EVERYTHING YOU EVERY WANTED TO KNOW ABOUT SEWERS BUT WERE AFRAID TO ASK…

Different Types of Sewer and Drain Lines

There are many different types of storm and wastewater pipes for a home, which are listed below. Each type of piping system can have its own unique drainage problems requiring different methods to maintain the lines and clear stoppages.

1. Lavatory waste lines
2. Toilet waste lines
3. Shower waste lines
4. Tub waste lines
5. Kitchen sink waste lines
    a. Catch basin with internal discharge routing
    b. Catch basin with external discharge routing
    c. Grease interceptors
6. Laundry waste lines
    a. Laundry tubs
    b. Stand pipes
    c. Lint traps
7. Floor drains
8. Vent lines & vent stacks
9. Storm sewer lines
    a. Footing or drain tile
    b. Sump pump discharge lines
    c. Window well drain lines
    d. Downspout lines
    e. Area yard drain lines
10. Sanitary sewer lines
    a. Underground sewers
    b. Overhead sewers
    c. Flood control systems
    d. Garage drain lines
    e. Triple basins
11. Combination sewers

Reasons for Line Stoppages

There is many ways in which either a sewer or drain line may become stopped up. Additionally, some of these reasons explain why we cannot guarantee a completely free flowing drain and or waste line after rodding work has been performed.

1. We cannot control how fast tree roots grow into a sewer line.
2. We cannot control how much grease from a kitchen sink goes down a line.
3. We cannot control the improper use of a garbage disposer.

4. We cannot prevent mud or yard waste from entering sewer lines.
5. We cannot prevent feminine hygiene products and other improper items from being flushed down a line.
6. We cannot prevent a sewer line from collapsing.
7. We cannot prevent improperly piped sewer and drain lines from stopping up.
8. We cannot prevent an already broken sewer line from stopping up by catching waste flowing down the line.
9. We cannot prevent the freeze-thaw cycles from heaving the ground, causing a sewer line to sag.
10. We cannot prevent a sewer line from sagging, thereby holding waste material, which builds up and stops the line.
11. We cannot prevent a line from being stopped up from a back-up in a city sewer line.
12. We cannot prevent the swing check in a backwater valve from becoming fouled with regular sewerage waste.
13. We cannot predict when or prevent a sewer with a large stoppage or line break from ensnaring or breaking our rodding cables.
14. Nor can we prevent any combination of the above items.

Looking a little further into each of the points made above in the same order listed:

1. Blockage from tree root infestation is the most common cause of a stopped or clogged sewer line. Root growth is a continuous problem; it can be temporarily abated with rodding, which is made more effective with the concurrent use of chemicals, but it cannot be stopped unless the tree is removed or a new line is installed. Root infestations only get worse over time. Preventative rodding will become more frequent with time until the roots eventually cause the sewer line to collapse requiring the line to be excavated and repaired or replaced.

2. A grease blockage inherently occurs in waste or sanitary lines and is introduced into the line from the kitchen sink, dishwasher and garbage disposer. When a line packed with grease is rodded out, it is impossible to determine how much grease is in the line. Once the rod opens the line it is assumed that we are complete with the job. If however the drain line is packed with grease, the grease will droop, closing the hole made by the rodding work, thereby stopping up the drain line again. If this occurs, additional work is required to open the drain line and attempt to find a solution to lessen the frequency of grease line stoppages. Grease stoppages can be prevented by the installation of a grease receptor, periodic rodding or water jet rodding, use of preventative maintenance chemicals specifically designed for grease, and a reduction of grease and oil products placed in drains.

3. Many people are not aware of what kinds of food matter they can and cannot throw down their disposer or how to use the disposer properly. First, when running the disposer, always run cold water before and at least two minutes after grinding is completed to wash the food waste down the drain line. Second, grind up food in small batches, allowing the food to wash down the drain line, preventing the disposer and drain line from becoming stopped up. Finally, avoid grinding up the following types of food: corn husks & cobs; onion peel; artichoke leaves, banana peels, celery, or any other fibrous foods.

4. Mud can enter sewer lines from driveway or area drains and yard waste can enter drain lines from dirty gutter lines. Because neither mud nor organic matter will break down into a liquid form like sewerage, this matter tends to accumulate and create a stoppage. The only way to prevent these types of stoppages is to keep driveway drains and gutters clean, and perform preventative rodding maintenance on those lines.

