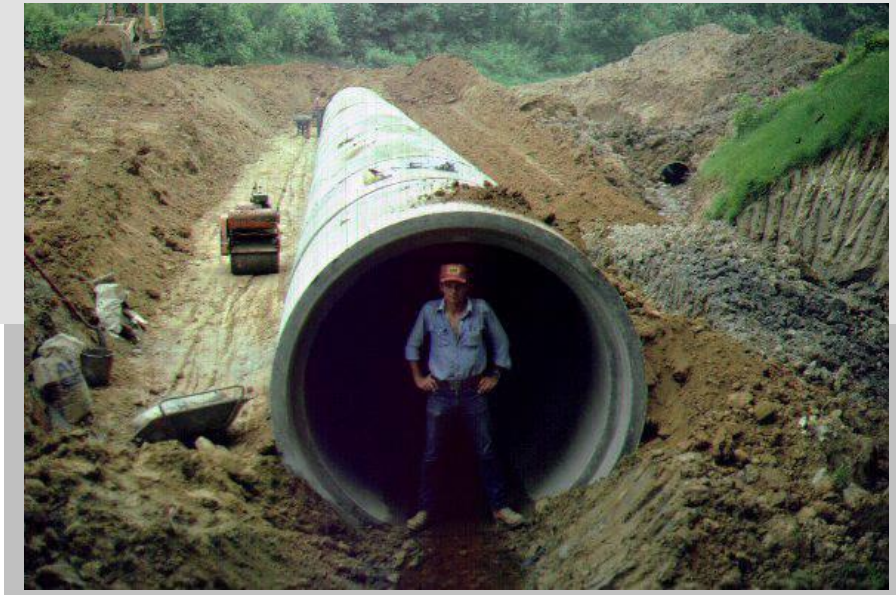
Drainage Installation and Inspection

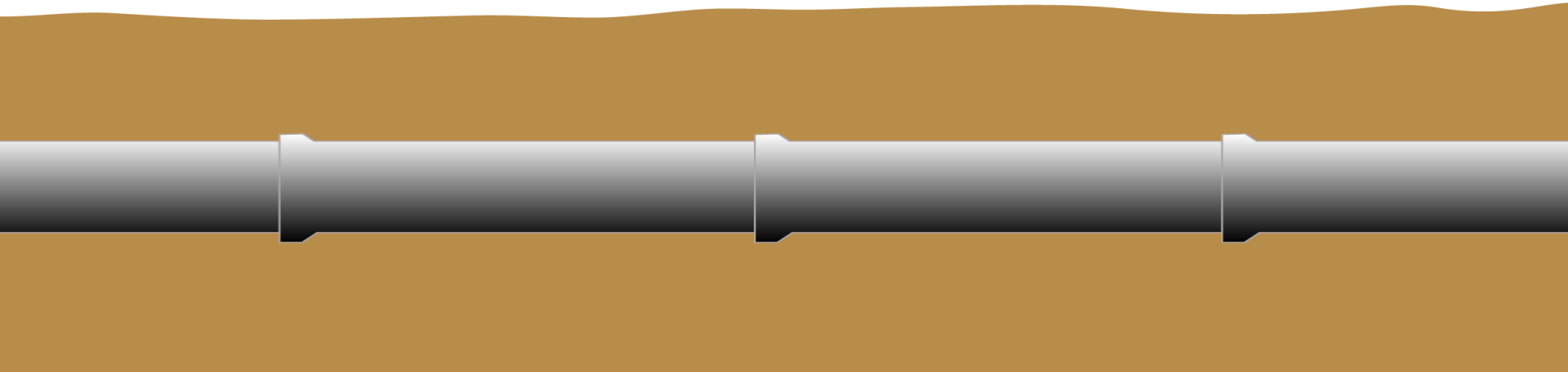


Hank Gottschalk
Concrete Pipe & Precast, LLC

CP&P
CONCRETE PIPE & PRECAST, LLC

Buried Pipeline

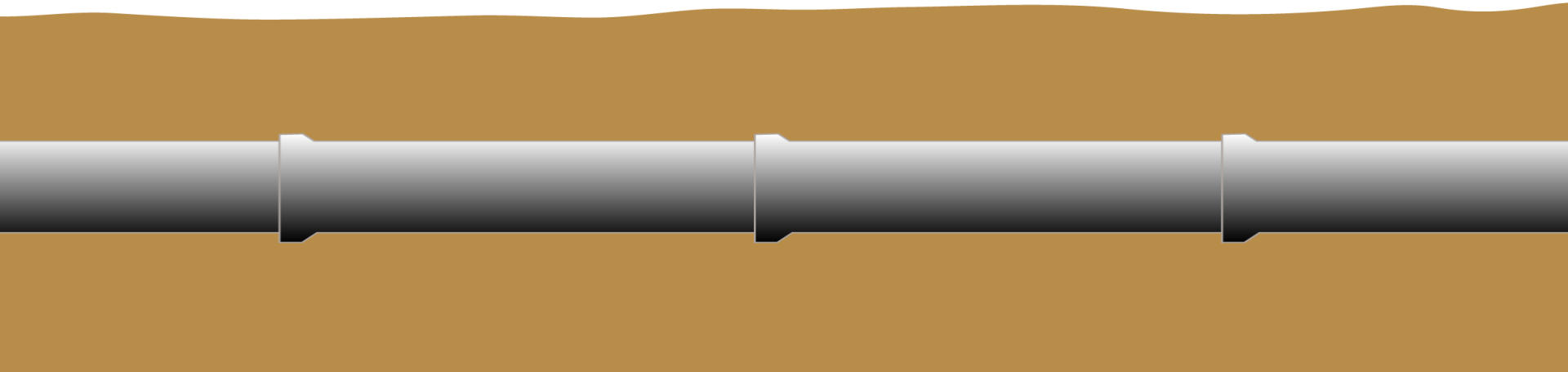
- Structure
