

TOA-TONE MACH DRILLING SYSTEM

*An innovative new concept of large diameter
rock drilling system by hybrid
of
down-the-hole air hammer percussion
and
fluid reverse circulation cuttings removal*

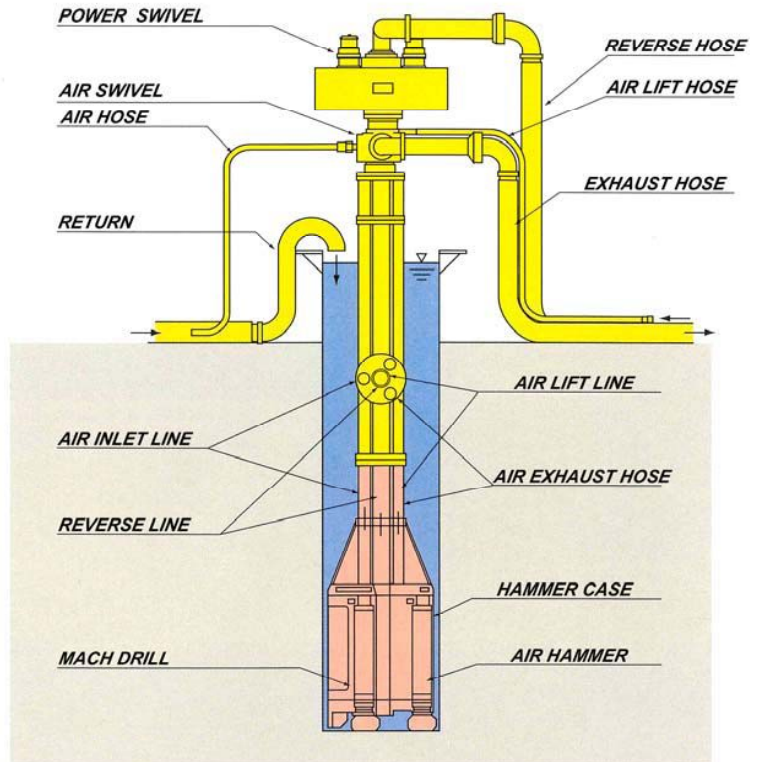


TOA-TONE BORING CO., LTD.

ULR: <http://www.toa-tone.jp>

Introduction

The MACH Drilling System is a new concept of large diameter drilling system with the combination of the superior method of mechanical percussion for rock crushing and the optimum method of cuttings removal by fluid reverse circulation.



Features of MACH Drilling System

1. Down-the-Hole Air Hammer method

- The greater and effective drilling energy of the down-the-hole hammer provides high drilling speed through hard rock formations
- The very slow rotation speed of air percussion hammer does not cause whipping of drill rod which minimizes drilling hole deviation and enlarging
- The light bit load of down-the-hole hammer applies the plumb-bob principle on drilling tools, which results in high vertical drilling accuracy
- Since down-the-hole air hammer does not need heavy and long drilling tools, preliminary excavation for drilling collar is not required

