

How to Make Your *Castle*



Last *Forever*

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HOME MAINTENANCE GUIDE

Dedication

It doesn't matter where your home is. No matter if it has granite countertops. It's not about the pool in back, or the 4th car garage. To me, home is where the people you love are.

For me, it's about my wife Julie, 5 kids, a way cool son in law, and an extremely cute baby boy. To all of you – when you're in my home, then it's home.

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Foreword

Congratulations on your new home. Whether your first home or your fifth, each new home puts you in new and unfamiliar territory. Like children, homes don't come with instruction manuals, and most of us have to "wing it". We quickly find that we are left alone to figure out how to deal with things ourselves. And the risk of making mistakes? Large.

While we can't help you with your children, this book can be your guide for vital knowledge and go-to local sources. If you have received this book for free, then it is because someone has paid the cost of the book on your behalf.

You can't pay them back, you can pay it pay it forward by referring the individual that gave it to you, by trying out the sponsoring business listed at the end of this book, by donating to your favorite charity, or by donating to one of mine.

My favorite home-related charity is the Heart2Home foundation, also known as the Utah Home Makeover. They do what the Extreme Home Makeover program does on TV, but without the Hollywood budget. These guys are amazing, and yes, my beautiful wife and I (mostly my wife) have donated many hours to this organization.

If you would like to donate or just check them out, their web site is www.Heart2Homefoundation.org. Thank you in advance.

Welcome

Seventeen years as a home inspector has taught me a few things. After inspecting thousands of homes, I have learned the simple steps homeowners that can take to avoid big-time problems. I have learned how unattended 10 dollar fixes can become 10,000 dollar disasters. I have learned what can go wrong, and how to deal with potential issues before they become a tragedy. Left ignored, simple fixes can create consequences that make home owners shudder. These small items can cost thousands to fix, and destroy the resale value of your home.

Sometimes the disaster has to do with sparking electrical wires. Sometimes it's a basement with a couple of feet of water. In any case, an ounce of prevention, well – it's a good thing.

This guide is intended to be only about home maintenance. It does not replace the need for a good home inspector, and is not a how-to for repairs. It was hard for me not to put in a few sections on environmental issues (i.e. mold, meth, lead, etc), but that's another subject. Information on those issues can be found at www.crossroadsengineers.com.

So if your questions are about home maintenance for a “typical” home, this is your simple guide. For a more complete guide for your particular home, you may wish to contact a reputable local home inspector.

Happy learning!

Exterior Maintenance

Frankly, I understand. No one reads books anymore. When most of us start on a book, chances are that we'll get to page 20 and quit – I do it too. That's why I placed the drainage information first. If you only cover one section, read the part about drainage.

We start at the exterior because it is the outside that most often gets ignored, and because the biggest problems you can have inside your home generally originate on the outside.

In home inspections, I find repeatedly that for most issues, there are what I call the \$10 dollar fix, and the \$10,000 dollar fix. The one you get to use depends on your willingness to do preventive maintenance, and your knowledge of what to do. I have seen homeowners spend thousands trying to seal, repair, or clean up after an interior issue like a flood or leak. What these homeowners never realized is that simple and very inexpensive maintenance could have addressed the issue before it became a problem.

This section will help you identify the potential issues before they become \$10,000 problems. Armed with the knowledge in this section, you'll know what inexpensive options are available to you before things get ugly.

Drainage

What causes the most home inspection related problems? What single category of home inspection issues is the easiest to fix? Ask any experienced home inspector and you'll get a very predictable answer: the biggest source of turmoil will always be the drainage issues.

Taken as a whole, drainage includes a few sub-categories. This list includes the following:

- window wells
- roof drainage (rain gutters)
- landscaping slopes, and
- sprinkler systems.

While the number of potential sources of water into a home can be many, the end goal is straightforward and simple: keep water away from your home. The more successful you are in doing so, the less likely your home will experience structural settling, mold, rot, and termite issues. You'll also keep your wife happier – women generally don't get along with termites.

Window wells

For homes that include basements, window wells provide daylight, a secondary fire escape, and a way into the home for firemen. Window wells also make an easy pathway for water to flow into the home. Unless you have a swimming pool down there, water entry into the basement is rarely a good thing.



Sprinkler spraying over the window well – this is begging for trouble

Window wells are generally made up of a barrier material such as sheet metal or rock; these are generally low maintenance. At the base of the well, the better contractors or homeowners will place a blanket of gravel to enhance drainage and prevent plant growth.

The window well is your last line of defense against water entry into the home. It should drain well, and must be kept free of water entry. If the sprinkler system or another water source provides enough water to grow plants or weeds, these weeds can drop leaves and twigs. Over time, the well's ability to drain gets weaker until the big moment arrives: a large volume of water flows into the window well, and the well can't drain. The next step will be a free swimming pool in your basement.

To keep the swimming pool from happening, all sources of water must be eliminated from the wells. The landscaping around the wells should be modified as needed to make surface water flow away from the wells. The well bed should be kept clean and free from leafy debris, trash, or other materials that may inhibit drainage.

To clean the wells, you should dig the soil out to a minimum 12 inches below the window sill height, then backfill with gravel to within 6 inches of the sill. This allows for good drainage, and a forgiveness factor of a few dozen gallons of water before overflow happens.

For more information:

Video Training: www.homeguidez.com/video.htm



There really are rain gutters on this roof, but they may have some trouble draining

Rain Gutters

If window wells and foundations are where you don't want water to go, then roof drainage is where you don't want it to come from. Homes without full rain gutter coverage and homes that have poorly draining rain gutters are plagued with all the ills that come with "wet" homes, such as mold, rot, termites, and structural settlement.

What do you need to do with your rain gutters? The end result is this: all water coming off your roof must be captured and routed well away from the structure - before it is allowed to drain into the soil. This starts with rain gutters for all roof drip lines. The gutters must be clean enough to reliably drain (if you see weeds growing in the gutters, it might be time to clean them), and the downspout will take it from there.

