UCT The Underground Utilities Event
Underground Construction Technology | January 28-30, 2020 | Fort Worth, TX

AWWA M28 Water Pipeline Rehabilitation Manual Update

Mike Ambroziak, P.E., Managing Partner, CPM, LLC, Phoenix, AZ
Tuesday, January 28, 2020 11:30am – 11:55am
Track II – Waterworks (Room 202A)

Committee Chair Mark. Knight PhD, , Associate Professor, University of Waterloo,
Committee Vice Chair George Bontus, P.Eng. Director Engineering, Insituform, Edmonton, Canada

Why is this so important right now?

- Pressure pipe rehabilitation continues to expand in acceptance and implementation around the world
  - Trillions of dollars to be invested in water main rehabilitation over the next 25 years
  - Pipe rehabilitation and lining systems will play an immense role
  - Europe and Canada has been a leader in product development and use
  - Developing standards is United States is critical to pipe rehab success

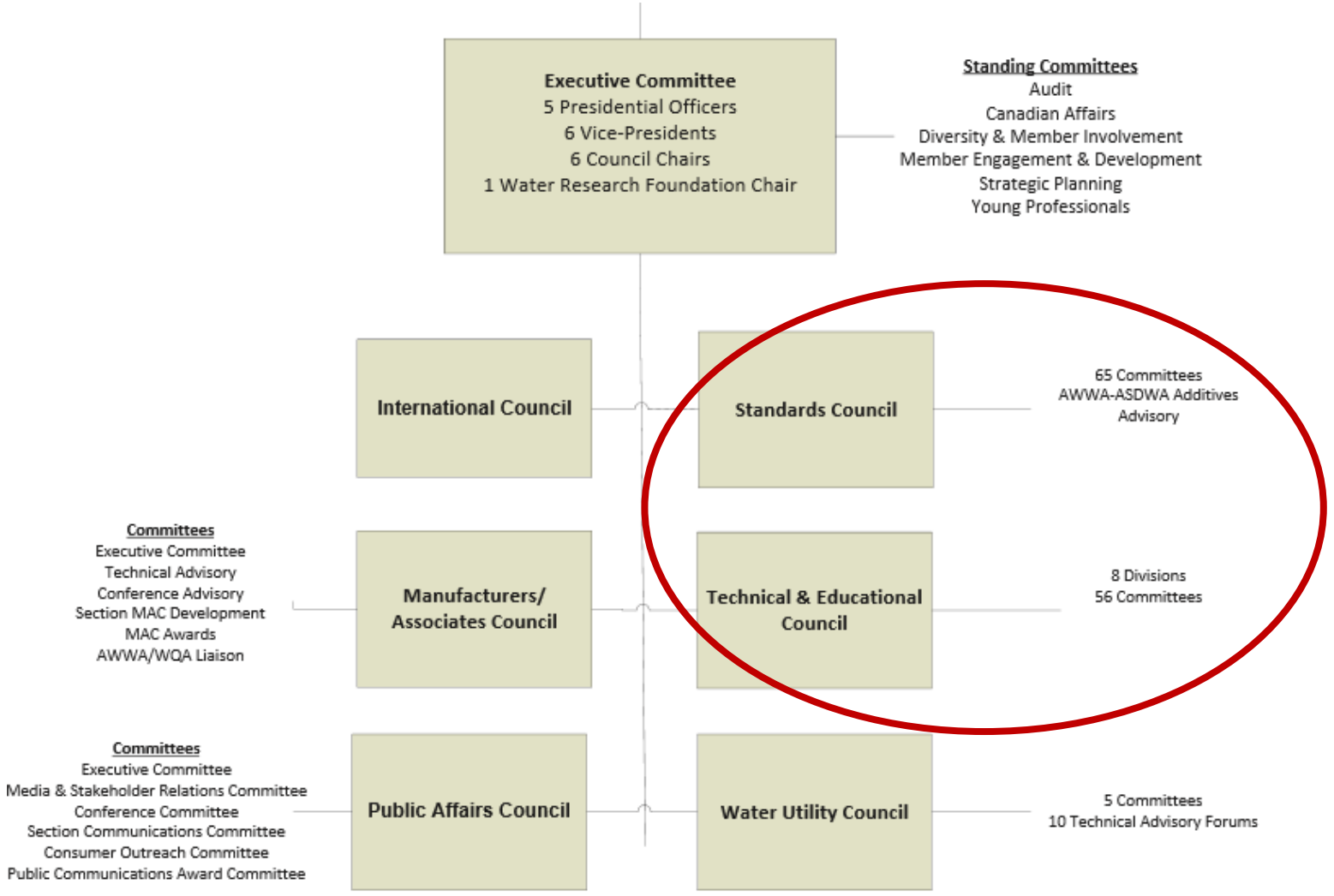
American Water Woks Association (AWWA)

- Founded in 1881, the Association is the largest organization of water supply professionals in the world.
- Membership includes over 4,300 utilities that supply roughly 80 percent of Canada's and United States drinking water
- AWWA's 51,000 total members represent the full spectrum of the water community: public water and wastewater systems, environmental advocates, scientists, academicians, and others who hold a genuine interest in water, our most important resource.

