

Ram and Annular Blowout Preventers, Remote Chokes and Gate Valves

Five-Day Course Outline
(WEST DEC Center, Brookshire, Texas)

Note: a job safety analysis (JSA) will be presented before each lab exercise.

Section I - Introduction

A. Shop safety

1. Fire awareness
2. Toolbox meetings (JSAs)
3. Awareness of potentially hazardous activities of other groups
4. Personal protective equipment (PPE)
5. Trapped pressure
6. Compressed air
7. Security of equipment being worked on or mounted on work benches
8. Working under suspended loads
9. Load rating of lifting equipment
10. Rotating machinery
11. Hand tools and electric power tools
12. Chemical storage and identification
13. Tool care and maintenance
14. Housekeeping

B. Safety equipment required in the shop

1. Steel-toed work boots
2. Safety glasses with side shields
3. Work gloves
4. Coveralls

Section II – Annular-type Blowout Preventers

A. The annular BOP module is designed to train the student in understanding, inspecting, maintaining, testing and deploying annular BOPs. The module provides the information necessary for the student to:

1. Describe the annular BOP and its functions
2. Know the elements of the annular BOP
3. Know the inspection methods and important inspection points of any annular BOP
4. Be familiar with the types of failures and incidents that have occurred in connection with annular BOPs
5. Know how to properly disassemble an annular BOP
6. Replace seals and packers
7. Know how to carry out hydraulic and wellbore testing

B. Lab –

1. Proper disassembly and assembly techniques
2. Seals and packer inspection, removal, and installation
3. Hydraulic piston and ring inspection, removal, and installation

4. Hydraulic and wellbore tests

Section III – Ram-type Blowout Preventers

- A. This module provides a detailed analysis of the operation, control, and inspection requirements for the three major suppliers of ram and annular BOPs (Hydril, Shaffer, and Cameron). Major components of this course module include:
1. Ram-type BOP stack operation and controls (including locking systems):
 - i. Fixed bore
 - ii. Variable bore
 - iii. Blind shear
 2. BOP connections
 3. BOP packer seal inspection and measurement requirements
 4. BOP packer seal groove inspection and measurement requirements
 5. BOP ram cavity and ram block inspection and measurement requirements
 6. Review of pertinent WEST ITPs (Inspection Test Procedures) associated with BOPs
 7. Hydraulic and wellbore testing
- B. **Lab** - Extensive lab exercises using a Hydril ram blowout preventer will familiarize students with the proper procedures for inspection, maintenance, and troubleshooting of a BOP.

Section IV - Remote Choke System

- A. This module provides students with in-depth information related to:
1. Major system components of a remote choke system:
 - a. Choke
 - b. Operator
 - c. Control panel
 - d. Pump
 - e. Stroke counter and pressure gauges
 2. Type of drilling chokes
 - a. Manual
 - b. Remote
 - i. CSO (Complete Shut-Off)
 - ii. MOV (Multi-Orifice Valve)
 3. Installation and operation
 4. Replacement of seat and gate (plug/disc)
 5. Hydraulic and wellbore testing
- B. **Lab** –
1. Disassemble and inspect the choke, operator, and pump assemblies of a Swaco remote choke.
 2. Operate and become familiar with controls and readouts on chokes.
 3. Replace the seat and gate assemblies
 4. Hydraulic and wellbore tests
 5. Troubleshoot a simulated problem on a Swaco remote choke.

Section V - Gate Valves

- A. This module provides students with in-depth information related to:
1. Types of valves
 - a. Manual
 - b. Remote
 - c. Subsea
 2. Types of gates
 - a. Slab
 - b. Split (expanding)

3. Seats
 - a. Upstream
 - b. Downstream
4. API 6A designations
 - a. PSL (Product Specification Level)
 - b. Retained fluids
 - c. Trim levels
 - i. H₂S
 - ii. CO₂
 - iii. Standard