If you want to push your luck, place a splash block at the base of the downspout – if you get the right slope on the splash block, the block will move the roof drainage another foot or two away from the home. From that point you need a positive drainage slope, meaning a landscaping slope that causes water to flow away from – not toward – the structure.

Better yet, you can go to most any hardware store and get a drainage tube. With these tubes, you can route water as far away as your imagination and property lines allow you to go. One excellent option is to run the drainage tube underground for at least 8-10 feet away, then allow the tube to drain to the

surface. This works well if you have a sloping natural landscape. If not, you can use drainage pop-up heads, also available at many hardware stores.

For more information:

Video Training: www.homeguidez.com/video.htm

Foundation and Landscape Slopes

Foundations represent another pathway for water to find its way into your basement. While it may at first appear that concrete is impervious to water, nothing could be further from the truth. The fact is that all concrete has cracks- many of them. Some cracks are visible above the soil line, others are not. While it is typical for contractors to tar the foundation in an attempt to make the foundation more water proof, the reality is that tar creates more of a false sense of security than experience would indicate.

Any concrete contractor will tell you that there are two types of concrete: the kind that has cracked, and the kind that is going to crack. This is because when concrete is poured, it has a considerable part of its volume made up in water. As it cures, the water evaporates, leaving a smaller volume of material than was originally poured into the form. To make up for the smaller mass, concrete tries to shrink – hence the cracking.

Sometimes homeowners will see certain types of foundation cracks and wonder if it means that the home is moving or structurally weakened. While structural settling does occur, the reality is that most cracks are just concrete simply doing what concrete does: it cracks. It's good at it.

This is why the foundation plastering business was developed; the concept with plastering is that you allow the foundation to do what it does, then you come back later and cover over the cracks to make the foundation look better.



This should leave no doubt about whether water can leak through concrete

Now, all of this information is placed in the drainage category for one reason. Because concrete cracks, and because soil is on one side and living space is on the other, it is vital that water not be allowed to soak the soil or pond near the foundation. If large quantities of water are allowed to stand against the structure, some of this water will find its way through the cracks, and into the basement or crawl space.

I have seen homeowners attempt to “seal” cracks in a foundation using epoxy injection. It’s a well-intended effort. The fact is however, that for every large crack in the foundation there are many more cracks that are not as visible. **The only way to make sure that water never makes it inside the home is to make sure that water never ponds outside the foundation.** This is done by creating a “positive” drainage slope around the foundation – meaning a slope that routes surface water away from the window wells, and away from the structure.

For more information:

Video Training: www.homeguidez.com/video.htm



Don't spray the house – it won't grow

Sprinkler Systems

Sprinkler systems are a common culprit for causing water entry near the foundations and window wells. Homeowners will often place sprinkler heads in corners near foundations and window wells, but they do so without thinking of the consequences. It doesn't take a scientist to understand that if something goes wrong, there will be hundreds of gallons of water either in the window well, or next to the foundation.

Sometimes the same result can occur even if the sprinklers do exactly what they were placed to do. For example, one common sprinkler design problem is to place a large sprinkler head behind a bush. The sprinkler sprays water out a few inches, the water hits the bush, and all of that water then drops straight down. Now we have many gallons of water located just a few inches away from the foundation, and sometimes within a short distance of the window wells.

It is fairly well known that you can't grow a home by watering it. Despite this understanding, home inspectors commonly find the home being routinely wetted by the sprinkler system. If the home is stucco, rock or masonry, the exterior is designed to get wet in a rain storm and dry out. When routinely sprinkled however, an exterior material that is routinely wetted will remain wet, and transfer some of that moisture to the interior walls. Once again, this brings with it the probability of mold, termites, rot and structural settlement.

A good friend called once to lament having to tear out an entire exterior wall on her home. It seems she was watering both the lawn and the house with her sprinkler system. Some of the water got into the window frame, where it found

its way into the wall. Termites followed. I'm certain they were grateful for the excellent living conditions; this was just what they needed.

These subterranean termites had wet wood, continuous moisture, and a short travel distance from their colony in the soil. Despite her creating just what they needed, I suspect that their gratitude may have been short-lived after she discovered them. She spent a good deal of money, time and grief disinviting them from the home. She called the exterminator, then ripped out and reconstructed an entire exterior wall in her home.

The proactive fix could have been much easier. She should not have been spraying the house. Where that rule was ignored, the next fix was more costly. It's like one of those commercials: exterminator and reconstruction: \$10,000, don't spray the home: priceless.

The key concept in drainage is this: force water to stay away from the home. This is done by the following:

- create a positive drainage slope around the home
- keep the window wells clean
- control the drainage off the roof, and
- manage the sprinklers

At the risk of sounding repetitive, I need to say this again. **If there is water outside the foundation, it will find its way inside the foundation.** To prevent water from entering your basement or crawl space, it must not be allowed to pond against the foundation. There is no other reliable way to assure that your basement or crawl space stays dry.

For more information:
Video Training: www.homeguidez.com/video.htm



When trees and homes collide, neither wins

Structure

If your home is located somewhere near civilization, there is a good chance it was designed to withstand earthquakes, heavy wind storms, and most anything else mother nature can dish out. Most homes are made up of a footing (concrete poured into a channel in the soil), followed by a foundation, and a wood or metal frame structure.

What can go wrong with such a structure? We have already covered settlement issues associated with drainage. Earthquakes can cause damage by shaking the frame off the foundation. Other than that, and your occasional errant semi-truck, only trees have the potential of causing major structural damage.

How does a tree cause structural problems? Two ways: roots and branches. When the tree is planted near the structure, the roots can push the foundation around, causing structural damage. At the same time, branches located near the roof line can damage the roof, the rain gutters, and the drip line.

