Drilling rig and hoisting system

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Outline

Today

- Introduction
- Drilling rig system
- Hoisting system
- Exercises

Tomorrow

- Circulating and driving system
- Drilling cost
- Drilling completion
- Exercises
- Assignments

Introduction

Drilling engineering is a big subject because it has many topics to talk about. The basics of drilling engineering deals with surface equipment such as drilling rig power , hoisting and mud circulation system

Connecting the drill pipes

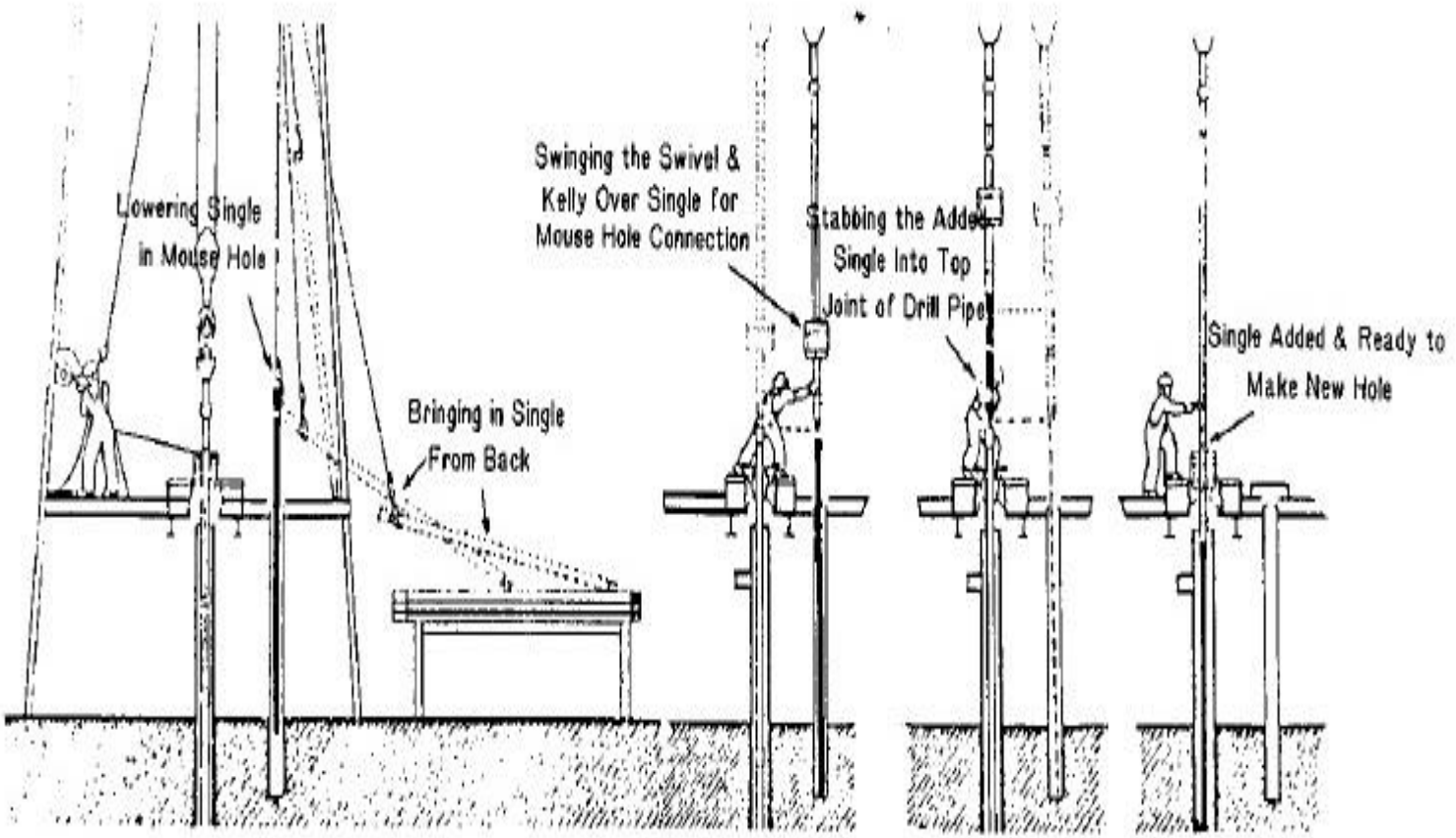


Fig. 1.14 – Making a connection.[12]

