

Speed measurement of a pop-pop boat

By Jean-Yves

Theoretically, everyone can measure the time (t) used by his pop-pop boat to go from one position to another one, and knowing the distance (d) between these two positions he can calculate the speed $V=d/t$. Practically, it is more difficult because pop-pop boats have no course stability. However, it is possible to get a rather good idea of the performance according one of the following methods.

One alternative is to use a sort of long gutter to force the boat to go straight ahead. This is the way used for the pop-pop boats competitions.

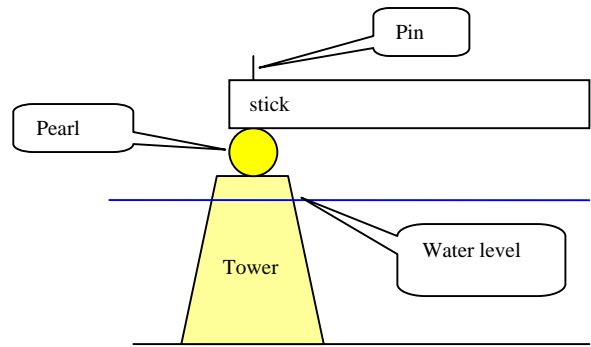
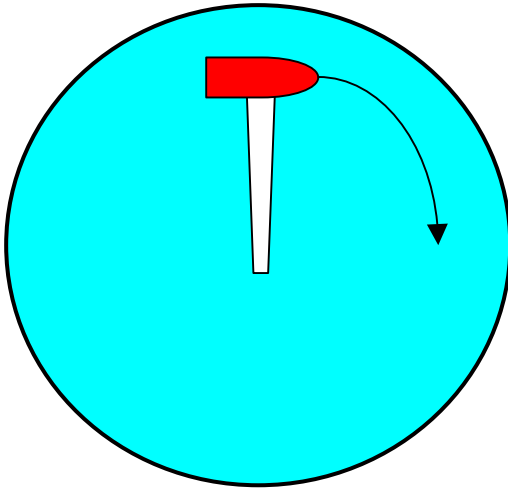


But, (There is always a *but!*) in such conditions, the boat tends to stick on one of the gutter wall which slows it.

This drawback can be considerably reduced by using some sort of outriggers above the water line. I used for that two little pieces of steel string glued as added hereafter on a picture of a pop-pop boat.

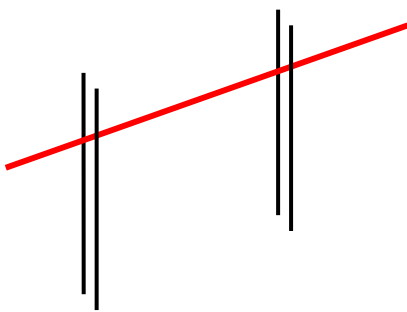
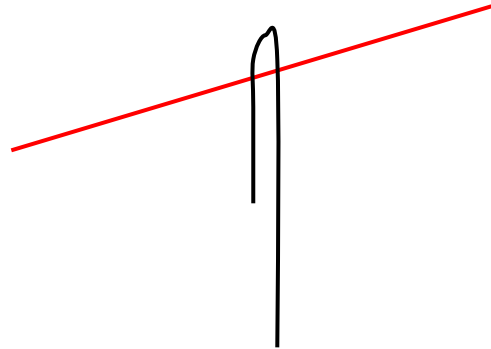


Another alternative (Jeff's method) is to measure the circular movement of the boat. Knowing the radius (r) and the number of seconds (t) per turn, the speed is $V=2\pi r/t$. To do this, use a large circular tray and put something that we will call a tower in the middle. The tower must have a specific gravity higher than the water one. It could be for instance a piece of metallic pipe in which you will have inserted a piece of wood at the upper end. Then, glue one end of a light stick on the boat (above the water line), and drill a small vertical hole at the other end of this stick. Insert a pin or a nail in this hole and hammer it into the top of the little tower with a small pearl in between (stolen to your sister or daughter) to get a low friction.



A third alternative consists in using one or two guide wires. Both ends of the boat are to be completed with some sort of antennas. Then, due to the fact a guide wire cannot be a perfect horizontal straight line (Once again this is Newton's responsibility!), there are three possibilities.

- Either you use one single wire and both antennas are ending by a sort of hook around the wire (Daryl's method).



Or you use double antennas at each end, and the wire is in between the antennas.

- Or you use two parallel guide wires and classic vertical antennas, one at each end.

