To strengthen and promote the onsite and decentralized wastewater industry.

NOWRA DESIGN SERIES

Troubleshooting Tanks

NOWRA Technical Practices Committee:
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Tank Troubleshooting Agenda:

1. Overall Goals
2. The Call – Information Gathering
3. Tank Structure and Material Evaluation
4. What to look for – site characteristics
Determine the Problem:

1. Obtain Information
   - Checklists
   - Trade Associations – web - YouTube

2. Observe
   - The large majority of troubleshooting is from Visual Observation
You Get the Call:

What is your procedure?

- Obtain information
- Do you have a checklist?
- Ask: “What sort of problem are you having?” Let them go on.
- Do you have a plan of your tank location? Or the permit?
- Outstanding conditions
You Get the Call: (continued)

Obtain information, (besides the obvious such as address)

• Get out your checklist – survey the homeowner
• How long before the tank was last pumped?
• How long has the problem been occurring?
• How many people live in the home?
• Any at-home activities/hobbies?
• Does the home have a water meter?
• Anyone in the home on medications?
More Americans Take Prescription Medication

Forty-four percent of all Americans take at least 1 prescription medication, and 17% take 3 or more medications. The proportion of Americans taking at least 1 medication increased 13% between 1988 to 1994 and 1999 to 2000. The proportion of Americans taking 3 or more medications increased 40%. Findings are from Health, United States 2004, a comprehensive report based on data collected by the CDC, National Center for Health Statistics, and other government and private sources. Survey respondents were asked whether they had taken medication during the previous month.

Prescription drug use increased among persons of all ages (Cover Figure), with use increasing with age. Five of 6 persons aged 65 and older take at least 1 medication, and almost half of those aged 65 years and older take 3 medications or more. Nearly half (49%) of all women were taking prescription drugs in 1999 to 2000, compared with 39% of men.
Medications

CDC Survey Summary:

- 54% percent of all Americans take at least 1 prescription medication
- 17% take 3 or more medications
- Prescription drug use increased among persons of all ages, with use increasing with age
- 83% of persons aged 65 and older take at least 1 medication, and almost half of those aged 65 years and older take 3 medications or more
- Nearly half (49%) of all women were taking prescription drugs in 1999 to 2000, compared with 39% of men
## Tank Troubleshooting Resources:

- [www.onsiteconsortium.org/omspchecklists.html](http://www.onsiteconsortium.org/omspchecklists.html)

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Troubleshooting On Site

Troubleshooting can be broken down into two major categories:

1. Structural/physical condition of the tank
   - Concrete
   - Plastic/Fiberglass

2. Operational/biological/siting-location
   - Tank performance as part of the Onsite Wastewater Treatment System
Tank Investigation: Tank functions

- Low-velocity flow environment
- Solids removal by settling and floatation
  - 75-95% solids removal
  - Reduce FOG by 85-95%
- Anaerobic digestion
  - 65-80% BOD reduction
- Storage of solids
  - Non-biodegradable or resistant to biodegradation
Site Visit: Locate the Tank

Uncover both risers, it will reveal more information.
**Site Visit: Access Risers**

**Riser System:**
Heavy, Locked or bolted
Can’t be slid or flipped
Secondary Restraint (recommended)
Troubleshooting:
Level, watertight, cracked, corrosion, roots
risers, more information
Site Visit: Access Risers

Evidence of infiltration?
Tank Troubleshooting Tools

❖ Video Snake Inspection System
❖ Mirror and Flashlight
Inlet – Outlet Baffles

Is it clear of debris?
Liquid levels

Above or below outlet?
Maintenance: When to pump?

- Sludge makes up 25-33% of the working volume
Solids Levels

❖ Use sampling probe (Sludge Judge, Dip Stick, Trucore, etc.)

❖ Heavy accumulation means excess inputs (or lack of pumping)

❖ Color should be black = anaerobic

❖ Yellow or brown can indicate chemical usage
Servicing Effluent Screens

- Should always be cleaned at the time of pumping the tank
- Wash accumulated material back into the septic tank
- Clean over inlet end of the tank
- Be sure no solids flow out of the tank while screen is removed
Problems - Roots

- Structural
- Back-up
- Leaks
Problems Caused by Tree Roots
Dealing With Tree Roots

- When extensive root activity is found in pipes and components, the roots will need to be moved.
- In pipes this typically occurs with a mechanical root clearing tool.
  - When used with chemicals, roots may only be delayed.
  - Repair or replace exist pipe with PVC tight joint otherwise roots will eventually return.
  - Removal of vegetation in close proximity.
Leaky Tanks:

