HOMEOWNER REPAIR GUIDE

ASSESSING & REPAIRING YOUR GARAGE STRUCTURE

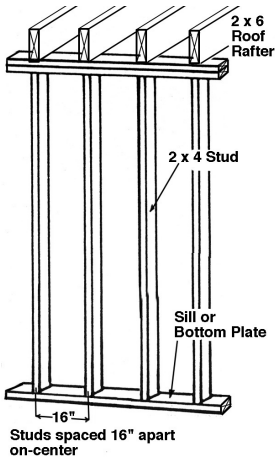
Sooner or later, most homeowners must decide whether it's better to repair or replace an old garage. We suggest that you start by taking a good look at its overall structure.

In communities with older homes, many garages were built for smaller cars. They were certainly not built to the quality standards of the houses – in fact, they may not have been designed to be permanent structures at all. As a result, some areas that frequently fail are:

- the place the wall framing meets the foundation (if there even is a foundation!)
- the rigidity of the side walls
- the structural framework of the roof (which is often undersized or improperly supported)
- the framework around the doors and windows
- a rear wall that has either rotted out because there was never a gutter installed, or has had an extension for a longer car cut into it, destroying what little structural integrity it may have had originally.

HOW A GARAGE IS FRAMED

The framing system of a garage *(see illustrations)* starts at the bottom with a **sill board**, the piece of wood that sits on the foundation and upon which the wall is built. This board is attached to the **wall studs**. At the top of the studs is a **top plate**, usually two 2 x 4's nailed together. **Roof rafters**, the boards that support the wood and shingles on the roof, usually rest on top of the top plate.



Wall framing

If any part of your framing system is damaged from water leaks or insects, it will weaken the whole structure. When enough damage accumulates, the garage becomes little more than a pile of giant pick-up-sticks. This seldom happens quickly (although if your teenager runs your car through the back wall of the garage, the process may occur more rapidly!) Usually, the first sign of deterioration is a garage door that doesn't quite close. Then, your garage starts leaning to one side or the other. These problems don't go away by themselves; they will usually need some help and encouragement from you.

How do you assess your garage? You can begin by going inside your garage and taking a good look at your framing system:

ASSESSING YOUR GARAGE

1 WALLS, SILL AND FOUNDATION

Look at the base of the side and back walls, where the wall studs are fastened to the bottom sill. Is the wood solid or rotted? Ground dampness, snow, and standing water make this a good place for rot to start. (Dirt

mounded against the outside of the garage keeps the dampness trapped in the wood, so keep the base of your garage – inside and out – clear of dirt and other debris.) If you can stick a nail more than 1/2” into the wood by hand, the wood needs to be replaced. Look carefully at the sill board, as these frequently rot out. Go around the entire garage like this with a piece of chalk and mark the pieces in need of replacement.

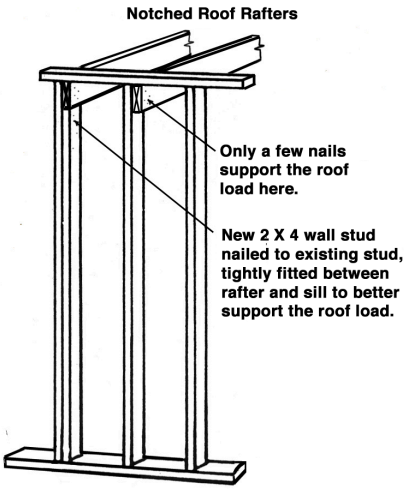
Wall studs are easily replaced. First, cut through the stud high enough away from the rotted end to where there is good solid wood, and remove the bad portion. Then, cut a new stud from 2 x 4 outdoor treated wood to fit in the opening and nail it in place. Next, take a full-length stud and nail it alongside the patched one, for strength. *(See separate handout on “Garage Wall Repair” for how-to information.)*

Replacing the sill requires that you jack up the side of the garage that you are working on. By taking two hydraulic bottle jacks, one at each end, and using a 2 x 4 placed from each jack to the top plate, you can raise the wall the couple of inches necessary for you to remove the rotted sill and replace it with outdoor treated wood of the same size (usually at least 2 x 6.)

If you need to replace any parts of the foundation, use this same method to support the garage off the foundation while you rebuild it. Dig out the old, and pour a new concrete footer and foundation. (You'll usually need a permit for this work, and your new footer and foundation must meet code requirements.) Repair one wall at a time until you are finished.

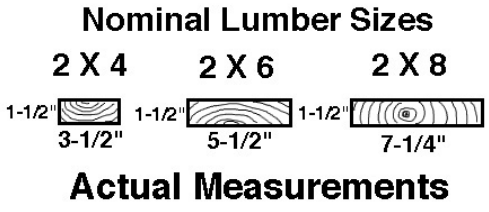
2 ROOF FRAMEWORK

Then, assess the framework that supports the roof. First, look at how your roof rafters are supported. Ideally, they should be resting on a top plate; sometimes, however, they are attached to the sides of the wall studs instead. If they are, give them proper support by nailing another stud alongside the existing stud, directly beneath the rafter *(see illustration)*. This reinforcement is required by code in Cleveland Heights and many other communities.



Supporting a notched roof rafter

Before you support the existing rafters, however, check their size and condition. If they’re 2 x 4’s, they are too small; replace them with 2 x 6 rafters, nailed alongside the existing ones. Support each end of the new rafter where it meets the wall by nailing a full-length 2 x 4 wall stud beneath it, running down to the sill board.



Nominal lumber sizes vs. actual measurements

If your rafters, regardless of size, span a two-car or larger garage without a center beam supporting them, you need to add a **center beam**. A center beam is made from two or three 2 x 12’s nailed together, spanning the entire depth of the garage. Raise it with jacks at either end of the garage until it touches all the rafters and takes out any sag. Then, nail it into the wall studs at either end. (Most often, posts will also be necessary for support.) Once installed, the center beam will promote good roof drainage and prolong the life of the garage.

