

Well Kick: Unwanted flow of formation fluid into the wellbore during drilling is known as well kick.

* If kick is not controlled it causes blowout of the well.

Surface indication of a well kick:-

- 1/ Increase in pit level :- During a kick, formation fluid enters into the wellbore hence increase the mud level in mud pit.
- 2/ Increase in penetration rate :- Sudden increase in penetration rate when soft or abnormally pressured formations are encountered. So there is a probability of kick in such cond.
- 3/ Decrease circulation pressure :-
When formation fluid enters into the well-bore it may cause a reduction of viscosity & density of drilling fluid hence decrease in circulation press^r.

* (formation fluid \rightarrow underground fluid, it may be gas or oil)
circulation press^r \rightarrow mud circulation press^r

($\because P = \rho gh$, formation fluid causes less density, hence P will be less)

4/ Gas, oil or salt-cut mud \rightarrow When there is a presence of gas, oil or salt in the drilling mud it indicates the influx of formation fluid, hence indicates kick.

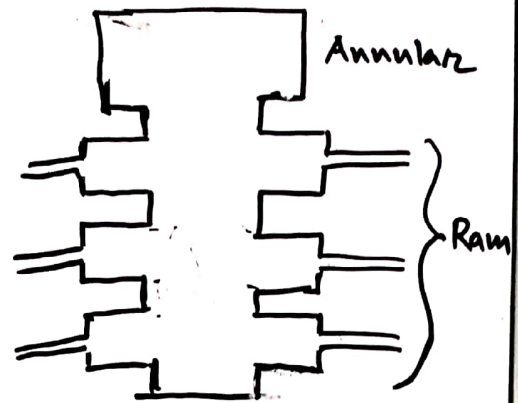
5/ Chloride Increase \rightarrow Quantity of chloride in mud is a good indicator of kick, as most formation fluid contains high level of salinity.

* Kick is controlled by using a device named BOP.

Types of BOP: →

There are two types of BOP.

- i) Annular type
- ii) Ram type



Annular preventers: →

Designed to shut off around any size

and shape of equipment run through the hole.

It can close around drill pipe, drill collars & casing and can pack off an open hole. (Operating pres^r 1500 psi)

* (Open hole :- when there is no drill pipe or tubing.)

Components of annular preventers: → (a) steel body
(b) Operating piston (c) opening & closing chambers
(d) A ring of reinforced synthetic rubber having high tensile strength.



Fig: Open-hole

Ram Preventers: - Ram preventers of four types.

- a) Pipe ram
- b) Variable bore ram
- c) blind ram
- d) Shear ram

Pipe ram: → Designed to close around a particular size of drill pipe, tubing or casing. (500 - 3000 psi pres^r)

Variable bore ram: → (VBR)

In normal operation a BOP ram has to be changed every-time a new drill pipe or casing size is run. In offshore changing a BOP is both time consuming & expensive.

VBR have been developed to close and seal on a range of pipe sizes.

Blind ram: → They are similar to pipe rams except the packers are replaced by ones that have no cutouts in rubber. They are designed to seal off the bore when no drill string or casing is present.

Shear ram: → Shear ram is a type of blind ram that can cut the pipe and seal off the open hole. Most shear rams require 5000 psi to cut the pipe.

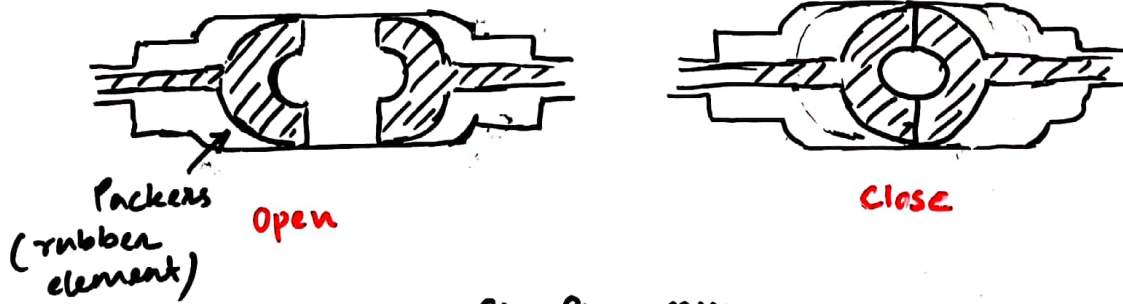


Fig: Pipe ram

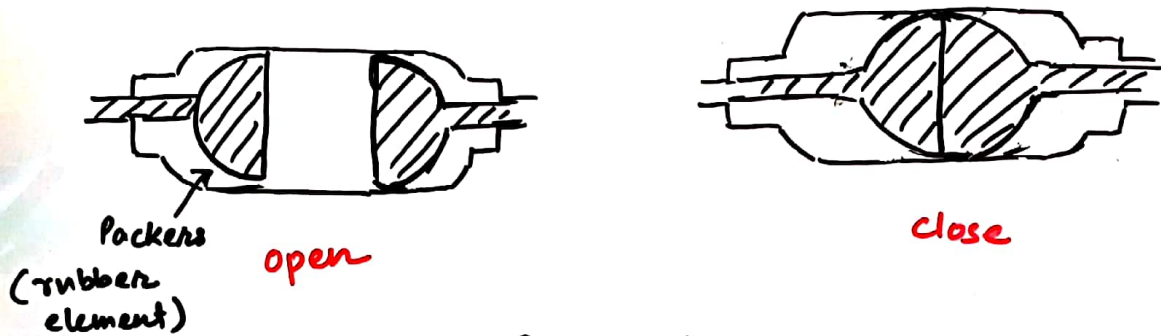


Fig: Blind Ram

VBR is similar to pipe ram having complex composition.
Shear ram is similar to blind ram except it has cutters in place of rubber element.

Probable question

- Q1. Write the function of BOP.
- Q2. What are the different types of BOP. Explain.
- Q3. What is well kick?
- Q4. What are the different surface indications of well kick.
- Q5. What is well control equipment / what is BOP.