

Co-innovating tomorrow™



YOKOGAWA MIDDLE EAST & AFRICA

Empower Professionals to enhance their performances through effective use of Process Control Technology and Industrial Best Practices



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Co-innovating tomorrow[™]

Since its foundation in 1915, Yokogawa has contributed to society by providing leading-edge products and solutions centering on its measurement, control, and information technologies. To ensure that it continues to meet changing needs and stays on track for another century of steady growth, Yokogawa has instituted reforms and is now working to transform itself in a number of other ways.

Under the corporate brand slogan of "Co-innovating tomorrow," Yokogawa seeks to establish ever greater levels of trust with its customers and to work with them to create new value for a brighter future, both for its customers and society.

THE YOKOGAWA PHILOSOPHY

As a company, our goal is to contribute to society through broad-ranging activities in the areas of measurement, control and information.

individually, we aim to combine good citizenship with the courage to innovate.

GLOBAL LEADERSHIP

Corporate Data*

Corporate Name Yokogawa Electric Corporation

President & CEO Hitoshi Nara Headquarters Tokyo, Japan

Founded September 1915 ,1 Incorporated December 1920 ,1

Paid-in Capital 404.308 million USD

Number of employees 18,329 (consolidated) 2,537 (non-consolidated)

Subsidiaries and Affiliates 13 subsidiaries and 1 affiliate in Japan

75 subsidiaries and 2 affiliates outside Japan

*As of March 2018,31





YOKOGAWA MIDDLE EAST & AFRICA Local partnership, Global capabilities

Company name: Yokogawa Middle East & Africa B.S.C. (c)

President and CEO: Pierre E. De Vuyst

Regional Headquarters: PO Box 10070, Manama, Kingdom of Bahrain

Founded: 15 May, 1990

No of staff: 1200 (Highly-skilled multinational workforce)

Profile: Process Control and Automation Solutions provider. Activities include

Sales, Project Execution, Engineering, Sub-assembly, Manufacturing, Integration, Startup & Commissioning, Electrical and Instrumentation, After-sales service support (Lifecycle Agreement, Spare parts warranty management and Training), R&D, and participation in Human Capital

Development Initiatives for Local Nationals

Middle East & Africa Network: 8 Affiliate Companies; 7 Engineering Centres, 23 Sales/Service offices and

11 Training Centres.

Yokogawa Middle East & Africa B.S.C. (c) (YMA) headquartered in Bahrain, is a wholly owned subsidiary of Yokogawa Electric Corporation in Japan. The company serves as Yokogawa's regional HQ, supporting users through a team of 1200 professionals operating from our network of local offices spread across the Middle-East and Africa.

Yokogawa executes Process Automation projects locally providing engineering, commissioning, training and Lifecycle Maintenance Services.









- The acute angle and sharp straight edges of the top half of the diamond symbol represent Yokogawa's cutting-edge technology while the gentle curvature of the bottom half represents the warm-hearted nature of Yokogawa's people.
- By balancing these two elements, Yokogawa aims to contribute toward the realization of a thriving global society in much the same way as the sun
- This property is reflected in the bright yellow of the diamond
- Corporate trademark since 1986

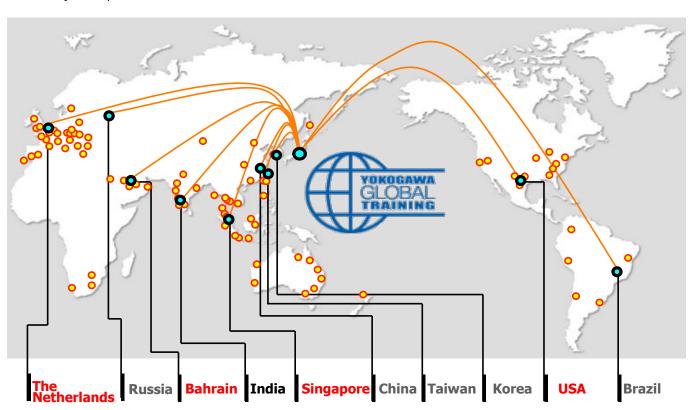
Our Vision: To be a socially responsible and profitable regional centre of excellence, achieving customer satisfaction by adding value through quality products and services and continuous improvement

Yokogawa Human Development Academy

Yokogawa Human
Development Academy
(YHDA) helps to maximize
the return on your most
significant investment: Human
Resources.

Our training programs are designed to help your workforce to become more proactive and deliver greater value to your operations. Our training solutions have been developed and validated by our customers over a century of experience.

Our worldwide Global Training Committee (GTC) supports and controls our evolution and change management.



International Certifications



Yokogawa Middle East and Africa has been approved by ATLAS as an IMIST invigilation Centre



Certified by TUV Rheinland, Yokogawa is accredited to deliver Functional Safety Certifications for **Engineers and Technicians** in the domain of Safety Instrumented Systems (SIS).

Whatever your industrial domain, YHDA offers the Response to your training needs

Industries



Oil & Gas

- Upstream
- Offshore (FPSO FLNG & FSRU)
- Pipeline



Oil & Gas Downstream

- Refining
- Terminal
- Lube Oil



LNG Supply Chain

- LNG Liquefaction
- LNG Carrier
- LNG Regasification & Storage



Chemical

- Petrochemical
- Base Chemical
- Specialty & Fine Chemical
- Biofuel
- Bulk & Petrochemical



Power

- Nuclear
- Thermal
- Combined Cycle
- Cogeneration
- Renewable Energy



Water & Wastewater

- Water Treatment
- Desalination
- Water Pipeline
- Water Distribution
- Wastewater Treatment
- Industrial Water



Mining & Metal



Pharmaceutical



Food & Beverage



Pulp & Paper

Iron & Steel

- Comprehensive and validated training solutions
- Applied Professional Training developed over a century of experience
- I&C Professional Trainers
- Training content supported by training textbooks
- Change and evolution management controlled by a worldwide Global Training Committee

YHDA will provide you with the highest expert level content, targeted to your needs and delivered in the most convenient and cost-effective way. Our 12 training centers are spread over Middle East and Africa and conduct training for more than 2,000 participants every year. They use interactive instructional methodologies to test and assess your personnel performances and skills.

At your site or within our own training premises, YHDA will offer you integrated applied specialization programs and solutions to develop your technical personnel skills and competences for:

- Plant / Process Engineers,
- Control Room Operators and Supervisors.
- Maintenance Personnel
- (I&A Maintenance Technicians / Engineers)
- Laboratory and Analyzer Technicians,
- IT / Control System Administration

YHDA may also offer you integrated Training management and solutions - in partnership with:



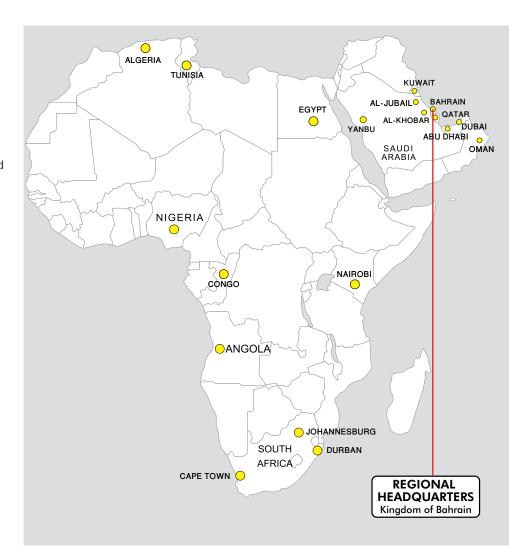
A Yokogawa Company

- Training Systems Assessment
- Training Management
- Accelerated Capability Transformation Programs

YHDA Key Strengths

Staff Expertise

Strong from a staff of permanent instructors and of a pool of 200+ Service Engineers and Process Solutions Specialists, our teams will develop and deliver standard and customized courses that fit within your project lifecycle and meet your specific process automation requirements, to maximize your systems and operations performances.



Partnerships

Our longstanding training experience allowed us to set up tight ties and partnerships with National and Private major training institutes and Universities all over Middle East and Africa.

Educational tools

- E-Learning and On Line Virtual Training
- Generic Process Dynamic Simulators
- Operator Training Simulators (OTS)
- 3D simulators with immersive environment
- Instrumentation training skids

YHDA Training progressions						
Course Reference	Course title	Plant / Process Engineers	Operators	Maintenance Personnel	IT /Control System Administration	Management
	Foundation courses					
EEE	Electrical & Electronics essentials for Instrumentation	F		F		
PMENG	Specialized Physics, Measurement & Engineering Units for Instrumentation	F		F		
EPMC	Essentials of Process Measurement and Control	F	F	F	F	F
PDD	Process Documents & Drawings in Oil & Gas Instrumentation	F	F	F		F
Fie	ld Instrumentation Courses					
PCIF	Field Instruments Measurement Principles	F	F	F		F
OMPCI	Operation, Calibration & Maintenance of Field Instruments			Р		
AFIT	Advanced Field Technology Instruments			Р		
HAI	Instrumentation and Hazardous Areas installations			Р		
ISZB	Intrinsic Safety galvanic isolation, Zener barriers technology & applications			Р		
YSTX	Yokogawa Smart Transmitters			Р		
FMOR	Fieldmate Orientation			Р		
F	unctional Safety Courses					
LOPA	Layers of Protection Analysis on Safety Systems			Р		
TUVFST	TUV Certification for Operations (SIS)	Р		P/T		Р
TUVFSE	TUV Certification for Engineers (SIS)	P/E		P/E		
RSEM	Safety Instrumented Systems: ProSafe-RS Engineering and Maintenance	Р		P/E		
	Process Control Courses					
PCP	Process Control Principles	F	Р			F
VPOF	DCS operation		Р		F	
CAMS	Consolidated Alarms Management	Р	Р			А
PIDBL	PID characteristics and Controllers	F	F	P/E		F
APC	Introduction to Advanced Process Control	Р	А			А
PAGE	Procedures Automation	Р	А			А
RPO	Real Time Process Optimization	А	А			А
Data Historia	n and Plant Information Management					
EQAD+EQDA	Data Historian Management and Administration	Р	А		А	А
ARAP	Alarm Reporting and Analysis	Р	А			А

С	istributed Control System					
VPGR	DCS Graphics	Р		А	А	
VPMT	DCS Maintenance			P/E	Р	
VPEG	DCS Engineering			P/E	А	
Field	dbus and Asset Management					
PRM	Plant resources Manager (PRM)			Р		А
FBEG	Fieldbus Engineering			Р	А	
Control	System Courses - Administration					
VNETIP	Control System Networking	А			Р	
SSI	Control System Substation Integration (Modbus & OPC)	А			Р	
PCNS	Process Control Network Cyber Security	А			Р	А
Real Tim	ne Units (RTU) and Signal Conditioning	And Data A	Acquisition ((SCADA)		
STEG+STMT	Real Time Unit (RTU) Engineering & Maintenance	А	Р		А	
FTEG	SCADA Operation, Engineering & Maintenance	А	Р	Р	А	А

Le	gend		
F	Foundation Information	Т	Technician
Р	Professional Training	Е	Engineer
Α	Additional Competency / Training	0	Optional

Available E	-Learning Supports associated to programs					
Course Reference	Course title	Plant / Process Engineers	Operators	Maintenance Personnel	IT /Control System Administration	Management
	Operator Responsibilities: Basic Operator Responsibilities	0		0		0
	Instrumentation and Control: Introduction to Process Control	0	0	0	0	0
	Instrumentation and Control: All Measurements: Pressure / temperature / Level / Flow / liquids –	0	0	0		0
	At least one module per unit					
	Distributed Control System (3 Modules)	0	0	0	0	0
	Automated Process Control (2 parts)	0	0			0
	Introduction to Safety Systems (2 parts)	0	0	0	0	0
	Process Control & fault diagnosis	0	0	0	0	0
	PLC Programming (2 modules)	0		0	0	
	Centum VP Virtual Operator Trainer		0			
	Centum VP Virtual Engineering Machine	0		0		
	ProSafe-RS Virtual Engineering Machine	0		0		

COURSE INDEX

Foundation courses

	Code	page	Duration (days)
Essentials of Process Measurement & Control	EPMC	15	5
Process Control System Overview	PCS	15	5
Specialized Physics, measurement & Engineering Units for instrumentation	PMENG	16	2
Electrical & Electronics essentials for instrumentation	EEE	16	4
Process Documents & Drawings Instrumentation in Oil & Gas	PDD	17	3
Instructors, Coaches and Mentors training: Train the Trainer	ПТ	17	5

Field Instrumentation Courses

	Code	page	Duration (days)
Distributed Control System (DCS) and Process Logic Controllers (PLC) operations	DPO	24	1
Yokogawa Smart Transmitters Course	YSTX	25	2
PID Characteristics of Controllers and Control Optimization	PIDBL	25	3
Control Valves Engineering	CVEG	26	4
Wireless Communication Technology: Basic Course	WFIB	26	1
Wireless Communication Technology Advanced Course	WFIA	27	2

Field Instrumentation Courses

	Code	page	Duration (days)
Field Instruments Measuring Principles	PCIF	19	5
Operation, calibration & maintenance of field instruments	OMPCI	20	5
Instrumentation, calibration and Maintenance	ICM	20	2
Transmitters and signal transmission	TNT	21	1
Flowmeters: Selection & sizing	FMS	21	2
Coriolis Mass Flowmeter Operation, Maintenance and Troubleshooting Training	CMFT	22	2
Advanced field instruments communication technology	AFIT	23	2
Instrumentation and hazardous area installations	HAI	23	2
Intrinsic safety galvanic isolation, zener barriers technology & application	ISZB	24	2

Functional Safety Courses

	Code	page	Duration (days)
Introduction to Safety Systems Training	ISST	29	1
Functional Safety for End- users	FSEU	29	2
TUV SIS Functional Safety Certification for Operation	TUVFST	30 Certification	3
TUV SIS Functional Safety Certification for Engineers	TUVFSE	30 Certification	4
Functional Safety of Machinery Certification	TUVFSM	31 Certification	5

Process Control

Duration Code page (days) **Process Control Principles** PCP 33 5 Introduction to advanced **APC** 34 3 process control techniques **MVCT** 35 5 Multivariable control techniques Tuning Concepts and "Tune VP" **TVP** 35 application 2 Tune VP: PID Control, tuning and **TVPA** 36 optimization 5 Advanced alarms Management **AAMS** 37 System 3 Introduction to Procedures **PAGE** 37 Automation using Exapilot 3 Real Time Process Optimization **RPO** 38 3 **Applied Process Control** Operator Training Simulator for **OTSO** 39 10 Operators (Customized course) **ETIM** 40 Tank Inventory Management 3 Operator Training Simulator (OTS) Operator Training Simulator OTS 41 4 (OTS) Engineering Training Operator Training Simulator OTSI 42 4 (OTS) Instructor Training Operator Training Simulator (OTS) System Management 42 Training **OTSM** 3

Control Systems

	Code	page	Duration (days)
Control Systems Networking and	Cyber Sec	urity	
Plant Control Network Security	PCNS	44	5
Centum VP Networking	VNETIP	44	3
Subsystems Integration (Modbus & OPC)	SSI	45	4
OPC Communication essentials	OPC	45	2
Data Acquisition Historian and Pla Systems	ant Informat	ion Mana	agement
Exaquantum Technical Overview seminar	EQTS	47	1
Exaquantum System Administrator	EQAD	47	4
Exaquantum data access from third party package	EQDA	47	1
Exaquantum User	EQUS	48	2
Exaquantum Explorer Overview	EQEO	48	1
ExaOPC/Exaquantum Engineering & Maintenance	Exa- OPC/ ExaQ	49	5
Exaquantum Alarms Reporting and Analysis Package	ARAP	49	5
Sequence of Events Recorder	SER	50	1
Alarms Reporting and Analysis	ARA	50	1
Alarm Master Database	AMD	51	1
PI Clients Application	PI	51	3

YOKOGAWA Products and Instruments courses (Continued)

	Code	page	Duration (days)	
Distributed Control Systems (DCS	S)			
Introduction to Distributed Control Systems (DCS)	DCSI	53	2	
Centum VP Operation & Monitoring	VPOF	53	5	
Centum VP fundamentals for Engineering	VPEF	54	3	
Centum VP Engineering	VPEG	54	5	
Centum VP AD Suite Engineering	VPAD	55	5	
Centum VP Maintenance	VPMT	55	3	
Centum VP Engineering & Maintenance	VPEM	56	5	
Centum VP Fundamentals of Operation & Maintenance	VPFM	56	5	
Centum VP Graphics	VPGR	57	3	
Consolidated Alarm Management System (CAMS) overview	CAMS	57	2	
Consolidated Alarm Management System (CAMS) Engineering	CAMSE	58	3	
DCS Maintenance on site training	SYMS	58	5	
Centum VP Essentials with Batch Process	VPBA	59	3	
Batch Programming	BATCH	59	5	
CS 3000 Fundamentals for Operations	3KOF	60	5	
CS 3000 Fundamentals for Engineering	3KEF	60	3	
Fieldbus & Asset Management Systems				
Fieldbus Orientation	FBOR	62	2	
Fieldbus Engineering	FBEG	62	5	
Fieldbus Engineering and Plant Resources Manager (PRM)	FPRM	63	5	

