Bar bending & concreting

LEVEL II

Learning Guide-25

Unit of Competence: Prepare for stone masonry Construction process

Module Title: Preparing for stone masonry Construction process

LG Code: EIS BBC2 MO7 LO4-LG-25

TTLM Code: EIS BBC2 TTLM 0919v1

LO 4: Assist with stonemasonry work

Instruction Sheet	Learning Guide #25

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- checking Selected stone visually to ensure it meets specifications,
- Brushing, scraping and washing surplus mortar from stonemasonry

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, **upon completion of this Learning Guide, you will be able to**:

- check Selected stone visually to ensure it meets specifications,
- Brush, scrap and wash surplus mortar from stonemasonry

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 3 to 7.
3. Read the information written for each “Information Sheets given below
4. Accomplish the “Self-check after reading & understanding of each information sheet
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet
6. Lastly do the “LAP test

If you have any question ask your teacher

Informationsheet-1	Checking Selected stone visually to ensure it meets specifications

4.1. **Checking Selected stone visually to ensure it meets specifications,**

- Introduction

Stone Selection Options architects and builders throughout the ages have chosen stone for its remanences and beauty. Where selection was once limited mainly to what was locally available, today's stone marketplace is virtually worldwide. With the broad and growing array of options, the stone selection process has become more complex under the weight of multiple considerations.

Selection Influencers. While any number of stipulations may direct selection of a particular stone for a specific application, there are several significant influencing factors. Among them are aesthetics, color, strength, durability, design, texture, finish, size, thickness, availability, stone testing, stone sampling, and cost. The effects any of these factors may have on another can influence the final choice. But aesthetic considerations nearly always drive the selection process.

- **Selection Criteria.**

The fact that interior stone is sheltered from the action of the elements makes all types of stone, from the hardest granite to the softest limestone, suitable for application. Criteria for the selection of interior stone for both commercial and residential projects tend to be similar. Selection considerations focus on whether the application will be on vertical or horizontal planes.

There is no specific criteria for selecting a natural stone(s) for construction projects. In fact, it is a mix of several factors that should be considered while selecting a natural stone for construction, architectural designing and landscaping projects. These are summed up below:

- **Type of Application**: Exterior or interior application.
- **Type of Installation**: Wall cladding, countertop, backsplash, featured walls, flooring or paving. Also, stone articles like statues, lamps and fountains for garden, backyard and front yard decoration.
- **Aesthetic features**: In terms of color palettes and veining/wavy patterns on the surface of the stone.

Personal choice in the context of the way you want to complement the decor of the space with a particular stone or choosing the one that best matches with your interiors or exteriors.

- Budget of the project. (Price of the stone and its installation cost).
- Maintenance requirement of the stone:

Functionality of the stone in terms of strength, durability, resistance to extreme temperatures, conditions and ability to withstand harsh weather conditions. Weight bearing capacity and response to natural weathering are other factors to be considered.

Fig 1 Images for visual selection

Being hard, durable and naturally **good looking**, stones are often used in construction but keeping in view the variable properties of stones of different types, there must be some criteria for the selection of stones for construction.

- **The criteria is based upon the following parameters**:

  ✓ **Chemical composition of stones:**

Using/selecting a stone for construction, its chemical properties and composition must be tested and verified because different elements and compounds in stones have different properties. For instance, Magnesium in Limestone causes it to be stronger and is called **Dolomite**. Feldspar, in large quantities in stone is a source of weakness because CO2 dissolves Potassium, Sodium, and even Calcium in the Feldspar leaving pure white clay behind.

Presence of Mica, even less than 2-3% makes stone unsuitable for building purposes. Stones with silicates as cementing materials are resistant to weathering.

✓ **Strength and hardness:**

The more compact grained and heavier a stone, the stronger it is. A crystalline stone is superior to a non-crystalline texture.