5. Many people do not realize that sanitary sewer lines are designed to accept toilet paper and human waste ONLY. If you flush anything else down the drain line, regardless as to what the manufacturer of those products states, you are asking for trouble. Do not flush the following items down your sewer line: feminine sanitary products; dental floss; Q-Tips; prophylactics; Handi-Wipes; Baby Wipes; diapers; dead goldfish (or other small deceased pets); paper towels; facial tissue.

6. A blockage caused by broken or collapsed lines usually occurs with age and is normally caused by interaction with tree roots, heaving and settling of the earth or settling of the building. A broken or sheared sewer line is usually found by pulling mud back on the end of the rod or an inability of the rod to go any further into the sewer line. Once a sewer line has broken, the only remedy is to insert a sewer camera into the line to determine the true cause of the problem, the location of the problem and the condition of the line up to the point of the problem. The decision to repair or replace the sewer line and the cost associated with the work cannot be determined without first inspecting the sewer line.

7. Small drains, less than 4" in diameter or lines with a 90' bend will often cause a blockage. Additionally, there are specific types of waste fittings that were widely used in the past that sanitary engineers found to cause problems and are no longer used today. These problems can be rectified by replacement of lines and/or elbows… or in the case of storm lines above ground, certain lines can be splashed on the ground.

8. A broken line will slowly accumulate waste matter flowing down the pipe until the line stops up. Once we determine that a drain line is broken, there is no way to determine how long the line will remain open or how much time it will take before the broken line worsens, making an immediate dig and repair necessary.

9. In the Midwest, our weather freezes the ground in the wintertime. The ground contains water. When water freezes it expands and heaves the ground upward. In the spring, the ground thaws and the earth settles again. The continuous freeze-thaw cycles can cause the ground surrounding a sewer line to heave causing a sag in the line. If the sewer line already has a leak, allowing the surrounding ground to become saturated, the freeze-thaw cycle can have a more pronounced effect.

10. Sewer lines will sometimes sag. This happens when the ground underneath the sewer settles or the ground heaves up due to frost. When the ground moves, the sewer line no longer has the standard, steady ¼" drop per foot but will create a sag or belly that will trap waste and water. When waste becomes trapped in the sagging portion of the sewer pipe, that waste will harden and slowly accumulate until a line stoppage occurs. Normal sewer rodding will usually remove the stoppage and clear the sewer line but this will only be a short lived

temporary solution. Only a dig and replacement of the sagged sewer line can provide a longer lasting repair.

11. When city storm and sanitary lines are full or "charged," the drain lines that run from the home cannot drain. Additionally, the full city drain lines carry much more debris than the individual house sewers. Sometimes when a city sewer fills to the point where it starts to back up, water and debris flow up the sewer line toward the home. Once the city sewer empties, that debris is left behind which can cause a line stoppage. Depending upon how much water is backing up into a city sewer main, that sewer main can become full to the point where it backs up into and floods a home. There is nothing that can prevent the flooding once it starts. Once the city sewer drains, the water left in the basement will usually drain away. There are a few ways to prevent a full city sewer from flooding a basement, they include the installation of a standpipes or a backwater valve.

12. Less common are blockages caused by malfunctioning check valves or back flow preventors. Repair or replacement of these devices along with annual maintenance should help to eliminate problems.

13. It is not uncommon to have a sewer line ensnare or break our sewer rodding cables while trying to open a sewer line. Unfortunately there is no way to determine from the onset the severity of a sewer line stoppage or if the sewer might ensnare or break our rodding cables. If a sewer cable breaks in the sewer line sometimes the lost cable can be retrieved with a special retrieving head that is placed on the end of a sewer cable. If cables are stuck in a sewer line we can sometimes free the cables with a more powerful machine, by pulling on the cables or by waiting for the tension in the cables and the stoppage to relieve and release the cables. If stuck or broken cables cannot be retrieved or freed from the sewer line, the sewer line must be excavated to remove the line stoppage and cables, repairing the sewer line.