	Code	Page	Duration (days)
Plant Resources Manager (PRM)	PRMF	63	2
Fieldmate Orientation	FMOR	64	2
Safety Instrumented Systems (SI	S): PROSAF	E	
Fundamentals of ESD Systems	ESD	66	2
ProSafe-RS Engineering	RSEG	66	4
ProSafe-RS Maintenance	RSMT	67	3
ProSafe-RS Engineering & Maintenance	RSEM	67	5
ProSafe-RS Advanced Engineering	PAEG	68	5
ProSafe-RS for Operators (On site Training)	RSOP	68	3
ProSafe-SLS - HIPPS	SLS	69	3
Supervisory Control And Data Ac	quisition (S	CADA)	
STARDOM & FAST/TOOLS Basic Engineering	STFTBE	71	5
STARDOM Engineering	STEG	72	4
STARDOM Maintenance	STMT	72	1
FAST/TOOL Engineering	FTEG	73	5
Analyzers and Detectors			
Introduction to process analyzer & sample handling systems	PASHS	75	2
Essentials of analyzers and gas chromatographs	ANZGC	75	2
GC8000 Operation and Maintenance	GCOM	76	3
GC8000 Operation and Maintenance with Network management	GCOMN	76	4
GC8000 Advanced Operation and Maintenance with Network and SCS	GCAOM	77	5
Liquid Analyzer Operation and Maintenance	LAOM	77	2
TDLS 200/220 Operation and Maintenance	TDOM	78	2
IR400 operation and Maintenance	IROM	78	2



Essentials of Process Measurement & Control

Training Module Code: EPMC

Duration: 5 Days

Objectives

The workshop will enable participants to:

- Comprehend the concepts of Process Measurement & Control Technology
- Know the role of major components of a process control system ranging from sensors, transmitters, controllers and final control elements
- Envisage the application of the technology in the industry
- Appreciate the potential of the technology and consider ways on optimum utilization

Target Beneficiaries

Personnel from Instrumentation, Electrical, Electronics, Chemical, Process Engineering & Plant Operations departments

Prerequisites

- Awareness of process industry and/or instrumentation
- Basic math and science background

Day 1 - Essentials of Process Control

- Instrumentation & Control Concepts
- Typical parameters used in process control
- Sensors & Transducers
- Transmitters
- Final Control Elements

Day 2 - Control Philosophy

- Controller definition
- Types of Control Cascade, Ratio, Split & Feed forward
- Controller Modes
- PID Algorithm
- Direct & Reverse Control

Day 3 – Overview of Process Control Systems

- Distributed Control System (DCS)
- Safety Instrumented System (SIS)

- Programmable Logic Controller (PLC)
- Supervisory Control & Data Acquisition (SCADA)
- Sub-System Communication Protocol

Day 4 – Role of Process Control in safety, quality, production, shipping, custody transfer

- Safety
- Alarms rationalization
- Trending (Real time / Historical)
- Reporting
- Quality
- Productivity
- Custody Transfer & Flow metering

Day 5 – Applications in Process Industry (Examples & Case Studies)

- Material & Heat Balance
- Flow Transfer
- Heat Transfer
- Distillation Process
- Centrifugal Compressor

Process Control Systems Overview

Training Module Code: PCS

Duration: 5 Days

Objectives

The workshop will enable participants to:

- Understand the system architecture and basic engineering concepts of various control systems like PLC, DCS, SCADA & SIS
- Understand control strategies and concepts related to Pressure, Temperature, Level and Flow

Target Beneficiaries

Personnel from Instrumentation, Electrical, Electronics, Chemical, Process Engineering & Plant Operations departments

Prerequisites

 Basic understanding of a Process is preferred

Day 1 – Distributed Control System (DCS) – Architecture

& Engineering

- · Introduction to DCS
- DCS System Architecture
- Basic Engineering in a DCS Environment
 - 1. Monitoring Loop
 - 2. Single Loop using PID Control
 - 3. Building a Cascade Loop
 - 4. Building a Split Control Strategy
 - 5. Building a Ratio Control Strategy

Day 2 – Supervisory Control & Data Acquisition System (SCADA)

- Introduction to SCADA
- Understanding the SCADA Architecture
- SCADA Functions
 - 1. I/O Processing
 - 2. I/O Update
 - 3. Alarming4. History
 - 5. Reporting

Day 3 – Programmable Logic Controller (PLC)

- Introduction to PLC
- Understanding the Architecture of PLC
- Ladder Logic Programming
- Solving real life examples using Ladder Logic

Day 4 – Safety Instrumented System (SIS)

- Introduction to SIS
- Understanding the Architecture of SIS
- Programming a SIS

Day 5 – Pressure Control Simulation

- Understanding a Pressure Process
- Evaluating Controllability through tutorial
- Understanding the effect of disturbance on Pressure Control
- Appropriate Control Parameters to be set when controlled by outlet gas flow rate
- Summary of important points related to pressure control

Specialized Physics, Measurement & Engineering Units for Instrumentation

Training Module Code: PMENG

Duration: 2 Days Objective

The participants will receive:

- An overview of the concepts of physics, measurement techniques & Engineering Units applied in the process control instrumentation
- Refresh their knowledge on physics & measurement techniques and relate the application in process instrumentation.
- This will enable them to comprehend the science behind instrumentation, products & systems & utilize the features to the maximum benefit

Target Beneficiaries

Personnel from Instrumentation, Electrical, Electronics, Chemical, Process Engineering & Plant Operations departments

Prerequisite

- Awareness of process industry and/or instrumentation
- Basic math and science background

Day 1 – Important applications of Physics

- Common Physics Units in Instrumentation – Density, Viscosity, Specific Gravity, Mass, Force, Energy, Volume, Area, Circumference, Distance, Power & Torque.
- Conservation Laws
- Role of Classic Mechanics in Instrumentation

- Fluid Mechanics- significance in process measurement & control
- Digital Electronics Gates, Sequential & Combinational Logics as applied in continuous process industry

Day 2 – Measurement Principles & Essentials of Engineering Units

- Basic Measurement Concepts
- Definition of Terminology
- Measurement principles of Level, Pressure, Temperature & Flow
- International System of Units & Conversion factors
- Engineering Units Comparison of Imperial & Metric Standards

Electrical & Electronics Essentials for Instrumentation

Training Module Code: EEE

Duration: 4 Days Objectives

The workshop will enable participants to:

- Understand the Generation, Transmission & Distribution principles & Equipment involved
- Overview of the characteristics of direct current (DC) & Alternating Current (AC) parameters
- Comprehend the properties of resistors, inductors and capacitors
- Learn the importance & practice of earthing & grounding
- Understand the functions & applications of various electronic components

Target Beneficiaries

Personnel from Instrumentation, Electrical, Electronics, Chemical, Process Engineering & Plant Operations departments

Prerequisites

- Awareness of process industry and/or instrumentation
- Basic math and science background

Day 1 - Applied Electricity

- Overview of electrical devices Transformers, Voltage Regulators, Inverters
- Power Supplies: Types, Operation Principle, UPS & Backup Generators
- Earthing & Grounding concepts & practices
- Protective Devices Switchgear, Relays, Circuit Breakers & Fuses
- Power Distribution
- Control Circuits: Study of Interlock logics
- PLC Vs. Hard Wired Relay Logic

Day 2 – Applied Electronics Part 1 of 3

- Solid State Principles
- Electronic Devices Zener Diodes, SCRs, Triacs, Op Amps & ICs

 Basic Electronic Circuits – Power Supplies, Amplifiers, Attenuators, Filters & Bridges etc.

Day 3 – Applied Electronics Part 2 of 3

- Essentials of Digital electronics
- Number Systems
- Signal Transmission 2 Wire & 4 Wire Transmitters, Wireless Transmitters
- Radio Frequency Interference(RFI), Electromagnetic Interference (EMI), S/N Ratio, Shielding Techniques

Day 4 – Applied Electronics Part 3 of 3

- Network Fundamentals Communication Systems, Telemetry,
- Protocols
- Computing (Analog Vs. Digital)
- Electronics in Measurement & Instrumentation

Process documents & drawings – Instrumentation in Oil & Gas

Training Module Code: PDD

Duration: 3 Days

Objectives

This course provides a deep understanding of plant documentation and diagrams that will enhance the understanding of the process, & improve the operation & maintenance performance. The module delivers the utility of each diagram type detailing where & when the document should be used, enabling the trainee to respond & resolve situations promptly & efficiently

Upon completion of this course participants will be able to:

Work with process flow diagrams, P&IDs, instrument lists, specification forms, logic diagrams, location plans, installation

details, instrument loop diagrams, instrument hook ups and other vital documentation

Target Beneficiaries

Personnel from Instrumentation, Electrical, Electronics, Chemical, Process Engineering & Plant Operations departments

Day 1 – Design Diagrams

- Essentials of Process flow diagrams (PFD)
- · Overview of ISA Symbol System
- Essentials of Piping & Instrumentation Diagrams (P&ID)
- Control loops on the P&ID

Day 2 – Instruments Drawing

Instrument lists

- Specification Plan
- Logic Diagrams
- Location Maps
- Installation Details

Day 3 – Engineering Drawing

- Block Diagrams
- Loop Diagrams
- · Wiring diagrams
- Control System Schematics
- Representation of Process Control Devices
- Commonly used terms
- Updating changes on documentation

Instructors, coaches & mentors training: Train the Trainer

Training Module Code: TTT

Duration: 5 Days Objectives

This workshop will enable the participants to:

- Identify the training needs of learners
- Define realistic and measureable training outcomes
- Design appropriate training to achieve objectives
- Plan, prepare and present participative skills and knowledge-based training activities for delivery both at the workplace and/or in a training room.
- Facilitate group learning activities

Construct performance metrics to measure the competence of learners

- Assess review and report on learners' progress
- Utilize best practices and tools to conduct participative and effective training
- Develop and use live scenarios from

the workplace to impart relevant knowledge.

Target Beneficiaries

Trainers, Subject Matters Experts,
Coaches, Mentors who are required to
train and/or participate in Competency
Development Programs
Individuals required to convey knowledge
transfers to colleagues, new joiners
and interns through formal classroom
instructional training and/or in a work
based learning environment.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1 - Reinforcing the key concepts for effective training

- Getting started & defining objectives
- Training vs facilitation
- Laying a solid foundation for effective results

Day 2 – Design and build the course

Create a lesson plan

- Material, media & activities to achieve the objectives
- Prepare to implement

Day 3 – Time to act

- · Kick off: Start with a Bang!
- Delivery: Tools, techiques and Best Practices

Day 4 – Participative Learning – the critical success factor

- · Methods to enhance interaction
- Overcoming hurdles and challenges

Day 5 – Measuring the outcomes

- Feedback and evaluation
- Assigned courses delivered by trainees
- Measuring effectiveness
- Creating long term action plan



Field Instruments Measuring Principles

Training Module Code: PCIF

Duration: 5 Days Objectives

The training course is designed to provide the delegates with necessary skills to understand and improve measurements solutions facilitated in the Industrial Automation Industry. Enable delegates to understand the fundamental and terminology of Field Instrumentation plus Process control technology and strategies.

The training / facilitation will include history and overview of terminology, principle of operation, standard applications and solutions for different industries, installation requirements, electrical connections, verification of the products, maintenance of the products and safety instruction. The Field Instrumentation Product Training includes the following main methods of measurement: Pressure, Temperature, Flow, Level and Liquid / Gas Analysis. Other topics covered are communications protocols and process control technology and strategy.

Target Beneficiaries

The course is suitable for Supervisors, Project Engineers, Engineers, Technologists, Technicians, Artisans, Apprentices, and Operators who required a practical knowledge for selection and implementation of Industrial Automation measurement systems



Prerequisites

Minimum requirement is a grade 12 with related Engineering subjects.

Delegates with minimum of five years industrial orientated plant knowledge can participate in the course.

Day 1 - Pressure

- Atmospheric pressure measurement
- · Gauge pressure measurement
- Absolute pressure measurement
- Differential pressure measurement
- Hydrostatic pressure measurement
- Dynamic pressure measurement
- Static pressure measurement
- Pressure in flow measurement
- Pressure in level measurement

Day 2 – Temperature

- Thermocouple temperature measurement
- Resistance Temperature Detector RTD Pt100/500/1000 temperature measurement
- Pyrometer temperature measurement

Day 3 - Flow

- Electromagnetic flow
- Coriolis Mass flow
- Vortex flow
- Ultrasonic flow
- Differential Pressure flow
- Variable Area flow
- Thermal flow
- Positive Displacement flow
- Turbine flow

Day 4 – Level

- Bubbler pipe method
- Hydrostatic method
- Vibration method (Tuning fork)
- · Conductive level switching
- · Capacitance level
- Ultrasonic Time of Flight method
- Microwave Time of Flight (RADAR)
- Gamma Radiation method

Day 5 – Liquid (Wet) & Gas (Dry) Analysis

- pH measurement
- · Conductivity measurement
- Zirconia Oxygen Analyzer

Operation, calibration & Maintenance of Field Instruments

Training Module Code: OMPCI

Duration: 5 Days

Objectives

The workshop will enable participants to:

- Comprehend the essentials of Installation, Calibration & Maintenance of Field Instruments
- Define calibration
- Recognize if an instrument is properly calibrated by examining the instrument input and output
- Understand Performance Assurance and how it affects the Quality, Productivity & Safety
- Understand the use of Vibration Monitoring Systems
- Compare various types of Analyzers and their applications

Target Beneficiaries

Personnel from Instrumentation, Electrical, Electronics, Chemical, Process Engineering & Plant Operations departments

Prerequisites

- Participants should be familiar with instruments and their functions within a typical feedback/control loop
- An understanding of Basic math and science background is preferred

Day 1 – Fundamentals & Application

- Fluid Mechanics & Flowmeter principles
- Operating Principles of Pressure Instruments
- Operating Principles of Temperature Instruments
- Operating Principles of Level Instruments

Day 2 – Performance Assurance

- Performance Accuracy & Error Calculations
- Calibration Essentials
- Temperature, Pressure, Flow & Level Calibration
- Operation & Configuration of SMART Transmitters

Day 3 – Operations & Maintenance

- Safety Concepts & Working in Hazardous Areas
- Hazardous Area Classification & Types
- Maintenance & Troubleshooting Techniques
- Safety First Safe Operations Equipment & Process Isolation

Day 4 – Final Control Elements

- Insight into Control Valve Operations & Maintenance
- Valve Positioners
- I/P & P/I Converters
- Actuators

Day 5 – Vibration Monitoring & Online Analyzers Essentials

- Vibration Monitoring Systems
- Sensor Maintenance
- Gas Analyzers
- Liquid Analyzers
- Gas Chromatographs
- · Sampling Systems

Instrumentation calibration & maintenance

Training Module Code: ICM

Duration: 2 Days Objectives

Participants will gain knowledge in the following areas:

- Instrument Calibration Concepts & Terminology
- Learning to Perform Calibration & Loop Check by hands on exercises
- Polish the existing skills on maintenance of various instruments
- Learn the importance of documentation in performance assurance

Target Beneficiaries

Maintenance Technicians / Foremen, Instrument & Control System Engineers who are responsible for installing, commissioning and maintaining Field Instruments

Prerequisites

- Participants familiar with instruments and their functions within a typical feedback/control loop
- An understanding of basic math & science is also preferred

Day 1 – Principles of Calibration

- Principles of Temperature, Flow, Pressure & Level measurement
- Introduction to Calibration Concepts & Definitions
- Installation & Calibration of Instruments

• Loop Check & Documentation

Day 2 – Maintenance schedule in Field Instrumentation

- Types of Maintenance Preventive, Predictive & Periodical
- Maintenance Schedules for Control Instrumentation
- Maintenance Schedules for Safety Equipment
- Documentation of incidents and its effects on maintenance

Transmitters and Signal Transmission

Training Module Code: TNT

Duration: 1 Day

Objectives

The Course is designed to provide the attendees with the fundamentals of Process Signal Transmitters & Transmission techniques

Target Beneficiaries

Instrumentation and process control personnel involved in Engineering & Maintenance of Field Instruments

Content

- Transducers & Transmitters
- Sensors for Pressure Measurement
- Trends for Pressure Transmitters
- Evolution of Industrial Communication Protocols & Standards
- Types of field Communication & Communication Models

- 4-20 ma signal Transmission Vs. HART Technology
- Fieldbus introduction & Benefits
- User application and standard blocks:
- · Resource block.
- Transducer block.
- · Function block.
- Basic Fieldbus components
- Advantages of Foundation Fieldbus
- Capacity & limitation of Fieldbus system

Flowmeter - Sizing & Selection

Training Module Code: FMS

Duration: 2 Days

Objectives

The workshop will enable participants to:

- Thoroughly understand the salient features of flow meters like accuracy, performance, sizing, specification, selection, and installation considerations
- Make decisions as on when, and how to use the technologies looking at measuring flow, the effect of fluid properties and engineering practices

required to optimize flow meter performance

 Understand the basic principles through practical examples

Target Beneficiaries

Instrumentation and process control personnel involved in Engineering & Maintenance of Field Instruments

Prerequisites

Awareness of flow metering principles and fluid mechanics is preferred

Day 1 - Flowmeter Sizing & Selection

- Flow meter considerations
- General Installation

- Flow meter performance
- Flow meter types
- 1. Ultrasonic Flow meter
- 2. Positive Displacement Flow meters
- 3. Insertion Flow meters
- 4. Oscillatory Flow meters
- 5. Differential Pressure
- 6. Mass Flow Meter
- 7. Magnetic Flow Meter

Day 2 – Selection Criteria

- Selection criteria
- Selection of various types of flow meters
- Sizing of flow meters
- Case Studies & work sheets

Coriolis Mass Flowmeter Operation, Maintenance and Troubleshooting Training

Training Module Code: CMFT

Duration: 2 Days Objective

This course will enable participants the understand in detail and enhance their knowledge on

- 1. Principle of Coriolis Flowmeters
- 2. Operation & Maintenance of Coriolis Flowmeters
- 3. Troubleshooting of Coriolis Flowmeters
- 4. Choosing Right Flowmeter for Specific Application
- Multiphase Flow Measurement Practical
- Net Oil and Concentration Measurement

Participants

Field Instrument Project Engineers, Field Instrument Maintenance Engineers Plant Operators and Operation Managers

Prerequisite

Participants should preferably have some basic knowledge on process measurement and control.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Course Highlight

- Concepts of Flow Covered from basics even beginners to Flowmeter can participate
- Concepts of Advanced Flow is Covered for the Most experienced people to attend.
- 3. Hands on Practical and Theory are in proper blend 50-50 for a well balance training.