Stones used for road metal, paving blocks, floor slabs and railway ballast have to withstand mainly abrasion or wear and tear. Stone wall subjected to vibrations of machinery and moving loads should necessarily possess toughness. Strength and hardness itself depend on some factors:

- ✓ **Resistance to heat:**

Resistance to heat means that the stone must have a very low amount of expansion due to large increase in temperature. Siliceous materials are good at areas where resistance to fire is required.

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- ✓ **Appearance:**

The aesthetic aspect that is color, appearance and show of stones must also be considered when being used in a project. Appearance depends on the color and the ease with which the stone can be dressed, rubbed or polished.

Self-Check 1	**Multiple Choice item**

Directions: Select the correct answer and encircle the letter of your choice.

1. Selecting natural stone visually is dependent on the following parameters:

A. Type of Application

B Type of Installation

C. Aesthetic features

D. All are correct

2. Stone appearance depends on the following criteria.

A. Ease to be dressed

B. Color

C. Can be easily rubbed or polished.

D. All are correct

3. Among the following one is not stone selection criteria:

A. Aesthetics, color

B. Strength, durability

C. Availability,

D. None

Note: **Satisfactory rating – 2 points Unsatisfactory - below 2 points**

Answer Sheet

Score = _____

Rating: _____

Informationsheet-2	Brushing, scraping and washing surplus mortar from stonemasonry

4.2. Brushing, scraping and washing surplus mortar from stonemasonry

Cut out any defective mortar in exposed masonry and tuck point with mortar. Dry clean the wall first, removing blobs of mortar with a wooden paddle, a brick, a trowel or a metal hoe.

- **How to Clean Mortar Off stone tool is used, metal colors or surface**

Dried-on mortar over the face of brick is unsightly and can ruin the appearance of a wall. The easiest way to have clean bricks is to prevent mortar splatter during wall construction, but you can also chisel off the mortar once it's dried. For mortar that you can't remove regardless of what you do, using muriatic acid to remove the stubborn mortar may be a good solution. Irrespective of your situation, it's important that you follow the correct procedures and take safety precautions when cleaning mortar off of stone /brick

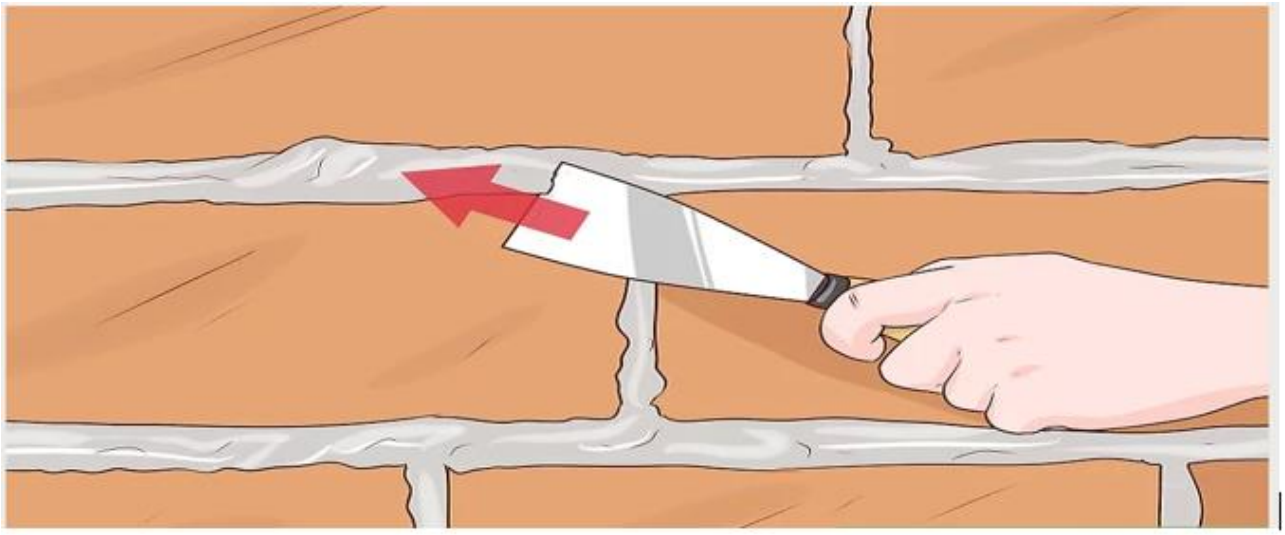


Fig 1.Cleaning of wet mortar

Step 1. Use the edge of a trowel to even out the mortar with the wall face. Use a forward lifting and rolling motion with the short edge of your trowel to even out the mortar with the face of the brick. Continue to do this as you lay new bricks to prevent mortar from bunching up and creating large chunks on the bricks.