- Conduit



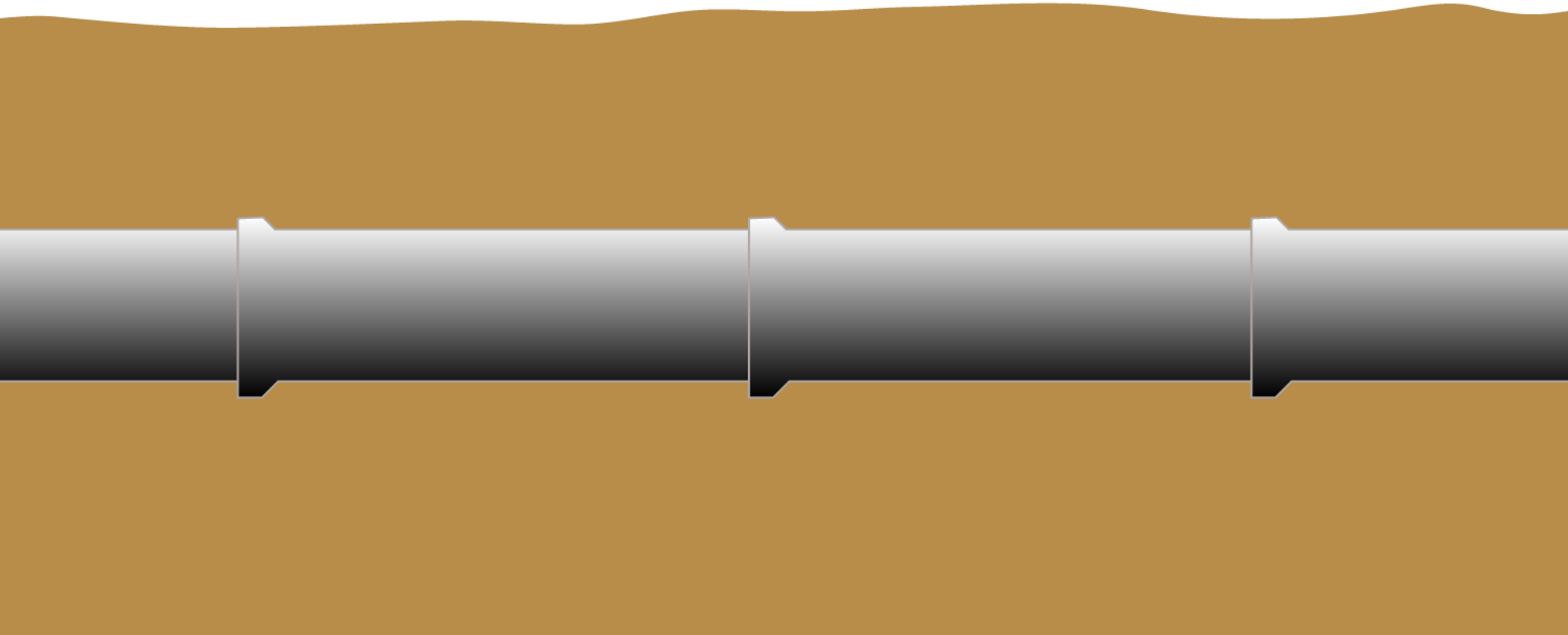
Buried Pipeline

Structure

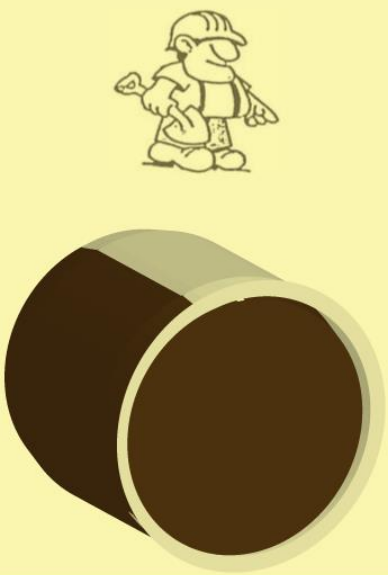
Pipe Strength + Soil Strength



A Buried Pipeline is a System that Incorporates Both the Properties of the Pipe and the Properties of the Soil



