



The static pipe bursting method with GRUNDOBURST

Technology and new developments





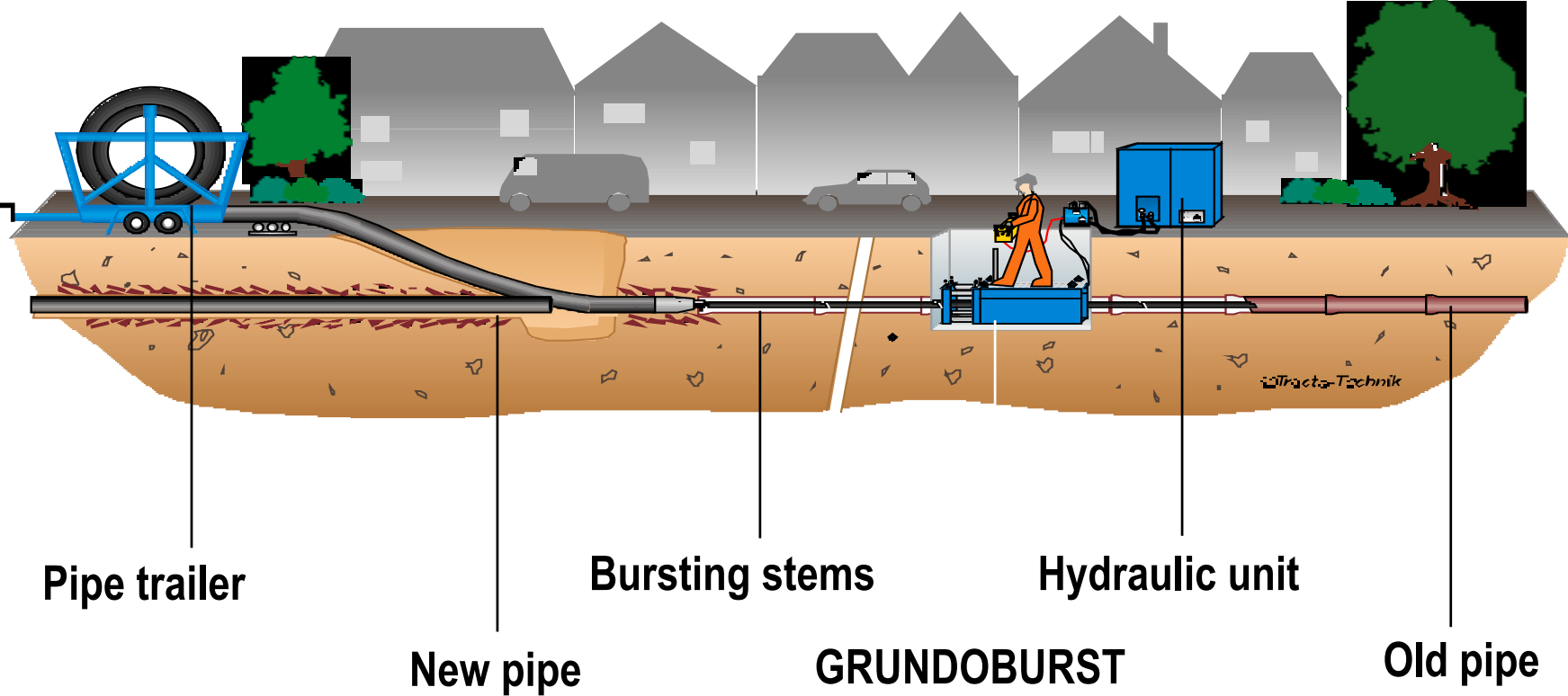
Pipe replacement techniques with GRUNDOBURST

- 1. Static long or short pipe bursting**
- 2. Pipe extraction technique**
for exchanging pipes
- 3. Tight-In-Pipe technique**
as economic alternative to hose relining techniques
- 3. Pipe splitting technique GRUNDOPULL**
for exchanging lead pipes





