Wuhan is the largest and most important city in China with 8467 km² area and 7.3 million people among which 4.4 million lived in the city proper. Wuhan is divided into three parts by Yangtze river and Han river. The restricted passage across Yangtze (2 bridges) blocks seriously the traffic and impedes the economic development of Wuhan city. So the Wuhan government has decided to build a tunnel across Yangtze river in the center of the city.

OVERALL PROJECT:
Wuhan Yangtze tunnels will be located between the 2 Yangtze bridges, connecting Hankou Dazhi road in the north with Wuchan Yonyi road in the south. It will be the main road passing Yangtze river in the city. The tunnel will be a double usage, highway and subway tunnel, with 4 automobile lanes and a double-line subway lane will be prepared for Wuhan subway system. The total length of the tunnel is 3,630 m including 2,720 m bored with TBMs. The two portals of the tunnels are performed by cut and cover method before the TBMs arrival.

THE PARTICIPANTS:
Contractor: China Railway Tunnel Group Co., Ltd.
Industrial partner: SHMG

Work carried out using the TBM
Bored length: 2,500 m
Soils: silt and sand with clay
Overburden: 7 to 40.5 m
Minimum radius of curvature: 800 m
Maximum slope: 4.4%
Overall inner diameter: 10 m
Lining used for tunnel segments:
  Number/shape: 9
  Thickness: 500 mm
  Length: 2 m
  Maximum segment weight: 10 t
THE TUNNELLING MACHINES

- Type: Benton’Air® pressurized slurry TBM
- Cutter head: full face type with 8 arms and hard facing
- Cutting tools: drag bits, disc cutters, variable overcuts
- Electrically powered variable speed with 8 motors
- Erector: 6 degrees of freedom-range +/ - 220°
- Back-up: 3 gantries
- Maximal outlet flow: 1,144 m³/h

THE JOB SITE

GEOLOGICAL PROFILE

- Excavation diameter: 11.38 m
- Total length: 58 m
- Total weight: 1,285 t
- Installed power: 4,500 kW

SHIELD:
- Shield diameter: 11.36 m
- Shield weight: 970 t
- Total thrust: 120,000 kN
- Maximal speed of advance: 4 cm/min.

CUTTERHEAD:
- Cutterhead motor: 8 X 200 kN
- Cutterhead power: 1,600 kW
- Rotation speed: 0 to 2.3 rpm

DRIVE UNIT:
- Maximal nominal torque: 13,650 kN.m
- Maximal breakout torque: 17,745 kN.m

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