14. Finally, many sewer problems are exasperated by the fact that more than one problem can exist with a sewer at the same time. Sewer problems are remedied on a trial and error basis and only one problem is found and fixed at a time. Once the first problem is taken care of, only then can we determine if a second problem exists and so on. Unfortunately, the customer perceives that the field technician has misdiagnosed the problem or has not fixed the problem when in reality the sewer is showing us that more than one problem exists or that the problem is bigger than can be remedied by rodding alone.

Remember that rodding a sewer line is only a cure for a sewer line that stopped up due to improper debris or a build-up of debris in the line. Rodding cannot cure sewer lines that are broken, sheared, sagging, infested with roots or are piped improperly.

How a Sewer Line is Cleared

The clearing of a sewer or drain line is not as simple as inserting rodding equipment and turning on the machine. There is quite a bit of diagnostic work that coincides with the knowledge of how

building sewer and drain lines are SUPPOSED to be installed in home. The procedure is as follows:

1. Find the floor drain or fixture that is showing the symptoms of a sewer stoppage.
2. Determine which fixtures are served by the blocked line.
3. Determine if the stoppage is in a branch line or a trunk line.
4. Determine the best location to rod from.
    a. Where is the largest cleanout?
    b. Which cleanout will allow access to the largest portion of the drain line
    c. Which cleanout will get the cutter head closest to the blockage to transmit the largest amount of power to break through the stoppage.
5. Determine if a second person is required to help rod to prevent damage to customer property or prevent injury of the rodding technician.
6. Determine the type of rodding machine and cable to use.
7. Determine the best type of cutting head to use.
8. Determine if the sewer line has to be drained before removing a clean-out plug that could otherwise cause water damage.
9. Begin rodding.
10. Note the distance that the sewer line opens.
11. Note the distance of any spots in the sewer that cause resistance to the rodding.
12. Continue rodding until the city main or trunk line is reached.
13. Extract the cables noting the distance of any hard spots.
14. If any hard spots still exist in the sewer line, continue to work the cutter head back and forth over the hard spot.
15. Extract the remaining cables, noting the type of debris, if any, extracted form the sewer line.
16. Seal the clean-out plug and pressure test if possible.
17. Test the sewer line to determine if the drain line is open.
18. If the sewer line is open, we have to assume the rodding has been completed successfully.

Once the sewer line is open and flowing, we have to assume that our work is done. It would be ridiculous to continue to work the cables back and forth through the sewer if no hard spots are detected. To do otherwise would be a waste of the customer's time and money.

Re-Occurring Line Stoppages is a Sign

When a drain line stops up shortly after rodding work has taken place, it is for one of two reasons. Usually, the amount of roots or debris in the line was not completely cleared during the first rodding session. Unfortunately it is impossible to determine if all of the debris is removed from a sewer line without the use of a video system. While the use of a video system will determine if the job is complete or if the sewer may have additional problems that should be addressed, most customers would not benefit from paying for a sewer line to be video inspected unless warranted by a reoccurring stoppage. To suggest that every sewer line should be video inspected would be considered unethical and gouging.

Sometimes a reoccurring line stoppage is a sign that the problem with the sewer is larger than can be remedied via conventional rodding. This occurrence generally requires further diagnostic work to determine what other problems may be causing repeated stoppages.

What is in a Guarantee?

There are many companies that offer a one-year guarantee on a sewer or drain line. Unfortunately what customers fail to realize is that a one-year guarantee on a drain line is nothing more than a marketing gimmick that is sometimes designed to take advantage of the consumer. If you have read and understand the above 13 points you can quickly realize why it is impossible to guarantee that a sewer or drain line can stay open for any length of time. Some companies offer a one-year guarantee because they are hoping that your line stops up again within the warranty period. This allows the company to sell further diagnostic measures which may be necessary but often lead to the conclusion that some or all of the drain line needs to be excavated and replaced at great cost. While some lines do need to be excavated for a repair, be wary of the costs involved, the use of undersized rodding equipment, and the lack effort put forth to open a line via conventional rodding.

Maintaining Sewer and Drain Lines

There are several methods available for opening and maintaining sewer and drain lines including:

1. Rodding
2. Jetting
3. Video Inspection & Location
4. Chemicals
5. Sewer Cleanout
6. Preventative Rodding Maintenance
7. Excavation

A more detailed explanation of each of the aforementioned points follows.

