TBM (Tunnel Boring Machine) SELI/Lovat EPB

(Year of manufacturing 2011)

Boring diameter 9.402 mm

A. History of the machine:

This machine was manufactured by SELI for the exaction of the two double-pipes tunnels for the High Speed Train line under passing Florence project. The machine was manufactured using the existing used shields from the EPB Lovat TBM that has excavated the Bologna High Speed train line under pass in 2005. The rest of the machine is completely new manufactured by SELI, only the main drive and the main bearing were new manufactured by Lovat.

The TBM was erected end dry tested in the starting shaft in Florence during the year 2012, but, for contractual reasons, the tunnel excavation never happened.

The TBM was disassembled, removed from the site and stored in a yard in Rovato, near Brescia, where it is now.

B. Current Configuration:

1. Internal segmental lining diameter= 8.300 mm
2. Segment thickness= 400 mm
3. Outside segmental lining diameter= 9.100
4. GAP=302mm
5. Number of segments / ring= 6 + 1 plus one invert segment

C. Main characteristics:

1. Cutterhead

- Cutter's type (Double Disc)	15.5"
- Number of Disc Cutters (or double picks)	13
- Maximum Individual Cuter Load	200 kN
- Number of Rippers/Scrapers	54+ 24 / 120
- Opening ratio	30%
- Copy-cutter number/Stroke	2 / 100 mm
- EPB cells	8
- Working pressure max	6 bar
- Spraying nozzles	8
- Cutterhead Drive	12 Hydraulic motors
- Cutterhead Power	2700 kW (9x300 kW)

- Cutterhead Speed	0 t o 2 rpm
- Cutterhead Torque	12,000 kNm (2 rpm) 25,000 kNm (<1 rpm)

2. Main Thrust

- Stroke	2251 mm
- Number of Main Thrust Cylinders	36
- Thrust force	72,500 kN @276 bar
- Max thrust	90,000 kM @345 bar

3. Articulation

- Active articulation number	1
- Cylinders	32
- Stroke	305 mm
- Max Thrust	96,600 kN @414 bar

4. Screw Conveyor

- Diameter	1118 mm
- Length	14 m
- Torque	213 kNm
- Capacity	1000 m3/hr
- Variable speed	0 – 32 RPM
- Installed power	300 KW

5. Hydraulic System

- Maximum System Pressure	345 bar
- Working pressure	250 bar

6. Grout System Two component type

- Lines for A component	6 + 6
- Lines for B component	6 + 6
- Lines type	removable
- A component pumps	6 (Moyno)
- B component pumps	6 (Moyno)

7. Erector

- Rotation speed slow	0,2 rev/ min
- Segment claw	vacuum type
- Lifting capacity	10 ton

8. Machine Conveyor

- Installed power	45 kW
- Belt speed	0-2,5m/s
- Capacity	2.300 t/h
- Width	1.000 mm
- Length	45 m

9. Electrical System

- Frequency	50 Hz
- Transformer Size	2 × 3000 kVA = 6000 kVA
- Primary Voltage	15000V/50Hz
- Secondary Voltage	600V, 400V