

Controls Section II:

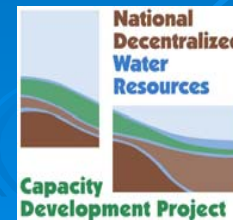
Hydraulic and Mechanical Controls in Onsite Wastewater Systems

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Citation

Trotta, P.D., and J.O. Ramsey. 2005 Controls Section II: Hydraulic and Mechanical Controls in Onsite Wastewater Systems - PowerPoint Presentation. *in* (M.A. Gross and N.E. Deal, eds.) University Curriculum Development for Decentralized Wastewater Management. National Decentralized Water Resources Capacity Development Project. University of Arkansas, Fayetteville, AR.

Section Objectives:

- Understand *Fixed Control*, and when to implement into Onsite design.
- Understand Operational Controls including Passive Hydraulic Controls and Automatic Mechanical Controls.
- Become familiar with different types of Passive Hydraulic Controls and Automatic Mechanical Controls.

Introduction

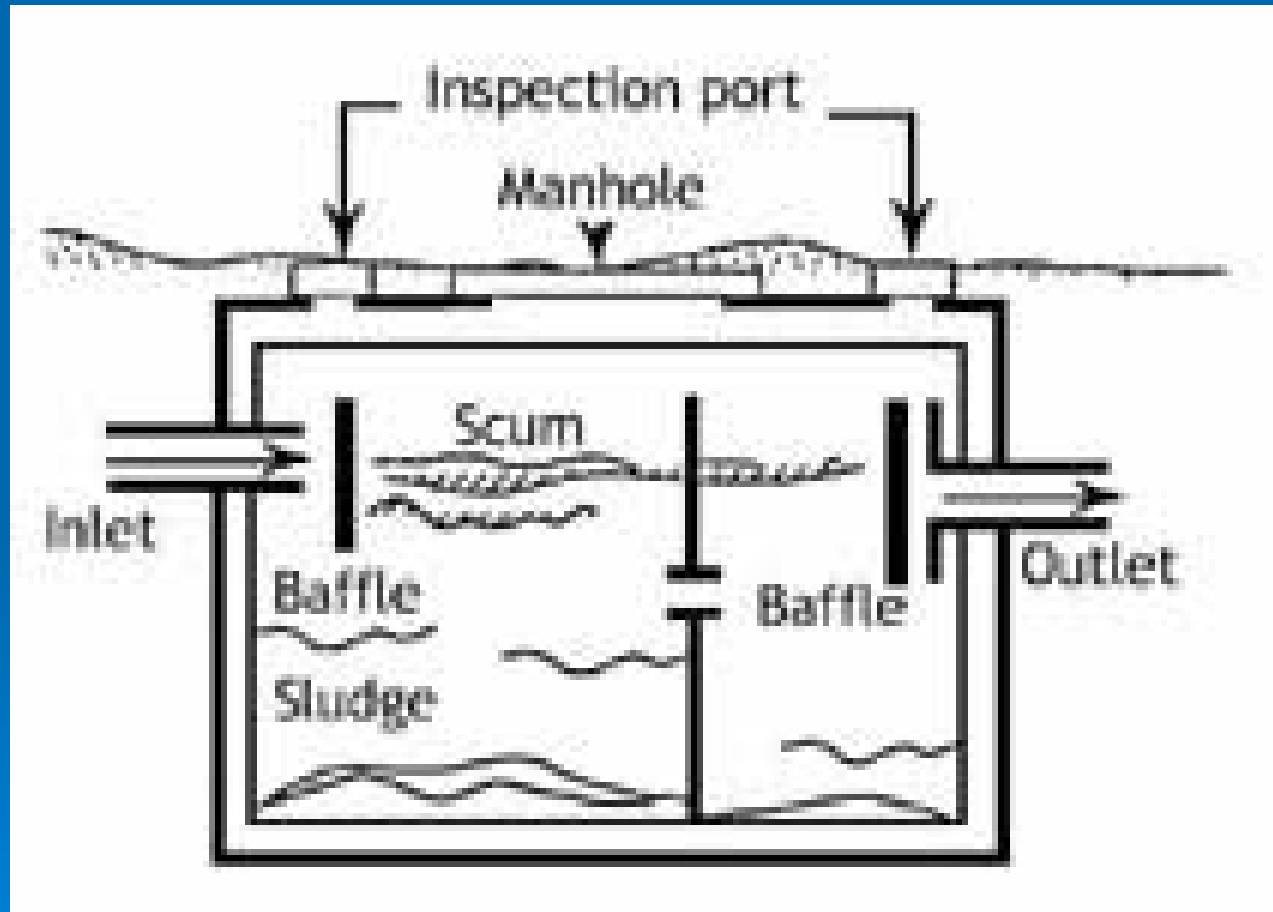
- Some control is built in, passive and permanent, while some of the control is automated and easily adjusted.
- Traditional systems tended to be passively controlled
- Newer mechanized systems have more active controls that may be strictly mechanical or electromechanical.