1. Rodding is a term used to describe the most common method used to open a slow or stopped drain line. Rodding equipment usually consists of rodding machine, cables and a cutting head. There are many different cutting heads designed for different types of drain lines that alleviate certain types of sewer and drain line stoppages. The cutting head attaches to the end of a cable that is inserted into the sewer or drain line. The cables are sectional and come in different lengths and diameters for different types of lines and stoppages. All cables look like long springs. The rodding machine consists of a motor and clutch to grab and spin the cables and cutting head at a low speed but at a very high torque. The spinning cutter head will cut through the different stoppages in an attempt to open the line. The coils in the cable help to feed the cable into the sewer line as the cable spins and to snare the debris stopping the line to help remove the debris from the line.

2. Jetting is a term used to describe a method used to open and scour drain lines with the use of high-pressure water. A jetter uses water pressurized between 2000 to 6000 psi to cut through small root fibers, dirt, organic debris, grease and oil. Jetters are commonly used in restaurants and auto garages where grease from kitchens and oily sludge from automobiles collects in drain lines. While rodding can open a drain line coated with grease or oil, only a jetter can scour the line removing the majority of the grease and oil.

3. Video inspection is used to determine why a sewer or drain line has a problem. Most cameras are designed to inspect sewer lines from 4" to 8" in diameter. The camera head is attached to a stiff fiber-optic line, which is pushed into the sewer. The head of the camera is illuminated with LED's (Light Emitting Diodes) to provide a light source for the camera. Sewer cameras cannot "see" underwater as the water is rarely clear which causes the LED's to reflect off of the debris in the murky water. Once the camera operator has positioned the camera to view the source of the problem, the problem has to be located above ground. A transmitter imbedded in the head of the camera allows the camera operator to locate the camera head above ground. The locating process is rarely exact because underground electric, cable, telephone, gas, water, sprinkler and other systems, as well as the type of sewer pipe material and sewer depth can throw off the accuracy of the locator. The average sewer video and location system costs about $8,000.00.

4. There are many differently types of chemicals on the market. The rule of thumb is never use any chemical that contains acid or a base such as Liquid Plumber or Draino as it will hurt your pipes and make our job more difficult, time consuming, and therefore more expensive. The best chemicals are those that are used by professionals. These chemicals are designed to take care of one type of stoppage. The four types of chemicals are for: 1. Kitchen sinks, 2. Lavatory & tub drains, 3. Septic and sewer lines, 4. Root control. All chemicals are used during a rodding process or as a preventative maintenance measure. No chemicals will open completely stopped up drains, regardless as to what a TV commercial might portray.

    1. Kitchen sinks. The majority of kitchen drain line stoppages occur due to a build up of grease in the drain line and improper use of a garbage disposer. Grease will build up in kitchen sinks due to food preparation and dish washing. Grease will build up on the walls of the drain lines and eventually cause a stoppage. Grease is very difficult to remove from waste lines and it is not uncommon to have to return two or three times to rod to remove enough grease to keep the line open and flowing. Nothing short of chemicals will remove all the grease. There are two chemicals used to remove grease. First is PT4 which liquefies grease. Second is Bio-Clean which uses bacterial enzymes, the same ones that live in the human intestinal tract, to eat the grease.
    2. Lavatory and tub drains fall victim to soap scum and hair. Neutrogena and other gel type soaps should be avoided as they cause a greater build-up of scum. Rossite opens drains by creating heat that melts the soap scum, releasing the hair and allowing the stoppage to be flushed down the line. OpenWide works by breaking

down the proteins that are in hair. Both types of chemicals are for preventative maintenance and will not work if the drain line is completely stopped up.