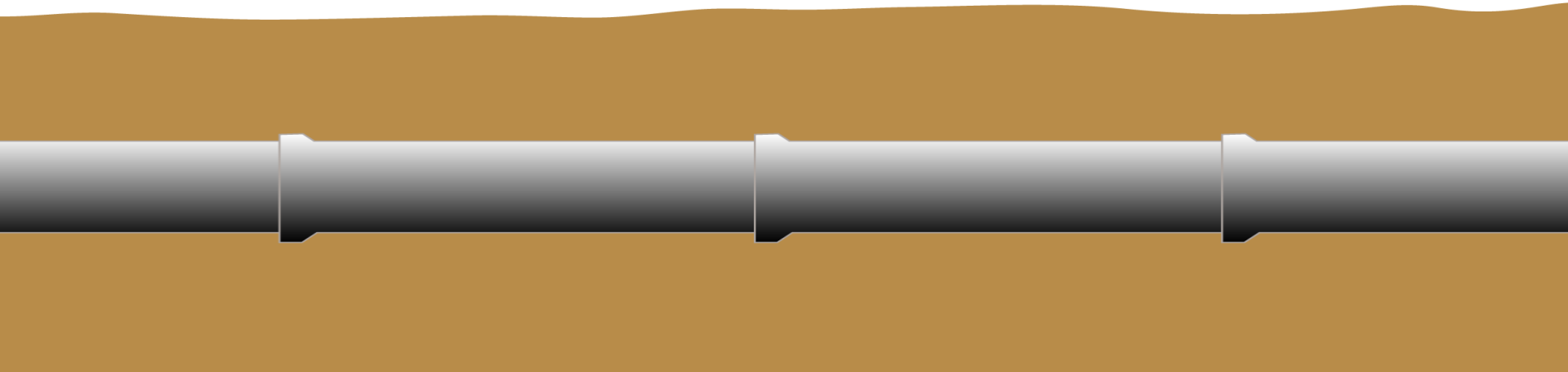
TYPE 4	TYPE 3	TYPE 2	TYPE 1
Least Cost Envelope	Good Soil Envelope	Better Soil Envelope	High Quality Envelope
No Bedding Required	Bedding Required	Bedding Required	Bedding Required
Minimium Soil Quality	Modest Soil Quality	Better Soil Quality	Select Soil Quality
Minimum Compaction	Modest Compaction	Good Compaction	Excellent Compaction
Minumum Control	Modest Control	Extensive Control	Extensive Control
-	-	-	-
Maximum Pipe Strength	Good Pipe Strength	Modest Pipe Strength	Minimum Pipe Strength



Buried Pipeline

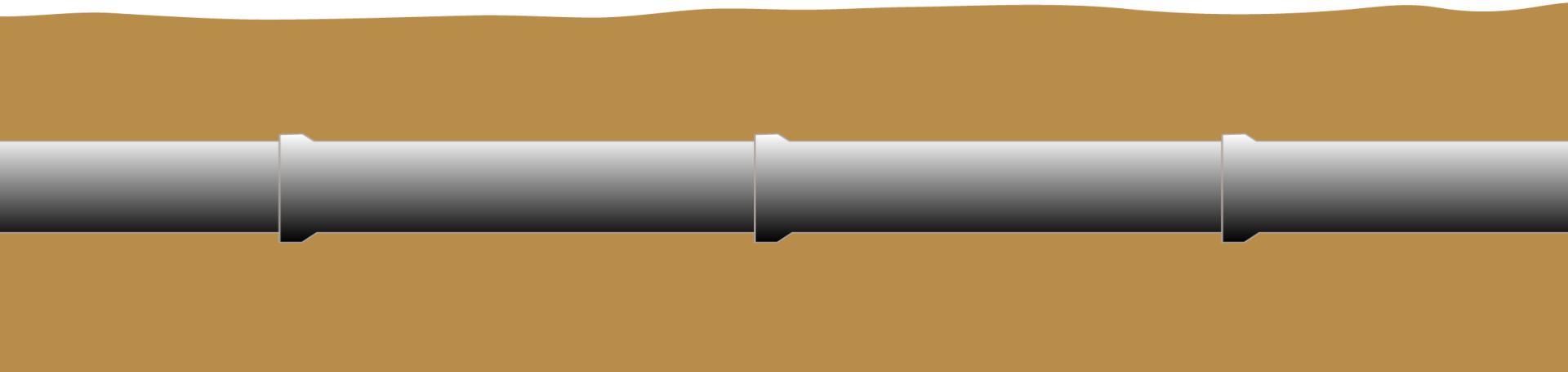
Conduit

Alignment Grade + Secure Joints



Buried Pipeline

- **Structure**
  - Pipe Strength + Soil Strength
- **Conduit**
  - Alignment Grade + Secure Joints



