



P.O. Box 577  
Brookshire, TX 77423  
U.S.A

Tel: (281) 934-1500  
Fax: (281) 934-1600  
west@westengineer.com

A Division of WEST Engineering Services  
ISO 9001: 2000 Certified

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# Hands on Training

## Drawings, Schematics & Symbols

### Target Audience:

- 1) Rig Mechanics, Entry level Subsea Engineers and Senior Subsea Engineers that would like a refresher course in reading and understanding drawings, schematics and symbols.
- 2) Rig floor and deck hands that work under the direction of the subsea department.
- 3) Rig supervisors that have not been trained in the basics or whom would like a refresher to train others.
- 4) Jack up and land rig staffs that are required to undertake equipment repair, maintenance and testing without the benefit of dedicated service personnel.

### Defining the need:

MMS Safety Alert # 249, issued 13 February 2007 addressing “Hands on Training” for safety devices

“...MMS recommends that operators review and evaluate the adequacy of their training program and policies with specific consideration being given to the following:

- Additional training of those inexperienced personnel to ensure appropriate competency
- Implementation of site specific hands-on training and/or evaluations
- Incorporation of new technology and new issues into training curriculum “

“Testing Improves Surface BOP Equipment Reliability” - Data from SINTEF and the OOC, Offshore Operators Committee in the GoM, indicates the reliability of surface BOP equipment is between 19 and 27 times less than subsea BOP equipment.

### Student Performance Objectives:

Upon completion, the delegate will have an appreciation of the technical topics covered and have the skill to read and understand drawings and schematics. Students will learn to use schematics and drawings to diagnose and rectify equipment faults. Each student will be expected to create a simple schematic prior to completion of the course.

**Application:**

This school is designed to be approximately 70% hands on activities and 30% lecture. A slide presentation will present the Learning Objectives. The classroom training will be followed by a hands on session where the student will work with actual components found on drilling rigs. Students will be tested for subject knowledge at entry and exit from the course. Reference material for use at the rig will be provided. Students will be required to produce a simple schematic to demonstrate competence.

**Staffing:**

Courses are designed for one instructor to a 12 students. Hands on exercises will be organized for work groups not larger than 4 students each. Classes will be divided into work groups for the hands on practical portion of the course.

“Self Instruction” exercises will also be used when possible.

**Facility:**

The course will be given at West’s newest facility, a 33,000sq/ft multi use property located in Brookshire Texas. The facility is equipped with dedicated instructional classrooms and an instructional lab for hands on practical training.

**Student Requirements**

Students will be required to provide their own steel toed work boots, safety glasses and coveralls, WEST will supply any additional PPE required in addition to all tools and training materials.

**Duration:**

The class is designed to take 5 days to complete. Certificates and a visible token will be provided on completion of each training module.

**Introduction**

## 1) Shop Safety

- a) Fire awareness
- b) Toolbox meetings (JSAs)
- c) Awareness of potentially hazardous activities of other groups
- d) Personal Protective Equipment
- e) Trapped pressure
- f) Compressed air
- g) Security of equipment being worked on or mounted on work benches
- h) Forklift operations
- i) Working under suspended loads
- j) Load rating of lifting equipment
- k) Rotating machinery
- l) Hand tools and electric power tools
- m) Chemical storage and identification
- n) Tool care and maintenance
- o) Housekeeping

- 2) Safety equipment required in the shop
  - a) Hard hat
  - b) Steel toed work boots
  - c) Safety glasses with side shields
  - d) Work gloves
  - e) Coveralls

### **Course Outline**

- 1) Symbols – students will be presented schematic symbols in classroom lecture facilitated with a power point presentation.
  - a) Hydraulic
  - b) Electrical
  - c) Pneumatic

#### **JSA**

- 2) Symbols Lab – the class will be divided into smaller work groups for lab work.
  - a) Presentation of components marked with the appropriate symbol
    - i) Discussion of each component function and how it is represented by the symbol.
    - ii) Component identification. Students will be shown how to identify components and will be required to successfully identify by drawing the correct symbol for the unmarked components.
- 3) Troubleshooting – Review a typical BOP Control System Schematic
  - a) Discussion of typical fault symptoms and locate on schematic
  - b) Students will be required to find an intentional schematic error after being given a set of related symptoms

#### **JSA**

- 4) Troubleshooting Lab – students will diagnose and correct faults
  - a) Push button control panel
  - b) Hydraulic circuit
  - c) Combination circuit
- 5) Circuit construction - students will be given a functional requirement and will be required to:
  - a) Construct a schematic to perform the desired function
  - b) Modify the schematic to revised specification
- 6) Reporting – Communicating technical information effectively with modern electronic media is essential. The students will be introduced to West's reporting method and will be shown how to:
  - a) Take and import digital photo's to a MS Word document
  - b) How to annotate digital photos and drawings.
  - c) West's report format

#### **JSA**

- 7) Reporting Lab – students will create a report for a failed component. The report requirements will include a properly annotated digital photo(s) and schematics in a word document which accurately communicates a clear description of the failed component and the nature/cause of the failure.