

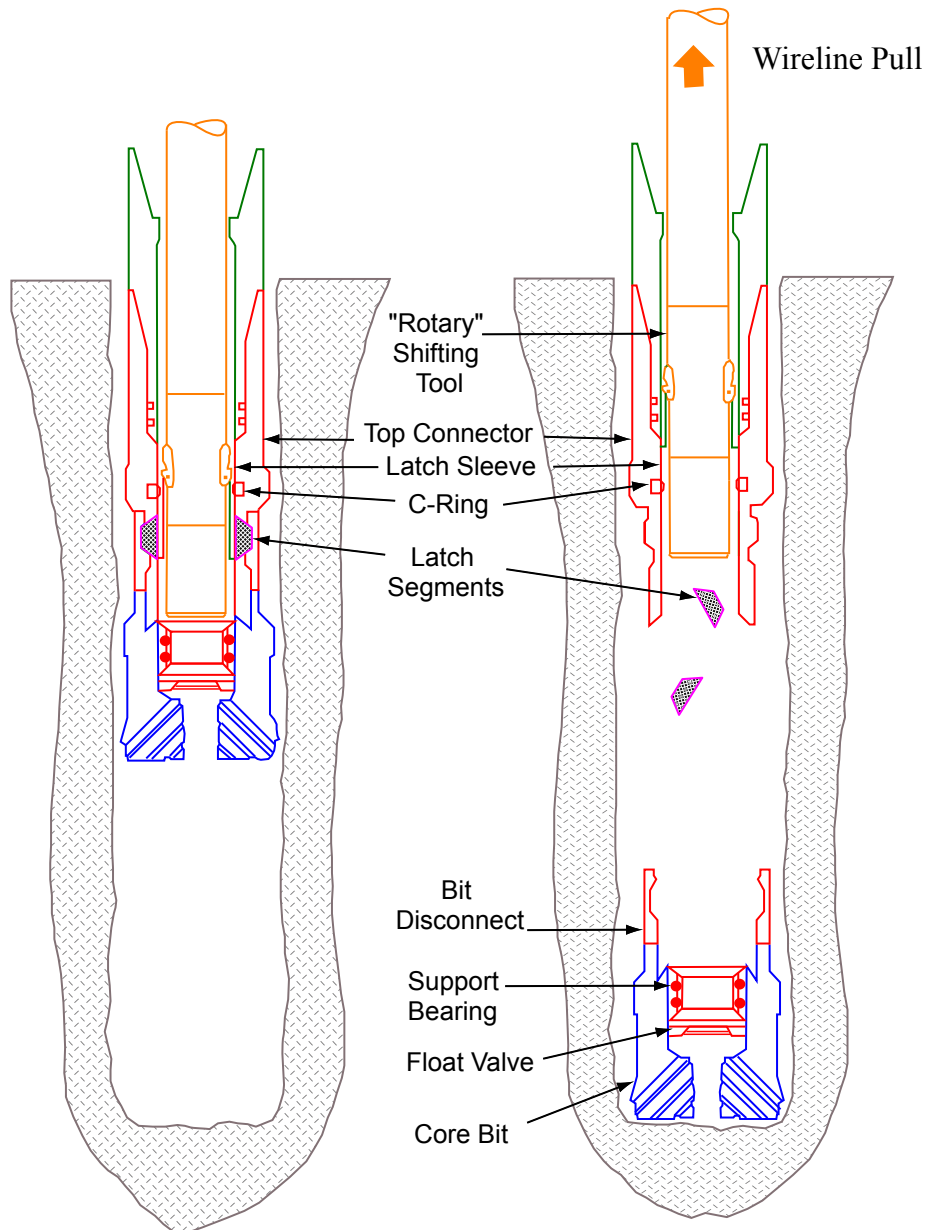
Mechanical Bit Release

Scientific Application

The Mechanical Bit Release (MBR) is designed to remotely release the Rotary Core Barrel (RCB) core bit from the Bottom-Hole assembly (BHA) to allow logging tools to pass through the BHA. The RCB drill bit must be released before logging starts because the internal diameter of the RCB drill bit throat (2.312 in.) is not large enough to pass most logging tools.

Operation

The MBR is placed in the RCB BHA above the RCB bit. After the hole is cored to logging depth and conditioned for wireline logging, the RCB bit is released with the MBR. To release the MBR, the Rotary Shifting Tool is made up on the bottom of a standard Inner Core Barrel. The Shifting Tool is lowered on the wireline until it engages the latch sleeve on the inside of the MBR. The wireline is slowly pulled up until an overpull of 4000-5000 lb shifts the Latch Sleeve and allows the latch dogs to fall out, thereby releasing the bit. The four metal latch dogs, lower MBR, flapper valve, lower support bearing, and the bit are left in the hole. This metal "junks" the hole and effectively prevents further coring. A second wireline trip is made with the Shifting Tool in the reversed position to close the Latch Sleeve, which covers the empty dog pockets to reduce the possibility of scraping hole wall material into the BHA.



Schematic illustrating MBR deployment. The MBR tool is outlined in red.

Features

Compatibility

The MBR is compatible with the RCB BHA. The MBR allows wireline logs to be run without the need to “trip the pipe” to remove the RCB bit on the rig floor.

Latch Sleeve/Dog Mechanism

Shifting the Latch Sleeve with the Rotary Shifting Tool releases the latch dog segments. This releases the bit disconnect, dogs, support bearing, float valve, and the core bit into the hole. The core bit can be released in a minimum amount of time, using the Shifting Tool to operate the Latch Sleeve via the wireline.

Emergency Bit Release

In unstable formations, the MBR can be run for an emergency bit release. If the BHA is stuck at the bit, the bit can be released to save the BHA from being severed.

Specifications

Outer Diameter: 8¼ in.

Inner Diameter: 4¹/₈ in.

Torque Limit: 12,000 ft-lb

Compression Weight: 45,000 lb

Operating Range

Formation

All formation types.

Depth Range

All depths.

Limitations

Dropping the core bit, float valve, four latch dogs, and lower MBR leaves metal junk in the hole, which effectively prevents further drilling or coring.



Photograph of the following MBR components: MBR Bit Disconnect, (left cylinder), Top Connector with hex drive (right cylinder), and Latch Segment (small pyramid-shape in the center).

For a hole with reentry hardware installed the drill pipe can be pulled out, the bit dropped on the seafloor, and the hole reentered for logging. This leaves the hole open for further deepening.

After removal of the bit, the drilling string is open-ended, which makes it susceptible to plugging by “swallowing” some of the hole wall as the pipe moves and/or logging tools drag debris into the pipe. This may plug the drill string, which increases the chance of jamming the logging tool when it is entering and exiting the open end of the pipe.

Excessive overpull on the MBR (i.e., 150,000 lb to 170,000 lb) can result in the accidental release of the core bit, which would leave junk in the hole.

The Inner Core Barrel can become “packed off” (from cuttings flowback) and unintentionally shift the MBR, which would prematurely release the bit.