Habitat for Humanity®
Nepal

STONECRETE BLOCK

Making Manual

Habitat for Humanity Nepal

Habitat for Humanity Nepal is a non profit organization helping to build simple, decent and affordable housing in partnership with people in need.

Mission: Habitat for Humanity brings people together to build homes, communities and hope.

- Focus on shelter
- Advocate for affordable housing
- Promote dignity and hope
- Support sustainable and transformational development

Habitat Nepal is committed to building homes and hope in both disaster-affected and non-affected areas across the country.

For your feedback please call our toll free number 16600133332 or email us at - feedback@habitat.org.

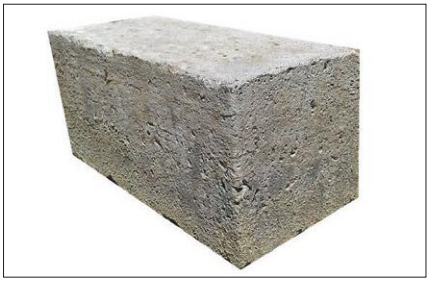
About the manual

This block making manual outlines the techniques and procedures adopted for the production of stonecrete blocks by Habitat for Humanity Nepal.

This block making manual is designed to support those who wish to develop the skill set of producing stonecrete block, and those who wish to construct a house made of stonecrete block.

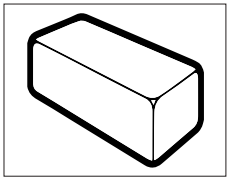
Introduction

Stonecrete blocks are made from the proportionate mix of cement, sand, aggregate and stone. These are made in moulds made from either ply or metal.

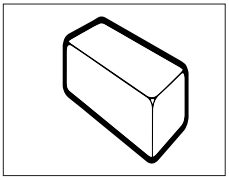


sizes: Stonecrete blocks can be produced in the following sizes. :

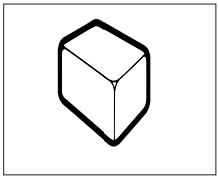
1. 12” x 6” x 6”



2. 9” x 6” x 6”



3. 6” x 6” x 6”

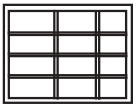


Manpower

1. 1-2 people

Single block mould

2. 3-4 people

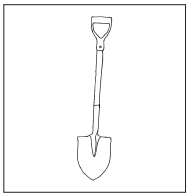


Multiple block mould

Why build with stonecrete blocks?

- Stonecrete blocks can be made from locally available materials (sand, aggregates, and stone) resulting in reduced transportation cost and environmental impact.
- The production of the stonecrete blocks in comparison to the production of bricks do not emit man-made CO2 in the atmosphere.
- The block production creates very low amount of raw waste.
- They have damp proofing and fire-resistant properties.
- They are economically viable due to their size, and the number of units required for the construction.
- The blocks are long lasting and can withstand external forces due to its high compressive strength.

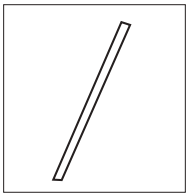
Tools



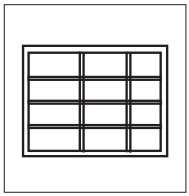
1. shovel

2. bucket

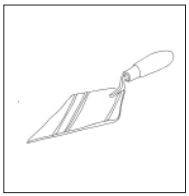
3. watering can



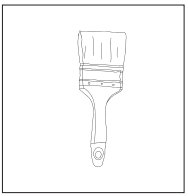
4. steel tampering bar



5. mould

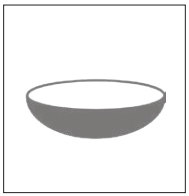


6. trowel



7. brush

8. form oil



9. pan

Materials

1. cement

2. sand

3. aggregate

4. stone

5. water

PCC Ratio

1 part cement : 3 part sand : 6 part aggregate M10

NOTE: M7.5 (1:4:8) can also be used to be economical in the ratio of 1 part cement, 4 part sand, and 8 part aggregate. However, M10 is the preferred option since it produces a block with greater compressive strength.

Steps

Step 1: Select a uniform level ground. Clear and clean up the work area. Loose soil can latch onto the blocks if not cleared properly.

Step 2: Apply form oil on stonecrete block mould (either iron or ply formwork) using brush. Form oil will prevent the concrete mix from sticking to the walls of the mould.

Step 3: Mix cement, sand, and aggregates with water as per ratio. (*)

* Mixing of cement, sand, aggregates and water:

1 cement

+

3 sand

+

6 aggregate

+

water

To ensure a good mix keep in mind the following tips:

- Use clean water.
- Do not mix directly on ground but rather use an impervious surface (tin/plastic)
- Mix it dry 2 times and wet 1 time.

