

Building Construction - Stone Masonry

Civil Engineering
Construction & Graphics

Lecture # 6

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Building Construction - Stone Masonry

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- **Rock**, that is removed from its natural site and generally, **cut or dressed** and then **finished** for building purposes, is called "**Stone**".
- The art of building the **structure with stones** as constructional units is called "**Stone Masonry**".



Building Construction - Types of Stone Masonry

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(1) Rubble Masonry

(2) Ashlar Masonry

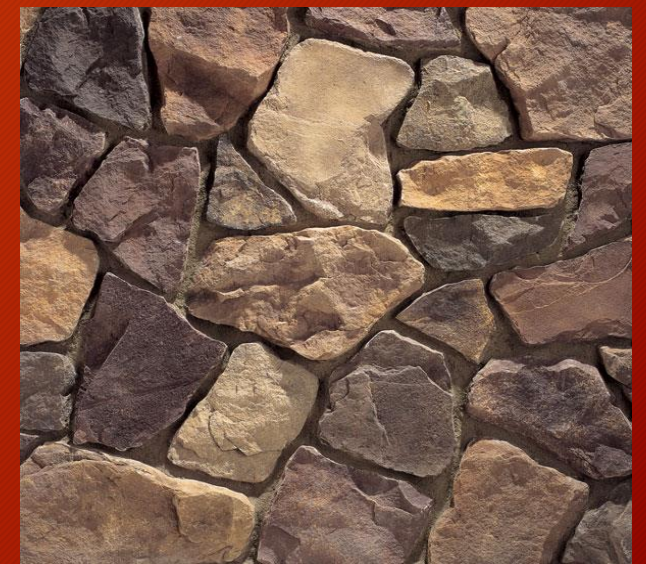


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A) Rubble Masonry

- The stone masonry in which either **undressed** or **roughly dressed stones**, are laid is called "**Rubble Masonry**".
- In this masonry, the **joints of mortar** are **not of uniform thickness**.



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Types of Rubble Masonry

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(A) Random Rubble Masonry

- (i) Uncoursed random rubble Masonry
- (ii) Built to courses random rubble Masonry

(B) Squared Rubble

- (i) Uncoursed squared rubble Masonry
- (ii) Built to courses squared rubble Masonry
- (iii) Regular coursed squared rubble Masonry

(C) Dry Rubble Masonry

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A) Random Rubble Masonry

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- The rubble masonry in which either **undressed or hammer dressed stones** are used is called "**Random Rubble Masonry**".
- The strength of this masonry depends upon the **bond between the stones**.
- The bond should be sound both transversely and longitudinally.
- Transverse bond is obtained by the liberal use of "**Bonders**" and "**Throughs**".