 State of Art Lab and only lab to have hands on practical to Understand Multiphase Flow and Net Oil Computation and Concentration Measurement

Day 1

This course will enable participants the understand in detail and enhance their knowledge on following

- 1. Fundamentals of Flowmeter
- 2. Why Mass Flow Measurement
- 3. Coriolis Mass Flowmeter Principle
- 4. Construction and Design of Coriolis Meter
- Process Factors affecting accuracy and Stability of Coriolis Mass Flowmeters
- a. Pump and Pipe Vibration
- b. Pipe Stress
- c. Process and Ambient Temperature effects
- d. Aeration
- e. Solving the Problems that affect the Performance of Coriolis Flowmeter

Day 2

- Practical or Hands on Operating and Parameter setting on Coriolis Flowmeter
- 2. How to Troubleshoot Coriolis Mass Flowmeter
- 3. Problem Scenario Will be simulated and Participants should solve it
- Flow lab understanding Multiphase
 Flow practically and problems caused
 by Multiphase flow and how to
 overcome.
- 5. Net Oil Computation Practical hands on training

Advanced Field Instrument Communication Technology

Training Module Code: AFIT

Duration: 2 Days Objectives

Participants will be able to:

- Appreciate the advantages of Digital Communication against the conventional signal Standards
- Comprehend the state of the art wireless transmission technology & enable them to contribute in the design, operation and maintenance of the Digital Instrumentation Platform and related components

Target Beneficiaries

Instrumentation and process control personnel involved in Engineering & Maintenance of Field Instruments

Prerequisites

Participants should preferably have working experience in process plant instrumentation and should strong basic knowledge on Transmitters, Sensors and their working principle

Day 1 – FieldBus Essentials

- Introduction to Foundation Fieldbus (FF)
- Comparing FF with 4-20ma standard
- Wiring Implementation
- Understanding the communication technique
 - 1. Scheduled Communication
 - 2. Unscheduled communication

- 3. Macro Cycle
- 4. Execution Order
- 5. Link Active Scheduler (LAS) and its functions

Day 2 – Essentials of Wireless Technology

- Concepts of wireless communication
- Overview of the various wireless technologies like RF, IR, Ultrasonic,
- Microwave etc. and their Frequency Bands
- Wireless Technology in Field Instruments: Popular Protocols, their Comparison and advantages
- Understanding the various important terms and concepts used in Wireless Transmitters like Latency, Subnets, Fresnel Zone, Routers,
- Topologies

Instrumentation and Hazardous Area Installations

Training Module Code: HAI

Duration: 2 Days Objectives

The workshop will enable participants to acquire:

- A general understanding of Installation & Maintenance of equipments in Hazardous Areas
- Understand the additional importance of permit to work systems and safe isolation in relation to explosion protection
- A "Safety First" mindset and be aware of the strategies and tools

Target Beneficiaries

Personnel from Instrumentation, Electrical, Electronics, Chemical, Process Engineering & Plant Operations departments who are required to operate maintain and Inspect instrumentation Installations in Hazardous areas

Prerequisites

Awareness of concepts of Safety Requirements

Day 1 – Working in Hazardous Area Installations

- Overview of Hazards in chemical processes
- The risk from electricity in hazardous areas
- Hazardous Area Classification Zones & Groups
- Explosion Protection Philosophy and Equipment Classification Systems & standards
- Overview of Installation Standards & Codes
- Complying with standards during installation
- Protection Concepts Ex i, Ex d etc.
- Installation Requirements for Explosion Protection equipment
- Role of Protection Systems
- Typical specifications of Explosion Protection equipment
- Identifying protection properties from the instrument's name plate

Day 2 – Inspection, Maintenance & Permit To Work (PTW) as Preventive Measures

- · Best practices during installation
- General requirements for Operation & Maintenance of Explosion Proof equipment
- · Fault finding & testing
- Typical cycles for Inspection Schedule
- Permits to Work
- Safe Isolation Lock out, Tag out procedures
- Gas Tests
- Strategies for "Safety First" Tools, Tackles & PPE (Personal Protective Equipment)

Intrinsic Safety Galvanic Isolation, Zener Barriers Technology & Applications

Training Module Code: ISZB

Duration: 2 Days

Objectives

The workshop will enable participants to:

- Understand the Standards prevalent to intrinsic Safety & their comparison
- Review the Hazardous Are classification into zones & groups
- Learn the importance of selecting equipment, based on "T" Rating
- Understand the principle of Galvanic Isolation, & impact of ground Loops in installations
- Appreciate the various protection concepts and "safe" selection criteria for equipment
- Review Ingress Protection classification
- Be aware of various principles & application of Galvanic Isolation & Safety Barriers
- Familiarize with the guidelines for selecting barriers that will match the

application

Learn best practices in the O&M of IS systems

Target Beneficiaries

Personnel from Instrumentation, Electrical, Electronics, Chemical, Process Engineering & Plant Operations Departments who are involved in Intrinsic Safety, Galvanic Isolation and Zener Barriers Technology & Applications.

Prerequisite

Awareness of concepts of Safety Requirements

Day 1 - Intrinsic Safety & Galvanic Isolation

- Basic hazards of chemical processes
- Flammability characteristics, ignition sources and the use of electricity
- Hazardous Area Classification zones and Groups
- Standards for Hazardous Area classification - ATEX & IEC Ex
- Complying with IEC requirements
- Protection concepts -Ex I, Ex d etc.

- Ingress Protection (IP) systems for enclosures
- Auto ignition temperatures and temperature class ratings
- Galvanic Isolation concepts and applications
- Origin & principles of Intrinsic Safety
- · Intrinsic Safety concepts
- Electrical theory behind Intrinsic Safety
- Implementation of Intrinsic Safety
- Operation and Maintenance of IS equipment

Day 2

- Introduction to Zener Barriers
- Earthing and Bonding
- Ground Loops
- Diodes vs Zener Barriers
- Zener Barriers characteristics and types
- Mounting and Mechanics of barriers
- · Selection criteria for barriers
- Application of Zener Barriers with different types of Process Instruments
 / Instrument Loops

Distributed Control Systems (DCS) & Process Logic Controllers (PLC) Operations

Training Module Code: DPO

Duration: 1 Day Objectives

The workshop will enable participants to:

- Familiarize with operational procedures of DCS & PLC.
- Appreciate the difference between DCS & PLC.
- Understand typical applications of both systems in the industry.
- Know the basic configuration & engineering procedures.

Target Beneficiaries

Personnel from Instrumentation, Electrical, Electronics, Chemical, Process Engineering & Plant Operations departments

Prerequisites

None

Day 1 – Operation of DCS & PLC

- Introduction to Control Systems
- DCS & PLC Definitions & Differences
- Basic Components of DCS
- Human Interface Station (HIS)
- Field Control Station (FCS)
- Communication Protocols
- PLC System Configuration
- PLC operation principles
- PLC programming concepts

Yokogawa Smart Transmitters Course

Training Module Code: YSTX

Duration: 2 Days

Objective

This course is designed to provide participants with advance smart transmitter industrial measurement technology used in process instrumentation and control.

Participants

For process instrumentation & control engineers, supervisors and technicians.

Prerequisite

Participants should preferably be experienced in process industry

with basic knowledge of process measurement and control.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

Introduction to Process Control Instrumentation communications & networks types.

Yokogawa field products overview. Typical measurement loops. EJA* Differential Pressure Transmitter.

Laboratory Work:

Loop connection of smart transmitters to DCS.

Day 2

YTA* Temperature Transmitter. Other selected transmitter. Transmitter adjustment, calibration & troubleshooting.

Laboratory Work:

Online adjustment & diagnosis using available tools.

- PRM.
- HART475 Communicator.
- Fieldmate.
- Brain Terminal BT200.

PID Characteristics of Controllers and Control Optimization

Training Module Code: PIDBL

Duration: 3 Days Objectives

The workshop will enable participants to:

- Comprehend the theoretical & practical aspects of PID Control & base layer control strategies
- Implement tuning on various processes like Level, Temperature etc. as well as gain knowledge on complex tuning

Target Beneficiaries

Process Control and Instrument Engineers, Operations Personnel, Process Engineers who are:

Responsible for tuning the control loops and ensure performance
Responsible for achieving higher levels of

Process Performance

Prerequisites

- Participants should be aware of Process Control Fundamentals
- Basic knowledge of DCS engineering

Day 1 – Introduction to P,I & D action

- Introduction to Proportional, Integral and Derivative Action
- Practical implementation of PID Control Action
- Open loop response of PID controller

Day 2 – PID Tuning rules & practice on simulated process

- PID Tuning rules
- PID Tuning practice using simulated processes
- Temperature Loop
- Cascade Loop

- Level Loop
- Pressure Loop
- Monitoring and Diagnostic of PID Controller
- · Different form of PID Controller in DCS
- Non-Linear PID Control

Day 3 – Advanced DCS configuration & complex tuning

- Cascade Control
- Ratio Control
- Pressure Compensated Temperature
- Signal Processing
- Feed forward Control

Control Valves Engineering

Training Module Code: CVEG

Duration: 4 Days Objectives

This training workshop is essential to understand the essentials of Control Valves Engineering and acquire the basic selection and sizing tips. At the end of the sessions, participants will be able to:

- Understand the basic hydraulics and the relationship between the Cv, flow rate and pressure drop
- Select the best suiting valve for a given process
- Select the best suiting control valve for a given application
- Select the proper sizing, packing and accessories for a given flow and hydraulic configuration
- Deal with the essentials of digital product protocols and options for control valve communication

Target Beneficiaries

Mechanical, instrumentation and process engineers involved in sizing, selecting and applying process control valves.

Prerequisites

Basic hydraulic and instrumentation skills

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

- Basic hydraulics relationship between the Cv, flow rate and pressure drop
- · Recall on different types of valves
- Actuators and Positioners
- Fundamentals on valve control: Understanding the operation of control valve in a control loop

Day 2

- Control valves selection
- Actuator selection and sizing
- Liquid valve sizing
- Gas valve sizing

Day 3

- Severe service application: cavitation, flashing and chocked conditions, erosion, noise control, antisurge control,...
- Typical Control Loops using control valves
- Case Studies and application exercises

Day 4

- Communication protocols
- Loops and Process Control
- Maintenance

Wireless Communication Technology - Basic Course

Training Module Code: WFIB

Duration: 1 Day Objective

To understand basic knowledge of wireless technology and to be able to setup minimum wireless system smoothly.

Participants

Instrumentation and process control personnel involved in Engineering & Maintenance of Field Instruments

Prerequisite

Participants should preferably have some basic knowledge on process measurement.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Training Agenda

1. ISA100.11a Wireless Standard

ISA100 wireless committee

Comparison with wireless HART

Key Feature of ISA100

- Channel hopping schemes
- IPv6, 6LowPAN
- Security Features
- Variety of ISA100 wireless venders etc.
- 2. Yokogawa wireless system features Device Portfolio

Long Communication Distance and multi-hop system

Remote antenna cable

Scalability

Full Redundant System

Security Measures

Sky mesh concept

Battery Life Time & Battery concept

3.Basic Setup of Yokogawa Wireless System (Hands-on training)

ISA100 wireless device roles

Preparation of software & hardware

Device Provisioning

Access Point Setup

Wireless System Configuration

Wireless Network Confirmation

Wireless Communication Technology - Advanced Course

Training Module Code: WFIA

Duration: 2 Days Objective

To understand advanced knowledge of wireless technology and to be able to operate large scale wireless system.

Participants

Instrumentation and process control personnel involved in Engineering & Maintenance of Field Instruments and already awarded basic wireless course certification.

Prerequisite

Participants should preferably have some basic knowledge on process measurement and wireless system.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Training Agenda

- Application references in Middle East Application introduction
- Advanced system setting for Large Scale Wireless System (Hands-on training)

Graphic Editor

Modbus Setting - Diagnostic, Device Status -

Multiple Subnet setting

Channel Blacklisting and noise interference

Full Redundant System

Latency minimization - Duocast -

Security Setting

OTA provisioning

System Design Sample for Large Scale Project

3. Maintenance procedure

Battery Maintenance

System Backup, Maintenance information & Firmware upgrade

4. Installation design guide line

Basic knowledge of radio communication

Wireless Device Layout and Topology (Sky Mesh Concept)

Consideration of Communication Distance

Fresnel zone

Height pattern effect

Weather condition effect

Examples of Installation Design without Site Survey

- Advanced product setup (Optional)
 Multi-Protocol Adapter setup (HART protocol)
- Advanced product setup (Optional)
 Multi-Functional Adapter (AI, DI, DO, Pulse)
- 7. Advanced product setup (Optional) Vibration transmitter setup



Introduction to Safety Systems Training

Training Module Code: ISST

Duration: 1 Day

Objectives
To give the participants an understanding of the role played by Safety Systems

of the role played by Safety Systems for industrial production processes in preventing personal injury, environmental damage, damage to equipment and loss of production.

This course will cover the terminology used for Safety Systems, the international standards IEC 61508 and IEC 61511 which cover all safety life-cycle activities and also the safety solutions offered by the Yokogawa ProSafe Systems family.

Target Beneficiaries

Operators, Engineers, etc., interested in the various aspects of safety systems for industrial production processes

Prerequisites

None

Day 1

- · Welcome and course introduction
- Usage of safety systems
- Safety systems terminology
- International standards IEC 61508 and IEC 61511
- Introduction to Yokogawa ProSafe systems family
- Evaluation

Functional Safety for End-users

Training Module Code: FSEU

Duration: 2 Days

Objectives

The objective is to provide participants with elementary and necessary knowledge about functional safety based on international standards IEC 61508 and IEC 61511.

Target Beneficiaries

Architectural and/or basic designers, lead engineers, project engineers, system engineers, application engineers, site engineers and project managers involved in safety projects

Prerequisites

Participants should have an affinity with industrial safety

Examination

An open book assessment will be given at the end of the 2 days.

Certificate

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Participant who attains at least 80% at the final exam will be awarded a Yokogawa Competence Certificate, valid for 3 years.

Day 1

- General introduction
- Module 1: Introduction to Functional Safety
- Module 2: International safety standards IEC61508 and IEC 61511
- Module 3: HAZOP-SIF-SIL
- Module 4: Safety Engineering

Day 2

- Module 5: Functional Safety Management
- Module 6: Failures and hardware fault tolerance
- Module 7: Common causes influences ad other failure types
- Module 8 Safety calculations

Layer of Protection Analysis (LOPA) on Safety Systems

Training Module Code: LOPA

Duration: 2 Days

Objectives

This course enables participant to learn to perform Layer of Protection Analysis (LOPA) & Safety Instrumented Systems (SIS). Layer of Protection Analysis (LOPA) is a methodology for hazard evaluation and risk assessment. It helps the analyst make consistent decisions on the adequacy of the existing or proposed layers of protection against an accident scenario. This decision-making process is ideally suited for coupling with a company's risk-decision criteria, such as those displayed in a risk matrix. LOPA is a recognized technique for selecting the appropriate safety integrity level (SIL) of your safety instrumented system (SIS) per the requirements of standards such

as ANSI/ISA-84.00.01, IEC 61508 and IEC 61511

Target Beneficiaries

- Process Safety personnel
- Process and Process Control engineers
- · Operations and Maintenance engineers
- Personnel who may participate in LOPA reviews or Who may be affected by LOPA recommendations
- Participant should have basic understanding of Process Safety, Process Hazard Analysis techniques, and with strong engineering skills

Prerequisites

Participants should preferably have some basic knowledge on process control.

