

MOSUL UNIVERSITY
PETROLEUM & MINING ENGINEERING COLLEGE
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Casing & Casing Design

Well Drilling Engineering

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What is Casing ?

- Casing is strong steel pipe used to prevent the wall of wellbore from caving and other things. (Fig.1)

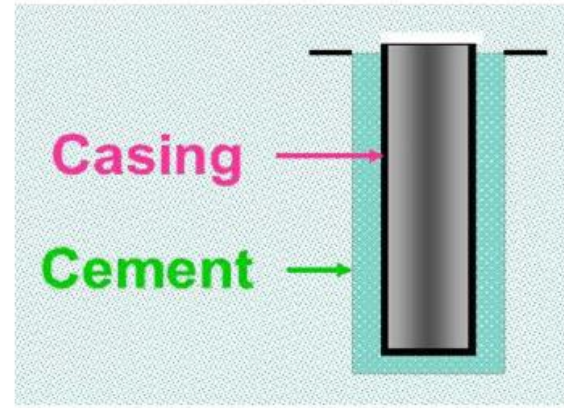


Fig.1



Why Run casing? (Functions)

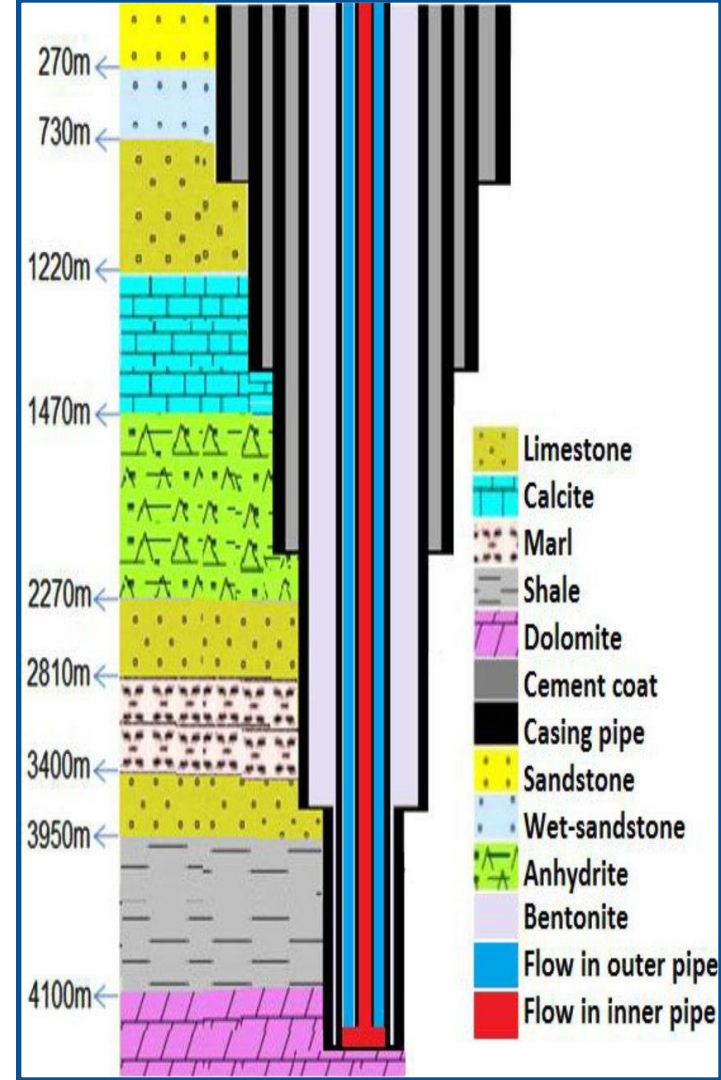
- 1. Prevents caving of the borehole.**
- 2. Provide a support for fractured, weak and vulnerable formations.**
- 3. Prevent contamination of fresh water zones, and to prevent water migration to producing formation.**
- 4. Provide support for surface equipment (Blow out prevent and production tree).**

5..Isolate abnormal pressure zones and also lost circulation zones (To control pressures during drilling).

6.Provides a borehole of a known diameter for further operation.

**7.Provide passage for production fluids.
In general production.**

8.Allow an adequate means for installing artificial lift equipment for production.



