GABION WALLS

A technical document detailing the process

The Hobbit Series

Masons Ink team and participants had a collaborative gabion wall workshop in Hosur under the mentorship of the principal architects.

This was the first out of a series of workshops held at site in the spirit of upskilling the women workforce and labourers. As a firm, we believe in gender equality, with it being a core part of our efforts in uplifting women in construction and addressing the issues they face at the root level.

This is a document detailing the technique and process attempted during this workshop.

Hosur, India
February, 2022

INTERNAL WORKSHOP

GABION WALLS

A basket or container filled with earth, stones, or other material and used in civil engineering works or (formerly) fortifications.

THE STRUCTURE

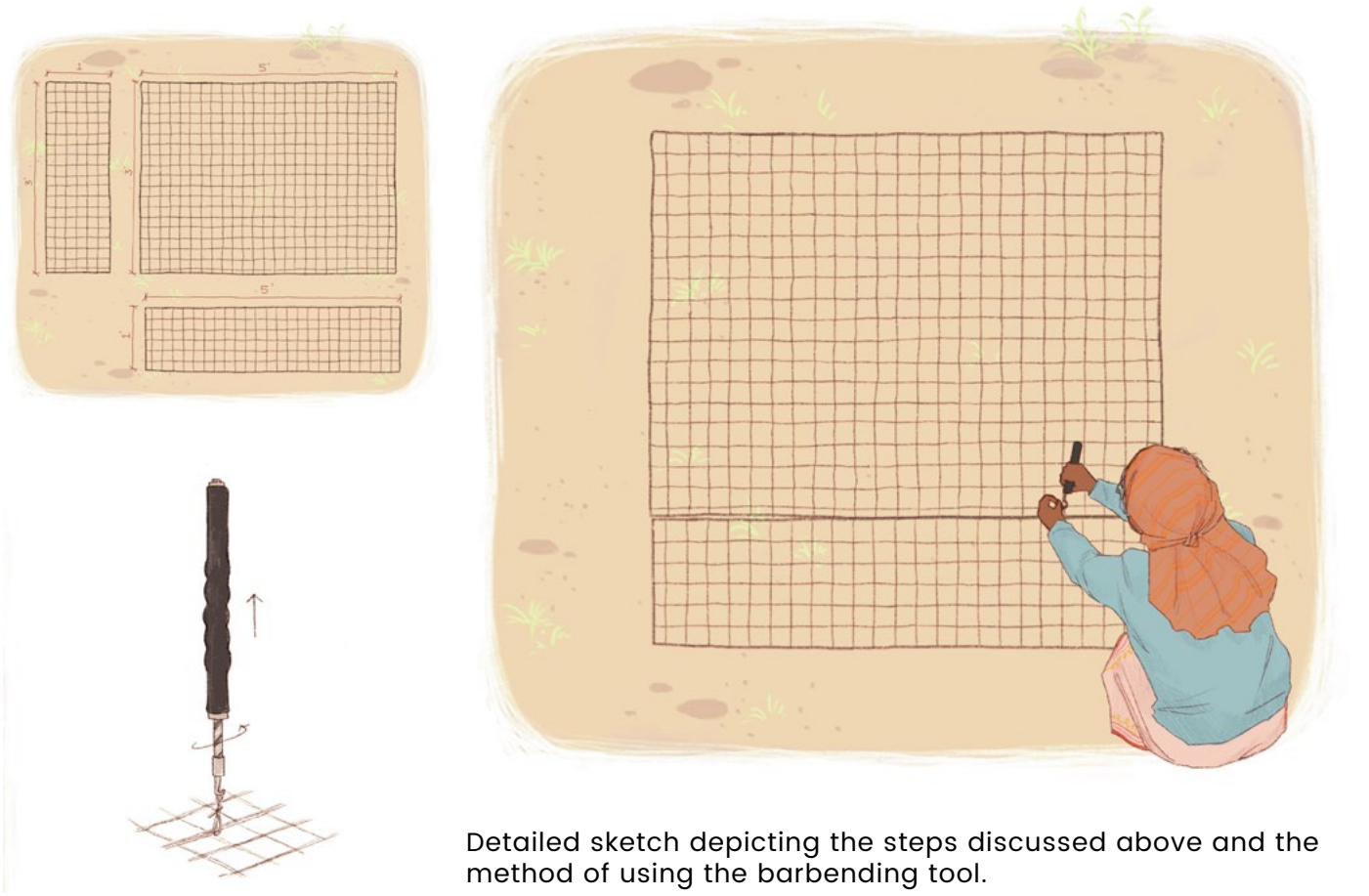
1. Assembly of meshes:
GI wire meshes sourced in sizes as per the requirement were procured. The sizes being 5' x 3' for the front faces and 1' x 3' / 1' x 5' for the sides of the basket or gabion.
These mesh panels were laid out in the formation that they were to be assembled in.
Only four of the six faces of the gabion are assembled as the baskets shall be joined together, with one side-face being a common face, and the top-face left open and tied later so that the gabion may be filled.

GI meshes on site

Assembly of GI meshes

2. GI wire ties:
Wire ties were used to loop around the wires of two adjoining mesh panels and twisted using barbending tools in order to hold them in place for lacing.

Barbending tool used to twist and knot GI wire ties.