You can also use a large, clean sponge to even out the mortar with the face of the bricks.

Fig 2. Rub off remaining mortar

Step 2. Rub off remaining mortar dust with a medium-soft bristle brush. The goal is to brush away dust on the face of your brick rather than wiping the mortar dust deeper into the brick. Avoid pressing down on the brush and wipe away from the surface of the brick. Use a back and forth motion until the mortar dust on the face of your wall is removed

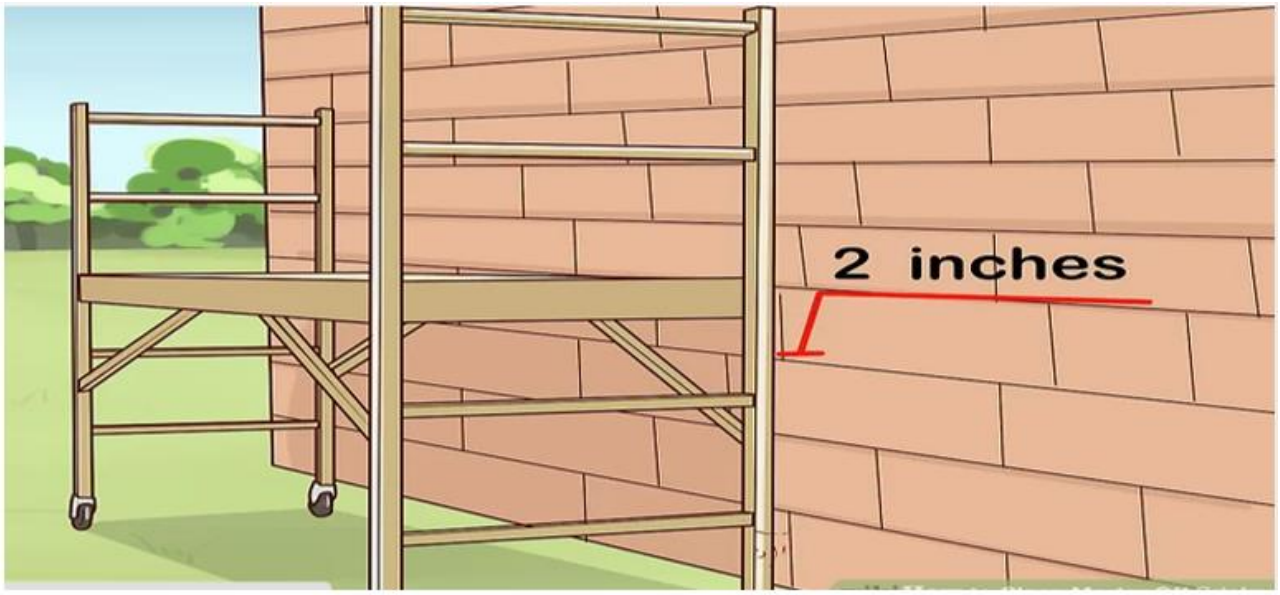


Fig 3. Set up a scaffold

Step 3. Set up a scaffold 2 inches (5.08cm) from the wall to prevent mortar splatter. A scaffold should be set up 2 inches (5.08cm) from the wall to prevent mortar splatter at the base of your wall. Scaffold boards that are closest to the wall should be angled away and slightly downward from the wall.