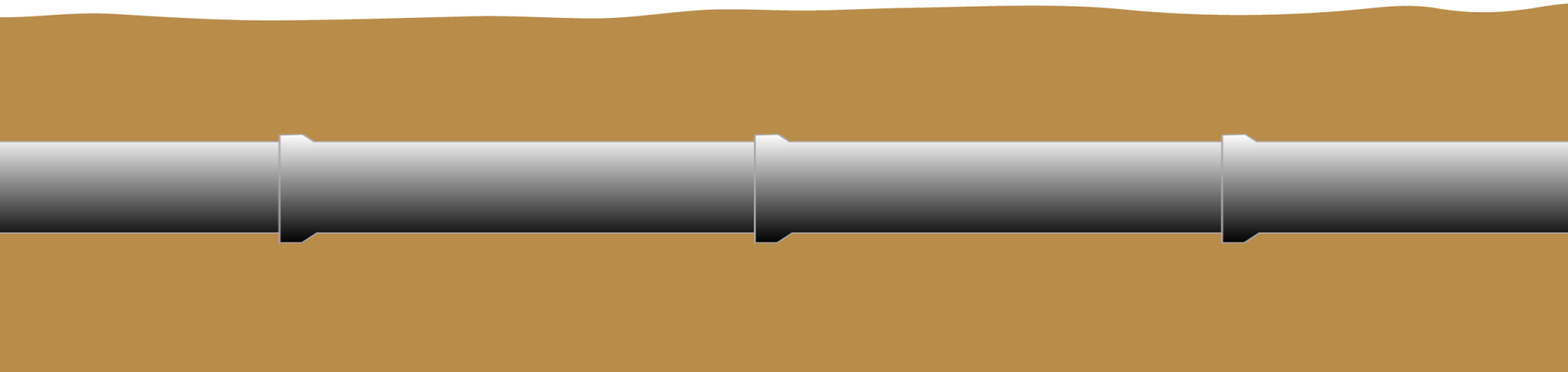
Buried Pipeline

Structure

- Pipe Strength + Soil Strength

Conduit

- Alignment Grade + Secure Joints



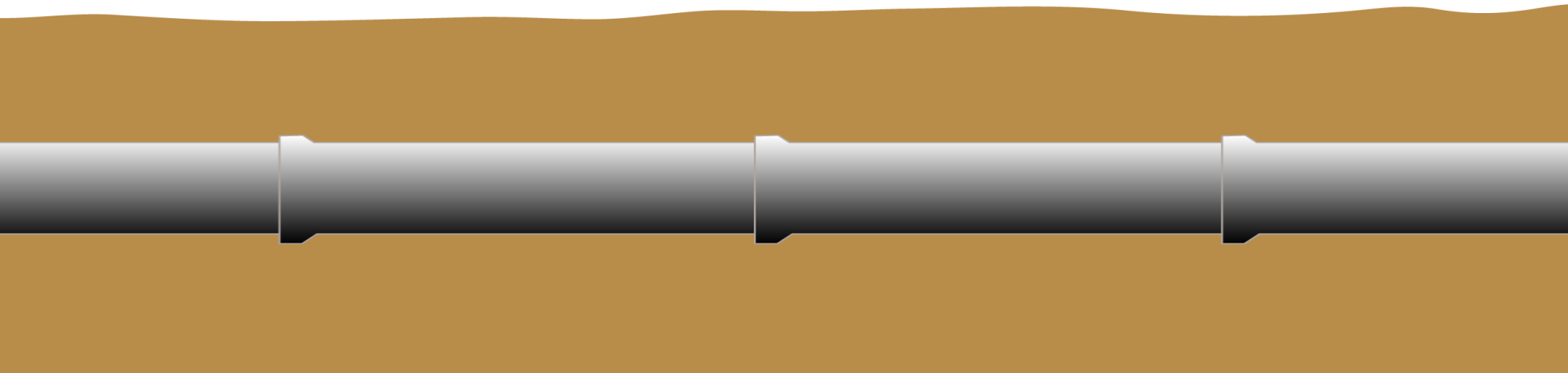
Buried Pipeline

Structure

- Pipe Strength
- +
- Soil Strength

Conduit

- Alignment Grade
- +
- Secure Joints



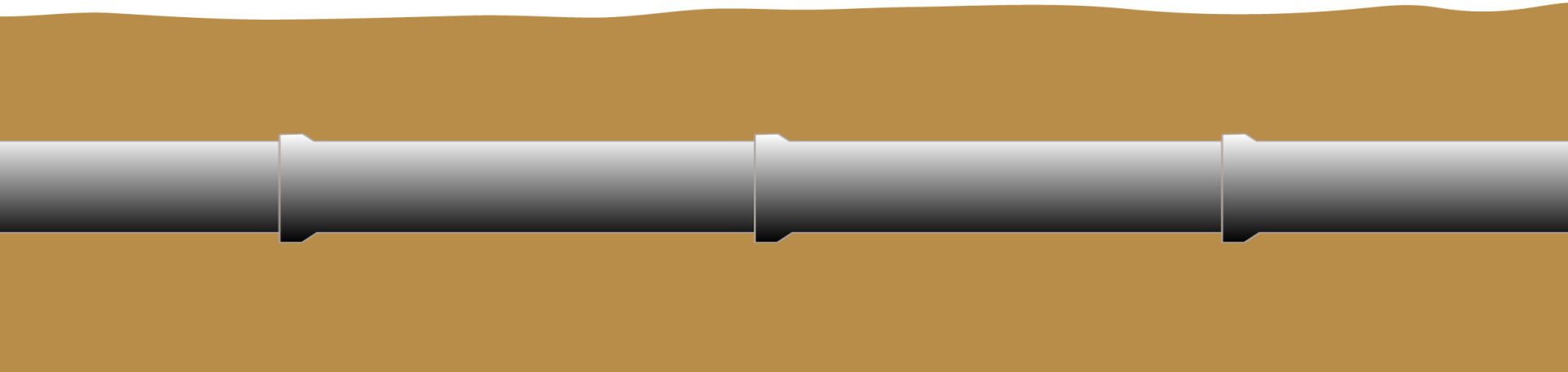
Buried Pipeline

Structure

- Pipe Strength
- +
- Soil Strength

Conduit

- Alignment Grade
- +
- Secure Joints



Standard Practice for

Evaluation of Precast Concrete Drainage Products

AASHTO Designation: R 73-16[1]

Technical Section: 4a, Concrete Drainage Structures

Release: Group 2 (June 2016)

AASHTO R 73-16

AASHTO

American Association of State Highway and Transportation Officials
444 North Capitol Street N.W., Suite 249
Washington, D.C. 20001

5. REPAIRABLE DEFECTS IN PRECAST CONCRETE PRODUCTS

5.1. Defects which can affect the function or design life of the precast product that can be adequately repaired to meet specification requirements shall be acceptable for repair as described in Sections 5.2 to 5.4. Any repairs made must be performed such that the structural integrity is not compromised and does not change the dimensional requirements of the product. Repairs made using commercially approved materials must be performed in accordance with the manufacturer's recommendations.

