

Best Practice in

# PROCESS, ELECTRICAL AND INSTRUMENTATION DRAWINGS & DOCUMENTATION

(Includes: Standards, Masters, Specifications, Templates, Drawings, Schedules & Diagrams)



## YOU WILL LEARN HOW TO:

- Define and use Process Flow diagrams, P&ID's, Instrument lists, Specification forms, Logic diagrams, Location plans, Installation details and Loop diagrams
- Understand process control devices and the symbols used to define them
- Define and specify vendor criteria for the production of plant documentation to the order of the company
- Be familiar with the use of specifications to control the design scope of the project
- Understand the purpose of a HAZOP in the development of a plant
- Be in a position to implement and manage plant modifications from conception to completion
- Be aware of the ISA standard available to assist you in developing and understanding instrument and control documents
- Better understand the scope, responsibility and interaction of each discipline in the completion of a project or plant modification

## WHO SHOULD ATTEND:

- Instrumentation and Control Engineers & Technicians
- Electrical Engineers
- Project Engineers
- Telecommunications Engineers & Technicians
- Process Control Engineers
- Consulting Engineers
- Maintenance Engineers & Technicians
- Production Controllers
- Project Managers
- Electricians
- Drawing Office Staff



*Technology Training that Works*

## THE WORKSHOP

This 2 day training workshop concentrates on teaching delegates how a thorough knowledge and understanding of how the plant works will greatly enhance their ability to maintain & enhance the operation of the plant. Using the documentation provided, the workshop will teach delegates how to diagnose problems and suggest solutions on a plant that they have never seen.

Too often plant modifications that are instituted fix the symptom instead of the underlying problem, this workshop teaches delegates why it is so important to keep looking at the plant as a whole in order to solve the problem.

Delegates will learn how to create documentation using simple standards and specifications as well as custom design a solution for their own plant. This workshop will create the awareness that a technical person's greatest resource is not his toolbox, but rather his drawing office and plant documentation.

As built plant documentation is at best 90% accurate on handover, from this point it degrades rapidly to 50 to 75% accuracy in two years, where after it continues a more gradual decline. This decline can be attributed to a number of factors. This workshop will address these problems and show delegates how to overcome them.

Disciplines covered include Process, Electrical, and Instrumentation and numerous practical sessions allow the application of knowledge gained to reinforce the principles.

## PRACTICAL SESSIONS

### Practical Exercise 1 - Process

Using a 'block Flow Diagram', delegates will develop a Process Flow Diagram and process description. From these the delegate will then develop the P&ID and functional specification.

### Practical Exercise 2 - Electrical

Using the P&ID provided, the delegate will develop load lists, single line diagrams and schematics for a drive on the P&ID. (Diagrams will be done using IEC symbols)

### Practical Exercise 3 - Instrumentation

We look at a typical maintenance situation and develop instrumentation documentation including data sheets and loop drawings for a planned 'in-house' modification to the plant. (Diagrams will be done using ISA symbols)

### Practical Exercise 4 - Vendors

Define a set of documentation criteria to be issued to a vendor to ensure that the required documentation is returned. This section also covers the information that must be supplied to the vendor to enable him to comply with company standards.

## THE PROGRAM

### DAY ONE

#### INTRODUCTION TO PLANT DESIGN, OPERATIONS & MAINTENANCE DOCUMENTATION

- Introduction
- Outline of workshop
- Standards - a history & overview
- Drawing Office / Company standards

#### BASIC CIRCUITS / COMPONENTS

- Power supply & protection
- Relays & contacts
- Switches
- Ladder logic
- Fail safe design

#### PROCESS DIAGRAMS

- Process Block Diagram
- Process Flow Diagram
- Process Description including scheduling
- Utility Flow Diagram and developing from flow diagrams
- Piping & Instrumentation Diagrams
- P&ID Standards, definition and use
- P&ID Symbols
- P&ID layout, design and construction
- Cooling water plant study
- Hazardous Area considerations

#### PRACTICAL SESSION

#### INSTRUMENTATION DOCUMENTATION

- Overview of Instrument Schedules, Drawings & Diagrams
- Purpose and target audience of each document
- Defining Loop Masters - Loop Layout
- Reading Instrumentation documentation
- Wire numbering
- Logic Diagrams - definition, use and interpretation
- Instrument specifications

#### PRACTICAL SESSION

### DAY TWO

#### ELECTRICAL DOCUMENTATION

- Load lists
- Single line diagrams
- Schematic & Control diagrams
- Cable Schedules & routing drawings
- Point to Point schedules
- Lighting Layouts
- Installation details
- Electrical Specifications

#### PRACTICAL SESSION

#### VENDOR PACKAGES

- Panel Wiring diagram
- Combined E & I disciplines
- Panel Schematics
- Panel Layout
- Document supply specification
- Maintenance specification

#### PRACTICAL SESSION

#### CHANGE CONTROL

- Request for change
- HAZOP, RCM Analysis, Configuration management
- ISO 9002

#### PRACTICAL SESSION

#### SUMMARY, OPEN FORUM AND CLOSING

## ON-SITE TRAINING

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