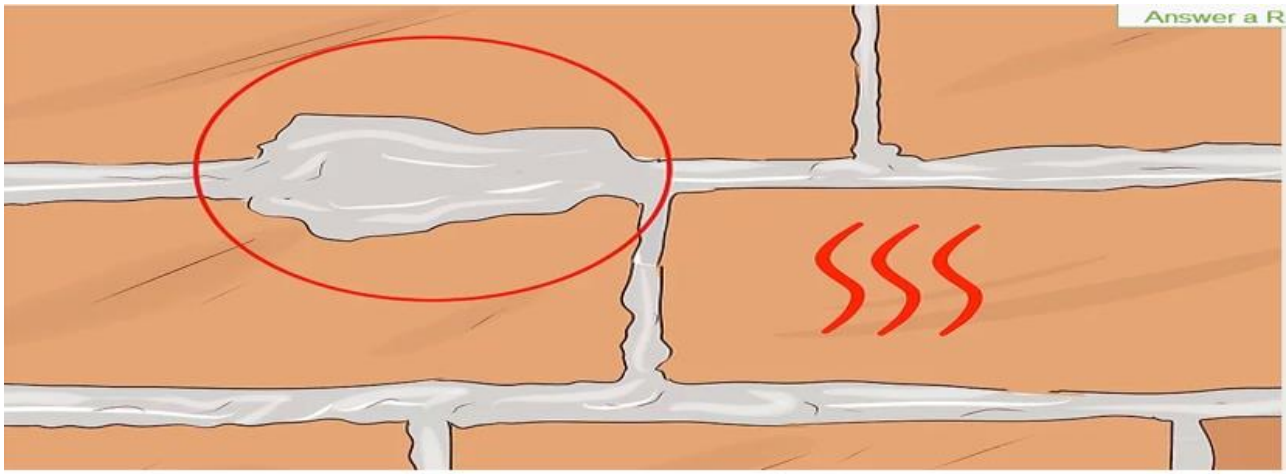


Fig 4 Allow larger clumps of mortar

Step 4. Allow larger clumps of mortar to dry before removing them. If you take all of these precautionary measures, but large clumps of mortar still end up on your wall, you should allow them to dry and then attempt to remove them using the chisel or acid method.

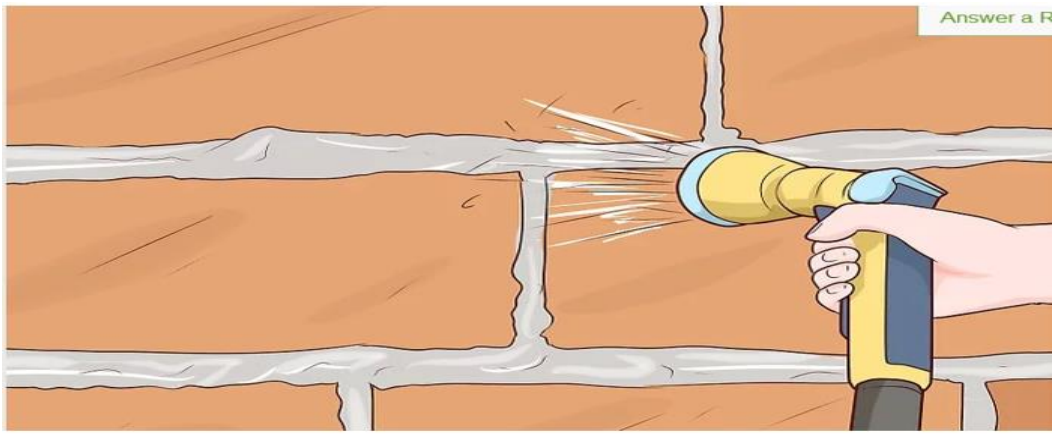


Fig 5 wetting stone/brick

Step 5. Wet down the stone/brick with a garden hose. Ensure that the mortar has had at least 7 days to dry before trying to remove the dried on mortar. Saturating the wall with water before you chisel will make removing the mortar easier and can protect your bricks from being damaged. Fully saturate the brick before you start working with a garden hose or with buckets of water.