Static Pipe Bursting Principle sketch



Pipe trailer

New pipe

Bursting stems

GRUNDOBURST

Hydraulic unit

Old pipe





GRUNDOBURST Models

GRUNDOBURST 400 G3

➔ **275 kN thrust / 400 kN pullback
for pipes from ND 65 - ND 250**

GRUNDOBURST 400 S

➔ **270 kN thrust / 400 kN pullback
for pipes from ND 65 - ND 250**

GRUNDOBURST 800 G

➔ **380 kN thrust / 770 kN pullback
for pipes from ND 80 - ND 450**

GRUNDOBURST 1250 G

➔ **670 kN thrust / 1250 kN pullback
for pipes from ND 100 - ND 600**

GRUNDOBURST 2500 G

➔ **1760 kN thrust / 2550 kN pullback
for pipes from ND 300 - ND 1000**



GRUNDOBURST 400 G3

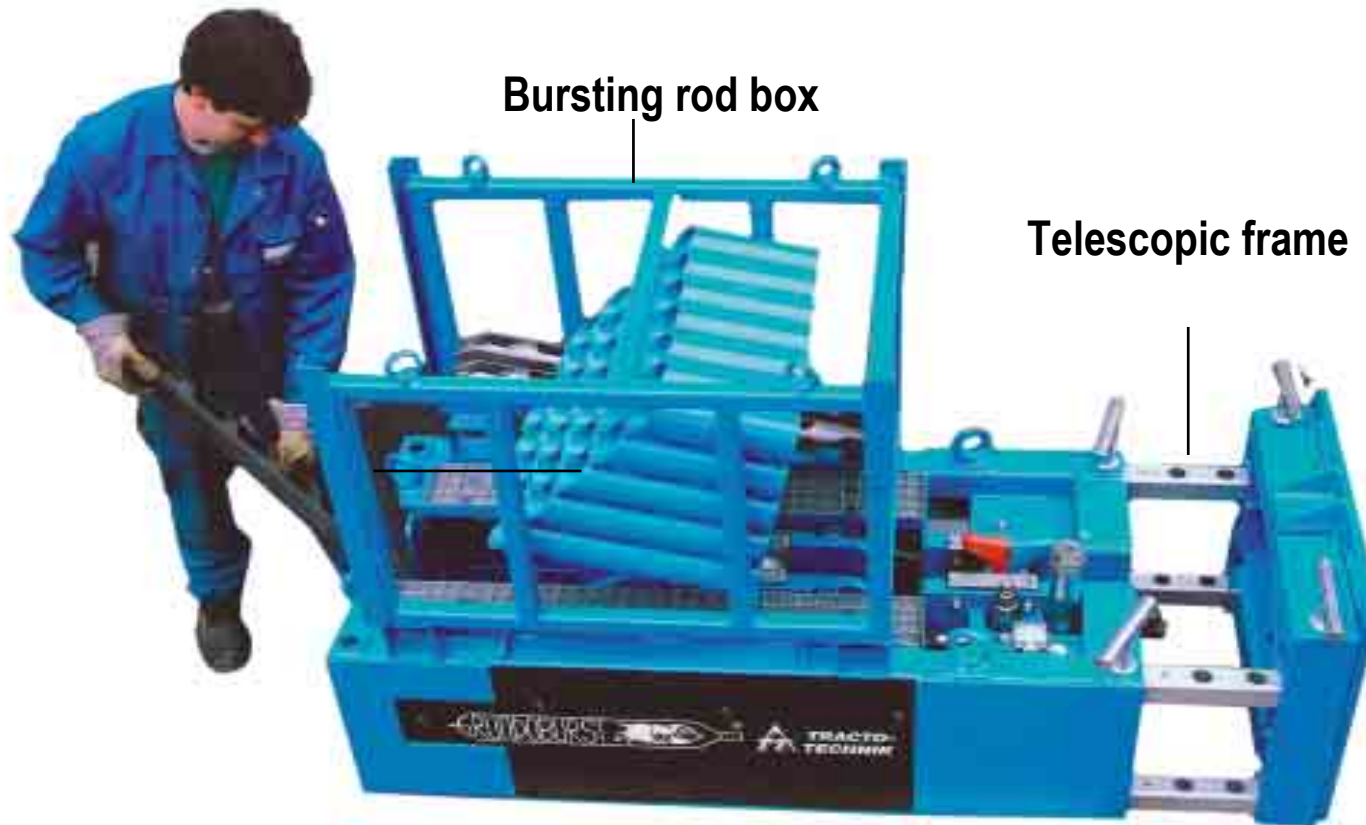


GRUNDOBURST 400 S





GRUNDOBURST 800 G



GRUNDOBURST rig





GRUNDOBURST 1250 G



GRUNDOBURST 2500 G





GRUNDOBURST

Application range

- ➔ **For the trenchless renewal of drinking water and gas pressure pipes from ND 65 to ND 1000**
- ➔ **In the field of open channelling, for the renewal of damaged sewer systems and for house connections**
- ➔ **Calibration of deformed pipe lines up to the gap profile (close fit pipe bursting as an economic alternative to liners)**
- ➔ **Application in deposit grounds for the renewal of damaged leakage water lines**
- ➔ **Multiple pipe pulling in old paths for additional leasing of empty pipes (city networks) possible, making the application even more economical!**





