Technical guide - Compost Bin Manufacturing

Introduction

Home composting is promoted in many municipalities as a simple and low cost solution to emerging waste disposal problem in the present day society. In this process, valuable compost is produced using the organic components of household waste that we dispose as being spent, useless, worthless, or in excess to the needs.

Different types of home composting units/bins are available in the markets that are manufactured with plastic, metal or concrete rings. Concrete bins have been identified as the most cost-effective and environmentally friendly solution, when compared to other designs. But productions of concrete bins have been limited to the few fabricators in the capital city and there is huge gap of dissemination of this knowledge to the other small scale fabricators. So, this technical guide mainly intended to disseminate the technology on concrete composting bin fabrication.

Moulds for manufacturing process

During the bin fabricating process, each component of the bin is moulded separately by concretes. Moulds can be prepared using metal sheets or most preferably by fibreglass. Separate moulds are required for;

- Basement
- Bottom ring
- Middle ring
- Top ring
- Top cover
- covering lid
- Compost removing doors

Main component of 3-ring concrete compost bin

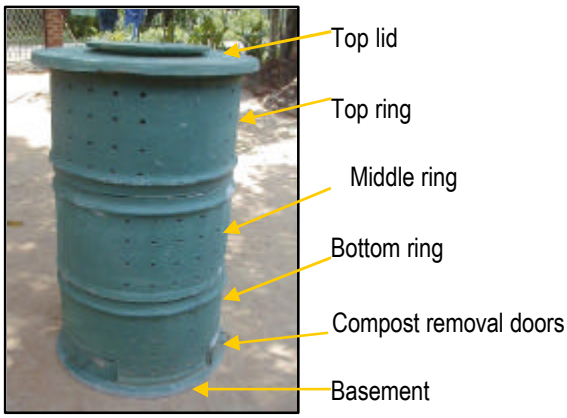

Plate-01

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Material required and cost for fabricating of one concrete bin

Description	Amount /rate	Cost (Rs) as prices on 1/06/2005
Cement(rapid hardening cement)	30.0 Kg	300.00
Iron (1/4" rods)	1.25 Kg	112.50
Metals(3/4")	1.5 cu ft	60.00
Sand	1.25 cu ft	50.00
Paints		60.00
Labour	3 bins/person/day	275.00
Cost for mold (Cost -18000.00/mold)	Assuming 100 bins are produced from 1 mold	180.00
Total		**1037.50**

Fabricating process

A) Preparation of the Concrete mixture

Material	Ratios
Sand	4 pans (screened through ½" mesh)
Metal	3 pans (size ¾")
Cement	30 kg

Above material should be mixed well and gradually add water to have a free-flowing concrete mixture. Good finish can be expected by adding 1 pan of quarry dust.

B) Bottom pad

Steps

1. Get the mould for (1" width iron ring that bolted by one side) bottom pad and place it on a polythene laid on the levelled ground (Plate-02).
2. Pour concrete mixture in to the mould (half –fill).

