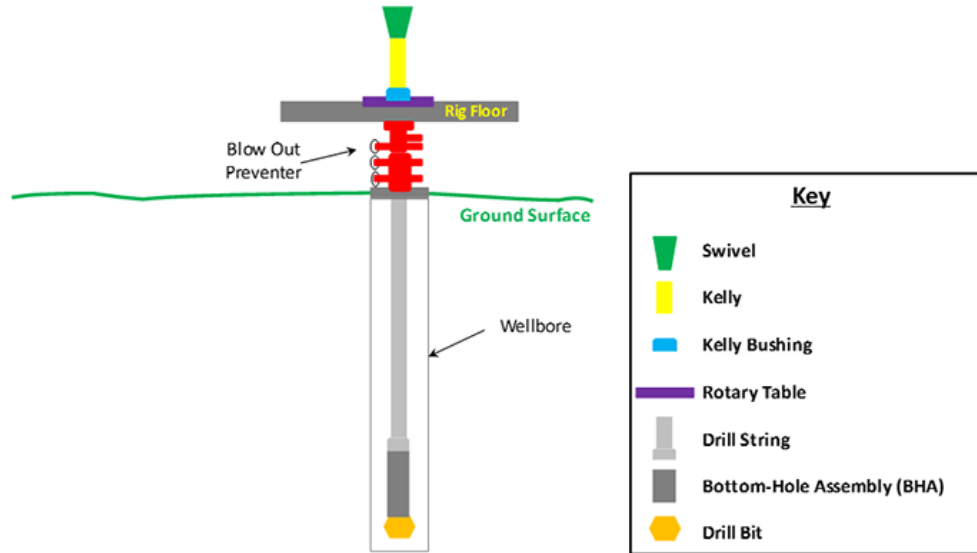




# Rotary System



Petroleum Well Drilling Engineering

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# Rotary System

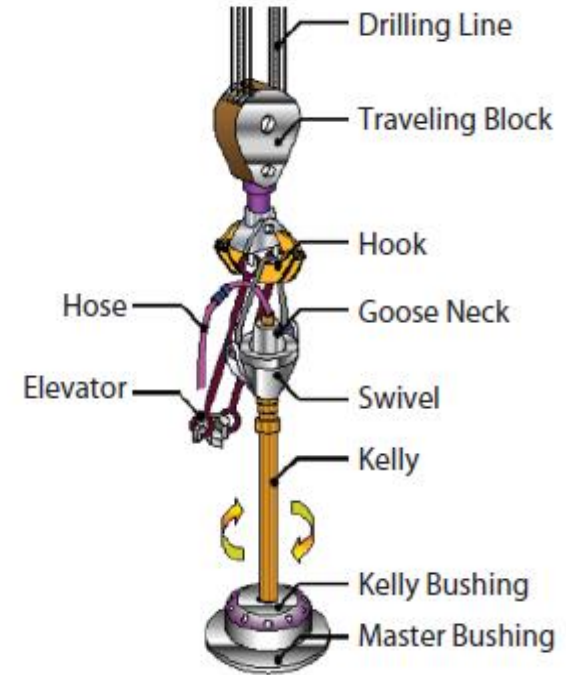
A rotary system is designed to give the continuous rotation from the surface to the drill string assembly to achieve bit rotation. This system includes all of the equipment used to attain bit rotation. There is a rotating machine (rotary table) on the rig floor, through which drill pipe is run. The drilling bit is screwed on (or made up) to the end of the drill pipe and lowered into the hole. As the hole gets deeper more sections of drill pipe are added to the drill string on surface. When the rotary table is engaged it rotates the pipe and the bit, which cuts away the rock at the bottom of the hole. A schematic diagram of different components of rotary system

# The main components of rotary system

include :

- (1) Rotary drive (top drive)
- (2) Swivel
- (3) Kelly , Kelly bushing and Master bushing.
- (4) Rotary table

There are some other related components such as,  
Kelly hose, drill pipes, drill collar and bit etc.