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A) Random Rubble Masonry

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A) Random Rubble Masonry

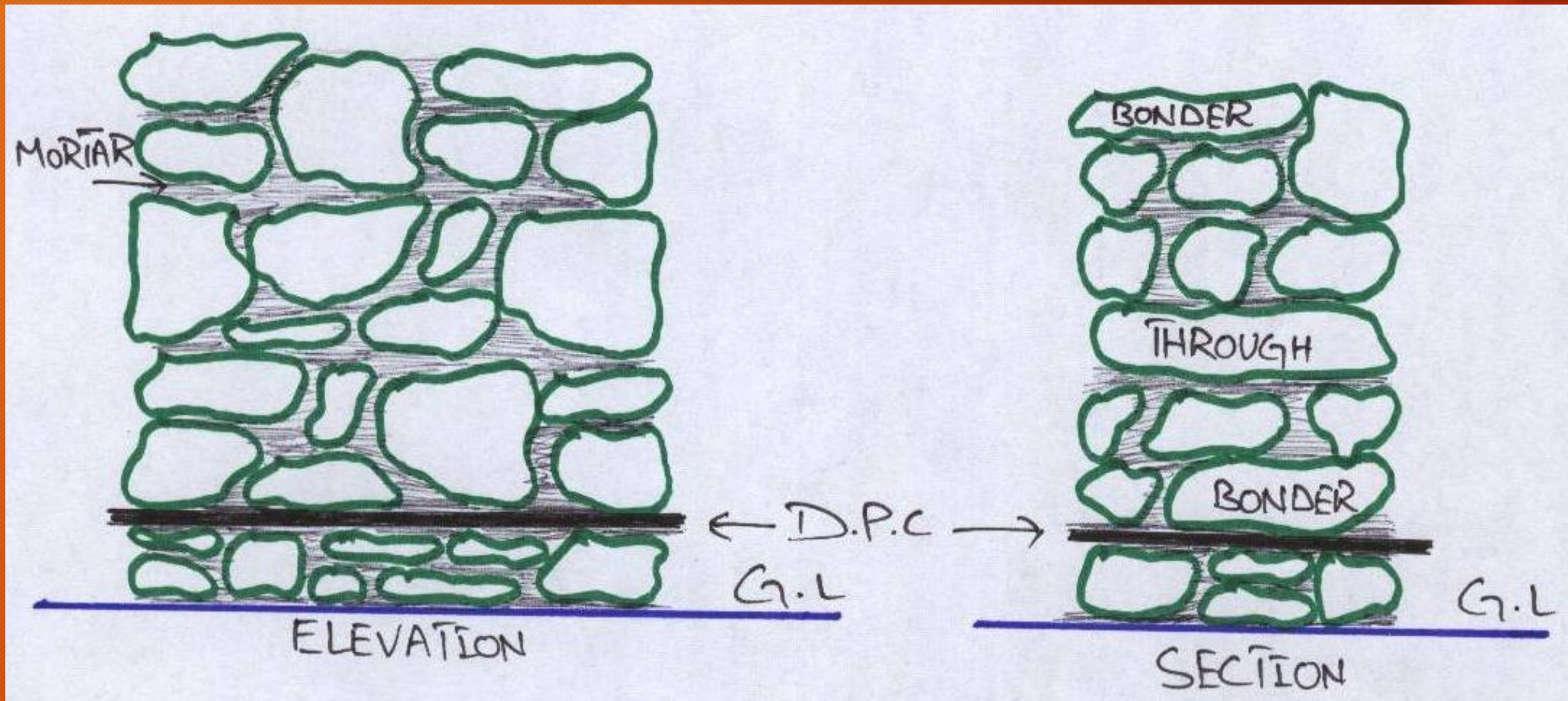
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- **Bonders** are stones, which reach beyond the middle of the wall from each face to overlap in the center (Dog's Teeth Bond).
- **Throughs** are stones, which extend the **full thickness of the wall**.
- Note: Throughs should **not be used in the external walls**, as moisture may be conducted through them and cause dampness on the internal face.

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A) Random Rubble Masonry

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A-1) Uncoursed Random Rubble Masonry

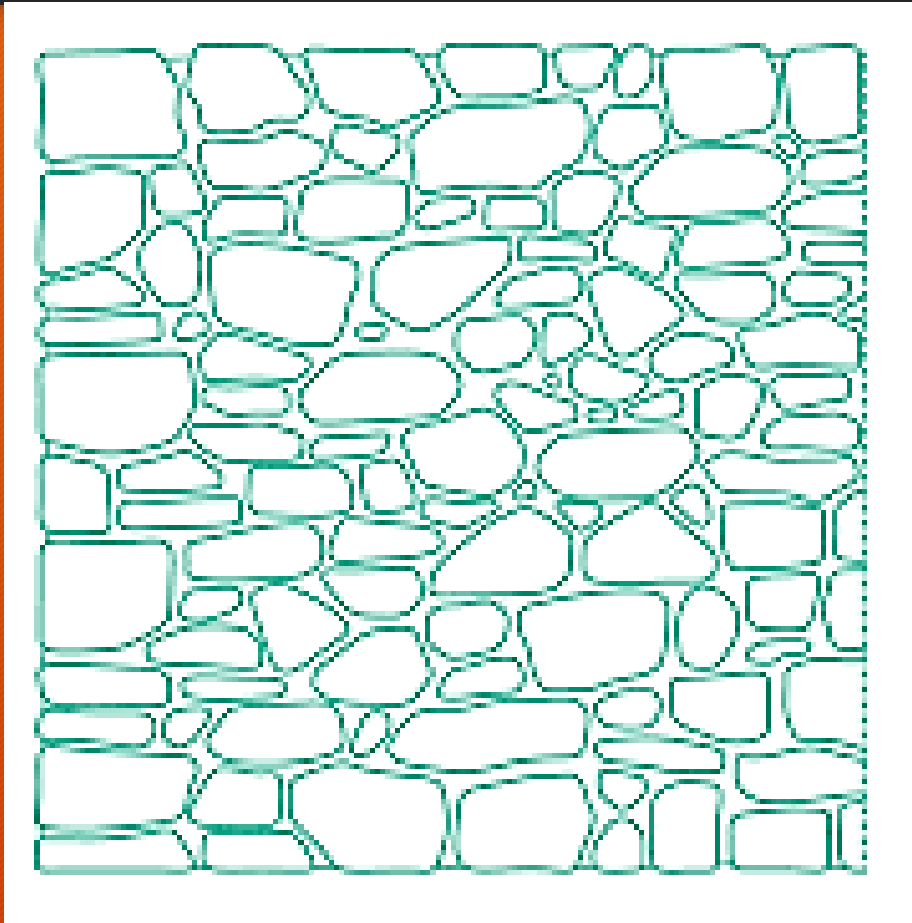
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- The random rubble masonry, in which all the stones are laid without forming courses, is known as "**Uncoursed Random Rubble masonry**".
- This masonry is the **cheapest** and **roughest type of masonry**.
- The stones to be used in this masonry are of **different sizes and shapes**.
- **Larger stones** are used at **corners** and at jambs to increase their strength.
- In general, stones are laid with their longer axis roughly horizontal and along the length of the wall.
- The only shaping of stones that is executed is the removal of inconvenient corners or projections with a hammer.
- This type of masonry is used for constructing walls of low height in case of ordinary buildings.