Figures of
Accessory
Equipment &
Tools

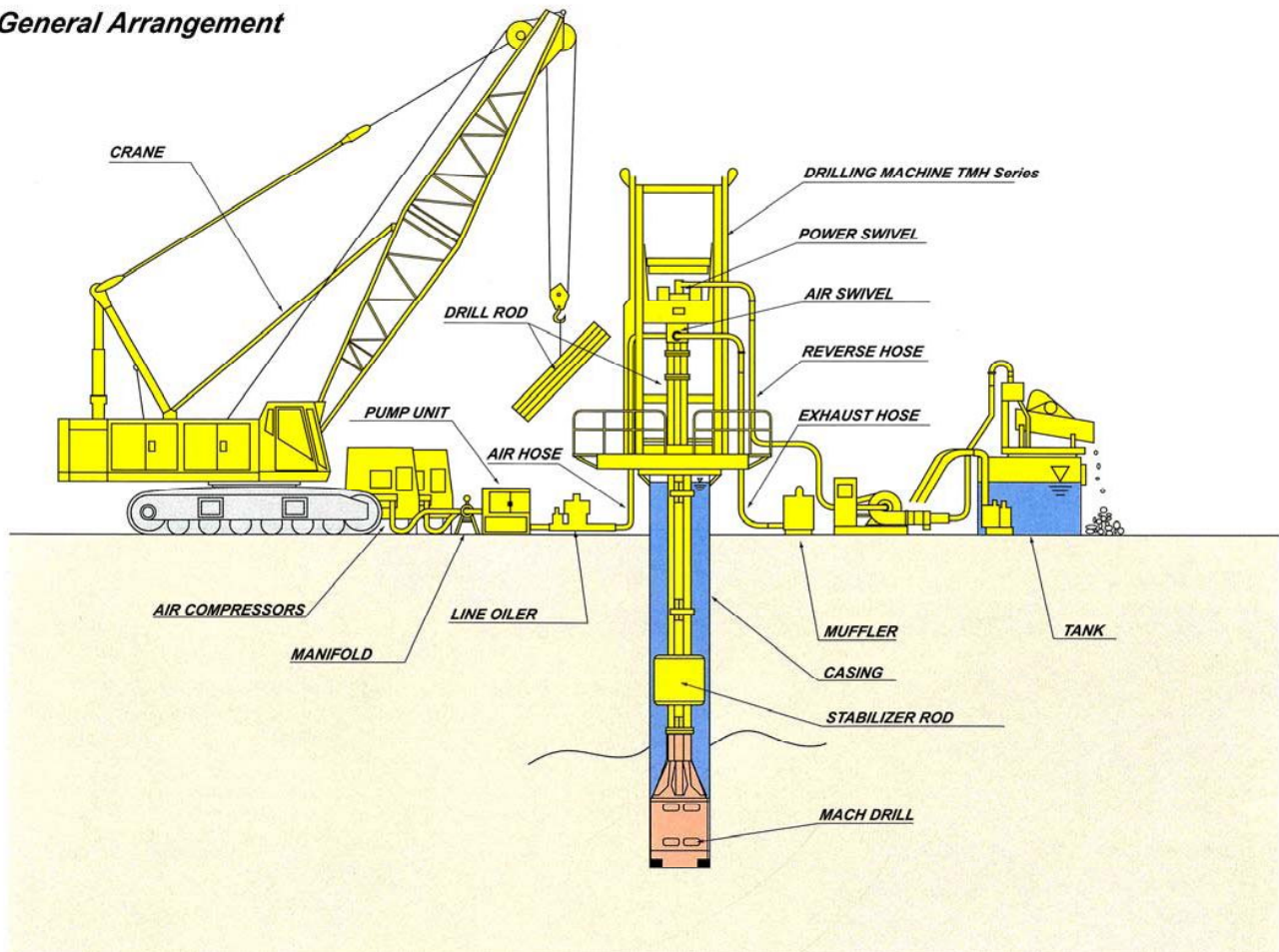


MACH Reverse Drill Rod



Manifold

General Arrangement



2. Fluid Reverse Circulation Method

- Since the hammer is perfectly sealed from outside, circulation water can be used for drilling. This means MACH drilling system has wide adaptability not only for hard rock also for collapsing formation such as alluvium or boulder bearing strata.
- Since drill cuttings are immediately removed by reverse circulation, secondary drilling of cuttings is prevented. This means high drilling efficiency is realized and wear of the bit is minimized.
- Fluid reverse circulation does not require the large diameter drill rod such as dry air hammer method. There is no dust generated by drill cuttings.
- Since the hammering action is actuated at the bottom of the hole filled with circulation fluid, percussive noise is almost eliminated.

3. Closed Air Circulating Circuit

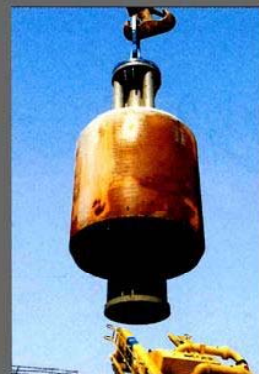
- As the actuated air passes through air pipes in closed circulation without exhausting in the hole, hammering is possible without being affected by back pressure from under-water and high pressure air compressor is not required. Percussion force can be controlled at the valve stand according to various conditions of formation.
- Since the exhaust air does not flush into the hole, the surrounding ground is free from disturbance and the hole is kept stable.
- Exhaust air passes through air pipes in closed circulation to the muffler on the ground. Therefore, exhaust noise is almost eliminated. The lubrication oil contaminated in the air is separated and recovered. So its use can be applied free from environmental pollution.



