RECC

Reentry Cone and Casing

OCEAN DRILLING PROGRAM

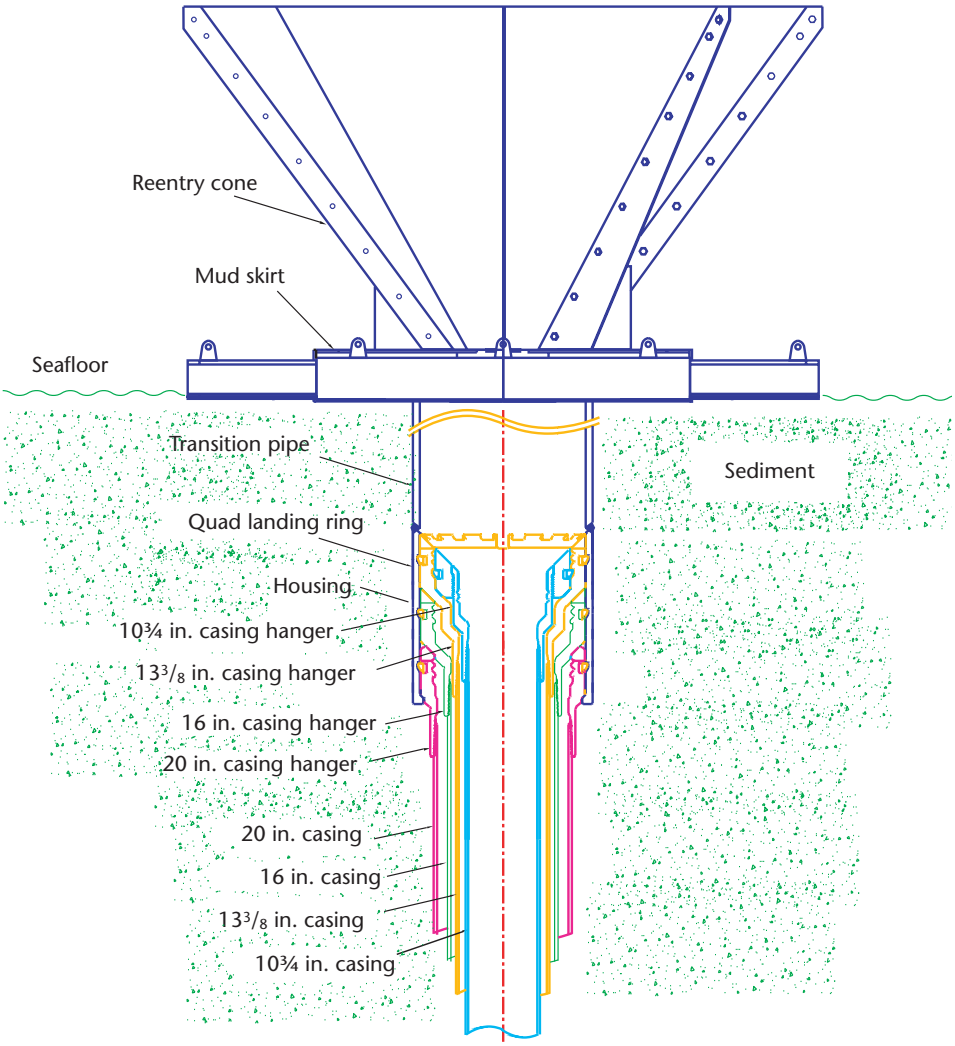
www.oceandrilling.org

Scientific Application

The Reentry Cone and Casing (RECC) system is a permanent seafloor installation (or legacy hole) that is able to support up to four nested casing strings that case off unconsolidated sediments to achieve deep target horizons. The RECC allows a borehole to be reentered on multiple legs to deepen the hole or install a borehole observatory for enhanced long-term downhole measurements and sampling. A borehole observatory can be configured as a Circulation Obviation Retrofit Kit (CORK), an Advanced CORK (ACORK), or an instrument hanger for a seismometer package or sensor string. The deeper casing strings need to be cemented to isolate the borehole from open circulation between the formation and ocean bottom water or between formation intervals.

