

AOL İstanbul, Expert in Trenchless Technologies Fold & Form Method using Modified PVC Pipe



Pipe Relining Rehabs Ancient Pipe lines
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1- SCOPE

- **REHABILITATION OF SEWER PIPELINES VIA
TRENCHLESS TECHNOLOGY BY;
FOLD & FORM METHOD USING MODIFIED PVC PIPE**

2- REFERENCES

- **ASTM STANDARTS**

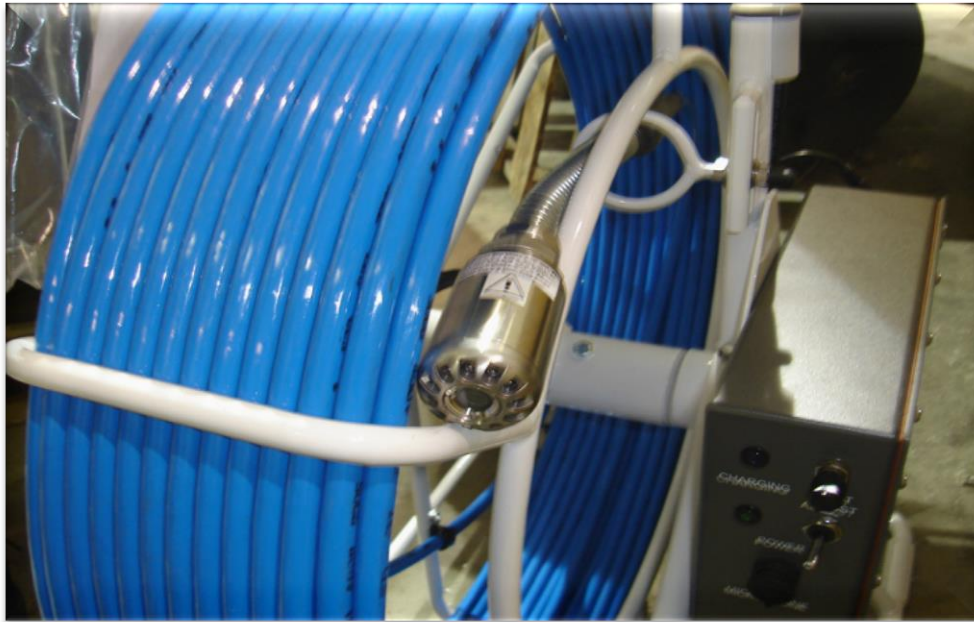
3- 1 Equipment

- Before starting rehabilitation, pipelines are jetted & vacuumed for cleaning via Combination Cleaning Truck
- Pressurized water pump is used in this process
- After this process pipelines are ready for video inspection and rehabilitation

