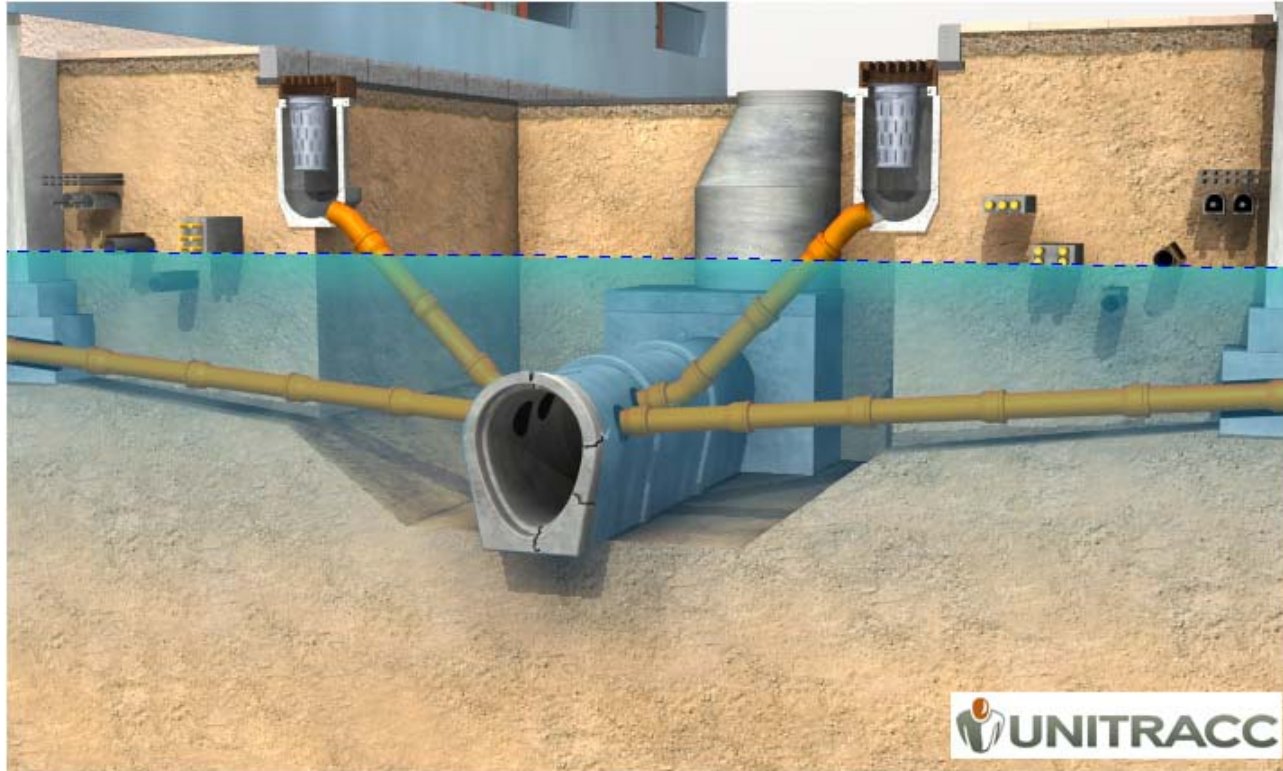




**Hotel Four Points, Sheraton**  
**Octubre 29 y 30 de 2015**



## Development in CIPP and lateral rehabilitación



description

wiederholen ▶ weiter





# Trenchless Technology

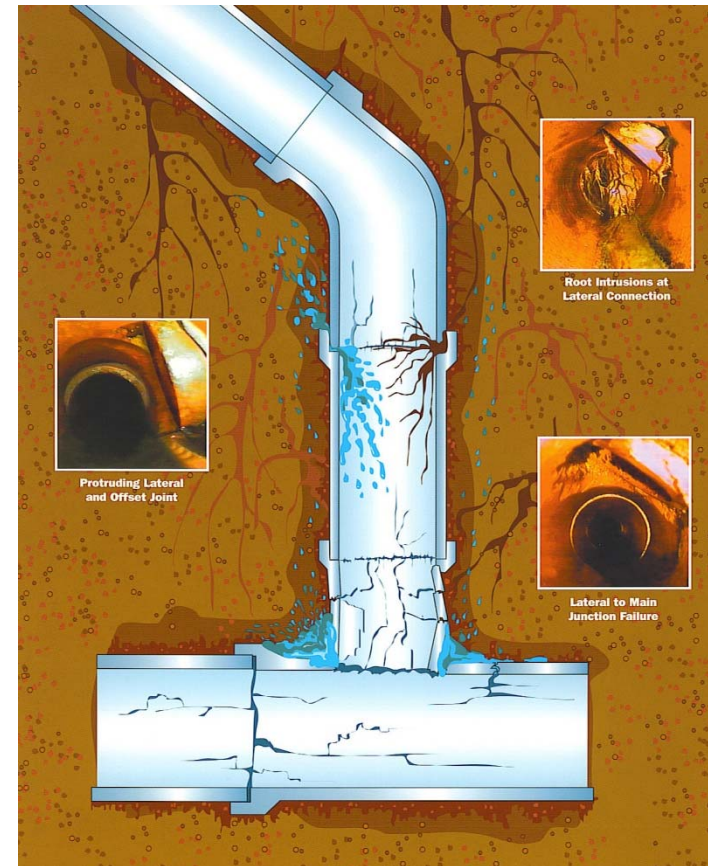
- Repair of Pipe networks and assets without digging them up.





