CISBOT – Cast Iron Joint Sealing Robot

- Seals Bell & Spigot Joints in Live 6” Cast Iron Gas Mains
- Reaches 150’ in 2 Directions to Seal 25 Joints from One Excavation
CISBOT – Cast Iron Joint Sealing Robot

• **Con Ed’s LP Gas System**
  - 47% is 6” Cast Iron
  - Seal over 2,500 6” joints/year

• **Want to inject Anaerobic into Jute**
  - Internal versus External
CISBOT – Cast Iron Joint Sealing Robot

- Cornell Study
  - 50 Year Longevity Proven
CISBOT – Cast Iron Joint Sealing Robot

- Contract with ULC Robotics
- Con Edison digs 7’ excavation and installs fitting
- ULC Robotics operates and maintains robot
CISBOT – Cast Iron Joint Sealing Robot

- Developed fitting with IPSCO
  - 45 degree entry with balloon stopper hole
- Approved to remain on main
  - No-Blow operation
  - Work live with no service interruption and no main cut-out
CISBOT – Cast Iron Joint Sealing Robot

- Developed drill system with IPSCO
  - Weighs 90 lbs.
  - Takes less than 5 minutes to make cut
  - 45 degree cutting angle
  - 4” shell cutter
  - ¾” end mill to catch coupon
CISBOT – Cast Iron Joint Sealing Robot

- Install launch tube housing robot
- Mount power motor that pushes umbilical
CISBOT – Cast Iron Joint Sealing Robot

- Turret Station holds:
  - Umbilical Cable
  - Electronics and Pneumatics
  - Anaerobic Sealant
**CISBOT – Cast Iron Joint Sealing Robot**

- **Electronic Brain**
  - Receives signal from operator
  - Uses feedback control to/from robot

- **Peristaltic Pumps**
  - Delivers exact amount
  - Pressure and Flow controlled
CISBOT – Cast Iron Joint Sealing Robot

• CISBOT Tool Head
  – Slides along bottom of main on skis
  – 3 traveling lights for viewing
  – 4 pointer lights for positioning at joint
  – Arms lock tool head
  – 3/16” Drill and 3/8” Chamfer
  – Nozzle for injection of Anaerobic
CISBOT – Cast Iron Joint Sealing Robot

- Inside gas main
- Just finished drilling
- Notice joint crack and shiny chamfer hole
CISBOT – Cast Iron Joint Sealing Robot

- ULC Robotics Operator hard at work
  - Watches video monitor
  - Uses control pad to operate robot
CISBOT – Cast Iron Joint Sealing Robot

8” to 12” Adjustable Tool Head
- same umbilical and support equipment
- larger arms, drill and body
CISBOT – Cast Iron Joint Sealing Robot

12” IPSCO Fitting
- 6” Shell Cutter
- same launch tube
- 30 degree angle
The Future

- Developing a fitting to be used on main cutouts and encroachments
- Medium Pressure CISBOT
- 16” & 24” CISBOT