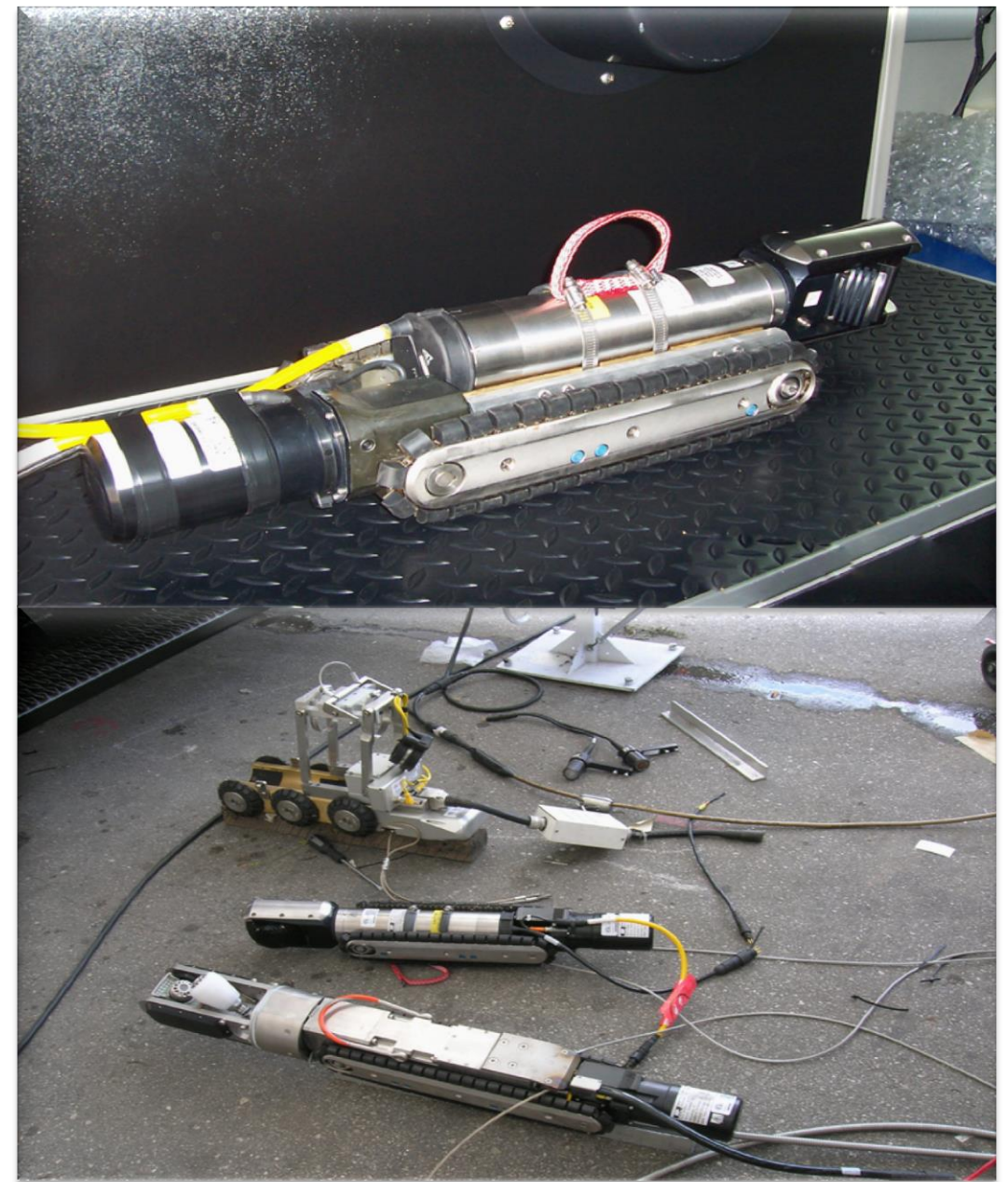


**Picture 1: Combined Sewer Cleaning Vehicle
(Vacuum & Water Jet)**

- Before starting rehabilitation, each and every section of host pipeline is video inspected (CCTV) by using special cameras
- For every different pipe diameter there are various different cameras to be used for inspection



Picture 2: Push Camera (50mm – 200mm diameter)



Picture 3: Robot Cameras (200mm – 600mm diameter)



- The video inspection controlled from a fully equipped special Video Inspection Truck



Picture 4: Video Inspection Truck

- Special cameras goes into the pipeline and video inspects the damages through the next manhole
- There are two types of cctv inspections;
a pre rehab
a post rehab
video inspections.



Picture 5: Before rehabilitation



Picture 6: After rehabilitation

- A Boiler Truck provides water steam for heating the Modified PVC Pipe
- This truck is consist of a diesel generator, air compressor, water treatment unit, water pumps, water tank, and a steam boiler
- After the steam is ready, using special steam hoses it is pumped into the steam truck to heat the Modified PVC Pipe on the reel.



Picture 10: Boiler Trucks

3-2 Material

- Modified PVC is a term used to describe uniquely enhanced PVC material
- It has sufficient material stiffness to provide full structural integrity
- It will conform to size transitions, tight bends, offset joint and other irregularities

Pipe	Length (meter)	Thickness (Before Application) mm	Thickness (After Application) mm	Diameter (mm)
Modified PVC	N/A	7-8	6-7	300

Chart 1: Properties of Modified PVC Pipe

- Modified PVC pipe spooled on the reels at the final stage of the production and after Quality Control tests, ships as it is, ready to use
- Length of the Modified PVC pipe on a reel depends on the diameter of the pipe
- (300 mm) 12” pipe reel has around 150 ~ 160 meters of Modified PVC pipe on it