Tool Operation

The reentry cone assembly consists of a reentry funnel mounted on a support plate that rests on the seafloor and a housing to support the multiple casing strings. The reentry cone is typically run with a short (20–80 m long) casing string (20 or 16 in. diameter). The first string of casing is typically deployed as an integral part of the reentry cone, which is hydraulically washed (or jetted) in pelagic mud and supported without cementation. The soft upper formation "heals" around the casing providing support and a weak annular seal. The first string of casing can also be drilled in with an underreamer and mud motor if the surface sediments are consolidated. Rotation of the casing string is not practical because of the large support plate. Subsequent casing strings are run into a predrilled hole, hung in the housing, and cemented in place.



Schematic of the reentry cone, mud skirt, and housing with four Dril-Quip casing hangers (20 in., 16 in., 13⅜ in. and 10¾ in.) landed in the housing.

Design Features

1) Continued Drilling Option

In compliance with ODP guidelines and to determine the casing setting depth, an 'A' hole must be cored to target depth, followed by logging. The casing is then set in the 'B' hole to isolate unconsolidated formations identified in the 'A' hole. A reentry cone provides a means to mark the seafloor entrance to a borehole and to stabilize the sediments. Coring and/or drilling to total depth (TD) is possible with trips for new bits, reentries, and multiple casing strings. Existing cased legacy holes can be reentered and deepened or instruments can be added at a later date.

Benefit: Coring and/or drilling in a single borehole can be continued to achieve the deep scientific objectives of the leg.

2) Reduction of Borehole Instability

Reentry cones provide a means to hang multiple casing strings to seal off unstable formations. In areas of borehole instability, downhole motors and underreamers can be run inside casing while the casing is being installed to ensure that the casing reaches TD.

Benefit: Coring and/or drilling a borehole can be continued through unstable formations.

3) Borehole Instrumentation

Reentry cones provide a stable platform for borehole completions.

Benefit: Long-term ancillary scientific investigations can be conducted such as investigating formation permeability, temperature and pressure changes over time, conducting fluid sampling, and seismic event monitoring.

Casing Running Tools

20 in. CADA (Cam Actuated Drill Ahead) Casing Running Tool

The CADA casing running tool is deployed on the drill string to emplace 20 in., 16 in., and 13⅜ in. casing in a borehole where a reentry cone has been installed. As an option, once the casing has been installed, the drill string can be released from the CADA tool. This feature allows casing to be set and the borehole drilled ahead of the casing in a single pipe trip.

Benefit: Eliminates a round trip for a bit change to open up the hole for casing.

10¾ in. Casing Running Tool

The 10¾ in. casing running tool is run on the drill string to install the 10¾ in. casing in a borehole after a reentry cone has been installed. Unlike the CADA tool, the 10¾ in. casing running tool does not have a "drill ahead" feature; therefore, before the borehole can be continued, a round trip of the drill string is required to remove the 10¾ in. casing running tool.

Reentry Cone Specifications (see Table 1)

Reentry Cone Diameter

13 ft (4.0 m)

Height above the Mudline

7 ft (2.1 m)

Baseplate Support Area

120 ft^2 (11.1 m^2)

Transition Pipe below Rentry Cone

26 in. outside diameter (OD); 24 in. inside diameter (ID)

Limitations

To minimize operational time for setting casing and reduce the risks associated with an underreaming operation, double casing string configurations are recommended.

If triple or quadruple casing programs are required because of formation stability problems, underreaming should be done in the softer formations in the upper hole (<500 to 700 m).

The Ocean Drilling Program does not normally carry underreamers or bits larger than 17½ in. as part of its inventory on board the *JOIDES Resolution.*

Table 1. Casing size options.

OD casing (in.)	Open hole (bit size) (in.)	OD casing coupling (in.)	Weight (lb/ft)	ID (nominal) (in.)	Drift (in.)	Cemented?	TD range (m)
20	24	21	94.0	19.124	18.936	No	40–80
16	20	17	75.0	15.124	14.936	Cemented below 20 in. casing	40–80 or 200–500
13⅜	17½	14⅜	54.5	12.615	12.456	Yes	300–700
10¾	14¾	10¾	40.5	10.050	9.894	Yes	500–1500

Note: Recommended casing configurations to avoid running an underreamer to create the open hole for the casing are 16:10¾ in. and 20:13⅜ in.