

# PIPE SEGMENT

# TECHNOLOGY

The structural support segment relining technology for circular and box shaped pipes and tunnels from 1000 – 6000 mm diameter

Presentation by  
GiS® industry & project consulting  
2018

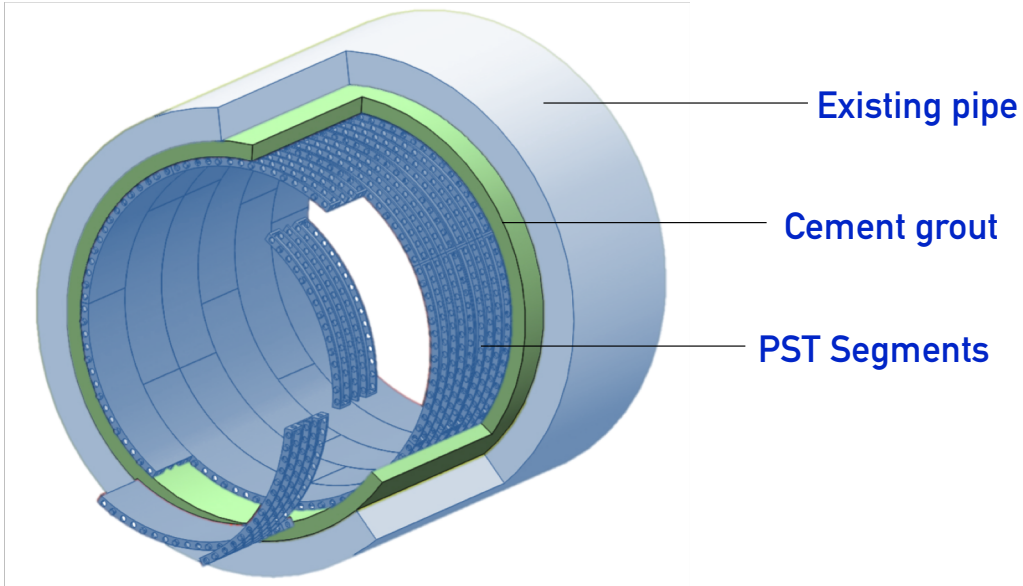


# AT A GLANCE

- ◌ The product
- ◌ The installation
- ◌ The costs and benefits

## The product

PST is a fast and simple relining technology, flexible, low-cost solution with no need for specific installation tools and equipment



PST is a semi or fully structural PP segment formwork with a steel reinforcement for circular and non-circular (box culvert, egg shape etc.) pipes and tunnels for diameter from 1000 to 6000\* mm

*\*for sizes > 2800 mm only on individual request*

 No special equipment and tools

 No pipe joints

 High space efficiency on site

 Installation under flow

 Cost efficient

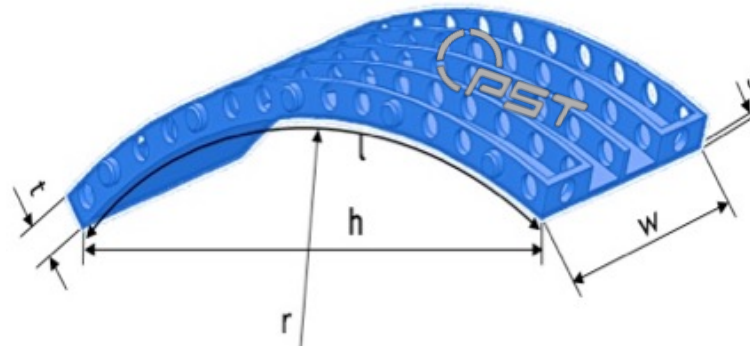
## The product

**PST is a semi or fully structural PP segment formwork with steel reinforcement for circular and non-circular pipes and tunnels for diameter from 1000 to 6000 mm**