Fixed Control Built in Initial Design

- Many features of an onsite wastewater are permanently controlled through the initial design.
- Controls that are designed, constructed and set for the life of the system during installation can be referred to as *fixed controls*.
- The most obvious example of a *fixed control* is the initial design of gravity flow hydraulic elements within an onsite system.

Example of Fixed Control: Gravity Flow Septic Tank

The weirs, baffles and orifices in a septic tank are not adjustable but effect control of the treatment within the septic tank.



Design for Fixed Control

- Carefully designing the relative elevations of the various components of a wastewater system controls its operation to a certain extent.
- Whether operating with gravity flow or pressure dosed, the slopes, hydraulic grade lines and conveyance characteristics of the hydraulic elements control flows and discharges.
- Many of these are established during the initial design and are often not subject to change after installation.

Operational Controls

There are a variety of passive (not automatic but with limited adjustment) and fully adjustable operable controls that are used in the design and operation of an onsite system that are amenable to manipulation after the system is built.

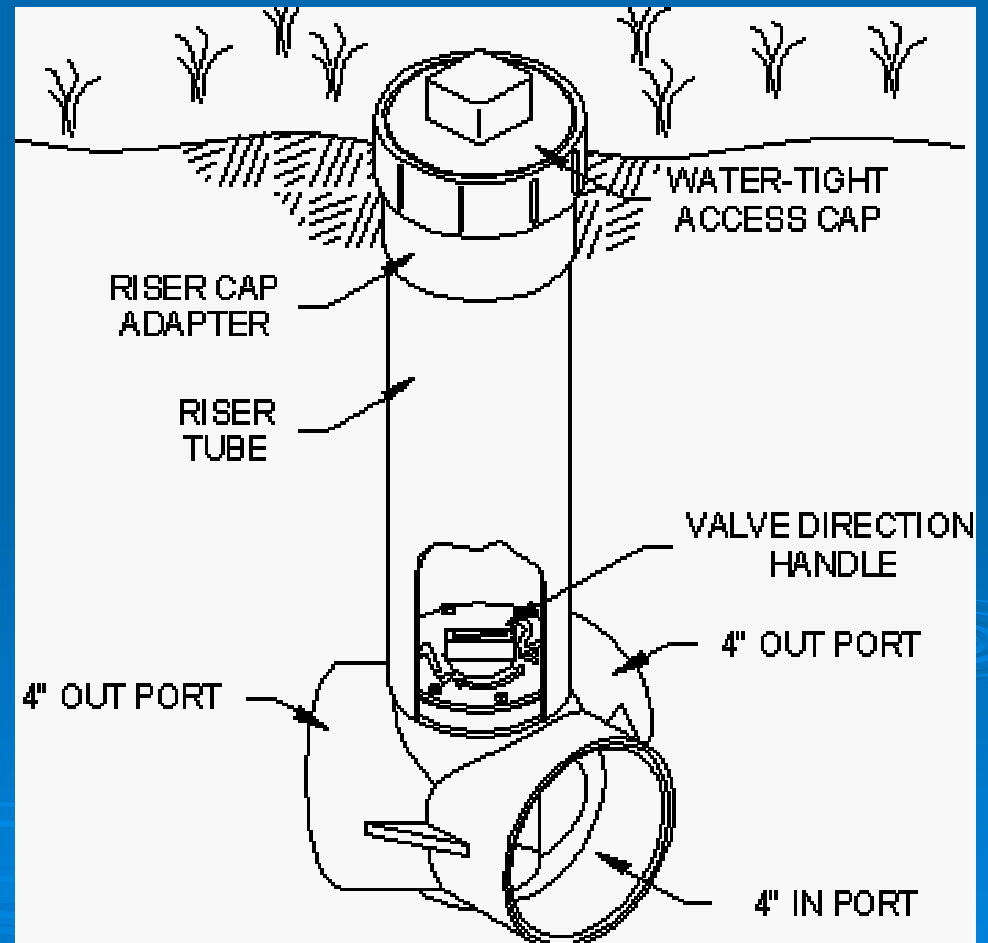
Adjustable operational controls include hydraulic, mechanical and electro-mechanical and often have one or more user-determined settings that can be changed with only minor interruption of the system.

