

# The Inspector Speaks<sup>SM</sup>

## A Solid Foundation: Planning for and preserving structural integrity

Our real estate inspections frequently reveal conditions that could damage (and sometimes already have damaged) a building's foundation. Water and insufficient soil compaction are two of the main culprits.

Here are a few ways to prevent foundation damage:

### Backfill

If you're having a new home or commercial structure built, ask your builder about his or her soil compaction standards. This is important because insufficiently compacted soil may later "give", causing your building's foundation to crack or buckle. Ask the builder if your site contains potentially expansive or consolidating soils. If so, measures should be taken to prevent the soil from being wetted during and after construction.

Generally this can be accomplished by ensuring that the backfill placed around the foundation walls will not settle after construction completion and that the backfill material is relatively impervious. For proper compaction, water may need to be added to backfill material, but do not puddle or saturate.

Backfill should be mechanically compacted to at least 90% of Standard Proctor (your builder should be familiar with this term.) All plumbing and utility trenches should be compacted to 95% of Standard Proctor beneath all structures and 90% elsewhere. Compaction measurements should be verified with field tests by a structural engineer.

### Surface drainage

Make sure that the grade around your building slopes away from the foundation wall on all sides. A minimum of 12" in the first ten feet is recommended.

Downspouts and sillcocks should discharge into splashblocks extending beyond the limits of the backfill. Even

better, use long downspout extensions instead of splashblocks.

Gravel fill should be placed in all window wells to the level of the basement window sill.

### Landscaping irrigation

Do not install sprinkler systems next to foundation walls, porches or patio slabs. For sprinkler systems installed nearby, make sure sprinkler heads are placed so that the spray under full pressure does not fall within five feet of foundation walls, porches or patio slabs. Moreover, lawn irrigation must be carefully controlled and monitored for leaks.

If you do want foundation plantings and are willing to assume the risk of structural damage, choose only flowers and shrubbery (no lawn) of varieties that require very little moisture and can be hand-watered. Do not use impermeable plastic weed barrier around foundations (it traps water beneath it); instead, select weed barrier that permits evaporation but still does its job of inhibiting weed growth.

### Sump pumps

Ideally installed during construction, sump pumps discharge water that has collected in a subsurface drain and route it away at least ten feet from a building. Make sure your builder is following sump pump standards – a 1-1/4" discharge line fitted with a backflow preventer about 30" above the pump. The pump should be wired permanently to a power supply and the pit or sump should be constructed of solid material and fitted with a removable lid. The drain itself should be a perforated rigid pipe at least 4" in diameter placed in a gravel bed with all joints securely fastened.

### Surface water or groundwater?

If you have noticed water in your crawlspace or basement, don't automatically assume that it is surface water such as rain or sprinkler system runoff. It may be groundwater!

Groundwater is simply water that has

percolated down through the soil from melting snow and rain. Where it collects underground is the "zone of saturation", the top of which is the water table. The collection formation is called an aquifer. Aquifers occur at different depths (dependent on geologic conditions), but most groundwater is found within 2,500 feet of the earth's crust. Generally, groundwater is found in slowly flowing, tightly packed sand and gravel, although some forms in channels, lava tubes and igneous rock crevices. Since these formations can be present at varying levels, it's possible for groundwater channels to lie close to basements and crawlspaces.

A building inspector with appropriate geotechnical and engineering expertise can help you identify the source of your water problems. If they are caused by groundwater then perimeter drainage, interceptor trenches, subterranean liners and soil/aggregate layering around your foundation are possible fixes.



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