# Issues with aging pipe networks

- Cracks
- Leaking joints
- Bad bedding
- Ground erosion
- Badly formed connections
- High Water Table around unsealed system

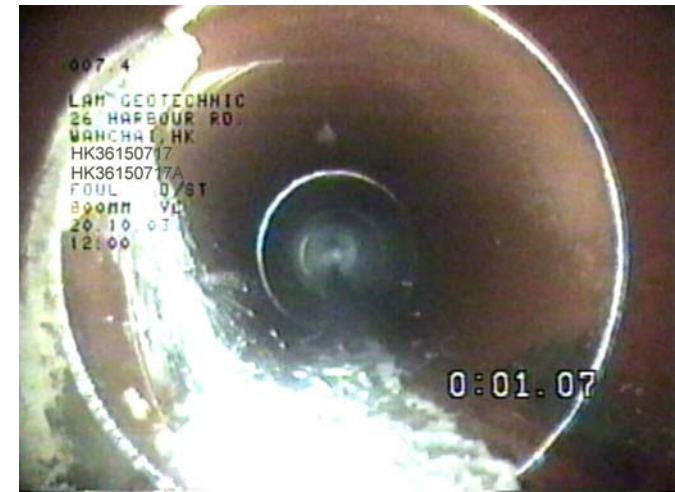






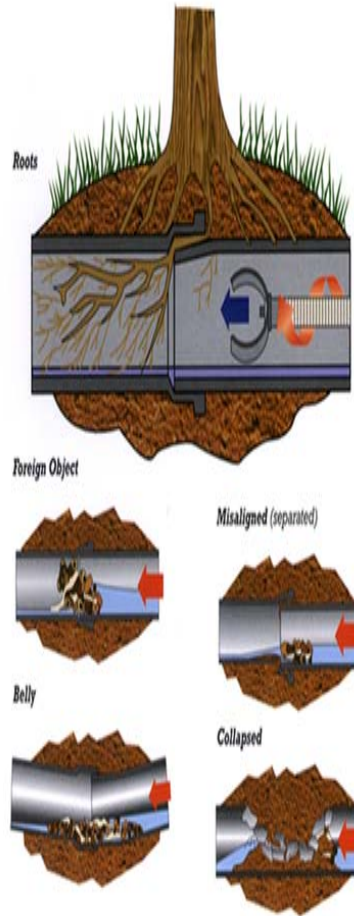
# Results of infiltration into a network

- Increased costs through treatment of diluted sewerage
- Overflows
- Further damage to network
- Bedding erosion and eventual collapse





# Collapse





# Sewer renovation programs

- Many countries have initiated sewer renovation programs
- Mapping
- Assessment
- Prioritization
- Renovation
- UK , Germany, USA for example have 5 and 10 year programs



# Sewer network

- Main Sewer
- House service line (lateral)
- Connection between the lateral and mainline
- Manhole





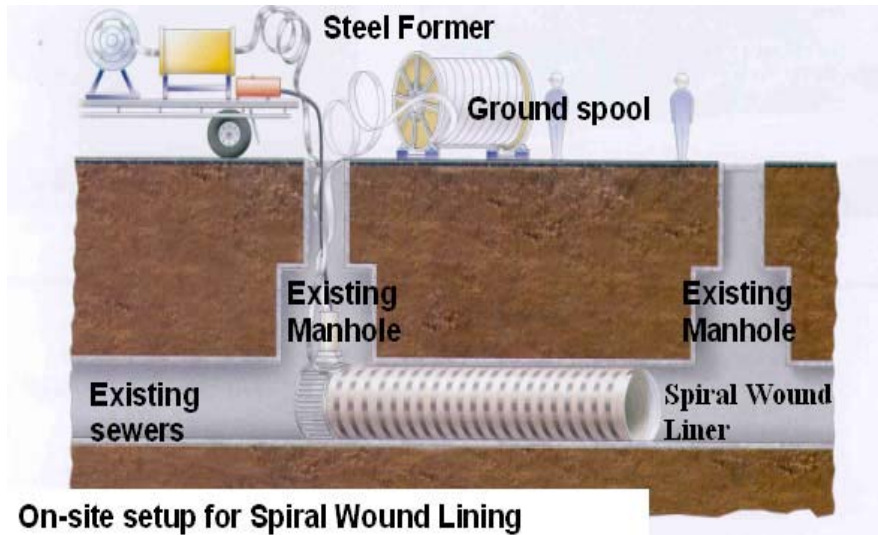
# Trenchless Solutions

Provide an “as new pipe” designed to withstand all loads Renewal of deteriorated sewer mains by trenchless methods for last 40 years.

