

Opening remarks, introduction and review of objectives (8.00-8:10 am)

History of mechanical pipe joining methods: (8:10-8:30)

- Screwed and Coupled
- Lead Joints and Leadite
- Flanged Joints
- Gasket-less joints (Trenton's "universal" pipe)
- Dresser Couplings
- Pushon, Tyton etc joints
- Hymax Couplings

Pipe Types: History and Characteristic Traits. Joining methods
(8:30-8:45)

- Steel
- Wrought Iron
- Cast iron Billet Pipe
- Pit Cast Iron
- Centrifugally cast or Spun Cast (DeLavaud process)
- Asbestos-Cement
- Ductile Iron
- PVC
- HDPE

Gasket Theory: (8:45-9:15)

- Mechanical considerations
- Durometer scale and reading
- Geometric shapes vs sealing ability-wedge vs ball vs flat vs O-ring style
- Composition with respect to chemical resistance
- Composition with respect to leaching of compounds into the water
- Example comparison of 4 different types of hydrant ball discs
- Calculation of sealing/clamping force from pressure in a hydrant valve
- Cold-flow of gaskets and the importance of proper clamping pressure
- The bell curve of sealing pressure vs cold flow to support the above

Lubrication...When, where and with what.

Torque: (9:15-9:45)

Clamping pressure in water distribution is usually related to torque on bolts

Nut and Bolt theory, and the 50-40-10 rule of torque

Rolled versus cut threads and their effect on torque

Platings and coatings and their effect on torque

Galling in aluminum and stainless nut/bolt systems and how to prevent it

Lubricants in nut/bolt systems

The impact of all of the above on proper installation and sealing of joints

Torque wrenches and Torque limiting socket extensions

Try your hand at “guessing the torque”

Break Time (9:45-10:00)

Stainless steel- (10:00-10:15)

History and composition

Review of galling,

Type 304 vs 316 and their applications

Effect of deoxygenation and the presence of chlorides on stainless

Review of the Dresser Style Coupling (10:15-10:30)

Principle and importance of torque and tightening order

When and with what to lubricate

Review of manufactures installation instructions

Size on Size Coupling

Variable Gland Rings and Gaskets based on OD chart

Materials

Cathodic Protection

Unbalanced forces that require restraint, with sample calculations

Review of the Hymax Style Coupling (10:30-10:45)

A different principle than dresser type couplings

Principle of operation and gasket geometry

Torque and bolts on the Hymax

Review of manufacturers installation instructions

Deflection limits, and flexibility

Unbalanced forces in reducers/transition couplings that need restraint

Stainless Steel Repair Clamps: (10:45-11:15)

Principle of operation

Mechanical limitations

Gauge of Metal

Welded vs non-welded types

Mat gaskets vs finger joints

Flat gaskets vs Waffle type gaskets

Gasket thickness and durometer rating

Gasket geometry-ridges/surface area/reinforcing materials

Torquing of nuts/studs on band clamps and tightening order

Continuity across ring breaks

Importance of careful handling w/r to passivation of the stainless steel

Hands-on demonstrations of couplings and clamps 11:15-11:30

Quiz and evaluation- 11:30-11:45

Total contact time exclusive of break - 3.5 hours