



United States
Department of
Agriculture

Soil
Conservation
Service

Columbia,
Missouri



Urban Conservation Tips



Retaining Walls

Description

Retaining walls are vertical walls that stabilize slopes created by construction or streambank erosion. They are used in areas where flat land is valuable, as they allow the space between the retaining wall and the top of the hill to be filled.

Construction

Retaining walls must have enough strength and stability to resist being fractured or displaced by the soil it is designed to hold in place. The pressure against the wall increases in relation to the height of the wall, and as extra loads, such as tractors or buildings, are placed on the soil

above the wall. Large retaining walls require detailed and complex engineering analysis.

A site investigation will help determine what type of retaining wall should be constructed in a particular area. The site conditions most critical to retaining walls are the soil's stability and drainage. Soils prone to landslides and heaving can adversely affect retaining walls. In fact, they can make a site unfavorable altogether.

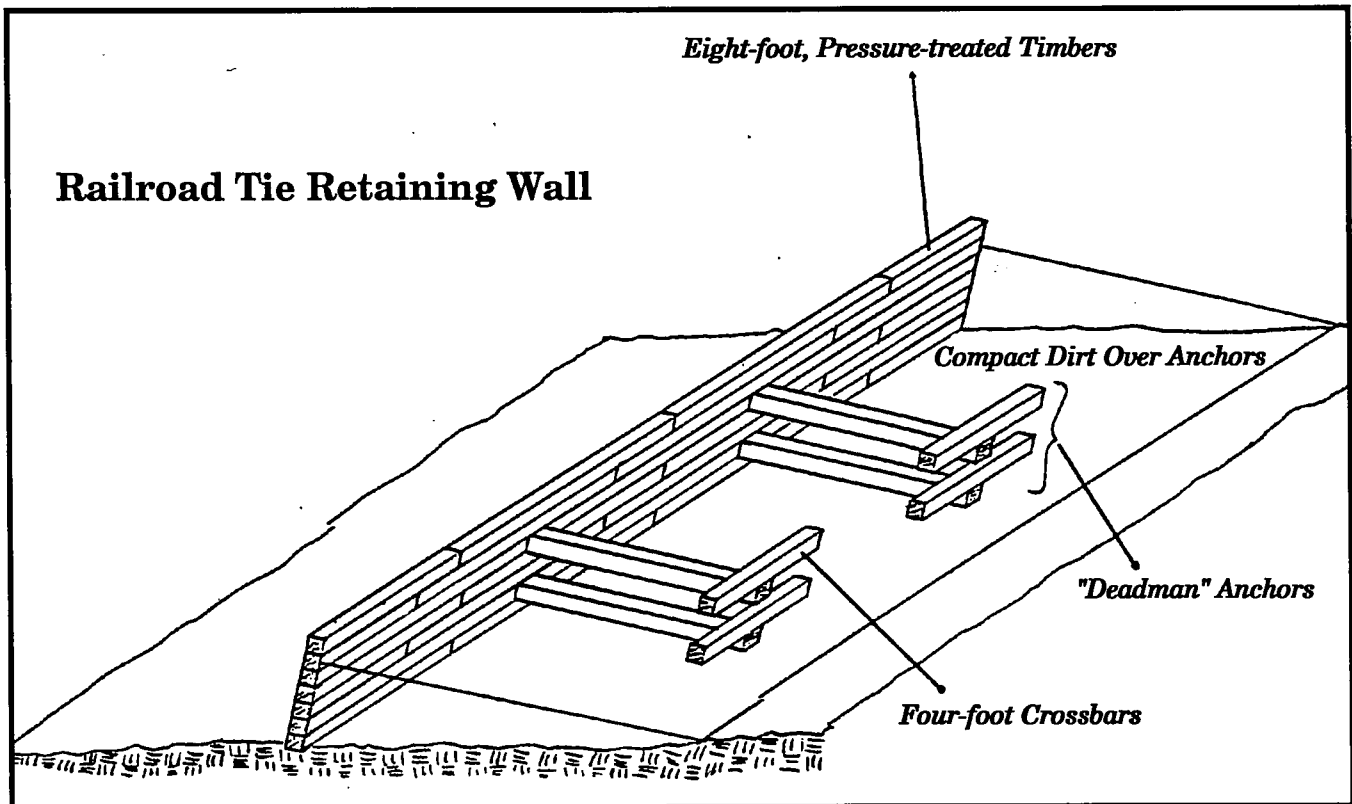
A site's drainage features, both surface and subsurface, also are important. Subsurface moisture can create a build-up of water pressure that can cause the retaining wall to tilt or collapse. Surface water cascading over the