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A-1) Uncoursed Random Rubble Masonry

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A-2) Built to Courses Random Rubble Masonry

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- In this type of masonry, the work is roughly leveled up to form courses, varying from 12 to 18 in thick.
- In each course, headers of one course height are placed at certain intervals.
- This type of masonry is used to construct residential buildings, go-downs, boundary walls, etc.

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B) Squared Rubble Masonry

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- The Rubble masonry in which the face stones are roughly squared by hammer dressing or chisel dressing, before their actual laying is called "**Squared Rubble Masonry**".
- There are **three types** of squared rubble masonry:
 - (i) **Uncoursed Squared Rubble Masonry**
 - (ii) **Built to Courses Squared Rubble Masonry**
 - (iii) **Regular Coursed Squared Rubble Masonry**

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B-1) Uncoursed Squared Rubble Masonry

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- In this type of squared rubble masonry, the stones are **roughly squared** and built **without continuous horizontal courses**.
- It is used for ordinary buildings in hilly areas, where a good variety of stones are easily and cheaply available.

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B-1) Uncoursed Squared Rubble Masonry

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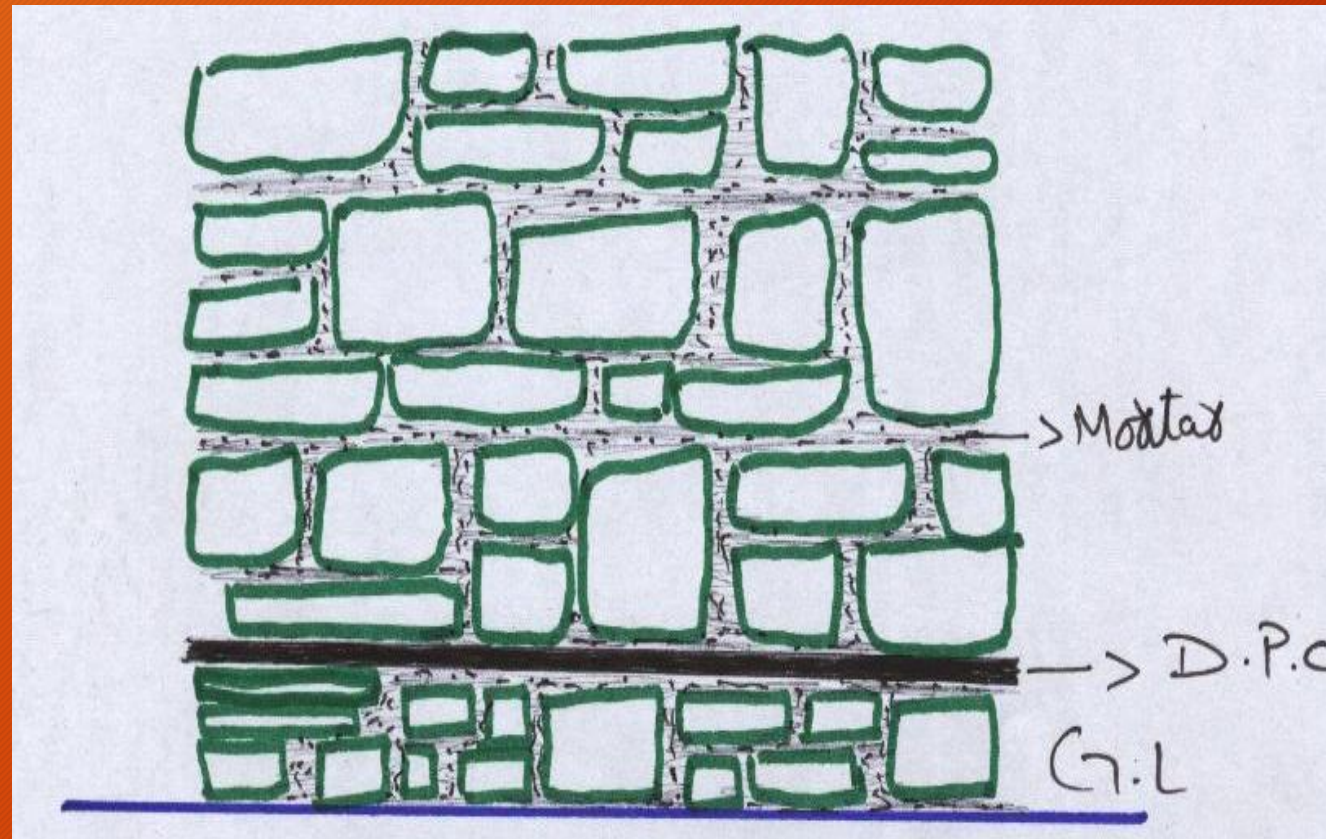


