Well Drilling Engineering

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MOSUL UNIVERSITY

PETROLEUM & MINING ENGINEERING COLLEG

Casing 2

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Casing physical properties

- Once the casing size and setting depth are selected, the loads which are exerted on the casing string will be calculated. According to these loads the casing properties are selected. Casing is classified in terms of outer diameter or size, weight, grade and the type of the connection.

Casing size and weight:

- The size of the casing or also called the outer diameter of casing joint varies from 4.5” to 36”.
- The string which has less than 4.5” is called the tubing rather than casing.
- The casing sizes are limited to standard sizes which can be available in the market.

Casing size and weight

- The API has designed and limited the internal diameter of a casing joint, but this diameter can vary slightly when manufacturing the joint of casing.
- A minimum guaranteed internal diameter is called drift diameter which is important when planning for further operations (ex: the drilling bit which will be run to drill the next section has to be less than the drift diameter).
- The casing joint is characterized by the casing weight which is given as weight per foot.

Classification of Casing:

1 – Outside diameter of casing pipe (e.g. 95/8").

2 – Wall thickness of casing (e.g. 1/2").

3 – Grade of material (e.g. N – 80).

4 – Type to threads and couplings (e.g. API LCSG).

5 – Length of each joint (RANGE) (e.g. Range 3).

6 – Nominal weight (Avg. wt/ft incl. wt coupling) (e.g. 47 Ib/ft).

