RLC ENGINEERING, LLC
DEDICATED TO IMPROVING THE PERFORMANCE OF RESIDENTIAL AND LIGHT COMMERCIAL BUILDINGS

SOIL COVERS

What are soil covers?

A soil cover is a sheet material installed on the soil in a crawl space to keep moisture from moving upward through the soil into the air where it can cause problems with the house. Soil moisture can lead to decay of joists, flooring, roofing and other parts of the house as well as contribute to problems with painted surfaces, hardwood floor and other wooden items, and cause mold-related indoor air quality problems.

Soil covers are sometimes referred to as vapor retarders, vapor barriers, moisture barriers or ground covers. The most common type is 6-mil polyethylene sheets; however roll roofing and EPDM rubber can sometimes be used.

Why are soil covers needed?

Years ago, most houses didn't need soil covers in the crawl space area. They were built on high, dry sites with plenty of ventilation under the house. With high and dry sites becoming scarce, builders are resorting to less suitable land. Houses also didn't have insulation that prevents moisture from escaping rapidly, or air conditioning that creates artificially cool surfaces.

The combination of significantly reduced ventilation, lower foundations and cooled surfaces results in ideal conditions for mold growth and wood decay.

As much as twelve gallons of moisture vapor can be released from the soil into the crawl space of a 1000 square foot house in a single day. A soil cover reduces the amount of moisture added to the crawl space, thereby reducing the potential for mold and decay. The first and simplest line of defense is a complete soil cover in the crawl space.

Before installing a soil cover:

Check site drainage. No water should stand under the house. If it does, divert the water away from the house by ditching, sub-surface drainage methods, or a sump pump. Be sure that the land slopes away from the house for 10 feet all the way around the house. Add extensions so that downspouts drain water at least 5 feet from the foundation.

Prepare the crawl space soil. Soil under the house should be crowned to prevent standing water in the crawl space. Remove wood scraps and other debris. Smooth the soil to prevent hills and valleys.

Above all, solve your drainage problems *before installing soil covers*. Otherwise, you may do more harm than good: if standing water is still present in the crawl space, the soil cover with prevent the water from seeping into the ground.

How to install a soil cover:

Follow these three steps:

1. Remove all debris from the crawl space, including wood, cans, bottles and rocks from the crawl space area.
2. Unroll the soil cover. Spread the soil cover over the entire surface of the crawl space. Trim around piers. Lap the soil cover up foundation walls if the outside ground level is above the crawl space soil level. Leave at least 8 inches between the soil cover and any wood framing or flooring members to prevent hidden termite pathways.
3. Overlap joints approximately 12 inches. Anchor the soil cover in place with bricks, sand or long nails.

Condensation and liquid water are often present under a soil cover. This is normal, and indicates that the soil cover is performing its

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job. Do not fold back the soil cover to dry out this water.

If water puddles on top of the soil cover, determine and solve the source of the water. Correct plumbing leaks, site drainage and duct condensation problems. If necessary use a knife or nail to poke holes or small slits in the soil cover to let the water seep down through the soil cover. (These small holes will let gravity push water down through the holes, but not allow a significant amount of water vapor from moving up through the holes.)

Special considerations for older homes:

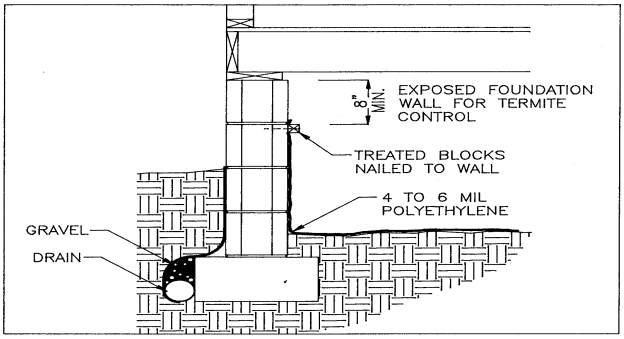
Some older homes have existed with such high moisture levels that installation of a complete soil cover causes excessive drying, shrinking and warping of flooring, cabinets and trim. In most cases, the excessive drying is a result of abnormally high ventilation rates of the house. These high ventilation rates result in high indoor moisture levels in the summer and low humidity levels in the winter. The best solution then, is to find and correct the leaks to reduce ventilation rates. In very rare cases, it may be necessary to uncover some of the soil to increase moisture levels. If this procedure is necessary, simply roll back a foot or so of the soil cover around the foundation wall.

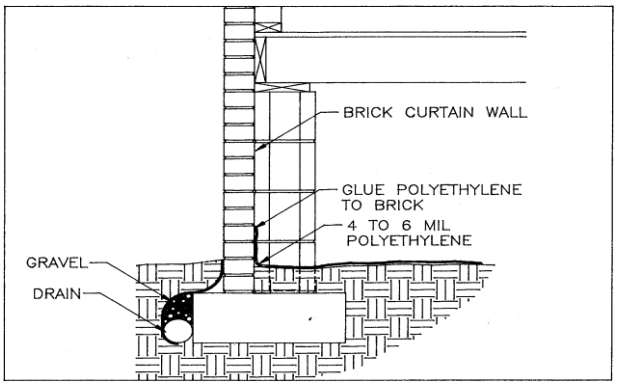
Note: Other changes to a house such as new windows, doors, and heating and cooling systems can cause moisture levels to rise. If this type of change is made to a house, complete soil coverage is warranted.

CAUTION: If signs of decay are evident in the crawl space, complete soil coverage is necessary even if excessive drying is noted inside the house. Once started, less moisture is necessary to continue the decay process. Stop the decay, then deal with low indoor humidity levels some other way.

Crawl space ventilation:

Current building codes normally require crawl space ventilation. With proper site drainage and a complete soil cover, building scientists agree that crawl space ventilation is not necessary and even detrimental in warm, humid climates. RLC Engineering, LLC's recommendations are to design and operate crawl space foundations as sealed, unvented foundations. Design specifications are available from RLC Engineering, LLC describing construction details. These specifications have been accepted by several building code entities.





Sections of this document have been adopted from "What you should know about soil covers", Daniel Cross, USDA, Purdue University

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