



HOBAS®

TECHNICAL ADVICE SHEET

03-25-2022

BURIAL IN FINE GRAINED NON-COHESIVE SOILS

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Burial in Fine Grained Non-cohesive Soils

Direct burial of flexible pipe in trenches consisting of fine grained non-cohesive soils with medium to low blow counts presents several challenges to achieving a quality installation. The higher the overburden load (deeper cover), the more important it is that the required installation be achieved.

In short, to achieve a quality installation (actually in all conditions), a “tight” pipe zone with a dense granular surround must be achieved to provide proper pipe support. This means no voids and no loose or sloughed native soils in the pipe zone or in the adjacent trench walls. In many native soils, such as rock, most clays or cemented non-cohesive, this result is easy to achieve since the trench walls typically remain intact when excavated. In non-cohesive soils, this is frequently not the case. When excavated, these soils tend to slough-in, greatly lowering their density and modulus. For the installation to be successful, the trench walls must be maintained in their original in situ condition or restored to that status, or better, during the enveloping of the pipe.

If an open graded pipe zone surround material is used such as a clean crushed rock, lateral migration of the native soils into the voids in the rock surround must be avoided to prevent a reduction in pipe side support. This phenomenon will only occur if there is a driver to move the fine grained native soils such as lateral ground water movement. If this is an issue, the materials must be separated by a filter fabric to prevent passage or a closed graded pipe zone surround used such as sand or a sand-rock mixture. Note that sand or sand-rock mixtures require compaction to achieve a proper density.

There are many construction procedures that can be used to achieve the foregoing requirements. We would be pleased to discuss the methods we’ve observed with any interested parties.

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Very importantly, proof of a successful burial can be easily determined by quantifying the level of pipe deflection (slight ovaling). Long-term, the maximum allowable deflection for fiberglass pipes is typically 5%. Initially, a lower deflection limit is prudent, since the buried pipe will initially have less than the long-term load due to backfill soil friction along the trench walls. As this friction resistance is lost, more load settles onto the pipe. We typically recommend a maximum overnight deflection of 3%. A good check point at ~30 days is maximum 4%. The beauty of this behavior is the deflection of pipes (i.e. the installation quality) can be measured soon after burial is completed and as often as deemed necessary to verify that the chosen procedures are achieving the desired results. If deflections for recently buried pipes are verified quickly (typically the next day), the installation quality and consistency is immediately confirmed, eliminating the risk of a wide spread “problem” later during the project. This subject can be complex and because of the wide range of native conditions that may be encountered, it is not easily possible to address all of the eventualities that may arise. While this narrative presents the general requirements needed for successful burial, it is not a comprehensive, all-encompassing review. Further, while we are not geotech engineers or installation experts, we would be happy to discuss specific situations and relate our experience and any ideas or recommendations for success.

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