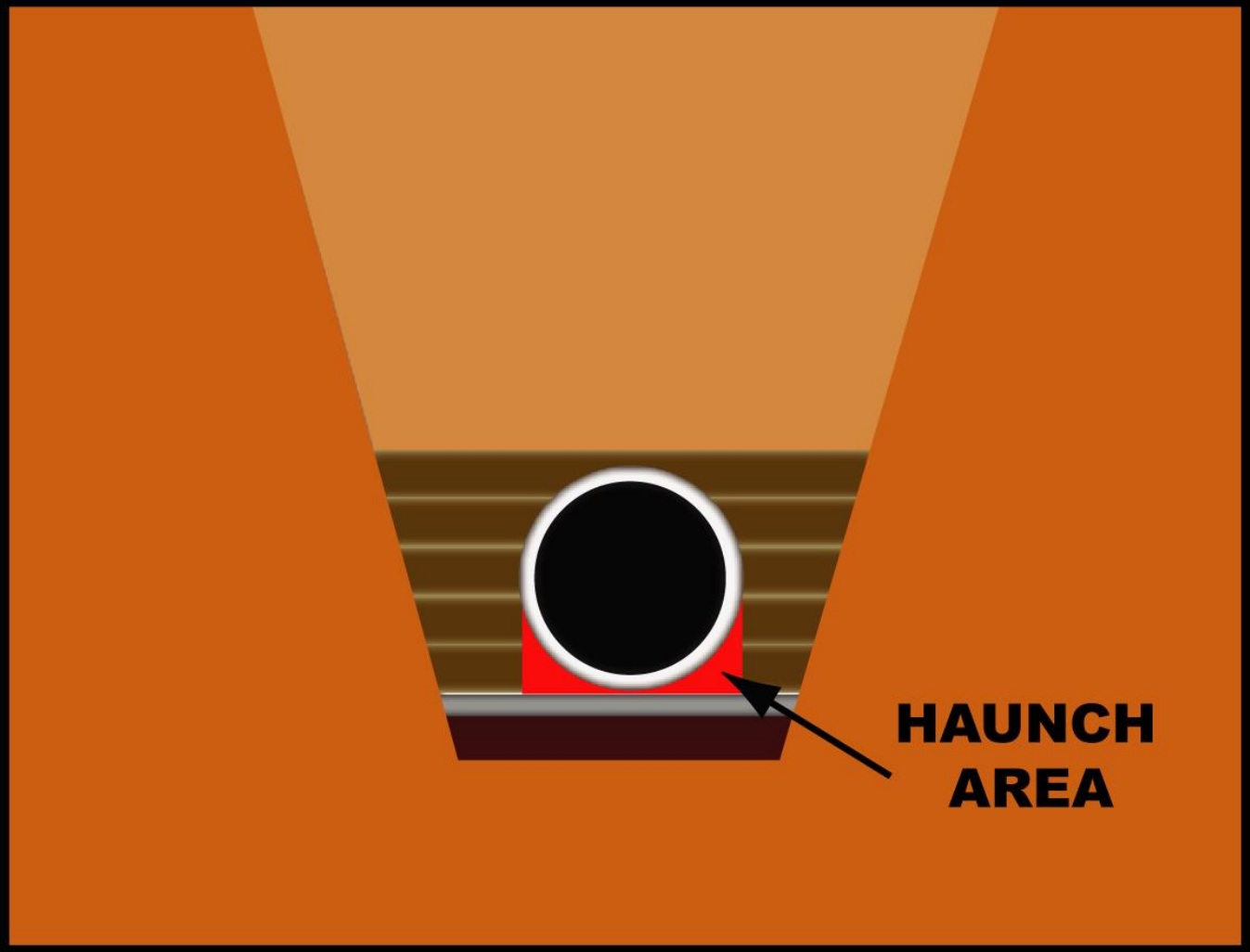
5.2. *Repairable Cracks in Reinforced Products*:

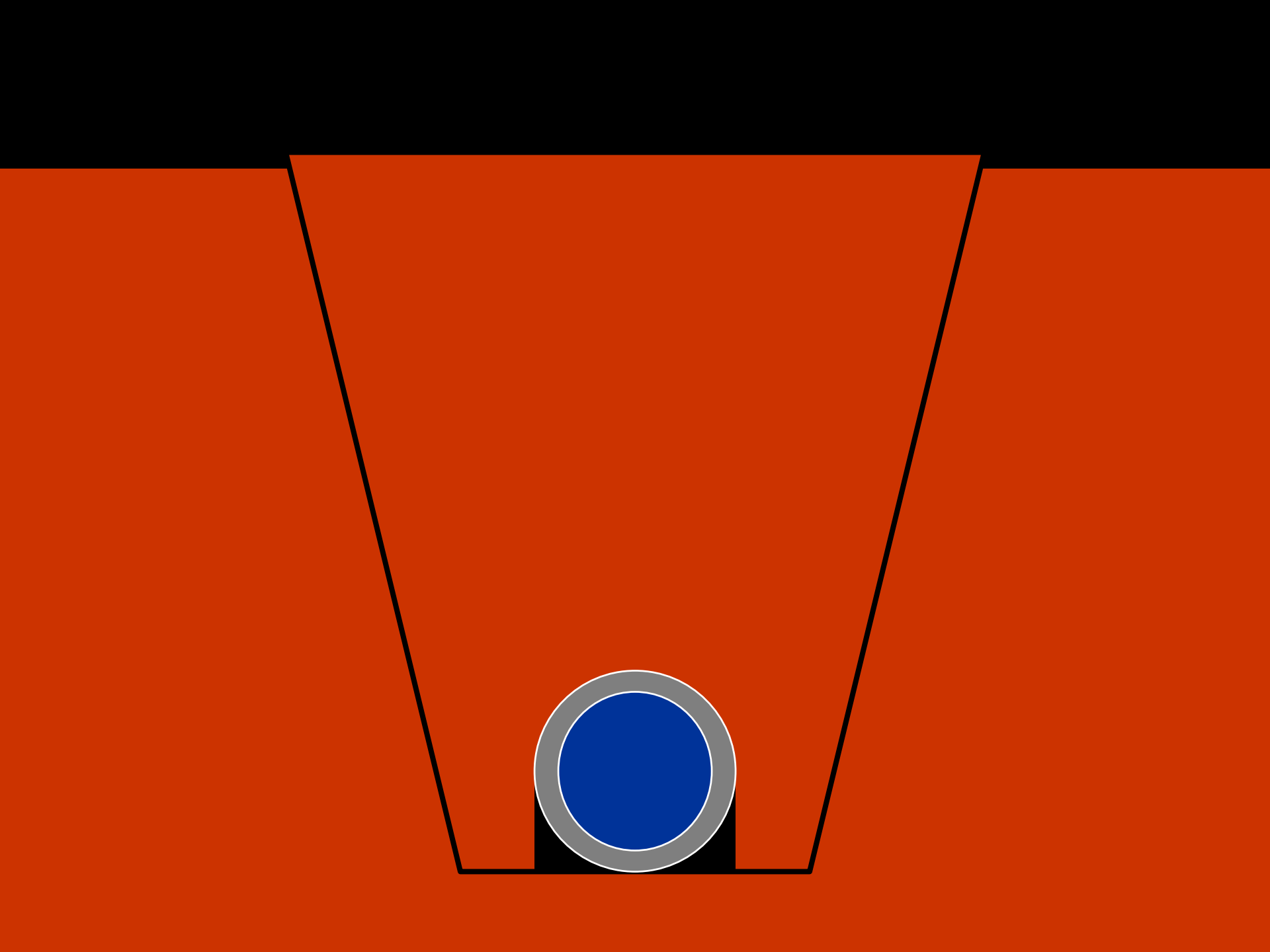
5.2.1. Cracks can be repaired in accordance with Sections 5.2.2 and 5.2.3.