Workable Pipe Materials

- ➔ Steel (except for flange connections)
- ➔ Grey cast iron
- ➔ Ductile cast iron (ND 125 - DN 200)
- ➔ Concrete
- ➔ Asbestos cement
- ➔ PE / PVC
- ➔ Stoneware



Pipe renewal with the static pipe bursting technique

- ➔ Direct pulling in of SLM pipes with extruded-coating (gas / drinking water)
- ➔ Direct pulling in of PE-X pipes with simultaneous annulus-grouting (gas / drinking water)
- ➔ Pulling in of HDPE pipes with annulus-grouting
- ➔ Pulling in of steel pipes with ZM-coating for trenchless technologies (gas / drinking water)
- ➔ Pulling in of special protection pipes (PP or PVC) with subsequent relining of the product pipe (gas / drinking water)



Pipe renewal with the static pipe bursting technique

- ➔ Pulling in of ductile cast iron pipes (GGG) up to 150 m length (gas/drinking water)
- ➔ Pulling in of stoneware pipes as inliner in existing sewers



GRUNDOBURST Quick-Lock® Bursting Rods

The QuickLock® bursting rods (patented) are simply clicked together without time consuming screwing forming one rod string which is absolutely stable towards pulling and pushing.





QuickLock® bursting rods

- ➔ Simple and safe QuickLock® rod connection due to click shut connection
- ➔ High productivity due to continuous insertion and extractio of the QuickLock® rods without screwing
- ➔ The QuickLock® rod enable two-way bursting eliminating the need for connection and disconnection each time the rods pass laterally through the bursting rig.
- ➔ Perfect rod gripping with built-in brake finger, i. e. no slipping back of the rods in the old pipe



GRUNDOBURST Telescopic frame

The telescopic frame with pivotable locking bars for pulling in and taking out the expander.

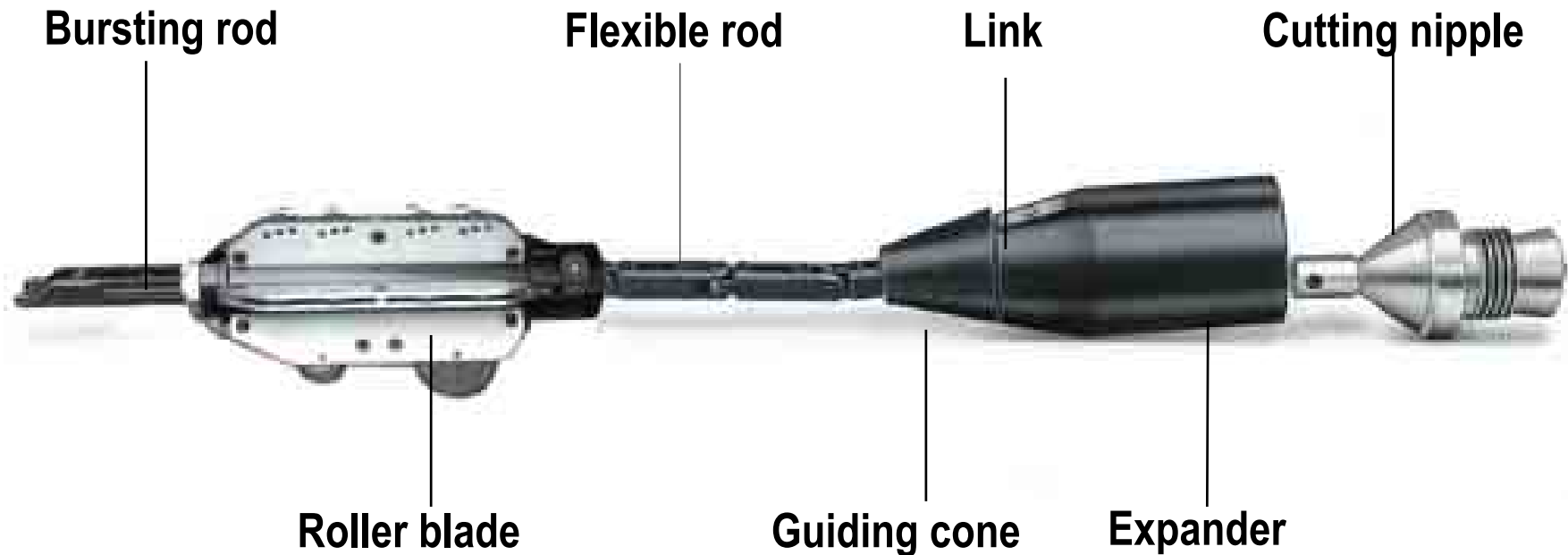




GRUNDOBURST

Roller blade

The roller blade cuts the old pipe, the expander bursts and displaces it, the cutting nipple firmly embeds the new long pipe modules.