Profile Type	Segments	DN	h	w	l	r	$\alpha$	s	t	Inner	Segments
	per DN		[mm]	[mm]	[mm]	[mm]	[deg]	[mm]	[mm]	DN	per meter
CX10-18	5	1000	520	205	545	434	72	4.5	25	868	25
	6	1100-1200	533	205	545	521	60	4.5	25	1041	30
	7	1300-1400	541	205	545	607	51	4.5	25	1215	35
	8	1500-1600	547	205	545	694	45	4.5	25	1389	40
	9	1700-1800	552	205	545	781	40	4.5	25	1562	45
CX19-22	10	1800-1900	551	205	540	860	45	4.5	25	1720	50
	11	2000-2100	555	205	540	946	40	4.5	25	1892	55
	12	2200-2300	558	205	540	1032	36	4.5	25	2064	60
	13	2400-2500	561	205	540	1118	33	4.5	25	2236	65
	14	2500-2600	564	205	540	1204	30	4.5	25	2408	70
CX23-28	15	2700-2900	566	205	540	1290	28	4.5	25	2580	75
	16	2900-3000	569	205	540	1376	26	4.5	25	2752	80
	17	3100-3200	571	205	540	1462	24	4.5	25	2924	85

The standard profiles CX 10-18 / CX 19-22 / CX 23-28 are applicable up to DN 3200. Further DN on request.

Box culverts and egg shapes are combined circular segments with flat elements of 500mm in length.



Standard colours are blue and transparent



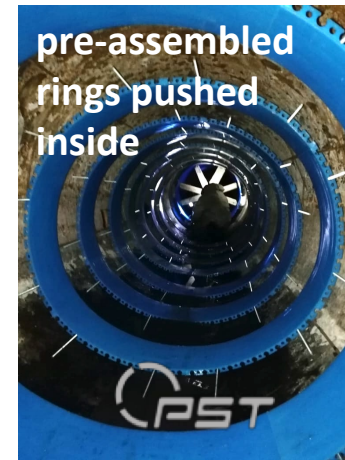
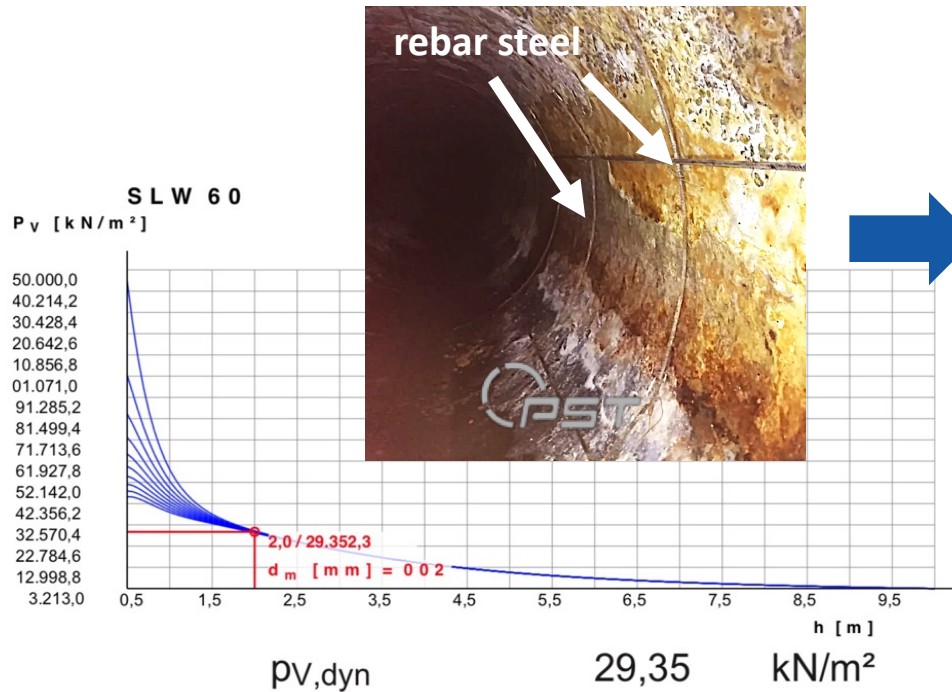