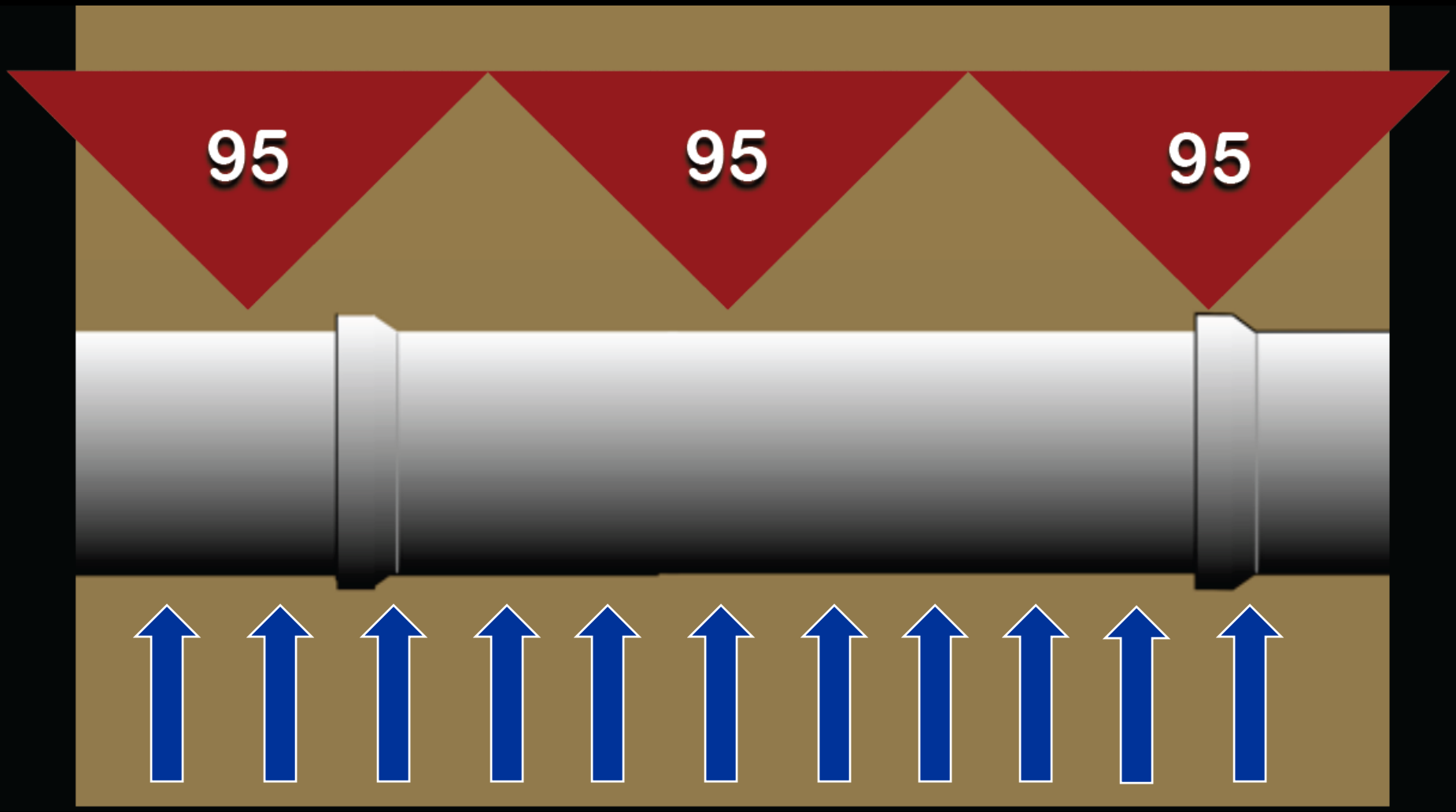
5.2.2. For pipe, cracks 0.01 in. or wider and longer than 12 in. that are not passing through the wall can be repaired with an approved repair material as described in the contract or approved by the owner.

5.2.3. For other products, cracks passing through the wall can be repaired with an approved repair material as described in the contract or approved by the owner.

