant lateral loads. Type N or other appropriate mortar should be used in other cases.

Adapted from ASTM C270.

horizontal surfaces exposed to weathering) may require the use of special mortars other than those shown in Table 1.

A recommended procedure for mixing tuckpointing mortar is: (1) thoroughly mix all of the dry ingredients; (2) mix in about half the water or enough water to produce a damp mix which will retain its shape when formed into a ball by hand; (3) mix the mortar for about 3 to 7 minutes, preferably with a mechanical mixer; (4) allow the mortar to stand for one hour for prehydration of the cementitious materials to reduce shrinkage; and then (5) add the remaining water and mix for 3 to 5 minutes.

Tuckpointing mortar should have a drier consistency than conventional mortar for laying masonry units. Retemper as needed; however, the mortar should be discarded approximately 2 ½ hours after the initial addition of water to the mix. Colored mortars may lighten upon the addition of water; therefore, retempering of colored mortar should be conducted with caution.

Filling the Mortar Joints

The general method of applying mortar in joints is to use a hawk and a tuckpointing trowel. The hawk is used to hold a supply of mortar; it also catches mortar droppings if held adjacent to the wall just below the joint that is being filled.

The pointing trowel should be slightly narrower than the mortar joints that are being filled in order to obtain a proper degree of compaction. If the trowel does not fit into the joints, it will be more difficult to obtain thoroughly compacted and completely filled joints.

Mortar should be spread into a joint in layers and firmly pressed to form a fully packed joint (see Fig. 4). Firm compaction is necessary to prevent voids as shown in Fig. 5. The act of firmly compacting the mortar also helps ensure bond to masonry units and to the old mortar. Voids are undesirable because they may trap water which can freeze and damage the new joint.

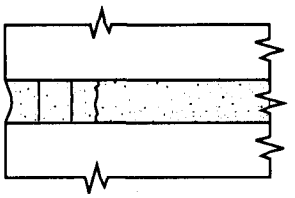

Fig. 4. Properly filled joint - pointing mortar compacted in layers.

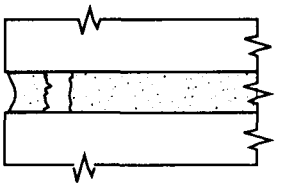

Fig. 5. Improperly filled joint - contains voids.

Tooling Mortar Joints

Tooling compacts the mortar to a dense surface with good durability. For weathertight construction, all mortar joints should be tooled to a concave or V shape. These shapes are recommended because they do not allow water to rest on the joint and they result in the mortar being pressed against both lower and upper masonry units. This reduces weathering and helps ensure maximum bond between the mortar and the masonry units.

Beaded, raked, flush, struck, and weathered joints can be used for decorative effects, but are not recommended for maximum weathertightness and durability. They can be satisfactorily used for interior work and for exterior work when the masonry is protected from the elements or located in climates that do not impose extremely low temperature or water saturation.

Curing and Cleaning

The cementitious materials in mortar require moisture to develop proper strength. The mixing water in the mortar will usually provide this necessary moisture. However, freshly placed mortar should be protected from the sun and drying winds. With severe drying conditions, it may be necessary to cover the masonry structure with plastic sheeting or use a fine water-fog spray on clay masonry for about 4 days to reduce evaporation of water from the mortar.

If repointing work is carefully executed, there will be little excess mortar to clean from the walls. Remove most mortar particles with a soft bristle brush after the mortar has dried but not hardened. Any hardened mortar that remains can be scraped off with a piece of a similar masonry unit or a wooden paddle. After the mortar has cured, additional cleaning may be performed with water and a stiff brush, if needed. Cleaning with acid solutions or masonry cleaning solutions should be used only as a last resort and with extreme caution. Improper cleaning can quickly destroy the benifits sought by performing the tuckpointing.

Portland Cement Association, 5420 Old Orchard Road, Skokie, IL 60077

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