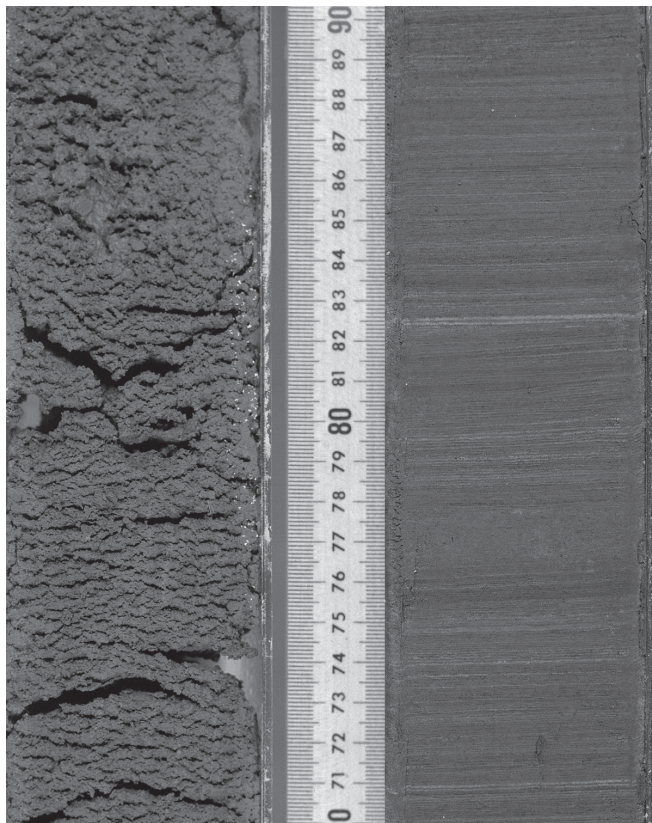


Advanced Piston Corer



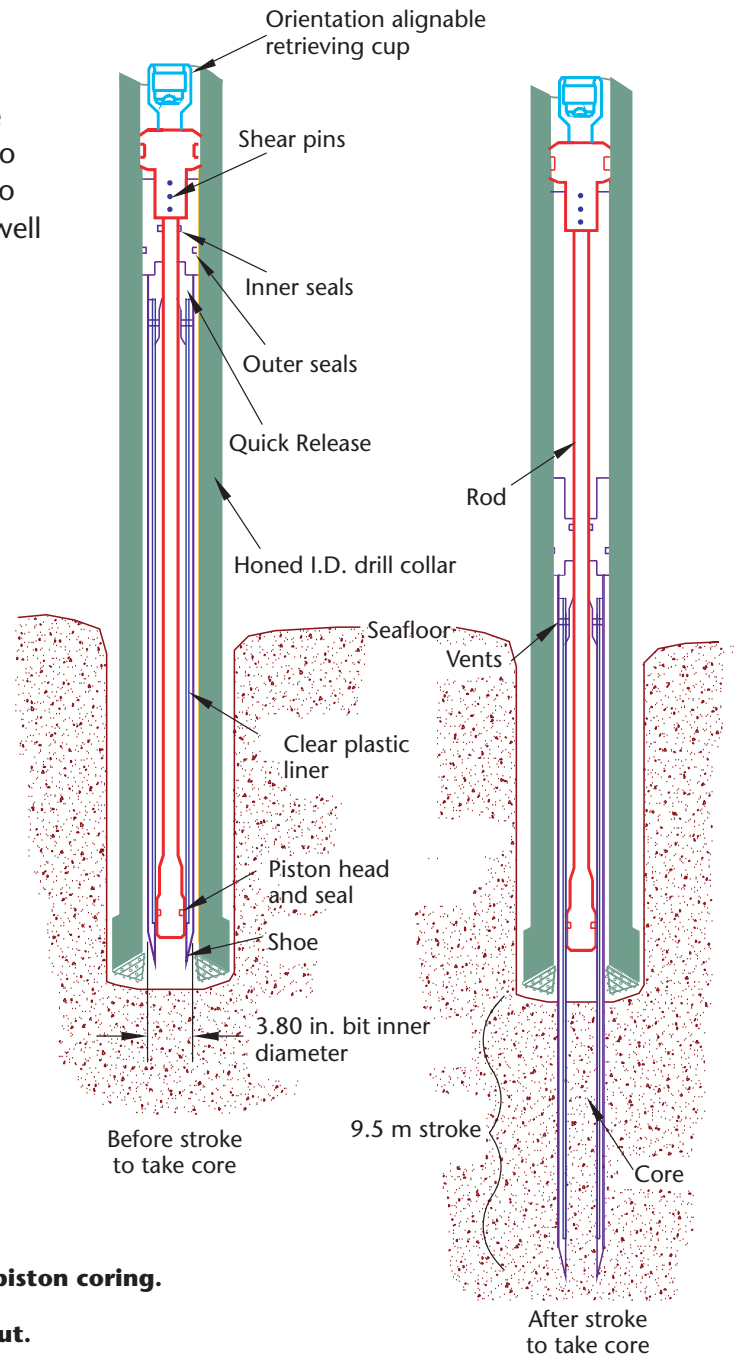
Scientific Application

The Advanced Piston Corer (APC) is crucial for high-resolution climate and paleoceanographic studies. The APC is a hydraulically actuated piston corer designed to recover relatively undisturbed samples from very soft to firm sediments. Such sediments cannot be recovered well by rotary coring.



Rotary cored

Piston cored



(Above) Comparison of core quality between rotary and piston coring.

(Right) Schematic of the APC before and after stroking out.

Operation

The APC core barrel is run to bottom on the coring wireline. Pump pressure is then applied to the drill pipe, which severs shear pins and strokes the core barrel 9.5 m into the sediment. The inner core barrel, containing the core, is then retrieved by wireline. After core retrieval, the bit and bottom-hole assembly (BHA) are advanced 9.5 m, and the process is repeated.

Features

Compatibility

The APC inner core barrel is deployed in the same BHA as the Extended Core Barrel (XCB). Both tools are interchangeable depending on formation and no time is spent for bit trips.

Wireline Deployment

