RCB

Rotary Core Barrel

OCEAN DRILLING PROGRAM

www.oceandrilling.org

Scientific Application

The Rotary Core Barrel (RCB) is a rotary coring system designed to recover core samples from firm to hard sediments and igneous basement. The RCB is crucial for oceanic crustal hard rock studies.

Tool Operation

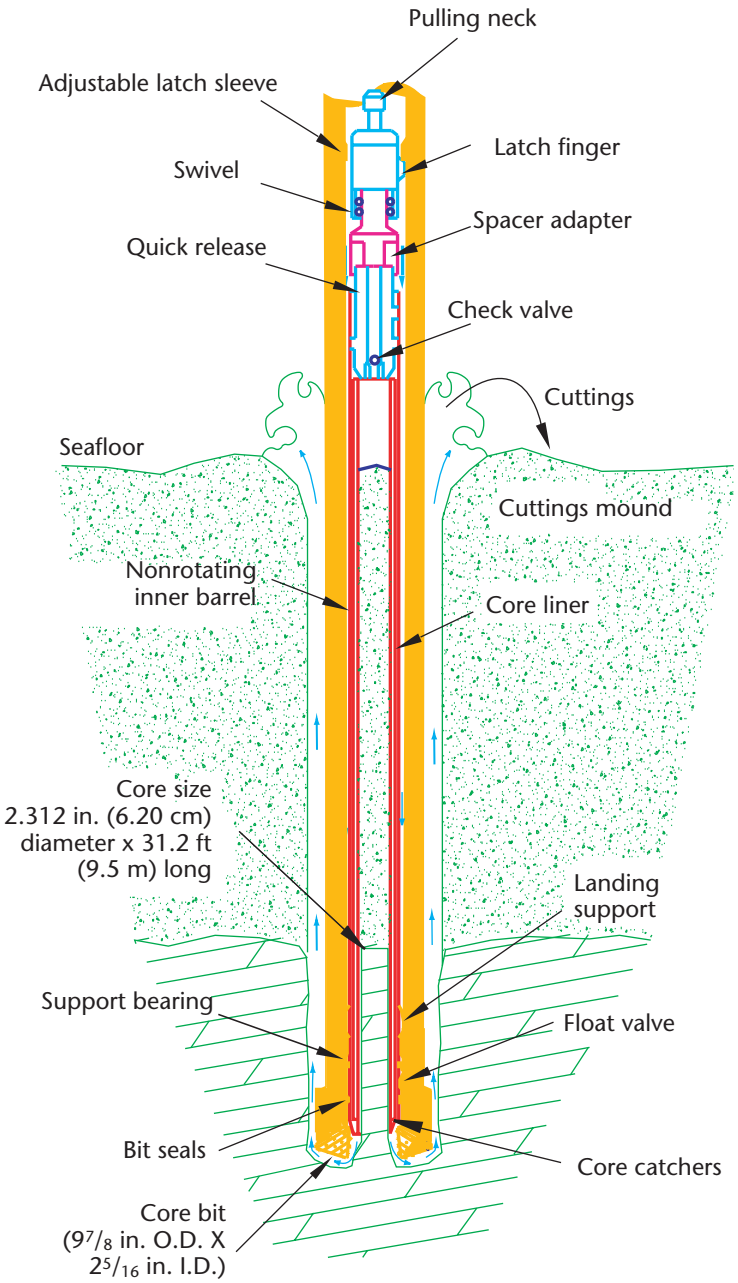
The RCB inner core barrel free falls (and is pumped) through the drill string and latches into the RCB bottom-hole assembly (BHA). The main RCB bit trims the 2.312 in. core. The BHA, including the bit and outer core barrel, is rotated with the drill string while bearings allow the inner core barrel to remain stationary. The inner core barrel can hold a 9.5 m core and is retrieved by wireline. A wireline packoff at the top of the drill string permits rotation and circulation of the drill string to continue while using the wireline to retrieve the core.

Design Features

1) Rugged Design

The RCB BHA, bit, and inner core barrel assembly have a rugged design for use in abrasive and fractured hard sediments and igneous basement.

Benefit: Increases operating time of the bit and improves penetration of hard formations.



Schematic of the RCB coring system in coring mode with a bare seafloor spud-in. A center bit can be run on the inner core barrel to drill ahead without core recovery.

2) Drilling with Center Bit

A center bit can be used to drill a hole without attempting to recover core. The center bit is used to drill ahead in hard rock and is run on a special inner barrel sub to lock it into the outer barrel for rotation. The center-bit assembly is configured to allow circulation through the center bit.

