

How riser drilling works, and import samples

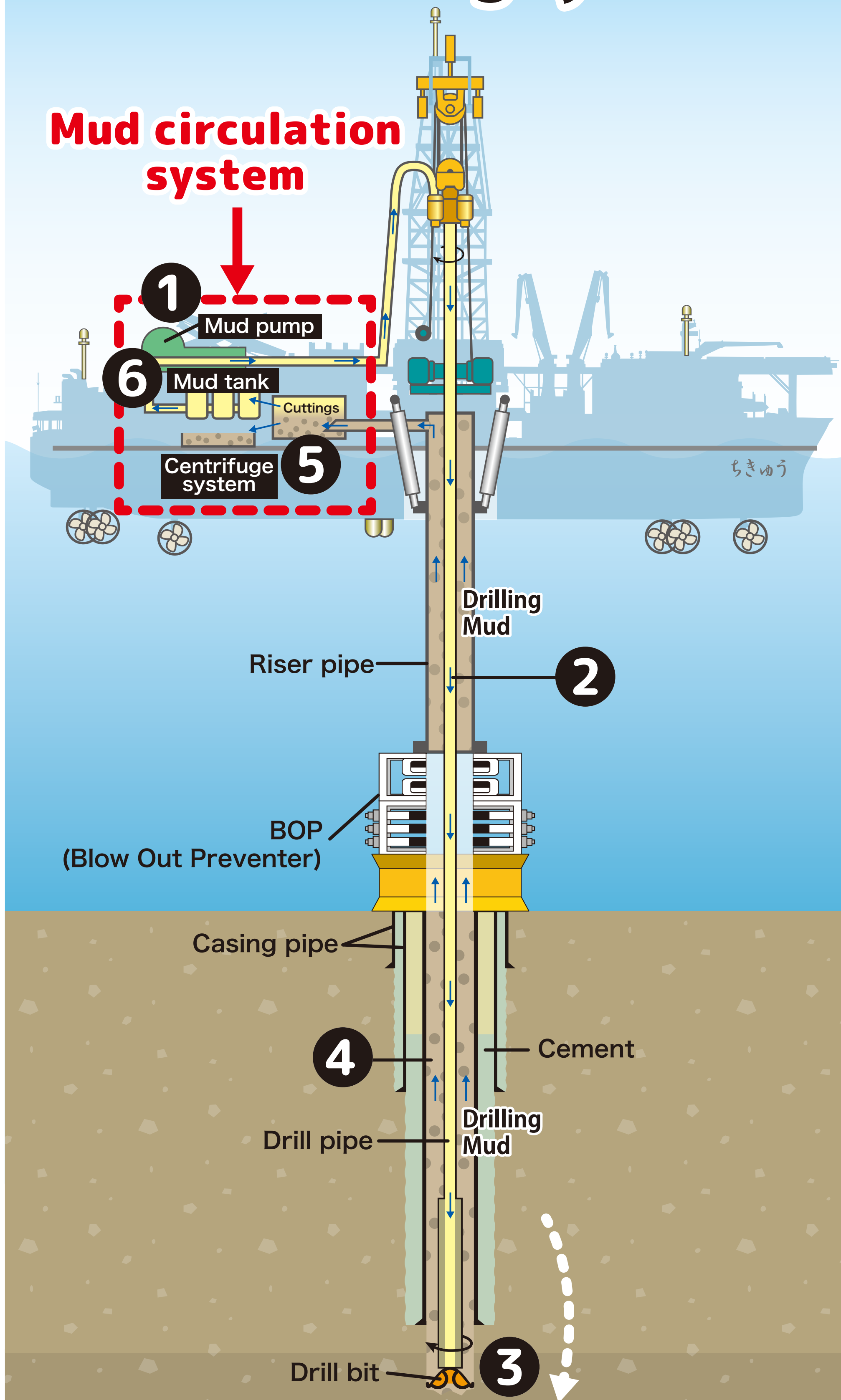
The Mud Circulation System and Cuttings

Mud Circulation System

Drilling mud circulates between the vessel and downhole during riser drilling. Once the drilling mud returns to *Chikyū*, the solids are removed, and the liquid is recycled and reused.