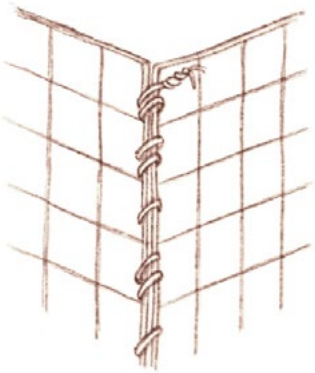
Detailed sketch depicting the steps discussed above and the method of using the barbending tool.

2. Lacing of baskets:

A length of the GI wire is used to lace the edges of two adjoining mesh panels together - strengthening the joints along the wire ties.

Lacing along the side face

Lacing along the bottom face

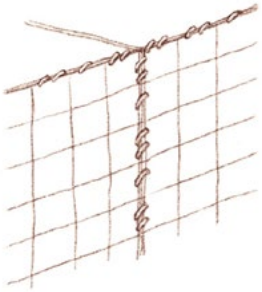


As depicted in the detail sketch, the laced wire had an alternating double loop

3. Assembly of tied baskets:
The tied and laced baskets are assembled in a linear format along the length of the compound wall so that they may be joined to form a single length. Again, metal ties are looped around the edges of two adjoining baskets, providing some stability before they are laced together.

Assembling and tying of single baskets to form the skeleton of the compound wall

4. Lacing of adjacent baskets:
A longer length of GI wire is used to lace together adjacent gabions. Care is taken such that one length of wire covers over at least one joint so that stability is achieved and the gabions behave as a single unit.
This lacing is done over the top lengths as well as the sides and has an alternating double loop.



Sketch depicting arrangement of aligned gabions and lacing details.

THE INFILL

5. Sorting of rubble and construction waste:
To be used as a filling in the gabions, piles of rubble and other construction waste were sourced. These were sorted into piles of usable stone blocks, brick and broken pieces of roofing tiles.

Sourced construction waste

Brick bats used

6. First course of infill:
The first and bottom-most course consisted of larger sized stone masonry with jelly and smaller rubble on top to fill in the gaps between them. Through stones are also placed for stability.

Sized stone used

Laying of the stone

Finished first course

7. Second course of infill:
The second course of infill is completed in a similar manner of placing slightly smaller sized stone masonry and once again filling the gaps with jelly stones and smaller rubble.

Laying of the stone

Finished first course

8. Third course of infill:
The third course of infill consists of brick bats that are lighter in weight that is placed in two courses on top of the jelly stone. The top most layer uses broken terracotta tiles laid in an even manner.

Once the third course has been completed, the top face of mesh is tied with the wire ties and then laced with GI wire as described in the previous steps.

Laying of the brick

Sketch depicting the laying of the courses

Tying of wire mesh of the top face

Top mesh surface

Finished top course

POINTS TO NOTE

Before step 2 (GI wire ties):

- It should be ensured that the ground surface is evened and well prepared before assembling the gabion cages. The centerline of the wall should also be marked.
- Form and structural details of the gabion wall depend on the height and length of the gabion wall to be achieved.
- In some cases a slightly uneven (bumpy) ground surface may prove advantageous as the mesh will mold itself to take the shape - forming a natural interlocking system.

During steps 2 & 4 (Lacing):

- Lacing can use any number of loops as required by the selected mesh in order to maintain stability of the gabion structure.

During step 6,7 & 8 (Infill):

- Infill of stones should be done such that most gaps in between the stones are filled. Different sizes of jelly stones can be used for this.
- Overfilling can cause the Gabions to bulge.

During step 8 (Third course of Infill):

- The top most layer of the infill can use a better quality of bricks or tiles to act as a form of protection from the rain.

PROS AND CONS

Pros

- Uses construction waste/discarded material such as stone blocks, brick and tile as the infill which makes sourcing a bulk of the required materials inexpensive, sustainable and eco friendly.

- They are porous in nature and are well suited for retaining soil or land terrain that requires drainage.

- As the walls are built with mesh that is flexible and yet resistant, these wallls are not perceptible to cracks caused by any seismic activity. They will not crack or collapse unless the wire cage breaks.

- Gabion walls have a comparatively small carbon footprint than other wall solutions that use cement or timber.

- They require very little maintenance and are long lasting.

Cons

- They are highly labour intensive, requiring a large amount of manual labour especially if using manual tools for laying the stones and the infill. This makes it difficult for gabion walls of larger heights

- Larger gabion walls may require heavy machinery like a backhoe for infill of material.

- While the aesthetic of the gabion is well suited for farmhouses, it may not appeal to the theme and design of every context or construction.

- Cannot be used in areas prone to a salinity content such as regions close to the coast as it can cause the metal to rust.

Material Checklist:

- [ ] Sized stone masonry blocks
- [ ] Construction waste - Salvaged stone blocks
- [ ] Construction waste - Salvaged brick bats and full bricks
- [ ] Construction waste - Salvaged mangalore tiles
- [ ] Jelly stones 40mm
- [ ] GI wire
- [ ] Wire mesh fence of 3 sizes (per box)

  5ft x 3 ft (2 nos)

  3ft x 1ft (2 nos)

  1ft x 5ft (2 nos)

Tool Checklist:

- [ ] Bandlis (2-3)
- [ ] Cutting pliers (2-3)
- [ ] Curved hook pull-tie twister (2-3)
- [ ] Protective gloves

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