The product

## PST Static requirements

Static design as per ATV-DVWK-A 127 can be provided for all load cases

Steel reinforcement can be installed prior to PST segment installation for achieving class III requirement (fully deteriorated host pipe condition)

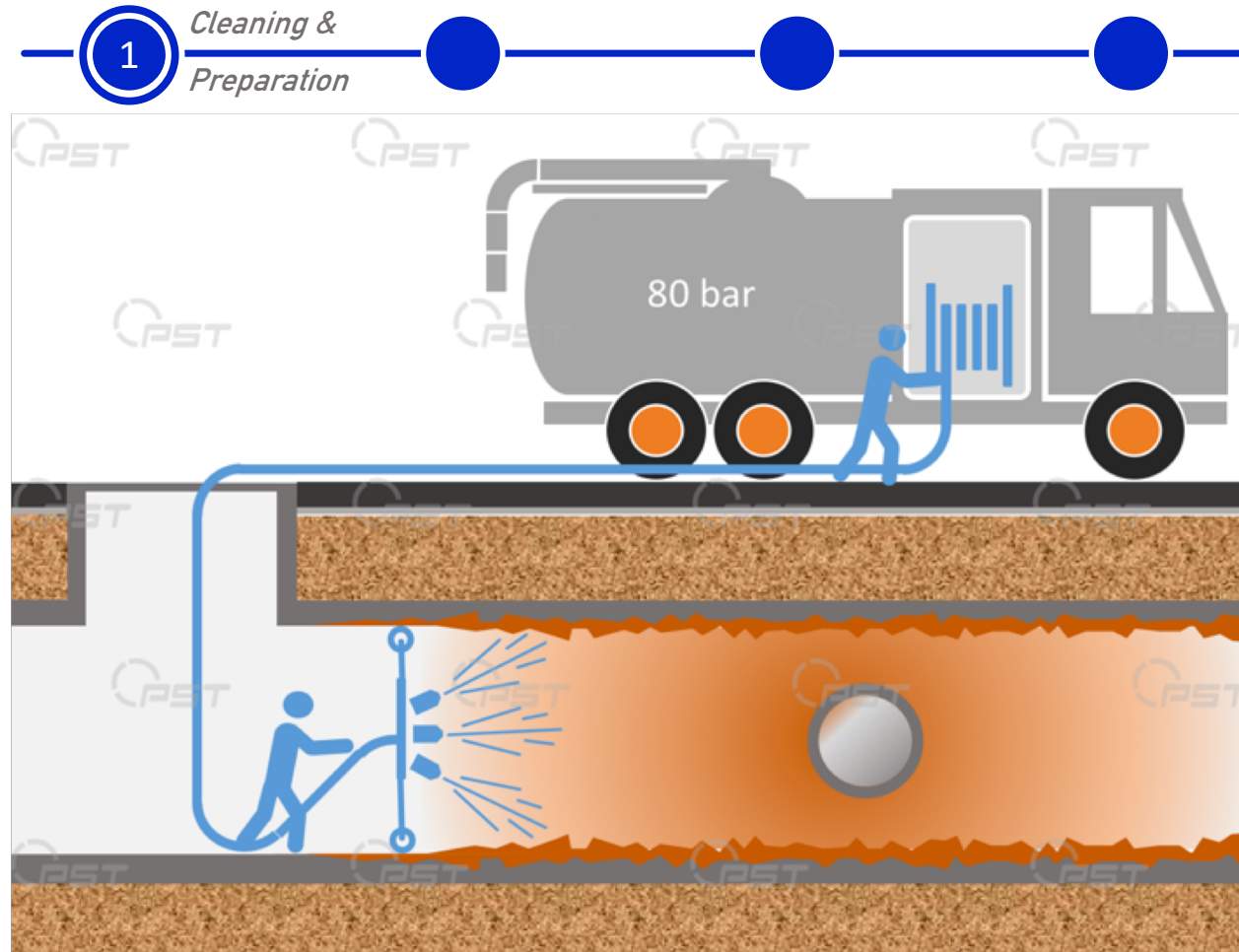


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## The installation

The first step is the preparation and cleaning – potential water management may be needed at heavy water flows – a safe range is 0.5 m/s and 10% water flow