Mainline, methods, CIPP, Spiral wound, fold and form

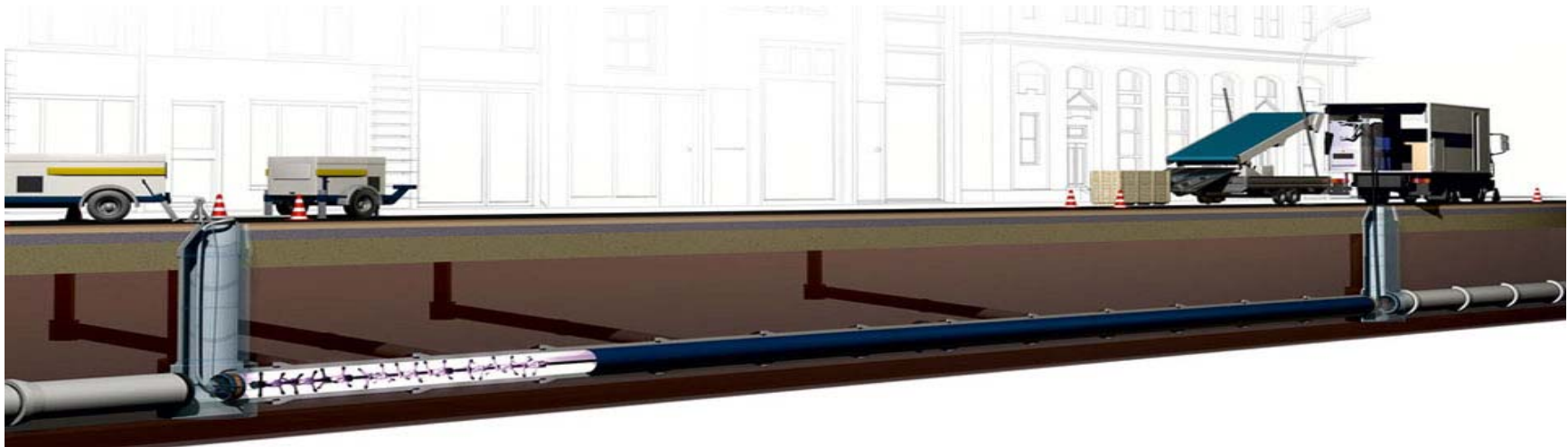


# Mainline Trenchless Solutions





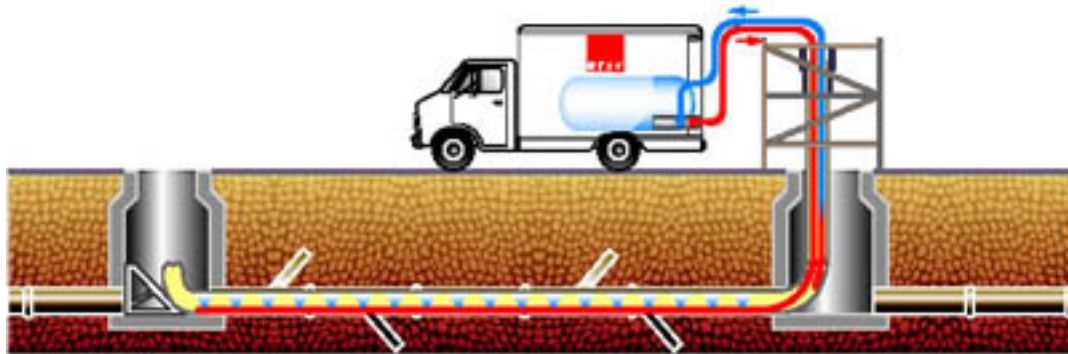
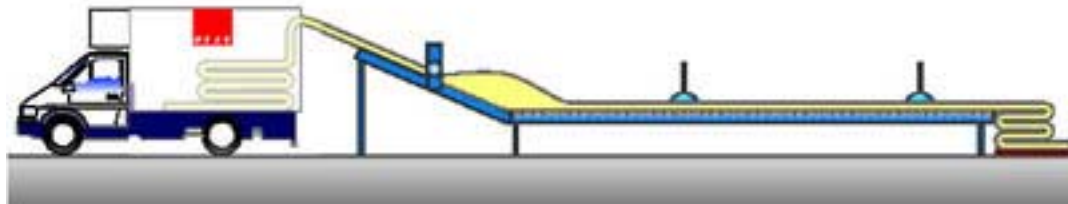
# STEAM OR UV CURING







# STEAM OR UV CURING







# STEAM AND INVERSION DRUM





# Hot water/Steam or UV

- Pipe Diameter
- Access
- Shipping of liner or local impregnation
- Set up
- Investment