Source: Applied Drilling Engineering. Bourgoyne & Young

Relieving the pipes

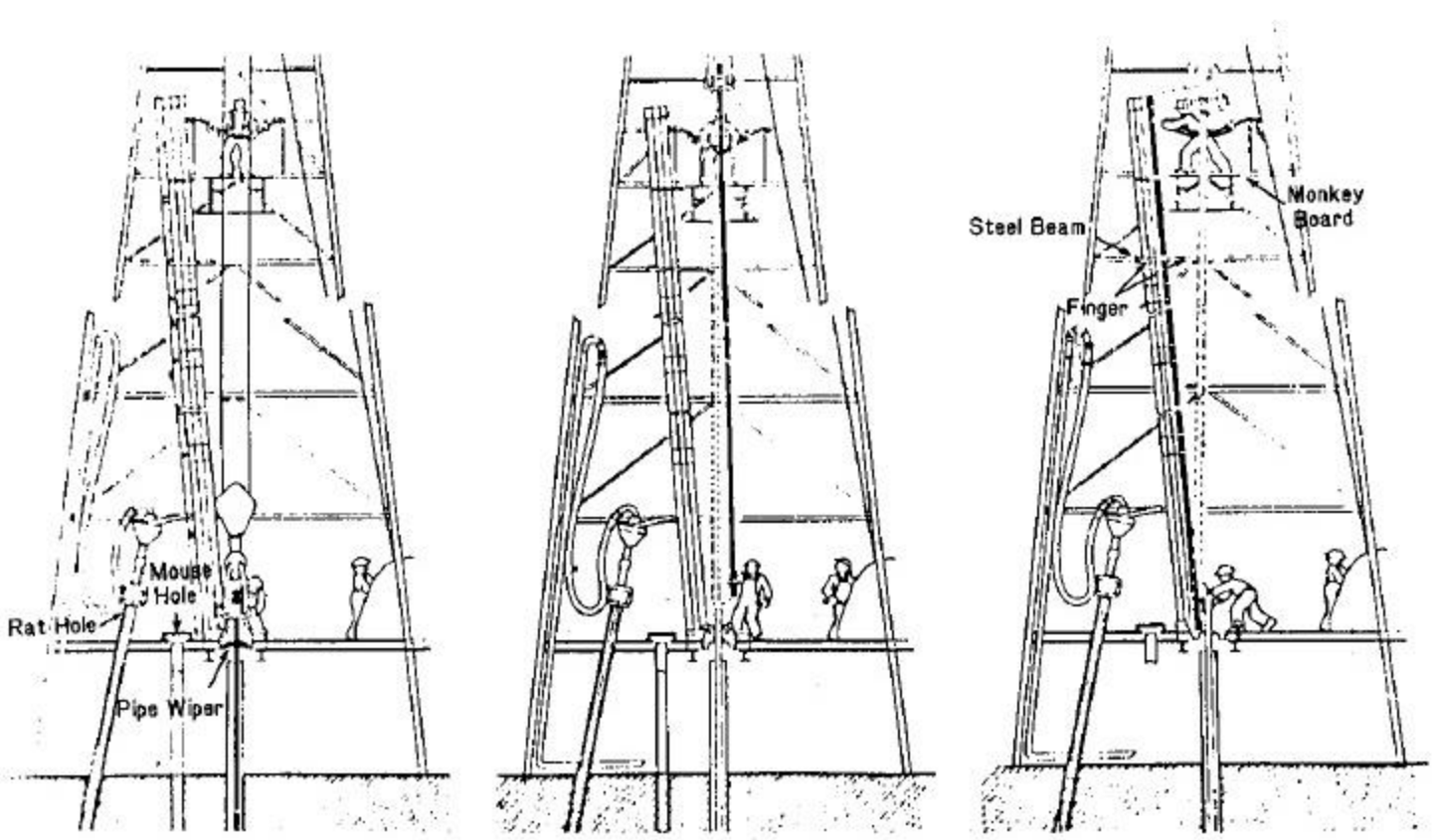


Fig. 1.15 – Pulling out of the hole.[12]