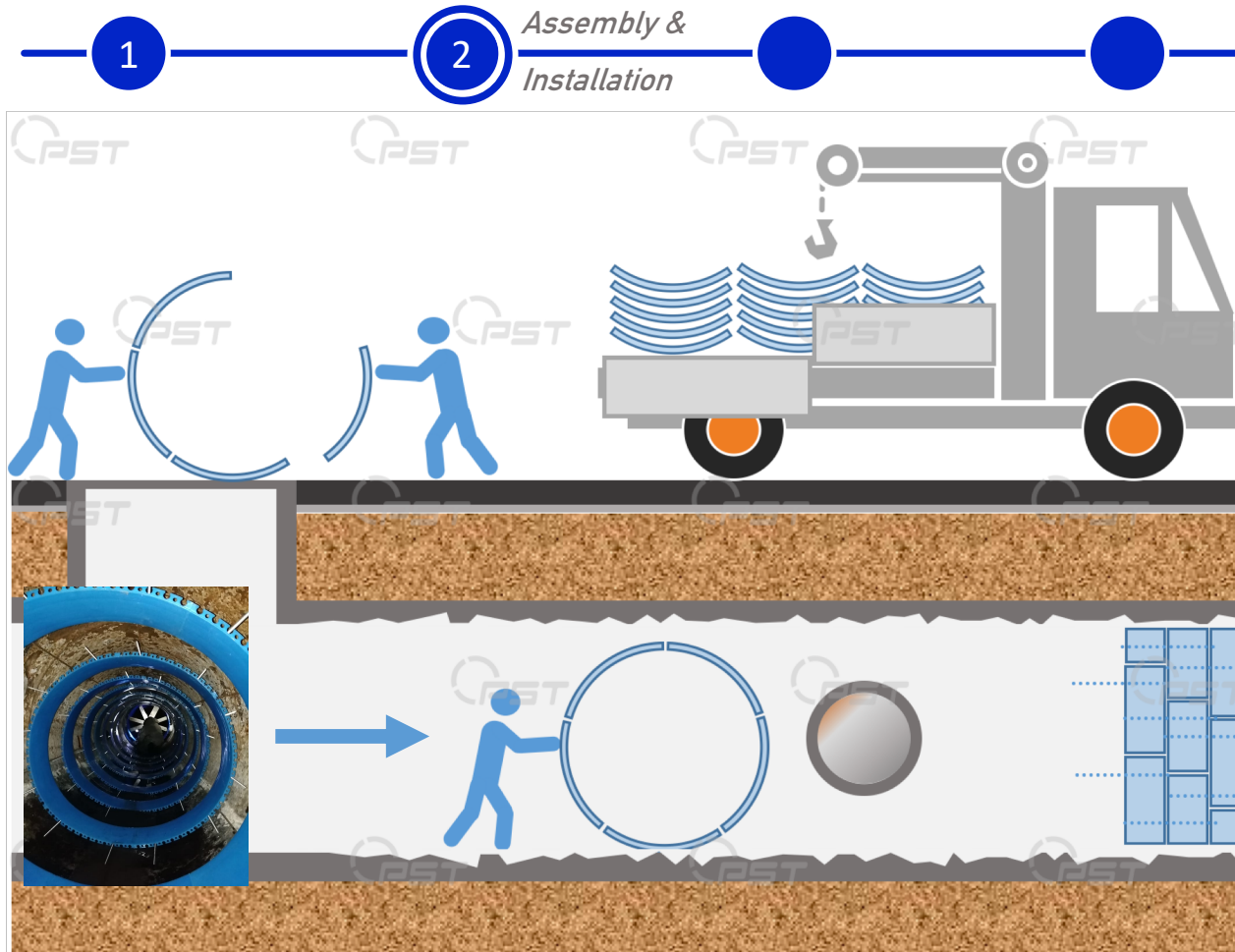
Cleaning with standard jetting units for large diameter

