

CASE STUDY OF THE CONSTRUCTION OF A
COMPOST TOILET
ON
ONE TREE HILL ALLOTMENTS
SE LONDON
JULY 2006 - updated April 2008

Introduction

This document details the build of a toilet on an allotment site. It gives an indication of how other allotment sites can build a toilet. It covers the construction of a bespoke building, it doesn't cover Planning law/permission, that is something that the society will need to deal with their Landowner.

Nor day-to-day running etc.

There is not an off the shelf detailed plans / costings / suppliers of how one can build a toilet. There are many books on Alternative Toilets but none have those details. There are companies that supply compost toilets, but some societies may consider the cost too expensive. This is frustrating to a committee who may not have the skills to implement this. In our build the committee member who took on the task has had experience of self building and interest in compost loos.

This document is intended to help societies in over coming this lack of off the shelf plans/details, by detailing what One Tree Hill Society did and to provide additional information.

NOTE

For information only. In this case study is only for guidance in order to help other allotments get underway in getting a toilet built. Whilst every effort has been made to make this information document and plans supplied as accurate as possible, no responsibility can be accepted for inaccuracies, errors or omissions in technical or any other information. The builders/societies using this information will need to ensure themselves that the information is correct for each stage and item of the build and if necessary engage the services of professionals.

None of these drawings are to scale.

The Brief

- A wheel chair accessible, 2 chamber (vault) toilet.
- Vandal proof
- Base to be level with ground level, i.e. no ramp.

Construction:

With being wheel chair accessible , twin vault and vandal proof, it had to be bespoke. So designed from scratch. Being at ground level, meant the vault had to be dug out of the ground.

- Frame: Timber constructed in Segal Building method of Post and Beam this is a tried and tested method that is simple and quick to erect a timber frame, about a day for this loo, literally drill hole and bolt together Many houses and even museums have been built using this technique, see www.segselfbuild.co.uk for more info.
- Walls: Sheet metal screwed on to frame, note about 15 cm off ground to provide circulation of air & wall does not sit on ground and rot. , Using sheets means quick and easy to install.
- Roof: Clear Polycarbonate, to let in light and tough & long lasting, quick and easy to install. Used the Twinfix method of fixing the polycarbonate in place, again quick and easy, system 501, instructions on www.twinfix.co.uk.
- Base: Concrete, to provide robust floor and foundations
- Vaults: Breeze block, easy to build,

Not very eco friendly (it could be with timber walls instead of metal, alternative flooring), but pretty vandal proof and easy to clean.

Lesson learnt

Hole depth

Check the depth of vault hole that it is not too deep that it is below the water table, you may have to dig a trial hole and leave over winter to check ! The vault depth could be reduced, but means they may have to be emptied a bit more regularly. Otherwise the design will have to have a raised base from the ground and a ramp. In experience the toilet has now been in use for 20 months and both vaults have been filled now and the oldest one is composting well.

Roof

From experience of how well the building has stood up to the elements, I have an amendment to the design. The design was done on a shoestring so there is a possibility that an item may not have been that performant. The roof was designed to be the cheapest configuration; it was cheap to have 3 large sections, than more smaller and more slightly expensive sections. Our building is not being in an overly exposed area did suffer from a panel being blown off. I have concluded that smaller sized panels say of 600 mm width would be a better choice, with glazing bars providing support. We have also added additional Nylon fixing buttons (from DIY stores) are used to spot fix the sheets to rafters and purlins, etc.

Costing

These figures are only an indication , as some costs were reduced by recycled items, some suppliers may be cheaper than others. *It will have to be up to the Society to do their own costings*

- Wood for Frame £170
- Concrete for Floor £ 200 also required reinforcing mesh £ 23
- Bolts (for joining timbers together) £ 90
- Metposts £ 45 for holding upright timbers in ground
- Wall cladding £ 300 this was corrugated Iron sheeting, could have been about £ 90 if been able to personally pick up 2nd quality agricultural sheeting from a manufacturer, delivery costs of greater than sheet cost made it prohibitive.
- Roofing £ 300
- Labour – £ 2800, used BTCV volunteers £ 280 per day 10 days required to build.
- Pipes/ sinks / plumbing / tank £ 200
- Breeze block for vault £ 70

Total cost £ 3892, so add 10% for contingency approx £ 4200,

Costing – beware labour costs!

