

## NERDC COST EFFECTIVE HOUSING TECHNOLOGY

### **NERDC introduced alternative methods for wall construction**

1. Slip form wall (seamless cast – insitu walls)
  - i. cement and quarry dust
  - ii. cement and soil
2. Soil cement block masonry wall
  - i. cement soil blocks

#### **1. (i) Slip-form walls with cement & quarry dust**

- Mix:
  - Cement and Quarry dust 1:12
  - Water: small volume to get the correct consistency of mix
- A steel shutter (form) is needed



#### **1. (ii) Slip form wall construction using cement & soil**

- Slip-form wall constructed with cement and soil instead of cement & quarry dust
- Special attention is needed for following aspects.
  1. Condition of the soil
  2. Cement to soil ratio.
  3. particle size distribution of soil
  4. Water Content
  5. Uniformity of mixing



- |                    |  |
|--------------------|--|
| 2. Rammed type     | Cement : Soil<br>- (hand mould, hand rammed machine)   |
| 3. Compressed type | a) Manual type : Cement : Soil<br>(Hand compressed machine)<br>b) Hydraulic type : Cement : Soil<br>(Hydraulic compressed machine) 100 blocks per hour |

After mixing soil with cement properly, next add water to mix.

### Manufacturing of Blocks

It is better to use compressed machines to get good finish blocks which can be used without wall plastering.

#### Curing with Water

- Keep blocks under shade (or cover with blade polythen)
- Cure 14 days (3 times per day)
- It is better to cure blocks by sprinkling water
- Keep another 14 days to shrinkage
- Then, use the blocks after testing

#### Strength of Blocks

According to the SLS, minimum compressive strength of blocks should be higher than  $1.2 \text{ N/m}^2$  and that can be used to single story building and partition walls. Sieve and compression strength of blocks for load bearing walls can be selected according to the SLS standard.

#### Special Things to be kept in Mind

*Factors affected for the block strength*

- ii. *Type of machine and level of compaction*
- iii. *Type of soil*
- iv. *Amount of cement degree of mixing soil with cement*  
*Quantity of water (optimum water content)*  
*Curing (frequency of curing and curing period)*

### Mortar for block laying and wall plaster

No need plaster for good finish wall. Then it can be apply early paint on wall after block layer. If any one wants to plaster wall, same mortar mix used for block laying can be used to plaster also.

Soil should be sieved for 3mm mesh and

- (a) 1:3:3 cement, soil (clayey soil) sand mortar can be used to plaster and block

laying 1:15 cement and clay (from same soil or makulu soil) can be used to smooth plaster  
or

(b) 1:6 cement, soil (sandy soil) mortar can be used to plaster and block laying  
1:15 cement and clay (from same soil or makulu soil) can be used to smooth plaster  
or

(c) 1:5 or 1:6 cement sand mortar for wall construction  
1:1:5 cement lime and sand for plaster and lime for smooth plaster  
and also,

1:2 cement: soil (soil should be sieved form 2mm mesh) paste can be used to apply in faces of interlocking blocks to be laid in walls.

### Application of paint

#### Natural soil colour paint

- Plain makulu soil or clay soil or soil used for blocks in water and stir well and use sterner to separate clayey liquid
- Add cement 250 ml and 250 ml chemifix or good binding gum to 8L clayey liquid and stir well.
- Apply two or three coats on walls using a brush. Before applying paint, wall should be prepared well.
- Applying or spraying two coats of matt clear warnish on wall, it can be provided additional protecting coat to the wall. (Also it can be used paints given in SLS standard)

#### Application of clay base colour paints

- Solve makulu soil or clayey soil or soil used for block manufacturing, in water.
- Pure water to gunny bag placed on sand pile and separate clay from water.
- Keep clay under sunlight to dry well.
- Crush dried clay particle in to powder by rollers or a machine.
- Take colour cement one part and mix with 15 parts of clay powder well.
- Next take 16 part of water and mix with one part of good binder gum well.
- Next dissolve prepared colour powder in prepared binding liquid and stir well.
- Next apply two or three coats on walls prepared correctly.

Also, it can be applied emulsion and weather shield paints available at market.

### Advantages:

- Solution for sand crisis
- Environmentally friendly green product (no problem related to sand mining, no problem related to deforesting and clay mining)
- Freely available, so less transport problems

- Comfortable environment in house (low heat in house) so much better for dry season and dry zones.
- Simple technology and simple machines
- 15%-50% cost can be saved (according to availability of soil)
- Creating new employments

Disadvantages:

- If technology is not used in proper way, it may occur some problems
- Man power requirement is dependent upon the type of soil