Surface cleaning sufficient by removal of all loose incrustations and particles



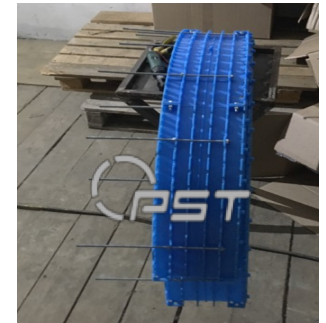
## The installation

The PST system can be pre-assembled on the surface, to ensure a quick installation in place – the staggered positions of the bolts ensure the stability



Maximum of space efficiency for material storage on site

Pre-assembly in partial or total rings according to access point size

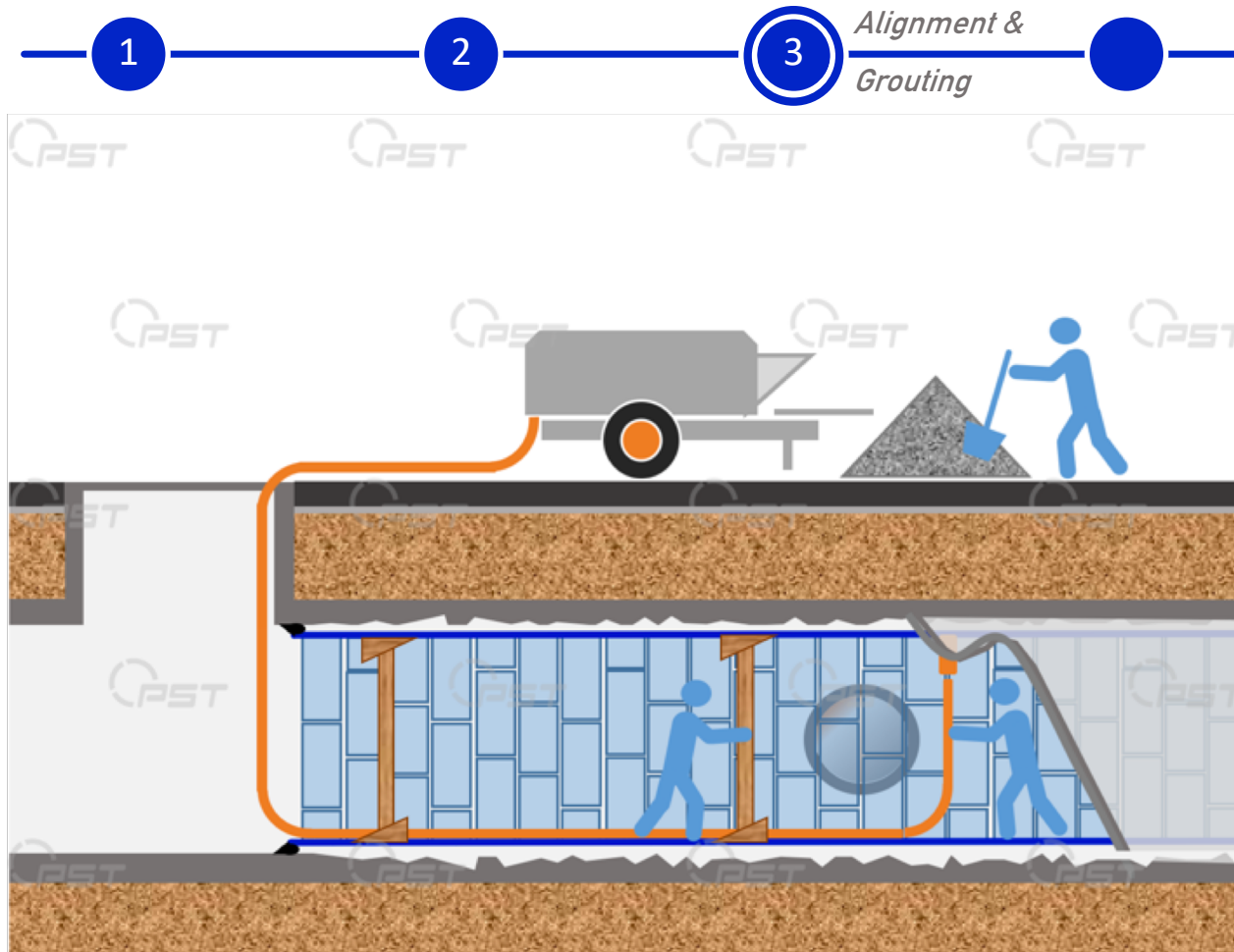