Passive Hydraulic Controls

- Passive Controls are adjustable at the time of installation or later during system maintenance, but are not readily used as control on a daily or weekly basis.
- For example the common diversion valve that will divert gravity flow effluent from one dispersal field to another. It has a moving part that is manually operated as needed.

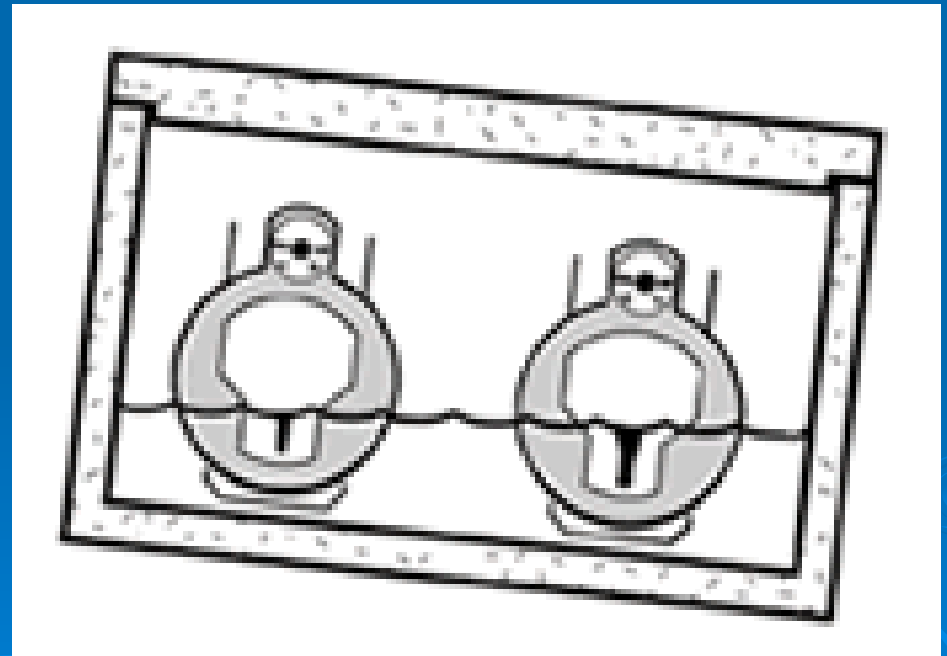
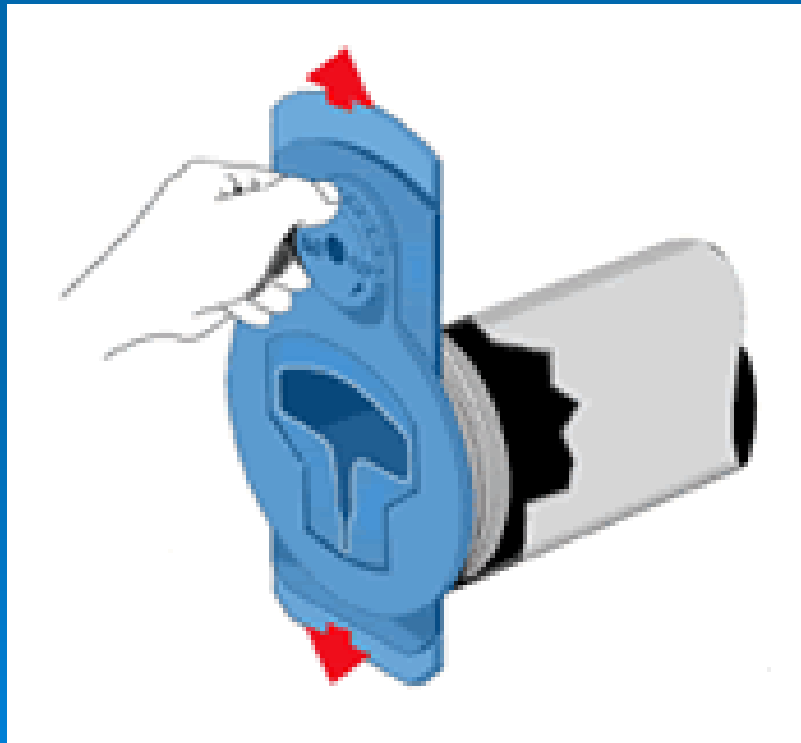
Bull Run Valve

