earthen MATERIALS
Brick

The information on this module is mainly taken from The Constructor: https://theconstructor.org/building/types-of-tests-on-bricks/12701/

OBJECTIVE I SUSTAINABILITY

The objective of exploring sustainable materials is to expand our knowledge of design strategies, materials, assemblies, and construction methods that we can apply into our practice. Green buildings require careful product and material selection criteria. Earthen materials, like brick, can be produced near the project and have lower embodied energy required for their production and their use than other materials.

DEFINITION OF "BRICK"

A brick is a rectangular unit composed of clay-bearing soil, sand, and lime, or concrete materials. Bricks are joined together with mortar, adhesives or by interlocking them. Bricks are produced in different classes, types, materials, and sizes, and are produced in bulk quantities. Bricks have very low environmental impact during fabrication, during construction, and after construction.

Bricks are classified by their fabrication method into "fired or burnt bricks" and "non-fired or sun-dried bricks". Bricks are manufactured in standard sizes given in length, width, and height. Brick for veneers (thin brick) is available too. The two main types of brick are:

EFFLORESCENCE is caused by salt deposits that are formed when the salt in the brick body surface.

Good quality bricks should not contain soluble salts in it; if a brick mixture contains salts, they will cause efflorescence in its surface

Sun-Dried or Unburnt Clay Bricks - These are molded usually in the field and then drying in the sun. Used for temporary structures, and never in our projects.

Burnt Clay Bricks are fired and come in four types: First, Second, Third, and Fourth Class. If brick is used exposed, first class is the best because the size and appearance are uniform, sizes are standard, edges are sharp, and surface is smooth. They are also stronger and more durable. First class brick should be used in our projects when brick is exposed.

BRICKS IN CONSTRUCTION

Bricks for construction work are tested as follows to determine if they are suitable:

- **Absorption Test:** This test determines the amount of moisture content absorbed by bricks under extreme conditions.
- **Compressive Strength Test**: This test is done in a compression testing machine to determine how crushing-resistant are the bricks. "Engineering" bricks have a high compressive strength and are used for special applications where they are use as a structural component of the building.
- **Hardness Test**; This test determines the brick's surface hardness to find out how resistant is the brick is to damage cause by sharp tools or other causes during and after construction.
- **Shape and Size test**: This test is to determine the consistency of shape and size in bricks of the same type.
- **Color Test:** This test determines the uniformity of color and texture in bricks of the same type.
- **Soundness Test**: This tests how bricks respond to sudden impact.
- **Structure of Bricks Test**: This test is done by breaking the bricks to verify that the inner portion of the brick is homogenous and be free from lumps.
- **Efflorescence Testing**: This test determines how much efflorescence appears in the surface of the brick when it gets wet.

Brick should be sealed. Our basis of design product (PSure Klean® Weather Seal Siloxane PD) A water-based water repellent is a good product to seal brick. Ask for a test over the brick where it is going to be applied to make sure it works). This product needs to be re-applied every few years.