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B-2) Built to Courses Squared Rubble Masonry

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The stones are roughly squared and **laid in courses to bond** in with the larger quoin stones.



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B-3) Regular Coursed Squared Rubble Masonry

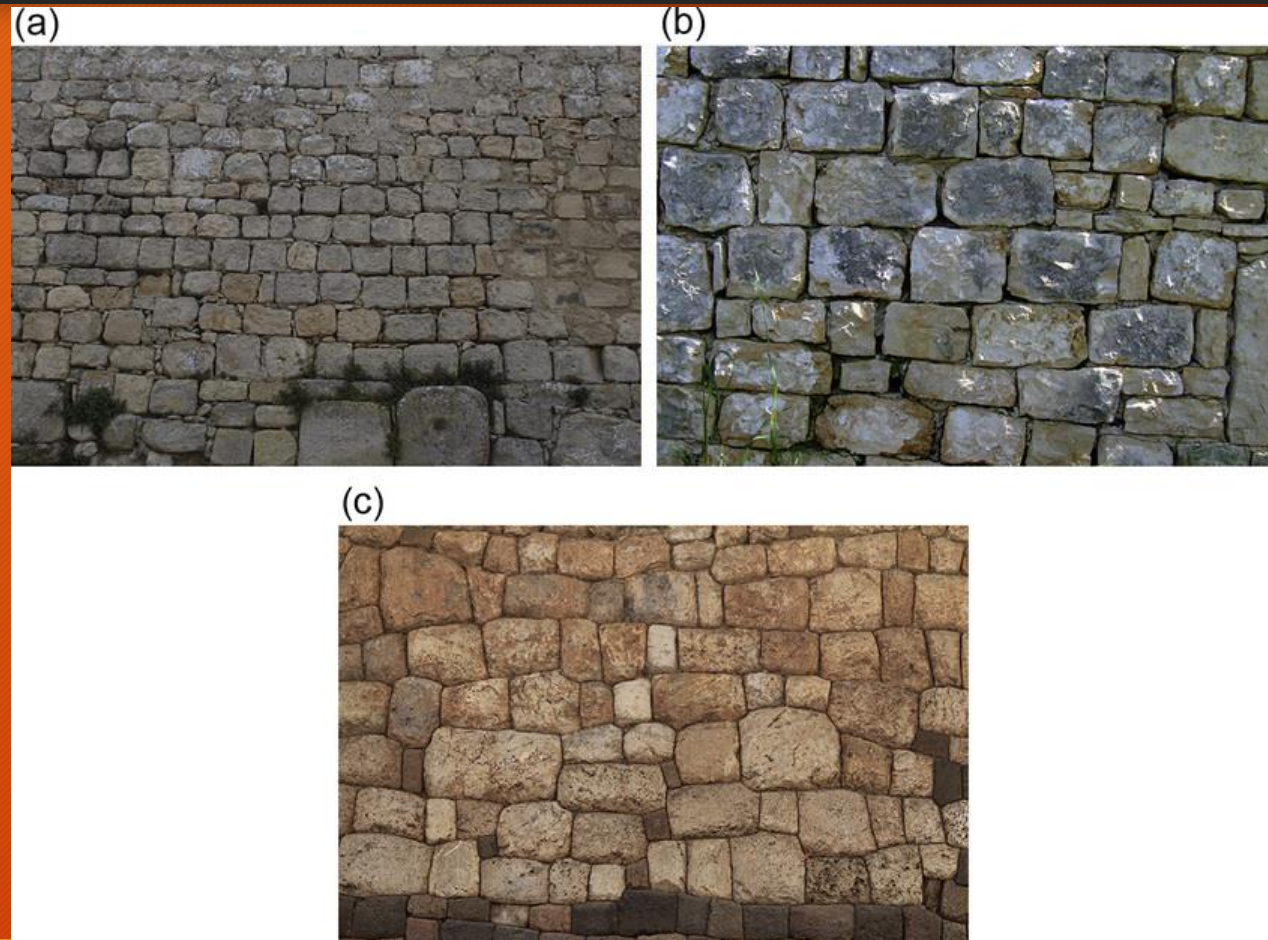
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- This type of masonry is built in courses of varying height but the stones in any one course are of the same depth.
- It is mostly used in public buildings, hospitals, schools, markets, modern residential buildings and in hilly areas, where a good quality of stone is easily and cheaply available.