top of a retaining wall also may affect the structure if the soil at the foot of the wall is not protected against erosion.

Here are some tips to consider when building retaining walls:

- * Excessively high walls are expensive to build because of high soil pressure. This often can be avoided by building multiple walls. For instance, two five-foot retaining walls could be built instead of one 10-foot wall.

- * Place weep holes in the retaining wall to help drain away excessive water and to prevent water table build-up. Use gravel (over)



wrapped with filter fabric to keep soil from flushing out through the weep holes.

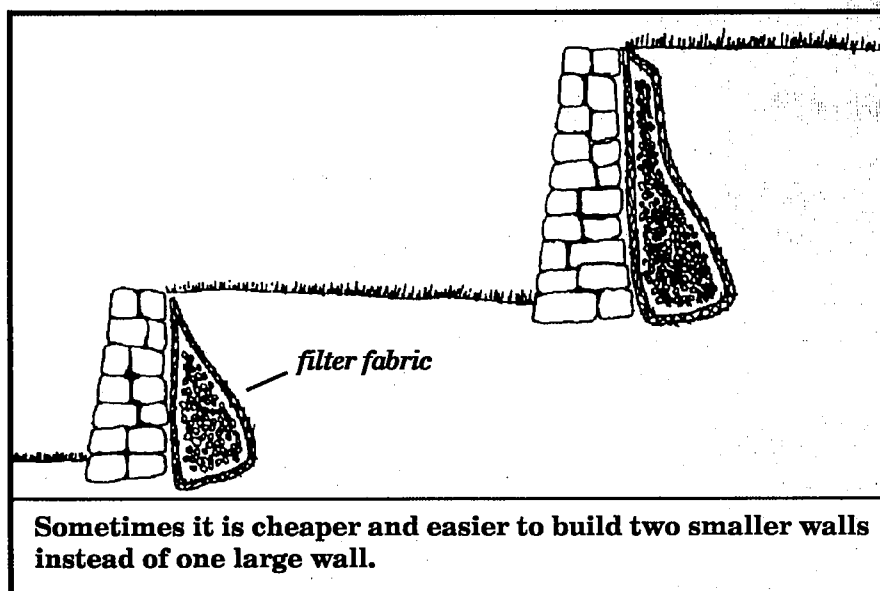
- * Backfill with coarse material, such as sand and gravel. It won't swell when wet, doesn't need to be compacted to fill the voids and provides excellent internal drainage.

- * Don't plant trees above the wall because pressure from their expanding root systems may damage the wall.

- * Make sure soil used to fill around the retaining wall is well compacted.

- * Retaining walls may be constructed using many different materials. Rock and mortar, brick and mortar, reinforced concrete, railroad ties and heavy timber, steel bins and gabions (rock-filled wire cages) are among the most common.

- * Stabilize the retaining wall by using an anchor or "deadman." Another technique is to make the



wall massive enough that it cannot be displaced by the soil.

- * Tilt the retaining wall slightly into the hill to compensate for soil pressure against the wall.

Maintenance

Regardless of the type of retaining wall used, good maintenance is necessary. Typical maintenance begins with periodic

examinations of the wall and careful monitoring of any defects. Any needed repairs should be done immediately.

Where To Get Help

For more information about retaining walls, contact your local Soil Conservation Service office. It is listed in the telephone directory under "U.S. Government, Department of Agriculture."