
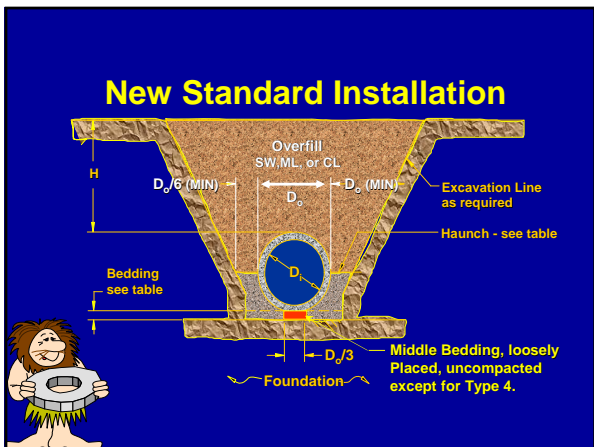
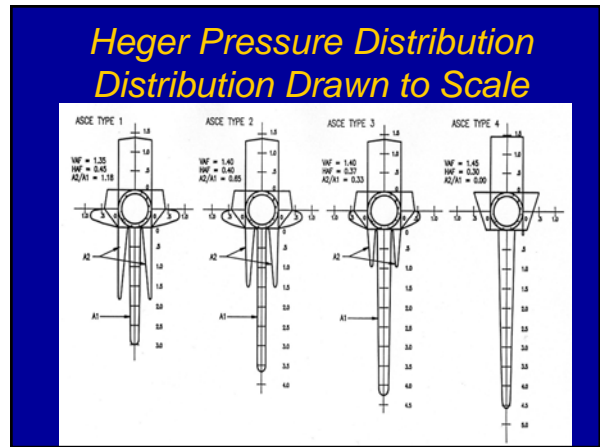


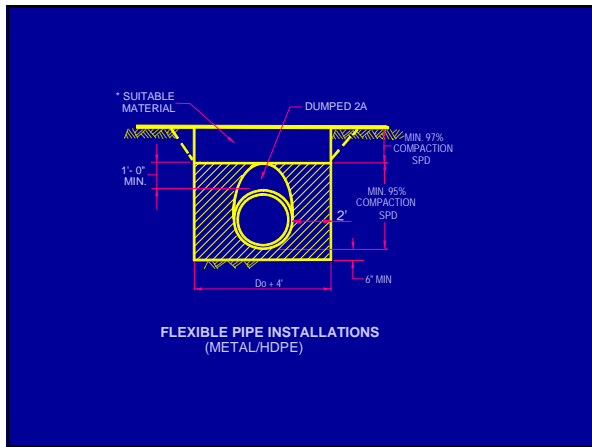
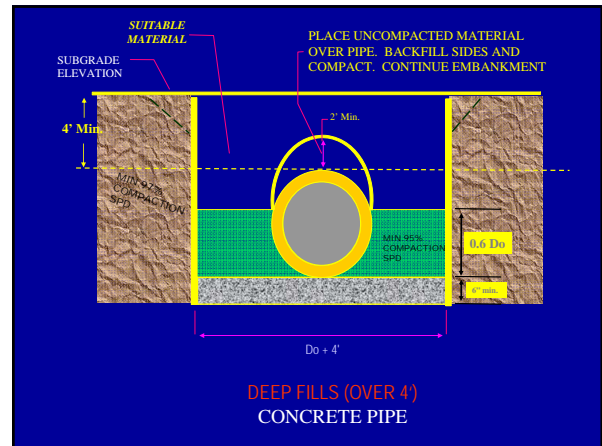
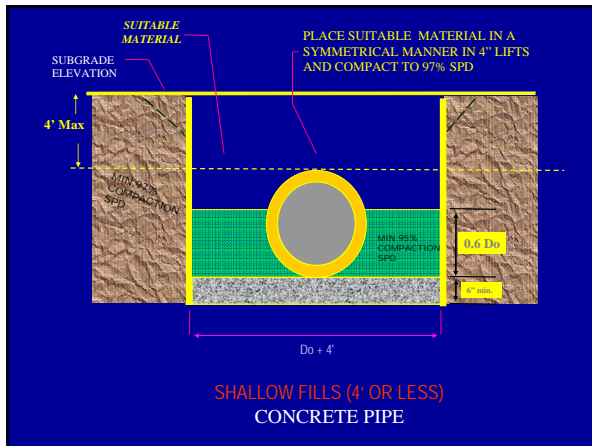
Foundation and Bedding