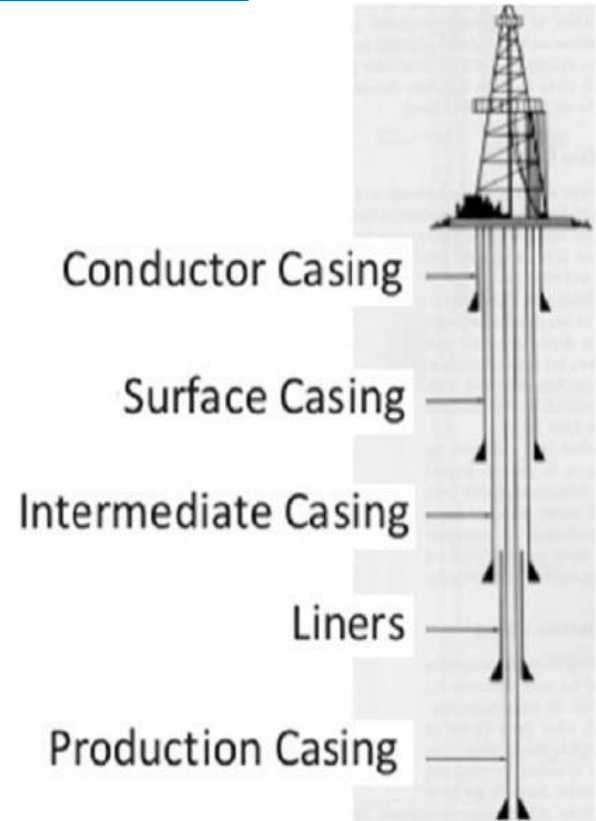
“ ■ *Type of casing strings:*

- *According to the different function, the total casing program consist of different casing strings.*

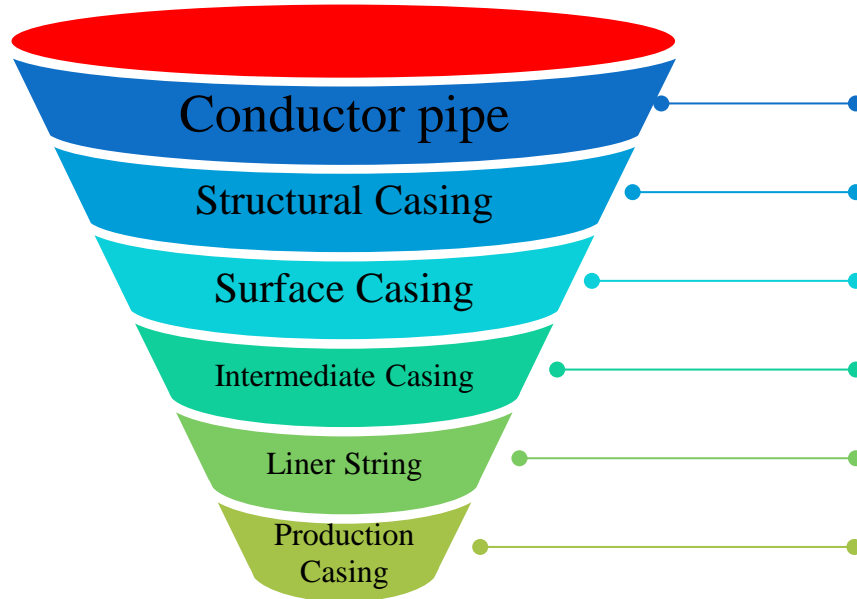


Type of casing strings:

- 1– Conductor pipe
- 2 –Structural Casing
- 3 – Surface Casing.
- 4 – Intermediate Casing.
- 5 – Liner String.
- 6 – Production Casing (tubing).



Type of casing strings:



- It is the first and largest casing to be run.
- It is generally set at 250 ft. below the ground level.
- The main function of setting the conductor pipe is sealing off the unconsolidated Formations which are near the surface. These Formations can be easily washed out with continuous mud circulation.
- They are characterized with low fracture gradient which can be exceeded by the hydrostatic pressure generated by the drilling fluids.



Surface Casing:

- Sealing off the fresh water zones and providing a support for the blowout preventer (BOP).
- The setting depth of this casing has to be accurately designed in areas where high pressure is expected.
- If the surface casing is set higher than planned or the setting depth is underestimated, the formation at casing shoe cannot resist to the pressure exerted while circulating gas influx which can occurs during drilling the next section.



Intermediate Casing:

- Sealing off troublesome Formations which can be encountered during drilling operations till getting to the production zone.
- The number of string run as intermediate casing depends on the faced problems such as: lost circulation zones, unstable shale, squeezing salts and abnormally pressured zones.



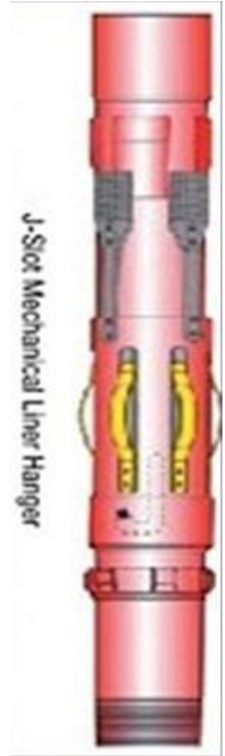
Production Casing:

- It can be set above the production zone or run through it.
- The main function is to isolate production zone from the other Formation such as water bearing sands.
- This type of casing is also used as a conduit for production tubing.