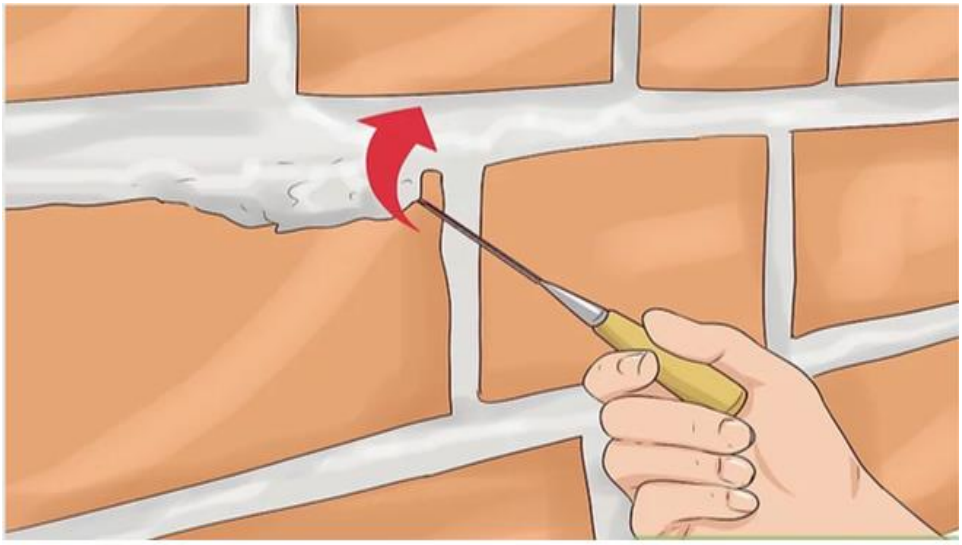


Fig 5. Taping the chisel

Step 6. Tap the chisel parallel to the brick to remove excess mortar. Hold the chisel at a 20° to 30° angle against the face of your wall on areas that have built-up mortar. Lightly tap on the end of the chisel and start to break the dried up mortar from off the wall. Start from the top and work your way to the bottom. Continue to work slowly and carefully until most of the mortar is removed from the wall.

Break up larger pieces of mortar into smaller more manageable pieces instead of trying to remove it all at once.

Lime mortar is easier to remove than cement based mortar using this method

Fig 6. Wipe off excess mortar

Step 7. Wipe off excess mortar with a hard wire brush. Go in a back and forth motion over the face of the unit to remove any broken up mortar dust. Try to scrape off any stubborn mortar that wasn't removed from chiseling. Do not spend too much time in one area or you may discolor the stone/brick in that area.

Step 8. Wait for mortar to set up before commencing cleaning. While industry standards generally require masonry to be 7 days old before cleaning, it is possible to start cleaning operations with chemicals 24 hours after completion of masonry work provided the mortar has hardened. However, if after cleaning commences the mortar paste in the joints begins to wash out, then cleaning should be stopped for several more days. For best results, cleaning should be carried out within 30 days after work is completed.

A masonry helper assists a mason who might be working with stone, brick, or tile. They would assist the mason to carry the tools and materials needed for the job and set the location up for the project. They might even help with the mortar and then assist with the site clean-up at the end of each day

