

BRICK AND BLOCK MAKING

MADE EASY WITH



OHORONGO cement

- If the product comes into **contact with the eyes**, immediately wash out thoroughly with water and **medical advice should be sought**.
- **Always wear protective clothing** to prevent skin irritation or caustic burning, which may result from prolonged contact with cement.
- The use of **dust masks is recommended**.
- To **avoid back injuries** when lifting cement bags, **bend the knees** while **keeping the back upright**.

**SAFETY
FIRST**

1. MATERIALS

CEMENT Use Ohorongogo CEM II B-LL 32.5N cement or Ohorongogo CEM II A-LL 42.5N cement, depending on the purpose and function of the brick or block.

AGGREGATES: SAND & STONE The following are common aggregates in the production of bricks or blocks:

- Fine river sand (particles < 1 mm);
- Coarse crusher dust or pit sand (particles -5 mm);
- Stone (max 13mm for bricks or solid blocks; 10 mm for hollow blocks).

In general, a combination of these aggregates is most suitable for the production of bricks or blocks. For small-scale production, the most appropriate aggregate or combination of aggregates is best determined through trial and error.

WATER Use clean, drinkable water.

Bricks or blocks are masonry units and are referred to as such in SABS standards. Units may be solid or hollow

2. THE BRICK- AND BLOCK MIXTURE

While mixing cement and aggregates to produce bricks or blocks, it is important to consider the trade-off between production costs and strength. Adding too much cement in the mixture results in higher costs, while using too little cement results in a low quality brick or block. It is thus important to find the optimal mixture that balances relatively low costs with the production of high quality bricks or blocks. The optimum cement content should be obtained by trial and error on site.

While the strength of bricks or blocks is most reliably tested in a laboratory, some other methods allow at least an indication regarding the quality of the brick or block: As a rule of thumb, for testing brick or block strength, knock two bricks or blocks together. Only do this after adequate curing has been done. If the bricks or blocks sound hollow, the mixture was too weak. Also, if the edges of any of the bricks or blocks chip off, or the bricks or blocks actually break, the mix clearly did not contain enough cement. If the bricks or blocks give off a ringing sound, the mixture was correct and the quality is good.

WARNING: Make sure that the bricks or blocks are properly dried before use. Bricks or blocks shrink slightly during curing, so that if an uncured brick or block is used for bricklaying, it will shrink once it has been laid, resulting in an unstable wall.

NOTE : If the surface of the dry brick or block is too smooth, fewer fine materials should be added to the mixture. If, on the other hand, the surface is too rough, fewer coarse materials are to be used in preparation of the bricks or blocks.



PRODUCTION Aggregates and cement should be ordered in good time, so as to ensure the steady supply of materials and to prevent interruption of production.

BATCHING: It is critical to batch all materials accurately. While cement supplied in bulk must be weighed, bagged cement should be batched by the full bag.

WATER CONTENT To produce a good quality brick or block that does not sag after removal from the mould, but is properly compacted, the mixture must be relatively dry to avoid sagging, but still allow for compaction. Machine mixing is preferable to hand mixing. However, if the mortar is mixed by hand, special care should be taken to properly blend the materials and to follow these instructions:

- Ensure correct proportions of cement, aggregate and water are used;
- Mix the mortar on a clean, hard surface such as a concrete floor or steel sheet;
- Spread the sand in a 10 cm thick layer on the floor or sheet;
- Spread the cement and stone uniformly over the sand;
- Blend until the cement and sand mixture are of a uniform colour;
- Spread the mixture out and add a little water over the surface and blend thoroughly.
- Continue with this process until the right amount of water has been mixed in.

WARNING: The mixture should be used within a maximum of two hours of being prepared. If the mixture has hardened and is no longer workable, it has to be discarded. Do not add more water into the blend, as this greatly reduces the resultant strength of the bricks or blocks.

MOULDING When moulding bricks or blocks, great care must be taken to produce bricks of the same height. Moreover, compaction of the concrete is critical, as inadequate compaction results in significant loss of strength.

CURING Curing is the process of maintaining satisfactory moisture content and a favourable temperature in the bricks or blocks, in order to ensure cement hydration and development of optimum strength. On the day after production, bricks or blocks should be removed from the production slab or pallets and stored in the stacking area, ready for curing.

Stacks should be carefully built to avoid chipping edges and corners. An area big enough to stack two weeks' worth of production is needed for curing and drying bricks or blocks. The surface of the stacking area should have a concrete floor. Discarded bricks or wooden boards can be used as an alternative. Fresh bricks or blocks should be covered with plastic sheeting or other suitable covering, in order to protect from rain, as well as from exposure to wind and sun. It is especially important in the dry season to regularly spray freshly-produced bricks or blocks with water. In some cases it may be necessary to protect bricks or blocks from damage due to frost. Covering the bricks or blocks with plastic sheeting held down at the edges

3. PRODUCTION SITE

SIZE The production site should be large enough to allow for aggregate stockpiles, cement storage, production, brick – or block stacking, staff facilities, offices and on-site access.

AGGREGATE STOCKPILES All aggregates must be stockpiled in such a way that they do not become contaminated by soil, leaves or other foreign material. Different kinds of aggregates must be kept separately and rainwater must be able to drain away. Preferably, aggregates should be kept on a concrete slab under roof. Ideally, the concrete slab should be slightly sloped, so that rain water cannot pool and contaminate the aggregates.

CEMENT STORAGE The best way to store cement is in a silo. For most small-scale blockyards, however, cement will be delivered in bags. Preferably, cement in bags should be stored in a weatherproof room. Bags should be stacked on a plastic tarpaulin or on closely spaced wooden strips, so that they do not absorb dampness/ moisture from the floor. The storeroom should be spacious enough to hold at least a week's supply of cement. Always work on 'First in, First out' stock rotation.

CONCRETE MIXER It is possible to produce on a small scale without a concrete mixer. Hand mixing has the advantages of reducing the amount of capital required, and might provide employment, however, it may limit output and lead to mixture inconsistency. Hand-mixing should be done with shovels on a concrete slab or flat steel sheet. Never blend the mixture directly on the ground, as this could result in contamination of the mixture. A pan mixer is the only type of machine mixer suitable for blockyards. Pan mixers, with a forced mixing action, can cope with the semi-dry mixes used for making blocks. Drum mixers do not work, because they cannot mix semi-dry concrete.



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