Day 1

- Overview of LOPA and SIL Assessment
- Process Hazard Analysis and Tolerable

Risk Target

- Consequence Evaluation
- Developing Scenarios
- Exercise
- Identifying Initiating Causes and Likelihood
- Identifying Independent Protection Layers
- Failure Rates and Reliability Data
- Risk Tolerance Criteria and Risk Reduction Measures

Day 2

- Introduction to Safety Instrumented Systems (SIS)
- Achieving Safety Integrity Level (SIL) Targets - Design Phase, Operations & Maintenance
- Exercise
- Case Study from a major site (refinery) for Operations & Maintenance
- Quiz

Functional Safety Certification for Operations

Training Module Code: TUVFST

Duration: 2.5 Days Objectives

The objective is to provide operators, maintenance technicians all those who are involved in the maintenance and operation of safety instrumented systems with elementary and necessary knowledge about functional safety, based on the international standards IEC 61508 edition 2010 and / IEC 61511 edition 2016

Target Beneficiaries

This course is ideally suited for maintenance and instrument technicians or operators who will be involved in testing, maintaining and decommission of Safety Instrumented Systems (cradle to grave) .

Prerequisites

In accordance with TUV Rheinland Functional Safety Program: a minimum of 2 years experience in the field of functional Safety - A technical diploma or certificate or equivalent engineer level responsibilities status certified by the employer.

Methods of delivery

Interactive lecture. Exercises (both groups and individual exercises)

Trainer:

Safety Assurance and consultancy group of Yokogawa Europe.

Participants: 6 to 12

Day 1

- Module 1: General Introduction
- Module 2: Standard IEC 61508 and 61511
- Module 3 Installation and commissioning
- Module 4:general aspects for all phases

Day 2

- Module 5: overall safety validation
- Module 6: Operational phase
- Module 7: Maintenance and repair
- Module 8: Proof Testing
- Module 9: Modifications
- Module 10: decommissioning and Disposal

Day 3 – Examination EXAMINATION

At the end of the course, participants have to take an exam. The examinations contains two parts. Part. Part1 Consists of 40 Multiple Choice questions and part 2 consists of 10 open questions.

Certification:

The certification delivered upon succeeding in passing the examination is a Functional Safety Technician Certification officially delivered by TUV Rheinland - Germany.

Functional Safety Certification for Engineers

Training Module Code: TUVFSE

Duration: 4 Days Objectives

The workshop will enable participants to: Understand and master the application, principles and requirements of IEC 61508 / IEC 61511

Target Beneficiaries

Instrument Engineers, Process Engineers & Supervisors, Maintenance & Operating Personnel, Safety System engineers.

Prerequisites

A minimum of 3 years experience in the field of functional Safety: Registration is subject to acceptation by TUV Rheinland.

Day 1 – Introduction to Safety Engineering

- Introduction to safety engineering
- Application of the international standard IEC 61511 part 1: General requirement and management of Functional Safety
- Examples concerning management of Functional Safety

Day 2 – Application of IEC 61511 standards

- Application of the international standard IEC 61511 part 2: Requirements E/E/PES
- Determination and evaluation of safety related parameter (practical examples)
- Application of international standard IEC 61511 part 3: software requirements
- Practical example concerning part3

Day 3 – Application of IEC 61511 standard

- Requirements of tools for configuration and parameterization of Safety Systems
- Requirement of safety related bus system according to IEC 61511
- Summary of training questions and

Day 4 – Examination

Certification:

The certification delivered upon succeeding in passing the examination is a Functional Safety Engineer Certification officially delivered by TUV Rheinland - Germany.

Functional Safety of Machinery

Training Module Code: TUVFSM

Duration: 5 Days Objective

The new standards regarding Functional Safety as well as the new European Machinery Directive demand that persons and organizations performing responsible (accountable) tasks during the life cycle phase of a machine have to acquire and prove their competencies in Machine Safety.

Within this training the requirements for the design as well as the proof of Functional Safety for Machinery applications are described and discussed in detail based on the relevant current standards.

The selection of protective devices for Machinery in order to achieve the required risk reduction is shown. Examples of safety functions are explained. The main requirements of ISO 13849 and IEC 62061 for the design of safety related parts of machine control systems are presented and application examples illustrating the quantitative assessment of safety functions are discussed.

Participants

Application engineers and system integrators with some experience in Functional Safety; also designers and safety specialists working in Machinery

applications.

Prerequisite and Certification

The following requirements must be fulfilled in order to get the FS Engineer (TÜV Rheinland) certificate in Machinery:

- Copy of degree (Bachelor's, Master's or other) in engineering or other technical area,
- 2. Participation in the complete training,
- 3. Passing of exam

Working Material

The standards ISO 13849 part 1 and part 2 and IEC 62061 are required working material for this training and need to be brought along by the participants.

Day 1

Introduction - TÜV Rheinland Functional SafetyTraining Program.

- · Guidelines and Standards
- Risk Analysis
- Introduction to ISO 13849
- · Safety Devices
- Guards, interlocking devices:
- Other safety devices:

Day 2

- · Safety functions of machines
- · Circuits, schematics, examples
- New standards regarding safety of machinery

Day 3

• ISO 13849

- Validation
- Validation acc. to ISO 13849-2.
- IEC 62061

Day 4

- Examples for proof of Functional Safety acc. to IEC 62061,
- Examples for proof of Functional Safety acc. to ISO 13849-1

Questions and answers, discussion

Day 5

Exam

Exam duration: 3 hours

The exam consists of 70 multiple choice questions and 12 open questions.

The standards EN ISO 13849 part 1 and 2 and EN 62061 are essential working material for the exam.

Additionally a calculator should be brought along for the quantitative assessment.



Process Control Principles

Training Module Code: PCP

Duration: 5 Days Objectives

The workshop will enable participants to:

- Gain Analytical Knowledge & handling abilities of different units & processes through a dynamic process simulator
- Confirm the knowledge gained through Textbooks, Lectures & exercises by practically operating the various modules in the dynamic simulator
- Refresh control theory and practice standard methods to set control parameters & improve the controllability of various process controls i.e. Flow, Level, Pressure & Temperature
- Learn the principles behind Heat & Mass Balance & Heat Transfer
- Understand the basics of behavior of fluids i.e. Volumetric Flow Rate, Reynolds Number, Pressure Drop etc. using a Fluid Simulator
- Experience the unit operation of a
 Distillation Column & a Centrifugal
 Compressor which leads to the
 understanding of the concepts of Gas
 Compression, managing the critical
 characteristics such as surge control
 & operation of a water methanol
 distillation tower

Target Beneficiaries

Personnel from Instrumentation, Electrical, Electronics, Chemical, Process Engineering & Plant Operations departments

Prerequisites

- Background knowledge of Windows Operating System
- Knowledge of Basic Chemical Engineering

Day 1 - Process Control Simulation

- Flow Control
- Liquid Level Control
- · Pressure Control
- Temperature Control
- · Feed forward Control

Day 2 – Equipment Control – Centrifugal Compressor

- Learn the basic operating method of Centrifugal Compressor by practical operation of the process simulator
- Reading the Performance Curve
- Understand the mechanisms behind surging and its avoidance

Day 3 – Distillation Column

- Learn the operation of a distillation tower by practical simulation
- Understand the type of control strategy behind the Distillation Tower

 Understand the influence of Reflux ratio on the Temperature & Heat Balance of the Tower

Day 4 – Heat Transfer, Material & Heat Balance

- Understanding the various parameters of a Heat Exchanger from the operating data
- Understand the relationship between the water amount & the overall Heat Transfer Coefficient
- Obtaining theoretical values of Material & Heat Balance from basic equations and testing verifying them
- Understanding the significance of Air Ratio Control
- Confirming the material balance of water around the steam generator

Day 5 – Dynamics of Fluid Flow

- Study of the important parameters related to fluid flow viz. Volumetric Flow rate, Mean Flow rate, Reynolds Number, Pressure Drop etc.
- Practically determine the properties of water that will be affected by temperature
- Verify pressure drops due to friction & potential difference

Introduction to Advanced Process Control Techniques

Training Module Code: APC

Duration: 3 Days Objectives

The workshop will enable participants to:

- Understand the basic concepts of Advanced Process Control (APC) techniques
- Apply the theory to practice
- Identify the APC areas and quantify the deliverable benefits upon implementation
- Work in a Project involving all facets of APC

Target Beneficiaries

Process, Operations, Instrument, Control Engineers and Console Operators who are:

- Responsible for efficiently running the process units
- Responsible for maintaining process controls and ensure a stable control performance

• Responsible for translating the intended objectives in to performance

Prerequisites

Participants should preferably have some basic knowledge on process control.

Day 1 - Introduction to APC Technology & Benefit estimation

Introduction to APC Terminology Process Dynamics PID Control Control Algorithms and Tuning Level Controls Cascade and Computer Controls

Introduction to Benefit Estimation Statistical Primer How benefits are achieved How to process data for benefit estimation Calculation approaches Real life examples Introduction to MPC

Day 2 - Working Principle

How it works in simple terms
Where should MVPC be used
Independent and Dependent Variables
Step test methods & Model identification
Project Implementation
Role of the consultant Vs. Client APC
APC Maintenance issues and QA

Day 3 – Quality estimators & optimization

 Introduction to Optimization within MVPC

Introduction to Economics Variables (EV)

Importance to EV in achieving APC benefits

Introduction to Quality Estimators
 Why use estimators?

Multivariable Control Techniques

Training Module Code: MVCT

Duration: 5 Days
Objectives

The workshop will enable participants to:

- Determine & express dynamic plant behavior in a multivariable sense
- Design & test MVC using SMOCPRO MVC
- Understand the details of the inferred measurements using the RQEPRO tool

Target Beneficiaries

Process, Operations, Instrument, Control Engineers and Console Operators

Prerequisites

Participants should be aware of Advanced Process Control Techniques

Day 1 – Project Screening & MVC Formulation

- How benefits are achieved
- · How to process data for benefit

Estimation

- Calculation approaches
- Project Screening
- Process Analysis
- Types of MVC
- Exercises

Day 2 – ERC Concepts & Requirements

- Obtaining a Model for SMOC
- Introduction to Process Models
- Classification of Models
- Plant Testing Methods
- Model Identification
- Process of Identification
- Use of AIDA
- Examples
- Model Building
- Use of Model Builder
- Exercises

Day 3 – Modeling Techniques (Process Models, Classification etc.)

• SMOC Features

- Unmeasured Disturbance Model
- Kalman Observer
- Optimization within SMOC Economic Variables (EV)
- Role of EV in achieving APC benefits
- Application Tips
- Exercises

Day 4 – Introduction to Quality Estimators

- · Why use RQE?
- Off-line and On-line Configuration of Estimators
- Keeping Estimators Healthy

Day 5 – Project Implementation

- Implementation Aspects
- MVC Strategies and Typical Application
- Implementation Guidelines
- · Role of the Consultant Vs. Client
- APC Maintenance issues and QA

Tuning concepts and "Tune VP" application

Training Module Code: TVP

Duration: 2 Days

Objectives

The workshop will enable participants to:

- Understand the basic concepts of control loops, and tuning techniques.
- Apply the theory to practice
- Identify the areas and quantify the deliverable benefits upon implementation

Work in a Project involving facets of APC.

Target Beneficiaries

Process, Operation, Maintenance, Control Engineers and Console Operators involved in:

• Plant operation efficiency and safety

improvement

- Plant operational procedure optimization
- Operational cost reduction
- Plant operation quality control
- Plant maintenance optimization

Prerequisites

Participants should preferably have some basic knowledge on process control

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1:

- Introduction to Terminology
- · Process Dynamics
- PID Control basics
- Yokogawa Control Algorithms
- Level Controls

- Overview of Tune VP Tools
- Cascade and Computer Controls
- Model -FOPTD, IPTD
- Loop Configuration.

Day 2:

- Tune VP functioning principle
- Tune VP System Architecture
- IMC Method Of tuning
- Tune VP Demo
- Q&A
- Introduction to MVPC

Tune VP: PID control, tuning and optimization

Training Module Code: TVPA

Duration: 5 Days Objectives

This course will be conducted for Five-days. The focus will be both on the theoretical and practical aspect of PID control and based layer control strategies, reinforced by exercises and hands on tuning practice on simulated process using CENTUM DCS.

At the end of the course, the participant

- Understand the theory behind the PID
- Familiarize with the PID Tuning Rules to be adopted to characterize the various types of Process Responses
- Tuning of Flow, Temperature, Pressure and Level Loops
- To analyze Process interactions and identify ways and means of overcoming them to provide improved base Laver Control.

Target Beneficiaries

Control, Process and Instrument Engineers who are:

Responsible for tuning the control loops and ensure performance

Responsible for achieving higher levels of Process Performance

Prerequisites

Participants should be familiar with:

- Process Control and Monitoring
- Instruments and their functions within a typical feedback/control loop
- Basic math and sciences

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1:

Introduction to Proportional, Integral and Derivative action.

Practical implementation of PID control

Open loop response of PID controller.

Day 2:

PID tuning rules.

PID tuning practice using simulated processes,

- Temperature loop,
- Cascade loop,
- Level loop and
- Pressure loop.

Day 3:

Monitoring and Diagnostic of PID controller.

Different form of PID controller in CENTUM DCS.

Non-linear PID Control.

Day 4:

Advanced DCS configuration, and complex loop tuning.

- Cascade Control
- Ratio Control,
- Pressure compensated temperature,
- Signal processing.

Day 5:

Advanced DCS configuration and complex loop tuning. Feed forward control.

Constraint control.

Temperature pass balancing.

Advanced Alarm Management System

Training Module Code: AAMS

Duration: 5 Days

Objectives

The workshop will enable participants to:

- Successfully eliminate the alarms by understanding of several analysis
- Optimize the alarms to improve the safety & reduce trips
- Understand Alarm Rationalization by learning effective procedures & strategies to prioritize & configure alarm settings
- · Assess a real world Project

Target Beneficiaries

Personnel from Instrumentation, Control System Engineers, Chemical, Process Operations & Console Operators

Prerequisites

An understanding of plant control systems working within the process control industry

Day 1 – Purpose of Alarm Management

- Purpose of Alarm System One of the risk mitigation mechanisms
- Issues of poor Alarm Management

 Background of alarm problem,
 Potential to miss alarms due to alarm rates beyond human capability,
 Alarm suppression without control,

Improper Alarm settings/priority, lack of documentation on consequences or operator actions

- EEMUA Guidelines Key points on EEMUA Guidelines
- Alarm management lifecycle Introduction of ISA 18.02
- Benefits of effective Alarm
 Management Minimize the likelihood
 of missing alarms, suppression
 controlled by procedures, Apply
 consistent methods to determine the
 alarm settings/priority, document on
 consequences/ operator actions

Day 2 – Applied Alarm Management

Alarm Management Solutions – Overview of existing Management Systems

- Alarm system performance analysis

 Introduction of alarm system
 benchmarking
- Application on Consolidated Alarm Management System (CAMS)
 - Alarms actions
 - Operations acknowledgement
 - Implementation, guidance
 - Testing of Alarms
 - Alarm response procedures
 - Alarm System Maintenance

Day 3 Benefits of effective alarm management

- Alarms Identification
 - Methods for alarms identification

- Alarms prioritization
- Objectives analysis
- Set point determination
- Alarms classification
- · Detailed Design
 - Alarms design principles
 - Special Alarms design considerations
 - Treatment of diagnostic alarms

Day 4 – Alarm Rationalization

- Assess current alarms performance using alarms and event logs
- Identify nuisance alarms to be reduced
- Identify root causes of nuisance alarms and review DCS settings
- Evaluate possible solutions for root causes
- Use HAZOP studies to evaluate and design alarm system
- Evaluate and optimize operational state

Day 5 – Alarms Reporting

- Practice on Alarm Master Database
- Alarms Reporting and Analysis
 - Alarms Documents and Reports
 - Security Reports
 - Publishing and Emailing reports automatically
 - Customized reports
 - Backup and Restore

Introduction to Procedures Automation using Exapilot

Training Module Code: PAGE

Duration: 3 Days

Objective

This course is designed to provide a thorough introduction to the Yokogawa Exapilot Asset Guard package. It provides focus on how Exapilot can help automate plant operation efficiency in steady, unsteady, abnormal states, enhance DCS function, and guard plant operation assets & resources.

Participants

Process, Operations, Maintenance, Control Engineers and Console

Operators, from chemical, petrochemical, and other Process-related industries who are:

- Responsible for plant operation efficiency and safety improvement;
- Responsible for plant operational procedure optimization;
- Responsible for operational cost reduction;
- Responsible for plant operation quality control;
- Responsible for optimized plant maintenance.

Prerequisite

Participants should preferably have plant experience and knowledge in operation and control.