American Water Works Association

Dedicated to the World's Most Important Resource®

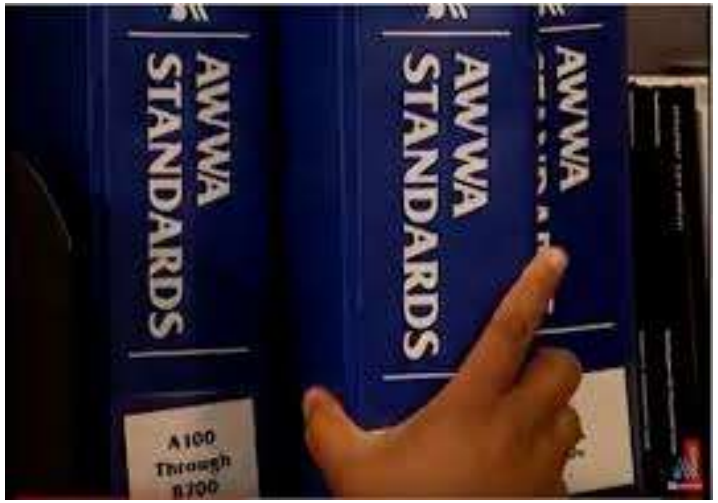
AWWA Council Org Chart



There are a variety of opportunities to participate and contribute to the industry!

AWWA Standards Council

- AWWA Standards represent a consensus of the water industry
- Accredited by the American National Standards Institute (ANSI).
- Procedures defined by committees under the AWWA Standards Council
- Standards are to be updated on five-year cycle

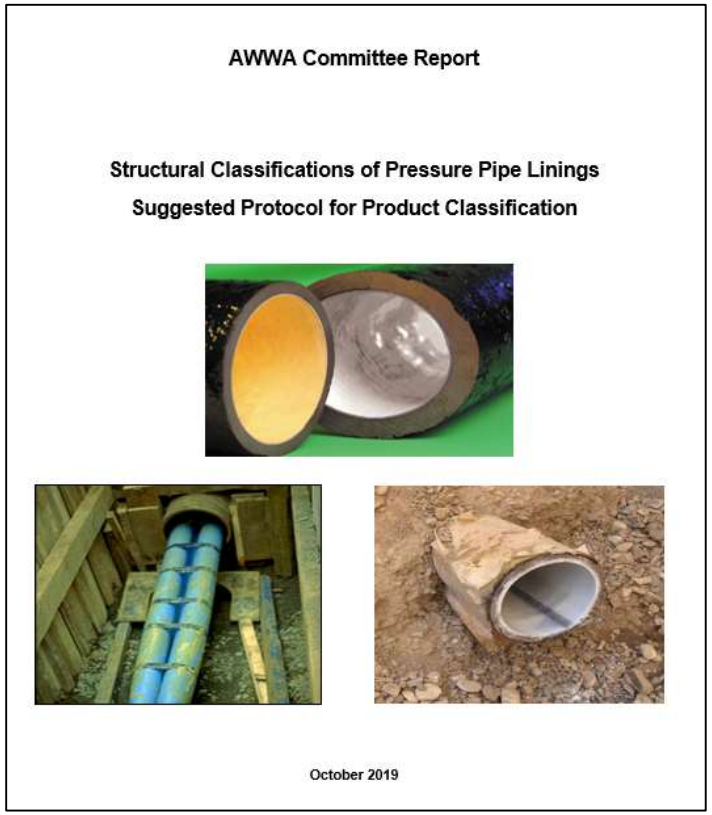


AWWA Standards Committee on Pipe Rehabilitation 257

- Chair Dr. Mohammad Najafi at the University of Texas in Arlington, Texas
- Each Standard has a Chair and sub-committee.
  - **Pipe Bursting** – Jon Turner, Phoenix Civil Engineering
  - **CIPP** – Dr. Mark Knight, University of Waterloo
  - **Sliplining** – George Bontus, Aegion Corporation
  - **Applied Linings** – Randall Cooper, Envirologics
  - **Structural Pipeline Classifications** – Dave Kozman, Hammerhead and Chris Macey, AECOM

Structural Pipeline Rehab Classifications

- One of the more challenging discussions in M28
  - Takes qualitative concepts to a quantitative format
  - Provides guidance on design and product selection for all lining products
  - Provides illustrative examples of sound engineering judgement to go beyond current design code
  - Published October 2019



Practical Aspects of the AWWA Structural Classifications Framework

- **Alignment of Lining Application Requirements with an Owner's Design Objectives**
  - When is a Class IV (or any other Class) liner really a Class IV liner???
  - Need to match products to Owner's Design Objectives
  - Owner's design objectives many be similar but often vary considerably

- **How Do We Do This?**
  1. *Problem Definition Statements* – The Owner/Engineer needs to quantify failure applied loads and design condition
  2. *Type Tests* – the products need quantifiable measures of short and long term mechanical/chemical resistance properties
  3. *Acceptance Tests* – How we measure in the field that we met the design objectives