Liners:

- Contrarily to the other types of casing strings which are hanged at the surface, the liners are suspended inside the previous casing string by the liner hangers.
- The liner hangers consisted of slips which can be activated hydraulically or mechanically. Slips grip inside the previous string in order support the weight of the liner.





Example Hole and string sizes (in)

Example Hole and String Sizes (in)

Hole Size

Pipe Size

36"

Structural casing

30"

26"

Conductor string

20"

17 1/2"

Surface pipe

13 3/8"

12 1/4"

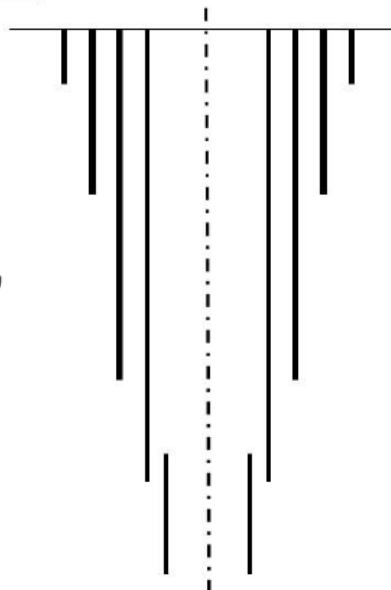
Intermediate String

9 5/8"

8 3/4"

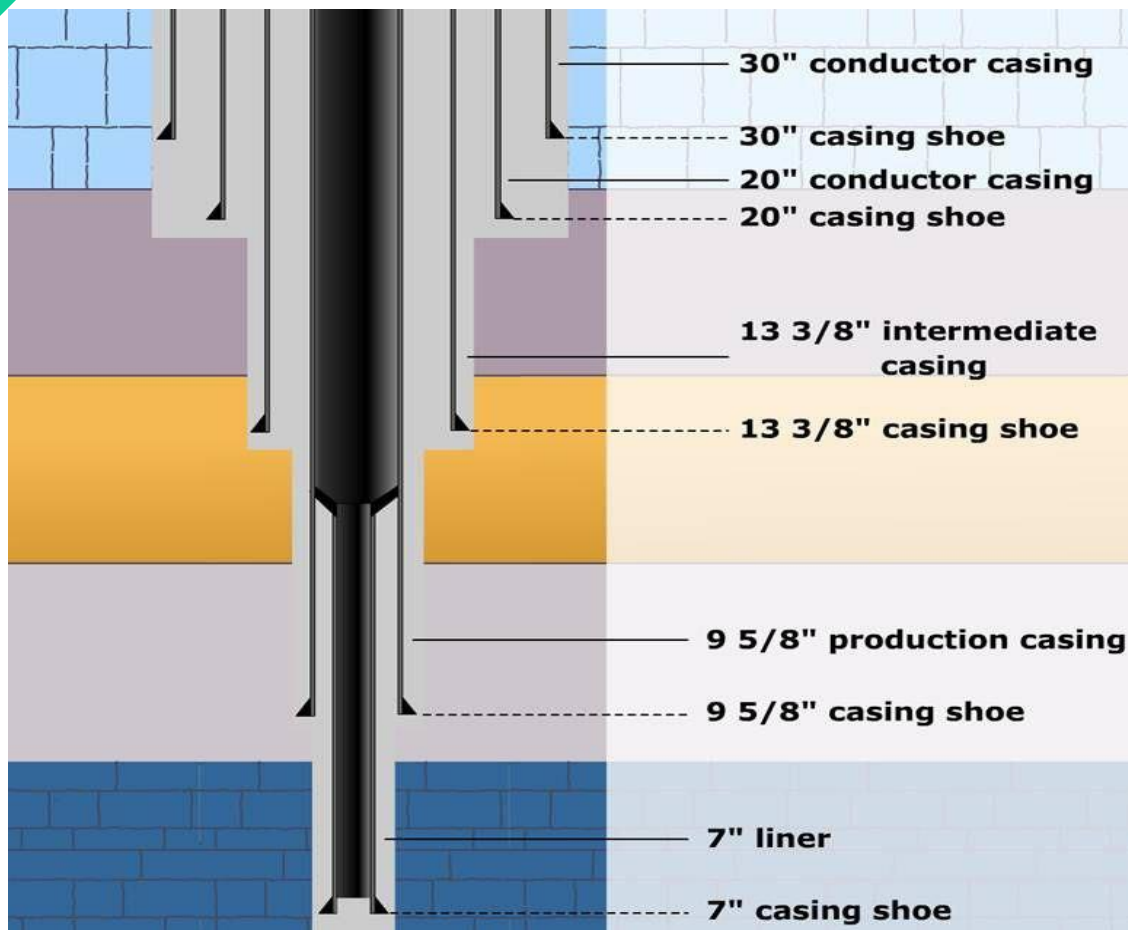
Production Liner

7"





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THANKS!

By Dr. Mohammed Ali Alrashedi