GRUNDOBURST

Jobsite arrangement



Small pit, min. jobsite arrangement: > 200m daily performance possible



GRUNDOBURST Machine Pit

Machine pit: 3.00 x 1.00m

The bursting rig pushes the patented QuickLock[®] bursting rods into the existing old line from this spot..



GRUNDOBURST

Rods with expander in the old pipe



GRUNDOBURST

Pulling in of the new pipe and recovery of the expander



Application example Grundoburst 2500G

- Task:** Replacement of a drinking water main ND 800 Erneuerung over 130 m length with a coverage of only 1 m
- Old pipe:** Grey cast iron ND 800
- New pipe:** Steel ND 800 with inner and outer concrete casing
- Machine:** GRUNDOBURST 2500 G
- Time:** 3 working days for pushing the rods and pulling in the new pipe, incl. Welding works



Application example Grundoburst 2500G



**Grundoburst 2500 G
in the machine pit.**



Application example Grundoburst 2500G



Preparation for pulling in the new steel pipe ND 800



Application example Grundoburst 2500G



Bursting the old grey cast iron pipe ND 800



Application example Grundoburst 2500G



The expander with new pipe attached arrives in the target pit Ankunft.



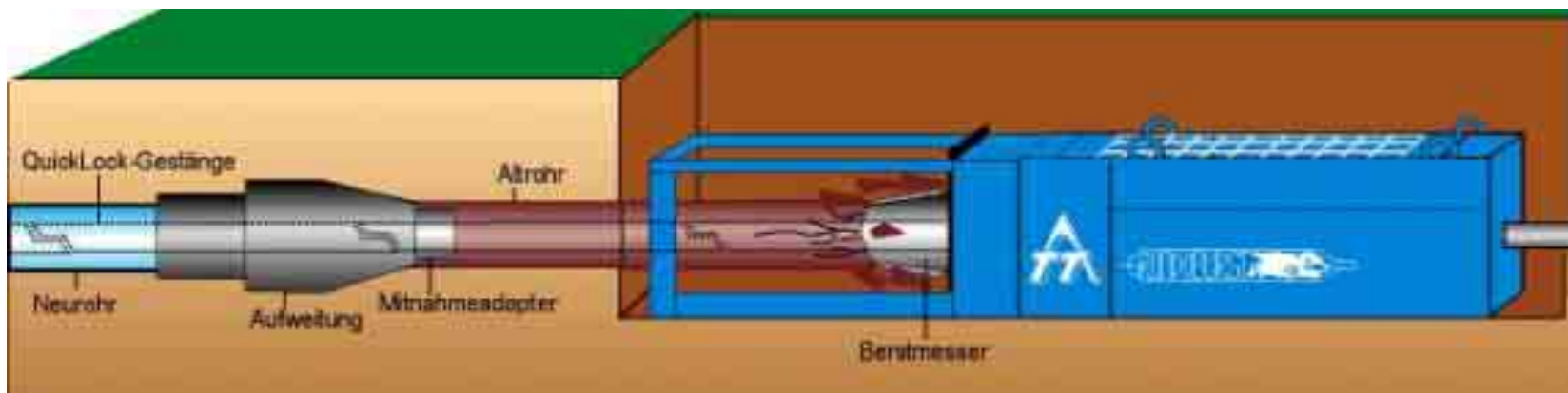
View into new new pipeline



2. Static pipe extraction technique

Damaged gas and water lines, which shall not remain in the ground, can be easily replaced by new pipes in the same bore path with the pipe extraction technique.

➔ This technique is suitable for pipes made out of grey cast iron, steel, ductile cast iron, plastic, asbestos and fibre cement up to ND 300



Static pipe extraction technique



Extraction and cutting of the old pipe

Grundoburst extracting the old pipe and pulling in the new pipe simultaneously.