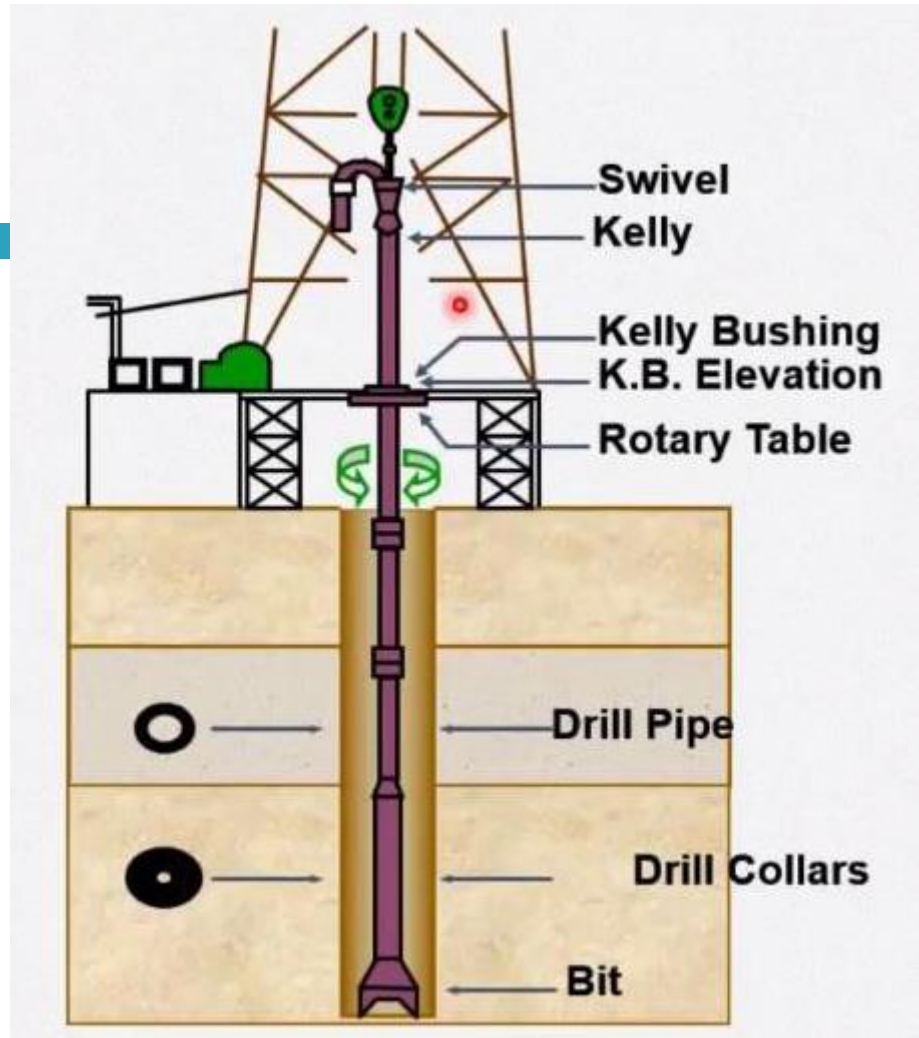


components of rotary system.

## Function

The system of rotation is intended to cause the drill string to rotate.

# Figure shown components of rotary system



## 1. Top drive

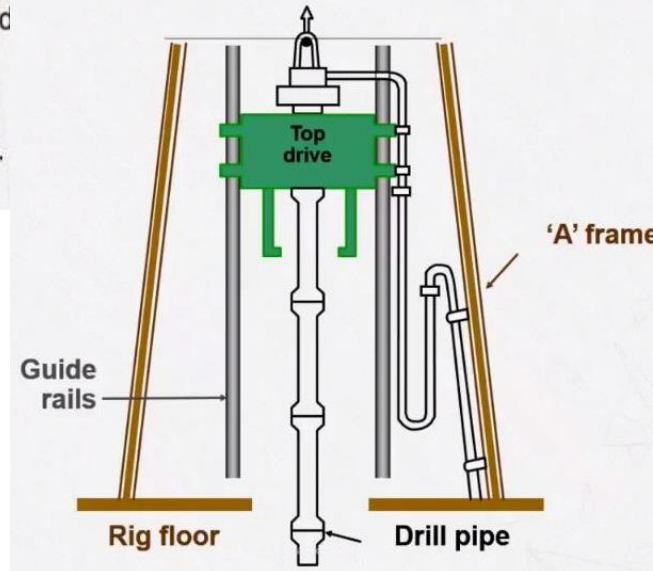
- ❖ The top drive is a relatively recent piece of equipment, introduced towards the mid-1980s, grouping together in a single unit the equipment for connecting the drill pipes, rotation of the drill string and circulation of the fluid
- ❖ The top drive unit is suspended from the hook and is guided by two vertical rails fixed to the derrick, which provide the reactive torque necessary to prevent the rotation of the whole complex and to allow free vertical movement.