The materials is only about £ 1000, that would sound reasonable and cheap to plotholders, the labour is the biggest expenditure of nearly £ 3000, as the whole thing had to be built by hand and from scratch. Labour costs is often over looked on projects as people look at the object and not the effort needed to construct it!

Savings

Use recycled items, on our build the guttering /down pipes / water tank / wash basin (a old kitchen sink) was used. Old wood for the vault doors.

Get plot holders to do work, on our build the groundwork of clearing and digging out the hole was done before BTCV arrived. We did the finishing off of building the seat, installing sink/ guttering /down pipes, building the vault doors. So we only had BTCV for 6 days. Getting plot holders involved in the finishing off was good for building relationships.

Of course this toilet is designed for wheel chair access, if a site does not need this facility, then the toilet Size can be significantly reduced, this will bring savings in the form of less materials & less labour.

Alternatives

Instead of building a bespoke Building over the loo, a Garden Shed (Wood or Metal), small agricultural building etc. could be used, that will also reduce the building costs.

Lesson leant

We had a grant of a set amount, we had to shoe horn the cost of building into it, as the grant was smaller than we required. *It cannot be stressed too highly that a society must do costings up front **BEFORE** applying for a grant.*

Suppliers

On our build we used these suppliers,

Item	Supplier	Located	Delivery area	Alternative
Wood	Merton Timber	South London	South London deliveries	Timber suppliers
Concrete	Merton Timber	South London	South London deliveries	Builders Merchants
Breeze Blocks	Merton Timber	South London	South London deliveries	Builders Merchants
Bolts	Merton Timber	South London	South London deliveries	Builders Merchants
Metposts	Merton Timber	South London	South London deliveries	Builders Merchants
Wall cladding	Roberts & Burling	Croydon	South London deliveries	Roofing suppliers/ Agricultural metal suppliers
Roofing	Twinfix	Warrington	UK, by courier (#20 del charge)	Search internet for Polycarbonate roofing suppliers/ Builders Merchants
Vent Pipe / Guttering / down pipes	Wickes	UK	UK	Builders Merchants

Lesson leant

Unless a member is in the building trade it can take significant time to source materials. This documents hopes to reduce the time spent by other societies in sourcing materials. Use of Internet search for suppliers assisted greatly.

Tracking down Metal sheets/Corrugated Iron was the most frustrating & time consuming, as they are not normally found in normal DIY/ Builders merchants.

Quantities

These are the quantities that we used, as far as we can recall. You will need to double check for your particular construction, before ordering!

Item	Values	Use
Wood	See appendix B	Building Frame
Concrete	See appendix C	Base
Breeze Blocks	33 440x215x100mm	Vault sides
Bolts	30 M12 Carriage bolts x 180 mm with washers	Fixing frame wood together.
Metposts	5 4x4 inch	For holding upright timbers in ground
Wall cladding	10 corrugated sheets of 2 foot wide by 2.5 meters high	These are used for the front and sides of the building
	5 corrugated sheets of 2 foot wide by 2.0 meters high.	These are used for the rear of the building
Roofing	3 sheets of 10mm polycarbonate 3000mmx1250mm clear	Actual roofing covering
	3 Glazing bars of 3000mm length	Holds polycarbonate on to middle of roof
	2 F section bars of 3000mm length	Holds polycarbonate on to sides of roof
Vent Pipe /	3 mtr of down pipe , 1 45 degree bend one , pipe coupling	Pipe coupling is to hold mesh on at open end
Guttering / down pipes	3 mtr of guttering , 2 mtrs of down pipe, 1 running outlet, 2 stop ends	

Design assumption

Vault

Having no experience nor dimension for volume , we did an estimation based on the following :
 Boldin allotments Ealing London has 0.8mtr vault ,
 Compost loo for a household in TV Prog had 6 blocks high

We suggest 4 breeze block high = 1.0 mtr approx ,
 Internal dimension is $0.44 \times 0.8 \times 1.0 = 352\text{m}^2 = 352$ approx poos per vault.