Picture 7: Modified PVC pipes spooled on the reels



Picture 8: Modified PVC Pipe Reel in a Steam Truck

4- Preparation

- The reel of Modified PVC is heated with 120 °C water steam
- This process takes around 45 ~ 60 minutes depending on pipe thickness and diameter
- After this process Modified PVC becomes elastic and soft
- Modified PVC is now softened and ready to be pulled inside host pipeline



Picture 9: Modified PVC Pipe Reel Heating Process

- After heating process finishes the Modified PVC pipe becomes elastic and soft
- It is ready to be pulled from station A (access point) to station B, within the host/existing pipe



Picture 11: Softened Modified PVC pipe

Station B

Pipe is pulled



Elastic and soft Modified PVC pipe is pulled from one manhole to next one with a winch

Station A

Pipe is inserted

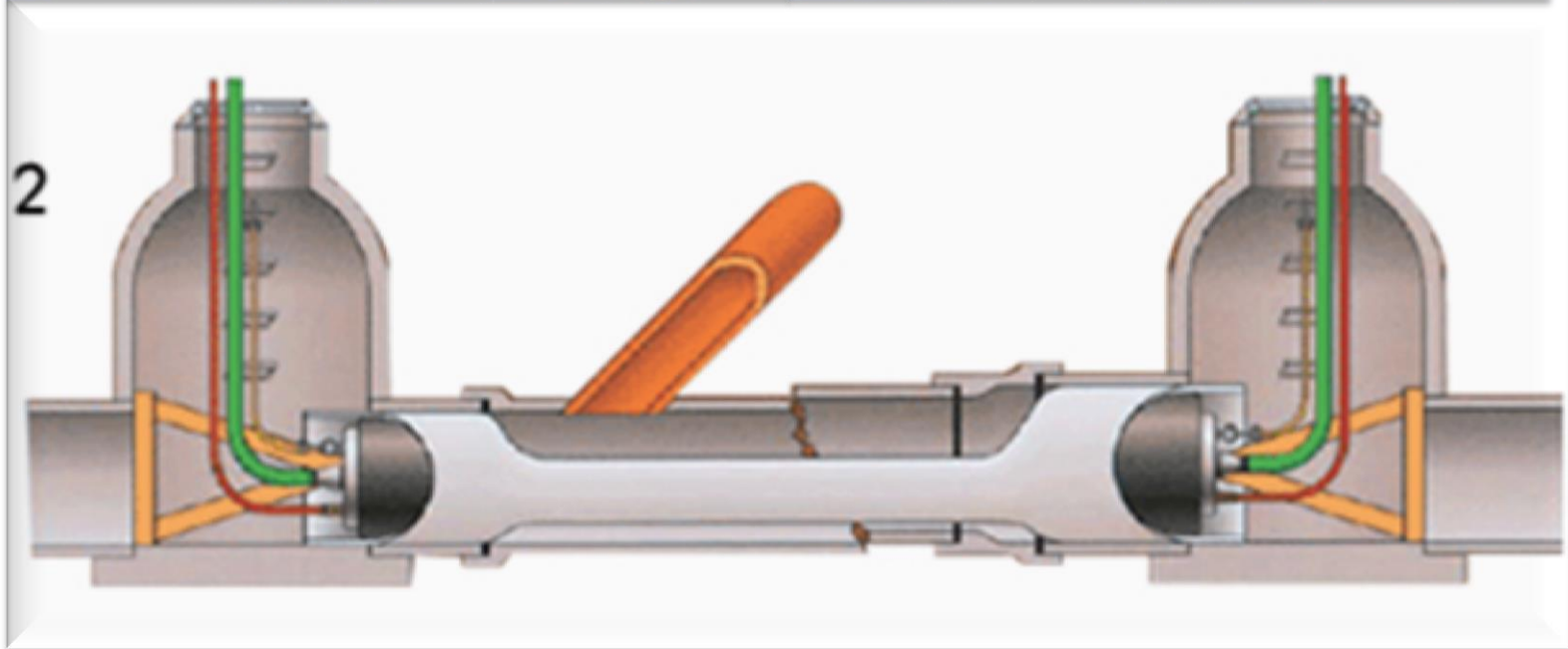


Picture 12: Modified PVC pipe pulling process into host pipeline

- Both ends of the Modified PVC are plugged with special flow thru steam plug then one more time the pipe is heated with steam for relaxation process