Day 1 – Introduction to EXAPILOT software

Introduction to Terminology

- Overview of ExaPilot
- Features of ExaPilot
- Functions of ExaPilot
- Suitable Operation's
- System Architecture
- Application Structure
- Q & A

Day 2 and 3: Practice

Builder function of ExaPilot

- •View of Programming tool
- Builder Function
- Operation Function
- Case Studies
- •Q & A

Real Time Process Optimization (RPO)

Training Module Code: RPO

Duration: 3 Days Max 12 Participants Objectives

This course is designed for allowing personnel operating and/or maintaining the Real Time Process Organizer to get started with this new system.

At the end of the sessions, the participants will:

- Understand the architecture of the platform
- Navigate within the different applications.

- Be capable of connecting a Plant Information System
- Be capable of performing basic maintenance and troubleshooting.

Day 1

- Introduction to RPO
- Architecture of I-Field System
- RPO Launcher
- Common Users
- Common Users roles and permissions
- RPO Common
 - Plant Hierarchy
 - Equipment Hierarchy
 - Organization Hierarchy
 - Shift Settings

Day 2

- Introduction to Production Instructor
- Operation Log
- Work Instructions
- Shift Handover
- Reports

- Introduction to Production Supervisor
- Configure Data Server
- Configure KPI's
- LPI Alarms
- KPI Hierarchy
- KPI Dashboard
- Overview of WFC Builder
- Process Monitoring Operations
- Connection to PI Server
- Troubleshooting

APPLIED PROCESS CONTROL

OTS Training for Operators – Customized course

Training Module Code: OTSOP

Duration: 10 Days

Objectives

At the end of the training program operators shall be fully aware of Process Startup and Shutdown in the OTS system for the plant model process. Awareness and analysis of Cause and Effect.

Process Upset and Scenario Handling using the Model in the OTS setup.

Important notes:

- The process training shall follow the Process Operating Manual (POM) and reference of Design and commissioning manual ,vendor manual as provided by the Company
- Training material from Yokogawa shall cover the functional aspects in line with the operational Aspects of the complete plant available in the OTS model.
- Process theory / process specific details of the model shall be referred from the POM.
- The training manual will use simple steps prepared from the referred design documents for the understanding of the operators

Target Beneficiaries

Panel Operator and Field Operator involved in the plant operations

Prerequisites

Participants should have attended HMI Operation and Graphics Training

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

- Introduction.
- Overview of OmegaLand Direct DCS connection.
- OmegaLand DCS emulation.
- · Loading OmegaLand.
- Stopping OmegaLand

Day 2

- Introduction to Omega Land's model and functionalities.
- The FAT Completed (application and Graphics) will be used to load the training setup.
- Run simulation model and visualize the complete operation.
- Hands-on Exercise

Day 3 and 4

- · Aspects of process startup.
- Load some Initial Conditions of startup and cold IC.
- Hands-on Exercise.

Day 5

- Overview of Field operator Interface and sequences.
- Introduction to Omega Land's Field Operation (FO).
- Operation sequences for startup.
- Hands-on Exercise.
- Q & A.

Day 6 and 7

- Overview of cause and effect.
- Use of Cause and Effect in the process and regular operations.
- Q & A

Day 8

- Malfunctions and Process Upset for resorting steady state operation.
- · Scenario Handling.

Day 9

• Process interlocks and Operations.

- Process And Operational Key points coverage.
- Q & A.

Tank Inventory Management

Training Module Code: ETIM

Duration: 3 Days Objectives

The objective is to provide participants with elementary and necessary information and understanding about tank gauging systems and Inventory Management.

It will introduce the Tank data calculations and detail the Tank Alarm Monitoring process.

Target Beneficiaries

All personnel involved in Tank Inventory Management operation and maintenance

Prerequisites

Participants should have an affinity with industrial safety

Day 1

- General introduction on Tank Gauging System
- Different types of onshore tanks
- Tanks Instrumentation
 - Radar Level measurement
 - Radar Sensors and transmitters operation and maintenance
 - Temperature, Pressure and Density Measurement

Day 2

- Inventory Calculation
- Tank data calculation
 - Tank Strapping table
 - Flow rate
 - Available volume / Ullage
 - Expected reach time to high/low
- Communication with DCS
- Tank Alarm Monitoring
 - Level
 - Temperature

Endress + Hauser 🔠

People for Process Automation

- Pressure
- Leaks
- Static Electricity
- Pre-Alarms
- ..
- Reporting

- Installation
 - Best Practice
- Commissioning
 - Get the system up and running
- Hand dipping
 - Verifying the accuracy on a tank gauging system
- Electrical
 - · Hazardous area
 - Cabling
 - Restrictions

OPERATOR TRAINING SIMULATOR(OTS)

Operator Training Simulator (OTS) Engineering Training

Training Module Code: OTS

Duration: 4 Days Max 5 Participants Objectives

This training course is designed to train engineers to configure and to make changes in the "VMmaster Training Simulator" effectively in a training environment. At the end of this course, the trainees will be able to:

- Understand basics Omegaland Dynamic Simulation
- Configure units available in the VMmaster library
- Operate each station such as MDL-PC and VIEW-PC
- Operate all features of the "VMmaster" model station.

Day 1

- Introduction & definition of OTS
- Overview of Virtual Machine (VM)
- Definition of Material property
- Operation in Edit-mode
- Operation in Execute-mode
- Calculations in streams and Units
- Calculation of Pressure-Flow balance
- Model Integration
- · Hands on exercises

Day 2

- Model building (selected process)
- Executing specific process
- Omegaland outline description
- Basic/option functional modules
- VM Space functions and mechanisms
- · Creation of simulators

Day 3

- Process component system
- Omegaland/DB configuration
- · Registrations in Omegaland/EXEC
- Reading stream and unit variables in Excel
- Writing in unit variables from Excel
- Customized physical property
- · Calculation and data library

- · Getting started with APLIB
- Using Field Operation Library (FOD LIB)
- Using Interlock Block Diagram Library (IBD LIB)
- Using DCS LIB (Yokogawa Centum VP Emulation library)
- Using Malfunction Generator

Operator Training Simulator (OTS) Instructor Training

Training Module Code: OTSI

Duration: 4 Days Max 5 Participants Objectives

The course is designed to train Instructors to use and maintain the "VMmaster" Training Simulator" effectively in a training environment. At the end of this course, the trainees will be able to:

- Start-up and Shut-down the simulator
- Operate each station such as ITK-PC, MDL-PC and VIEW-PC
- Operate all features of the "VMmaster" Instructor Station
- This course will help PLANT's
 Instructors to maintain an overall operator training program for the simulator, which covers a set of typical training exercises for modifications (process model, database, malfunction and graphics).

Day 1

- Introduction and overview
- Loading OmegaLand
- Executing OmegaLand
- Stopping OmegaLand

- Hands-on Exercises
- Introduction to OmegaLand's snapshot function
- Save snap shot
- · Load snap shot
- Snap shot step back
- Q&A

Day 2

- Introduction to OmegaLand's Initial Condition Loading function
- Save Initial Condition
- Load Initial Condition
- Hands-on Exercises
- Introduction to OmegaLand's Freeze/ Run function
- Freeze simulation
- Run simulation
- Hands-on Exercises
- Introduction to OmegaLand's Replay Evaluation Module
- Replaying
- · Outputting logs
- Training record sheets
- Q&A

Day 3

• Hands-on Exercise

- Introduction to OmegaLand's Malfunction
- Malfunction panel
- · Executing Malfunction
- Stopping Malfunction
- Hands-on Exercises
- Introduction to OmegaLand's Instructor Variables
- Modifying Instructor Variables
- Execution
- Hands-on Exercises
- Q&A

Day 4

- Introduction to OmegaLand's Field Operation (FO)
- Executing FO
- Stopping FO
- Hands-on Exercises
- Introduction to OmegaLand's Abnormal Scenario Handling
- Hands-on Exercises
- Introduction to OmegaLand's Abnormal Scenario Handling
- Executing Abnormal Scenario
- Stopping Abnormal Scenario
- Hands-on Exercise
- Q&A

Operator Training Simulator (OTS) System Management Training

Training Module Code: OTSM

Duration: 3 Days Max 5 Participants Objectives

This course can help PLANT's engineers to maintain the proper configuration of operator training system and trouble shooting. The programme is specially designed for the maintenance members

of the company to have hands on exercise to maintain the OTS (hardware and components) and be confident on handling the system for maintenance and backups.

Day 1

- · Overview of OmegaLand
- OmegaLand System configuration
- Q&A

Day 2

- Hands on exercises
- Backup and Restore data

- Hands on exercises
- Q&A

- System maintenance
- Hands on exercises
- System configuration
- Trouble shooting
- Hands on exercises
- Q&A



CONTROL SYSTEMS NETWORKING AND CYBER SECURITY

Plant Control Network Security

Training Module Code: PCNS

Duration: 5 Days

Objectives

The workshop will enable to: Qualify participants with the necessary skills to prevent unauthorized access to information related to their work and to protect computer systems from being attacked by harmful software, besides that it will provide them with the techniques in avoiding data loss.

Target Beneficiaries

Network Engineers

Prerequisites

Knowledge on network management

Day 1 – System Security Overview

- System Security Overview
- Firewall
- Anti-virus software management

Day 2 – Management of security essentials

- Operating System (OS) patch management
- Windows domains and accounts management

Day 3 – Managing backup and recovery

- Backup and Restore management
- · Network management system.

Day 4 – Importance of cyber security

- Cyber security overview
- · Necessity of control system security

Day 5 – Vulnerability to computer viruses

- Security, strategy & control
- Computer viruses and vulnerabilities

Centum VP Networking (Vnet/IP)

Training Module Code: VNETIP

Duration: 3 Days Objectives

This course empowers participants to understand the concept of control network incorporating the general communication function to keep highly reliable stable real time communication. The participants will practice on configuring, setting up, maintaining and trouble shooting the network and the hardware involved :

- Acquire and apply the fundamentals on Control System Network Management
- Manage simple and multiple domains network
- Master Vnet/IP addressing
- Maintain and troubleshoot Control System Networks

Target Beneficiaries

Engineers and Technicians involved in Process Control Network Management

Prerequisites

Participants should preferably be familiar with Process Control Systems and have basic knowledge on network management.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

- Introduction
- Vnet/IP overview
- System architecture
- System specification
- Vnet/IP hardware
- Network Configuration
- Vnet/IP redundancy
- Vnet/IP Addressing

- DIP switches
- Hands on

Day 2

- Vnet/IP Addressing
- Physical IP (PIP)
- Virtual IP (PIP)
- Hands on
- Vnet/IP Troubleshooting
- Hands on

- Network Switches
- L2 & L3 Switch Functionalities
- Yokogawa Recommended switches
- Trouble shooting
- · Security Hardening
- Hands on
- Q&A and wrap up

Subsystems Integration

Training Module Code: SSI

Duration: 4 Days

Objective

Allow participants to:

Integrate subsystems to Yokogawa control system and manage communication.

Manage sub system communication using industry standard communication protocols like MODBUS and OPC.

The participants will practice on connecting, configuring, setting up and trouble shooting the subsystems communication.

Participants

Engineers and Technicians involved in Process Control Network Management

Prerequisite

Participants should have attended the course "Centum VP Engineering".

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1 MODBUS

Overview of Modbus concept. MODBUS Protocol Introduction & function

Subsystem communication.

Communication I/O Modules.

Communication Specifications of

Connection and engineering for MODBUS communication.

Subsystem Data Storing Format

Laboratory Work: Modbus DCS project part 1.

Day 2 MODBUS (Continued)

Engineering and configuration. Communication Packet Analysis. Maintenance and trouble shooting.

Laboratory Work: Modbus DCS project part 2.

Day 3: Unified Gateway Station (UGS)

Functional architecture Functional details of UGS function blocks OPC A&E event notifications Communication functions

- Modbus

Engineering and Configuration.

Day 4:

Unified Gateway Station (UGS) Continued Engineering and Configuration Station redundancy:

- Principle of Redundant UGS
- Computer or Network Switch-over
- Redundant UGS operation
- Station switching

Maintenance and trouble shooting

OPC Communication Essentials

Training Module Code: OPC

Duration: 2 Days

Objectives

The workshop will enable participants to:

- Understand the concepts of OPC (OLE for Process Control)
- Understand the benefits of this communication method by comparing the Traditional connectivity methods to

Target Beneficiaries

For engineers, developers and integrators who are integrating new systems, expanding current operations, replacing legacy equipment and looking for ways to improve data communication using

Prerequisites

- · Microsoft Windows and basic computer use
- An understanding of Process Automation requirements
- No previous OPC experience is expected

Day 1 – Introduction to OPC its underlying technology

- Introduction to OPC and the underlying technology
- Specification Overview
- Configure OPC Server
- Configure OPC Client
- Exercises

Day 2 – OPC Networking **Essentials**

- Networking essentials and how they apply to OPC communication
- DCOM settings and security
- DCOM Troubleshooting techniques
- Exercises



Exaquantum Technical Overview Seminar

Training Module Code: EQTS

Duration: 1 Day Objective

This is a not a formal course but a presentation and demonstration of the features of Exaquantum. It describes the features and benefits of both Exaquantum server and the various client interfaces.

Participants

Anyone who wishes to have an overview of the features of Exaquantum will benefit from this

exaquantum will benefit from the seminar.

Prerequisite

None.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance

Day 1

Introduction to Exaquantum.
Features and Benefits.
Features and Benefits continued.
Addressing customer specific Issues.

Exaquantum System Administrator

Training Module Code: EQAD

Duration: 4 Days

Objective

This course covers all the tasks necessary to administer an Exaquantum System. The aim of the course is to demonstrate the post installation configuration of an Exaquantum System, perform all necessary steps to get the system up and running and then monitor it for performance etc.

Participants

This course is essential for those people responsible for the Administration of an Exaquantum System.

Prerequisite

A working knowledge of the Microsoft Windows Desktop environment.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

Introduction to Exaquantum Administration.
System-Wide Configuration.

Laboratory Work:

Template Configuration.

Exercises and Multiple choice questions on the concepts covered.

Day 2

Tag Editor.

Tag Generation.

Laboratory Work:

Exercises and VMultiple choice questions on the concepts covered.

Day 3

Role Based Name. Space Configuration. Miscellaneous. Administration Topics.

Laboratory Work:

Exercises and Multiple choice questions on the concepts covered.

Day 4

Database Maintenance. First Line Troubleshooting.

Laboratory Work:

Exercises and Multiple choice questions on the concepts covered.

Exaquantum Data Access from Third Party package

Training Module Code: EQDA

Duration: 1 Day

Objective

Introduces the user to the Exaquantum tools to access data from third party clients like Microsoft Excel and Internet Explorer 6

Participants

Anyone in an organization who needs

access to data stored in Exaquantum would benefit from attending this course.

Prerequisite

A working knowledge of the Microsoft Windows desktop environment.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

Exaquantum Data Handling Overview. Overview of the Exaquantum / Explorer. Excel Add-In.

The Exaquantum OLE DB interface.

The Exaquantum Web Frame Work. Exercises and Multiple choice questions on the concepts covered.

Exaquantum User

Training Module Code: EQUS

Duration: 2 Days

Objective

This is an entry-level course designed to improve an overview of the Exaquantum system. In addition, hands-on training will be provided in the client access tools such as the Exaquantum/Explorer Excel Add-In and Exaquantum/Explorer itself...

Participants

Anyone who:

Needs access to data stored in Exaquantum

Needs to understand where the Exaquantum/Explorer product could be used within their organization Has a knowledge of other User Interface

Generation applications and wishes to compare them with Exaquantum/ Explorer.

Prerequisite

A user level knowledge of the Windows Desktop Environment.

Certification

Participant who attains at least 75% attendance will be awarded Certification

of Attendance.

Day 1

Demonstration of the feature of Exaquantum

 Describes the features and benefit of both Exaquantum server and various client interface

Introduction to Exaquantum Data Handling

- · How it handles information
- How it represents information
- Introduction to Exaquantum/Explorer Excel Add-in
- · Features of Add-In
- Use of the Set Data/Range Update dialogues
- Use of the Set Report Times dialogues
 The Exaguantum OLE DB interface
- · Discussion of what OLE DB is
- Which Exaquantum data is available to the user
- Sufficient info covered to generate a report

Exaquantum/Explorer Positioning and Benefits

- What is Exaquantum/Explorer
- What Exaquantum/Explorer is not

- Why should I use Exaquantum/Explorer
- What benefit would I gain from using it

Day 2

Exaquantum/Explorer Terminology and User Interface

- What is an Explorer Document
- What is a Control
- What are Explorer Workbooks
- How do they differ from Microsoft Excel Workbook
- How and when would I use Explorer Workbooks
- What is the purpose of the various parts of the user interface
- What do you do in Run Mode and Design Mode
- What is the use of the Secure Workbook Folder
- What is navigation
- Trend Analysis
- Templates

Creating Documents and Configuring Controls

- Develop and configure one-off reports
- Covering textual, pictorial & graphical representation.

Exaquantum Explorer Overview

Training Module Code: EQEO

Duration: 1 Day

Objective

Introduce the user to the Features and Benefits of Exaquantum / Explorer.

Participants

Anyone in an organization who needs access to data stored in Exaquantum using Exaquantum / Explorer.