Source: Applied Drilling Engineering. Bourgoyne & Young

Drilling rig hoisting system

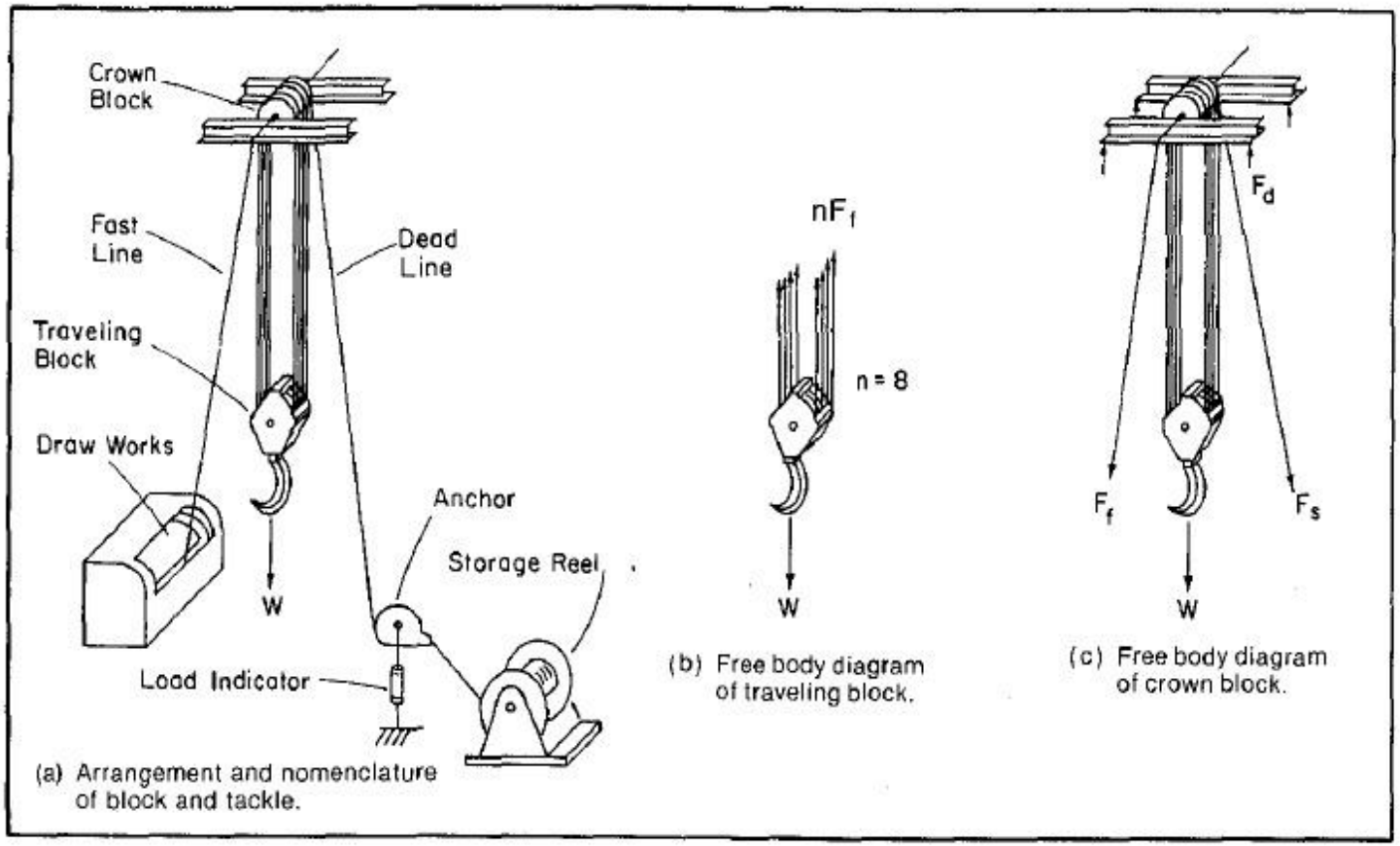
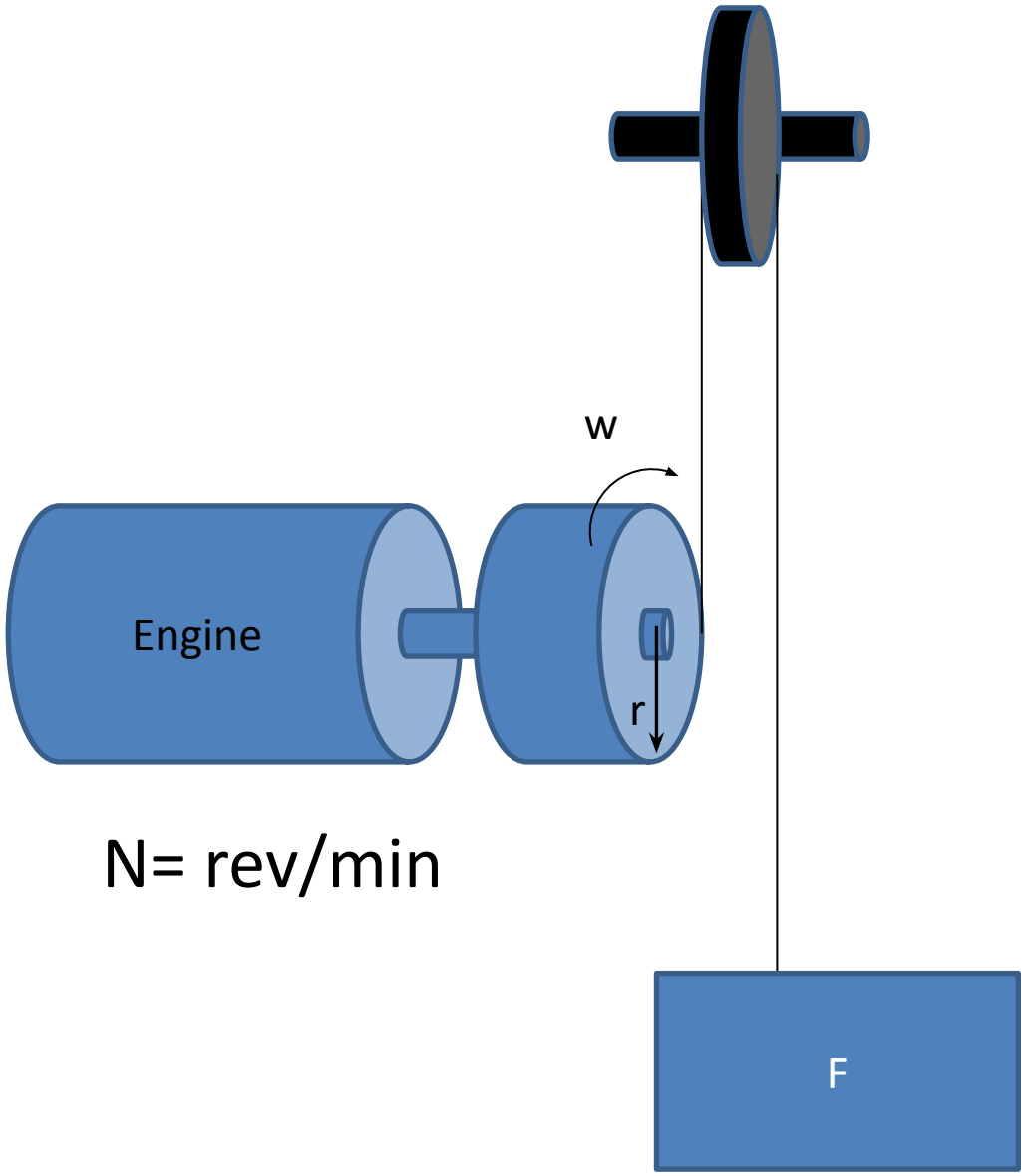