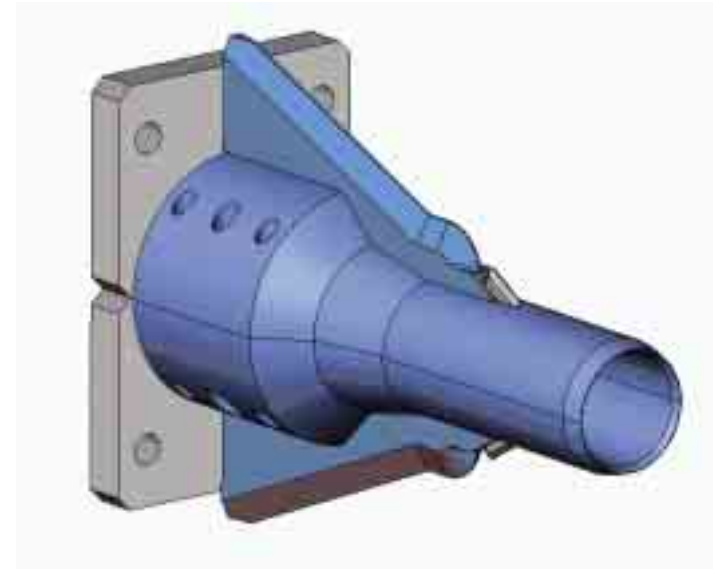


Tools for the static pipe extraction technique



Pushing head

For pushing out the old pipe



Bursting mandrel

which cuts the pushed out old pipe
in the interim pit.





Features of the static pipe extraction technique

- ➔ The possible replacement lengths are determined by the old pipe \emptyset , the nominal width of the new pipe, the soil quality and the capacity of the applied machine technique. Usually, interim pits for house connections are established along the complete pulling-in track in distances of 25 m to 30 m.
- ➔ **The old lines are not shattered underground, they are pulled out and destroyed with cutting heads, when they reach the engineering or interim pits (often house connection pits).**
- ➔ On arrival in the pulling-in pit, a pull-push adapter for the old pipe with an expanding cone for the new pipe is mounted, allowing the old pipe to be pulled out of the soil (= extraction) and the new pipe to be pulled in at the same time.
- ➔ The adapter system, connected to the QuickLock pulling rods, pushes the old pipe out while simultaneously pulling the new pipe into the vacant and, if required, expanded pipe canal.





Advantages of the static pipe extraction technique

- ➔ The Grundoburst rig can be used for the pipe bursting as well as the pipe extraction technique**
- ➔ no shock or vibration caused by the static mode of operation**
- ➔ 800 kN pulling force are available**
- ➔ The max. stroke length corresponds with the rod length of 1 m**
- ➔ As a further advantage, the rods are not screwed together in a time-consuming way, they are simply clicked together (patent), allowing an operation speed far above the average**
- ➔ Hard-to-cut pipe materials - like steel and ductile cast iron pipes - are not destroyed underground, they are cut open with special cutting blades on arrival in the machine pit. Once the pipe is cut open, it is completely removed from the pit.**





Application example static pipe extraction technique

Replacement of a drinking water main ND 100 cast iron with ND 100 ductile cast iron



Laid open
house
connections
with emergency
supply





Application example static pipe extraction technique

Replacement of a drinking water main ND 100 cast iron with ND 100 ductile cast iron



The adapter attached to the QuickLock bursting rod pushes the old pipe out of the bore path.





Application example static pipe extraction technique

Replacement of a drinking water main ND 100 cast iron with ND 100 ductile cast iron



The old pipe is shattered in the machine resp. interim pit and the pipe fragments are disposed.





Application example static pipe extraction technique

Replacement of a drinking water main ND 100 cast iron with ND 100 ductile cast iron



