

## ORIGINATION FORM

### THE INFORMATION BELOW IS TO BE PROVIDED BY THE ORIGINATOR

**Specification:** Specification Section 430

**Subject:** Pipe Culverts

**Origination date:** 5-19-08

**Originator:** David Sadler

**Office/Phone:** State Construction Office/850-414-5203

**Problem statement:** Specification change is submitted to include a requirement for an initial laser video inspection of the pipe and allow for a reduced frequency final laser video inspection of installed drainage pipe later in the project. Result is shifting some of the risk away from the contractor by requiring earlier inspection so that damages, defects, or installation errors can be corrected prior to roadway be constructed above the pipes.

**Proposed solution:** Benefit to contractor is the laser video inspection can become part of its QC of its work. Additional benefit is opportunity for reduced final inspection. Impact to contractor is that it will have to schedule laser videoing to be done earlier in the project and more than once per project. Benefit to Department is improved quality of workmanship and opportunity for earlier identification of potential rework.

**Information source:** David Sadler, Rick Renna

#### **Recommended**

**Usage Note:** For all jobs.

#### **Estimated fiscal impact, if**

**implemented:** Minimal

**Implementation of these changes, if and when approved, will begin with the January 2009 letting.**



# Florida Department of Transportation

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## **M E M O R A N D U M**

**DATE:** July 7, 2008  
**TO:** Specification Review Distribution List  
**FROM:** Rudy Powell, Jr., P.E., State Specifications Engineer  
**SUBJECT:** Section 430  
4300408 – Pipe Culverts

In accordance with Specification Development Procedures, we are sending you a copy of a proposed specification change.

Please share this proposal with others within your responsibility. Review comments are due within four weeks and should be sent to Mail Station 75 or to my attention via e-mail at ST986RP or rudy.powell@dot.state.fl.us. Comments received after July 28, 2008 may not be considered. Your input is encouraged.

RP/sh

Attachment

**430—PIPE CULVERTS.**

—(REV 12-7-07 ~~6-10-08~~)-(FA 12-18-07)-(7-08)

ARTICLE 430-2 (of the Supplemental Specifications) is deleted and the following substituted:

**430-2 Materials.**

**430-2.1 Pipe:** Meet the following requirements:

Concrete Pipe .....	Section 449
Round Rubber Gaskets .....	Section 942
Corrugated Steel Pipe and Pipe Arch .....	Section 943
Corrugated Aluminum Pipe and Pipe Arch .....	Section 945
Corrugated Polyethylene Pipe .....	Section 948
Polyvinyl Chloride (PVC) Pipe .....	Section 948

**430-2.2 Joint Materials:** Use joint materials specified in 430-7 through 430-940 according to type of pipe and conditions of usage.

**430-2.3 Mortar:** Use mortar composed of one part ~~p~~Portland cement and two parts of clean, sharp sand, to which mixture the Contractor may add hydrated lime in an amount not to exceed 15% of the cement content. Use mortar within 30 minutes after its preparation.

SUBARTICLE 430-3.1 (of the Supplemental Specifications) is deleted and the following substituted:

**430-3.1 General:** When the plans designate a type (or types) of pipe, use only the type (or choose from the types) designated. As an exception, when the plans designate reinforced concrete pipe as Class S, Class I, Class II, Class III and Class IV, the Contractor may use nonreinforced *or fiber reinforced* concrete pipe up to and including 36 inch in diameter. ~~or fiber reinforced concrete pipe up to and including 48 inch in diameter.~~ Do not use fiber reinforced concrete pipe beneath the main travel lanes of interstate highways.

SUBARTICLE 430-4.8 (of the Supplemental Specifications) is deleted and the following substituted:

**430-4.8 Final Pipe Inspection:**

**430-4.8.1 Initial Pipe Inspection:** ~~Based on contract pavement type, u~~Upon completion of placement of concrete pavement or the placement of structural asphalt *the pipe and 3 ft. of backfill above the pipe crown (or the bottom of the stabilized subgrade if lower) backfill,* but prior to *continued* placement of *backfill or embankment or placement of asphalt friction course stabilized subgrade or base,* dewater installed pipe and provide the Engineer with a ~~video recording schedule allowing for pipe videoing and reports~~ *of the installed pipe. to be completed and s*Submitted to the Department and *videos and reports are to be reviewed by the Department Engineer* prior to ~~continuation~~ *resuming pipe backfill or embankment placement or placement of subgrade or base pavement.* For pipe installed within MSE wall embankments, initial inspection is to be conducted when compacted embankment reaches 3 feet above the pipe crown. The submittal, review and resumption requirements stated above also apply for pipe in MSE wall locations.