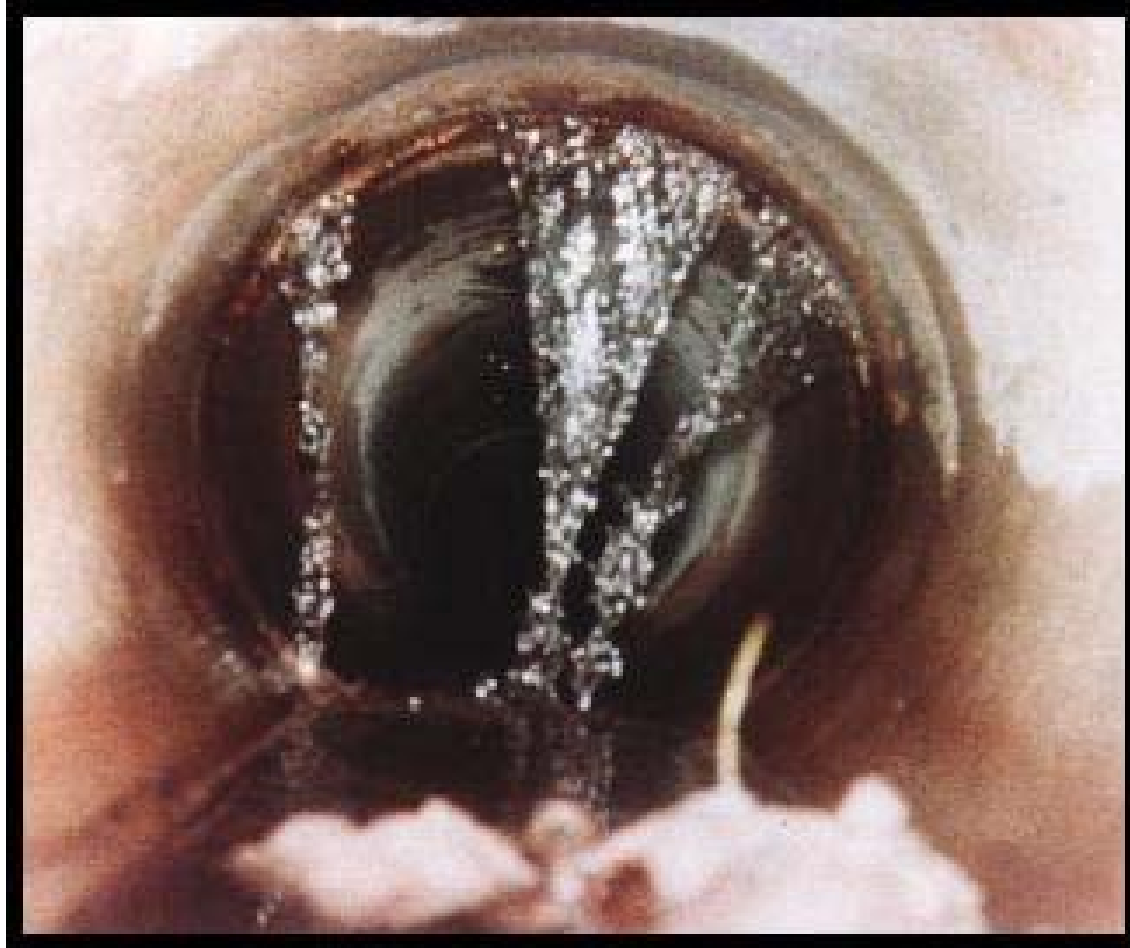


# Patches

- When a pipe from manhole to manhole has only a few defects, i.e cracks, offset joints, high levels of infiltration at certain points etc
- The sectional repair is used to seal those defective areas only.