3. Septic and sewer lines are best served by the use of Bio-Clean that will literally eat any build-up of sewerage waste. Bio Clean will not do anything to root growth but will keep the roots from accumulating debris.
4. Root control chemicals are widely used. The most effective chemical is Root-X. Root-X is a two part chemical consisting of a non-systemic root killer and a delivery system. The non-systemic root killer kills roots without killing the shrub or tree. The root killer is delivered to the roots, which grow from the top of the sewer down, by a foaming agent that carries the root killer to the whole interior of the pipe. The other chemical that many people have heard of is copper sulphate (CS). There are several reasons why we do not recommend the use of CS. First, CS will only kill roots that happen to extend to the bottom of the sewer line, leaving the majority of the root mass un-treated. Second, CS kills roots but also the bacteria, fungus and molds that decay and remove the dead roots, leaving the dead roots behind to cause another line stoppage. Third, CS is actually a wood preservative that us used to treat telephone poles and fence posts. Treating dead wood (roots) just makes them stay in the sewer longer.

5. A sewer cleanout is the general term used to describe an access point installed in a waste piping system to allow access to the system for rodding maintenance. All homes should have a readily accessible cleanout for rodding. Any home built from 1980 to the present is required to have a cleanout installed outside the home. Most homes in this area have a 4” diameter sewer line exiting the house which transitions to a 6” diameter line outside underground. It is at this transition that makes for the best clean-out location. This will allow for a 6” diameter cleanout to be installed, allowing for a full 6” diameter cutter to clean the 6” clay tile sewer line. If the cleanout is in the home, the 4” diameter pipe will have a 3” diameter plug, which means that the largest cutter that can be used to clean the sewer is a 3” cutter. There are several benefits of having an outside cleanout.
    1. Rodding work is performed easier and quicker if performed outside. Equipment does not have to be brought into the home, up and down stairs, into crawl spaces or on top of a roof.
    2. Rodding work is cleaner if performed outside. Tarps do not have to be laid out in the home to protect the area from damage from the rodding process.
    3. If the home has an overhead sewer, the cleanout must be opened slowly allowing all of the sewerage that is inside the sewer to be slowly drained from the sewer before we can completely remove the cleanout cap and begin the rodding work. This is time consuming (and therefore more expensive) and can potentially be very messy.

6. Preventative rodding maintenance is performed to keep the myriad of sewer and drain lines open and flowing. Consumers ask us how often they should have their sewer rodded to prevent a sewer back-up. Unfortunately it is impossible to tell. Preventative rodding frequency is usually determined by historical information. If the customer finds that the sewer typically stops up once a year, then rodding once every 6 to 8 months would be prudent. Just remember that as time goes by, the problems in the sewer will become worse, requiring more frequent rodding maintenance.

7. Excavation has to be performed for several reasons:
    1. The sewer line cannot be opened by rodding
    2. The sewer line has so much debris that the rodding cables or video camera head have become ensnared in the sewer. Usually the only way to retrieve the equipment and open the sewer is via excavation.
    3. To install a sewer cleanout to allow for more effective, safer, or less liability for damage to personal property during rodding.
    4. To make a spot repair of a sewer line.
    5. To replace a sewer line.

    Excavations can be performed by hand or with equipment. The decision to use equipment is based on the depth of the sewer line, the number and types of underground utilities that may be in the path of the excavation, and the area surrounding the excavation. If there is not enough room to move equipment to the excavation or enough room surrounding the excavation area then the only alternative is hand excavation.

Why Sometimes Does it Take a Second Person to Perform Sewer and Drain Work?

1. Sometimes it is impossible to rod a sewer with one person. Certain situations call for a second technician to provide a hand and / or to provide a safe working environment. Examples of a two man rodding call are:
    a. If the customer has a sewer cleanout that requires that the rodding machine be more than 4’ away from the jaws of the rodding machine. This situation requires two men because the greater the distance between the rodding machine and the cleanout, the greater the risk of injury to the technician. At a distance of 4’ or more, two men are needed to hold the spinning rod.
    b. Any excavation deeper than 3 feet requires a second man for safety reasons. This is a federal law as defined and enforced by OSHA. The potential for loss of life while performing an excavation is too great to risk with only one man.
    c. Rodding from a roof requires two men to move the equipment onto and off of the roof and the second man helps to keep the equipment from sliding off of the roof due to the vibrations of the running equipment.
    d. Rodding in confined areas such as a crawl space requires two men to move the equipment into and out of the space. The second man also helps with the feeding and removing the cables while the other technician works the rodding machine.

2. Protection of property. If we have to pull a toilet to rod your sewer line, it is usually necessary to have a second man to prevent the cables from destroying the interior finishes of the home.