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B-3) Regular Coursed Squared Rubble Masonry

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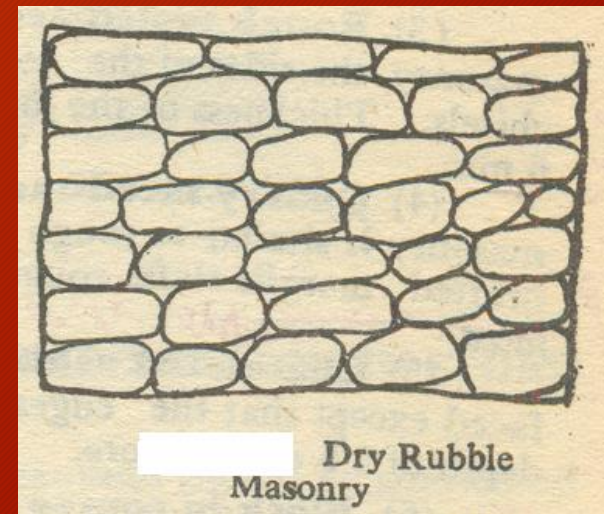


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C) Dry Rubble Masonry

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- The rubble masonry in which stones are laid **without using any mortar** is known as "**Dry Rubble Masonry**".
- It is an ordinary masonry and is recommended for constructing walls of **height not more than 18 ft.**
- In case, the height is more, three adjacent courses are laid in Squared rubble masonry, in mortar at 9 ft interval.



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C) Dry Rubble Masonry

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Building Construction - Types of Stone Masonry

2) Ashlar Masonry

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- The stone masonry in which **finely dressed stones** are **laid in cement or lime mortar**, is known as "**Ashlar Masonry**".
- In this masonry, all the joints are regular, thin, and of uniform thickness.
- This type of masonry **is costly in construction** as involves **heavy cost of dressing** of stones.
- This masonry is used for **heavy structures, arches, architectural buildings, high piers, abutments of bridges, etc.**

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2) Ashlar Masonry

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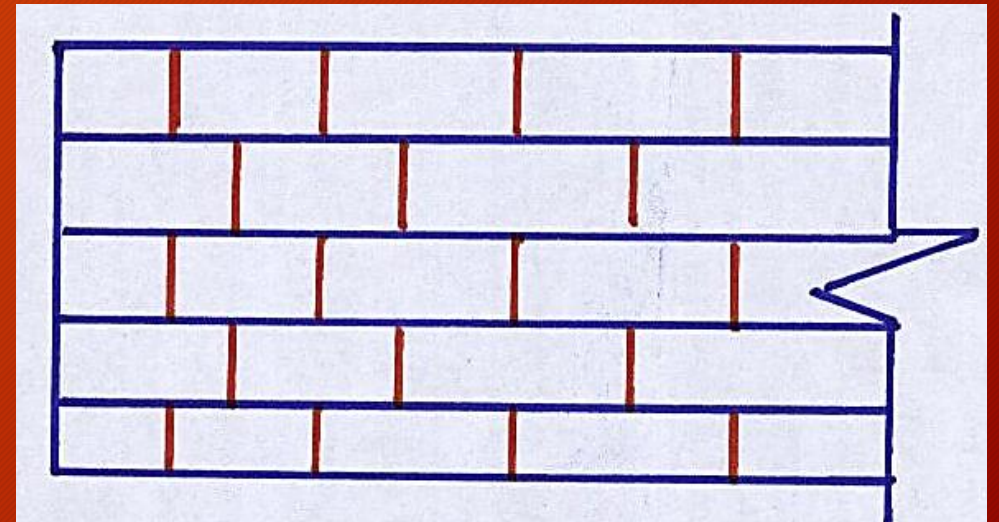
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Types of Ashlar Masonry

(a) Ashler Fine / Coursed Ashlar Masonry

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- In this type of masonry stone blocks of same height are used in each course.
- Every stone is fine tooled on all sides.
- Thickness of Mortar joint is less than 1/16 in and is uniform through out.



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Types of Ashlar Masonry

(b) Random Coursed Ashlar Masonry

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- This type of Ashlar masonry consists of fine or coursed Ashlar masonry but the courses are of varying thickness, depending upon the character of the building.