If the drainage issues have been addressed and trees are within a reasonable distance of the foundation, maintenance for your structure is easy. You simply make sure that your branches are not causing any havoc. Take a look at your trees and their branches; which ones need to be trimmed? What needs to go?

And now you have the structure covered. No further maintenance until a semi runs through it.



Damaged roof from blowing branches against the shingles

Roof

First, let me be clear: if your roof is not safe to get on, don't do it. If something must be done to your roof and you're uncomfortable doing it, there are professionals. Let them go up there and risk their life. You stay home and feed your family.

At the same time, there are roof types (i.e. tile) where stepping on certain parts of the shingle will damage the roof. If you lack the athletic skills, the required knowledge, or the willingness to die, call a roofer.

There are any number of roofing types and materials. The most common are the various grades of asphalt shingles, but metal, ceramic, and flat roof sealants are also very common. Sadly, tar and gravel is still out there as well.

While all of these have very different features, one thing is common: they keep the water out - or they try to. If there is a reason that they might not, then your task is to eliminate the leak.

If your roof is safe to ascend, and you're safe to ascend it, there are a number of maintenance items you should inspect. This should be done at least twice a year.



Interface between stucco, asphalt shingle and rain gutter

Asphalt Shingles

Asphalt shingles are very common in most areas. Maintenance for asphalt shingles is generally limited to making sure that all interfaces are sealed and checking shingle condition. If you have a swamp cooler, you should also make sure that the drainage from the cooler is not flowing onto the roof.

Roof interfaces may include the joint between shingle and chimney, or between shingle and stucco wall. Where different materials meet on your roof, the best scenario is that it's "flushed". This has nothing to do with acting illegally - it has to do with sheet metal. There should be sheet metal at these interfaces to protect and to direct water. If it's not there, you'll need roofing tar and/or a caulking gun until you can get it flashed right.

Ventilation is an important part of most roofing systems. If you have a roof type that is more prone to aging (i.e. asphalt shingles), you will want to keep the attic vents working. I have seen homeowners plug off the openings for the vents, thinking that this saves energy. Bad idea.

The ventilation is there to keep you – and your roof – from being baked in the summer. During the winter, good insulation & ventilation are vital in keeping your roof ice-dam resistant. Insulation is there to protect the living space from the temperatures in the attic. Ventilation is there to keep the temperatures in the attic from becoming extreme.



*Ponding on a flat roof at center.
Notice the reflection of the trees in the ponding water*

Metal Roofs

Metal roofs have the advantage that they can last longer than other roofing types, and they allow snow to slide off more readily – an advantage in areas where snowfall is heavier. Metal roofs can also be more slippery to walk on. If you have a metal roof, you will want to avoid getting on it. For example, you should avoid swamp coolers with a metal roof, as one of your maintenance visits to the swamper may result in you, in a pile, on the grass. If you must be up there, don't do metal.

Tile Roofs

Tile has the advantage that it can last forever – almost. Like diamonds, the tile is forever, but only as long as it stays where you need it to stay.

Also like diamonds, tile can be tricky. Tile roofs should only be ascended by someone who knows what he can step on. Tile roofs also must be inspected regularly, as experience shows that individual tiles can slide off over time, leaving holes in your home's armor. When such an event happens, call a professional.

Flat Roof

If you have a flat roof, here's my best advice: punt. Buy another home. More seriously, there are some good options for flat roofs, but tar and gravel are not high on that list. If you do have tar and gravel, be aware that the tar is intended to be a water barrier and the gravel is the UV barrier – it's placed there to protect the tar from the sun. If everything is in



Drainage down this valley will flow against the stucco wall

excellent condition, you should be OK for a few years. Better yet, go with a sloped roof or with a good flat roof drainage system.

Valleys & Heat Tape

Valleys are the location on your roof where two slopes come together. Water will drain to the bottom of the valley, then hopefully flow into the rain gutters. Valleys are where roof aging shows up first, and where roof leaks often originate.

Sometimes valleys can drain water down a roof slope to a third intersection. Here's the problem. Imagine yourself as a drop of water from a rain storm, happily draining down a roof in its valley. Suddenly, your course is changed because you just slammed into a stucco wall. Why? You ask, should I be normal? I'll just ditch this whole valley concept and just run down the stucco wall! It could be an adventure!

Pretty soon many of your droplet buddies follow you, and the home begins to fill up with you and your friends.

Now imagine yourself as the homeowner here. If having water droplet buddies sounds like fun to you, go ahead and let the water in. If not, you may want to cause all roof drainage to go exactly where you want it to go. This is done by flashing (sealing with sheet metal), sealants (i.e. tar), and ice melting (heat) tape.

If the home was well constructed, you should already have the flashing done. If not, you may need to add flashing as needed to control water flow. This fits more into the realm of



Heat tape used near the drip line to discourage ice damming

construction than maintenance, but it should be on your radar screen as relates to roof issues.

If the home is not flashed adequately, there will be areas that need to be sealed with roofing tar. For example, all the interfaces where a vent, fireplace, or swamp cooler are located should be flashed to prevent water entry. If not, and if reconstruction is not an option, you will need to seal the roof-to-stuff interfaces. The goal is to keep water on the surface of the roof rather than allow it inside your home.

Other conditions can cause problems in the winter. If the home is poorly vented, or if you have a valley that forces drainage around an object such as a wall, you can get ice damming problems.

Ice damming happens when a warm attic melts the snow at the top of the roof, causing snow to melt. The melted snow begins to run down the roof, where conditions may be slightly cooler in the attic, or where snow buildup might occur. At a location like this, snow and ice buildup begins to happen, then presto: ice damming. This condition can result in shingle damage and water entry inside the home.

To address this condition, the first fix is to make sure the attic is well vented. In the case of valley drainage obstructions, you may have to resort in the “nuclear option”. This would be ice melting tape, also known as “heat tape”.