Different types of stone brushing tools

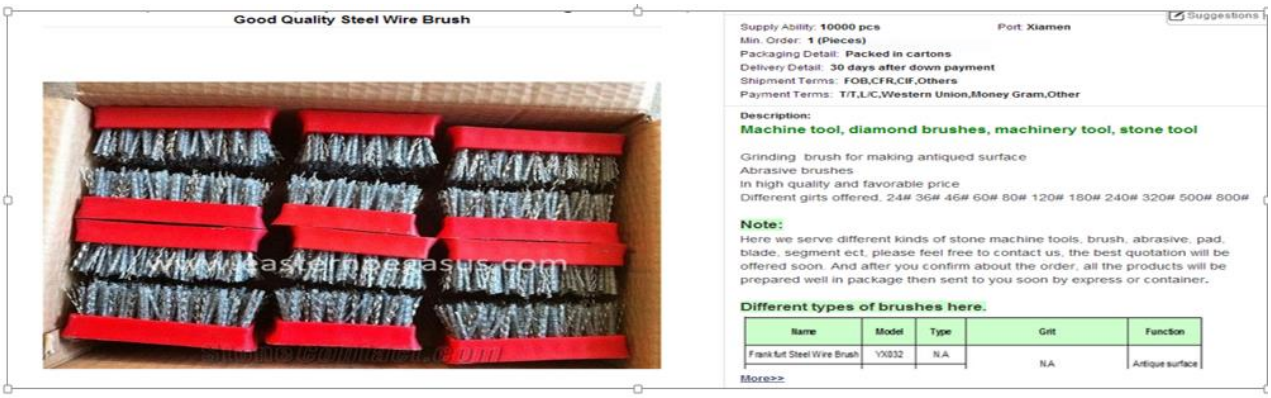


Figure 7. Brushing and scraping tools

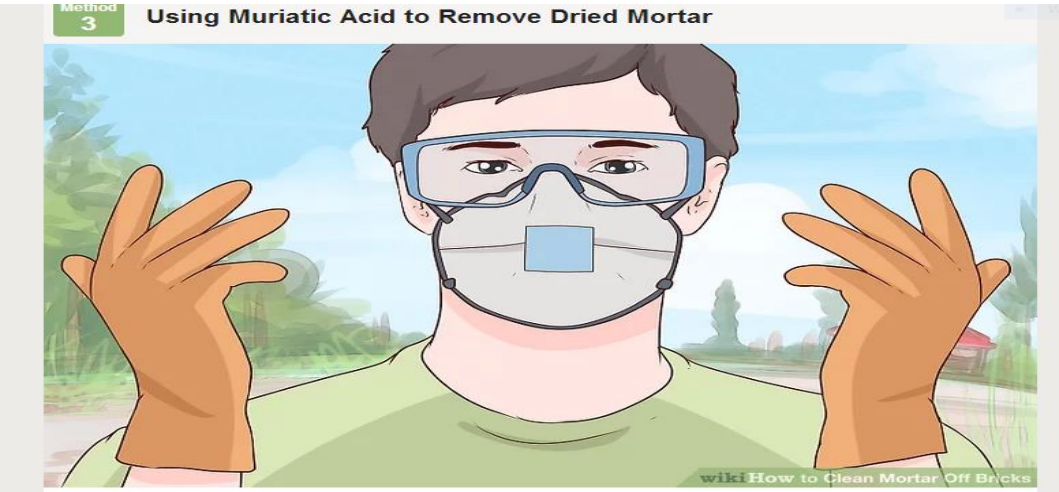
Images for Brushing, scraping and washing surplus ...

Fig 8.

One of the great things about doing masonry work apart from the pleasure of seeing a fantastic job well done is in that masonry tools and masonry materials are basic, inexpensive, and easy to understand and work with. Masonry work requires tools for various purposes i.e. handling of mortar, for dressing of stone, for cutting of bricks to get required shape etc. As it goes with

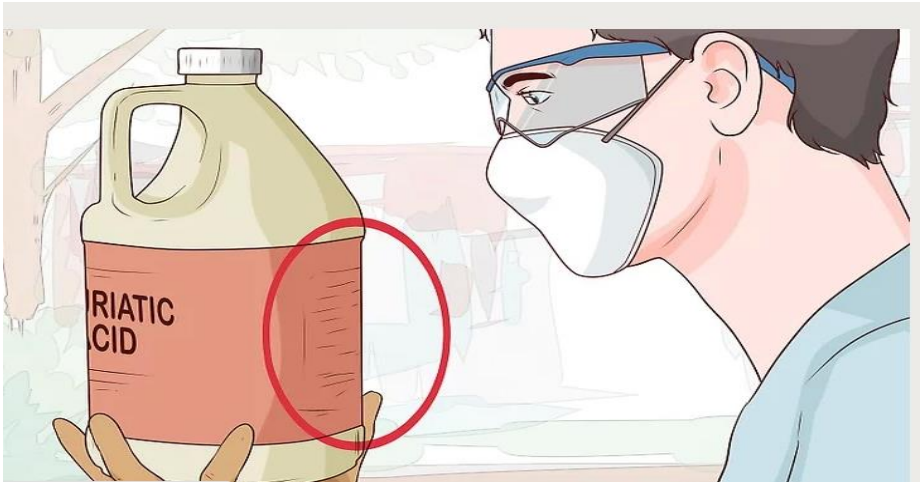
traditions in existence since the days of the Ancient Indian and Egypt, masonry deals with some common elements as crushed stones from the earth and simple metal tools.