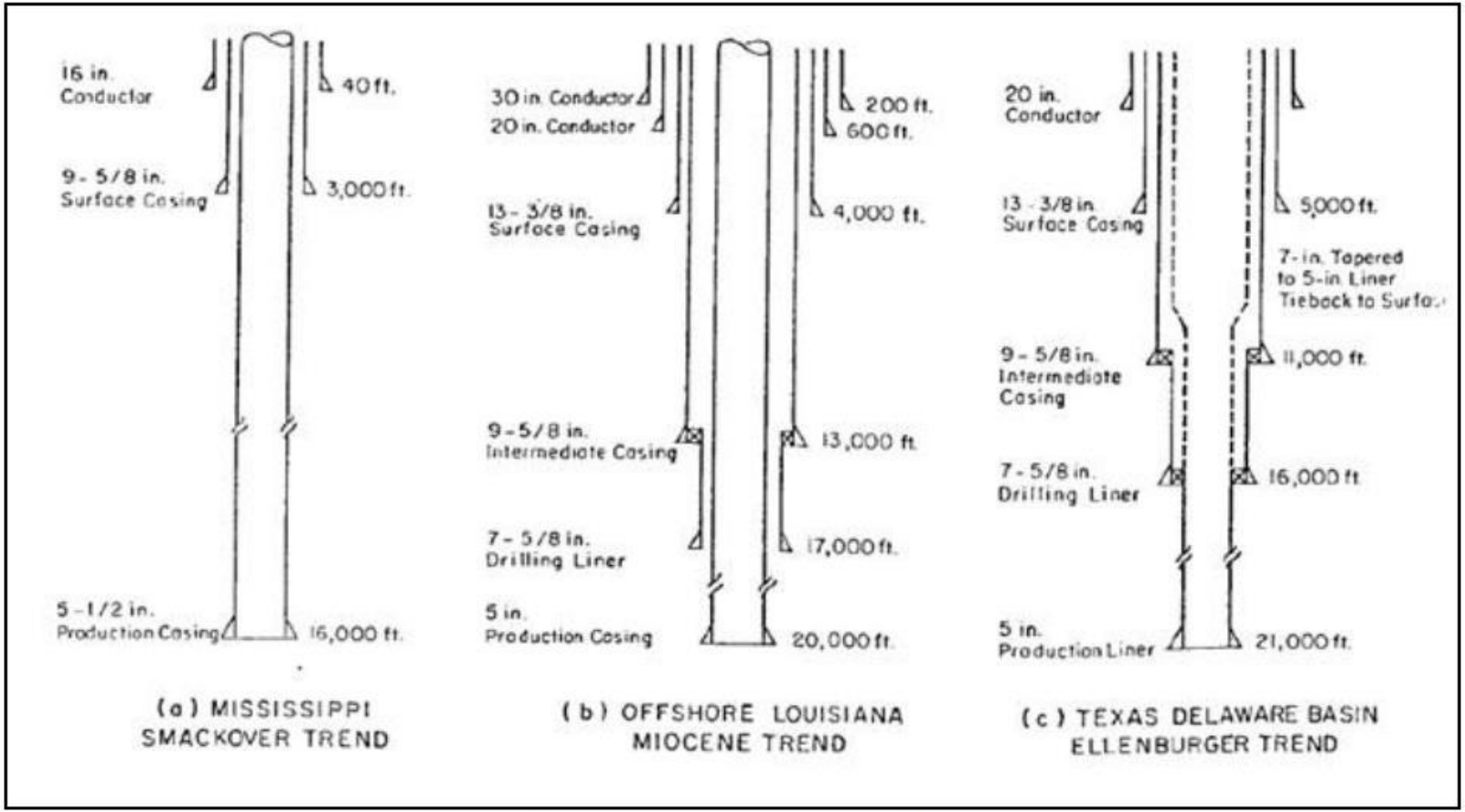

Fig.2 Examples of casing programs

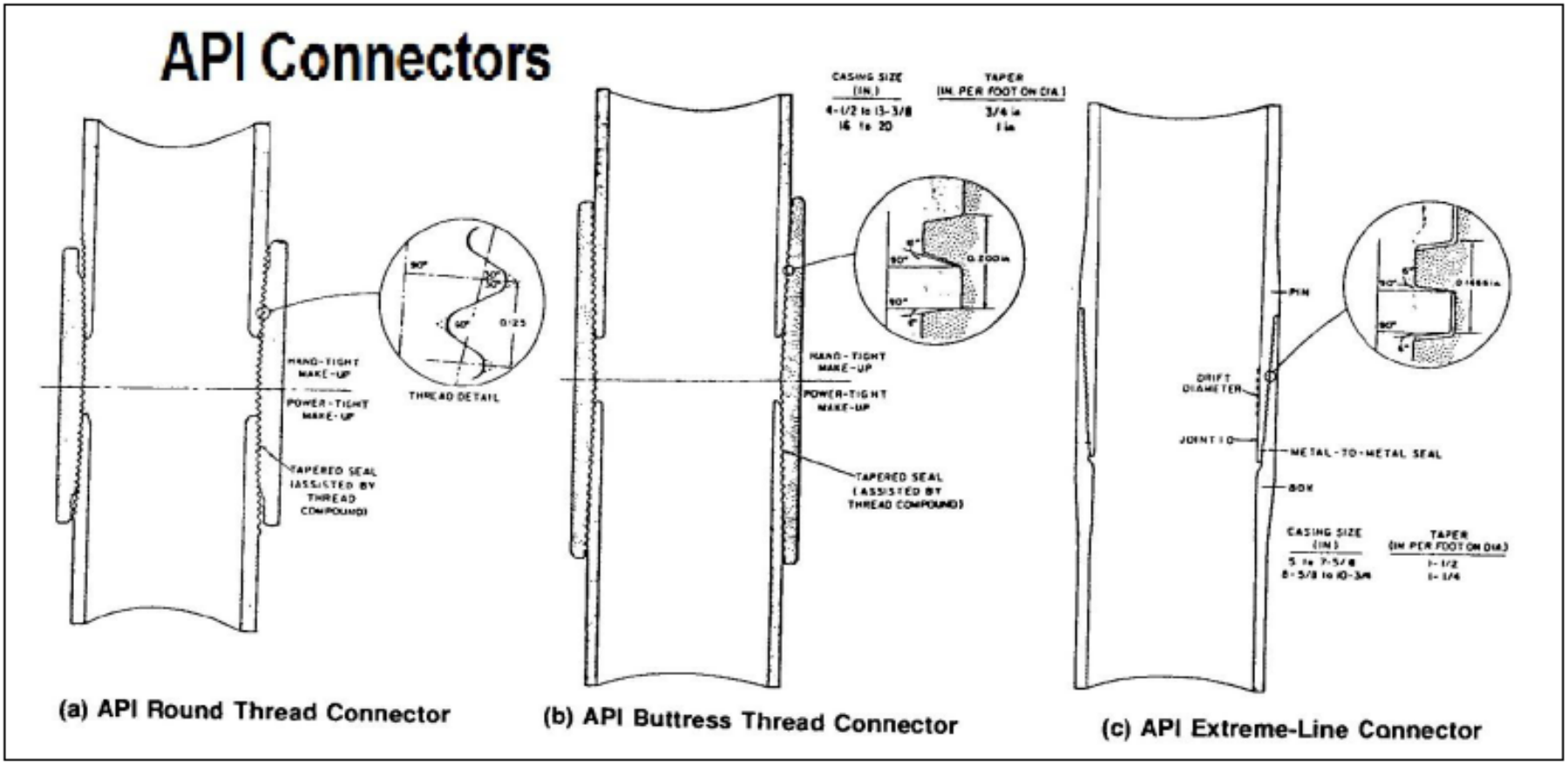

Fig.3 The API Connectors

Info. needed for casing design:

1) Mud weight.
2) Formation pressure.
3) Frack gradients.
4) Casing seats.
5) Directional plans.
6) Cement program.
7) Temperature profiles.
8) Base frack fluid, propant type and max propant concentration.
9) Max anticipated frack surface pressure.
10) Produced fluid composition.

Casing Design:

The casing design process involves three distinct operations:

1. The selection of the casing sizes and setting depths.