The goal with heat tape is to warm the drainage enough to cause water to flow off the roof, away from the home, and into the soil. That being the case, you should place the heat tape in the valleys within a few feet of the drip edge, and near any drainage obstructions.

Even slope changes can be a source of ice damming. When you get up on your roof, take a look at these areas. Where are the most likely ice damming locations? When you find them, protect them.

For more information:

Video Training: www.homeguidez.com/video.htm



The perfect start spot for termites: leaves & debris forever

Vines, Branches Trees & Debris

Home inspectors don't love heavy volumes of vines near the home. Vine-covered walls prevent foundation and wall inspection. They result in a good deal of termite friendly materials near the home. They are a haven for pests, and inhibit the inspector's ability to determine if the landscaping slope is adequate.

Vines and nearby trees near the home can also be a ladder for pests to find their way onto the roof. Once on the roof, critters and pests can find their way into the home via the chimney. First among these are raccoons.

I have seen a number of homes where raccoons found their way onto a roof, then into the attic or chimney to make their home. You can guess how well that turns out.

Multiple homeowners have tried – and failed – to discourage raccoons from nesting in the chimney using noisemakers and pots and pans. Finally, one of the homeowners built a fire to disinvite the raccoon. That could have turned out very badly. I have also seen homes where baby raccoons fell from the chimney nest into the grill of the fireplace, where they were found whelping for mommy's assistance. She could never come, so the young whelpings were fed to a pet snake.

To avoid all of these conditions, the vines, trees, and any other pathways onto the roof should be trimmed back or removed. Raccoons make lousy neighbors.



This chimney cap needs to be rebuilt

Chimney

The chimney: source of peaceful evening fireplace warmth and family togetherness. Whether your fireplace is wood burning, gas burning, or uses pellets, your fireplace is often considered to be the heart of the home. That is unless it's leaking water, then it's the bane of your existence.

Perhaps you have a wood burning fireplace. That old unit has been burning memorable fires for the last 50 years. It's wonderful, until the day when you build a nice holiday fire – really get it stoked up for the grandkids - next thing you know, your house is burning down. It does ruin the holidays when things like this happen.

What can cause problems like this? Let's take the leak factors first. The chimney cap and the chimney/roof interface are the greatest culprits for water entry. If the chimney cap is a rotted out metal cap, or if it turns out to be made of what looks like scrambled-eggs, you have a problem on your hands. If water stands on your chimney cap because your cap takes a bowl shape, you have a task on your hands. You don't want water flowing into the home from the chimney.

Around the chimney, you should see a healthy quantity of metal flashing, once again to control where the water goes. The flashing should be sealed to the chimney.

Most chimneys are built of brick and mortar. In older homes, the mortar ages and falls out, exposing the outside of the chimney to what's going on inside the chimney. Now, add to this scenario another picture: the creosote fire.



Missing chimney mortar – notice the absence of mortar on the left edges

Creosote is a tar-like material found in wood. Over years of wood burning, creosote can build up on a chimney flue. If the chimney is not regularly cleaned, the creosote can reignite inside the flue. Oh - when it burns, it burns hot. Now you have an uncontrollable, extremely hot fire in the chimney. Add a cheese-grater chimney flue to the picture, and things get ugly.

To avoid this scenario, make sure the chimney mortar remains in good condition or is "repointed" (remortared). You should also have the chimney cleaned. Cleaning intervals depends on how much you use the fireplace, and what types of fuel you use. Gas burners leave no creosote. Wood burners do.

Regardless of the cleaning interval for your fireplace, you'll need to check your fireplace flue at least once a year. For more guidance, talk to your chimney sweep or a reputable home inspector.

For more information:

Video Training: www.homeguidez.com/video.htm



*This attic shows the structural components and a heat duct at right.
his attic area also lacks any insulation*

Attic

Some may be surprised to hear that your attic is really intended to be exterior space. Yes, it has a roof over it and yes, some store boxes there, but the temperature in your attic should be much closer to the outdoors than the living space.

Attics get hot – very hot in the summer. Unless you enjoy summer heat in the range of 150 degrees, you probably don't want to bask in the warmth of the attic's not-so-gentle radiance.

To avoid being cooked in the summer, you should have at least 10-12 inches of insulation in the attic. Insulation is key to having not only a more economical home, but a more comfortable place to live. Be aware that the value in the insulation has to do with its depth, not its volume. If you crush the insulation, you lose your insulation ("R") value.

The attic is much like the crawl space. Neither is living space, both require insulation between that space and the home, and both should be vented to the outdoors. Finally, both should be bone-dry. If there's dampness, there's trouble.

Attics and crawl spaces are usually low maintenance. If they are dry and well vented, the most likely issues are insulation and water entry. If the insulation is moved (i.e. raccoons, birds, teenagers, etc), then it should be replaced. If the cause of the problem was pests, then their pathway in should be eliminated. If you see water, eliminate its source and provide any needed repairs. If you caught it early, repairs from water entry should be minor and inexpensive.



The garage door release rope. Pull to release the door, but only if you're sure it won't cause the door to slam closed

Garage

The garage will make a good transition point as we move from the outside to the living space. What can go wrong here? You may not realize it, but there's a guillotine in every garage! That's right; it's your garage door.

Sometimes when the power is out, you have to pull the release rope - yeah, the red thingy. It releases the garage door from the door opener, allowing you to lift or close your door manually. This is important in a power outage when you really want to get your car in or out of the garage.

So what can go wrong? There's a spring on the garage door opener system. Its purpose is to exactly counterbalance the forces of gravity, so you can raise or lower the door without being a weightlifter and without having your feet cut off or your truck mashed. When the springs go bad, the door opener has to work much harder. Poorly sprung doors will age the opener and damage the door itself.