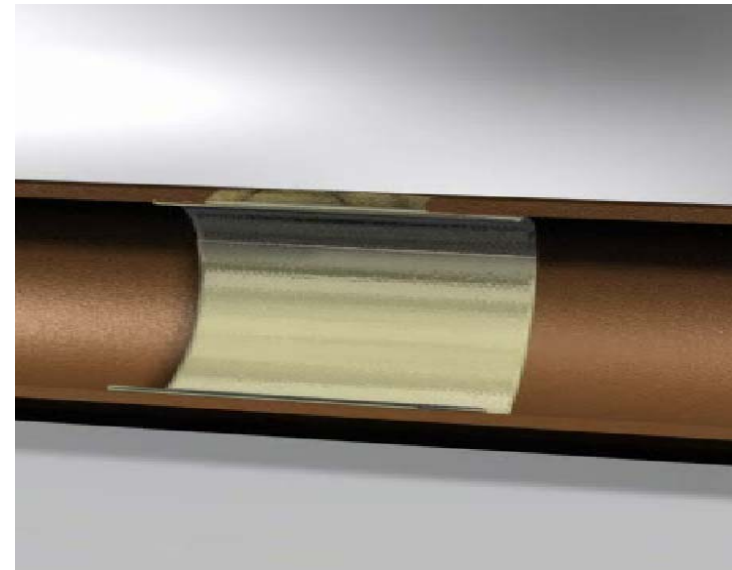
# Patches







# Patches



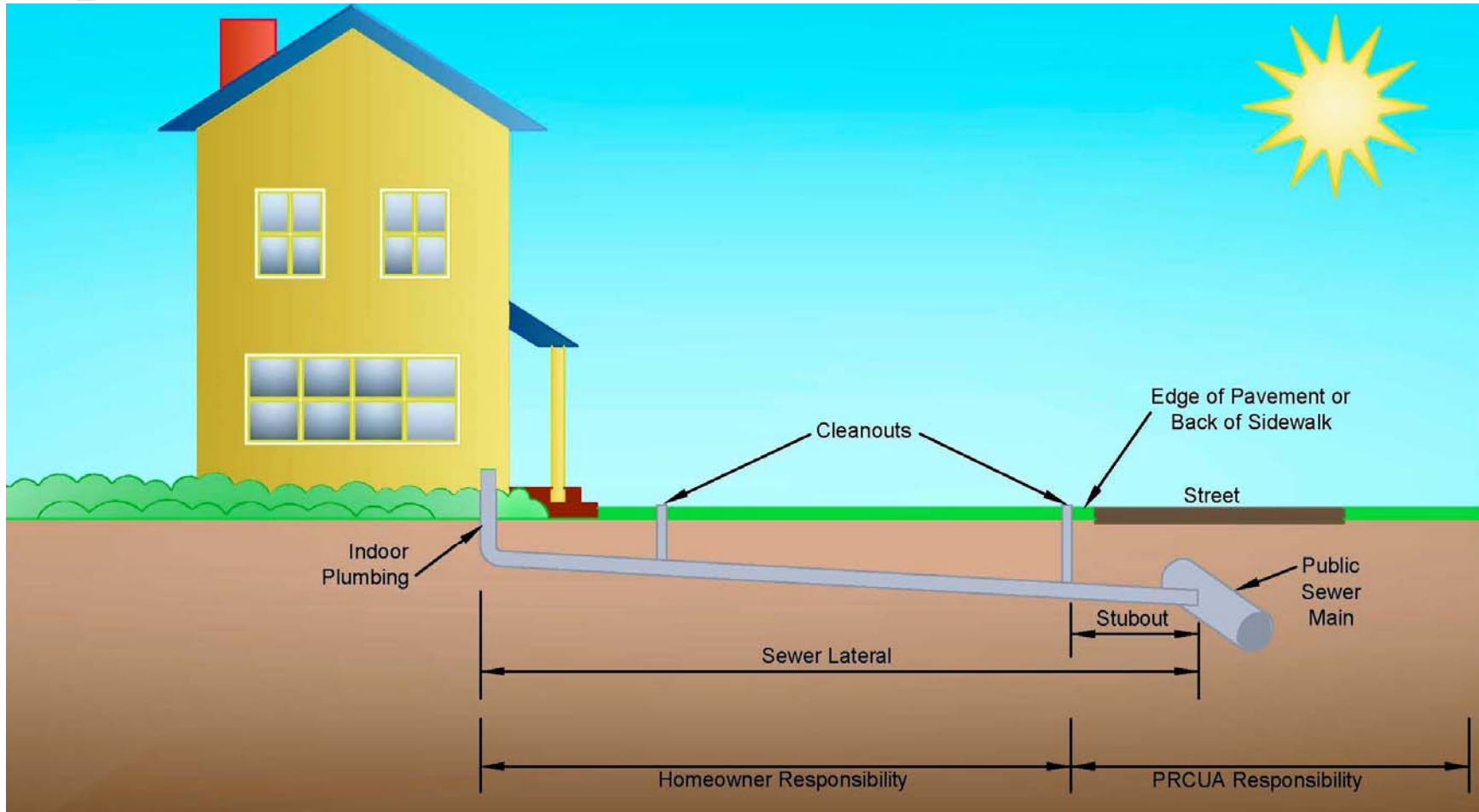


# Laterals

- Small diameters (100mm-150mm)
- Diameter changes
- Multiple bends
- Flat and shallow pipes
- Local construction with little inspection
- Limited access
- Defective connections to the mainline
- Misaligned and/or open joints
- Bells at pipe joints are cracked
- Constructed near trees so root issues
- Previous repairs tend to be poor quality
- Vary in length from 2/3m to up to 20m. Average around 11m



# Laterals





# Laterals and infiltration

- Studies in the USA and UK have shown that up to 50% of a networks infiltration is attributed to the laterals.





# Lateral Rehabilitation





# Lateral Rehabilitation

- Development of CIPP Liners
- Development of CIPP resins
- Development of Lateral curing systems
- Development of small robotic cutters



# Specialist liners







# Bends and transitions





# Resin developments for CIPP

- Previous experiences and testing showed shrinkage issues with CIPP resins.
- Development of new epoxy.
  - Minimal Shrinkage
  - Styrene free
  - Pot life from 15 mins to 6 hours
  - Cure time 30 mins with Steam,
  - High long term e modulus (1200 mpa)
  - Viscosity allow easy impregnation





# Fiberglass Liner





## Glass liner Features

### • Glass Liner

- \* 100% E GLASS LINER
- \* 30% less resin required
- \* Negotiates 90 deg bends
- \* Fully structural/high strengths
- \* Steam or hot water cure
- \* Radial expansion allows pipe dn changes to be lined. Ie 100-150mm.
- \* Available up to dn 300mm
- \* Undergoing European approvals.





