C 115

A new composite construction material for low cost underground water tanks

There is a great need to construct low cost underground water tanks in the dry zone of Sri Lanka to enable rainwater harvesting. A research is conducted to introduce the said tanks with the use of low cost materials. Mainly cylindrical tanks with spherical domed roofs were analyzed.

Analytical results revealed that high tensile develop near top and bottom joints of the cylindrical wall. As the tank diameter increases, the tensile stresses near the joints also increase. Lesser the depth of cylindrical wall, lesser the earth confinement, resulting in high tensile stresses near the joints. Therefore tensile strength of construction materials is a governing factor which will limit the storage capacity.

Maximum tank diameter that can be achieved using brick masonry is only about 2.0 – 2.5 m, since the tensile strength of brick masonry reinforced with wire mesh for the cylindrical wall. With this new composite material, diameter of cylindrical wall can be increased up to about 6m, as it possesses a fairly high tensile strength.

It is necessary to reinforce both inner and outer surfaces as high tensile stresses develop on both sides. Outer wire mesh can be extended only up to a required distance from the joints, where the tensile stresses are high, but it is recommended to have the inner one on the entire surface area to minimize shrinkage cracking of brick walls.