Most importantly, you don't want to pull that cord only to have the door come slamming down on your two-year old. You know what a guillotine does - it chops. That's what your poorly sprung door can do to you, your family, your pets or your belongings.

To keep this from happening, call a garage door technician every two years, or as recommended by your trusted door technician. Don't try to do this yourself - things can go badly if you don't know what you're doing.

Interior Maintenance

When in the market to buy a home, a majority of the buying population looks first to the beautiful homes – the ones that sparkle, the ones that are well decorated, and that appear to be immaculately maintained.

It is absolutely true that better maintained homes command a better price. It's true that these homes sell faster when listed. It is also true that there is no such thing as a maintenance-free home. Despite a home buyer's intention to buy a "move in and live happy" home, the reality is that vigilance and maintenance will always be necessary.

Interior maintenance tasks consist primarily of caring for your plumbing, heating and cooling, and safety systems. We'll discuss these in the next few sections.



Water heater tank drain valve.

Plumbing

It's not a good day when you come home and hear water running inside the house. You look for the source and find out that a pipe has burst, and you have a house full of water. It's also unpleasant when you attempt to work on a leak at the sink or toilet, only to cause another leak by attempting to fix the first one. Do those things happen? I can assure you that they do.

Water Heater

Someone once referred to certain tanks as being like barns. He said "*you build them, then ignore them till they fall down*". Water heaters can be like that. You install them, and they don't enter your mind again until they begin to leak.

Water heaters will last six to twelve years in most homes, but have been known to last in excess of 25 years. What's the difference? Use and water quality. In some newer areas where there is a lot of construction, soil can be washed into the water lines, and the water heater becomes the soil storage unit for the home. As time goes by, a thick sludge layer builds up on the bottom of the unit. Eventually the sludge starts to sound like popping popcorn as the flame beneath "boils" the sludge. When it pops, you hear the sound of the superheated sludge boiling off its heat to the water above. Some have also compared this to the sound of jeans in the dryer.

It isn't always mud or sludge that washes in. The local water quality can also affect the water heater. In areas where

water chemistry is heavier, simple water hardness, iron, and other materials can also fill the tank.

So how do we get the soil, sludge, hardness, iron and assorted body parts out of the water heater? Two ways: At the base of the unit, you'll find the tank drain. This should be opened a few times a year. If it can flow to a nearby drain, that's best. Otherwise, you might need to hook it up to a hose – you'll want to run at least 20 gallons out. Now, be aware that if your tank drain valve hasn't been opened regularly, it will be frozen in place. This means that if you open it now, it may not close. You'll have a leaky valve and you'll need to call a plumber.

Your next task will be to test the pressure valve (PRV). This is located near the top of the tank. You can open this to exercise the valve, and to drain out any scum floating on the top of the tank. Once again, if it's been more than a few months, opening this valve may cause a leak. If it's a few years old and hasn't been maintained, don't start now unless you know a minute-man plumber. You'll probably need him.

If it's safe to turn them, I recommend opening both of these valves every 3-4 months. Turn the valve at least one full turn, let it do its job, and turn it back off again.



*The water heater PRV.
This one can't function because it's blocked
by the heater next to it*



There they are, under the sink. Turn them often.

Kitchen & Bathroom Manual Shutoff Valves

The instructions for kitchen and bathroom valves are very similar to those for the water heater. These valves are usually located under the sink. There you will find two valves: one for the hot and the other, well, you know what that one is for.

Why is this important? Because if you get a gusher in the sink, you want to be able to turn the water off. If you attempt to do so on a frozen valve, now you have two leaks. Once again, this constitutes a bad day. Exercising the valves prevents bad days.

These valves should be exercised approximately 4 times a year as well. Give them a full turn, then turn them back to a different position than before the turn.

Mana-Bloc Systems

The mana-bloc system is meant to create for your plumbing system what a breaker box does for the electrical system. If you have a Mana-bloc system, I do not recommend routinely turning the valves, as these sometimes don't respond well to being turned that often. Based on my experience, sometimes the heads turn off but the valve remains on: bad day.

Instead, you should know where the key is, know how to turn the valves off, and know what each valve represents. The wrong time to be looking for the key, or identifying valves, is when the gusher is happening. Bad, bad day.



*The hot side of the mana-bloc system.
Notice the key in the bloc at upper right*

Water Filtration

Water filtration systems come in a number of shapes and sizes. Some filter particles, others do metals or bacteria. One thing comes standard with all of these units: filters.

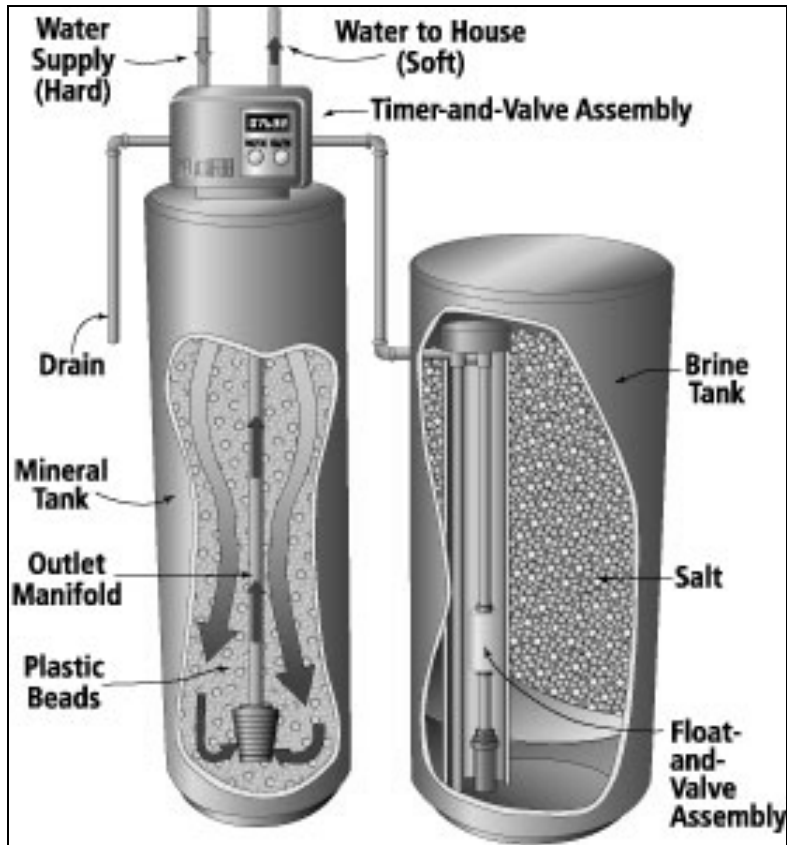
When dealing with filters, this is certain: if they're not maintained they get grimy. Imagine if you will a filter that captures bug parts, water swimmers, calcium, soil, etc. Left in place for too long, this poor filter starts to look like a decaying corpse.

