

# Measuring Gravity Sewer Flow Accurately

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## SUBMISSION TYPE

30 minute presentation

## KEYWORDS

Waste Strength, Flow Volume Comparison, Estimating Sewage Flow for design and repair, Anticipating sewer flow to gauge potential problems, Identifying the Problem, Inflow and Infiltration, Exfiltration, Wet Weather Events

## ABSTRACT

### The Problem

Flow measurement is a missing link in computing why septic systems may fail. Measuring flow should indicate a state of hydraulic overloading if evident in the performance of any septic system. Daily flow can exceed the design capacity of the system, resulting in frequent sewer backups or puddling of sewage onto the ground surface. The daily sewage flow value may be based on an engineer prescription or a value based on the number of bedrooms, seats, etc. Septic codes in each state adopt a value for daily sewage flow. However, the value is different from state to state. Two state agencies may disagree on the same estimated value. The value may question accuracy or depict a possible misdiagnose of the estimated sewage flow affect system design. A poorly designed system can lead to premature failure.

When a building served by an onsite septic system is not connected to a metered water system, verification of above normal flow cannot be proved unless the flow can be metered. If in-line flowmeters are used on drinking water systems, they should be available also for private water systems serving a residence or business. Using such a flowmeter would register the mass flow used. The mass flow includes the usage from showers, baths, toilet flushes, tooth brushing, dishwashing, laundry, and other indoor uses. Lawn watering and other outdoor uses are also considered into the mass flow equation.

### Goals and Objectives

The flow of a single waste stream should be able to be measured without comparing the mass flow from water used for filling the swimming pool or for irrigating the yard. Being able to meter sewage flow would be a benefit to septic utility groups and septic tank contractors that service onsite management programs. Estimated flows are used for system design. Metered sewage flow should not burden a mandated regulation upon every system in use. The idea would be to offer a way to monitor those septic systems where hydraulic overloading is suspected. Alternative measures to conserve water could be addressed in those cases to prevent the occurrence of system overuse. The system user should be advised that flow measurement can benefit the overall management of system performance.

## Identifying the Problem

Water usage records have been an acceptable way to calculate average daily flow where septic systems have been repaired. Using this method may hint if hydraulic overloading has occurred and if this condition is an ongoing issue in system performance. At present, this can only be calculated by subtracting the water used for filling the swimming pool or for irrigating the yard from the mass flow. Infiltration, inflow, and exfiltration can affect sewage flow. Often these conditions are not considered when a septic system is sized. When there is a break in the sewer line or if the sewer clean out cap is missing, this can affect the flow entering a septic tank. Flow in a gravity sewer line should be able to be measured accurately.

## The Solution

Flow should be able to be measured accurately. Using a device in the gravity sewer line to measure the flow should provide a more accurate value compared to the estimated value of flow design for the system. The use of such a device would provide support the evidence in the event that a hydraulic overload condition is ongoing. Knowing this would allow the user to justify alternative methods to reduce water usage or to consider modifying the system to meet the true flow entering the system. Measuring flows accurately can improve system performance and contribute to a longer lasting system if monitored. Options to measure flow will be discussed,

## Summary Presentation for Abstract

Flow measurement is a missing link in computing why septic systems may fail. Measuring flow should indicate a state of hydraulic overloading if evident in the performance of any septic system. Daily flow can exceed the system design capacity, resulting in frequent sewer backups or puddling of sewage onto the ground surface. Values for estimated sewage flows will be compared. Inflow and infiltration are often not considered when sizing an onsite wastewater system. Several solutions to measure gravity sewer flow accurately will be discussed.

## ABOUT THE AUTHOR

**Albert Royster** obtained his B.A. in Secondary Education: Biology from Warner Southern College in Lake Wales, 1983. He is retired as a former Environmental Specialist at the Florida Department of Health in Volusia County. The Florida Septic Tank Association recognized Albert as the Inspector of the Year in 1997. Albert has written several articles on septage treatment and wastewater related issues for industry trade publications. Albert is a state licensed drinking water and wastewater treatment plant operator. The Florida Environmental Health Association recognized Albert as the outstanding Environmental Health Professional in 2010. He completed a septic technical manual and authored seven self published books available to seminar attendees. Albert speaks on leadership/ customer client relations, wastewater treatment issues and topics pertinent to the utility and onsite sewage trade. Contact: [roysterbert@yahoo.com](mailto:roysterbert@yahoo.com).