Pulling in the new cast iron pipe



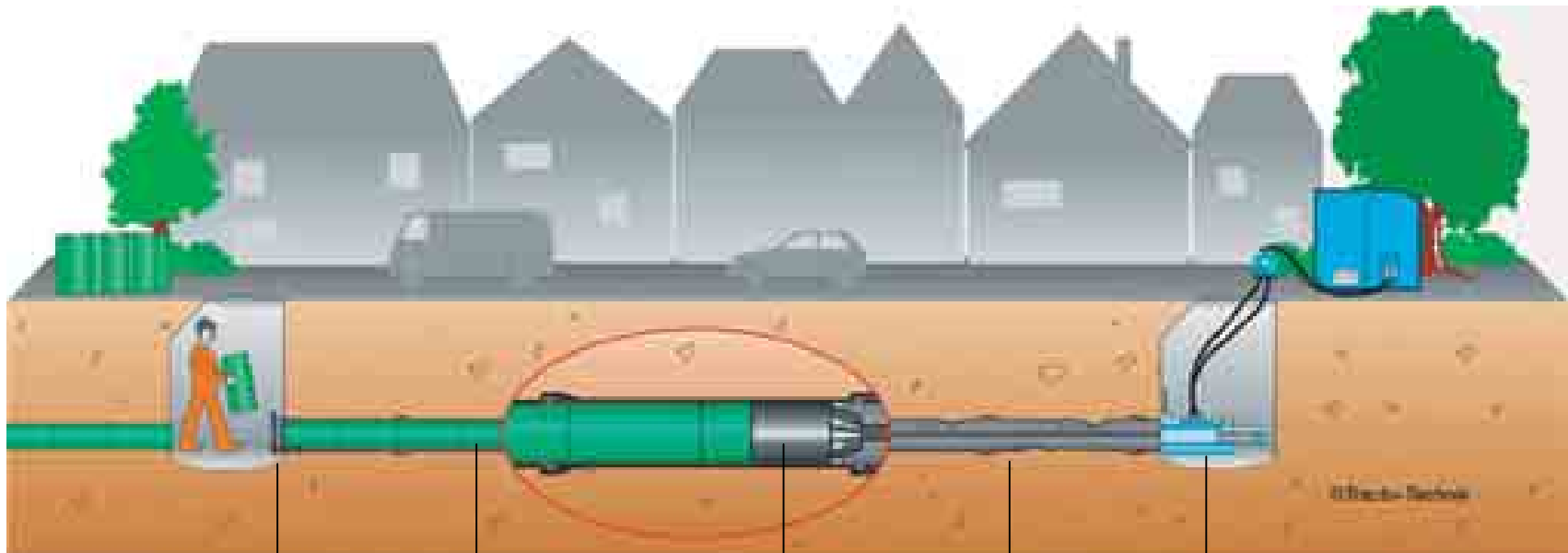
Application example static pipe extraction technique



Grundoburst pulling in the
new pipe.
Pulling force 800 kN



3. Tight-In-Pipe technique



Push adapter

New pipe

Guiding sleeve

Old pipe

Grundoburst 400S





Application range TIP technique

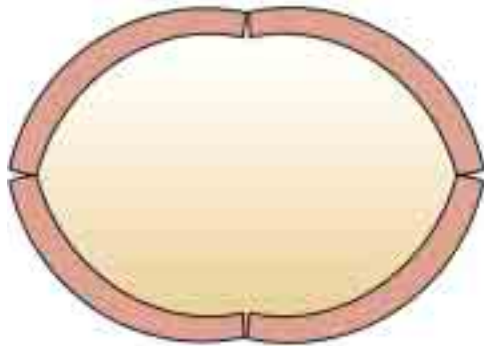
The TIP technique can be used with the following types of damage:

- ➔ Slight root infestation
- ➔ Slight to medium deformation
- ➔ Cracks
- ➔ Slight fragmentation
- ➔ Missing pipe pieces
- ➔ Inner corrosion

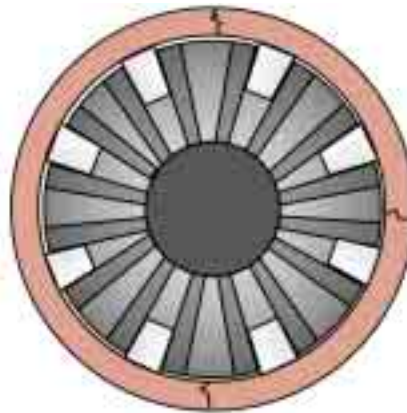




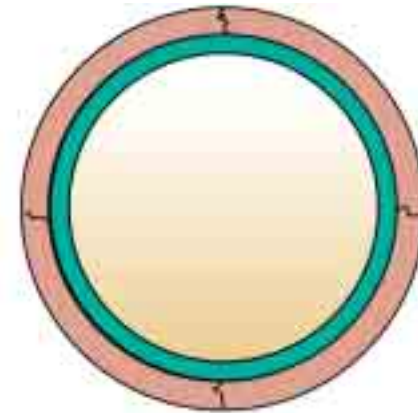
Functioning of the Tight-In-Pipe technique



1. Deformed old pipe



2. The guiding sleeve with new pipe attached is pushed through the old pipe.



3. The new pipe is installed tightly adjacent to the pipe wall, the cross section is reestablished.



Tight-In-Pipeshort pipe renewal



Deformed sewer with cracks before and directly after renewal according to the TIP technique.