If you have a water filtration system, that's beautiful. Bear in mind however that if the filter is not well maintained, it can cause many more problems than it was ever intended to solve. If you can't or won't change the filter per the manufacturer's recommendations, then by all means take the system out of service.

Water Softener

Soft water! The glory of housewives everywhere. Women often love it because the water feels better and fixture cleaning is easier. Soft water can also be the bane of house-husbands, because it's the poor, poor house-husband that gets the honor of buying and bringing in the salt.

Water softeners are usually made up of three systems – the brains, the brine and the beads. The brains (or electronics) are the controls. The brine barrel is the one you pour the salt or



The water softener's inner workings

other chemical into, and the beads are inside the sealed resin tank. While it's easy to understand what's in the brine barrel, the resin bead tank is more of a mystery. If you can see what's inside that tank, chances are that something has gone very wrong.

A water softener system works like this: the resin or mineral tank has resin beads inside – beads that attract water hardness chemistry like calcium and magnesium. These are not harmful chemicals, because many of us take calcium pills. Nonetheless, calcium & magnesium (hardness) makes the bathroom sink harder to clean.

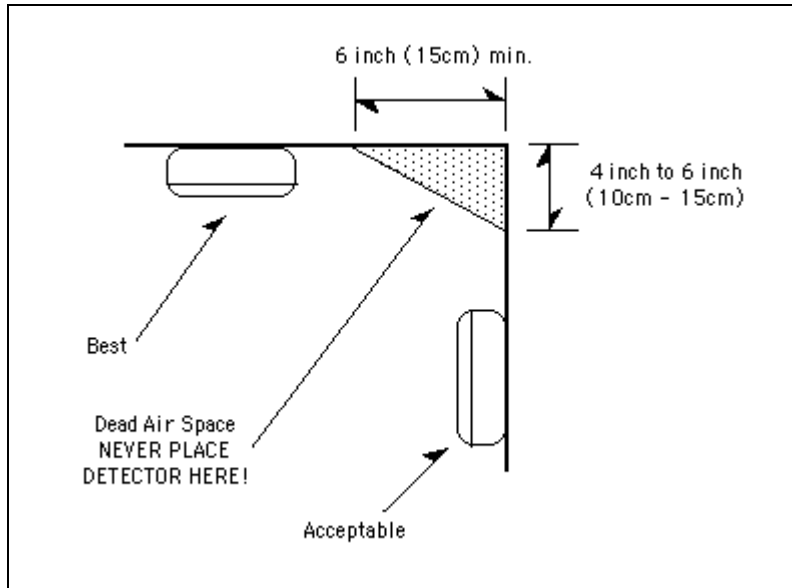
The other parts of the water softener system are the brains (timer and valves) and the brine (chemical) tank. The resin beads attract water hardness until they are saturated. At that time, the brains (timer & valves) start the process to clean the beads with salt-water from the brine tank. This process cleans the beads and flushes the waste materials to the sewer. Then the process starts over again. Depending on the type of controls, the system restart can occur after a certain number of days, or after a number of gallons run through the system. The process for many non-salt systems is generally similar.

Maintenance on such a system is generally quite limited. You will need a few inches of water in the base of the brine tank. You want to make sure that the water in the brine tank is reasonably clean. Floating mouse carcasses are not a good idea. Other than that, you just need to keep salt in the brine barrel. Remember, what's in that barrel does make it into your home's water system - if it starts to look like a swamp, change the water.

One last thing: water hardness (calcium etc) is good for you. Sodium (salt) isn't. This means that the taps you drink from should be hard water. On the same note, don't soften the water that goes to the exterior - watering with soft water wastes salt and kills your plants.

The bottom line for water softening is that while soft water is better for cleaning your sinks, toilets and tubs, it is hard on anything that lives. You were built for calcium (hardness) in your water, not sodium. Plants are built the same way. If you have a water softener, make sure that the softened water is used at the locations where you want it – and not used where you don't.

For more information:
Video Training: www.homeguidez.com/video.htm



*Smoke alarm placement.
Placement on the ceiling is definitely better*

Smoke Alarms

Smoke alarms come in various shapes and sizes, the most common of these being the variety with battery and hardwire. In these alarms the battery backs up the wired system, and the wires back up the battery. With this system in place, one side can be temporarily down and you still get protection from the other.

Other types of alarms are also available. If you look hard enough, you can find heat detectors out there. These are intended to sense the heat from a fire before a smoke detector would go off. Don't test these with a blowtorch – that would be a bad idea.

You also have the combination carbon monoxide / smoke detector alarm. These are placed on the ceiling where smoke detectors should go. That's great, but there's a drawback. If you have a raging fire, the carbon monoxide (CO) detector may sense the fire before the smoke alarm does. On the other hand, if the CO source is a slow-burn unit (i.e. fireplace, space heater or water heater), a CO detector on the ceiling may not detect the problem until you're already dead. This is because CO is heavier than air, and pools on the lowest levels of the home. Don't confuse a standard CO detector for a smoke alarm – if it's only for CO, it should go near the floor.