## 1. Top drive

the use of the top drive instead of the rotary table offers numerous advantages, including:

- 1 possibility of 'drilling by stands' (adding the pipes by stands, and not individually), allowing greater control of drilling.
- 2 the reduction of the time required to connect the pipes, with less risk of accidents for drilling operators
- 3 the possibility of performing the trip-out operation while circulating mud and rotating the string (*back reaming*), impossible with the rotary table and useful for preventing the drill string from becoming stuck
- 4 the possibility of obtaining longer cores, as intermediate connections are eliminated.



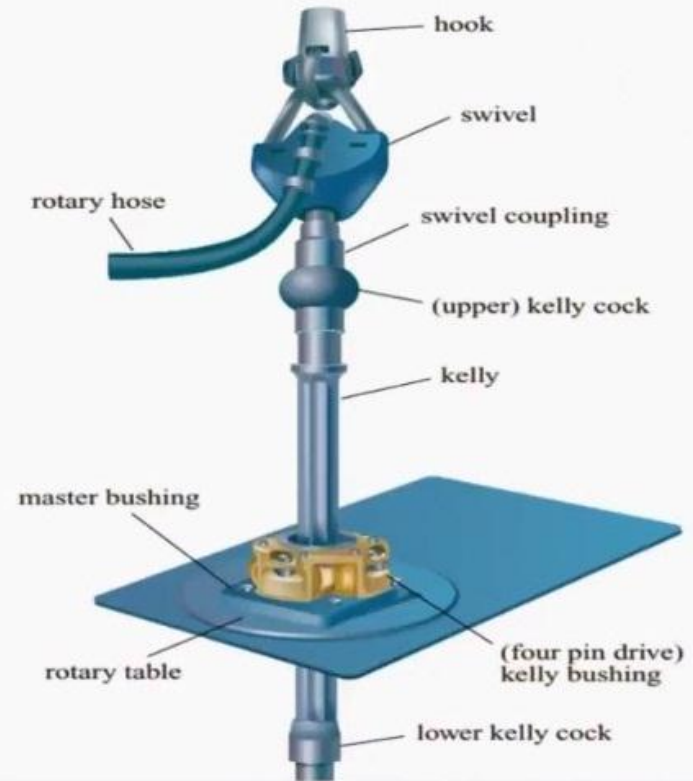


## 2. swivel

- ❖ The rotary tool that is hung from the hook of the traveling block to suspend the drillstring and permit it to rotate freely.
- ❖ It also provide connection for the rotary hose and provide passageway for the flow of drilling fluid into the drill stem.

## 3. Kelly

- ❖ The Kelly is a pipe of square or hexagonal section that transmits the motion of the rotary table to the drill string.
- ❖ It receives this motion from the Kelly bushing, to which it is joined through a sliding coupling, so that it can move vertically.

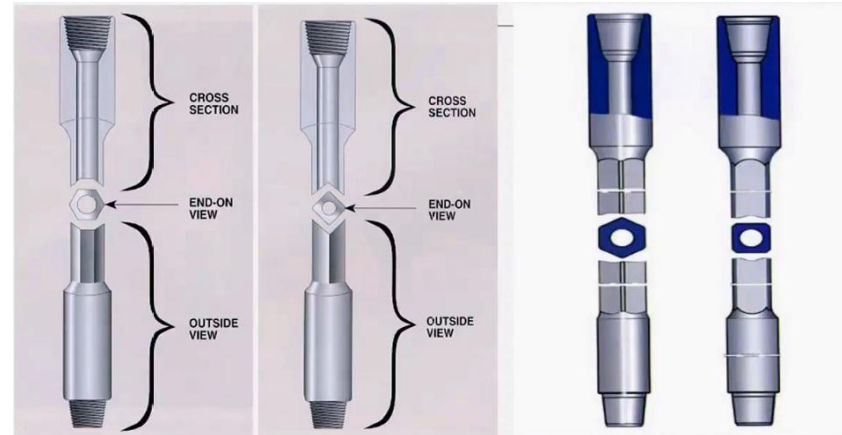


# The Kelly

The kelly is rotating link between the rotary table and drill string

- Transmits rotation and weight-on-bit to the drill bit
- Supports the weight of the drill string
- Connects to the swivel and allow circulation thru pipe
- Provide access to the drilling fluid into the drill string.