Easy manual installation through guiding locking bars



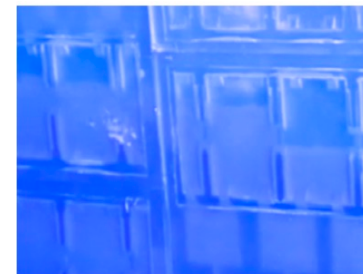
## The installation

During assembly, the PST structure is aligned with the inner host pipe or tunnel central axis and is ready for cement grouting



Alignment with space holders made of cement or metal

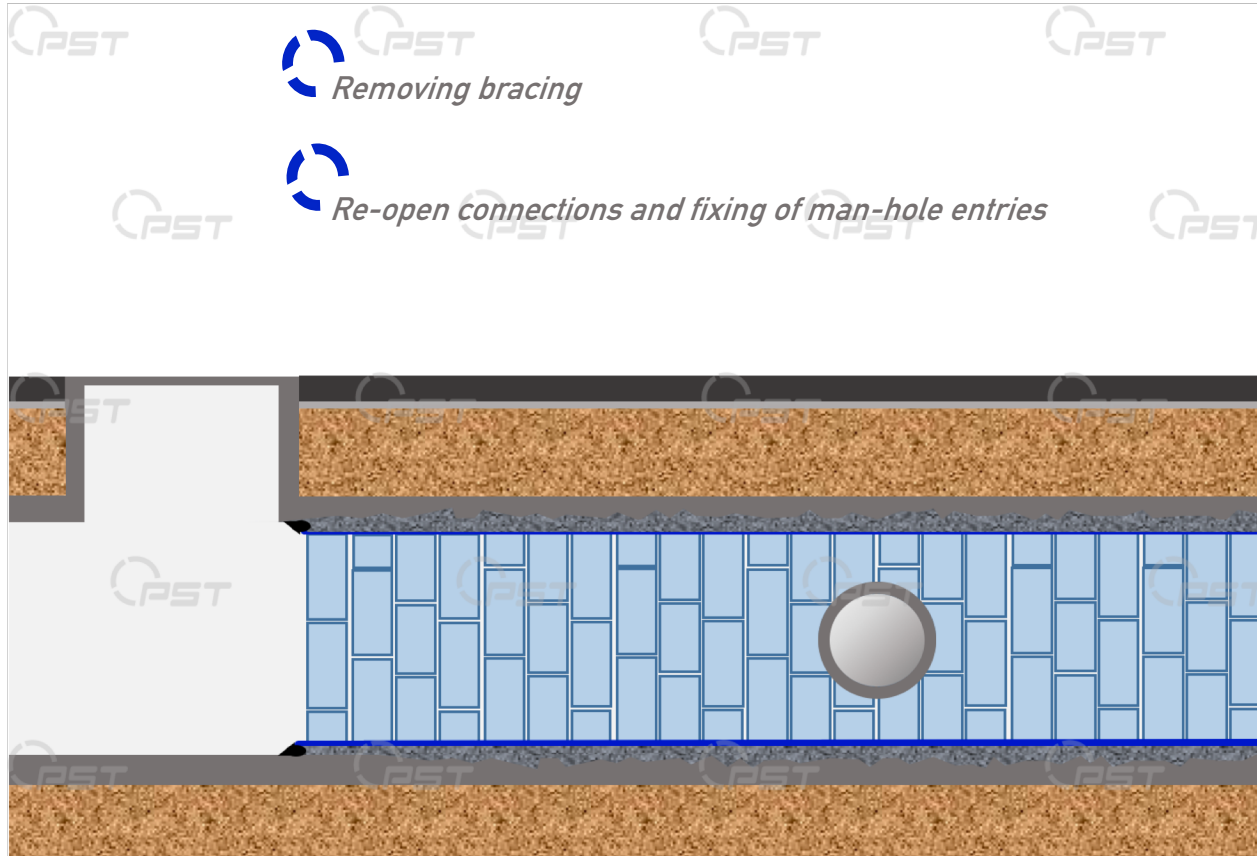
Before grouting the structure needs to be supported by bracing and injections valves are drilled in



