**Stripping/Snubbing Calculations**

**Breakover Point Between Stripping and Snubbing**

Sample Case : Use the following data to determine the breakover point :

DATA : Mud weight = 12.5 ppg  
 Drill collars (6-1/4 in.— 2-13/16 in.) = 83 1b/ft  
 Length of drill collars = 276 ft  
 Drill pipe = 5.0 in.  
 Drill pipe weight = 19.5 lb/ft  
 Shut-in casing pressure = 2400 psi  
 Buoyancy factor = 0.8092

**Determine the force (lb) created by wellbore pressure on 6-1/4 in. drill collars :**

*Force (lb) = [pipe or collar OD (inch)]2 x 0.7854 x wellbore pressure (psi)*

= 6.252 x 0.7854 x 2400 psi

= 73,631 lb

**Determine the weight (lb) of the drill collars ;**

**Additional weight required from drill pipa :**

**Length of drill pipe required to reach breakover point :**

Length of drill string to reach breakover point :

**Minimum Surface Pressure Before Stripping is Possible**

Sample Case : Drill collars — 8.0 in. OD x 3.0 in. ID = 147 lb/ft  
 Length of one stand = 92 ft

Minimum surface pressure (psi) = (147 lb/ft x 92 ft) ÷ (82 x 0.7854)

= 13,524 ÷ 50.2656 sq in.

= 269 psi

**Height Gain From Stripping into Influx**

Where, L = length of pipe stripped (ft)  
 Cdp = capacity of drill pipe, drill collars or tubing (bbl/ft)  
 Ddp = displacement of drill pipe, drill collars or tubing (bbl/ft)  
 Ca = annular capacity (bbl/ft)

Sample Case : If 300 ft of 5.0 in. driil pipe — 19.5 lb/ft is stripped into

An Influx in a 12-1/4 in. hole, determine the height (ft)

gained :

DATA : Drill pipe capacity = 0.01776 bbl/ft  
 Drill pipe displacement = 0.00755 bbl/ft  
 Length drill pipe stripped = 300 ft  
 Annular capacity = 0.1215 bbl/ft

Solution :

**Casing Pressure Increase From Stripping Into Influx**

Sample Case : Gain in height = 62.5 ft  
 Gradient of mud (12.5 ppg x 0.052) = 0.65 psi/ft  
 Gradient of influx = 0.12 psi/ft

psi = 62.5 ft x (0.65 — 0.12)

= 33 psi

**Volume of Mud to Bleed to Maintain Constant Bottom hole**

**Pressure with a Gas Bubble Rising**

With pipe in the hole :

Where ;

Vmud = volume of mud (bbl) that must be bled to maintain constant

bottomhole pressure with a gas bubble rising.  
Dp = incremental pressure steps that the casing pressure will be allowed

to increase.  
Ca = annular capacity (bbl/ft)

Sample Case : Casing pressure increase per step = 100 psi  
 Gradient of mud (13.5 ppg x 0.052) = 0.70 psi/ft  
 Annular capacity = 0.1215 bbl/ft  
 (Dh = 12-1/4 in.; Dp = 5.0 in.)

With no pipe in hole:

Where, Ch = hole size or casing ID, in.

Sample Case : Casing pressure increase per step = 100 psi  
 Gradient of mud (13.5 ppg x 0.052) = 0.702 psi/ft  
 Hole capacity (12-1/4 in.) = 0.1458 bbl/ft

**Maximum Allowable Surface Pressure (MASP) Governed by the Formation**

Sample Case : Maximum allowable mud weight = 15.0 ppg  
 (from leak-off test data)  
 Mud weight = 12.0 ppg  
 Casing seat TVD = 8000 ft

MASP (psi) = (15.0 — 12.0) x 0.052 x 8000

= 1248 psi

**Maximum Allowable Surface Pressure (MASP) Governed by Casing Burst Pressure**

Sample Case : Casing — 10-3/4 in. — 51 lb/ft N-80  
 Casing burst pressure = 6070 psi  
 Casing setting depth = 8000 ft  
 Mud weight behind casing = 9.4 ppg  
 Mud weight in use = 12.0 ppg  
 Casing safety factor = 80%

MASP = (6070 x 80%) — [(12.0 —9.4) x 0.052 x 8000]

= 4856 — (2.6 x 0.052 x 8000)

= 3774 psi