Advantages of the Tight-In-Pipe technique

- ➔ small to medium sized deformations and offsettings can be evened out
- ➔ restoration of the circular profile
- ➔ trenchless connection of house connections
- ➔ minimal reduction of the cross-section
- ➔ no underground construction work
- ➔ if necessary several canal reaches per day can be renewed.
- ➔ solid girder, prepared ex factory with new limit of wear and long service life
- ➔ no annular filling required
- ➔ applicable for various types of damages, e.g. tears, leakages, root infestations, forming of fragments
- ➔ low jobsite set-up requirements: less personnel and space required
- ➔ comparatively low set-up times



Equipment for the Tight-In-Pipe technique



Guiding sleeve with gliding rollers (Patent pending)



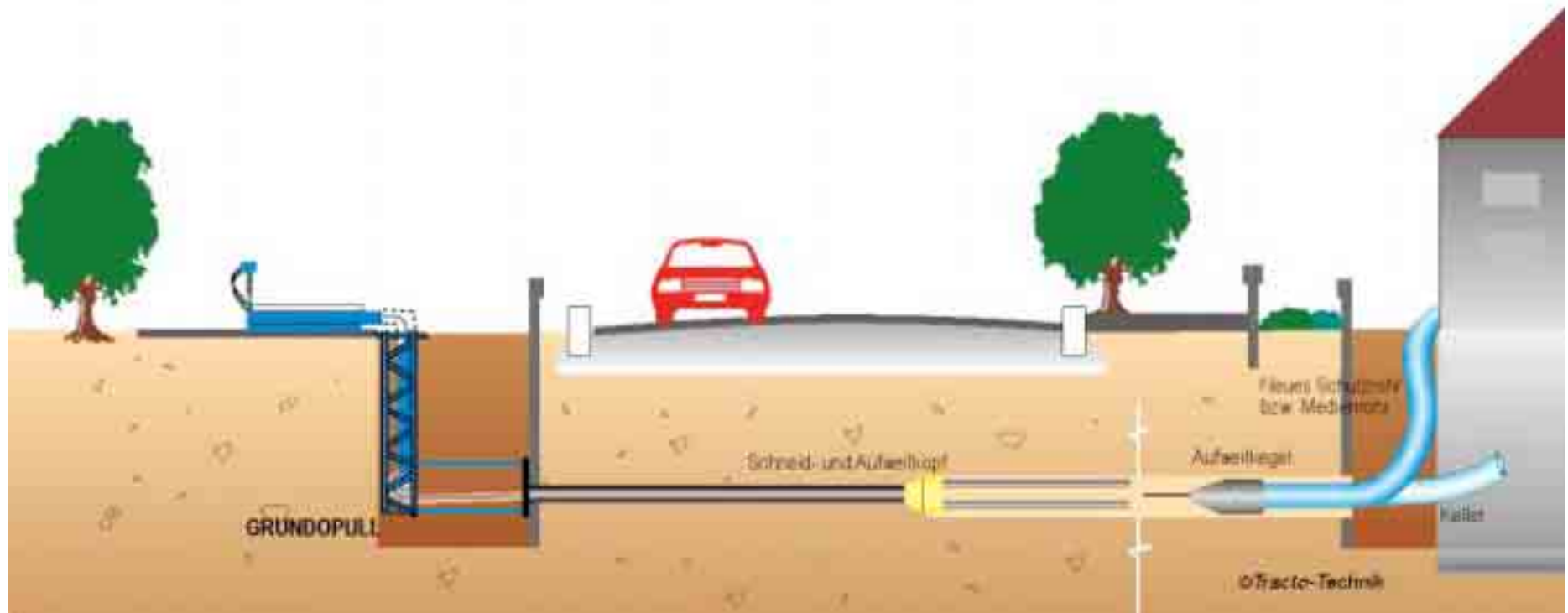
BURSTFIX Push adapter (Patent pending)