- **Cleaning Using Chemicals**



Stp1. Wear the proper safety equipment. Muriatic acid is very toxic and caustic, so it's important that you follow the proper safety precautions when using it. Wear acid-proof gloves, goggles, closed-toe shoes, protective clothing, and a NIOSH-approved respirator equipped with the appropriate acid-grade filter when working with acid. You can find this safety equipment at the hardware store or online. Lay plastic sheets down at the base of the wall to act as drop cloths for the acid.

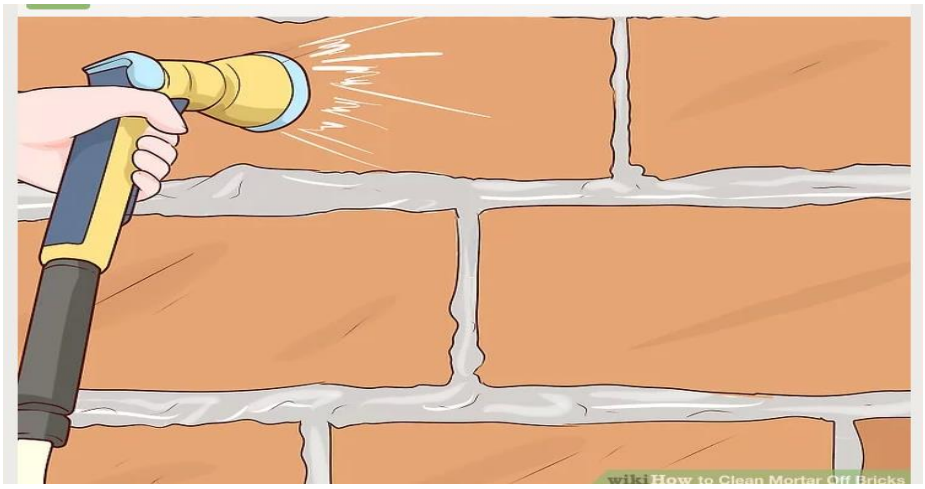
Keep a box of baking soda around to pour it on yourself if acid splashes onto your skin. Caustic chemicals from the muriatic acid could cause chemical burns.



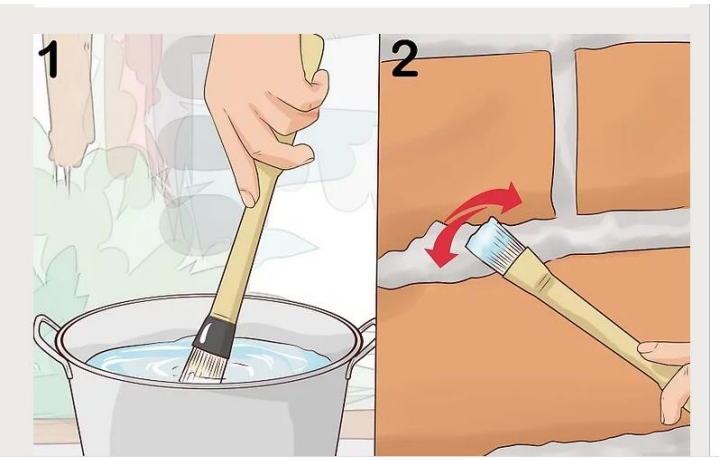
Step 2. Read the instructions on the back of the acid. Read the information and warnings provided with the product that you've purchased. Follow the dilution amounts and process on the back of the packaging. Typically, you'll want to create a solution that is one part muriatic acid to nine parts water. Never mix muriatic acid with other chemicals

Do not use acid for lightly colored or cream-colored bricks. The acid can discolor them and weaken their joints.