- Indications
  - Hydraulic overload of soil treatment area
  - Low water levels in tank
  - Streaks inside riser sections or tank
Critical Areas for Watertightness

- Riser and Access
- Horizontal joint
- Pipe Connections
- Material itself
Critical Areas for Watertightness

Riser and Access
The lower section of the riser assembly should be:
(A) cast into the tank lid; or
(B) sealed to the top of the tank with butyl sealant meeting ASTM C 990-09 to provide a watertight seal.
Critical Areas for Watertightness

Horizontal joint
Leak at Mid-Seam
Tank Seam / Joint Seal

- 3/8” maximum gap between two mating joint surfaces BEFORE sealant is applied.
- ASTM C 1227 Section 10.3
Joint Configurations

- Slab Joint
- Lap Joint
- Shiplap Joint
- Tongue & Groove Joint
Joint Sealant

ASTM C1227
5.12 Sealants—Flexible sealants used in the manufacture and installation of tanks shall conform to Specification C990. Rigid (mortar) sealing of tank sections is not permitted.
Joining Ropes of Sealant

Recommended Practice

BAD

BETTER

BEST

KNEAD SEALANT INTO ONE PIECE

12" MIN.
Joining Ropes of Sealant
Critical Areas for Watertightness

Pipe Connections
Connectors

Pipe to Tank Connections

Basic Function – Prevent Infiltration and Exfiltration

- Provide a permanent flexible connection between pipe and tank.
- Provide for angular deflection of pipe.
- Provide for shear deflection of pipe.
- Provide sure, simple connection for installer.
Connectors

Pipe to Tank Connections

Basic Function — Prevent Infiltration and Exfiltration

ASTM C1227

5.13 *Pipe Connections*—Pipe-to-tank connections shall use flexible connectors conforming to the requirements of Specification ASTM C1644 - Standard Specification for Resilient Connectors Between Reinforced Concrete On-Site Wastewater Tanks and Pipes
Critical Areas for Watertightness

Material itself
Permeability
Concrete Strength

What does it mean?
Tank Structural Condition

- Check for:
  - Rebar exposed
  - Corrosion
  - Spalling
Concrete Corrosion (MIC)
How Does it Occur?
Strategies for MIC Mitigation

Material
• Use core quality control practices to produce strong concrete with low porosity

Environment
• Design system for low turbulence

Material – Environment Interface
• Coatings
• Sealants
Structural Assessment: Plastic Tanks
Tank Structurally Compromised
Riser/Manhole Deformation
Plastic tank installation – no compaction of fill - bad installation practices
Site Visit

- Backfill Settlement
- Site Drainage
- Risers
- What is the fix?
Site Visit

- The Concrete Block Tank
- Careful excavation
- Watertightness?
Surface Water

• Down spouts
• Storm water
• Elevation
• Slopes/settling
• Note issues on inspection
Water Treatment Devices

• Water Softener
  • Salt – Concrete, microbes
  • Scum - Separation
  • Additional water
  • On demand regeneration better
    • Reduces salt use by 26 – 60%
    • Reduces water use by 25 – 40%
  • Softener misuse and malfunctions
• Iron Filters
  • Change iron from dissolved to solid
  • Results in iron accumulation in tank
  • More pumping needed
  • Unknown impacts to system
  • Large amount of back
Odors

- Can get caught under roof over hangs
- Wind patterns can limit odor traveling away from home
  - Valleys, forested areas, low areas, etc.
- Vent can be extended
- Carbon filters can be added on end
  - Be careful of winter use
  - Last 1-5 years
Odors

• Dry traps
• Bad seal on grinder/ejector pump in home
• Blocked plumbing stack
• Improper venting
• Sewage back-ups
Outdoor Odor Problems

- Odors near septic tank
  - Manholes and riser secure?
    - Cover with soil or mulch
    - Seal with weather stripping
  - Sick septic tank?
    - Excessive chemical use in tank or lack of maintenance can effect odor
    - Pump tanks, reduce chemical usage
Venting of Gases
Venting

• Vents by septic tanks may be required
  • No adequate way to vent back through plumbing stack
  • Release hydrogen sulfide and methane naturally produced in septic tank
Conclusions

❖ Acquire Data
❖ Have the right tools
❖ Be a Problem Solver not just a Pumper
Thanks for your time!

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