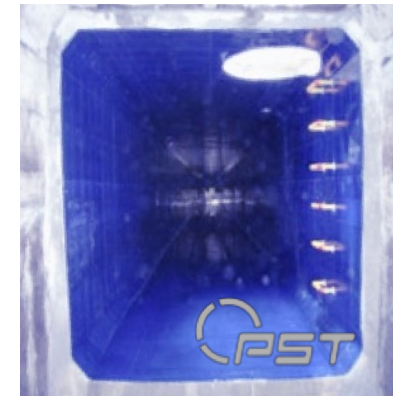
Through its transparency the grouting process can be monitored

## The installation

After re-opening of the connections and removing the bracing PST can provide an additional life time of 50 years and more for the existing underground structure



Through the segment systems each profile can be used for a range of diameters



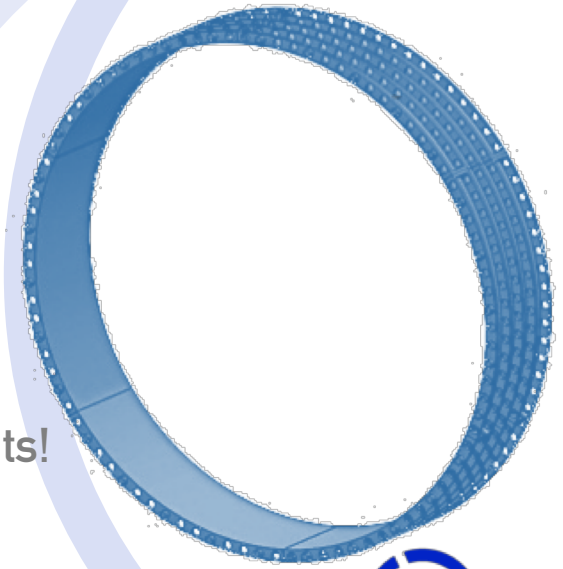
By combining circular and flat segments also box culverts and other out of round profiles are possible

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## PST Benefits – Especially compared to GRP pipe Lining

- **90% savings** for transport and logistics, 18,000 segments fit into one 40' container, material enough for 320 m of DN 2000 pipe rehabilitation!
- **up to 20% savings** in grouting as the installed size is variable, determined by the number of segments per ring
- **app. 20 – 30% savings** in material cost
- **No pipe joints** are needed or couplings
- **No heavy equipment** needed for installation
- **No pits!** All installations are feasible through existing access points!





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