Table 3 Standard Trench Installations Soils and Minimum Compaction Requirements			
Installation Type	Bedding Thickness	Haunch and Outer Bedding	Lower Side
Type 1	$D_o/24$ minimum, not less than 75 mm (3"). If rock foundation, use $D_o/12$ minimum, not less than 150 mm (6").	95% Category I	90% Category I, 95% Category II, or 100% Category III
Type 2	$D_o/24$ minimum, not less than 75 mm (3"). If rock foundation, use $D_o/12$ minimum, not less than 150 mm (6").	90% Category I or 95% Category II	85% Category I, 90% Category II, or 95% Category III
Type 3	$D_o/24$ minimum, not less than 75 mm (3"). If rock foundation, use $D_o/12$ minimum, not less than 150 mm (6").	85% Category I, 90% Category II, or 95% Category III	85% Category I, 90% Category II, or 95% Category III
Type 4	$D_o/24$ minimum, not less than 75 mm (3"). If rock foundation, use $D_o/12$ minimum, not less than 150 mm (6").	No compaction required, except if Category III, use 85% Category III	No compaction required, except if Category III, use 85% Category III

- ### Summary Standard Installations
- Type 1 - Use of high quality backfill materials and high compaction values.
 - Type 2 - Similar materials as Type 1 with lower compaction values.
 - Type 3 - Lower grade backfill material with lower compaction values.
 - Type 4 - No bedding with little or no compaction of native backfill required (not recommended).
- 

