

Can't help but crow about my latest Rube-Goldberg contraption at the BEACH HUT:

## A SECONDARY WATER PUMPING SYSTEM

Background: for the past year, the 3 cubic meter below-grade cistern that collects overnight the slow-running municipal water has a centrifugal-pump/pressure-tank combination that works well, except when it gets air-bound after non-use and has to be manually primed to start. Besides, it is noisy and draws high current. See the pictures below showing the hut fronting the beach, the pump/tank combination, and the cistern.



The solution is to have a submersible pump. Since my project is based on minimal costs, using "off-the-shelf" items as much as possible, I bought a 1/3 hp submersible pump used for basement flooding. But it is not powerful enough to pump into the pressure tank. I needed an overhead tank, but didn't like to buy a similar SS tank we have at the house in town, shown on right.



So I went ala Rube-Goldberg style. See the progression of pictures outlining the construction of the secondary water pumping system:



Left: The float switches which signal the pump when to start and stop are plastic medicine bottles that house mercury switches taken from an old air-con thermostat, waterproofed by epoxy. For safety, 12 volts was used for these switches, sourced from a 3 ampere boxed power supply similar to those types one can get at Radio

Shack. The local version cost an equivalent of only 8 bucks. The submersible pump was even relatively cheaper at 32 bucks. I used a 12-volt relay to complete the logic circuitry for the float switches and also as an interposing relay for the 220 volt pump. All these electricals went into the power supply box.



Left: The overhead tank is a plastic water container with a hole bored at the bottom for the entry/outlet pipe, with plastic garden hose fittings. The tank is hung from the eave's roof rafters using the supporting metal pipes that also locate the wooden crossbeam that holds the float switches inside the tank. Various holes drilled through the wood allow height adjustment for the switches.

Right: The overhead tank is set in place. The black box is the 12 volt power supply, modified to also house the relay as mentioned above. I bolted a convenience outlet on the box so the pump's cord plugs directly into it, and I also plugged a small night light into the outlet to serve as a pilot light to tell when the pump is running.



I calculated the weight of the water-filled tank and it came to about my weight, so I did a number of pull-ups on each of the roof rafters and they didn't even budge: therefore, no need for any fancy platform or supporting structure.



Voila, the finished secondary water system.

The new additional all plastic piping with it's valving arrangement that includes brass check valves allows both pumps to run in parallel if need be. And it keeps the original pump primed at all times. The pipe going up connects to the overhead tank. The two pipes going down go to the cistern.

If we need higher pressure for showering in the bathrooms, a manual switch located outside the door of the main bathroom starts the original and more powerful pump/pressure-tank combo (eventually, I'll put a timer to stop it in a few minutes), otherwise the new overhead gravity water tank is more than adequate for normal kitchen sink, lavatory, toilet functions. And everything is automatic.

16 August 2007