If your roof has puddles after a rain in areas where the rafters sag, then you need to remove that sag or you will constantly have roof leaks. To remove a sag, place a 2 x 4 on a hydraulic jack at the lowest point of the sagging rafter; then, slowly jack it up. When the rafter is bowed the other way, nail a new rafter alongside it; after the jack is removed, the rafter should still have a slight upward bow.

Finally, look at what covers the rafters. If you have rotted **roof decking**, you'll need to replace at least the deteriorated area, or the damage caused to it by the rain will just multiply. Inside your garage, drive screwdrivers up from the underside of the decking to mark the corners of the area to be patched. Then, go up on the roof and cut away the roof covering to get to the decking. Make sure that the edges of the rotted area you cut out extend to the center of a rafter. (This will give you something to nail the new piece of decking into.) Replace the rotted piece with new wood of the same thickness, and patch the roof covering. *(See separate handout on "Roof Sheathing" for how-to information.)*

3 DOOR AND WINDOW OPENINGS

The various openings in the sides of your garage are also important parts of the framework. The garage door provides a way for your car to get in, and most garages also have a window to let in light. In some garages you'll also have a service door ("man-door"), so you can get into the garage without opening the big door.

Each of these openings is really a hole in the side of your garage that weakens the whole wall. (You can imagine what that large opening for your garage door does for the front wall.) When garages – or houses – are built, special attention is paid to these openings to strengthen them and the rest of the wall.

Across the top of the garage door opening runs a beam, usually called a **header** (or **lintel**). Because this beam supports the weight of the roof, it must be especially sturdy. The header is commonly made by bolting two 2 x 12's together; in some cases, a piece of steel is sandwiched between them for added strength. If you have a sagging door opening, this is the piece that you must replace.

To hold it up, the header must be supported by studs on each side. These supports are usually two 2 x 4's, nailed together. The stud that is closest to the opening is called a **jack stud.** When your car bumper hits the side of the door frame and knocks the jack stud loose, you weaken the support for the weight of the entire roof. Before long, that nice, straight garage door opening isn't so nice and straight. So, if you have a garage door that won't close properly, you'll need to look at these important areas to see where the problems are. Most garages aren't enclosed on the inside, so these framing details are easy to see.

The frames for your windows and service door are constructed in the same manner but, because they are much smaller in size, the lumber used to frame them is smaller—usually two 2 x 4's, nailed together, are used to form all four sides. If you have a service door or window that won't open or close properly, look first at the frame for any deterioration or damage, to determine how to solve the problem.

4 LEANING WALLS

Finally, older garages may be leaning one way or another, or the rear wall may have come off the foundation, so check the outside of the structure for these conditions, as well. Repairing these problems is more of an art than a science. You'll probably need to jack up some areas to pull the walls in. To correct leans, use a hoist-type device called a **"come-along"** to pull the garage straight. Once you have straightened it, a 2 x 6 nailed diagonally from top to bottom along the offending wall will keep it aligned properly. *(See separate handout on "Straightening a Leaning Garage" for how-to information.)*

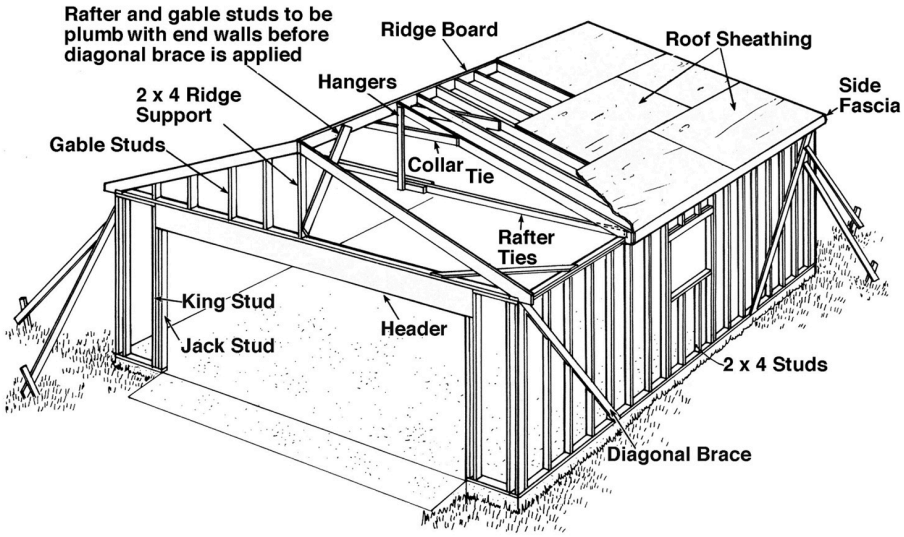
REPAIR OR REPLACE?

THE 50% RULE

These are the most common repairs needed for older garages. In light of current replacement costs, it generally pays to keep your old garage in shape. However, if the cost to repair an old garage reaches 50% of the cost of a new one, you should consider replacement.

IF YOU DECIDE TO REPLACE YOUR GARAGE

Think about a design with a gable roof, rather than a flat “shed-type” structure. Focus on material choices and construction methods that will provide the most longevity. *Even if you are purchasing a garage “kit,”* talk to the supplier and/or contractor about how the foundation will be laid, what siding will be installed, and what roofing material will be used. (See separate handouts *“Foundations for New Garages,” “Siding Options,”* and *“Choosing Roofing Materials”* for the advantages and disadvantages of the various options available.)



Garage framing members

Home Repair Resource Center empowers homeowners to maintain their homes for sustainable and diverse communities.

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