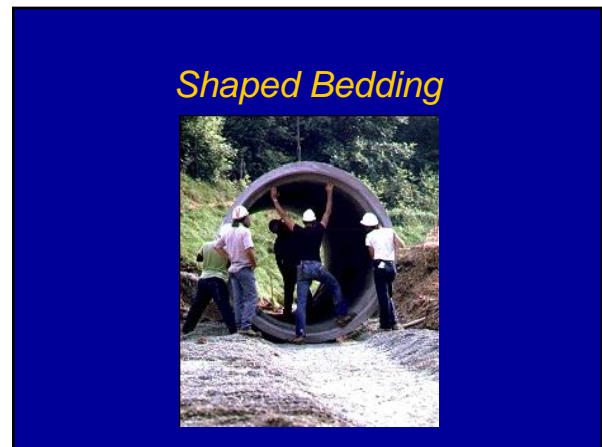


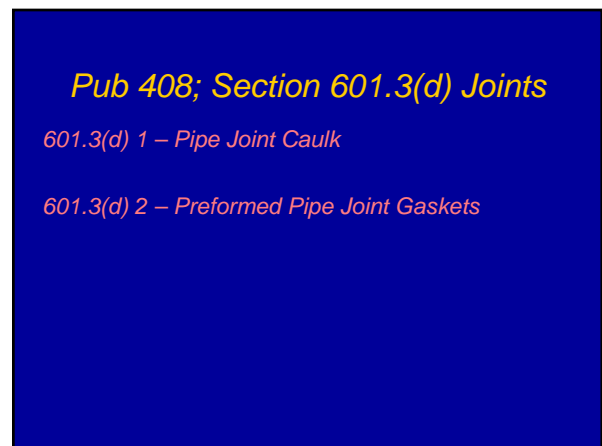
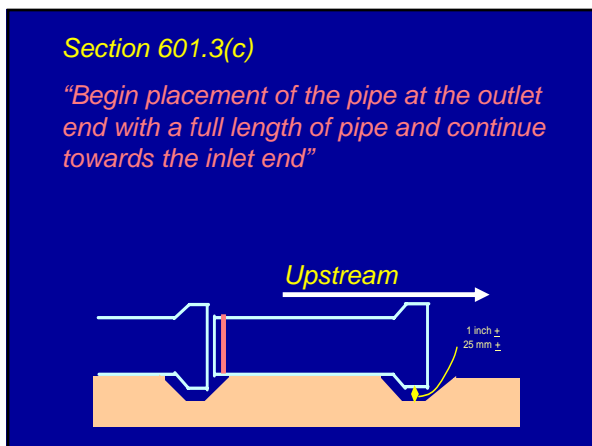
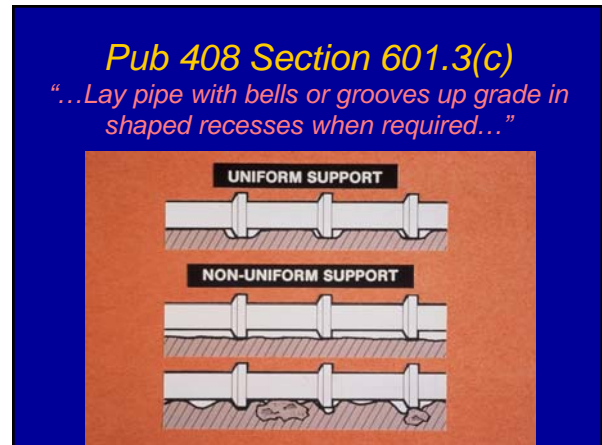
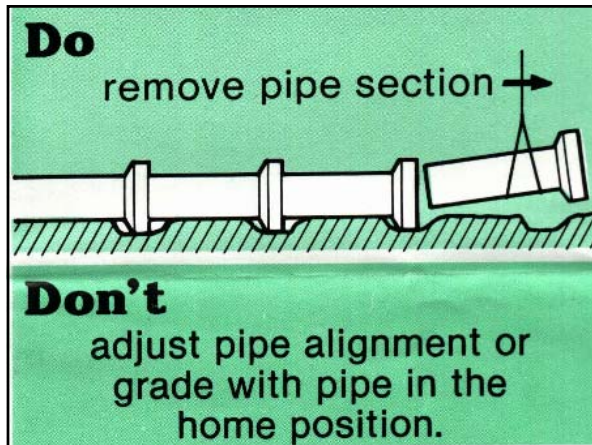
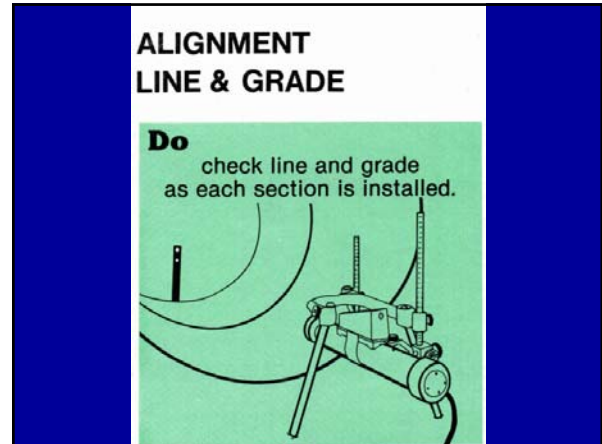
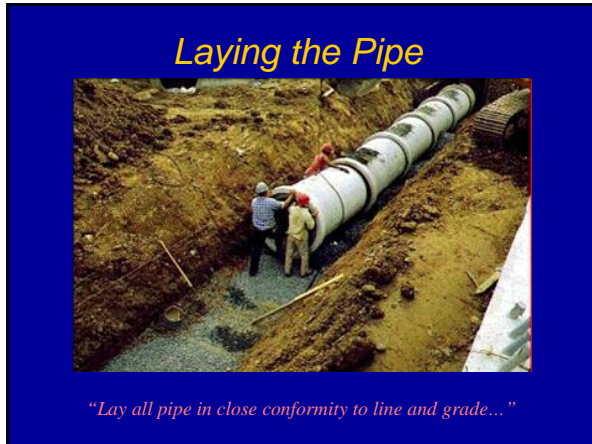
- ### PENNDOT STANDARD DRAWING RC -30
- Width of Trench = O.D. + 4 ft.**
- Bedding - min. 6 inches
 - AASHTO #3
 - Uncompacted
 - Backfill
 - Concrete Pipe
 - Coarse Aggregate (2A)
 - 0.6 O.D.
 - Suitable material for remainder



FLEXIBLE PIPE CONSTRUCTION SPECIFICATIONS

- Pub 408; Section 601.3(g)
Shored or Trench Box
 - Use in accordance with OSHA requirements
 - Shoring/sheeting to remain in place (for Flexible Pipe)
 - Installed flexible pipe and its embedment cannot be disturbed





ASTM C443

- Joints for Circular Concrete Sewer and Culvert Pipe , Using Rubber Gaskets
- Section 6-Gaskets
- Section 7-Design of Joints

“The joint design shall consist of a bell or groove on one end of a unit of pipe, and and a spigot or tongue on the adjacent end of the joining pipe”