The APC core barrel is deployed using the coring wireline to avoid premature release of the shear pins.

Core Orientation

For paleomagnetic studies, the APC core can be oriented with respect to the Earth's magnetic field by running a downhole orientation tool above the core barrel.

In Situ Temperature Measurement

Special APC shoes (APCT-3) can be run to record the in situ formation temperature while taking a core.

Specifications

Core Diameter

6.2 cm (2.44 in)

Maximum Length

9.5 m (31.16 ft)

Piston Force

23,000 – 28,000 lb
at 2300 – 2800 psi
pump pressure

Typical Operating Range

Formation

Very soft to firm sediments

Depth Range

Seafloor to +300 m below seafloor (mbsf)

Mean Recovery

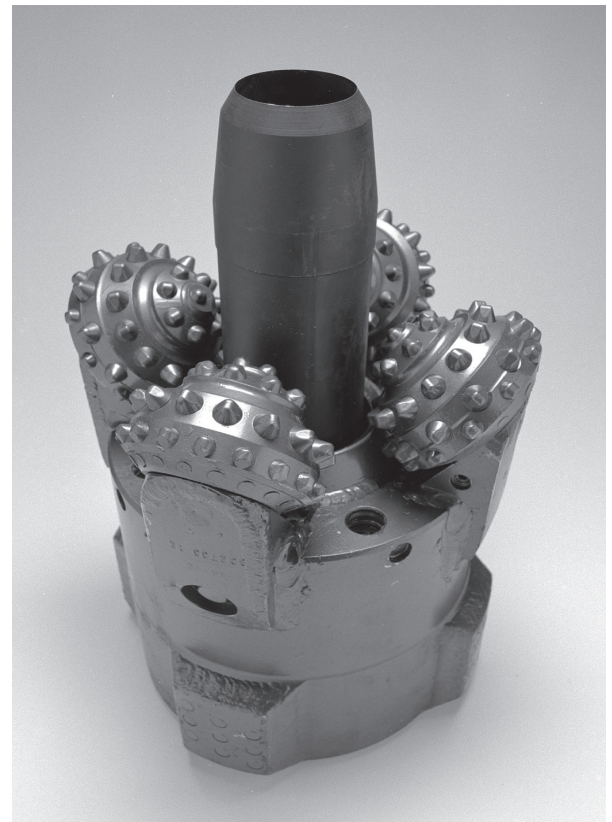
~100% in soft sediments (see Limitations)

Rate of Penetration

9.5 m to ~38.0 m of core/hr (depends on depth/wireline time). Rate of penetration typically decreases with depth.

Quantity of Cores on Deck

1 to 4 cores/hr depending on water depth and formation.



APC piston shoe extending through APC/XCB bit (shown upside down).

Limitations

Does **not** penetrate or recover granular formations (such as sand) or hard ground. Core barrel may stick in firm sediments and require drill-over.