## Task #1: How far can we drill with the four types of drill strings?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Grade** | **Coefficient of friction** | **Flow Rate** | **Tripping Parameters** | **Maximum allowable drilling depth** |
| **E-75** | Casing/String=0.25  Well/String=0.30 | Q=500 gpm | RPM=50  Speed=30 | 11450 |
| **G-105** | 13200 |
| **S-135** | 14250 |
| **X-95** | 12300 |

## Task #2: What is the maximum flow rate that the von Mises stress in the drill string would be in safe window?

|  |  |  |  |
| --- | --- | --- | --- |
| **Grade** | **Coefficient of friction** | **Tripping Parameters** | **Maximum allowable flow rate for Von Misesto be within the safe window** |
| **E-75** | Casing/String=0.25  Well/String=0.30 | RPM=50  Speed=30 | 950 |
| **G-105** | 1350 |
| **S-135** | 1500 |
| **X-95** | 1150 |

## Task #3: What is the effect of pack off/poor hole cleaning on torque and drag?

|  |  |  |  |
| --- | --- | --- | --- |
| **Senario 1** | **Coefficient friction** | **Tripping in/out parameters** | **Analyze the mechanics of string -Comment your simulation result** |
| 1 Normal | Casing/String=0.25  Well/String=0.30 | RPM=50  Speed=30 | Our trip in and trip out curves in safe window by using these coefficients of friction. |
| 2 poor hole cleaning/Pack off | Casing/String=0.35  Well/String=0.45 | Curves move slightly right when we change our friction coefficient in normal scenario. In second case, like well/string, our curves cross the torque limit. |

## 

## Task #4: Parametric sensitivity study on E-75 grade drill string.

## 

a) What is the effect of **RPM** on torque, effective tension, Von Mises? (RPM = 30, 60, 90, 120)?

* Torque will increase.
* Effective tension will decrease.
* Von Mises will decrease.

b) What is the effect of **tripping speed** on torque, effective tension, Von Mises? (20, 30, 60ft/min)?

* Torque will decrease.
* Effective tension will increase.
* Von Mises will increase.

c) What is the effect of **flow rate** on torque, effective tension, Von Mises? (250, 500, 750gpm)?

* Torque will decrease.
* Effective tension will decrease.
* Von Mises will increase.

d) What is the effect of **density of drilling** fluid on torque, effective tension, Von Mises? (1.2, 1.5, 1.75sg)?

* Torque will decrease.
* Effective tension will decrease.
* Von Mises will decrease.

e) What is the effect of **weight per unit length** of the drill string on torque, effective tension, Von Mises? (Select two different weight per length from wellplan, example….23, 29lbf/ft)?

* Torque will increase.
* Effective tension will increase.
* Von Mises will decrease.

## Task #5: Make your final comment comparing the results your obtained with the theory

* Do the results make sense with reference to the theory we have during lecture? If not which part?

Ans: Yes our parameter are according to the theory about drill string mechanics.