DUKE'S ROOTED IN INNOVATION

A Comprehensive Overview of Roots and Grease

How effective management of F.R.O.G. can lead to fundamental changes in your organization

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Agenda:

- Introduction: What is FROG? Impacts of Roots and Grease in collection systems
- Roots 101: The Basics of Root Growth and Historical Root Control Methods
- Fats, Oil and Grease: Where does it come from and what to do when it gets there.
- Education and Enforcement
- Joined at the Hip: The roll of both Chemical Root Control and Grease control in sanitary sewers
- Case Study Macon, Georgia

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The EPA States…

"The intrusion of roots into sewers is probably the most destructive single element that faces those maintaining wastewater collection systems"

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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What is F.R.O.G?

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The "Root" of the Problem

- Tree Roots grow into the sewer and can gather debris and grease causing stoppages
- Tree roots also effectively "slow down" sewer flow, allowing grease to coagulate in spots previously unknown to have grease accumulation issues.
- Now areas that were never grease spots before, are problems

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The Outcome…

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How Roots Grow

Tree Roots are attracted to the condensation on the outside of a sewer pipe.

The microscopic roots search out sources of water along the vapor trail emitted by sewers through the soil

Once in, they grow rapidly due to conditions

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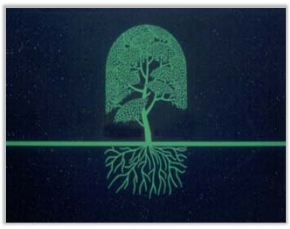
Common Root Growth

Tree roots rarely grow outside of the “drip line”

Leaves fall from the tree and decay and nutrients return to the soil and the cycle repeats

Roots can continue to grow after the tree has been cut down for years



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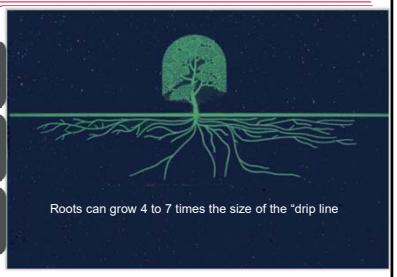
Root Growth in Urban Areas

Roots grow far outside of the “drip line”. Leaf pick-up leaves roots searching for nutrients

Roots have everything they need in a sewer. Nutrients, oxygen, and a constant supply of water

Root cutting provides the last step “Pruning”



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How to “Control” the Problem

Mechanical/Hydraulic Cutting

While necessary to free a blockage, this method for “control” of root growth is not the best. Roots that are cut in sewers grow back thicker, stronger, faster. Pipes that may never have been an issue before become problematic over time and often need to be replaced

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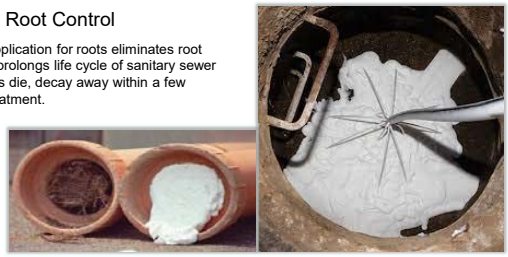
How to “Control” the Problem

Chemical Root Control

Chemical application for roots eliminates root growth and prolongs life cycle of sanitary sewer pipes. Roots die, decay away within a few weeks of treatment.



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What Makes Chemical Root Control Effective?

Best systems consist of :

- **Herbicide**
- **State of the art foaming technologies for herbicide delivery with longer retention time**
- **Degreaser**
- **No bypass requirements**

Applicator’s Qualification & Experience

Chemical Root Control inherently done in areas prone to backups

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Why Foam

- Foam carries Herbicide to Roots
- Degreaser exposes roots
- Foam holds herbicide in place to ensure proper coverage

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What to Expect

- 80 to 95% reduction in sewer stoppages
- Reduce related off-hour sewer calls
- Future sustainability
- Less headaches
- More production

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In Short

The benefits of a chemical root control program far exceed the benefits achieved through mechanical methods. Pipes are blockage free for up to three years with no damage to the sanitary sewer main. The return on investment allows for pipes to remain in the ground, functioning as designed far longer than if they were maintained with mechanical cutters.

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Let's talk Grease – Where does it come from?

Restaurants | Private Residents | Industry

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Using Degreaser to fight the battles

- Regular use of a sewer degreaser in conjunction with a good rotating nozzle on a jet truck is the most effective way to properly clean a sanitary sewer line that is impacted with grease.
- Cleaning with a degreaser not only emulsifies the grease and keeps it in suspension, but also elongates the time in between cleanings.
- Good foaming degreasers do not harm pumps on jet trucks and should not be petroleum-based products.

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How do you Win the War?

Frequent grease trap cleaning and inspections	• Health departments provide essential roles in enforcement!
Using degreasers while cleaning	• Using only water to clean is not enough
Most importantly – EDUCATION!!	• Teaching residents about the impact of grease on the sanitary sewer is the most important step. The more people know, the less likely they are to pour grease down the drain!

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Joined at the Hip

Roots and Grease can often be found together! Areas that where never grease spots before can become problem sections because of roots. Most of the time, in rural areas if you eliminate the roots, you eliminate the grease!

Roots "slow down" flow causing grease to coagulate

Grease builds up on roots causing blockages

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Case Study – Macon, Georgia

- 977 Miles of sewer
- 48,000 Customers
- 1,661,619 lf of Chemical Root Control since 2003
- 2005 Wastewater Collection System of the Year in GA
- 2007 Wastewater Collection System of the Year in GA
- 2011 Wastewater Collection System Excellence Award, GA

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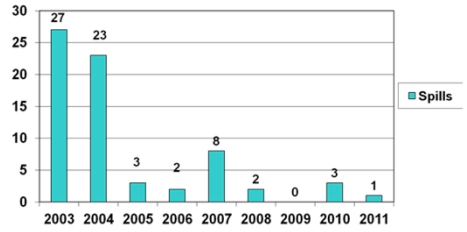
Spills Caused by Roots and Grease



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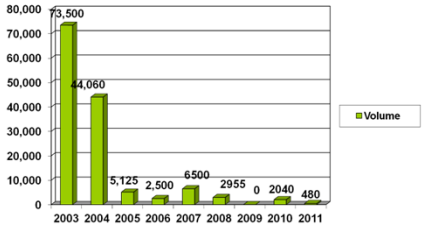
Impact



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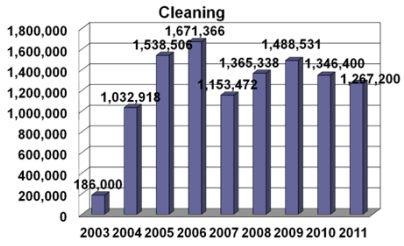
Cleaning Activities



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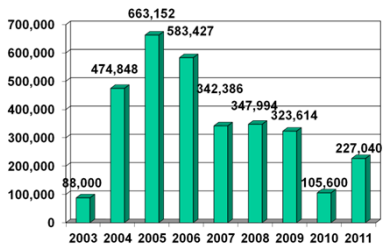
CCTV Inspections



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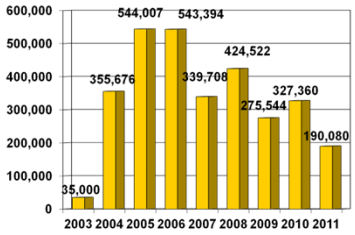
Right of Way Clearing



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In Summary

Implementing a comprehensive chemical root control program in conjunction with the utilization of sewer degreasers is vital to winning the war on F.R.O.G.

Questions?

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