

The “Dunk” Tank Revisited Less Cost and Less Water The “Sump” Tank

Always wanted to have a Dunk tank for fun at an event for your organization? I have a simpler and easier solution for you. I have designed and built a “Sump” tank. Make money for your organization or Just Have Fun with it!

General Information

My involvement in organizing activities for a community group led to the idea of having a “Dunk Tank”. Rentals, of such equipment, was expensive, did not fit into the budget, and traditional Dunk Tanks require several hundred gallons of water which was inconvenient. The revised version, the “Sump” Tank, uses an off-the-shelf Sump pump. The “douse” time is adjustable and can deliver between 1 and 5 gallons of water to the “Victim” when the target is hit.

The unit requires AC power and the water is not currently “recycled” but this modification could be made. The unit is controlled with an electronic module using a microprocessor.

You can build this “Sump Tank” for a cost of around \$200!

In the first generation of this the frame was constructed of wood, primarily 2x4’s this structure was heavy and needed a trailer to transport. This led me to the idea of constructing the frame from 1 ½” ID PVC Tubing. If you glue the main structural pieces and assemble the main structure with screws and wing nuts you have an easy to transport (or store) structure that is easy to transport and assemble.

Electronic Control

The second generation of this uses a 8-pin processor to provide the control of the system. The on time for the pump is adjustable from 1 to 9 seconds. This application also demonstrates how much can be done with a processor that has a minimal amount of input and output.

The control module is powered with a 12 VDC input. There are inputs for a switch to change the “dump” time and an input from the Target switch. When the target is hit a switch closes. The target switch closure is detected by the processor, which in turn turns on a relay, that turn on the pump.

If the time change switch is press the time increases and the time that is set is clocked out to a shift register that displays the time on a 7-Segment display. This time is used for the time that the relay is held on.

AC Receptacle

A standard off the shelf AC wall receptacle is modified to work in conjunction with the Electronic controller. A drawing is provided to show how this is done. See the schematic for the Modified Outlet. These receptacles have 5 screw terminals. There are 2 on the side with the wide slot, 2 on the side with the narrow slot and a Ground connection. First modify the receptacle by breaking away the jumper on the side with the wide slot.

AC voltage is provided to this outlet by using a 3-wire extension cord and cutting off the female end. The wires from the extension cord are connected to the bottom screws (those closest to the Ground Screw). A 2-conductor wire is now run from the J5 screw block on the Control Circuit to the top and bottom screws on the modified receptacle. Now the power supply for the electronics can be plugged into the bottom receptacle and the Pump is plugged into the top receptacle. The top receptacle will be “Switched” by the electronics and the bottom receptacle will provide a constant voltage.

AC voltage can be dangerous. Make Sure to use a grounded extension cord and connect up the modified outlet as described above. If you have any doubt about this consult someone knowable in this area.

“Sump Tank” Frame Construction

The frame is constructed from 1 ½” PVC Tubing. Cut all sections and assemble to check size and orientation before gluing any sections. I recommend gluing basic sections and using screws to assemble the main structure. That way it can be broken down for easy storage or ease of transportation.

See Figure 1 for a drawing of the basic frame.

Parts required for frame:

1 ½” PVC T’s  11 Required

1 ½” Elbows  7 Required

1 ½” Tubing – Lengths Listed below 

8 sections @ 14.75” (Back and sides)
4 sections @ 2.5” (Front, join elbows and T’s)
5 sections @ 6” (Uprights)
2 sections @ 22.5” (Front mid section)
1 section @ 3’ (Target Bar)