This is called the “mud circulation system”. The cuttings and other solids are collected, and not dumped, to protect the environment. Riser drilling mud is a special composition of various materials and chemicals.

Riser drilling system



Drilling mud usage

- Removes cuttings from borehole.
- Cools and washes the drill bit and downhole equipment (jetting speed is 100-120 m/s).
- Prevents borehole collapse by coating the borehole wall with drilling mud.
- Transfers borehole information (geology, gas, etc.) to the ship.
- Suspends cuttings in the drilling mud when mud circulation stops.

Mud circulation route

1 Mud pump (on vessel)

Pump circulating drilling mud.



6 Mud tank

Recycle mud after special processing.



2 Through drill pipes.

3 Jetting from drill bit. Mixture with cuttings.

4 Annulus (space) between drill pipes and riser pipes.

5 Solid-liquid separation (on vessel)

Separate mud from cuttings in a three step process:

Sieve with conveyor



Centrifuge system



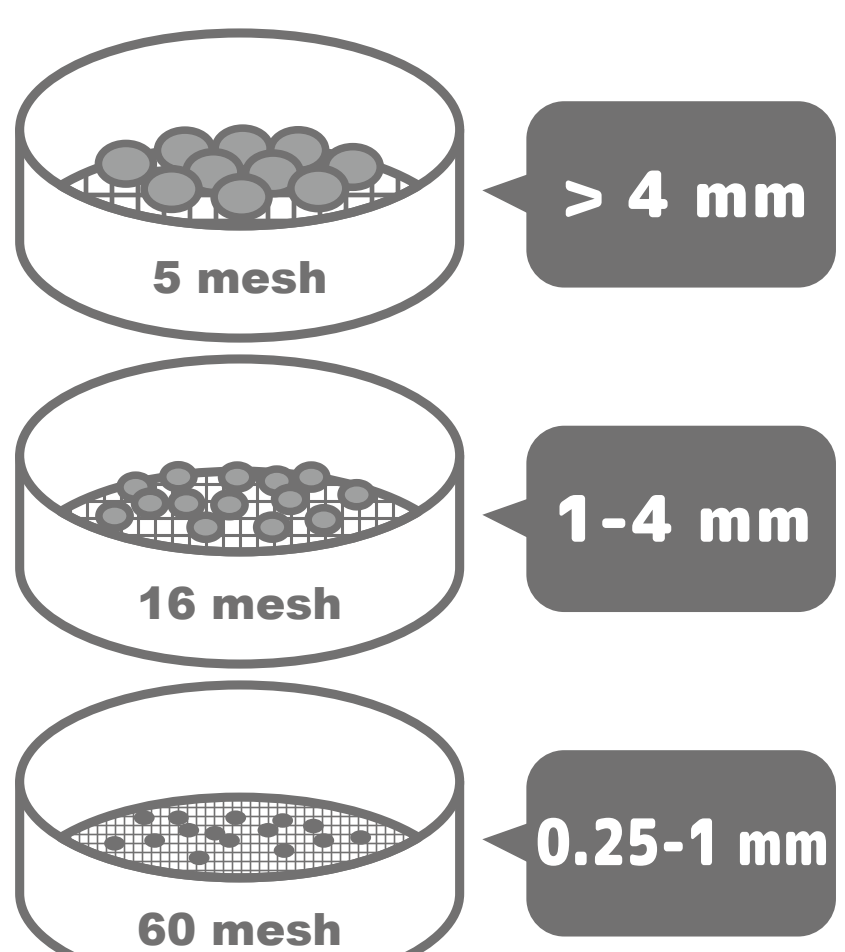
Shale shaker (sieve with vibration)



Then sample for laboratory analysis.

Cuttings

Cuttings are separated by the shale shaker, and they are as important as core samples. They are processed and analyzed in the laboratory.



Separating cuttings with the shale shaker.



Photos: Continuous formation changes are observed in cuttings, after sorting with sieves and examined by microscope.