The Kelly comes in lengths ranging from 40 to 54ft. With cross sections such as hexagonal (most common), square.





A device that when fitted to master bushing transmits torque to the Kelly and simultaneously permits vertical movement of the Kelly to make hole.

## Kelly bushing



Type HDP

Heavy Duty fits 23" through 49-1/2" Rotary Table



Type HDS

Heavy Duty for Square Drive Rotary Tables



Type MDS

Medium Duty for Square Rotary Table



# Master bushing

A device that fits into the rotary table to accommodate the slips and drive the kelly bushing so that the rotating motion of the rotary table can be transmitted to the Kelly.



Type MSPC

Fits 20-1/2" to 27-1/2" Rotary Tables



Type MPCH

Fits 37-1/2" to 49-1/2" Rotary Tables



Type MSPC

Fits 17-1/2" to 27-1/2" Rotary Tables

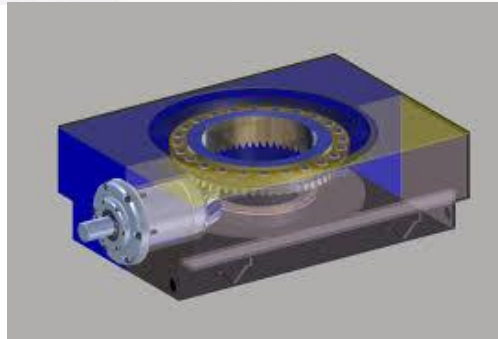
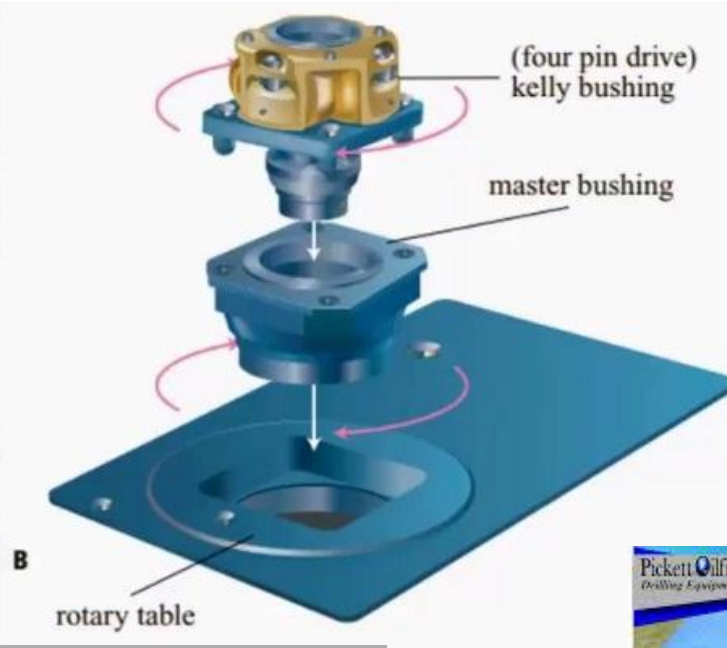


Type MBSS

Fits 17-1/2" to 27-1/2" Rotary Tables

## 4- Rotary table

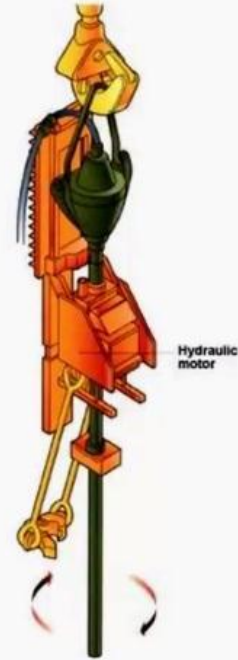
- ❖ The rotary table makes the drill string rotate and supports its weight during operations or during the connection of a new drill pipe, when it cannot be borne by the hook



# Correlate between (Homework)



Rotary Table drive Drilling



Top Drive Drilling