Tight-In-Pipe technique - Jobsite arrangement -



4. Pipe splitting technique with GRUNDOPULL





Features of the pipe splitting technique with GRUNDOPULL

- ➔ GRUNDOPULL is a hydraulically driven doubleside-effect cable pulling device to exchange of lead pipes for HD-PE pipes without trench
- ➔ By means of cutting head and expander the lead pipe is cut into halves and simultaneously loosened from the surrounding soil.
- ➔ Max. lead pipe Ø: ND 20 – ND 50 (depending on soil)
Max. new pipe Ø: OD 63 (depending on soil)
- ➔ Einzug des neuen Kunststoffrohres vom Rohrbund als Produkt- oder Schutzrohr
- ➔ 3 tons of pulling force (30 kN)
- ➔ Pulling speed approx.. 5 m/min.
- ➔ One-man operation



Pipe splitting technique with GRUNDOPULL



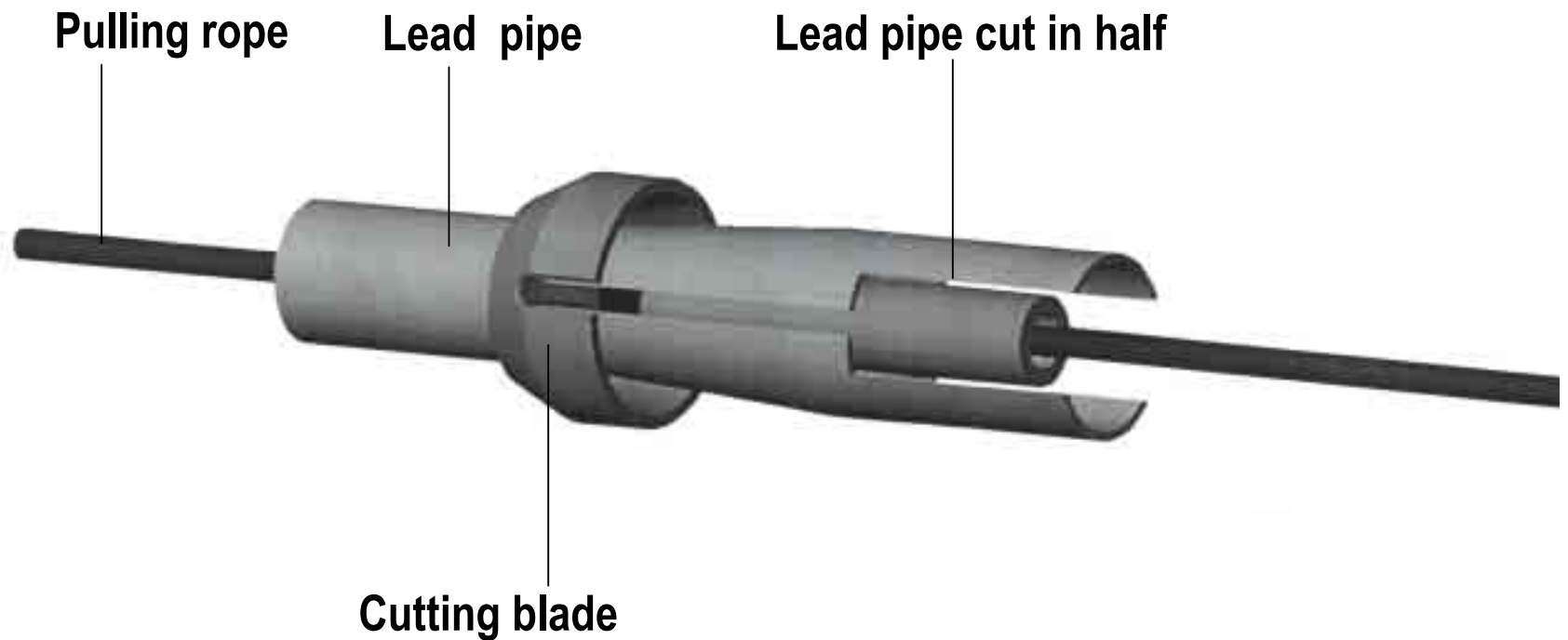
Above: The rig boom installed into the pit, Grundopull stand outside the pit.

Left: Grundopull cutting a lead pie





GRUNDOPULL Cutting technique





Advantages of the pipe splitting technique with GRUNDOPULL

- ➔ Easy exchange of noxious lead pipes
- ➔ Recovery of the valuable substance lead
- ➔ Cutting head for lead and PE pipes
- ➔ Maintenance of existing buildings
- ➔ Avoidance of traffic disruptions, waste gas, traffic noise
- ➔ Reduction of road break-ups
- ➔ Cost reduction of up to 50% compared to open trenching





ENDE

Vielen Dank für Ihr Interesse!