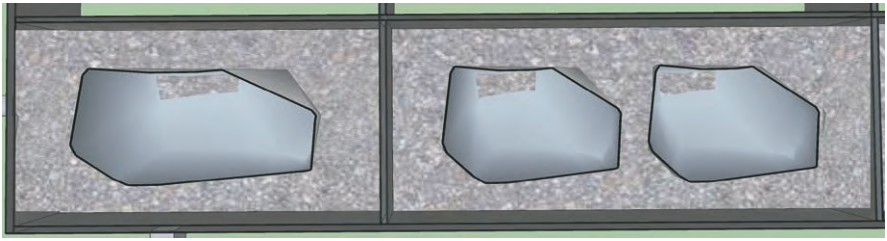
** NOTE: Do not make the mixture too wet because this will create problems while removing blocks from their moulds.

Step 4: Pour the concrete mix into the mould (enough to make 1.5” thick layer of concrete). Use tampering rod to tamper the mix 25 to 35 times.

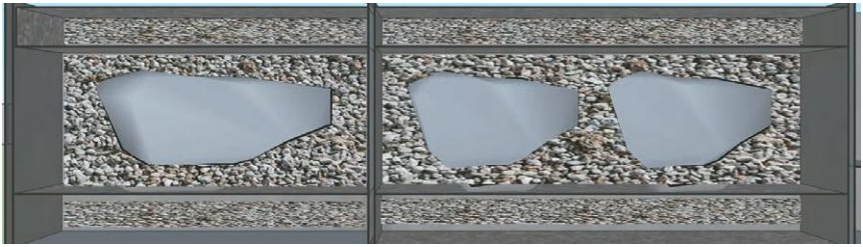
NOTE: Tampering the mix helps fill in gaps between the mix and prevent honeycombing of concrete.

Honeycombing of concrete: It is caused by insufficient fine materials in the mix due to poor mixing and lack of compaction. It reduces the strength of the block produced.

Step 5: Once 1.5" concrete layer is obtained, place one large or two small stones on the layer. Make sure to leave 1" gap on all sides.



Plan view: Stone in the middle with 1” gaps on the side and middle.



Section view: Stone in the middle with 1” gaps on the side and middle.

Step 6: Pour concrete mix to fill in the remaining gap and make sure to tamper the mix minimum 25 to 35 times.

Step 7: Pour the final layer of concrete mix (enough for 1.5” thick layer) and tamper the mix 25 to 35 times to create homogenous mix and better compaction.

Step 8: Level off the mixture on the mould with a trowel for a clean finish.

Step 9: Leave the mixture in the mould to set and then remove once the block looks well set.

NOTE: Make sure the mould is balanced while removing and appropriate manpower is utilised.

Step 10: After the block is left to dry for 24 hours, wet the blocks for 7 days for curing. If a container big enough to dip the blocks is not found, wet a burlap sack and place over the blocks at repeated intervals to keep the blocks moist.

NOTE: Curing is important because it gives strength and stability to concrete.

Storage: Proper storage of blocks is important to maintain its strength and other physical conditions

1. Store in a cool, dry, and shaded area.

2. Keep out of reach of children.

3. Stack up the blocks. Make sure the stack does not exceed 1 metre in height.

Lab testing: Carry out lab tests on 3 blocks if possible after after 28 days to ensure the quality of stonecrete blocks produced using the above mentioned procedure. The compressive strength test should be carried out on 3 samples of blocks, and the average compressive strength obtained should be 10 Mpa.

1. weight of block

2. measurement of block

3. Compressive strength test by universal testing machine

NOTE: Lab tests were carried out on 3 samples after 14 days on stonecrete blocks produced as a demo.
Stonecrete block made from M10 ratio lab results are: weight = 18 kg, measurement = 12” x 6” x 6”, compressive strength = 10.5 Mpa.
Stonecrete block made from M7.5 ratio lab results are: weight = 17 kg, measurement = 12” x 6” x 6”, compressive strength = 7.2 Mpa.

Safety first: Always wear the below listed tools to ensure safety whilst working.

Wear gloves

Wear masks

Keep site tidy, avoid accidents

Wear safety helmets

Wear hard shoes

Habitat for Humanity® Nepal

Sanepa Chowk, Lalitpur - 2
Phone: +977 1 5521182, 5554976
Toll free number: 16600133332
Email : info@habitatnepal.org
Website : www.habitatnepal.org
Facebook: www.facebook.com/HabitatForHumanityInternationalNepal

Parnter Organisation