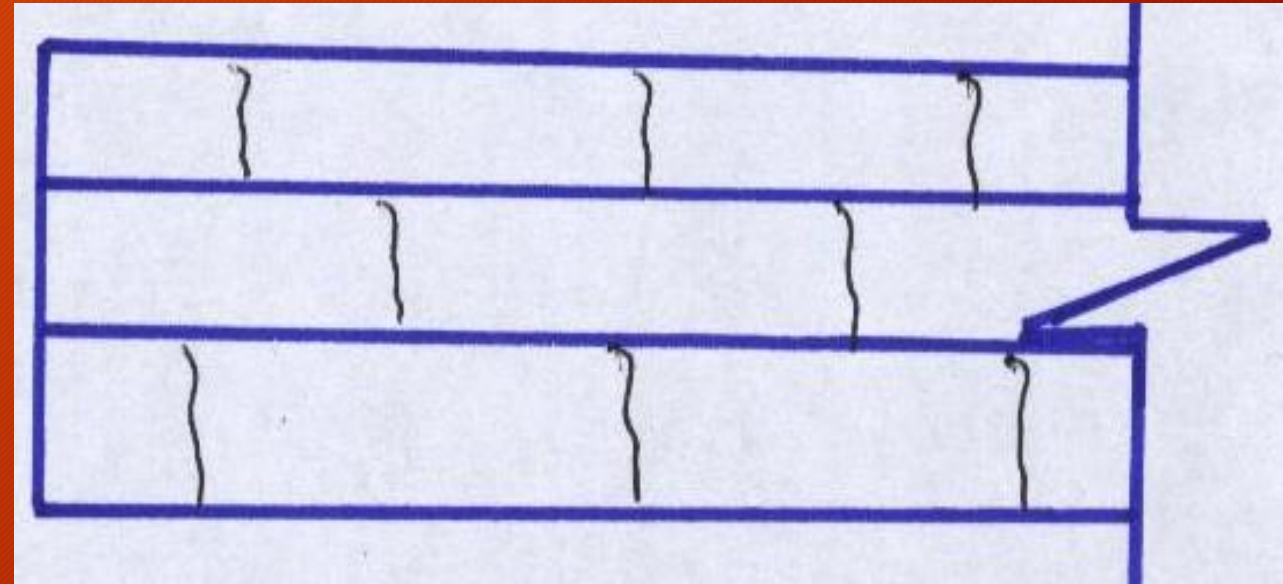
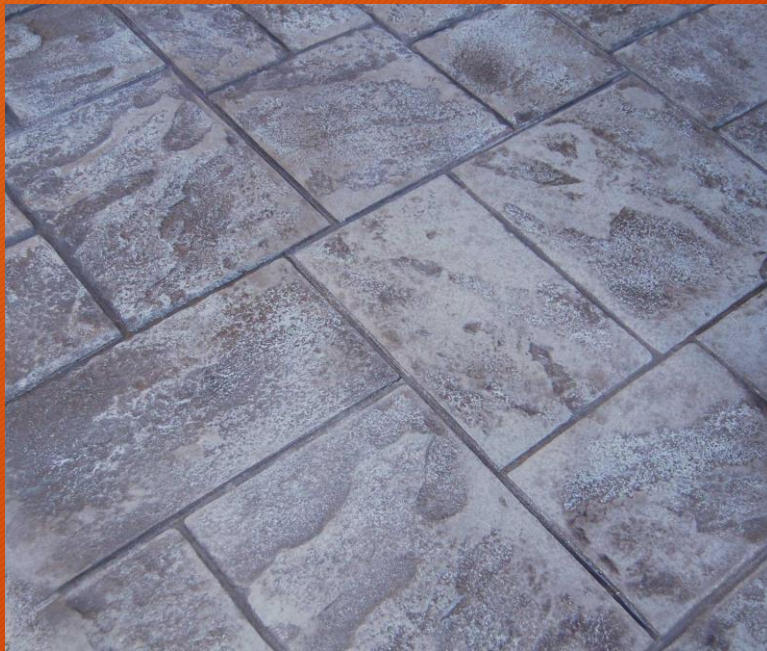
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Types of Ashlar Masonry

(c) Rough Tooled Ashlar Masonry

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- In this type Ashlar masonry, the sides of the stones are rough tooled and dressed with chisels.
- Thickness of joints does not exceed $\frac{1}{4}$ in.



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Types of Ashlar Masonry

(d) Quarry Faced Ashlar Masonry

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- This type of Ashlar masonry is **similar to rough tooled Ashlar masonry** but there is **chisel-drafted margin left rough** on the face.



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Types of Ashlar Masonry

(e) Chamfered Ashlar Masonry

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It is similar to Quarry faced except that the edges are given a slope of 45 degree for a depth of 1 in. or more.



