

## Sinkhole Repairs: Underpinning and Grouting

Citizens Property Insurance Corporation (Citizens) adjusts each sinkhole claim based on the facts of the individual loss and according to Florida laws. In accordance with Florida Statute 627.707, on claims where Citizens has determined there is a covered sinkhole loss, the assigned professional engineering firm prepares a report that outlines a recommended sinkhole stabilization and foundation repair method. This report also must state the cause of the physical and structural damage, the analysis conducted and a description of the tests performed.

Citizens abides by the recommendations of the professional engineer. We neither dictate the repair methods nor have a predetermined position on the best repair methods to be used to stabilize the principal building or the principal building's land, or to repair the foundation.

The two primary repair methods for sinkhole remediation are *grouting* and *underpinning*.



Home with perimeter underpins that rest on limestone and were installed to support load-bearing members and transfer the load to solid, stable soils or rock.

**Grouting** is used to stop (arrest) the soils that have been affected by sinkhole condition beneath the home. The two types of grouting are *cement* and *chemical*.

**Cement grouting** (usually compaction or limited-mobility displacement grouting) pumps cement-based grout into the ground through steel casings, under high pressure, at depth. The shallower depths sometimes can be grouted under lower pressure with wetter mixes. In general, cement grouting is used to fill voids, seal the limestone surface and densify the soils beneath the residence.

**Chemical grouting** is the injection of a resin, usually polyurethane, that expands into inert foam. It can be used to densify shallow soils, fill voids, bind soils together, and/or generate a controlled lift of a floor slab, depending on the type of resin used. Different types of chemical grouting can exert different amounts of pressures, once injected, and the foam can form at different rates.

**Underpinning** is used to relevel or stabilize the home's foundation or to close relatively wide cracks in exterior masonry walls that have been significantly affected by settlement distress. Underpinning, by itself, does not repair the sinkhole that caused or contributed to the structural damage. Underpinning can be used to stabilize the foundation, restore the foundation, or prevent further damage to the foundation caused by certain types of unsuitable soils that can contribute to foundation damage or soils that may settle or consolidate over the long term as a result of grouting. Professional engineers do not generally recommend underpinning unless there is damage involving significant differential settlement or significant structural damage.

In summary, depending on the specific characteristics of the land beneath the principal building and the damages to the principal building and its foundation, the assigned professional engineer may recommend, individually or together, various methods of grouting and/or underpinning, as the engineer deems appropriate.