FLORIDA CORRUGATION CUTTING MASSACRE

FDOT Spec Changed to Ban Cutting, Drilling Corrugations Once and For All

"Chain-sawing," or cutting through corrugations is not allowed per AASHTO M294 and M330, and is now explicitly prohibited by FDOT.

FDOT Bans Drilling, Cutting Corrugations

The Florida Department of Transportation (FDOT) has revised the Standard Specifications for Road and Bridge Construction (SSRBC) Section 430-4 to explicitly prohibit drilling and cutting plastic pipe corrugations. The revised specification, which will go into effect January 2019 states the following:

"Do not cut or drill into or through the corrugations or ribs of plastic pipe except when necessary to meet the dimensional requirements shown in the Plans."

Remarkably, an FDOT spec change was needed to explicitly prohibit drilled corrugations, as shown in this photo of polypropylene pipe in the City of Miami Beach, 2011.

These field modifications have included drilling, cutting, and even "chain-sawing" the corrugations of flexible pipe products to avoid flotation of the pipe, during and after installation. Drilling or cutting the corrugations allows the corrugations to flood, thereby sinking the pipe in wet trench conditions. While it may make for a hasty installation, altering the corrugations is detrimental to the structural integrity of the pipe and provides a path for infiltration.

There is a difference between drilling holes in corrugations to "sink" pipe versus specifying perforated pipe that is used for exfiltration trenches or French drains. Legitimate perforations are prohibited from the corrugations. According to AASHTO M294 (HDPE) and M330 (Polypropylene), "the perforations shall be located in the external valleys." Additionally, AASHTO M294 and M330 prohibit certain visual defects prior to accepting the pipe: "cracks, creases, delaminations, and unpigmented or nonuniformly pigmented pipe are not permissible in the pipe or fittings as furnished." Clearly, intentionally drilling or cutting corrugations violates these AASHTO specifications, and it now unequivocally violates FDOT specifications.

This HDPE pipe was deflected and cracked at the springline, passing through the ~1/8-inch holes that had been drilled into each corrugation.

Groundwater uplift force is a risk to plastic pipe both during installation and during in-service conditions. During the recent Sec. 430-4 specification review process, FDOT stated that:

"It is the responsibility of the Engineer of Record to make sure the pipe has the minimum design cover to prevent floatation"

Specifications to Mitigate Flotation and Hydrostatic Forces

Many areas of Florida have high groundwater elevations above the pipe invert. The Engineer of Record has several project specification options for avoiding plastic pipe buoyancy risks, such as:

A. Using a more massive pipe – Concrete Pipe.
B. Specifying a minimum cover that provides enough soil mass to counter buoyancy forces.
C. Specifying a pipe anchoring system.

18-inch diameter polypropylene pipe flotation at residential subdivision project in the City of Winter Springs, 2018.

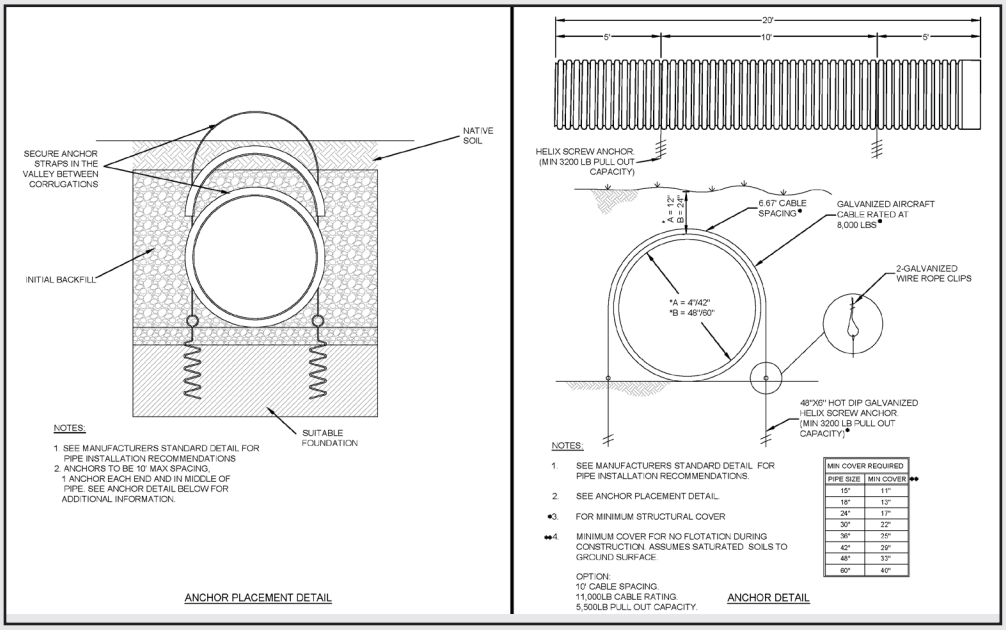
Min. Cover for Plastic Pipe (Loads)

ASTM D2321 (2014), Sec. 7.6 specifies minimum cover of 24 inches or one pipe diameter, whichever greater, if using Class I (crushed rock) embedment. Otherwise, use the greater of 36 inches or one pipe diameter for all other embedment soils.

Min. Cover for Plastic Pipe (Flotation)

The Plastic Pipes Institute (PPI) Handbook of PE Pipe, Chapter 6 specifies minimum cover of at least 1 ½ pipe diameters and also further cautions the Engineer: "Upward buckling occurs when lateral pressure due to ground water or vacuum pushes the sides of the pipe inward while forcing the pipe crown and the soil above it upward. (Collapse looks like pipe deflection rotated 90 degrees.). A pipe is susceptible to upward buckling where the cover depth is insufficient to restrain upward crown movement. *It has been suggested that a minimum cover of four feet is required before soil support contributes to averting upward buckling."*

Plastic Pipe Anchoring Systems



This plastic pipe anchor system detail was specified by the Engineer of Record for the Bay Pointe residential subdivision in Jacksonville, 2018. Additional anchoring counter-measures could include concrete encasement.

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