Muffler



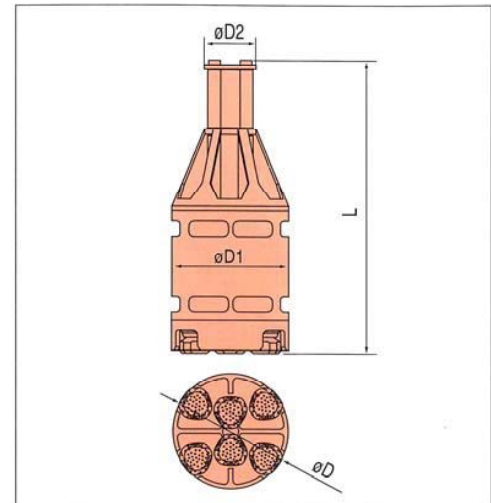
Line Oiler



Stabilizer Rod

Specifications of TONE MACH Drill
(Multiple Hammer Type)

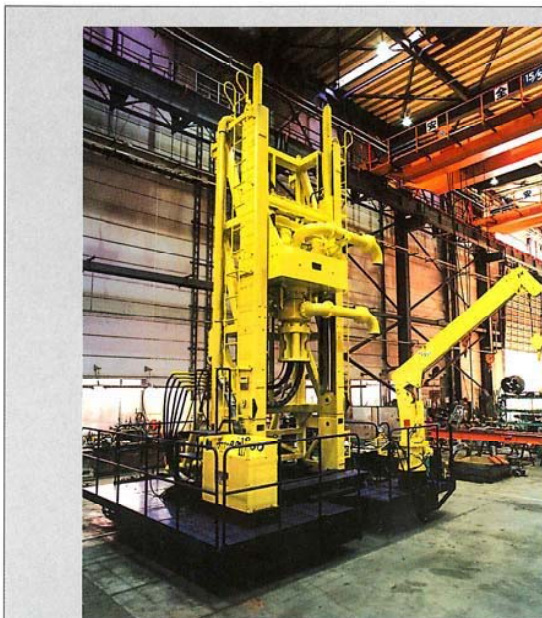
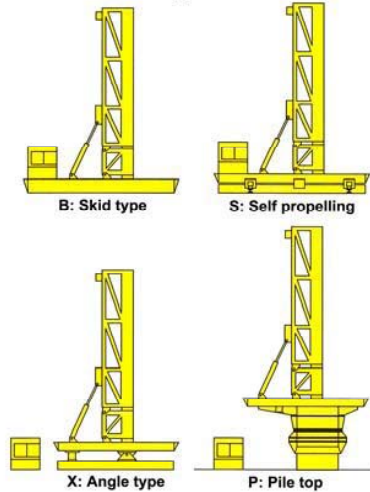
| MODEL | | MACH-50M | MACH-80M | MACH-137M | MACH-145M | MACH183M |
|---------------------------|-------------|----------|----------|-----------|-----------|----------|
| Drilling diameter(mm) (D) | | 500 | 800 | 1370 | 1450 | 1830 |
| Hammer Body | Model | AD-150M | | AD-250M | | |
| | Q'ty | 2 | 2 | 6 | 6 | 8 |
| Air Consumption (m3/min) | 7 bar | 15 | 30 | 90 | 90 | 120 |
| | 10 bar | 25 | 50 | 150 | 150 | 200 |
| Dimensions(mm) | (L) | 3000 | 3000 | 3400 | 3500 | 3700 |
| | (d1) | 480 | 780 | 1350 | 1430 | 1810 |
| | (d2) | 360 | 510 | 610 | | |
| Reverse Line ID(mm) | | 150 | 200 | | | |
| Approx. Weight (kg) | Hammer+bit | 200x2 | 600x2 | 600x6 | 600x6 | 600x8 |
| | Hammer case | 1600 | 4800 | 11400 | 14000 | 20000 |
| | Total | 2000 | 6000 | 15000 | 17600 | 24800 |



Specifications of TMH Base Machine

| MODEL | TMH-1 | TMH-2 | TMH-3 | TMH-4 |
|-----------------------------|-----------------|---------------------------------|------------------------|-------|
| Max. Drilling Diameter (mm) | 1500 | | | 2000 |
| Applicable MACH Drill | MACH-80R / 100S | | MACH-80R / 100S / 130S | |
| Hammering Diameter (mm) | 600 - 1100 | | 600 - 1370 (1450) | |
| Spindle Torque (ton-m) | 4.5 / 2.3 | 8 / 4 | 12 / 6 | |
| Revolution Speed (rpm) | 0 - 7.5 / 15 | 0 - 3.5 / 7 | 0 - 3 / 6 | |
| Type of Feed System | Rope down | Hydraulic cylinder direct drive | | |
| Feed Stroke (mm) | 4100 | 3800 | | |
| Max. Pull Up (ton) | 30 | 40 | 75 | |
| Pull Up Speed (m/min.) | 0 - 6 | | 0 - 4.5 | |
| Base Type Selection | Type S | Type B, S, X, P | | |
| Motor Power (kW) | 45 | 37+11 | 45+11 | |

Base Type Selection



TMH-3 Base Machine

Quick Rod Connection

