Ram Pump

August 14, 2011

Abstract

The ram pump team is investigating the use of a ram pump that would be installed on the treated water line between the AguaClara plant effluent and the distribution tank. The ram pump would use a little of the excess elevation difference between those two locations to pump a small flow of water into an elevated tank for use in the bathroom and to fill chemical stock tanks.

students 3 PT

skills fabrication, strong in fluid mechanics

1 Introduction

Ram pumps are a well established technology that can lift a small amount of water to a high elevation by using the energy of a large flow of water that is dropping a small elevation. This technology could be used to pump a small amount of the treated water into an elevated storage tank. The elevated water would be used to fill stock tanks and to provide water for the bathroom at the water treatment plant. See the Hydraulic Engineering Course notes on Hydraulic Transients to learn about the theory of using pressure transients to pump water. Explore commercially available ram pumps as well as the possibility of fabricating our own pump. The available head between the AguaClara plant and the distribution tank is highly variable between plants. In some locations it might be necessary to increase the size of the pipe between the plant and the distribution tank. An alternative may be to add a parallel line that is used exclusively by the ram pump.

There is extensive information on the web including plans for ram pumps from Clemson Universityand Detailed plans from Warwick University. The concepts presented in the notes on Hydraulic Transients may be used to estimate the required size of the ram pump. It is very likely that we can build our own pump given the success of the PVC ram pump by Warwick University. The design must be modified to collect all of the "wasted" water because that water must all go to the distribution tank. It is possible that the ram pump would

be installed at the distribution tank or that it would be installed in the pipe gallery of the stacked rapid sand filter.

Given the extensive online documentation for ram pumps it should be possible to build one during the fall semester for installation at one of the water treatment plants (or distribution tanks) in Honduras during the January 2012 trip.