Joint Comparison



Joint Comparison



Offset Joint Lubrication Application

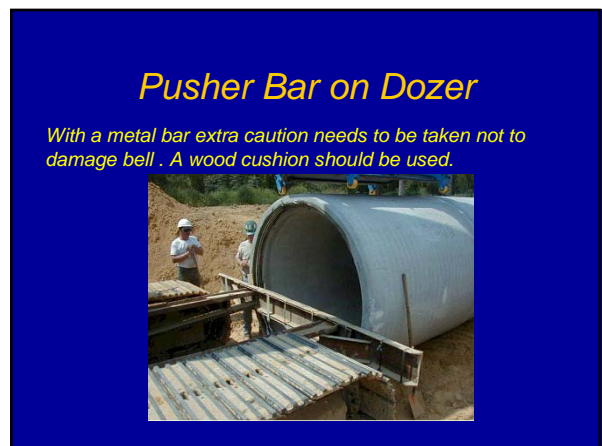
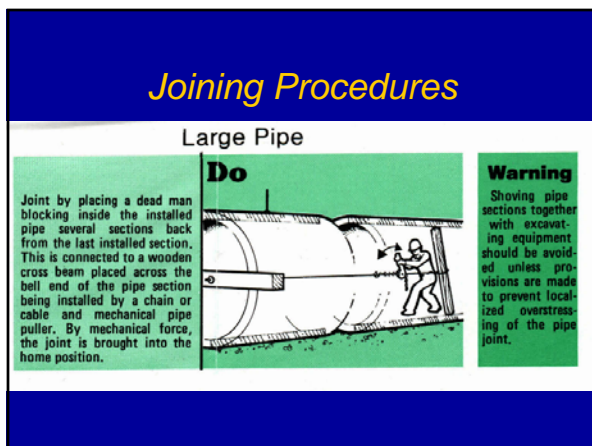
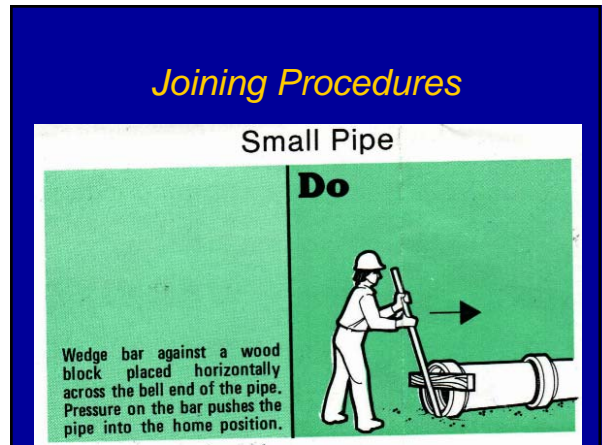
1. Clean the Bell & Spigot Ends of the Pipe
2. Lubricate the Bell End of the Pipe
3. Slide the Offset Gasket Onto the Spigot End of the Pipe
4. Lubricate the Spigot End of the Pipe After Applying the Gasket
5. Ready for Installation

O-Ring Joint Lubrication Application

1. Clean the Bell & Spigot Ends of the Pipe
2. Lubricate the Spigot & Bell Ends
3. Lubricate the Gasket
4. Apply the Gasket to the Spigot End
5. Equalize the Gasket
6. Ready for Installation

Gaskets

- Pre-lubricated • Non-lubricated
- Joint Cleaning process the same for both gaskets
- Do Not lubricate joints where a pre-lubricated gasket will be used
- Equalize gasket tension for both type of joints and gaskets



Come Along



Completed Watertight Joint



Practices to Avoid

- *Homing pipe with the excavator bucket*
 - *Protect bell with timber.*
- *Re-grading bedding while the pipe is homed.*
 - *Remove pipe and then re-grade*
- *Using excavator bucket to put pipe on-grade.*
 - *Protect pipe barrel with timber*
- *Inadequate lubrication of the joint recess.*
 - *Gasket must be able to roll*
 - *Equalization of gasket tension.*

Backfilling

Backfill the Haunches



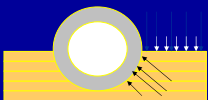
RC-30 : Backfill

- *Horizontal layers not exceeding 8" before compaction*
- *Minimum 95% Standard Proctor Maximum Density*
- *Deposited equally on both sides*



Alignment

Deposited equally on both sides of the pipe in horizontal layers



Shallow Cover

WARNING

Do 

Don't 

operate heavy construction equipment over the pipe until adequate backfill is in place.



Installation Checklist

Check for:

- *Damage to pipe wall or joint sealing surfaces*
- *Trench excavated to line & grade*
- *Foundation material placement & compaction*
- *Pipe fully supported on barrel*
- *Correct seals and proper joint lubrication*

Installation Checklist

Check for:

- *Pipe alignment and grade*
- *Connections to manholes*
- *Connecting straps where required*
- *Repair to lifting holes where used*
- *Backfill placement and compaction*

Typical Payment

- *Excavation Item*
- *Foundation material- (Select granular fill Item)*
- *Pipe and installation- Pipe Item*
- *Backfill-Select granular material fill item and suitable material Item (included in excavation item or separate item).*

Typical Payment

- *Some agencies pay by the linear feet of pipe installed by depth intervals, i.e.,*
 - 0-5.0 feet*
 - 5.1-10.0 feet, etc*
- *In these instances, the pay item provides for all the work shown on the previous slide*

*For Further Information
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