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Types of Ashlar Masonry

(f) Ashlar Facing

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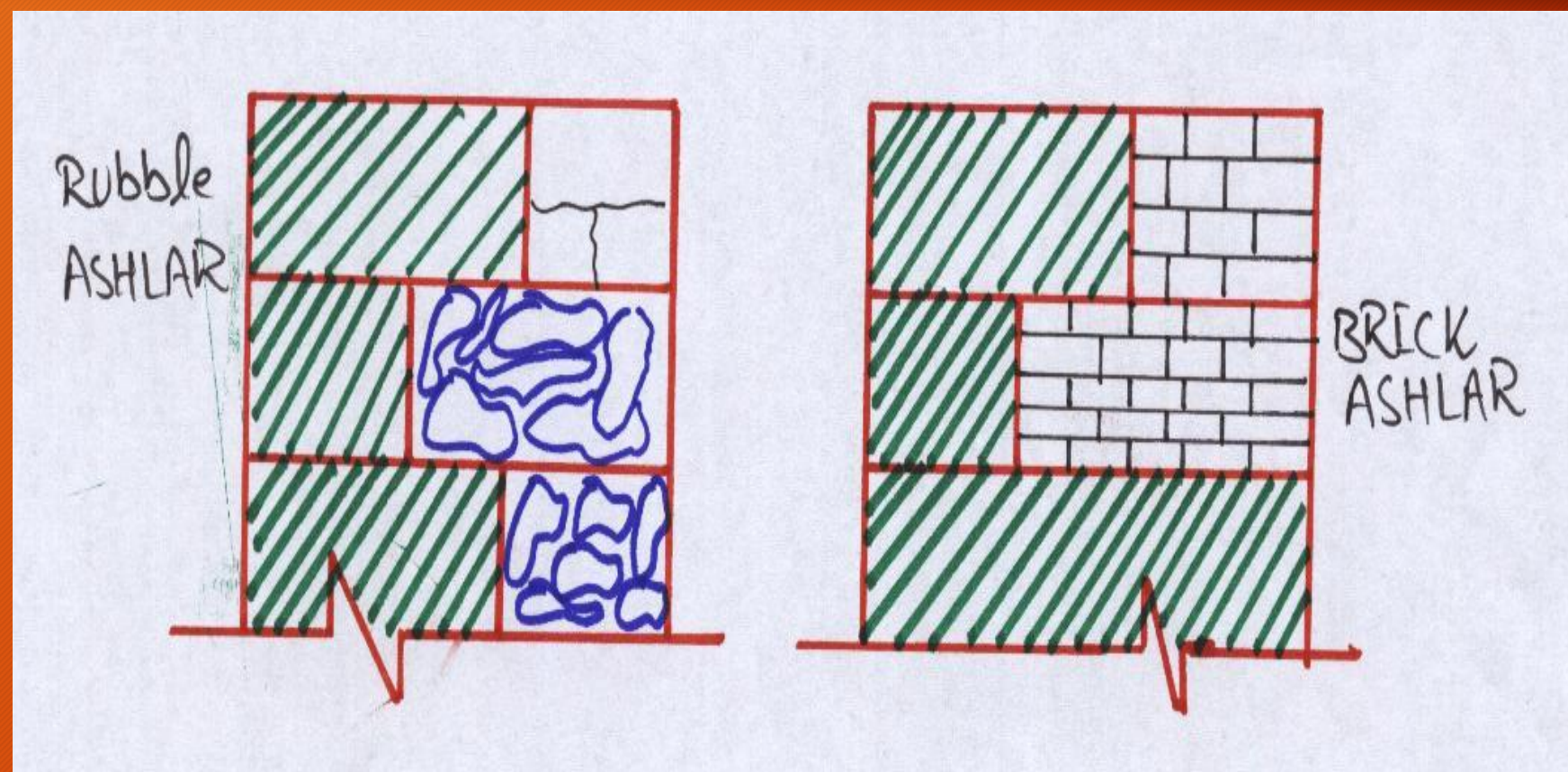
- In order to reduce the cost and to give the appearance of Ashlar facing to the wall it is usual practice to construct walls with facing of Ashlar and backing of Rubble or brick masonry. Such walls are also called “**Compound or Composite Masonry Walls**”.
- If the backing is of Rubble masonry, It is called “**Rubble Ashlar**” and if the backing is of brick work the masonry is termed as “**Brick Ashlar**”.