The “Bull Run” valve shown is an example of passive hydraulic control.



The “Equalizer” by Polylok

The “Equalized” is another example of Passive Hydraulic Control to be used in a “D” Box.



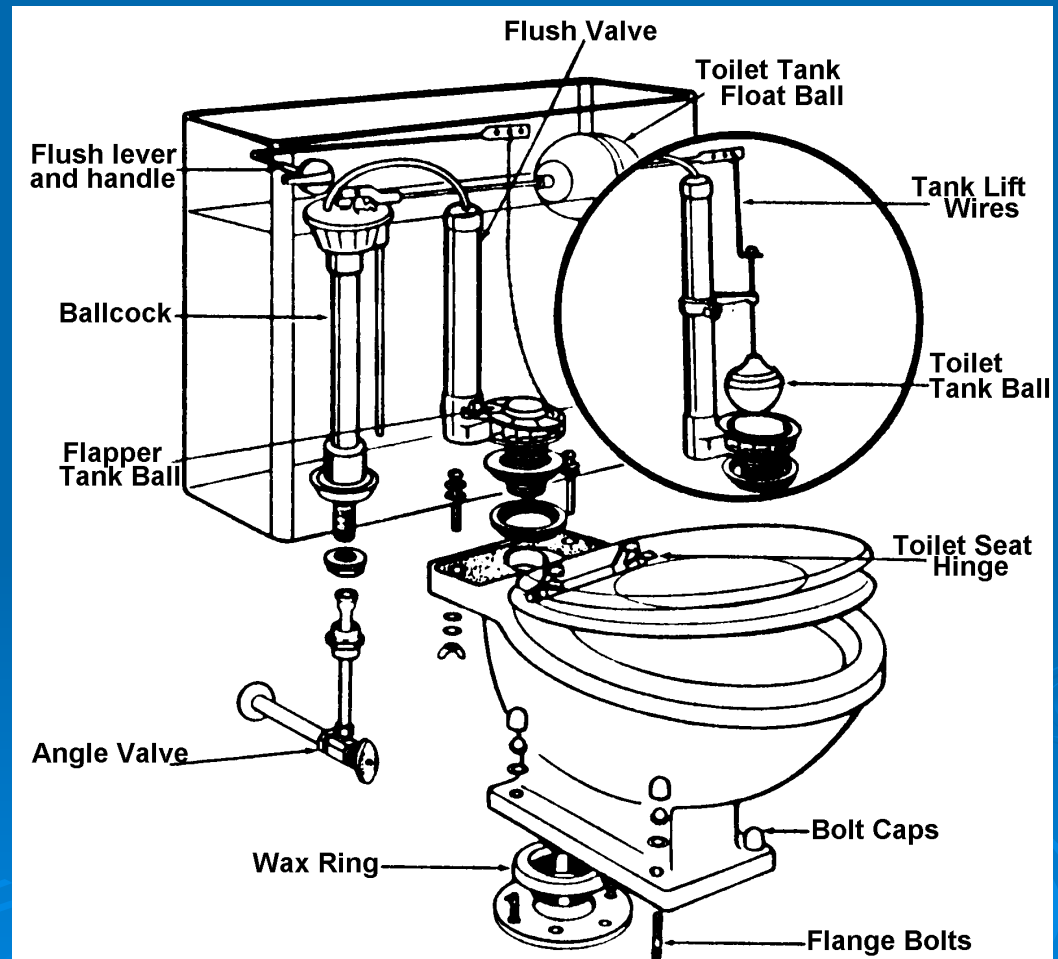
Automatic Mechanical

Controls that operate automatically during the normal functioning of the onsite system can be referred to as *Automatic Mechanical Controls*. Simple automatic mechanical controls include:

