How to construct a ferrocement rainwater harvesting tank

Philippine Center for Water and Sanitation
WASH Coalition Pilipinas
Ferrocement:

- a **concrete construction technology** that favors the use of closely-spaced mortar and small diameter reinforcement such as wires and meshes;

- as opposed to graved concrete and rebars mainly used by conventional reinforced concrete.
Advantages of Ferrocement Over Conventional Rebar Concrete

1. More bonding area, more dispersed reinforcement = more crack resistance and usually, savings in reinforcement needed.
Advantages of Ferrocement Over Conventional Rebar Concrete

2. Smaller diameter reinforcement + smaller aggregate sizes = less concrete as steel cover = thinner sections = possible savings in concrete.

Ferrocement structures usually cost 65-85% less than conventional reinforced concrete.
Advantages of Ferrocement Over Conventional Rebar Concrete

3. Thinner sections = enables the use of reusable forms.
Advantages of Ferrocement Over Conventional Rebar Concrete

4. Reusable molds facilitate curved shapes = stronger structures.
MAKING A 5,000-LITER TANK: A Typical Ferrocement Construction

1. Making the reusable mold:

Drawing the rebar patterns. Cutting and bending the rebars for the molds.
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1. Making the reusable mold (cont’d.):

- Welding the rebars together to form the mold.
- Cutting the mold into panels.
- Cladding the panels with wire mesh.
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2. Making the tank (cont’d): Preparing the molds for use

Papering over the mold panels. Assembling the panels together over the tank base.
MAKING A 5,000-LITER TANK: A Typical Ferrocement Construction

Making the tank base

a. The ground is leveled and staked.

b. Plain GI strips and rebar ring comprise the base mold; a base course of gravel is laid.

c. A reinforcing grid of tie wire is laid; concrete is troweled in.
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Constructing the tank

Winding some wire around the tank to hold the paper.

One or two mortar coats.
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Constructing the tank

Vertical wire reinforcement.

Horizontal wire reinforcement to resist the water pressure.
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Constructing the tank

<table>
<thead>
<tr>
<th>Elevation (cm)</th>
<th>#18 Wire Spacing (mm) Piped System</th>
<th>#18 Wire Spacing (mm) Rain Catchment</th>
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<tr>
<td>9 additional wire wrappings</td>
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Example of horizontal wire spacing for a 5,000 liter tank
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Making the tank (cont’d): Lip construction details

Lip mold set atop tank.

Lip mold details.
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Finishing the tank exterior with more mortar
MAKING A 5,000-LITER TANK: A Typical Ferrocement Construction

Finishing the interior

Interior finish of mortar then a final flooring layer.

De-molding the following morning.
MAKING A 5,000-LITER TANK:
A Typical Ferrocement Construction

Making a manhole lid

Shape earth. Stake. Line with news papers. Place lid mold and reinforcement.

Emplace mortar; demold.
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A finished rainwater harvesting tank
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