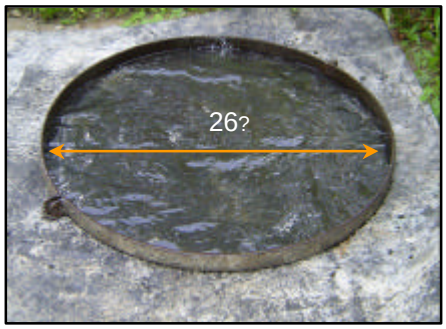


Plate-02

3. Place iron rings (1/4") as mention in diagram (three rings) Plate-03.

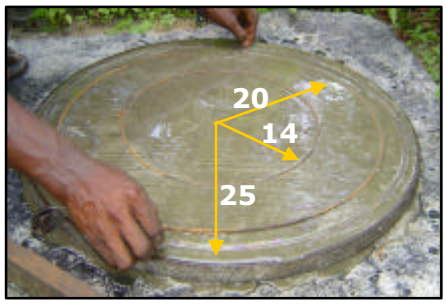


Plate-03

4. Fill the mould with concrete mixture covering iron rings completely.

5. Level the surface using a straight pole and remove the excess concrete from mould (maintain thickness 1").

6. Locate 4-5 PVC pipe pieces (1/2" diameter and 2" long each) to make the pad porous (Plate -04).

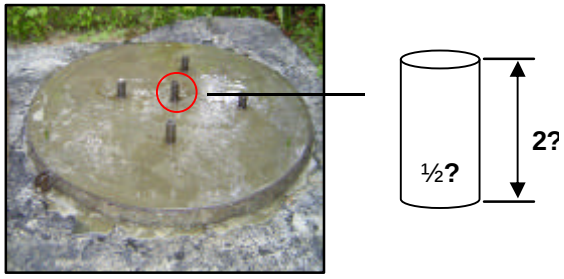


Plate -04

C) Bottom, middle and top rings (depend on the design)

1. Get three separate moulds for top middle and bottom rings (correctly fix all Components of each mould using bolt and nuts). Before fixing the ring parts of the mould, some burnt oil (oil from petrol vehicle is more preferable) can be apply in inner side of the mould. It makes it easy to remove the blocks form mould.

2. Locate the moulds on levelled ground (Plate 05 and 06).

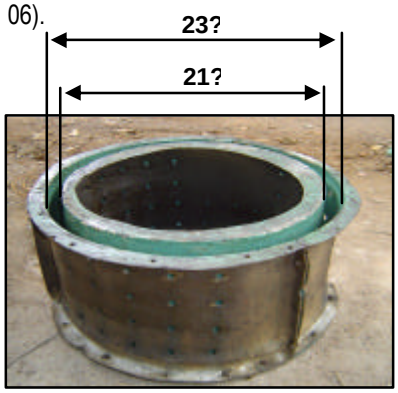


Plate -05

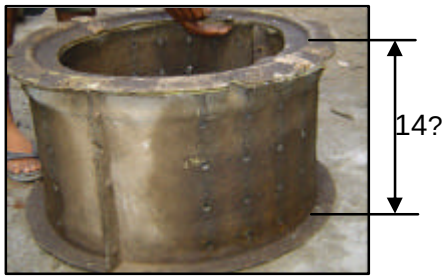


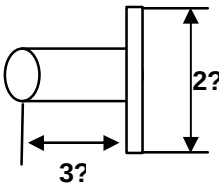
Plate -06

3. Get the concrete mixture and pour it in to the moulds to fill 1-1.5" from the bottom (Plate -07).

Plate -07

4. Insert first iron ring between inner and outer moulds – should not touch the walls of the moulds

5. Fixed the plugs for aeration holes in all bins(Plate-08)



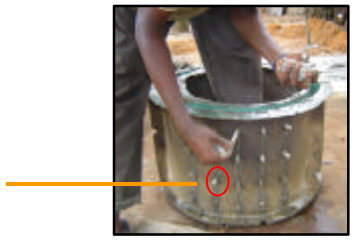


Plate-08

6. Add concrete mixture gradually and spread it uniformly with a stick (Plate -09)

Plate -09

For middle and top rings

7. Once the mould is filled up to 1-1.5" from the top level-place 2nd iron ring as first ring (Plate-10).

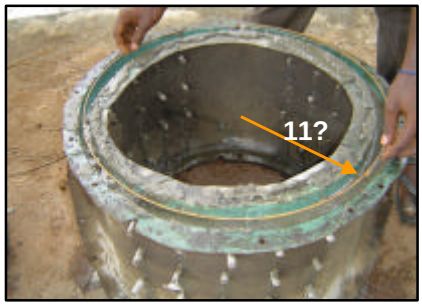


Plate-10

8. Fill the concrete mixture up to the top level of the moulds and levelled using a trowel

9. After 30 min , fixed the strip to the mould and add some mortar to make inner interlocking grove(only for middle ring) and levelled(Plate-11).

Plate-11

For bottom ring

7. Stop the filling of mould once concrete level close to 4" form the top.

8. Insert the 2nd iron ring and add 1" thick concrete layer on it.

9. Insert 3 sockets with equal spacing to leave the space for compost removing doors (Plate-12).

Plate-12

10. Fill the space in-between the sockets and Insert iron rods from the sides of each door (6 rods with 15" long and ¼" diameter) (Plate-13).