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Types of Ashlar Masonry

(f) Ashlar Facing

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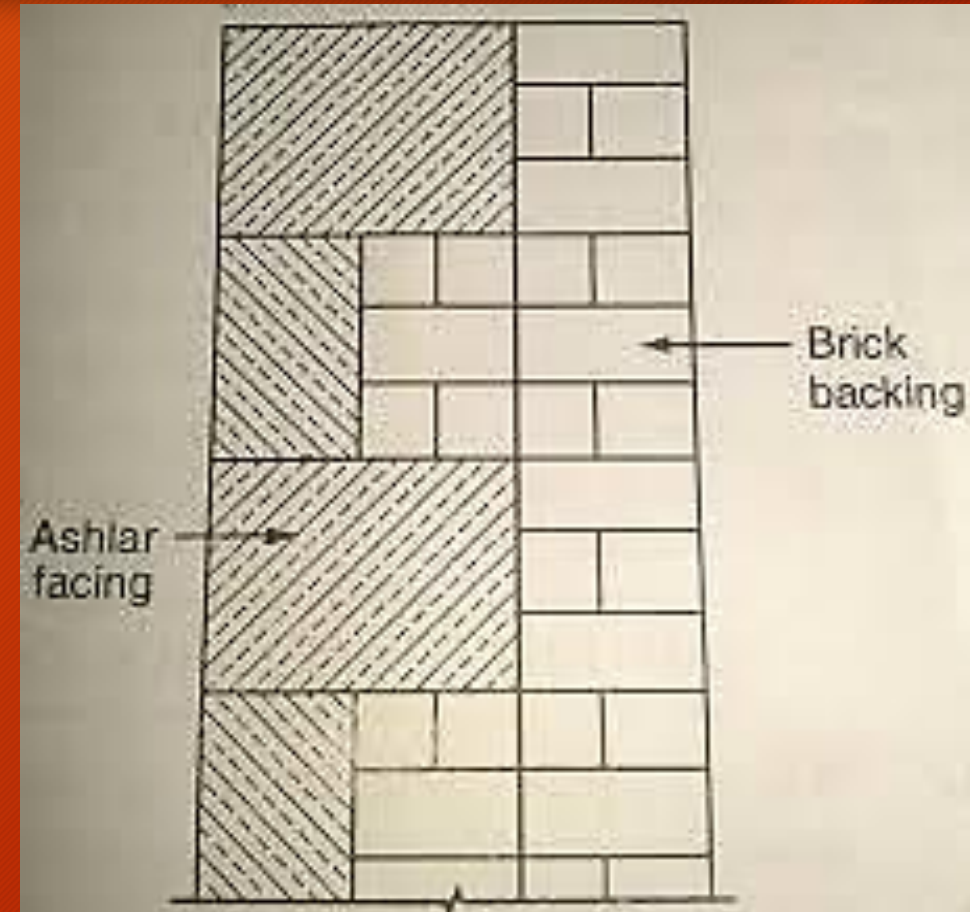


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Types of Ashlar Masonry

(f) Ashlar Facing

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Comparison Between Brick Masonry And Stone Masonry

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(1) **Stone is stronger** and more durable than brick and for public buildings; it is decidedly more suitable than brick. It reflects strength in every inch of it. It is in tune with nature. Its color improves and looks more serene with age.

On the other hand, brick is an artificial product made as a copy of stone. It is flimsy material and plastering is only a camouflage for its defects.

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Comparison Between Brick Masonry And Stone Masonry

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(2) **Stone is water proof.** On the other hand, Brick absorbs moisture and with dampness certain salts rise in the walls from the ground and cause disintegration of bricks.

Especially brick should not be allowed to come in contact with urine or sewage and in such places it must always be covered with cement plaster or any other protective coat.

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Comparison Between Brick Masonry And Stone Masonry

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- (3) **Brick offers greater facility for ornamental work in plaster** as a rough shape can first be given to it by means of any tool. This is not so in case of stones.
- (4) **Plaster does not stick so well to stones** as it does to brick.
- (5) On account of the regular shape and uniform size of brick, **a proper bond can be obtained** with comparative ease.

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Comparison Between Brick Masonry And Stone Masonry

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(6) Due to the **handy size of brick**, brick masonry can be more rapidly constructed than stone masonry.

(7) **Brick wall requires a fixed quantity of mortar** and even with careless masons, the regular shape of the brick considerably reduces the possibility of hollows being left in the body of the wall. This is not so with some stone walls.

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Comparison Between Brick Masonry And Stone Masonry

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(8) **It is possible to build brick walls of any thickness** e.g., 4 1/2 in, 3 in, 9 in, 13 1/2 inch etc. Whereas, the minimum thickness of ordinary stone wall is 15 in. Stone walls of a smaller thickness than 15 in, have to be constructed with properly dressed stones, which involves a comparatively high cost.

(9) **Brick does not absorb as much heat as stone does.** So, brick is more fire resistant than stone.

Thank-you for Listening!

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To get wisdom, listen to the unheard!

(Shad)