Still another type of smoke alarm is the "I'm an island" detector. This unit is typically installed in older homes, or placed in areas finished after the home is built. These alarms rely exclusively on a battery and are not interconnected with

other alarms. While they provide more protection than nothing at all, a basement fire alarm may not be heard in a second story bedroom.

Maintenance on a smoke alarm is limited to two simple tasks: replace the batteries twice a year, and test the units regularly. All smoke alarms worth having in a home will have a test button. When you press and hold this alarm, you should hear all other alarms in the home as well. If not, you have “islands”:

If you do have “island” smoke alarms, your choices are few. Either you reconstruct the home to include a wire back up, or you do the best you can with island units. This would involve testing each unit individually. Yes, that’s a pain, but less painful than the knowledge that is gained in hindsight after a house fire.

*For more information:
Video Training: www.homeguidez.com/video.htm*



GFCI outlet

Electrical

You want to do maintenance on your electrical system? Are you nuts?

Actually there are some important tasks you can safely do on your electrical system. If your home has been built or remodeled within the last 20 years, you should have GFCI circuits. Those are the electrical plugs with the two buttons. Sometimes these are red and blue, but there is always a test button and a reset button.

The purpose of this type of outlet is to detect a short. Let's say you were blow-drying your hair and dropped your blow-dryer into a sink full of water. Now you have electricity and water mixing together – not a good combination. The GFCI circuit can now heroically perform its task – it detects the electrical short and disables the line.

Maintenance on these outlets is simple and straightforward: you hit the test button. If it pops, that's good. Now make sure that the power is really off at that outlet. If so, that's better. Finally, press the reset button. Congratulations, you're done! You passed the electrical test. We recommend that you do this twice per year – perhaps when you change the batteries on the smoke alarm.

In the electrical category, one more task comes up. If your main power line comes in through a maze of tree branches, and if the wind blows or the tree grows, the branches will



Power line brought through tree branches spells trouble

stress your power line. If your home has tree limbs and power lines intermixed, trim the tree – or remove it altogether.

Perhaps a paragraph for those of us who really, really love that particular tree: if you have a tree/power line conflict, and you really want the tree to stay, you have some choices. You could just eliminate the power line and live naturally. That would be safer but perhaps inconvenient. Alternatively, you may have the option of bringing in your power from another location. Good luck with that – it may be somewhat expensive.

My suggestion is that you not leave it up to chance – and weather – to determine when your power line and tree create a bad day for you. Keep the branches trimmed away from the power lines, or remove any offending trees altogether.



The furnace filter must be regularly cleaned or replaced

Furnace

A furnace is much like the water heater; its reliability can cause it to be forgotten. When that happens, the bills can pile up.

For most modern furnaces, there is no need to grease the moving parts or light the pilot. All that remains is to replace the filter and turn up the heat. Because it's so easy, many homeowners and renters tend to let furnace filters go too many months – or years - between filter changes. When this happens the dust that should have been caught by the filter ends up in the burn chamber, the moving parts, and the computer chips found inside the furnace.

When dust gets in the burn chamber, the dust acts like an insulator for parts of the chamber. This means that some of the metal gets hotter than other areas. As this condition occurs over and over, stresses develop in the metal because parts are expanding and contracting at different rates. Finally, the dreaded *crack in the burn chamber* occurs. When the chamber is cracked, it's time to replace the furnace.

Then there is the issue of dust in the moving parts. Not good. Or perhaps you may get dust on the computer chips. Ditto on the Not Good thing. The furnace needs to be clean to do its job.

There's more to furnace maintenance than simply changing the filter. Many filters are not placed in a position or location where they can adequately filter the incoming air. For example, some that should be in a "J" or "V" position can end

up in the “/” location. When this condition happens, air brushes by the filter, but does not move through. Such a filter is more of a piece of abstract art than a functioning part of the furnace.

What else can go wrong? Sometimes the cold air return comes in from beneath the furnace. The filter is then laid horizontally at the base of the furnace. Sure looks good when the furnace is off! Problem is that when the furnace is on, the incoming air lifts the filter and, you guessed it, useless.

If you're good at keeping the furnace filter in the right position, you may need to service your furnace less often than your piggy neighbors. If you're not good at changing the filter, you'll need to add one more thing to your furnace maintenance list: have the furnace serviced often. For most homes, we recommend that it be professionally serviced every 2-3 years.

Service needs and filter replacement for your furnace filter can vary dramatically. It is based on the type of filter you use, and by the conditions in your home. For example, you'll need to change your filter more often if your home

- is in the country (more dust)
- is in a construction zone (dust)
- if the wind blows more often (dust)
- if your home has more tile or hardwood
- if you smoke
- or if you have a hairy pet – the kind that sheds a lot

This list could go on forever.

Changing your filter depends on the filter itself. Filter types range all the way from the nearly useless “30-day” filters to the more effective variety. The simple answer to filter changes is to monitor the filter, and don’t leave it in longer than the manufacturer recommends.

Now there are other types of heating systems. These include boiler & radiant systems, electrical, even coal burning systems. If you’ve got one of these, you’ll need to go to a higher authority – we just can’t cover it here. You’ll need to talk to your home inspector or HVAC technician about maintenance requirements on these units.

Cooling

For most of us, there are two primary ways to cool your home: the central air compressor and the swamp cooler.