# Curing systems







# Portable and compact





# Lateral connections

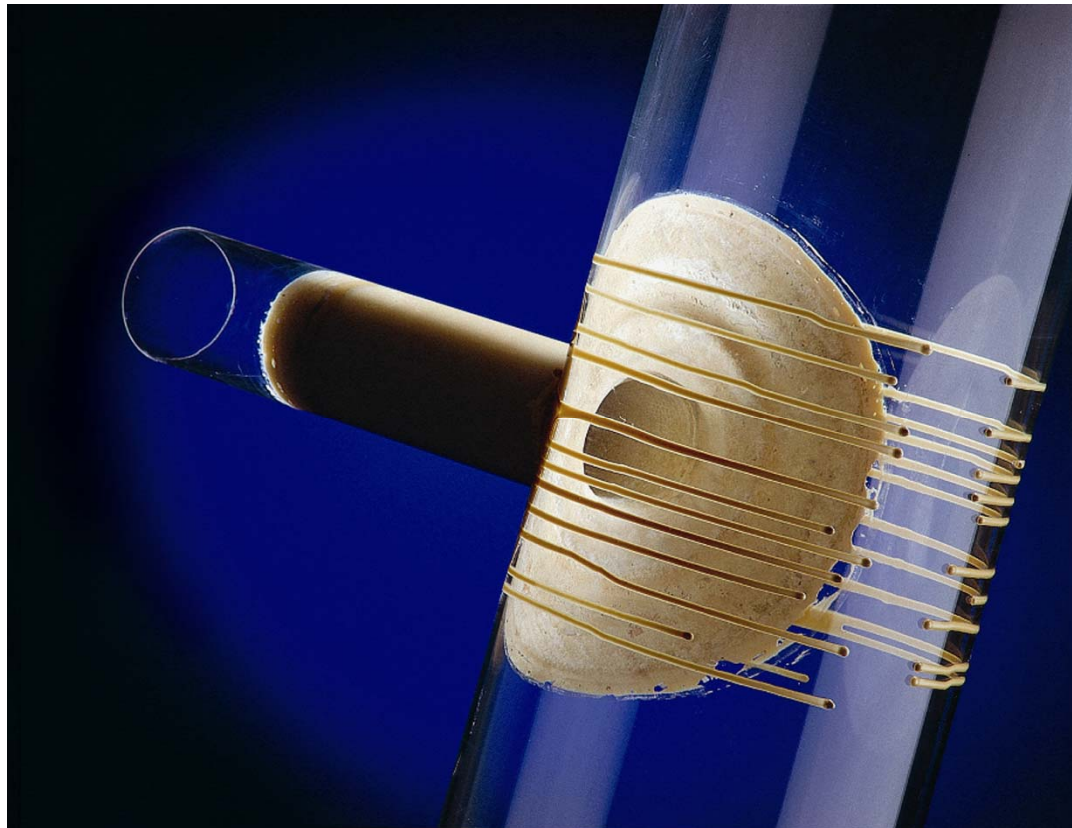
- The lateral can be a major source of infiltration into the system.
- It is often the connection that is badly formed and not only the lateral leaks but the connection itself.
- The connection point is a major stress area in the network.
- Very little sealing.
- Even when the main pipe is lined and the service connections reopened the liner annulus can cause infiltration tracking at the lateral





# Lateral connections

- The connection between the mainpipe and the lateral.





# Cured In Place hat profiles





# Cured in Place Hat/Wraps

- Non woven felt/fibreglass hat impregnated with a silicate resin.
- Inverted or placed into the lateral.
- Has a full wrap or standard brim
- Gives a tight bond to host pipe and lateral.
- Fibreglass in non woven (85%) gives high hoop strength
- Extends past first joint into lateral
- Can be used in main pipes from lined 50mm.
- Wrc developed hydro static test to establish long term sealing capability