For pipe 48 inches or less in diameter, provide the Engineer a video DVD and report using low barrel distortion video equipment with laser profile technology *with continuous laser ring*, non-contact video micrometer and associated software that provides:

1. Actual recorded length and width measurements of all cracks within the pipe. *Show calibration procedure on screen and recorded on the video for each measurement recorded. Evidence must be provided for each measurement that the camera lens and video micrometer is positioned perpendicular to the observation being measured.*
  2. Actual recorded separation measurement of all pipe joints *gaps. Record in the video and report the locations along the pipe joint four measurement locations separated by 90° beginning at the widest observed joint gap location on the pipe section.*
  3. Pipe ovality report.
  4. Deflection measurements and graphical diameter analysis report in terms of x and y axis. *Identify location within the run of pipe for each measurement recorded.*
  5. Flat analysis report. *Identify in this report a structure to structure listing of the location and type of observation recorded.*
  6. ~~Representative diameter of pipe.~~ *Record the actual diameter of the pipe along the entire pipeline being measured.*
  7. Pipe deformation measurements, leaks, debris, or other damage or defects. *Identify and record the observation details of the damage or defect such that the Engineer can determine from the report and video any needed further actions.*
  8. Deviation in pipe line and grade, ~~joint gaps, and joint misalignment.~~ *Provide in the reporting a graphical representation from structure to structure of the actual line and grade maintained during installation.*
  9. *Record in the video the actual speed at which the camera is traveling ensuring that the rate of travel does not exceed that limit defined in 430-4.8.3 below.*
- The aforementioned report may be submitted in electronic media if approved by the Engineer.*

Laser profiling and measurement technology must be certified by *an independent accredited laboratory recognized in the field of equipment calibration and measurement certification, the manufacturer of the technology and* the company performing the work to be in compliance with the calibration criteria posted at:

[www.dot.state.fl.us/construction/contractorissues/laser.htm](http://www.dot.state.fl.us/construction/contractorissues/laser.htm) . *These certifications must be provided to the Engineer prior to performing any laser profiling of pipe.* ~~Reports may be submitted in electronic media if approved by the Engineer.~~

For video recorded, laser profiled pipe that indicates deflection that appears to be in excess of that allowed by Specification, the Engineer may require further testing of the pipe. If directed by the Engineer, test pipe using a mandrel. The mandrel shall be pulled by hand and be approved by the Engineer prior to use. If use of a mandrel is selected as the means of further testing, the mandrel's diameter, length, and other requirements shall conform to 430-4.8.2. Remove, replace, and retest pipe failing to meet the specific deflection requirements for the type of pipe installed, at no cost to the Department. Should the deflection test prove that the pipe met specifications, the Department will bear the cost of the deflection testing.

The Engineer may waive this requirement for side drains and cross drains which are short enough to inspect from each end of the pipe.

*430-4.8.2 Final Pipe Inspection: Based on the Contract pavement type, upon completion of concrete pavement or the placement of structural asphalt, but prior to placement of asphalt friction course, dewater installed pipe and conduct pipe inspection as defined in 430-*

*4.8.1 for 25% of the initial inspection locations. Locations are to be determined by the Engineer based on results of the initial pipe inspection. The Engineer ~~and can~~ may ~~be reduced~~ the final inspection locations to a lesser percentage provided initial results of the final pipe inspection ~~indicated installed pipe meets specification~~ indicate the installed pipe meets the requirements of this Section and final pipe inspection confirms initial pipe inspection results.*

*Should final pipe inspections find damages or defects not noted in the initial inspections, 100% of the pipe will be re-inspected as defined in 430-4.8.1 at the contractor's expense. Pipes not meeting ~~specification~~ the requirement of this Section are to be removed and replaced at the contractor's expense. As an exception to removal and replacement and upon approval of the Engineer, obtain an engineering analysis by a Specialty Engineer ~~(as approved by the Engineer)~~ to determine the disposition of the material. The engineering analysis must be signed and sealed by a Professional Engineer licensed in the State of Florida.*

430-4.8.13 Video Report: Provide a high quality DVD in a MPEG2 format video with a standard resolution of 720 x 480. Use a camera with lighting suitable to allow a clear picture of the entire periphery of the pipe. Center the camera in the pipe both vertically and horizontally and be able to pan and tilt to a 90 degree angle with the axis of the pipe and rotating 360 degrees. Use equipment to move the camera through the pipe that will not obstruct the camera's view or interfere with proper documentation of the pipe's condition.

The video image shall be clear, focused, and relatively free from roll, static, or other image distortion qualities that would prevent the reviewer from evaluating the condition of the pipe. The video will include identification before each section of pipe filmed. The identification will include the project number, the structure number corresponding to the structure number on the set of plans for the project, size of pipe, the date and time, and indicate which pipe is being filmed if multiple pipes are connected to the structure. Notes should be taken during the video recording process. Provide the Engineer with copies of these notes along with the video.

Move the camera through the pipe at a speed not greater than 30 feet per minute. Mark the video with the distance down the pipe. The distance shall have an accuracy of one foot per 100 feet. Film the entire circumference at each joint. Stop the camera and pan when necessary to document *and measure* defects.

430-4.8.24 Mandrels: Use mandrels which are rigid, nonadjustable, odd-numbered legged (minimum 9 legs) having a length not less than its nominal diameter. The diameter at any point shall not be less than the allowed percent deflection of the certified actual mean diameter of the pipe being tested. The mandrel shall be fabricated of metal, fitted with pulling rings at each end, stamped or engraved on some segment other than a runner with the nominal pipe size and mandrel outside diameter.