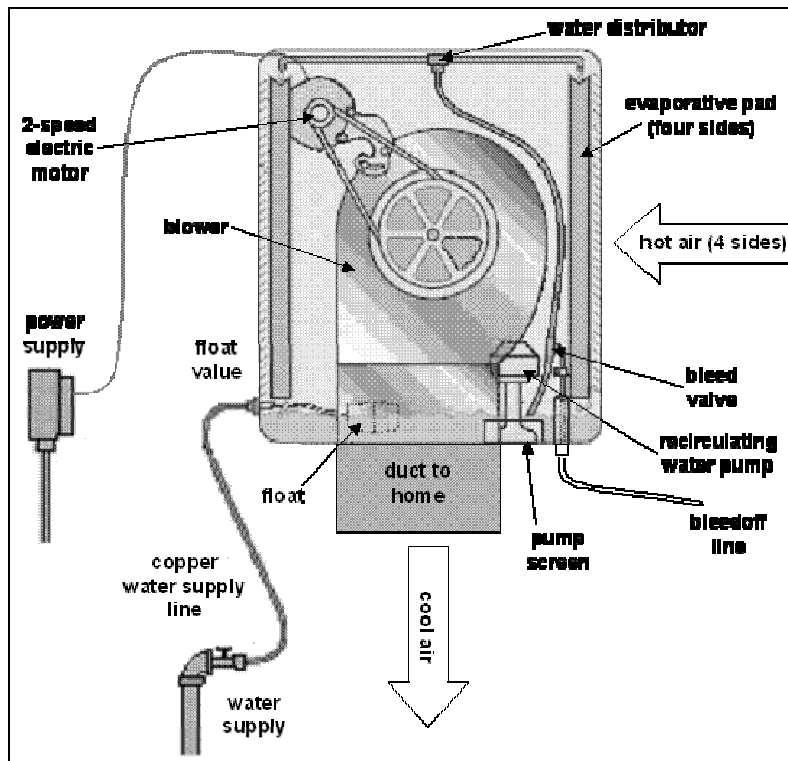
Swamp coolers and central air are fundamentally different in the way they operate. The swamper will take outside air - with all its impurities - cool the air and push it into your home. The central air compressor uses your furnace system to take air from within your home, filter it, then distribute cooler air through each of your heat ducts.

Swamp cooler air comes with an added level of humidity and allergens, while central air will take a small amount of humidity and allergens out of your home.

Swamp Cooler Maintenance

Swamp coolers take more maintenance. Swampers operate on a reliance of the cooling power of water. This process begins with a basin that has been filled with water. The water is drawn through a filter into a pump, which distributes water to the top side of the swamp cooler pads. These get wet, and outside air is drawn through the pads and cooled by the moisture. Water that doesn't get evaporated in the process flows back down into the basin, and the process starts over again.

A key concept to all of this is that water is more than just H₂O. Water comes to your home with any number of natural chemicals, including water hardness, metals, bacteria, etc. When water evaporates in the pads, only the H₂O leaves,



Swamp cooler diagram

and the rest of the water chemistry stays right there. Over time this chemistry can harden the pads, plug up the filters, and generally reduce the effectiveness of the entire swamper system.

This brings up the first thing you must do to perform maintenance on your swamp cooler system - clean or replace all pads and parts that are affected by the deposits. Pads need to be replaced at least once per year, and the parts should be cleaned or replaced as needed.

After the summer heat is over, you should drain the basin and turn off the water source to your swamp cooler. You must also disconnect the bottom end of your supply line to the swamp cooler. This allows the system to drain out – an important step because ice in the basin or in the plumbing can cause problems. Bursting lines are rarely a good idea.

The summer maintenance list continues: You must make sure that the swamp cooler is not overflowing onto your roof. If you have an asphalt or tar roof, the chemistry from the overflow water ages your roof very quickly - it can turn a 30-year shingle into a product with a 5-year life span.

To control drainage over the roof, attach a hose to the underside of the drain. This super-drain-extender-on-steroids allows the chemical-heavy water to move directly into your rain gutter, where it flows soothingly into your soil. Your plants can handle that kind of chemistry, but your roof cannot. Be good to your roof and it may just treat you kindly.

Finally, winter maintenance. Swampers and their flues are an excellent pathway for cold air to find its way into the home during the winter. To reduce the cold air you can use the



The central air compressor must be kept free of dust and weeds

canvas cooler covers, but it's also good to place a good insulator on the ceiling just beneath the flue. Truth is, the cooler itself can handle the winter. The canvas just protects you from forced air entry by howling winds and severe weather.

Central Air

The central air compressor uses one of the laws of physics to create cool air in your home. It relies on the fact that pressure and temperature are enemies. Or perhaps they are friends. In any case, where pressure goes up, temperature also tends to go up. Reduce pressure, and temps go down. The compressor relies on this fact - it compresses gases on the exterior and releases the heat from the process outside. Inside the home, the opposite occurs. Compressed gases are decompressed, and the cool is captured and routed through the home.

What this means then, is that for the compressor to function, it must be able to move air. The grills on the side of the compressor are used for air input, and the warmer air is blown out the top. If there are weeds, tree branches, cottonwood cotton, or dust, the effectiveness gets reduced. Maintenance on the compressor means keeping the weeds and plants at least 18 inches away from the compressor. It also means keeping the grills clean, clear & undamaged.

Maintenance on the rest of the central air system is limited to changing the furnace filter as needed, and protecting the central air compressor from icicles. It's that simple.

Some choose to remove electrical parts from the compressor or swamp cooler during the winter. Others remove or turn off the breaker for the compressor during the winter. If you choose to do that, more power to you. Doing so may enhance the service life of certain parts – unless bringing them inside means they get used as hockey pucks.

For more information:

Video Training: www.homeguidez.com/video.htm

Summary

I know a man who felt that changing the oil in his car was too much of a hassle. Whether serious or not, he said that leaving dirty oil in the engine would “toughen it up”. We all know that the opposite is true. Your engine is “toughest” when it’s treated like a baby.

So goes your home.

Another analogy comes to mind: *your home may be like a good woman*. Treat her right, and she’ll treat you well right back. Ignore her, and you get soaked.

Enough on that subject.