Prerequisite

A user level knowledge of the Windows Desktop Environment.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

Exaquantum / Explorer Positioning and Benefits.

Exaquantum / Explorer Terminology and User Interface.

Preconfigured Examples and Templates.

Creating Documents and Configuring Controls.

Overview of Advanced Exaquantum / Explorer Features.

Exercises and Multiple choice questions on the concepts covered.

ExaOPC / Exaquantum Engineering & Maintenance

Training Module Code: ExaOPC/ExaQ

Duration: 5 Days Objectives

The workshop will enable participants to acquire:

- Understanding the Exaquantum & OPC
- Enhance to using system support tools
- Increase the knowledge in backup/ restore/troubleshooting & Installation.

Target Beneficiaries

Personnel who want to improve and develop their knowledge in Exaquantum & ExaOPC

Prerequisites

None

Days 1, 2 & 3 -

- Introduction to Exaquantum concepts
- Building the system configuration
- Using System Support tools
- Understanding Multi-Server Exaquantum
- Concept of Items, Tags, Function

Blocks

- Backup/ restore/troubleshooting
- Installation
- Using the Exaquantum Transformation Server
- Writing calculation

Days 4 & 5 -

- Introduction to OPC technologies
- Understanding OPC Interfaces
- Understanding Yokogawa ExaOPC Software
- ExaOPC Tools and Troubleshooting
- · Monitoring user connections

Exaquantum Alarms Reporting and Analysis Package

Training Module Code: ARAP

Duration: 5 Days

Objective

Exaquantum Advanced Alarm Management System assists users in determining the cause of incidents and trips by automatically collecting and storing all alarm & event messages and data points of interest from plant equipment such as control and safety systems.

The course provides an overview of the product as well as allowing students to configure a system that starts to collect Alarm and Event data and the creation of trip reports.

Participants

This course is designed for those users who wish to get more familiar with the Exaquantum Advanced Alarms Management System.

Prerequisite

It will be assumed that attendees are familiar with Exaquantum Administration to the level which would be obtained by attending the Exaquantum Administrators Course (EQAD).

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1: EXAQUANTUM OVERVIEW

Introduction to Exaquantum.

Features and Benefits.

Features and Benefits continued.

Addressing customer specific Issues.

Day 2: EXAQUANTUM DATA HANDLING SYSTEM

Exaquantum Data Handling Overview.

Overview of the Exaquantum / Explorer.

Excel Add-In.

The Exaguantum OLE DB interface.

The Exaguantum Web Frame Work.

Exercises and Multiple choice questions on the concepts covered.

Day 3: SEQUENCE OF EVENTS RECORDER

Introduction and Overview

Installation

Trip and Tag Configuration

User Interface

Configuration of MS SQL Report Services Basic Troubleshooting

Day 4: ALARMS REPORTING AND ANALYSIS

Introduction and Overview

Installation

Configuring ARA using the Configurator

CENTUM VP CAMS integration

ARA Security

Reports

Publishing and Emailing Reports Automatically

ARA Data Storage and Update

Creating Custom Reports

Backup and Restore of ARA Data

Day 5: ALARMS MASTER DATABASE

Installation requirements and prerequisites

Installation

Post installation configuration

AMD agents

Security

AMD web User Interface (UI)

Alarms and alarms configuration

Documents and reports

Import an export

Enforcements

Troubleshooting

Exaquantum Sequence of Events Recorder

Training Module Code: SER

Duration: 1 Day

Objective

Exaquantum/SER assists users in determining the cause of incidents and trips by automatically collecting and storing all alarm & event messages and data points of interest from plant equipment such as control and safety systems.

The course provides an overview of the product as well as allowing students to configure a system that starts to collect Alarm and Event data and the creation of trip reports.

Participants

This course is designed for those users who wish to get more familiar with the Exaguantum/SER product.

Prerequisite

It will be assumed that attendees are familiar with Exaquantum Administration to the level which would be obtained by attending the Exaquantum Administrators Course (EQAD).

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

The course consists of the following sessions:

- Introduction and Overview
- Installation
- Trip and Tag Configuration
- User Interface
- Configuration of MS SQL Report Services
- Basic Troubleshooting

Exaquantum Alarm Reporting and Analysis

Training Module Code: ARA

Duration: 1 Day Objective

Exaquantum/ARA (based upon EEMUA 191) is a valuable tool which helps managers to assess and monitor process and system alarm behaviour. The information provided helps diagnose many causes of operator overload and provides benchmarks for system improvement.

This course covers the installation, configuration, administration and use of the Exaquantum Alarm Reporting and Analysis package...

Participants

This course is designed for those users who wish to get more familiar with the Exaquantum/ARA product.

Prerequisite

This coures assumes that the user is familiar with Microsoft Windows and the basic Microsoft Windows terminology. It also assumes that the student is familiar with all the major features of Exaguantum.

Knowledge of SQL Server Management Studio would also be useful but is not essential..

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

The course consists of the following sessions:

- Introduction and Overview
- Installation
- Configuring ARA using the Configurator Application
- CENTUM VP CAMS integration
- ARA Security
- Reports
- Publishing and Emailing Reports Automatically
- ARA Data Storage and Update
- Creating Custom Reports
- Backup and Restore of ARA Data

Exaquantum Alarm Master Database

Training Module Code: AMD

Duration: 1 Day

Objective

Exaquantum/AMD provides a centralized Alarm Master Database, holding the alarm configuration of connected process plants. It provides the ability to configure and maintain the alarm configuration details for multiple DCS and CAMS systems. Exaquantum/AMD strives to adhere to the principles as laid out in the EEMUA 191 and ISA 18.2 guidelines.

Participants

This course is designed for those who wish to get more familiar with the Exaquantum/AMD product.

Prerequisite

It will be assumed that attendees are familiar with Microsoft windows and the basic Microsoft windows terminology. It also assumes that the student is familiar with major features of Exaquantum with knowledge of SQL Server management essentials.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

- Installation requirements and prerequisites
- Installation
- · Post installation configuration
- AMD agents
- Security
- AMD web User Interface (UI)
- Alarms and alarms configuration
- · Documents and reports
- Import an export
- Enforcements
- Troubleshooting

PI Client Applications

Training Module Code: Pl

Duration: 3 Days Objective

This course is designed to give participants the understanding of Client tools and handling the plant data.

Participants

Mainly DCS Operators, Plant Operation personnel and Engineers who are required to study the process history data of the Plant.

Prerequisite

Participants should preferably have some basic knowledge on process measurement and control.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

1. Overview

 What is PI? System architecture / data flow / PI Client Applications

2. Fundamentals

 Dialogs boxes / Logging into PI / Tag search / Time formats / Processbook modes

3. Processbook Trends

- Creating a trend / Using the trend / Customizing the trend

4. Other Processbook Elements

 Values / Bars / Text and shapes / Symbol Library / Bitmaps and graphics / XY Graph

5. Animation and Colour

- Modifying colours / Multistate indication / buttons

6. Introduction to Processbook Scripting

 ActiveX Objects / VB for applications / Automating processbook

7. Calculations and External

Data sets / Calculations in Processbook
 / Connecting to external data

8. Organizing Processbook Display

- Processbooks and displays / Filetypes
- Links and commands / external documents

9. Getting Around Datalink

 Datalink and Excel basics / functions / calculations and expressions /trends

10. Single Value Functions

- Current & Archive Value / Tag Attributes

11. Table Functions

 Compressed Values Function / Sampled Data & Timed Data Function / Filter Expressions

12. Calculation Functions

 Calculated Data Function / Expression Calculations / Time Filtered Calculations / Advanced Calculations

13. Data Trend

 Creating a real-time trend / Using the trend / Customizing the trend / Trends using spreadsheet data



Introduction to Distributed Control Systems (DCS)

Training Module Code: DCSI

Duration: 2 Days
Objective

This course is designed to give participants the fundamental knowledge of Distributed Control System (DCS).

Participants

For process instrumentation & control engineers, supervisors and technicians.

Prerequisite

Participants should preferably have some basic knowledge on process measurements and control

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

Morning session:

Introduction to Control system concepts. History and evolution of DCS. Features & Advantages of DCS. DCS architecture and configuration. Introduction to DCS Communication.

Afternoon session:

Overview of Yokogawa CENTUM VP DCS.

CENTUM VP software and operation workshop.

Day 2

Morning session:

CENTUM VP Hardware overview. Control loop design. Control loop engineering.

Afternoon session:

Loop connection design workshop in CENTUM VP system.

CENTUM VP Operation & Monitoring

Training Module Code: VPOF

Duration: 5 Days

Objective

This course is designed to give participants the fundamental knowledge of operation and functions of the CENTUM VP system.

Participants

Mainly CENTUM VP operators and plant operation personnel who are required to operate the CENTUM VP system.

Prerequisite

Participants should preferably have some basic knowledge on process measurement and control.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

LESSON 1 System Architecture **LESSON 2** Display Layout of HIS and Navigation Activities

Laboratory Work for lesson 1 & 2..

Day 2

LESSON 3 3 Centum VP – Operational Windows

Laboratory Work for Lesson 3:

Day 3

LESSON 4 Operation Keyboard **LESSON 5** System Monitoring Window Displays and Reports

Laboratory Work for lesson 4 & 5

Day 4

LESSON 6 Sequence Control Displays **LESSON 7** Alarm and Message Windows

Laboratory Work for lesson 6 & 7

Dav 5

LESSON 8 HIS Setup Appendixes Virtual Test Function and Supplemental Topics

Laboratory Work for all lessons.

CENTUM VP Fundamentals For Engineering

Training Module Code: VPEF

Duration: 3 Days
Objective

This course is designed to give participants the fundamental knowledge of operation and functions of the CENTUM VP system in preparation of engineering works.

Participants

Plant operation specialists, Engineers and Maintenance personnel who are required to operate the CENTUM VP system.

Prerequisite

Engineers and Technicians involved in software generation or modification on CENTUM VP system.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

LESSON 1 System Architecture

LESSON 2 Display Layout of HIS and Navigation Activities

LESSON 3 Centum VP – Operational Windows

Day 2

LESSON 4 Operation Keyboard

LESSON 5 System Monitoring Window Displays and Reports

LESSON 6 Sequence Control Displays.

Day 3

LESSON 7 Alarm and Message Windows

LESSON 8 HIS Setup

Appendixes Virtual Test Function and Supplemental Topics

CENTUM VP Engineering

Training Module Code: VPEG

Duration: 5 Days

Objective

This course empowers participants to perform generation of CENTUM VP regulatory control functions, sequence control function, and Human Interface Station.

Participants

Engineers and Technicians involved in software generation or modification on CENTUM VP system.

Prerequisite

Participants should have attended the CENTUM VP Fundamentals for Engineering course.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

LESSON 1 System Architecture **LESSON 2** System Configuration

Laboratory Work:

Day 2

FLESSON 3 HIS Builders **LESSON 4** FCS Configuration Builders

Laboratory Work:

Day 3

LESSON 4 FCS Configuration Builders **LESSON 5** Regulatory and Calculation Functions

Laboratory Work:

Day 4

LESSON 6 Sequence Control Programs Laboratory Work

Day 5

LESSON 7 Graphics **LESSON 8** System Backup

Laboratory Work.

CENTUM VP AD Suite Engineering

Training Module Code: VPAD

Duration: 5 Days Objective

This course empowers participants to perform generation of CENTUM VP regulatory control functions, sequence control function using AD SUITE and Human Interface Station

Participants

Engineers and Technicians involved in software generation or modification on CENTUM VP system.

Prerequisite

Participants should have attended the CENTUM VP Engineering.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

LESSON 1 System Configuration **LESSON 2** IO List and IOM

Laboratory Work:

Hands on Lesson 1 and 2.

Day 2

LESSON 3 Module Configuration **LESSON 4** Switches and Message of FCS

Laboratory Work:

Hands on Lesson 3 and 4.

Day 3

LESSON 5 History and Change Management

LESSON 6 Document Generation

Laboratory Work:

Hands on Lesson 5 and 6.

Day 4

LESSON 7 Downloading LESSON 8 Backup of ADMDB

Laboratory Work:

Hands on Lesson 7 and 8.

Day 5

LESSON 9 Course Project

Laboratory Work:

Hands on Lesson 9.

CENTUM VP Maintenance

Training Module Code: VPMT

Duration: 3 Days

Objective

This course is designed to provide participants with an overall understanding of CENTUM VP hardware, maintenance procedure, software installation, backup procedures and maintenance tools.

Participants

Engineers and Technicians who are responsible for daily maintenance of CENTUM VP system.

Prerequisite

Participants should preferably be familiar with the CENTUM VP Fundamentals or Engineering.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

LESSON 1 System Architecture **LESSON 2** CENTUM VP System Setup **LESSON 3** Downloading

Laboratory Work:

Hands on Lesson 1,2 and 3.

Day 2

LESSON 4 Maintenance Related HIS Buttons

LESSON 5 Replacement of Common Modules

LESSON 6 System Backup

Laboratory Work:

Hands on Lesson 4,5 and 6.

Day 3

LESSON 7 Software Re-installation **LESSON 8** Lifecycle Agreement

Laboratory Work.

Hands on Lesson 7 and 8.

CENTUM VP Engineering & Maintenance

Training Module Code: VPEM

Duration: 5 Days
Objective

This course is designed to provide participants with an overall understanding of CENTUM VP hardware, maintenance procedure, backup procedures and maintenance tools. Course will empowers participants to perform generation of CENTUM VP regulatory control functions, sequence control function, and Human Interface Station.

Participants

Engineers and Technicians involved in software generation or modification on CENTUM VP system.

Prerequisite

Participants should have attended the CENTUM VP Fundamentals for engineering course.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

LESSON 1 System Architecture **LESSON 2** System Configuration **LESSON 3** HIS Builders

Laboratory Work:

Hands on Lesson 1,2 and 3.

Day 2

LESSON 4 FCS Configuration Builders **LESSON 5** Regulatory and Calculation Functions

Laboratory Work:

Hands on Lesson 4 and 5.

Day 3

LESSON 6 Sequence Control Programs

Laboratory Work:

Hands on Lesson 6.

Day 4

LESSON 7 Graphics **LESSON 8** System Backup

Laboratory Work:

Hands on Lesson 7 and 8.

Day 5

LESSON 9 Maintenance Related HIS Buttons

LESSON 10 Replacement of Common Modules

Laboratory Work:

Hands on Lesson 9 and 10.

CENTUM VP Fundamentals of Operation & Maintenance

Training Module Code: VPFM

Duration: 5 Days

Objective

This course is designed to provide participants with an overall understanding of CENTUM VP Function, hardware, maintenance procedure, software installation, backup procedures and maintenance tools.

Participants

Engineers and Technicians who are responsible for daily maintenance of CENTUM VP system.

Prerequisite

Participants should preferably have some basic knowledge on process measurement and control

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

CENTUM VP system overview and configuration. Description of hardware.

Laboratory Work:

Familiarization on CENTUM VP different components.

Day 2

Window Panel Operation

- User security.
- Basic tag features & security.
- Standard operation panel.

Laboratory Work:

Operation exercise on operation panels part 1.

Regulatory Control Functions. Sequence Control Function.

Laboratory Work:

Operation exercise on feedback and sequence. control operations

Day 3

CENTUM VP system configuration. HIS hardware & software. Daily checking of HIS hardware & software.

System maintenance function.

Laboratory Work:

HIS Components check-up.
Replacement of HIS components.

Day 4

Installation fo Centum VP Laboratory Work: FCS Component Check-up. Replacement of FCS Components.

Day 5

Laboratory Work for Operators.

CENTUM VP Graphic Builder

Training Module Code: VPGR

Duration: 3 Days

Objective

This course empowers participants to perform graphic generation of CENTUM VP system and edit existing graphics.

Participants

Engineers involved in software generation or modification on CENTUM VP system.

Prerequisite

Participants should preferably have some basic knowledge on process measurement and control.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

LESSON 1 Terminology **LESSON 2** Navigation

Laboratory Work: Centum VP Navigation

Day 2

LESSON 3 Graphic Builder LESSON 4 Building a Graphic

Laboratory Work:

Graphic generation hands-on

Day 3

LESSON 5 Building a Graphic (continue)

LESSON 6 Custom Faceplate

Laboratory Work:

Graphic generation hands-on

CAMS (Consolidated Alarm Management System) Overview

Training Module Code: CAMS

Duration: 2 Days

Objective

This course is designed to provide participants with an overall understanding of the package for alarm rationalization CAMS (Consolidated Alarm Management System).

Participants

Mainly CENTUM VP operators and plant operation personnel who are required to operate the CENTUM VP or CS3000 system.

Prerequisite

Participants should preferably be familiar with the CENTUM VP or CS3000 Fundamentals.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

Introduction.
CAMS Main Operation Functions
Alarm Action & Acknowledgment
Operation

Laboratory Work:

Familiarization on CAMS operations.

Day 2

CAMS Operation & Features Relationship between CAMS for HIS and HIS

Displaying Historical Data

Laboratory Work:

Familiarization on CAMS operations and features.