Societies may consider this too large and can reduce the depth of the vault, from 4 months use we reckon we could have reduced it by 1 breezeblock . We live and learn !

Publications

Many out there on alternative sewerage systems , but here are the ones I came across found useful;

Lifting the lid (An ecological approach to toilet systems) P Harper & L Halestrap
ISBN 1-898049-79-3 Centre for Alternative Technology publications

The Toilet Papers Sim Van der Ryn ISBN 0-9644718-0-9 Ecological Design press

The Human manure Handbook J Jenkins ISBN 0-9644258-9-0

Appendix A

Step by step construction

This is just bullet point of each stage, this is not intended to be an in detail how to construct.

Clear and level land

Mark our concrete base area,

Mark out vault concrete base area,

Dig out to depth of concrete base and vault area, and the access slope.

Fill Base with hardcore and metal reinforcing mesh.

Fill vault with hardcore.

Place Metposts in position

Fill Base & Vault with concrete and leave to dry

Build Vault block work

Place upright 4x4 inch posts in Metposts and tighten up bolts.

Fix lower Horizontals wooden beams using bolts, Note :check levels and uprights are in vertical

Fix upper Horizontals wooden beams using bolts , Note :check levels and uprights are in vertical

Fix Roof beams in place ,Note: the dimensions must be adhered to and must be true to ensure easy fixing of polycarbonate

Fix metal cladding

Fix roofing

Build and install vault doors

Fit Vent pipe , Note open end cover with fine nylon mesh ,use straight connector to hold in place.

Build pedestal and loo seat and cover for non use vault.

Hang door

Install water tank if using rainwater from roof

Install and plumb in washbasin

Install loo roll holder !

Install bucket with sawdust.

Note

The vault and pedestal needs to be constructed in a way that it is fly tight. You don't want flies breeding in the loo. IF you use an existing loo seat then it needs to be modified , so it fits tight, remove the plastic studs and re align the top.

Helpful idea

If no electricity on site hire of generator to run power tools. Jigsaw/angle grinder to cutout metal sheeting. Power drills for drilling and screwing.

Appendix B

All 4 x2 inch unless stated

SIDE 1

	no of	length
1 x 2.1 mtr bottom	1	2
1x 2.1 mtr roof	1	2.1

SIDE 2

1 x 2.1 mtr bottom	1	2
1x 2.1 mtr roof	1	2.1

FRONT

4 X 2.5 mtrs uprights 4x4	10mtr	4	2.5
1 x 1.9 mtr	bottom	1	1.9
1 x 3.5 mtr	top	1	3.5

REAR

2 X 2.0 mtrs uprights 4x4	4mtr	2	2
1 x 3.1 mtr	bottom	1	3
1 x 3.5 mtr	top	1	3.5

ROOF

4 x 3 mtrs		4	3
2 x 3.8 front piece		2	3.8

PEDISTAL

2 x 1 mtr top		2	1
2 x 1 mtr bottom		2	1
4 x 0.8 mtr side bottom		4	0.8
4 x 0.5 mtr uprights 4x4 = 2mtr		4	0.5
3 x3	ply 6mm	1	
3x3	shuttering ply	1	

Appendix c

item	size /length	no of
cement	25 kg bag	12
sharp sand	600 kg	2
coarse aggregate 20mm	1200kg	3
Steel reinforcing mesh	3mtr x 3	