

Faculty of Engineering

Department of Civil Engineering

Construction Materials Laboratory (ENCE215)

Experiment No. 5

**Building Stones**

Applied by Group “B” Students

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**Introduction :**

The building bricks are made of cement, aggregates, and water. These components are poured after mixing them well in special molds. These molds are in the form of parallel rectangles and are emptied from the inside to reduce the weight of the brick ,In this way, concrete can be converted into pre-cast units, as it is easy to use in construction due to its low weight, different sizes and measurements.

**Purpose :**

To know the pressure strength of the concrete block, and to know its suitability for different goals.

**Theory :**

Brick is the oldest manufactured building material. The earliest brick, made from mud (sometimes with added straw), was invented almost 10,000 years ago. Clay brick started to appear about 5,000 years ago, Since that period, bricks are mainly used in construction work, after the number of materials from which they are made have increased and their strength and properties have increased.

Cement bricks are considered one of the building methods spread all over the world, as it is one of the strongest, fastest and easiest methods of construction. A concrete brick is a construction unit that is made in advance in custom molds and in specific quantities of cement, aggregates and water, and it is manufactured with different dimensions and measurements, according to the purpose for which it was made. , And the most common of them (here in Palestine) (40 \* 20 \* 20) (40 \* 20 \* 15) (40 \* 20 \* 10) and each type of them is used in a specific place in the building according to the pressure it is required to bear.

The larger bricks (20 \* 20 \* 40) are usually used in the outer walls of the building for their strength and their tolerance to external weather factors, while smaller bricks are usually used in internal divisions for their small dimensions to make more use of the space.

**Materials & Equipments :**

|  |  |
| --- | --- |
| A brick building  Description automatically generated  Concrete block | A picture containing building, building material, lumber  Description automatically generated  Wooden boards |
| A close up of an animal  Description automatically generated  morter | A picture containing ground, building, object, outdoor  Description automatically generated  block compressive device |
| caliper |

**Procedure:**

1. Two wood plates and a block were taken and their dimensions were measured.

2. The mortar’s ingredients were obtained (water, sand and cement 1:1.5).

3. The sand and cement were dry mixed.

4. The dry mix was put on a tray in the shape of a ring and the water was added all at once in the middle and mixed.

5. Part of the mortar was put on top of the wood plate.

6. The block was then put on top of the mortar, more mortar were put on top of the block and the wood was put on top of the mortar.

7. The stack was then put in the stress machine and the force needed for the block to break and the force was obtained.

**Calculations:**

The surface that face the load = (length\*width) – voids

𝑣𝑜𝑖𝑑𝑠=(1.2×6×2×67%)+(9.9×5.8×3)=167.06 𝑐𝑚2

𝐴=(10×40)−167.06=232.94 𝑐𝑚2 𝑠𝑡𝑟𝑒𝑠𝑠=80𝑘𝑁\232.94𝑐𝑚2

=80000\23294=3.434 𝑀𝑃𝑎

**Results and Conclusion:**

After applying the test and calculations were made 𝑠𝑡𝑟𝑒𝑠𝑠=3.434 𝑀𝑃𝑎

It can be concluded that the stress calculated is huge until a certain point ,which allows a certain load to be applied where the block of concrete can handle it before fracture.

There is a various types of blocks that vary in the allowed amount of force that can be applied, depending on its use either for slabs that must handle more than a partition or a decorative element.

**References:**

Instructor