

# Large Sized Boring Machine MT 410 RS

The full-rotary boring machine is the major product for foundation works of Mitsubishi Heavy Industries, Ltd. (MHI). Cast-in-place pile drivers, such as full rotary boring machines, are becoming the mainstream instead of the existing pre-cast pile drivers such as diesel pile hammers because of the stricter environmental pollution regulations as vibrations and noises in recent years. This large-sized boring machine MT 410 RS is a new model machine jointly developed by NTT (Nippon Telegram and Telephone Co.) and MHI. It can be used for both applications of a cast-in-place pile and a shaft boring for tunneling works and so on.

## 1. Features

### (1) High boring capacity

The boring machine has the structure capable of increasing its rotary torque up to 1 280 tf·m which is twice of the existing unit by the additional installation of rotary drive motors for deeper boring needs in the future. The MT 410 RS has the abilities of rotary torque of 640 tf·m and extraction force of 700 tf, and can drive

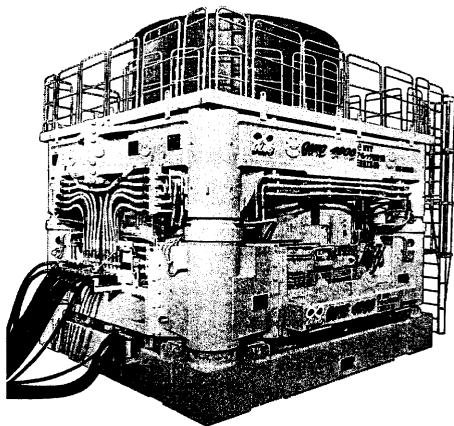


Fig. 1 Large sized boring machine body

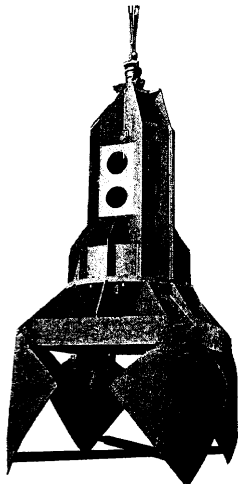


Fig. 2 Hammer grab

4 100 mm casing tubes with 100 mm thickness to the maximum depth of 40 m in the standard strata.

(2) High efficiency and rapid operation

Compared with conventional methods such as column pile wall, continuous wall, plate wall and caisson, MT 410 RS can excavate with high safety and efficiency using a newly developed 3 m<sup>3</sup> hammer grab and rotating casing tubes. Construction period, for example, can be remarkably shortened from six months to about one month.

### (3) Division

MT 410 RS can be divided into transportable sizes in order to transport and easily assemble/disassemble in the area with heavy traffic. MT 410 RS has the structure with divided radical and thrust roller bearings arranged on the circumference of the rotary unit in place of a large-sized roller bearing. Moreover, casing tubes, which are divided vertically into three pieces and tightened by bolt connection, are employed with water-swelling sealings on the flange surfaces.

### (4) Slide type traveling device

The weight of the assembled boring machine becomes as much as about 174 tons, and it is almost impossible to lift and slide the machine with a crane as

Table 1 Specifications of large sized boring machine MT 410 RS

Boring machine body	Principal dimensions			
	Overall length	(mm)	6 300(excluding reaction receiver)	
	Overall width	(mm)	5 700	
	Overall height	(mm)	4 355(excluding handrails)	
	Drilling capacity			
	Drilling diameter	(mm)	4 100	
	Drilling depth	(m)	40	
Power unit	Rotary torque	(tf·m)	640/320(standard torque) 1 280/640(maximum torque)	
	Rotary speed	(rpm)	to 0.6/1.2(standard torque) to 0.3/0.6(maximum torque)	
	Driving/extracting force	(tf)	150/700	
	Engine		Mitsubishi 6 D 22 CT×2 units	
	Model			
	Output/rpm	(ps/rpm)	220/1 600(normal) 245/2 000(maximum)	
	Pump			
Hammer grab	Type		Axial plunger type	
	Pressure	(kgf/cm <sup>2</sup> )	280	250
	Discharge	( l /min)	240×4	150×2
	Tank capacity			
	Hydraulic oil	( l )	1 500	
	Fuel	( l )	600	
	Capacity	(m <sup>3</sup> )	3	
Casing tube	Dimensions		3 600 (shell dia.)×6 000	
	Principal dimensions			
	Casing tube	(mm)	φ 4 100×6 000	
Weight	First tube	(mm)	φ 4 100×6 000	
			(Cutter bit with manhole at side wall)	
	Boring machine body		(t)	174(standard torque) 181(maximum torque)
Total weight	Power unit	(t)	17	
	Hydraulic hoses	(t)	2	
	Hammer grab	(t)	15	
	Casing tube	(t)	—	
	Total weight		(t)	208(standard torque) 215(maximum torque)

being usually done in case of small-sized boring machines. Traveling device with hoisting and sliding cylinders is applied to easily transport the machine by itself to the appointed position.

(5) Low noise power unit

The engine room and hydraulic equipment room are made to be completely independent in the power unit driven by a diesel engine. Each bonnet is covered with three layer all closed structure of glass wool boards,

sound-proof lead sheets and sound-proof corrugated urethane rubber sheets. This method makes it possible to realize lower noises of 71 dB(A)/1 600 rpm—74 dB(A)/2 000 rpm.

## 2. Specifications

Figs. 1 and 2 show respectively the photos of the large-sized boring machine MT 410 RS, and 3 m<sup>3</sup> hammer grab, while their specifications are shown in Table 1.