Benefit: The center bit can be interchanged with a standard RCB core barrel for "spot" coring.

3) Wireline Logging with Bit Release

A Mechanical Bit Release (MBR) can be operated by wireline to drop a bit in the hole or on the seafloor to provide a fully open BHA for logging.

Benefit: Wireline logs can be run after coring with the RCB system without making a pipe trip to install a logging bit.

RCB Specifications

Inner Core Barrel Length

9.5 m (31.16 ft)

RCB Bit Throat (Core Diameter)

5.87 cm (2.312 in.)

Typical Operating Range

Formation

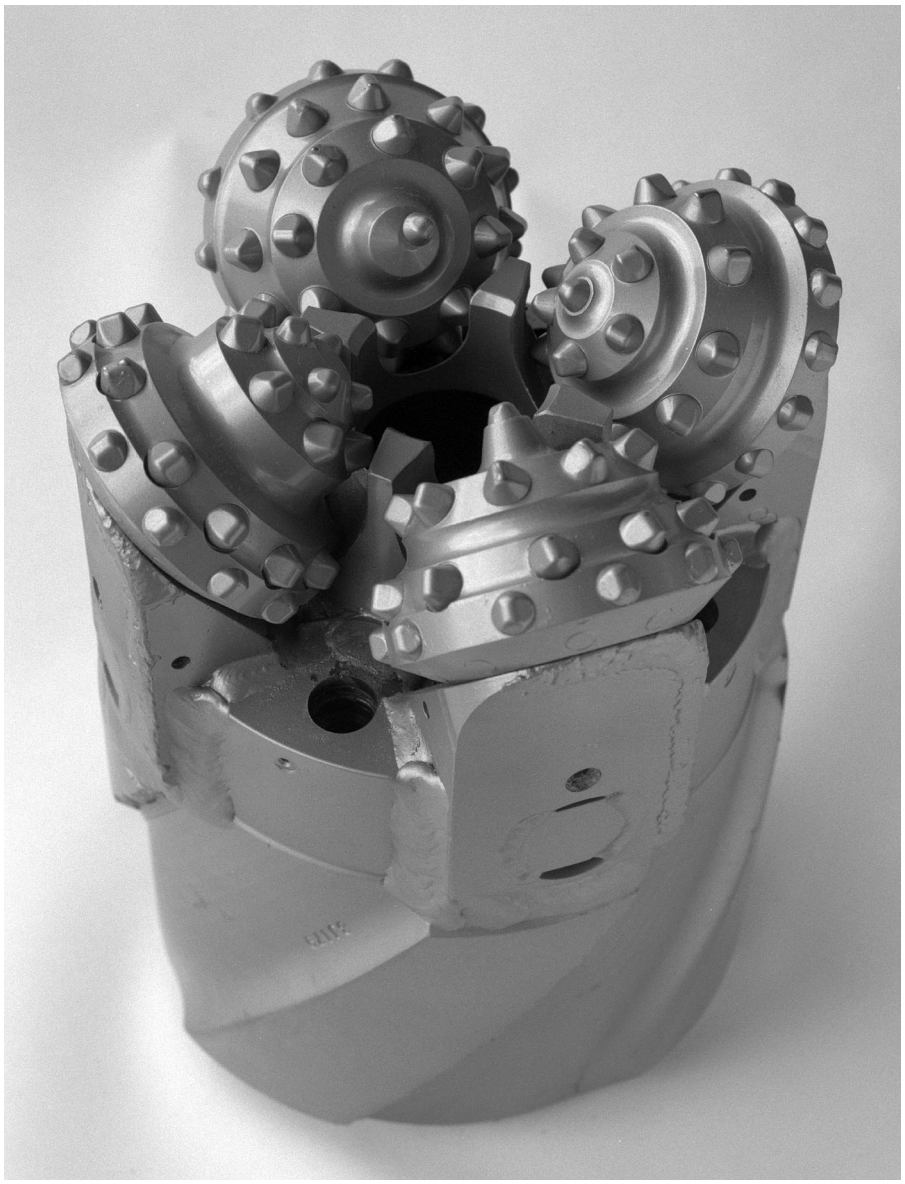
Firm to very hard sediments and igneous basement

Depth Range

Seafloor through igneous basement

Mean Recovery

20% to 55%



The RCB roller cone bit utilizes hard tungston carbide inserts to trim the core.

Quantity of Cores on Deck

0.3 to 2 cores/hr depending on water depth and formation hardness

Rate of Penetration

Depends on rock properties, but averages 4.0 to 9.8 m/hr

Limitation

Does not recover soft sediments or granular formations (such as sand, fractured rock, or rubble)