INSTALLATION


HAUNCH
AREA

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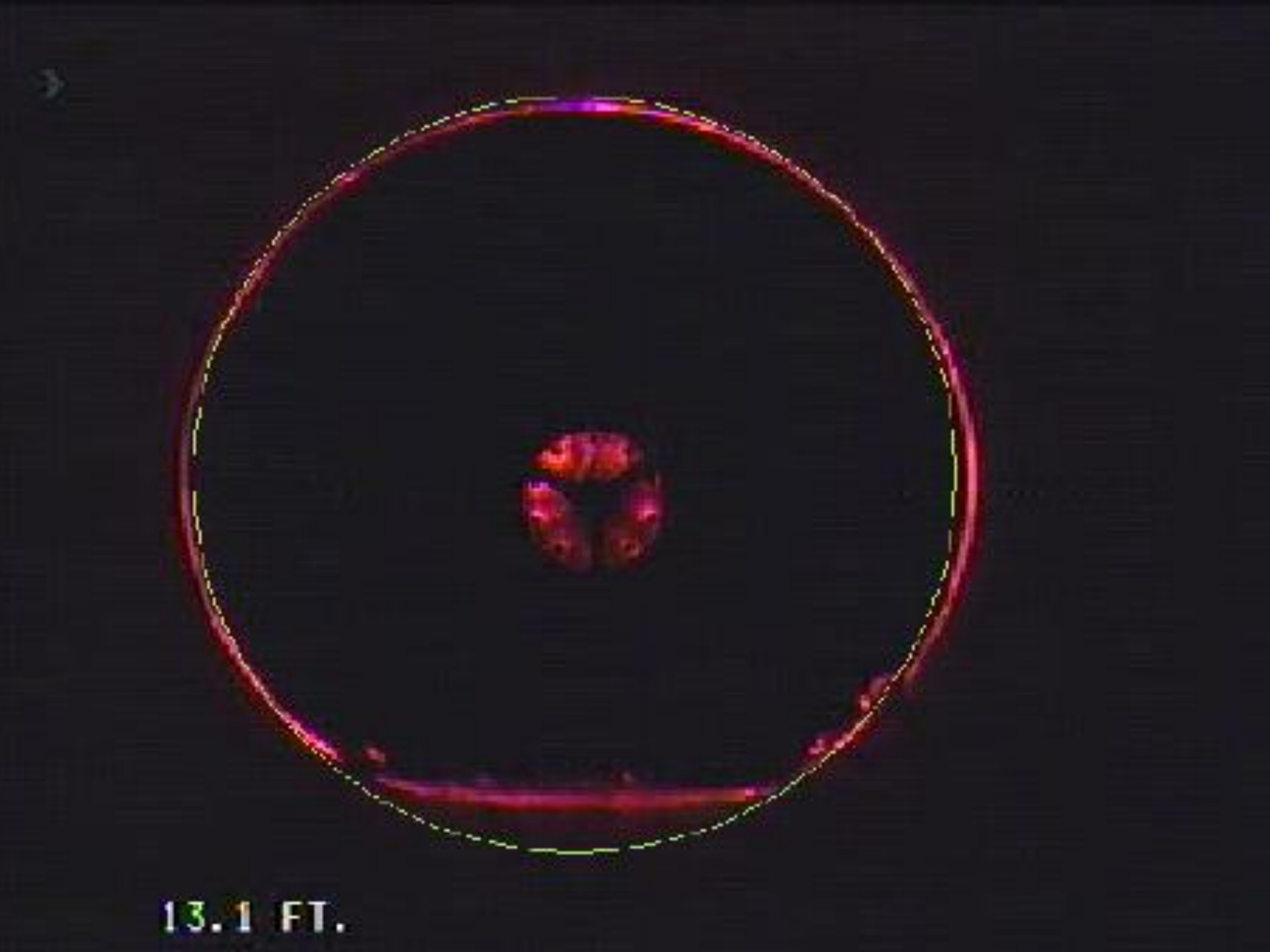
95
95