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AWWA M28 Pipe Rehab Structural Classifications

LINER CHARACTERISTICS	NON-STRUCTURAL	SEMI-STRUCTURAL		FULLY STRUCTURAL
	CLASS I	CLASS II	CLASS III	CLASS IV
INTERNAL CORROSION BARRIER	YES	YES	YES	YES
BRIDGES HOLES/GAPS AT PIPE OPERATING PRESSURE	NO	YES	YES	YES
INHERENT RING STIFFNESS	NO (depends on adhesion)	NO (depends on adhesion)	YES*	YES*
LONG-TERM INDEPENDENT PRESSURE RATING ≥ PIPE OPERATING PRESSURE	NO	NO	NO	YES
SURVIVES "BURST" FAILURE OF HOST PIPE	NO	NO	NO	YES

M28 Manual Revision

- Version 4 will be a major revision
  - V3 approx. 120 pages while V4 over 300
- Committee started in the fall of 2019
  - Over 40 members
- New Table of Content approved by AWWA January 2019
- Approx. 80 percent of first drafts of chapters now completed

M28 Manual Revision

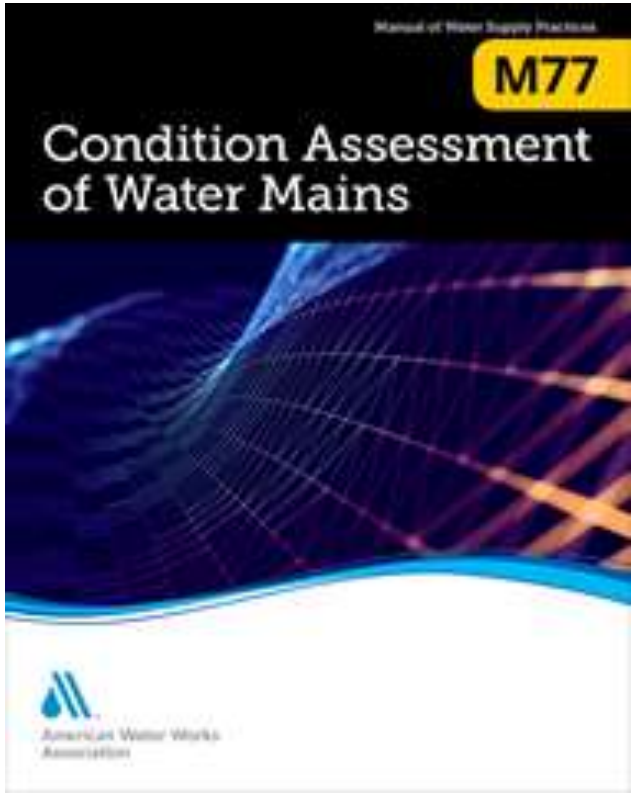
- Version 4 Manual re-organized
  - Chapters 1 to 6 focus on watermain rehab process
    - ✓ Product classification, how to build programs, program management, cleaning, bypass, service reinstatement etc.
  - Chapters 7 to 16 focus on specific rehab methods
- Four new Chapters
  - **Chapter 2 Structural Design Objectives and Considerations**
  - **Chapter 3 Development of Programs vs Projects**
  - **Chapter 4 Project Development**
  - **Chapter 16 Service Replacement/Rehabilitation Methods**

M28 Version 4 Methods Focus

- Non-human entry watermain rehabilitation methods
  - Cement Mortar Lining
  - Polymeric Linings
  - Cured in Place Pipe (CIPP)
  - Sliplining
  - Pipe Bursting
  - Internal Joints and Spot Repairs
  - External Corrosion Control
  - Service Replacement and Rehabilitation

Other Complimentary AWWA Committees/Councils

- **AWWA M77 - Water Main Condition Assessment Committee**
  - Over 90 members: utilities, consultants, service providers, technology companies
  - June 2019: published first edition of M77 Manual of Practice - Condition Assessment of Water Mains
  - Excellent resource for water industry professionals
  - With emerging technologies, additions and changes are constantly occurring



AWWA M77 Activities

- Utility collaboration
- Data standards
- Education
  - Conference technical sessions
  - Workshops (at ACE, WIC)
  - Webinars
- Publications
  - Journal AWWA
  - Opflow
  - Water Science
- Collaboration with other AWWA Committees (joint workshops a
  conference sessions)
  - Asset Management Committee
  - Water Main Rehabilitation Committee
- Contact New Committee Chair Andi Corrao, P.E.:
  corraoal@cdmsmith.com

What's Next for AWWA M28

- January 2020, new manual on Large Diameter Pressure Pipe Rehabilitation will begin
  - GRP repairs
  - Large diameter cement mortar lining
  - Sliplining
  - Polymeric linings

- Committee Meeting January 29, 2020 (Tomorrow!)
  - 12pm to 4pm
  - Ft. Worth Convention Center – Room 101

Questions?

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