- Mechanical float valves
- Ball float valves
- Sequencing valves
- Self priming siphon dosing valves
- Tipping dosing plates

Inside of a Toilet Showing Mechanical Float Valves

Mechanical valves like the valves found in everyday toilets use the buoyancy or increasing pressure of the rising liquid level to provide the force needed to actuate the mechanical valve.



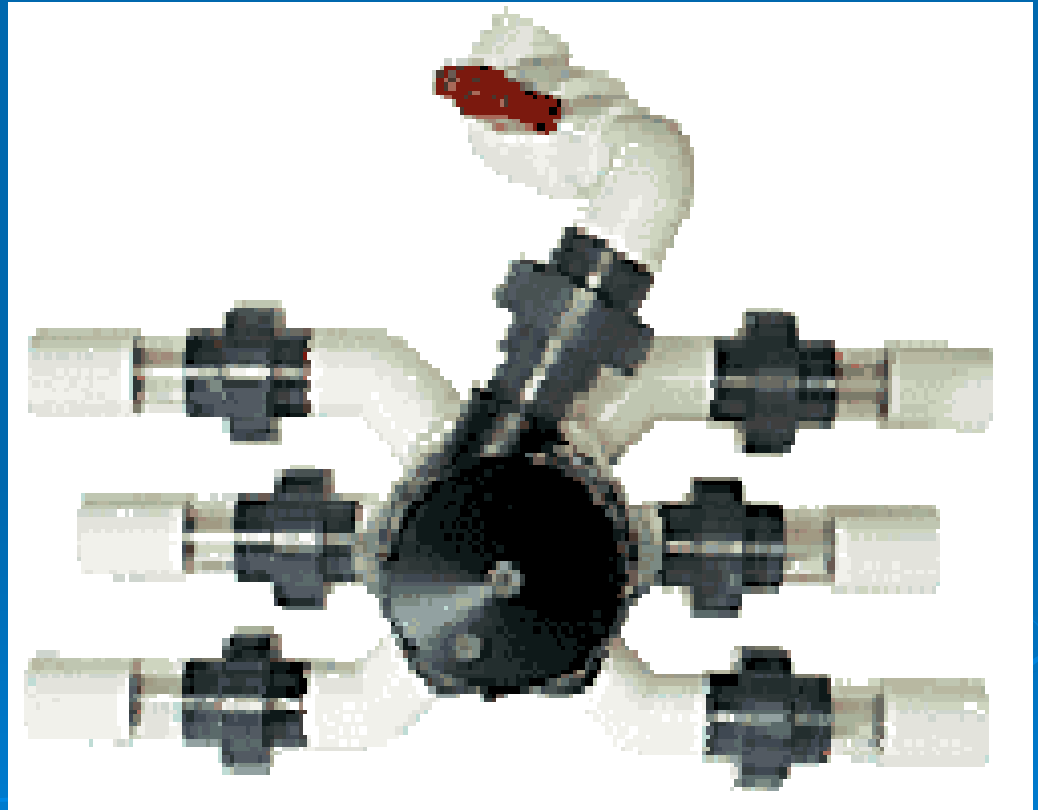
Re-circulating Ball Valve

Hydraulic controls for onsite systems also include the use of a floating ball to control the diversion of water away from a recirculating tank when additional influent enters the tank.



Mechanical / Hydraulic Sequencing Valve

The hydraulically operated automatic sequencing valve automatically switches the discharge from the currently opened port to the next thus enabling the cycling of discharge to each of several dispersal features.



Self Priming Siphon Valve

Automatic siphons are useful control devices for dosing a dispersal field if elevation difference is sufficient to support use of siphon.



Tipping Dosing Plate

Below is a tipping dosing plate that achieves a controlled dosing of the peat media in an Ecoflow peat bio-filter.