Plate-13

11. Cover the iron rods level the surface.

c) Top cover

1. Place the mould on levelled ground

2. Apply some oil in side the mould (Plate -14)

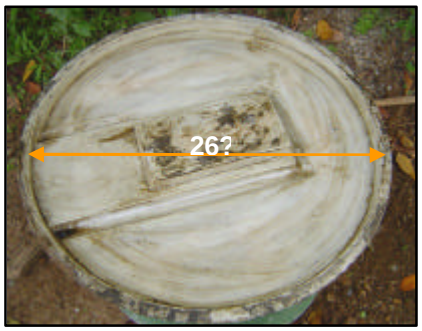


Plate-14

3. Fill the mould with concrete (3/4" from bottom)

4. Place two iron rings (¼") (Plate-15)

Plate-15

5. Filled with concrete up to the top level of the mould (1.5") leaving the space for door(Plate-16)

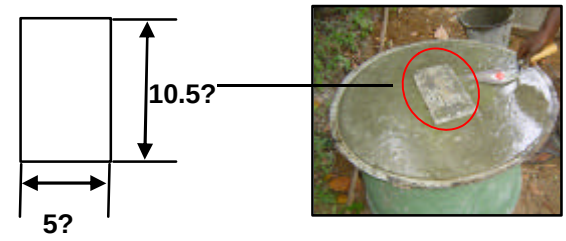


Plate-16

d) Top lid and compost removing doors

1. Place the mould on levelled ground
2. Apply some used oil in side the mould (Plate-17)

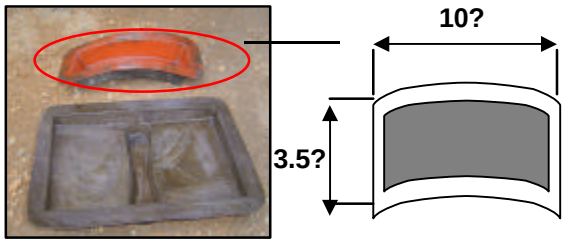


Plate-17

3. Fill the mould with concrete (half)
4. Place iron rods as mentions in the diagrams(Plate-18)

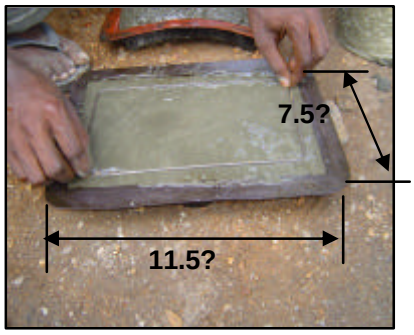


Plate-18

5. Filled with concrete up to the top level of the mould and levelled well.

e) Remove the moulds

If rapid hardening cement was used, mould can be removed after 24 hours. Special care should be taken to remove moulds from concrete rings. Inner mould should remove first to minimize possible damages.

1. Remove bolts and nuts in the flange of inner mould and loosen it from mould with little knocking (Plate-19)

Plate-19

2. Remove the inner mould with little curling (slide upwards) (Plate-20).

Plate-20

3. Remove the nuts in outer mould and separate it carefully from ring(Plate – 21).

Plate-21

- The plugs that were used for aeration holes need to be removed in 3-4 hours. Its little bit difficult to remove after hardening.
- Other components of the bins are easy to separate. Little knocking can be done to loosen the concrete blocks from moulds.
- These blocks are suitable to use after two weeks of maturation period. (Better to spray some water for hardening)

F) Painting

Painting can be done after the initial maturation period (2 weeks). Any colour can be used but dark colours are much preferable to absorb more heat from the environment. Green colour is commonly used due to it's environmentally friendliness.

Concrete compost bin manufacturers and mould producers

Bin Manufacturers
Lakna Concrete Works No.125, Hiripitiya, Pannipitiya Tele: 011-4305792/ 071-4058045 Reg. No. WF 4104 **Ruhunu Concrete Works** K.K.D.Koratuwa Rd Polhena Tel:0412229262/077457133

Bin Mould Producers
Lakna fibre works No.125, Hiripitiya, Pannipitiya Tel: 011-4305792/ 071-4058045 **Prasantha Kumara Mel** "Melsiri" Ullala Kamburupitiya Tel: 0773285516