3. Locating a line underground. If one technician is having difficulty locating a sewer line, a second man will help move the camera inside the home while the second technician will use the locating wand outside to find the sewer.

4. The element of time. Many times, having two men cuts the time of the service call in half. There is no difference in the charge to the customer if one man charges for 2 hours of work as opposed to 2 men charging for 1 hour of work. The total charged time in either case is 2 man-hours.

Preventative Maintenance Versus Excavation and Repair

There are many customers who are on preventative maintenance schedules with our company. The idea is to rod a sewer line with enough frequency to prevent the sewer line from backing up into the house. The frequency of rodding maintenance is historically based and differs with every sewer line. We have customers who know, from past experience, that they need to rod their sewer anywhere from once every other year to up to 4 times a year.

Over time, a sewer will require move frequent rodding maintenance because problems with a sewer line do not get better over time, they get worse.

When a customer reaches the point where they require preventative rodding maintenance two or more times a year, we will usually suggest inspecting the line with our sewer camera to determine the type of problem and a cost for a long lasting solution.

At this point the customer has to decide how much longer they intend on living in the house and calculate the maintenance cost versus the repair. Other considerations should include the risk of damage when a sewer does backup (if not repaired) and the value of the home when selling due to a problematic sewer, (Disclosure laws prevent homeowners from not informing prospective buyers of the sewer history.)

When is it Determined that Excavation is Necessary

1. If preventative rodding maintenance is rarely performed, roots will have the opportunity to overgrow the sewer line and debris will be allowed to accumulate to the point where rodding takes an inordinate amount of time to perform. If rodding for more than 3 hours with several different types of cutting heads is removing debris but not opening the line, at some point a decision has to be made. Because no one can see underground, it is impossible to determine the extent of the debris or how much of a stoppage has been ground through and removed and how much of the stoppage remains. For example, assume that a root growth is 10’ long inside a sewer and we spend 3 hours rodding. We may have successfully removed 9’ of the stoppage or we may have removed 1’ of the stoppage. What are we to do? Do we continue in hopes of removing the last foot successfully, or continue wastefully when we should be excavating instead. Sometimes a customer will become frustrated and call in another company in an attempt to open the line. If the first company removed 90% of the stoppage but did not clear the line and a second company arrives, removing the last 10% and opens the line, the first company, which did the majority of the work is considered a failure while the second company, who performed little work in comparison is considered the hero.

2. When we rod a sewer line and we hit an obstruction, we will typically extract our rodding cables and re-try the rodding process two or three times before having to look at excavation for a solution.

3. Sometimes when the cables are pulled out of the sewer for inspection, mud or clay is found on the cutting head. When a sewer line breaks, sometimes rain and groundwater will slowly wash mud and clay into the sewer line, eventually causing an obstruction. When the rods are inserted into the mud filled sewer line, the clay will impact itself onto the cutter head. This is a clear indication that the sewer is broken and must be excavated for repair.

4. Not all sewer lines can be opened with rodding equipment. When a sewer line collapses, shears, or a root infestation is too large; the only remedy is excavation and replacement of a portion of or the entire sewer line.

Miscellaneous Customer Concerns

1. I never had a problem with the sewer before, why do I have a problem now? Sewer and drain lines, like everything, have a useful life. When a sewer breaks, it breaks. There is a specific point in time when the condition of the sewer becomes a problem.

2. Why is it taking so long to rod the line?
   a. If the sewer and drain line piping was not installed properly, it may take a long time to rod the drain line. Because most drain lines are buried inside walls or underground, it is impossible to know if a drain line was properly installed without first attempting to rod the line. If during the course of our work it is determined that our rodding cables will not follow the sewer line downstream, this is an indication that the drain line was not installed properly.
   b. If the sewer has a large root mass or contains a lot of debris, it may take a longer than normal amount of time to remove as much of the roots and / or debris as possible to prevent the sewer from backing-up again.

While Ravinia Plumbing & Heating Co. cannot 100% guarantee a clear line. We can assure you that our expertise and the open mind of an informed customer willing to take the necessary steps to affect a proper repair will keep sewer and drain lines open for much greater periods of time.

If you have any questions regarding the above information, please do not hesitate to call us at (847) 432-5561