

A Guide to Preserving the Value of Your Home

THE HOMEOWNER'S HANDBOOK



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Section 4: The Roof—Keeping a Lid on It All

Roof structures come in two general categories: (1) joist and rafter systems, and (2) factory-fabricated trusses.

Joist and Rafter System

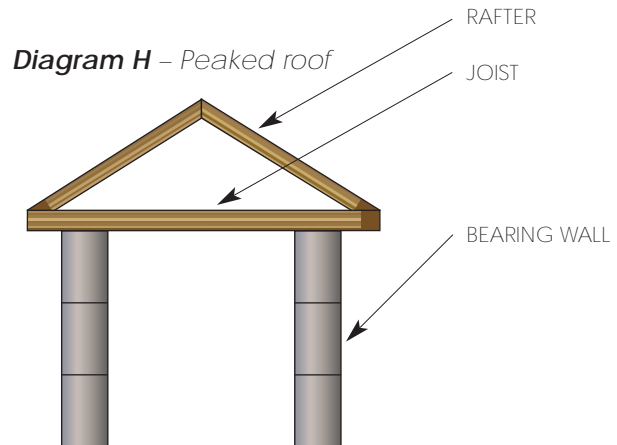
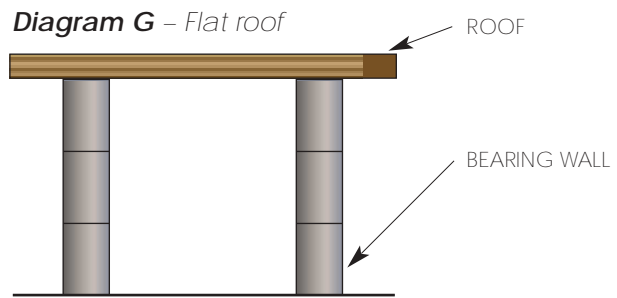
Diagram G (right) shows the first type of roof structure ever used by humans. This is a primitive form of a joist and rafter system.

With a joist and rafter roof, the joists are laid horizontally to provide protection from weather. The joists span from bearing wall to bearing wall. In primitive times, these roofs were flat. However, as humans evolved and mastered geometry, they learned that the triangle was one of the strongest, most efficient shapes for supporting a load, Diagram H (right). A peaked roof was made by raising the joists. Rafters were then added to provide the slope and it became known as the “joist and rafter system,” Photo 1-18 (right). The result was not only a strong roof, but also one that helps shed water, snow, etc.

Joist and rafter roofs are still used in many homes that feature distinctive architecture. This type of roof can be used to create cathedral or vaulted ceilings.

Factory-Fabricated Trusses

Not all homeowners want or can afford elaborate architecture. So, many homes are mass-produced and include factory-made materials. One of those materials is the factory-fabricated truss. These trusses are made by joining individual pieces of lumber by sheet metal truss plates. The plates contain hundreds of projecting “claws” that are pressed into the lumber by hydraulic presses. The truss plates effectively bridge each joint and transfer loads from one member to the next. The result is a strong structural element. Photo 1-19 (right) shows manufactured roof trusses in use. Notice the “truss-packs” sitting on the ground waiting to be installed.



1-18 Joist and rafter roof structure



1-19 Pre-fabricated roof trusses in use

Section 5: Soil—Its Effect on a Home

As we have stated throughout this chapter, the soil around and below your home can have a major effect on your foundation. Let's look at how the major "soil culprits" (landslide, swelling, shrinking, and settling) can affect your home.

If your home was built on a hillside, more than likely "cut and fill" techniques were used to build a perch for its foundation, Diagram I (right). Cut and fill refers to the process of cutting out the soil from the hill to form part of the platform. Unfortunately, this process could possibly cause a landslide.

Usually, the "cut" portion of the site is very stable, and a home built in this area will not settle. However, the "fill" portion of the site can be quite another story. Because the soil was cut out and moved, it does not compact as it did before excavation. The soil must be manually compacted or else, when it becomes wet, it will settle. In extreme cases, it can slide down the slope.