CAMS (Consolidated Alarm Management System) Engineering

Training Module Code: CAMSE

Duration: 3 Days

Objective

This course is designed to provide participants with an overall understanding of the package for alarm rationalization CAMS (Consolidated Alarm Management System) and provide engineering exercises on CAMS builder

Participants

Mainly Process Control Engineers and plant operation personnel who are required to operate the CENTUM VP or CS3000 system.

Prerequisite

Participants should preferably be familiar with the CENTUM VP or CS3000 Fundamentals.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance

Day 1

Introduction.
CAMS Main Operation Functions
Alarm Action & Acknowledgment
Operation

Laboratory Work:

Familiarization on CAMS operations.

Day 2

CAMS Operation & Features Relationship between CAMS for HIS and HIS

Displaying Historical Data

Laboratory Work:

Familiarization on CAMS operations and features.

Day 3

CAMS Engineering
Project Properties CAMS Options
-CAMS for HIS Alarm
-CAMS for HIS Alarm Group
-CAMS for HIS Shelf
-CAMS for HIS Message Monitor
Definition

CAMS Master Station Definition
Common Section Download &
Equalization
HIS Setup CAMS Tab
Laboratory Work:
Explore CAMS Builders and option items.
Download Common section definition
Apply CAMS Master Database Definition

DCS System maintenance on Site training

Training Module Code: SYMS

Duration: 3 Days
Objective

This course is designed to provide guidance and supervision on site for participants working on CENTUM VP system, If focus on practical training.

Participants

Technicians, engineers and maintenance personnel who are required to maintain YOKOGAWA system.

Minimum: Two Maximum: Four

Prerequisite

Participants should preferably have some basic knowledge on process measurement and control.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Notes

Based on the system type and sized the course contents and duration can be customized.

Collecting work permits if required is customer scope.

Day 1

Plant Architecture Familiarization Plant System Configuration System Hardware & Software Familiarization

Daily Checking Of Hardware & Software Replacement System Components Procedure

Day 2

System Maintenance Functions System Hardware Configuration Network Troubleshooting Loop Tracing And Troubleshooting Maintenance Data Management

Day 3

Troubleshooting Data Gathering And Analysis History Log Analysis System Loading Backup And Restore Report Writing And Considerations

Centum VP Essentials with Batch Process

Training Module Code: VPBA

Duration: 3 Days Objectives

After completion of this course, participants will have acquired fundamental knowledge about the operation and functions of the Centum VP system working with Batch process.

Target Beneficiaries

Centum VP Operators, Plant Operation Specialists and Engineers.

Prerequisites

Participants should have basic knowledge on process measurement and control.

Day 1

System status overview
HIS Startup & Security
HIS tool bar and operator Keyboard
Window Hierarchy and navigator
Windows: Calling, size zoom, dynamics
an sets

Context meu, soft keys, function keys Instrument faceplates regulatory

Day 2

Tuning panel, Trending Logic charts, sequence tables & control drawings Messages, SFC operation Alarm filters Process report Historical report Help messages

Day 3

Operator guide messages
Output screen images
Plant hierarchy
Example of batch automation concepts
The recipe overview screen
Familiarization with automated recipe
Loading and operation of a control recipe
Assigning units

Monitoring active recipe operation steps Batch trending

Batch Programming

Training Module Code: BATCH

Duration: 5 Days

Objectives

After completion of this course, participants will be able to perform generation of a Centum VP Batch Project using the workstation.

Target Beneficiaries

Engineers involved in software generation and/or modifications of the Centum VP Batch Systems.

Prerequisites

Participants should have previously attended the Centum VP Essentials

of Operation (VPEF) and Centum VP Engineering (VPEG)

Day 1

Batch Automation overview Introduction of Batch Concepts ISA S88.01 Batch Control Standards Familiarization with example Batch Processes

Overview of Centum VP Batch Packages

Day 2

Unit Supervision
Batch Engineering activities, defining a plant hierarchy
Management of shared resources, common blocks

Day 3

Batch Control Operations
Derivation of Batch operations from a

recipe

SFC sequences, operations and flashes Basics of SEBOL batch control language, operation SFC function blocks

Day 4

Process Management and recipe management

Process management, batch trains and paths, master recipes
Batch operation and monitoring screens

Day 5

Exception handling and batch report Exception handling logic Custom state transition matrix Batch report concepts and builder Access control concepts and builder Batch trend

CS3000 Fundamentals for Operation

Training Module Code: 3KOF

Duration: 5 Days

Objective

This course is designed to give participants the fundamental knowledge of operation and functions of the CENTUM CS3000 system.

Participants

Mainly CENTUM CS3000 operators and plant operation personnel who are required to operate the CENTUM CS3000 system.

Prerequisite

Participants should preferably have some basic knowledge on process measurements and control.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

CENTUM CS3000 system overview and configuration.

Description of hardware.

Laboratory Work:

Familiarization on CENTUM CS3000 different components.

Day 2

Window Panel.

Operation Part 1.

- User security.
- Basic tag features & security.
- Standard operation panel.

Laboratory Work:

Operation Exercise on operation panels part 1.

Day 3

Regulatory.
Control Function.
Sequence Control Function.

Laboratory Work:

Operation Exercise on feedback and sequence control operations.

Operation exercise on operation panels part 2.

Day 4

Window Panel.

Operation Part 2.

- System Status Display.
- Process / Historical Reports.

Day 5

Laboratory Work for Operators.

CS3000 Fundamentals for Engineering

Training Module Code: 3KEF

Duration: 3 Days

Objective

This course is designed to give participants the fundamental knowledge of operation and functions of the CENTUM CS3000 system.

Participants

Plant operation specialists, Engineers and Maintenance personnel who are required to operate the CENTUM CS3000 system.

Prerequisite

Participants should preferably have some basic knowledge on process measurements and control

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

CENTUM CS3000 system overview Description of hardware.

Window Panel Operation Part 1.

- User security.
- Basic tag features & security.
- Standard operation panel.

Laboratory Work:

Operation exercise on operation panels part 1.

Day 2

Regulatory sequence. Control functions.

Laboratory Work:

Operation exercise on feedback. Sequence control operations.

Day 3

Window Panel.

Operation Part 2.

- System Status Display.
- Process / Historical Reports.



Fieldbus Orientation

Training Module Code: FBOR

Duration: 2 Days Objective

This course is designed to provide participants with an overall understanding of Fieldbus concept, and familiarization of Fieldbus Engineering tools.

Participants

Engineers and Technicians who are responsible for Fieldbus engineering configuration and modification of Fieldbus device parameters.

Prerequisite

Participants should preferably be familiar with the CENTUM VP or CS3000 Fundamentals and Engineering.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

Overview Fieldbus concepts.
Fieldbus system hardware.
Fieldbus communication.
Overview of Fieldbus engineering tools.

Laboratory Work:

Fieldbus configuration for some devices.

Day 2

Overview of device Management tools.

Laboratory Work:

Using device Management tool - Examples.

Fieldbus Engineering

Training Module Code: FBEG

Duration: 5 Day Objective

This course is designed to provide participants with an overall understanding of Fieldbus concepts, software installation and Fieldbus Engineering Tool.

Participants

Engineers and Technicians who are responsible for Fieldbus Engineering configuration and modification of Fieldbus device parameters.

Prerequisite

Participants should preferably be familiar with the CENTUM VP or CS3000 Fundamentals and Engineering and Field instruments knowledge

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

Overview Fieldbus concepts. Fieldbus system hardware. Fieldbus communication. Fieldbus function blocks. Device Management. Fieldbus wiring.

Day 2

Segment design considerations. Fieldbus devices (example: EJA).

Day 3

Fieldbus Engineering concepts. CENTUM Fieldbus block engineering.

Laboratory Work:

Fieldbus devices engineering.

Day 4

Fieldbus device management tool.

- NI Tool.
- Yokogawa Device Management Tool.
- Other tools.

Laboratory Work:

Fieldbus tools.

Day 5

Fieldbus Startup procedures. Fieldbus device replacement procedure.

Laboratory Work:

Fieldbus device replacement procedure.

Fieldbus Engineering & PRM

Training Module Code: FPRM

Duration: 5 Days Objective

This course is designed to provide participants with an overall understanding of Fieldbus & PRM concepts, Fieldbus Engineering Tools, PRM configuration & operation.

Participants

Engineers and Technicians who are responsible for Fieldbus.
Engineering configuration and modification of Fieldbus device parameters.

Engineers and Technicians who are responsible for field device maintenance and modification of field device parameters.

Prerequisite

Participants should preferably be familiar with the CENTUM VP or CS3000 Fundamentals and Engineering and Field instruments knowledge

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

Overview Fieldbus concepts.
Fieldbus system hardware.
Fieldbus communication.
Fieldbus function blocks.
Device Management.
Fieldbus wiring.
Segment design considerations.

Day 2

Fieldbus devices (example: EJA). Fieldbus Engineering concepts. CENTUM Fieldbus block engineering.

Day 3

Laboratory Work:

Fieldbus devices engineering. Fieldbus tools.

Day 4

Plant Resource Manager Overview. PRM System configuration. PRM Function specification. PRM operation procedure. PRM Administration.

- User and Device security.
- Reference code.
- Inspection schedule.
- Inspection memo.
- Parts list.
- Link document.
- Calibration management.
- Self documentation

Day 5

PRM database management. PRM Plugin application.

Laboratory Work:

Fieldbus device replacement procedure.

Plant Resource Manager

Training Module Code: PRMF

Duration: 2 Days

Objective

This course is designed to provide participants with an overall understanding of the concepts of Plant Resource Manager.

Participants

Engineers and Technicians who are responsible for field device maintenance and modification of field device parameters.

Prerequisite

Participants should preferably be familiar with any of CENTUM VP, CS3000, STARDOM or ProSafe-RS and Foundation Fieldbus concepts.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

Plant Resource Manager Overview. PRM System configuration.

PRM Function specification. PRM operation procedure. PRM Administration part1.

• User and Device security.

Laboratory Work:

Device parameters changes from PRM.

Day 2

PRM Administration part2.

- Reference code.
- Inspection schedule.
- Inspection memo.
- Parts list.
- Link document.
- Calibration management.
- Self documentation.

PRM database management. PRM Plugin application.

Laboratory Work:

PRM Plugin application.

FieldMate Orientation

Training Module Code: FMOR

Duration: 2 Days

Objective

This course is designed to provide participants with overall knowledge that allow him to understand and operate the Fieldmate and use it in maintenance activities.

Participants

For process instrumentation & control engineers, supervisors and technicians.

Prerequisite

Participants should preferably be experienced in process industry with basic knowledge of process measurement and control.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

FieldMate Overview & Features
FieldMate Registration
FieldMate PC Configuration
FOUNDATION fieldbus H1 Device
Interface
HART Device Interface
Installation of DD files
User Management Function

Laboratory Work:

FieldMate Installation
Device Configuration/Connection
Exercises

Day 2

Device Maintenance Information
Management
Segment Viewer and settings
Function Blocks settings for
FOUNDATION fieldbus
Device Adjustment/Setting Functions
Device Viewer & Operation Log

Laboratory Work:

Online adjustment & diagnosis



Fundamentals of ESD (Emergency Shut Down) Systems

Training Module Code: ESD

Duration: 2 Days

Objectives

Participants will be able to:

Gain fundamental knowledge of Emergency Shutdown Systems Understand the terms associated with safety systems and the need to comply with regulations

Target Beneficiaries

Engineers, Supervisors & Technician from Process maintenance fields

Prerequisites

Basic understanding of Oil & Gas Industry

Day 1 – Safety System Essentials

- The fundamental concept of safety systems
- Characteristic of critical process systems
- Basic terminology associated with safety systems
- Identify the components of safety systems
- Safety Integrity Levels (SIL)
- Understand safety system architectures
- Safety System positioning

Day 2 – Functional Safety Concepts

- Level of Protection Analysis (LOPA)
- Risk assessment & mitigation
- Types of safety failures
- Calculation of PFD(Probability of Failure on Demand)
- TUV/SIL classification
- Comparing of TMR/QMR and redundancy
- Comparing DCS and Safety System

ProSafe-RS Engineering

Training Module Code: RSEG

Duration: 4 Days

Objective

This course empowers participants to perform generation of ProSafe-RS programs, functional block diagrams, ladder logic and CENTUM VP or CS3000 integration

Participants

Engineers involved in design, software generation or modifications of ProSafe-RS system.

Prerequisite

Participants should preferably be familiar with MS Windows environment and

basic knowledge of logic functions. CENTUM VP or CS3000 Fundamentals or Engineering knowledge is advantage

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

Introduction to Safety & Safety Integrity Levels "SIL".

ProSafe-RS hardware.

Laboratory Work:

SCS Manager (Workbench) software.

Day 2

Project creation.
design function blocks.
Simulation and debug.
Project Downloading.

Laboratory Work:

Creation of application logic Application development.

Day 3

Instances and typical.
User-defined function blocks.

Laboratory Work:

Creation of function blocks.

Day 4

ProSafe-RS and CENTUM VP or CS3000 integration.

Inter-SCS communication.

Laboratory Work:

Exercise ESD and DCS integration.

ProSafe-RS Maintenance

Training Module Code: RSMT

Duration: 3 Days

Objective

This course is designed to provide participants with an overall understanding of ProSafe-RS hardware, maintenance procedures, software installation, backup procedures and Maintenance Support Tools.

Participants

Engineers who are responsible for the daily maintenance of ProSafe-RS system.

Prerequisite

Participants should preferably be familiar with MS Windows environment.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

Introduction to Safety & Safety Integrity Levels "SIL".

Prosafe-RS hardware. SCS-FCS integration.

Day 2

SCS Maintenance Support Tools.

Laboratory Work:

CPU module replacement. I/O module replacement.

Day 3

Version Control Tool procedures. Database Validity Check Tool. Sequence Of Events Recorder.

Laboratory Work:

Security and Password Protection. SCS Reports.

ProSafe-RS Engineering and Maintenance

Training Module Code: RSEM

Duration: 5 Days

Objective

This course empowers participants to perform generation of ProSafe-RS programs, hardware and software maintenance and CENTUM VP or CS3000 integration.

Participants

Engineers involved in software generation or modification and daily maintenance of ProSafe-RS.

Prerequisite

Participants should preferably be familiar with MS Windows environment and basic knowledge of logic functions. CENTUM VP or CS3000 Fundamentals or Engineering knowledge is advantage.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

Introduction to Safety & Safety Integrity Levels "SIL".

ProSafe-RS hardware. SCS Manager (Workbench).

Day 2

Project creation. design function blocks. Simulation and debug. Project Downloading.

Laboratory Work: Creation of application logic. Application development.

Day 3

Instances and typical.
User-defined function blocks.

Laboratory Work: Creation of function blocks.

Day 4

ProSafe-RS and CENTUM VP or CS3000 integration.
Inter-SCS communication.

Laboratory Work: CPU module replacement. I/O module replacement.

Day 5

Version Control Tool procedures. Database Validity Check Tool. Sequence of Events Recorder.

Laboratory Work: Security and Password Protection. SCS Reports.

ProSafe-RS Advanced Engineering

Training Module Code: PAEG

Duration: 5 Days

Objective

This course empowers participants to perform generation of ProSafe-RS programs, functional block diagrams, ladder logic and CENTUM VP or CS3000 integration.

Participants

Engineers involved in design, software generation or modifications of ProSafe-RS system.

Prerequisite

Participants should preferably be familiar with MS Windows environment and basic knowledge of logic functions. CENTUM VP or CS3000 Fundamentals and Engineering knowledge of Prosafe-RS is required.

Certification

Participant who attains at least 75%

attendance will be awarded Certification of Attendance.

Day 1

ProSafe-RS Hardware SCS Process Data Flow and Scan Times. SCS Application Builders & Project Creation

Laboratory Work:

SCS Application Builders & Project Creation

Day 2

SCS Test Function Procedures SCS Project Downloading Simulation and debug Ladder Logic Application Programming Functions/System Function Application Programming

Laboratory Work:

Creation of application logic Application development.

Ladder Logic Application Programming SCS Project Downloading.

Day 3

Manual Operation Function Blocks

Application Programming. Structured Text Application Programming.

Laboratory Work:

Manual Operation & Structured Text Application Programming.

Day 4

Inter-SCS Communication Application Programming SCS Link Transmission Application Programming ProSafe-RS and CENTUM VP or CS3000 integration.

Laboratory Work:

ESD and DCS integration. Inter SCS communication.

Day 5

SCS Application Analysis Project Database management and master data recovery

Laboratory Work:

Application Analysis.

Application logic backup and master data recovery.

ProSafe-RS Operation—Customized On Site training

Training Module Code: RSOP

Duration: 3 Days

Objective

This course is designed to provide guidance and supervision on site for participants working on ProSafe-RS system, If focuses on practical training.

Participants

Engineers who are required to operate YOKOGAWA Safety Instrumented System.

Prerequisite

Participants should have some basic knowledge on process measurement and control, Safety Instrumented Systems and Functional Safety.

