

VANE BORER

Model M-1000

DESCRIPTION

The vane borer is a precision field instrument which consists of:

- A torque recording head
- Boring rods (20 mm diameter)
- A specially designed vane
- A slip coupling

The system is supported by either:

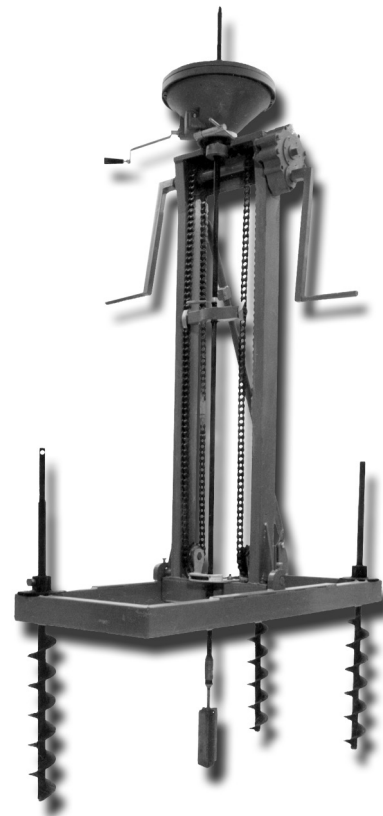
- A portable boring rig (light- or heavy-duty)
- A torque head casing adaptor

Torque recording head

The torque head is both a loading and recording instrument. It contains a crank-operated loading device by which the rods can be rotated at two different speeds. A complete, accurate and permanent test record is scribed by a sharp steel pointer on a waxed paper disc. The torque is recorded radially, and the angular rotation tangentially. A transparent cover protects the recording chart. A sample recording is illustrated on the overleaf.



Recording head with casing adaptor



Vane borer model M-1000
with heavy-duty rig

FEATURES

- Measures and records: vane resistance, rod friction and angular rotation
- Designed to operate without protective casing or within a cased borehole

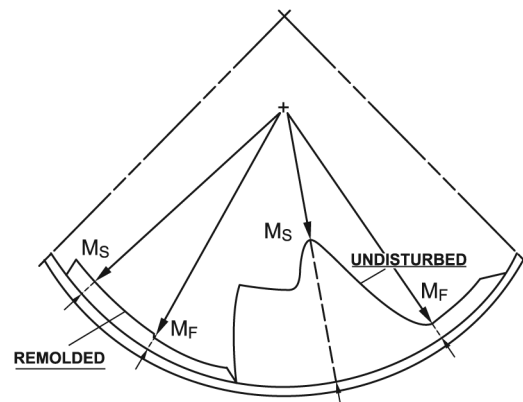
Vane and slip coupling

The vanes are made of high ultimate strength (1 700 000 kPa) tempered, chrome-nickel steel.

A special slip coupling allows for using only one set of rods. The very low friction bearing in this sealed coupling permits a free slip, or "play", of approximately 15° between the rods and the vane. During the test, the rod rotates first until the play has disappeared, after which the rod and vane rotate together. On the test record shown at right, M_f is the torque required to turn the rods only. The maximum torque required to turn both the rods and the vane is M_s . The difference ($M_s - M_f$) determines the soil's shear strength. Note that the reduction in shear strength after failure is easily determined by a remolded strength test at the same test depth.



Vanes with slip coupling



Sample recording of vane borer curve

Boring rig

The boring rig is a lightweight chain jack and is available with driving forces of one or two tons. The jack is anchored with four earth augers and locking plates. The vane is advanced using a very efficient manual crank system. The rig can be erected and operated by one person.

SPECIFICATIONS

| DESCRIPTION | DIMENSIONS | WEIGHT | CAPACITY | SENSITIVITY |
|----------------------------|--|----------------------------|--|---|
| Torque recorder | 38 cm × 38 cm × 25 cm | 25 kg | 1150 kg-cm (1000 in.-lb.) | — |
| Boring rig | 155 cm × 35 cm 155 cm × 45 cm | 35 kg 100 kg | 1 ton 2 tons | — — |
| Vane | 5 cm × 11 cm 6.5 cm × 13 cm 8 cm × 17.2 cm | 0.3 kg 0.5 kg 0.8 kg | 2.2 kg/cm ² 1.1 kg/cm ² 0.6 kg/cm ² | 0.60 (kg/cm ² / radial in. of recording paper) 0.30 (kg/cm ² / radial in. of recording paper) 0.15 (kg/cm ² / radial in. of recording paper) |
| Boring rod (20 mm dia.) | 1 m | 2 kg | — | — |

ACCESSORIES

- Recording head casing adaptors for B, N and H size casing
- Auger extension rods (set of 4)
- Calibration frame
- Registration paper