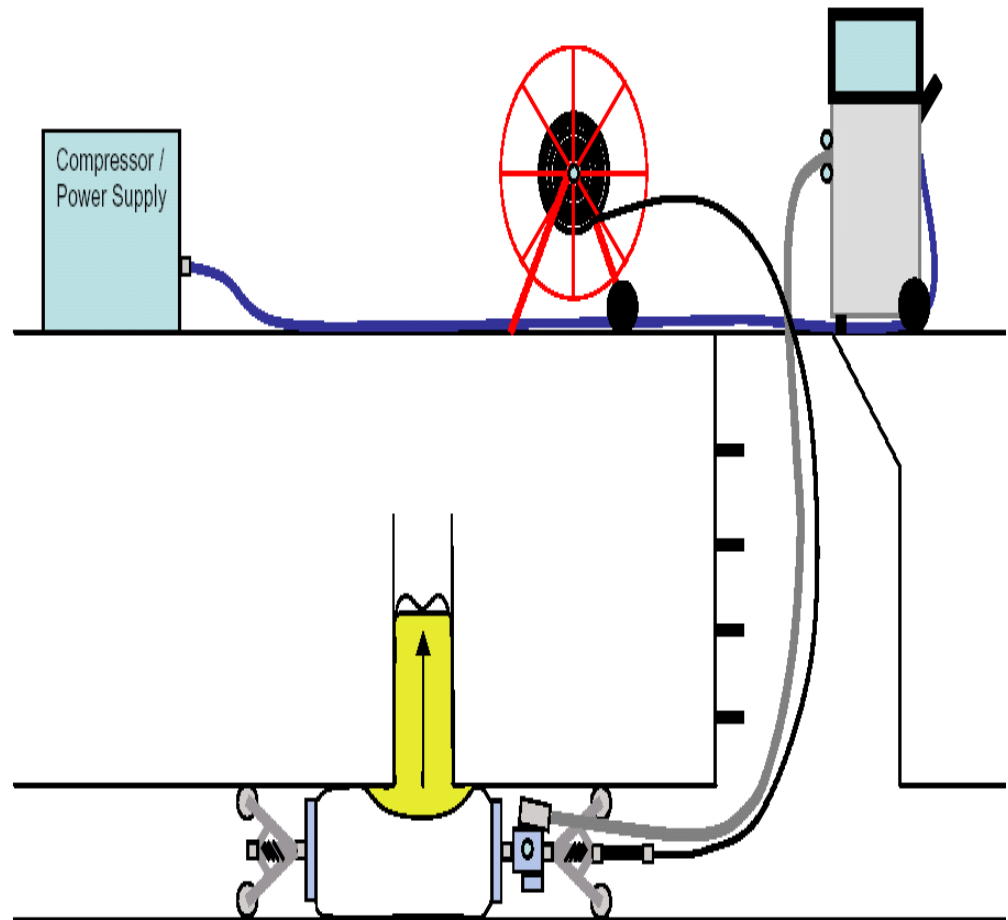


# T connection developments

- In any building there will be T and Y connections.
- These once opened need to be sealed.
- T and Y connections can be 50mm/50mm, to 200/100mm
- To seal they require a form of hat profile.
- Difficult access and pipes could have bends