Fig. 1.16 – Schematic of block and tackle.

Source: Applied Drilling Engineering. Bourgoyne & Young



$P = w*T = (2\pi N)*(Fr) = 2\pi rNF$

$v = 2\pi rN$

N= rev/min

$P = F*d/t = 2\pi rN\ F$

Drilling rig hoisting system

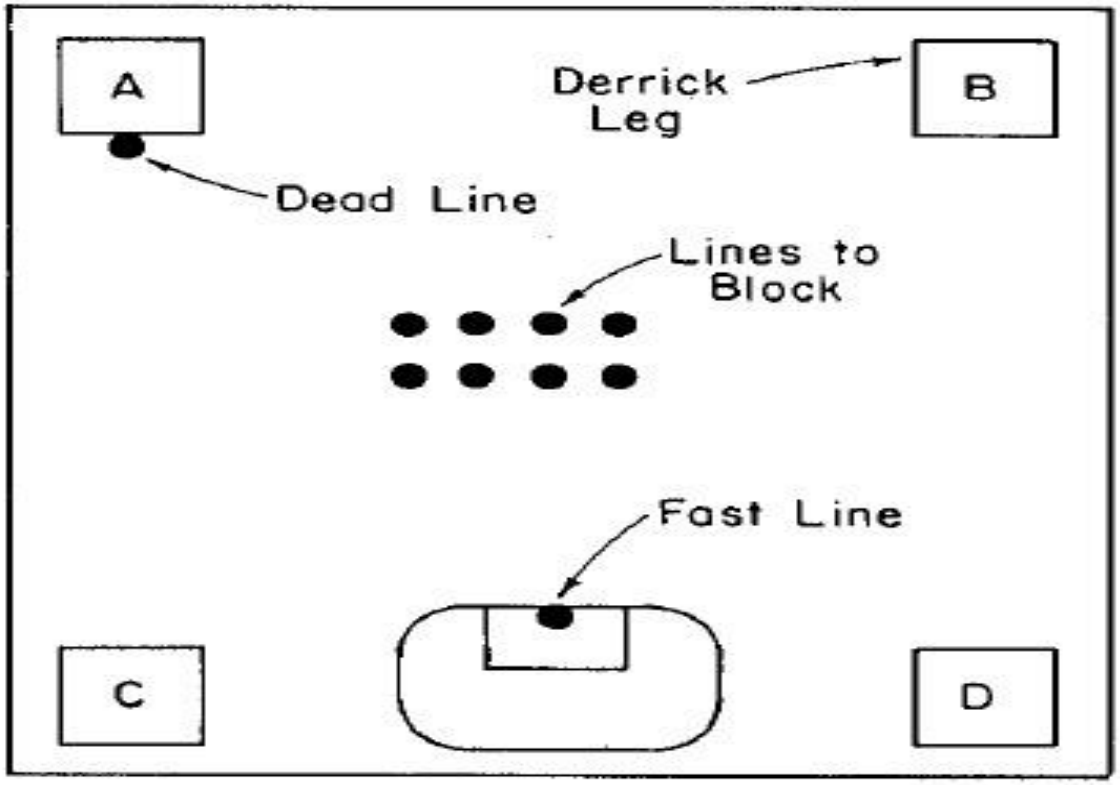
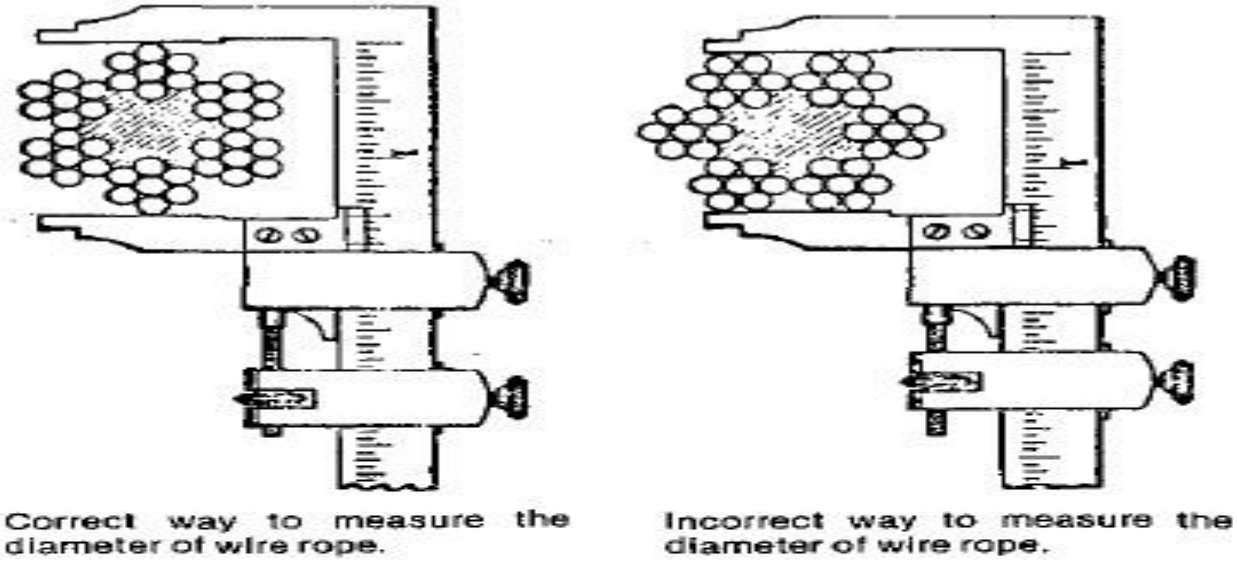


Fig. 1.17 – Projection of drilling lines on rig floor.

Source: Applied Drilling Engineering. Bourgoyne & Young

Measurement of rope diameter



Correct way to measure the diameter of wire rope.

Incorrect way to measure the diameter of wire rope.

Fig. 1.18 – Measurement of wire rope diameter.[7]

Source: Applied Drilling Engineering. Bourgoyne & Young

Problem 1

The output torque of the diesel engine is 3.5 kN*m and the engine's shaft speed is 1000rpm. Determine the output power and total efficiency of the engine, when the fuel consumption rate is 100 l/hr

Problem 2.

The total load of the rig hoist is 20 kN. The highest input power of the block and tackle system's input from the draw work is 1 kW. 6 lines connect the crown block to travelling block.

Find: 1) fast line's static tension;

2) highest hook power;

3) highest hoisting speed;

4) the actual derrick load;

5) highest equivalent derrick load;

6) Efficiency factor of the drilling rig