- Modified PVC pipe is ready to be heated up with steam and pressure



Picture 13: Plugging process

- B Station operator applies a back pressure, with increments, in order to expand the Modified PVC Pipe back to its original size
- After reaching to appropriate pressure and temperature, when them “Perfect Fit” occurs Modified PVC is cooled down using cold air
- This process takes around 30 ~ 60 minutes depending on pipe diameter and length of the pipe pulled in the host pipe



Picture 14: Modified PVC Installation process

- Cooled Modified PVC pipe ensures Perfect Fit to the host (existing) pipeline
- A stand alone unique Modified PVC Pipe is produced as one piece/jointless and it has superior material characteristics than the host pipe itself



Picture 15: Rehabilitated pipelines

- Special plugs are deplugged and both ends of Modified PVC Pipe are trimmed
- The stand alone jointless pipe is ready for use
- Existing flow is ensured in Modified PVC pipeline

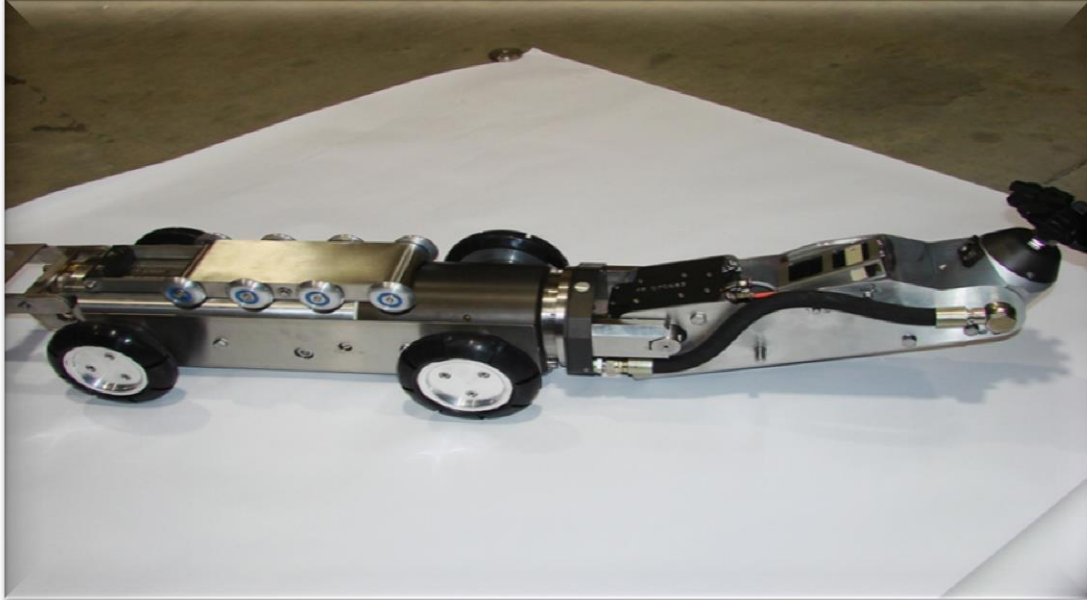


Picture 16: In service Modified PVC Pipe

- Modified PVC forms a permanent, tight fit / perfect fit = new pipe



Picture 17: Inside and outside view of the new pipe



Picture 18: Cutter-robots

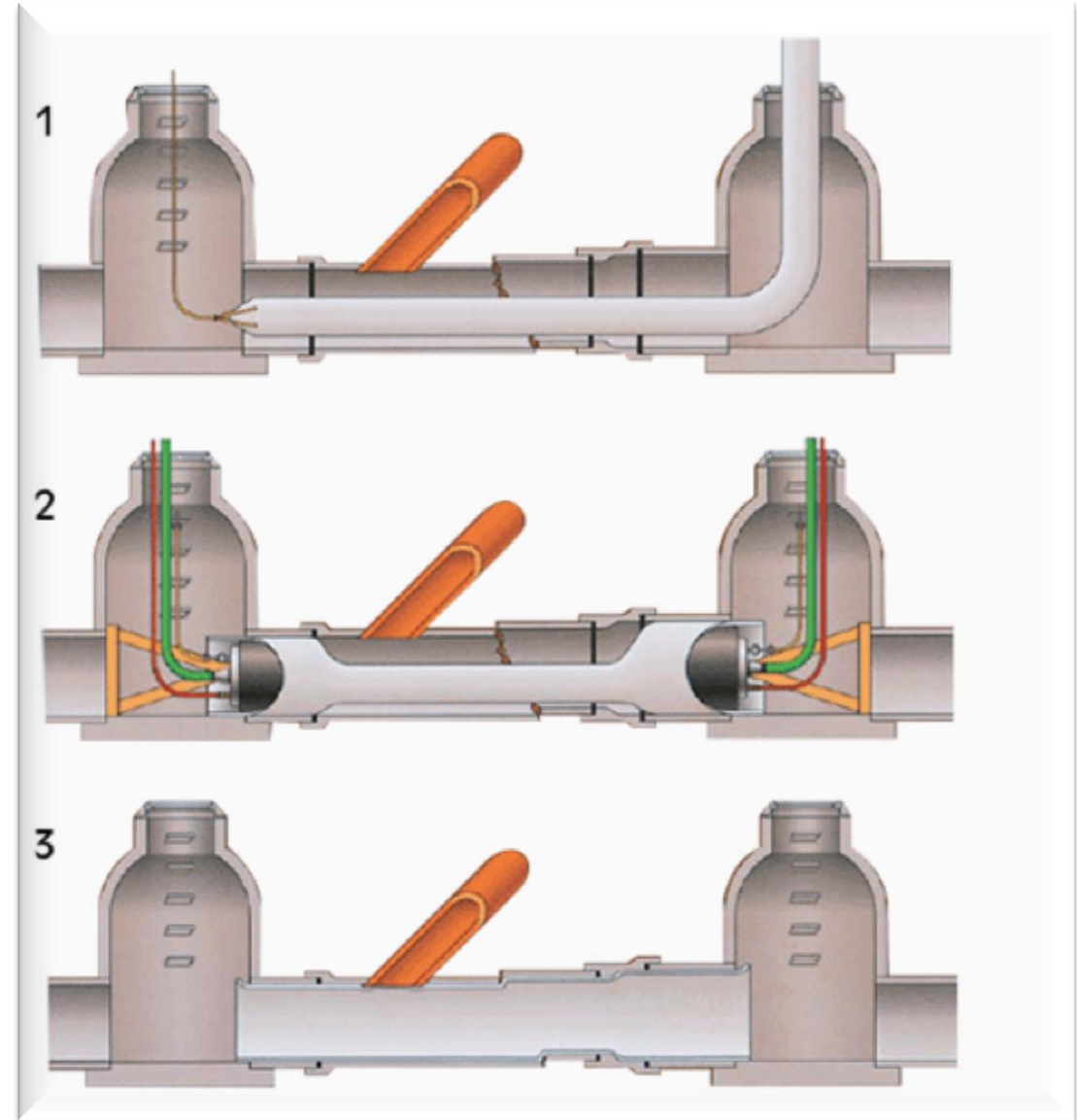
- If there are any, the Laterals/ existing House connections to the main line are reinstated using cutter-robot.