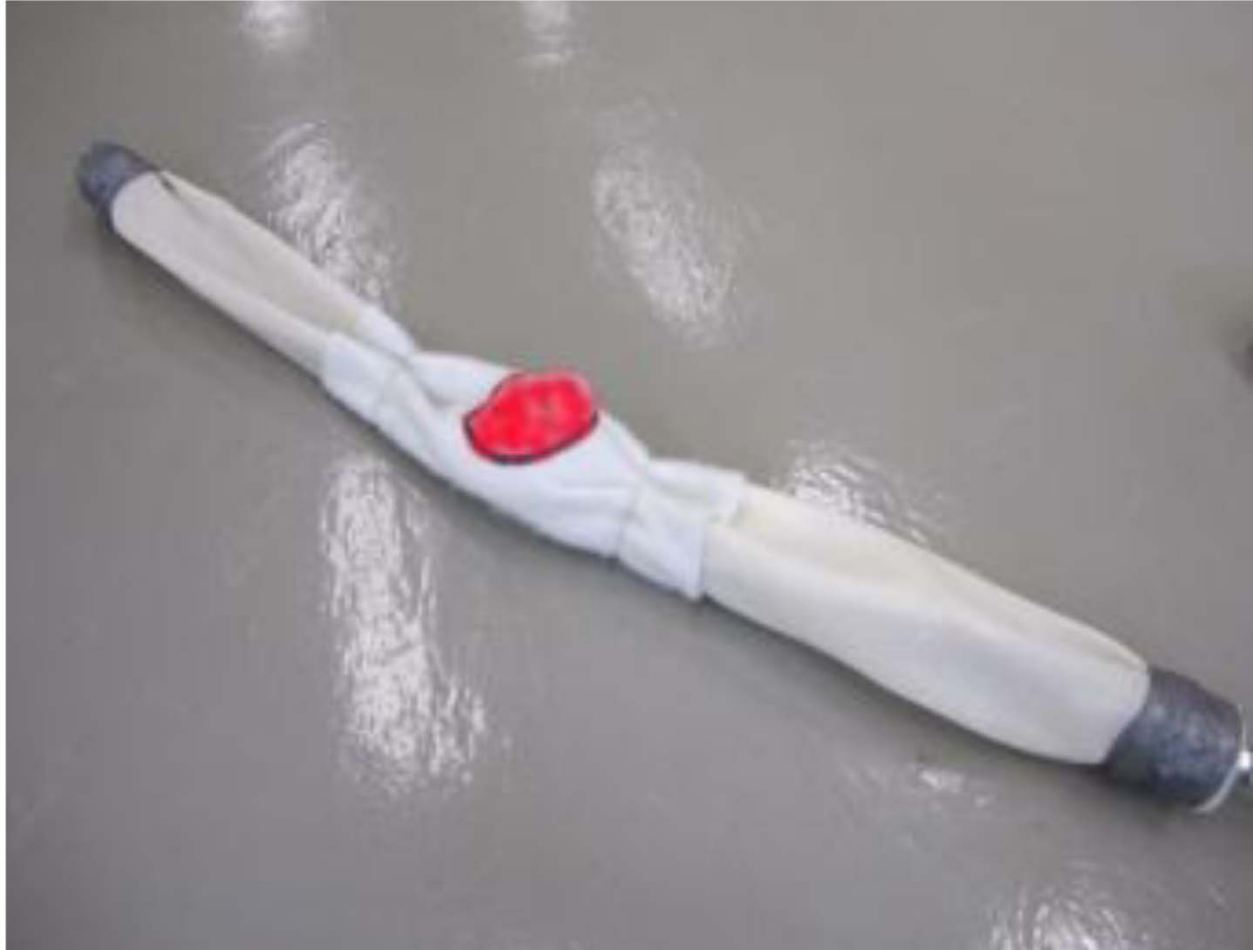
# Mainline sealing





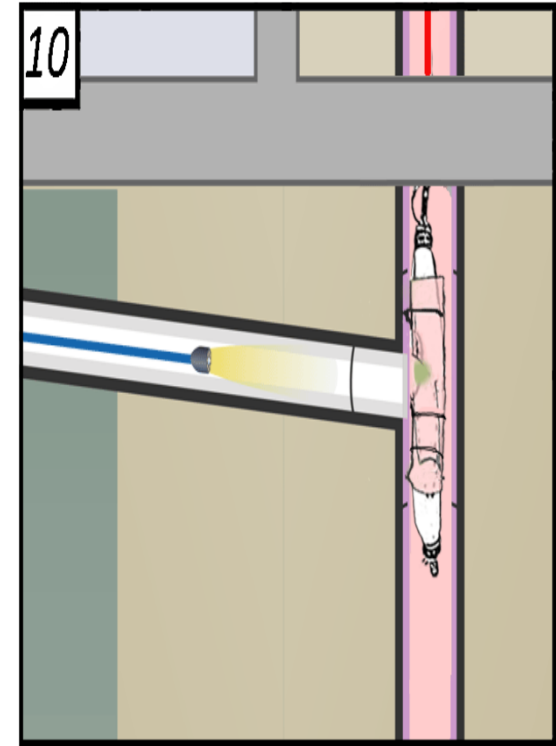


# Insertion from Lateral or main pipe





# Insert from lateral or main





# Testing

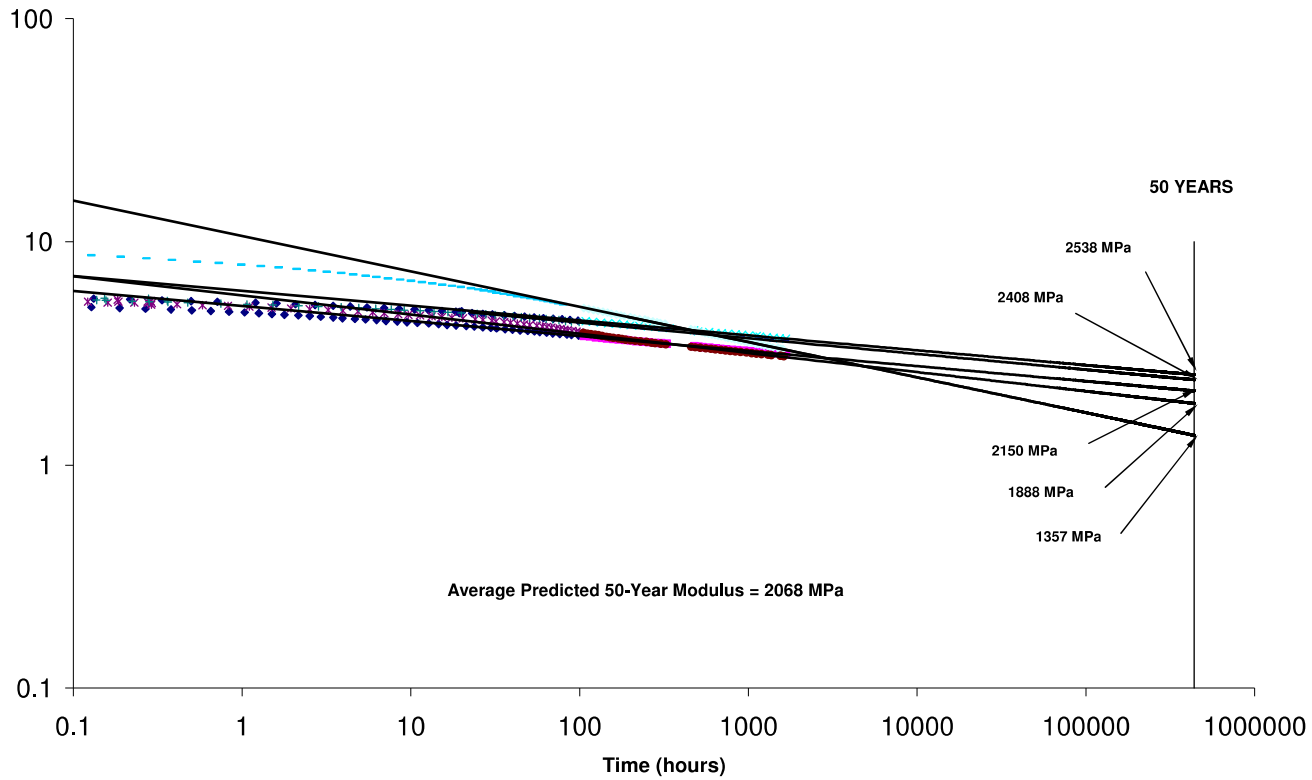
- WIS 4-34-04 for the UK
- ASTM F1216 for the USA
- DIN ISO/EN 11296 for Germany



# Design

Testing of a Fluvius Cured in Place Sewer Repair Material **EXOVA**

Wet-Creep Testing of Fluvius 300mm Diameter Patch Repair  
Fluvius Type S Resin, Fluvius Waterglass, Single Layer of 1050g/m<sup>2</sup> Glass Matting  
Results From Data Points Up To 1000 Hours





# Summary

- World wide Trenchless technology in pipeline networks is growing 20-30% per year.
- Thousands of km of CIPP liners installed from dn 50mm to 2m.
- Massive growth in lateral rehabilitation
- Growth is lateral connection sealing
- Development by suppliers working with installers
- Cost savings, up to 50% on conventional digging.
- Repair, infiltration control, reactive and planned.



Gracias