For these reasons, homes built on cut and fill sites should be monitored, especially during long periods of wet weather. Look for symptoms of settlement over the fill portion of the site. These symptoms might show as vertical cracking in your basement or crawl space walls.

Another issue covered elsewhere in this chapter is swelling soil. Swelling soil can push up concrete, landscaping, and even home foundations. These problems can be avoided with proper design and effective moisture management.

The last, and more common culprit, is soil shrinkage or settlement. This usually occurs where soil has been added or filled, such as around the foundation, Diagram J (right), under driveways and walkways, or in the fill portion of a cut and fill home site. Heavy rainfall, snowmelt, or poor water drainage around the foundation can saturate the soil and cause settlement.

Diagram I – Cut and fill site

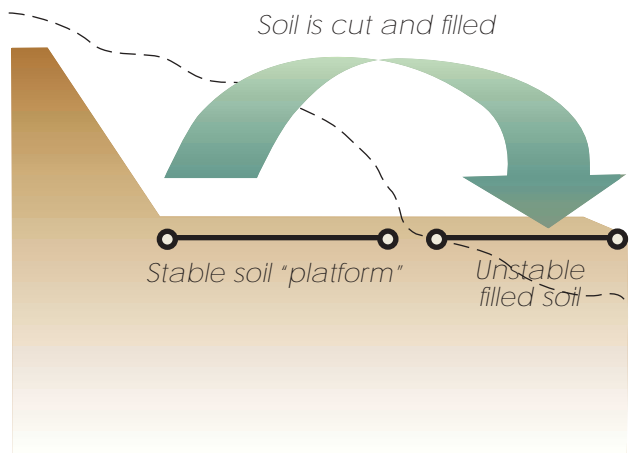
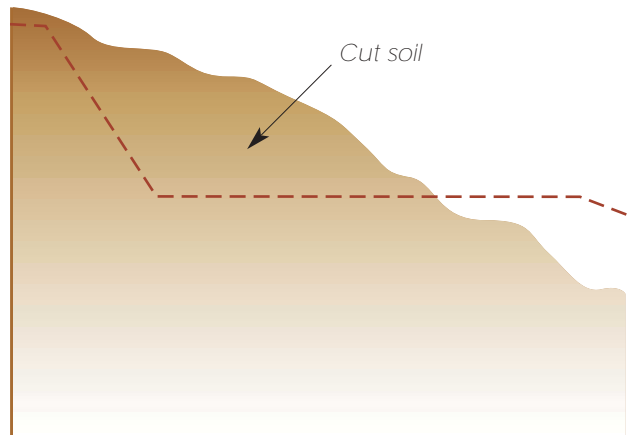
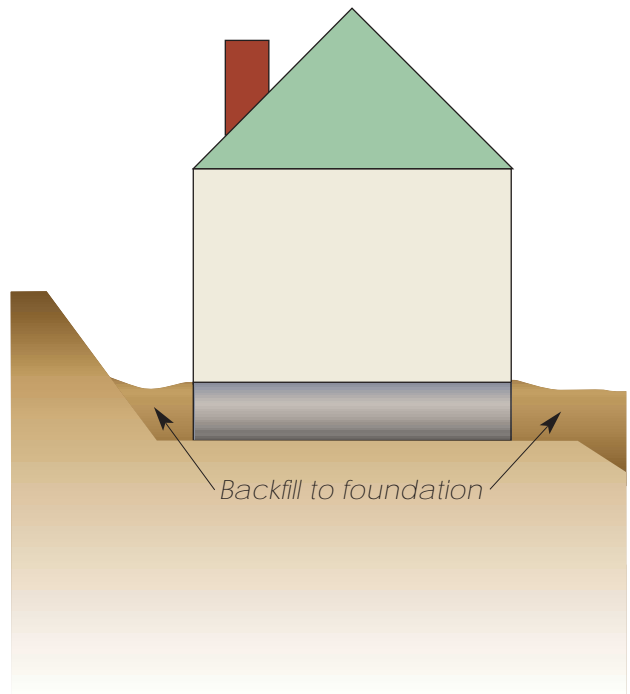


Diagram J – Shrinkage or settlement



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