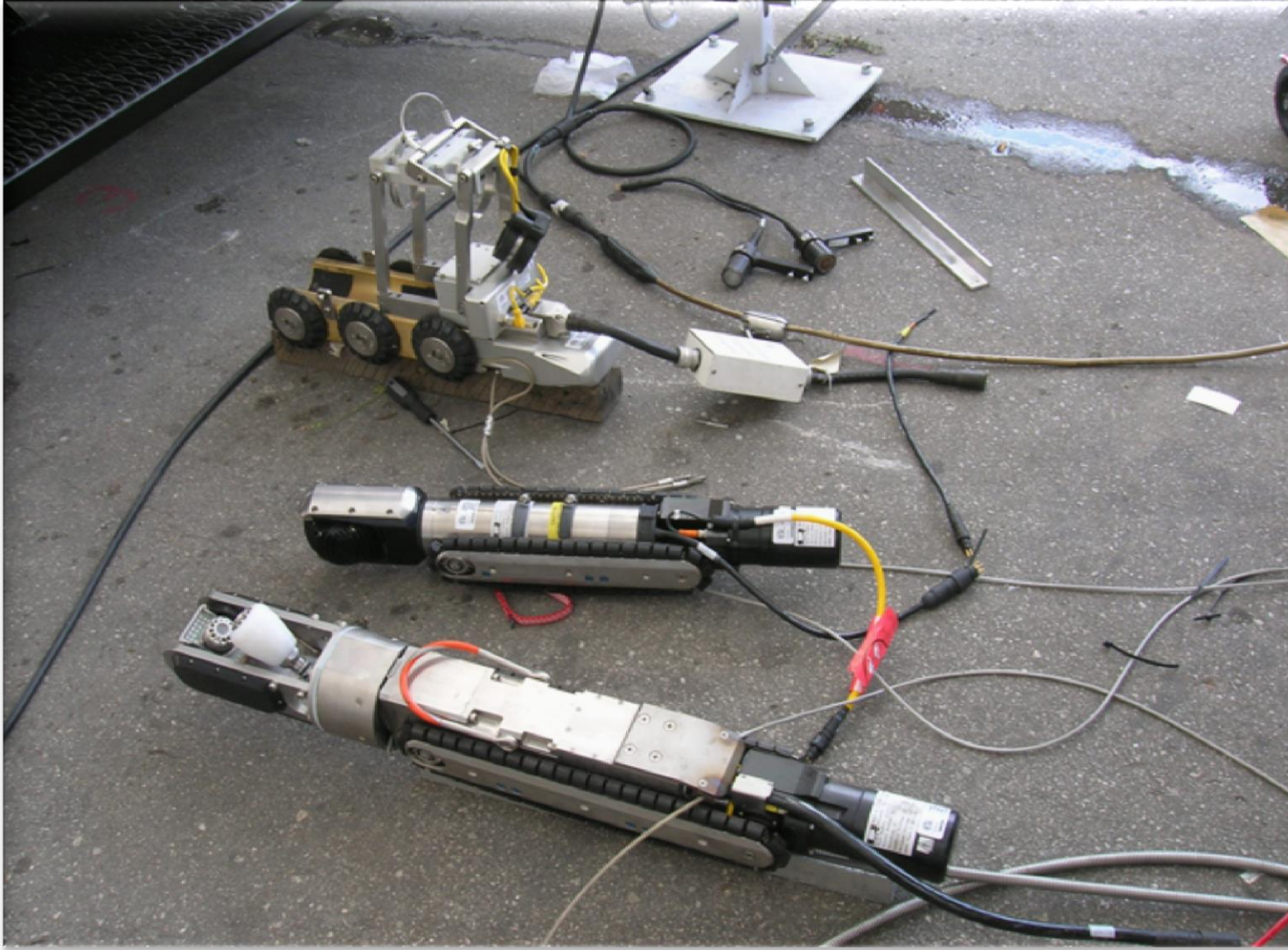
Picture 19: Cutter-robot opening up a house connection/lateral

Summary of Installation

- Modified PVC pipe is heated and pulled into a prepared (previously cleaned & video inspected) host pipe.
- Modified PVC pipe is plugged and expanded with water steam and air pressure and then cooled down
- The Modified PVC pipe forms a permanent, tight-fitting new pipe within the existing pipe



Picture 20: Modified PVC Pipe Installation
summary



Pipelines will be video inspected once again after rehabilitation with Modified PVC Pipe (post rehab)

- Modified PVC pipe will make a perfect fit to every corner/joint of the host pipe as shown in the picture



Inside view of the new pipe

Perfect Fit



The new pipe

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**“Expert on Trenchless Pipe Rehabilitation
Applications”**