2. The definition of the operational scenarios which will result in burst, collapse and axial loads (Tension).
3. The calculation of the magnitude of these loads and selection of an appropriate weight and grade of casing.

API Casing Performance Properties:

The most important performance properties of casing include its rated values for axial tension, burst pressure and collapse pressure Fig.4, The secondary bending, buckling, and temperature effect.

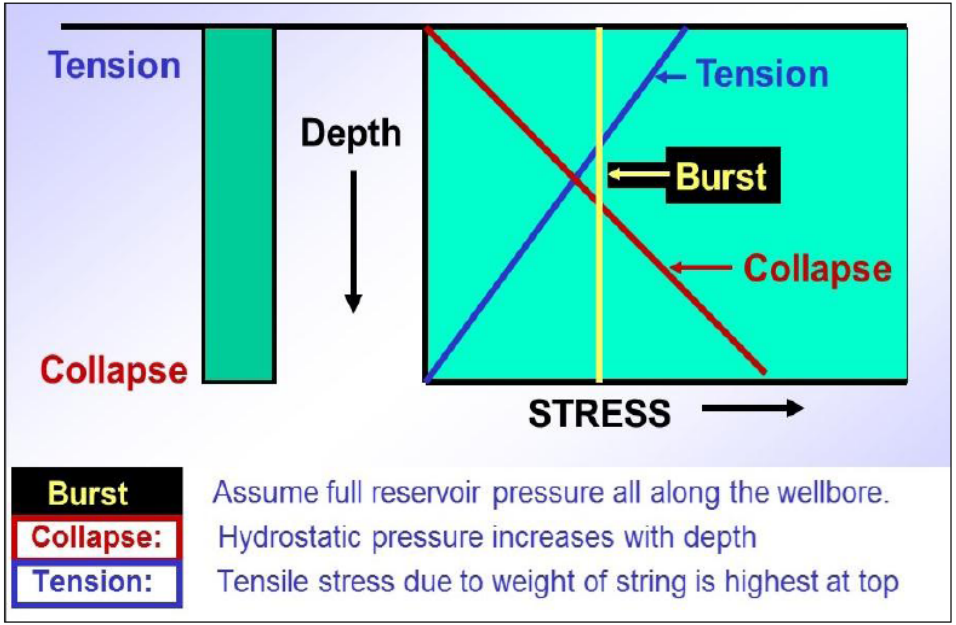

Fig.4 Relationship between the different stresses & depth

THANKS!

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