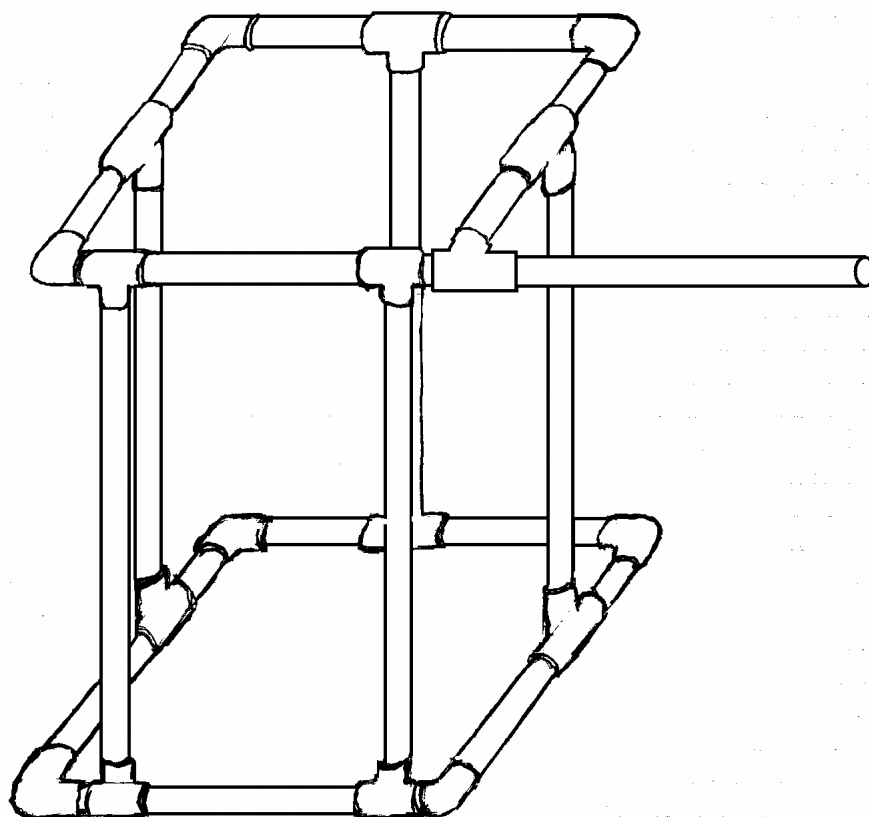


Figure 1, Basic Frame

Plumbing and Pump

Sump Pump is a Craftsman Submersible Utility Pump. Model 390.269451.

Pump is connected to a 5' 6" piece of garden hose to $\frac{3}{4}$ " plastic plumbing to provide the "downspout" to douse the victim. See Figure 2 for the idea.

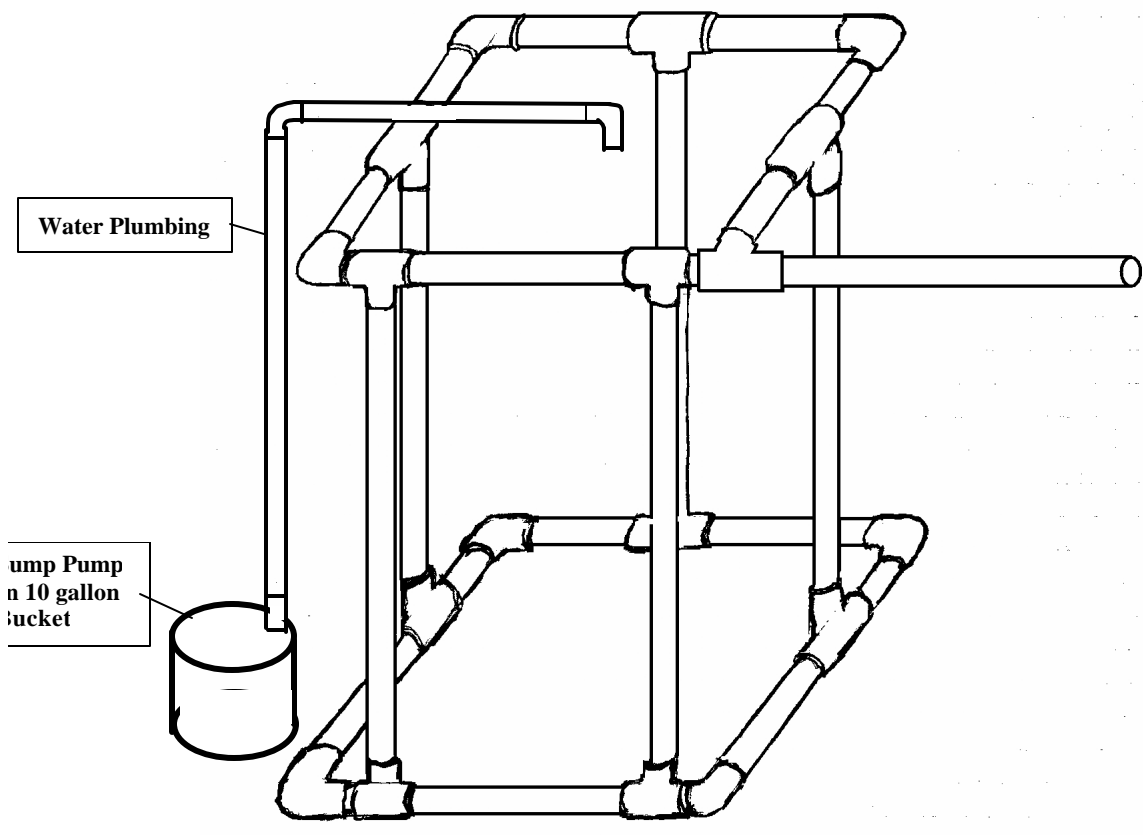


Figure 2, Frame with Plumbing