

Stone masonry

Introduction

The construction of stone brick or tile which is hardened by heat is termed as masonry, It may also be defined as construction of building units bounded together with mortar. The selection of the type of material (i.e. brick or stone etc) for the masonry is made keeping in view the requirement of strength, water proofing, thermal insulation ,fire resistance ,durability and economy.

Depending upon the types of material used, masonry can be broadly divided in the following categories.

1. Stone masonry
2. Brick masonry
3. Reinforced brick masonry
4. Composite masonry
5. Hollow concrete block masonry
6. Load bearing wall tile masonry

History

Stonemasonry is one of the earliest trades in civilization's history. They used these to fashion homes for themselves with mud, straw, or stone, and masonry was born

The Ancients heavily relied on the stonemason to build the most impressive and long lasting monuments to their civilizations. The Egyptians built their pyramids, the civilizations of Central America had their step pyramids, the Persians their palaces, the Greeks their temples, and the Romans their public works and wonders (See Roman Architecture).



Bavarian stonemasons, c. 1505

People of Inca civilization were masters of the polished **dry-stone walls**, called ashlar, where blocks of stone were cut to fit together tightly without any mortar. The Incas were among the best stone masons the world has ever seen and many junctions in their masonry were so perfect that even blades of grass could not fit between the stones.



Dry-stone walls of Machu Picchu Temple of the Sun, Peru

From times immemorial, stone has been used for both residential as well as public buildings. Historical buildings that stand today are the living examples of the strength, durability and the excellent weather resisting qualities of stone masonry. Brick on the other hand has much less strength, durability and weather resisting qualities.



Great wall of china



Red fort, Delhi

Technical terms used in masonry

Some terms used in masonry which are as following

1. Header

It is the full brick or stone which is laid with its length perpendicular to the face of the wall. Thus a brick laid as header will show its face measuring 10cm *10cm on the face of wall. It also called as through stone.

2. Stretcher

It is the full brick or stone which is laid with its length parallel to the face of the wall. Thus a brick laid as stretcher will show its face measuring 10cm*20cm on the face of wall.

3. Bond

It is a term applied to the over lapping of bricks or stones in a wall in alternate courses, to bind the whole wall together. Bonding is essential to eliminate continuous vertical joints both in the body as well as on the face of wall.

4. Course

A horizontal layer of bricks or stones is termed as course. Thickness of one course is equal to 10 cm plus thickness of 1 mortar joint.

5. Header Course

It is a course of brick work entirely composed of headers.

6. Stretcher course

It is a course of brick work in which all the bricks are laid as stretchers.

7. Face

The surface of wall exposed to the weather is termed as face.

8. Facing

The material used in the in the face of the wall is known as facing.

9. Back

The inner surface of wall which is not exposed to the weather is termed as back.

10. Backing

The material used in the in the back of the wall is known as backing.

11. Hearting

The portion of a wall between facing and backing is termed as hearting.

12. Bat

It is the portion of a brick cut across the width or a brick cut by some fraction of its length.

13. Closer

It is the portion of the brick cut in such a manner that its one long face remains uncut

14. King closer

It is a brick which cut in such a way that the width of one of its end is half that of a full brick. It is formed by cutting of the triangular piece , between the center of one end and the center one side.

15. Queen closer

It is a term applied to a brick which is half as wide as full brick. Queen closer is made by cutting a brick lengthwise into 2 portions

16. Bevelled closer

It is similar to king closer with the only difference that the whole length of the brick is beveled for maintaining half width at one end and full width at the other.

17. Mitred closer

It is a brick whose one end is cut splayed or mitred for the full width.

18. Frog

It is a depression on the top face of a brick. Frog provides recess for the mortar which on setting forms a key and prevents the displacement of the brick above.

General Principals to be observed in stone masonry construction

1. Stone used in a good masonry should be well seasoned, hard,tough ,compact grained and uniform in texture and should be free fro defects like cracks ,flaws ,cavities , veins and patches of soft or loose materials.

2. Stone masonry may be construct in lime or in cement mortar about plinth level, but in damp-proof construction or water-logged site or in basements lime or in hydraulic lime or cement mortar with surkhi should be used in foundations and upto plinth level.
3. Proper bond should be maintained throughout the masonry. The construction should be well supervised.
4. The facing and the backing of the wall should be well bound by through stones. They should be laid staggered successive courses and kept apart with their centre to centre distance not exceeding 1.5 m.
5. Quoins used to form the jams for doors or window openings should be of the full height of the course . The breadth of the quoins should be at least 1.5 times the depth of course and its length twice its depth.
6. Tothing should not be allowed in stone masonry.
7. The hearting of the masonry should be properly packed with chips (spalls) and mortar avoid hollows being left.
8. The vertical joints should be staggered as far as possible.
9. Necessary chases for dowels and cramps etc should be formed in stone before use in masonry.
10. Stones to be used in the work should be well-wetted before use.
11. The masonry should not be subjected to tensile stresses.
12. When it is desired to construct over old or dry surface , it should be well cleaned and wetted before starting new construction.
13. The entire work should be cured well , I.e. it should be kept well – wetted for at least two weeks.