

TECHNICAL BULLETIN 3

MORTAR JOINT REMOVAL



INTRODUCTION

This bulletin is intended to aid with inspections and problem-solving techniques with respect to the removal of mortar from joints in masonry facades. This bulletin should be used as a guideline for procedures utilized in the removal of defective mortar.

The intent of any mortar removal technique is to adequately remove the existing mortar to the specified depth without damaging the surrounding substrate.

APPLICATION

CONSIDERATIONS/PROCEDURES

1. Joint Assessment

Joint Assessment consists of carefully removing defective or inappropriate mortar from between masonry units. Defective mortar is generally defined as mortar that has shelled, cracked or eroded more than 1/4 inch from its original weathering face, or de-bonded from the adjacent masonry. Inappropriate mortar is generally defined as mortar that is: 1) technically incorrect (high in portland cement) or 2) aesthetically incorrect (off-colored, or tooled in an unacceptable manner). Efforts to remove defective and inappropriate mortar will vary and must be appropriate to prevent damage to adjacent masonry units

It is generally accepted that existing mortar should be removed to a minimum depth equal to 2-2 1/2 times the width of the joint to ensure that adequate bond of the repointing mortar can be achieved. For most brick joints, this will require removal of the mortar to a depth of approximately 5/8 inch to 1 inch. For irregular or wide stone joints, several inches of mortar removal may be required. If loose or defective mortar exists beyond the minimum required depth, the joint material must be removed until solid/sound mortar is reached.

2. Methods of mortar removal

There are generally two accepted methods for the removal of mortar:

1) impact removal (chisels) and 2) mechanical abrasion (grinders). In some scenarios, it may be required to use multiple methods of removal (for example – a very hard mortar can be center cut with a thin diamond blade in the center of the joint, afterwards the joint is then removed with flat chisels by collapsing the mortar into the void created by the center cut.

A. Hand tools

The oldest and most traditional manner of removing mortar is through the use of masonry chisels and hammers. Though labor intensive, this method, in the hands of a skilled craftsperson, may pose the least threat of damage to masonry units. The width of the chisel should not exceed three quarters of the width of the mortar joint. The “swept cape” chisel is used most commonly, as its design prevents it from becoming lodged in the mortar joint.

B. Pneumatic chisels

The advent of air-assisted (pneumatic) chisels has increased the potential productivity of the impact method in the hands of an experienced craftsperson. The pneumatic assist must provide 360-degree rotation of the chisel and throttle control. The use of standard chipping hammers for the purpose of removing mortar is more difficult and potentially more damaging due to lack of control.

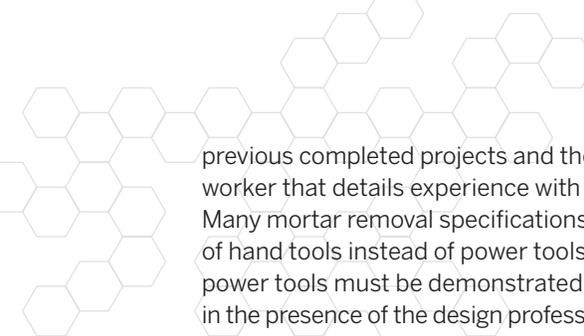
C. Power grinders

The most common method for the removal of mortar is through the use of power grinders, both electric and air-powered. In the hands of a skilled and experienced craftsperson the power grinder can dramatically improve the productivity of the mortar removal operation and likewise provide a superior joint to receive the pointing mortar. However, in the hands of the inexperienced and unskilled worker, the power grinder can be the most damaging method for joint removal. The use of power grinders on masonry joints can result in damage to the masonry by over-grinding into the units themselves, most commonly at the head or vertical joint. Damage to the masonry units not only affects the aesthetics of the wall but can decrease the wall's ability to resist weathering and moisture penetration.

3. Considerations for choosing a removal method

The decision to use power tools must include the skill and experience level of the workers, proper choice of the type of tool with respect to the type and condition of the mortar joints (hardness) and the environmental impact of the atmospheric contaminants created by the operation.

A. Skill and experience level of the worker Generally a level of expertise must be shown by examples of



previous completed projects and the resume of each worker that details experience with similar projects. Many mortar removal specifications call for the use of hand tools instead of power tools. The ability to use power tools must be demonstrated by "mock-ups" in the presence of the design professionals and/or the building owner's representative. The standard achieved must be monitored and used as a guideline by which the operation is judged throughout the project.

- B. Proper choice of the removal tools such as die/pin grinders, reciprocating cutters, etc. It is important to match the equipment to the type and hardness of the material being removed.

The most commonly used tool is a 4.5 inch grinder with a 4.5 inch masonry diamond blade. To accommodate site conditions different size and types of blades can be used including specialty blades. Composite blades have a low initial cost but are generally not effective for significant mortar removal.

Diamond tipped blades retain their cutting ability without changing the dimensions of the cutting blade. When the shape of the blade and the strength of adhered abrasive is properly matched to the hardness of the mortar, the result is the maximization of the blade life and productivity.

Although grinders are used to remove the majority of the horizontal mortar joint material, other tools should be used to complete mortar removal. The following tools should be used to address head joints, unusual joint configurations and difficult to access joints; routers, plunge saws, reciprocating saw and oscillating cutters

The grinding of joints wider than 1/2 inch generally requires the use of specialty blades including sandwich blades.

4 Environmental impact

Consideration must be given to the Impact that grinding mortar joints have on the health and safety of the workers and the environment of the surrounding project site. Workers must wear and be properly trained in the use of respirators and other personal protective equipment, such as face shields, eye and hearing protection. It is also incumbent on the contractor to ensure that pedestrians and building occupants are protected from the dust created by the operation. Protective tarping and mesh have proven to be effective in controlling the dust to the work area directly. The use of vacuum attachments to the equipment housing is also effective in collecting dust. Some attachments prevent workers from having a clear view of the mortar joint and should not be used. from the Sealant, Waterproofing & Restoration Institute

SWR Institute *Applicator*, a technical journal Applying Liquid Sealants: An Applicator Training Program Below Grade Waterproofing Manual Clear Water Repellent Handbook A Practical Guide to Waterproofing Exterior Walls Sealants: The Professional's Guide

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