Post Installation Inspection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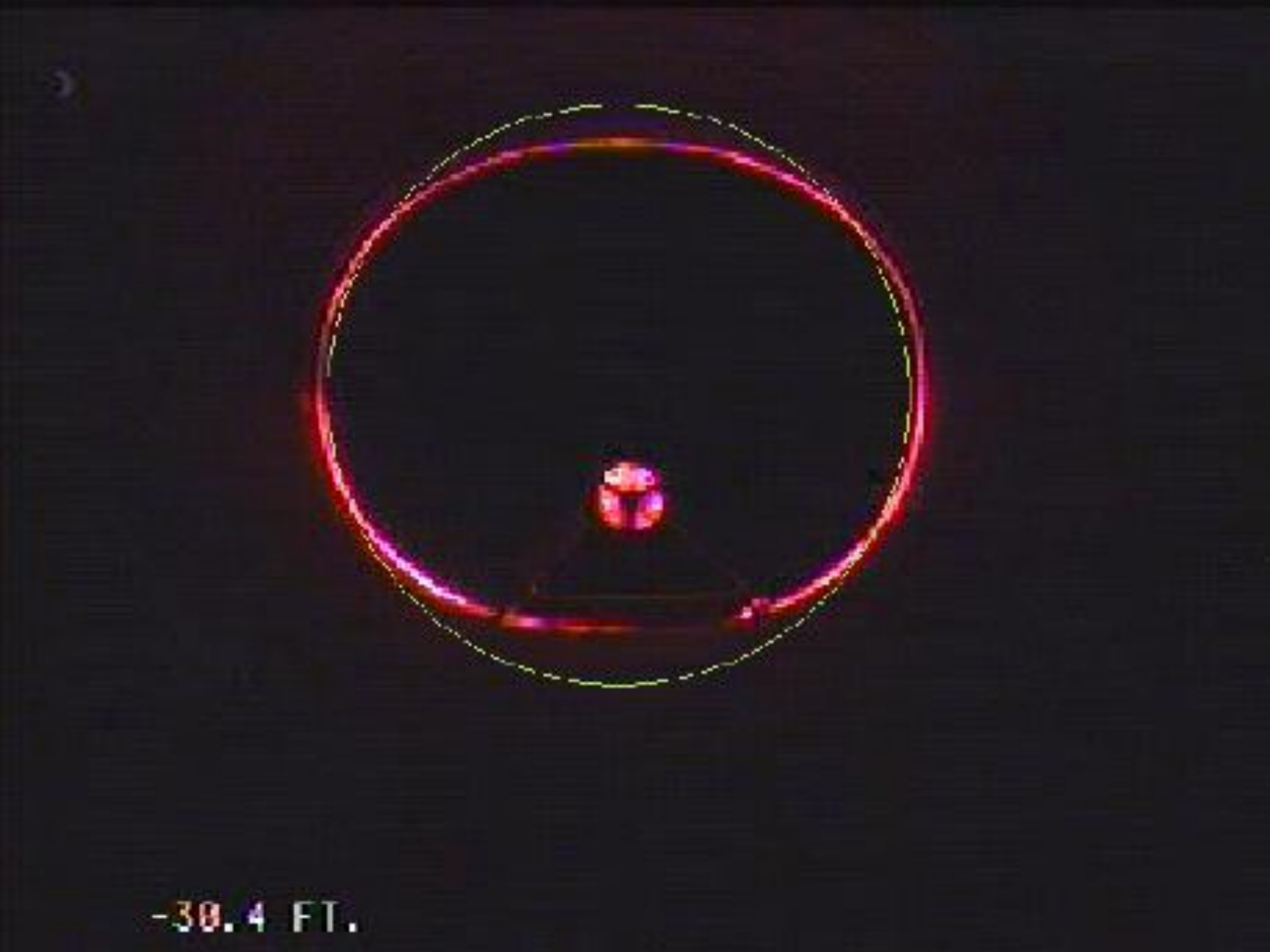
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-65.4 FT.


2.0 FT


MH 5
TO
MH 6
10-16-14
10:20:10
Bittersweet Farms
167.0 FT
5.7%
0 FPM


MH CB-51
TO
MH CB-50
9/23/2014
Blackmoor CB
13:56
21.1 FT


10.5 FT
P

Designation: C1840/C1840M – 17

Standard Practice for Inspection and Acceptance of Installed Reinforced Concrete Culvert, Storm Drain, and Storm Sewer Pipe[1]

This standard is issued under the fixed designation C1840/C1840M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers the requirements for inspection and acceptance of installed reinforced concrete pipe by either person-entry, or remote inspection as shown in Figs. 1 and 2, respectively.

1.2 The scope of this specification is intended for installation related observations and assumes that pre-installation inspection has been completed.

1.3 The reinforced concrete culvert, storm drain and storm sewer pipe shall be manufactured in accordance with Specification C76, C506, C[illegible] C6[illegible] [illegible] ac[illegible]ted in accordance with AAS[illegible] R07[illegible] This specific[illegible] only be used for gravity, [illegible]-p[illegible] [illegible]orm [illegible]ina[illegible] a[illegible]ations.

1.4 Person Entry shall be used unless extenuating circumstances preclude this type inspection. Remote inspection is acceptable for use for pipe diameters of 30 in. [750 mm] and smaller unless otherwise specified by owner or engineer.

1.5 Access of installed pipe for manual inspection shall follow OSHA 29 CFR PART 1926 SUBPART AA regulations for confined space entry. However, this standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

1.6 This practice does not cover deformation or deflection assessment. Concrete pipe is classified as a rigid structure because they do not bend or deflect appreciably under load before cracking. Due to these facts shape evaluation are of little or no value when evaluating concrete pipe.

1.7 The values stated in either Imperial/US or [SI units] are to be regarded separately as standard. The SI units are shown in brackets. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other.

1.8 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*

C76 Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe

C506 S[illegible]ific[illegible] for [illegible]nf[illegible]ce[illegible] Concrete Arch Culvert, Storm [illegible]rai[illegible] S[illegible] Pi[illegible]

C507 Sp[illegible]ific[illegible] for [illegible]ei[illegible]ed Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe

C655 Specification for Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe

C822 Terminology Relating to Concrete Pipe and Related Products

C1417 Specification for Manufacture of Reinforced Concrete Sewer, Storm Drain, and Culvert Pipe for Direct Design

D932 Practice for Filamentous Iron Bacteria in Water and Water-Formed Deposits

2.2 *AASHTO Standards:*

AASHTO LRFD Bridge Design Specification

AASHTO LRFD Bridge Construction Specification, Section 27

AASHTO PP63 Standard Practice for Pipe Joint Selection for Highway Culvert and Storm Drains

AASHTO R073 Standard Practice for Evaluation of Precast Concrete Drainage Products

2.3 *Occupational Safety and Health Standards:*

OSHA 29 CFR Part 1926 Subpart AA for the Construction Industry

2.4 *ISO/IEC Standards:*

ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories

3. Terminology

3.1 For definitions of other terms relating to concrete pipe not defined in this specification, see Terminology C822.

[1] This test method is under the jurisdiction of ASTM Committee C13 on Concrete Pipe and is the direct responsibility of Subcommittee C13.05 on Special Projects.

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30.9 FT

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