Step 3. Dilute the muriatic acid. Fill an acid-resistant bucket up with water first, then add the muriatic acid. This will prevent splash back which could potentially spray acid onto you.



Step 4. Wet down the stone/brick with water. Before you apply the acid to the wall, it's important that it's fully saturated with water. Applying the muriatic acid directly on a dry stne/ brick may damage your wall.



Step 5. Apply the acid with an acid-resistant brush. Purchase an acid resistant brush online so that the bristles don't disintegrate while you apply it to the brick. Dip the brush into the acid solution that you created and apply it in a layer over a small portion of the brick that you want to clean. Apply the acid in a small area to make sure that there isn't an adverse reaction with the brick in your wall.[9]

Step 6. Let the acid sit for five minutes. Allow the acid to soak into the mortar on the bricks and break it down. If the acid is working, it will start to bubble and fizz when it comes into contact with the mortar. Do not let the acid fully dry on the brick or it could damage them.

If you notice that there is discoloration on the brick, stop using the acid.

Step 7. Scrub the mortar away with a brush. Use a medium bristle brush and scrub the face of the brick/stone vigorously. Avoid scrubbing in the joints of the brick or you may weaken the mortar that holds the brick in place. Scrape the sludge that's created from the mortar and acid onto your drop cloth. Continue to scrub until all of the dried on mortar is removed.7.

Step 8. Rinse the acid off with several gallons of water. As you work, make sure that none of the acid dries to the brick/stone. Dried acid can weaken the brick and discolor it. Always keep a garden hose or a bucket filled with water close by and rinse away the acid after you're done scrubbing away the mortar.

Once the acid is thoroughly washed away, store the leftover acid somewhere that children and pets won't be able to reach it.

Self-Check -1	**Multiple Choice item**

Directions: Select the correct answer and encircle the letter of your choice.

1. Which one of the following tools is used to clean stone surface?

A. Brush C. Steel Brush

B. Broom D. All are correct

2. A masonry helper assists a mason who might be working with :

A. Stone C. Tile

B. Brick D. All

3. One of the following tool is used to cut mortar :

A. Spade C. Float

B. Trowel D. All

4. What is the criteria for the selection of stones for construction?

A. chemical composition C. Resistance to heat

B. Strength and hardness D. Appearance E. All

5. Among the following, one is not cleaning tool.

A. Spade C. Trowel

B. Shovel D. None of the above

Note: **Satisfactory rating - 2.5 points Unsatisfactory - below -2.5 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Operation Sheet- 1 Brush, scrap and wash surplus mortar from stonemasonry
Procedure to Brush, scrap and wash surplus mortar from stonemasonry Step 1. Use the edge of a trowel to even out the mortar with the wall face Step 2. Rub off remaining mortar dust with a medium-soft bristle brush Step 3. Set up a scaffold 2 inches (5.08cm) from the wall to prevent mortar splatter Step 4. Allow larger clumps of mortar to dry before removing them Step 5. Wet down the stone/brick with a garden hose Step 6. Tap the chisel parallel to the brick to remove excess mortar Step 7. Wipe off excess mortar with a hard wire brush Step.8.Wait for mortar to set up before commencing cleaning

LAP Test	**Practical Demonstration**

Name: _____

Date: _____

Time started: _____

Time finished: _____

Instruction I: Given necessary templates, tools and materials you are required to perform the following tasks within.8 hours.

Task 2: Brush, scrap and wash surplus mortar from stonemasonry

Reference

- Different website like the contractor civil engineering .com
- Internet
- Christian Meuli Karl Wehrle Heini Müller Heini Pfiffner Volume 3

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