Florida Association of Sinkhole Stabilization Specialists

Position Statement: Minimum Guidelines for Modified Repair Plans for Foundation Stabilization

Problem

- Currently numerous residential properties with identified sinkhole conditions are being subject to modified remediation plans, which differ from those proposed by the original Engineer of Record (EOR). Many of the modified remedial plans are insufficient to fully stabilize the structure against sinkhole activity and are implemented primarily due to cost constraints by the property owner.
- Commonly these modified remediation plans involve underpinning of the foundation with, or without, limited subsurface grouting. Typically, the remediation will not provide for full stabilization of subsurface soils weakened by raveling associated with developing sinkhole activity.
- Although the modified remediation should not be expected to '*fix the sinkhole*', it may serve to stabilize and/or restore the foundation on an interim basis against the immediate effects of sinkhole activity at a lower cost to the property owner. Depending on what is done, some of these modified plans that have been implemented over the years would do nothing to stabilize the foundation in any manner against developing sinkhole activity.

Intent/Objective

- This position statement is intended to provide an outline of minimum guidelines for contractors and engineers for interim or temporary stabilization of residential structures against detrimental subsurface conditions, which may include sinkhole activity.
- Modified repair plans may include components of foundation underpinning with (or without) subsurface Limited Mobility Displacement (compaction) grouting and/or shallow Polyurethane grouting.
- It is important to recognize that modified repair plans will not be sufficient to fully stabilize the identified sinkhole conditions at a site and may only serve to stabilize a structure against shallow deleterious soils and/or reduce potential damages caused by developing sinkhole activity. Under no circumstances should a modified repair plan be represented to the property owner and/or regulatory agencies as a complete repair of a sinkhole problem.

Requirements

- The modified repair plan should be designed by a qualified professional engineer experienced in remedial design. If the modified plan is completed by a party other than the original Engineer of Record, then the new engineer should follow the notification requirements as the Successor Engineer.
- The repair plan should clearly indicate that it does not constitute a comprehensive repair to stabilize sinkhole activity.
- Depending on the method utilized, modified repair plans should follow FAS^3 standards for subsurface grouting and underpinning:

LMDG-10: Minimum Guidelines for the Design and Use of Limited Mobility Displacement Grout Injection When Performing Subsurface Soil Stabilization in Karst Florida Environments

UP-08: Minimum Guidelines for the Design and Use of Underpins When Performing Foundation Stabilization and /or Supplementation

- In developing the modified repair plan, the successor engineer will evaluate the available site data and conduct any additional site investigation as they deem necessary to determine current site conditions.
- The investigation may include evaluation of the building and subsurface conditions, and may require an updated structure damage assessment, floor elevation survey and/or SPT borings, etc.
- The structure damage assessment should consist of an evaluation of current damages to the building, focusing on identifying areas of settlement/displacement which may require stabilization and/or restoration.
- For any subsurface assessment, efforts should be directed to identifying subsurface zones of weak/unstable raveled soils and void zones associated with sinkhole activity, as well as shallow deleterious soil conditions which might be affecting the structure.

Procedures

- At a minimum, the modified repair plan should include methods for stabilizing the foundation for the current and apparent effects of sinkhole activity.
- At a minimum, foundation underpinning efforts, if used, must be sufficient to restore affected portions of the structure and stabilize the foundation against weak/unstable soils within the influence zone of the building. The micro-piles or piers should be installed into stable bearing strata to depths below any known raveled soils or voids zones.
- The micro-piles or piers (underpins) should be designed to stabilize the foundation against any known deleterious soil conditions, such as organic-bearing soils, expansive shrink/swell clays, or buried debris.
- Use of LMD grouting is encouraged to stabilize portions of the building with known weak/unstable raveled soil and/or void zones.
- Shallow polyurethane grouting is also an option to stabilize portions of the building against shallow deleterious soil conditions.
- Monitoring of any remediation activities by the successor engineer is required, and should be conducted in accordance with FAS^3 standards.
- The successor engineer is responsible for filing of required building completion reports in accordance with local requirements, and shall ensure that applicable modified remedial repairs for a site are not classified as a '*repaired sinkhole*' in the permitting documents.