Notes

- Based on the system type and size the course contents and duration can be customized.
- 1 day familiarization with the site / ESD's and procedures in place will be necessary for the Instructor to acquire the required local knowledge before teaching the course.
- Collecting work permits, if required, is within customer scope.

Day 1

Plant architecture familiarization
Plant system configuration
System hardware familiarization
System software familiarization
System overview windows related to
ProSafe-RS

Day 2

Overview of safety functions in plant Overview of safety operation graphics Run test function and simulate project Debug and simulation

Day 3

Review standard operation procedures (SOP) for

- Startup override
- Operation override
- Maintenance override

Process alarm window for safety

Process report

Historical report

Operation of Sequence of Event Recorder (SOER)

ProSafe SLS - HIPPS

Training Module Code: SLS

Duration: 3 Days

Objective

This course enables participants to understand the principles of ProSafe-SLS, to operate and perform first-line maintenance on ProSafe-SLS systems. A predefined ProSafe-SLS High Integrity Pressure Protection system [HIPPS] training will be used to give participants an opportunity for hands-on experience and troubleshooting on a physical ProSafe-SLS system.

Participants

Engineers involved in maintenance of ProSafe-SLS HIPPS System.

Prerequisite

Participants should preferably have some basic knowledge on process measurement and control. It would

also be beneficial to have knowledge of electronics and Boolean logic.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1:

Course introduction.
ProSafe-SLS principle of operation.
ProSafe-SLS solid-state logic solver.
ProSafe-SLS hardware overview.
Explanation of a basic HIPPS in relation to ProSafe-SLS (2003, 2004)
Exercise: ProSafe-SLS hardware familiarization

Day 2:

Concepts of ProSafe-SLS system configuration.

Exercise: Using the Harting extractor tool. Understanding ProSafe-SLS functional logic diagrams.

Reading and understanding the HIPPS Functional Logic Design (FLD) Exercises: Building ProSafe-SLS Logic and basic troubleshooting.

Day 3:

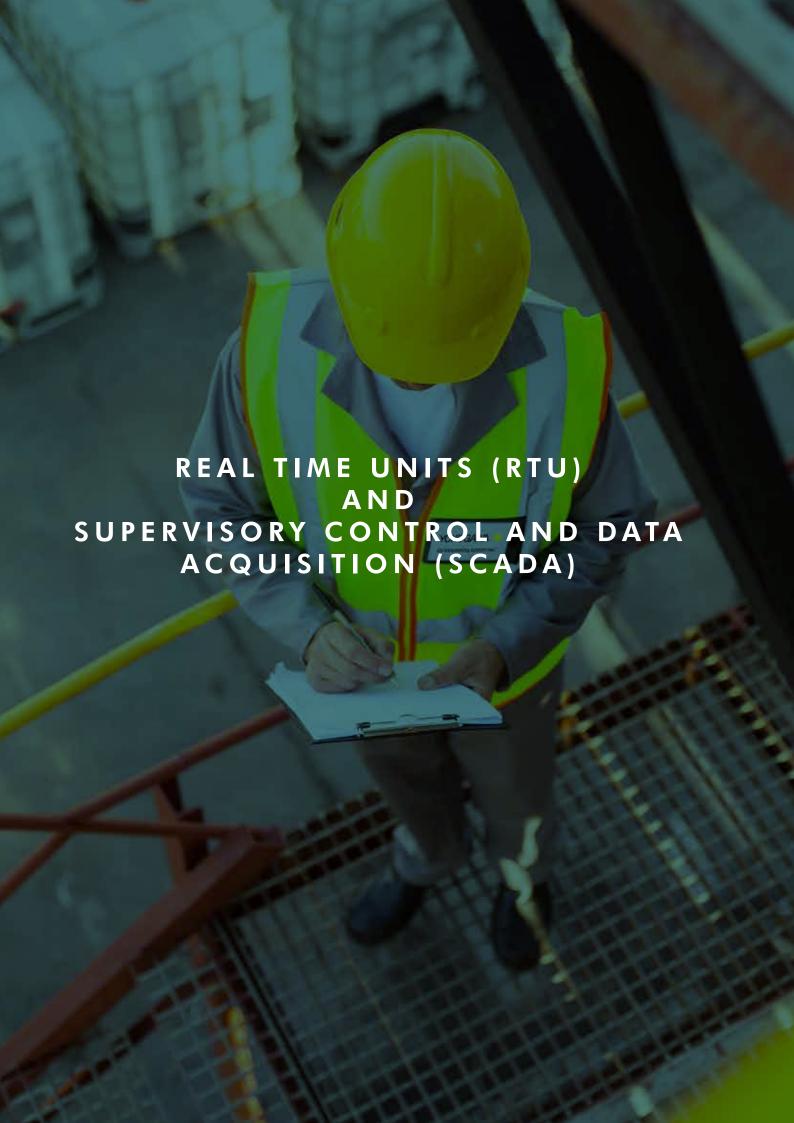
ProSafe-COM hardware overview Concepts of ProSafe-COM SET software.

Exercise: ProSafe-COM SET step-by-step guide.

Exercise: Set up communication between ProSafe-SLS Rack and Safety Station. Exercise: Modifying the TAG and CNF

files.

Exercise: Creating your own tags and monitoring them via the ProSafe-SLS COM SET



STARDOM & FAST/TOOLS Basic Engineering

Training Module Code: STFTBE

Duration: 5 Days

Objective

This 5-day course is designed for Engineers and Operation and Maintenance Personnel to configure the application to meet the demand of the process operator

Participants

For engineers involved in software generation or modification of the Stardom system

- For Operations and Maintenance Personnel who will configure and/or maintain the FAST/TOOLS operational environment
- Participants must be familiar with IEC61131-3 programming or have attended the IEC61131 programming training course
- With Fundamentals knowledge of computers and a working knowledge of MS- Windows

Prerequisite

Participants should preferably be familiar with MS Windows environment and some basic knowledge on process measurements and control.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

Introduction to Stardom

- · System Configuration
- Hardware Configuration
- Licenses
- FCX Introduction
- FCX Configuration
- Resource Configurator
- I/O Configuration
- Logic Designer Overview
- Program Organization
- Laboratory Work: Using the Resource Configurator, Creating a project and creating a control application

Day 2

Data and Variables

- IEC61131 Programming
- IEC61131 (cont.) Creating a control application
- PAS POU Function Blocks
- Connections
- Function Block Detail
- Debugging Tools
- Laboratory Work: Creating a control application and NPAS POU exercise

Day 3

FAST/TOOLS Introduction

- User Interface
- Exercise: Adding new users
- Stations

- What are stations?
- Exercise: Requesting/changing station information
- Process variables
- Exercise: Definition of Installation/Units and Items/Sub-items.

Day 4

The Human Machine Interface

- Exercise: Creation of symbols
- Exercise: Creation of mimics (with process variables)
- Exercise: Menu definition.

Day 5

Alarms

- The Alarm Mechanism
- Exercise: Configuration of an alarm environment
- Historical information
- Exercise: The method of collecting and storing

STARDOM Engineering

Training Module Code: STEG

Duration: 4 Days

Objective

This course empowers participants to perform system configuration of STARDOM and use of programming tools and YOKOGAWA function blocks available in the STARDOM controller.

Participants

Engineers or Technicians involved in design, software generation or modifications of STARDOM system.

Prerequisite

Participants should preferably be familiar with MS Windows environment and some basic knowledge on process measurements and control.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

Introduction to STARDOM system configuration
Hardware configuration and Licenses FCX introduction
FCX configuration
Resource Configurator

Laboratory Work:

Creating a Project Using the Recourse Configurator

Day 2

I/O Configuration.
Logic Designer overview.
Program organization.
Project creation.
Generation of control application.

Laboratory Work:

Creating a project in Logic Designer. Downloading the logic in STARDOM controller.

Day 3

Data and variables.
Introduction to IEC 61131 programming.

- Structured text.
- FBD.
- Ladder Diagrams.
- PAS POU function blocks.

Laboratory Work:

Creating an IEC 61131 program. PAS POU. Function blocks details.

Inter-FCX communication.

Day 4

Debug tools. STARDOM maintenance. using web browser. Upgrading firmware.

Laboratory Work:

Changing STARDOM controller IP address.
Using debug tools.
Function blocks.

STARDOM Maintenance

Training Module Code: STMT

Duration: 1 Days

Objective

This course enables participants to learn to use the Maintenance browser page, use maintenance tools and perform backup, revision upgrade and step to perform before a battery change operation.

Participants

Engineers or Technicians involved in routine maintenance of the STARDOM system

Prerequisite

Participants must be familiar with the STARDOM system.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

Basic of Maintenance page. Change System date/ time. Change communication parameters. Retain data save. Maintenance tools.

Laboratory Work:

Backup tools. Restoration tools. Firm ware revision upgrade. Battery change operation.

FAST/TOOLS Engineering Revision 10

Training Module Code: FTEG

Duration: 5 Days

Objective

System Managers are able to configure the application to meet the demand of the process operator. This lecture-based course combined with lab exercises provides the opportunity for hands-on experience to configure FAST/TOOLS. After completion of this module the student is able to develop a SCADA application according the Yokogawa recommended standard and Interpret and understand the available FAST/ TOOLS manuals / documentation.

Participants

The course is meant for System Managers who will configure and/or maintain the FAST/TOOLS operational environment.

Prerequisite

Participants will require fundamental knowledge of computers and working knowledge of MS-Windows.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance

Day 1

Welcome and Course Introduction. Introduction to FAST/TOOLS. How to use the documentation I/O Processing. Connecting equipment (MODBUS based)

Definition of items / Use of Item status **Exercises**

Day 2

FAST

First-out groups / Alarm collections / acknowledgement types Alarm selection areas / areas of interest / Alarm-Display relations / Alarm notification Exercises

Introduction and interface of PROCESS/

Day 5

Day 3 Introduction Object Oriented Programming.

Exercises

Introduction and interface of REPORT/ **FAST**

Introduction to Report Query Language (RQL)

Exercises

Day 4

Report Query Language (RQL) Continue...

Create and modify reports. Storing and retrieving Historical Information.

Implementing user Authorization. Logging user actions: Audit Trail Database engineering by means of quickload tool.

Creating graphics - Basics



Introduction to Process Analyzer & Sample Handling Systems

Training Module Code: PASHS

Duration: 2 Days

Objectives

The workshop will enable participants to:

Gain understanding of process analyzers and sample handling systems

Understand the theory of the various types of analyzers and their measuring principles and operation, Sample Handling System design and the function of components, sample phase consideration and their effects on measurement, and the preventive maintenance program for analyzers

Target Beneficiaries

Plant Operation & Maintenance personnel who are responsible for ensuring the continuous and stable analyzer performance

Prerequisites

Participants should preferably have fundamental knowledge on process measurement and control

Day 1 – Role & Application of Process Analyzers

- Role of Process Analyzers Process Control
 Process Monitoring
 Product Quality Control
- Application of Process Analyzers Petroleum Refinery Petrochemical Complex Natural Gas Plant

Environmental Monitoring

 Sampling System Configuration Sample Take-Off
 Pre-Conditioning System
 Sample Transport
 Sample Conditioning System

Day 2 – Maintenance & Troubleshooting

- Basic Chemistry
 Elements and Compounds
 Sample Media Phase
- Analyzers
 Various Types of Analyzers
 Gas or Liquid Measurement
 Continuous & Batch Analyses
- Maintenance & Services
 Planned Maintenance Program
 Trouble-Shooting Guidelines

Essentials of Analyzers & Gas Chromatographs

Training Module Code: ANZGC

Duration: 2 Days Objectives

The workshop will enable participants to:

Understand the different types of Analyzers & Gas Chromatographs Understand their applications & their measuring principles, Operation & Maintenance

Target Beneficiaries

Maintenance, engineers and technicians involved in engineering and maintaining Gas and Liquid analyzers and Gas Chromatographs

Prerequisites

Participants should preferably have fundamental knowledge on process measurement and control

Day 1 – Introduction to Analyzers (Principles & Operations)

- Role of Process Analyzers Process Control
 Process Monitoring
 Product Quality Control
- Application of Process Analyzers
 Petroleum Refinery
 Petrochemical Complex
 Natural Gas Plant
 Environmental Monitoring

Day 2 – Online Gas Chromatographs (Introduction, Terminology, Components & Functions)

- Gas Chromatograph Appreciation
- Gas Chromatography terminology
- Introduction to different function blocks of Process Gas Chromatography Analyzer.
- Main components and their functions:
- Oven, Column, Detectors, Switching Valves and processor.
- Operation of Gas Chromatograph
- Injection, Separation, Detection and Calculation
- Sample Handling System
- Vaporizer, filter, fast loop, switching valves & vents.
- Start up and Shutdown procedures
- Basic Maintenance practices
- Trouble-shooting techniques
- Demonstration of PGC

GC8000 Operation and Maintenance

Training Module Code: GCOM

Duration: 3 Days

Objective

This course is designed to provide participants with overall understanding of GC 8000 hardware, maintenance procedure, Analyzer Server Engineering Terminal software installation, backup procedure and troubleshooting.

Participants

Plant instrument Engineers and Maintenance Technicians involved in operation and maintenance of gas chromatograph.

Prerequisite

Participants should preferably have some knowledge on process instrumentation. However, prior exposure to GC1000

Mark-II, GC 8000 or any other gas chromatograph/analyzer will be an advantage.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

Overview & principle of Gas Chromatograph

- Basic Chromatography and Detection Principles
- GC8000 Introduction & specification
- GC8000 Specifications

GC8000 hardware identification & functions

- Protection System
- Electronics System
- Pressure/Flow Control
- Oven System

Day 2

Overview of KGC datasheet KGC datasheet explanation

- Analyzer specification
- Method setup
- Stream setup
- Peak specification and setup
- Analog/Digital setup
- IP address setup

Ethernet LCD

GC table review

Day 3

GC 8000 operation

- GC startup
- HMI operation
- Flow check
- Hands on calibration
- Hands on validation
- GC Shut down

ASET setup and comunication

GC8000 maintenance

GC8000 Operation and Maintenance & Network Management

Training Module Code: GCOMN

Duration: 4 Days

Objective

This course is designed to provide participants with overall understanding of GC 8000 hardware, operation & maintenance procedure, PC Analyzer Server, Analyzer Server Engineering Terminal, GC Virtual Technician software installation & operation, backup procedure and GC network architecture.

Participants

Plant instrument Engineers and Maintenance Technicians involved in operation and maintenance of gas chromatograph.

Prerequisite

Participants should preferably have knowledge on process instrumentation. However, prior exposure to GC1000 Mark-II and GC 8000 or any other gas chromatograph/analyzer will be required.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

Overview & principle of Gas Chromatograph

GC8000 Introduction specification & configuration

GC8000 hardware identification & functions

- Protection & Electronics System
- Pressure/Flow Control
- Oven & column System

Day 2

Overview of KGC datasheet KGC datasheet explanation

- Analyzer specification
- Method, stream, peak and Analog/ Digital setup
- IP address setup

HMI Operation:

Ethernet LCD - KGC datasheet review

Day 3

Take it and fix it - Practical

• Uninstall and install electronic cards

- · Replace rotary valve seat
- Check and test the detector
- GC operation Practical
- Startup procedure
- Manual operation and hardware test procedure
- Flow check procedure
- Calibration procedure
- GC shutdown procedure GC8000 maintenance procedure

Day 4

Introduction of Analyzer Bus System Analyzer server and Network setup procedure

Software and networking component setup

- Installation and operation
 - PC analyzer server
 - Analyzer server Engineering terminal
 - Ethernet LCD operation
 - Virtal technician
- Analyzer server gateway
- Introduction to Stardom and ASGW
- Hardware setup and configuration
- AGSW mapping

GC8000 Operation and Maintenance with Network & Sample Conditioning System (SCS)

Training Module Code: GCAON

Duration:5 Days Objective

This course is designed to provide participants with overall understanding of GC 8000 hardware, operation & maintenance procedure, PC Analyzer Server, Analyzer Server Engineering Terminal, GC Virtual Technician software installation & operation, backup procedure and GC network architecture.

Participants

Plant instrument Engineers and Maintenance Technicians involved in operation and maintenance of gas chromatograph.

Prerequisite

Participants should preferably have knowledge on process instrumentation. However, prior exposure to GC1000 Mark-II and GC 8000 or any other gas chromatograph/analyzer will be required.

Certification

Participant who attains at least 75%

attendance will be awarded Certification of Attendance.

Day 1

Overview & principle of Gas Chromatograph

GC8000 Introduction specification & configuration

GC8000 hardware identification & functions

- Protection & Electronics System
- Pressure/Flow Control
- Oven & column System

Day 2

Overview of KGC datasheet KGC datasheet explanation

- Analyzer specification
- Method, stream, peak and Analog/ Digital setup
- IP address setup HMI Operation:

Ethernet LCD - KGC datasheet review

Day 3

Hands on - Practical

- Uninstall and install electronic cards
- Replace rotary valve seat
- Check and test the detector GC operation Practical
- Startup procedure

- Manual operation and hardware test procedure
- Flow check procedure
- Calibration procedure
- GC shutdown procedure GC8000 maintenance procedure

Day 4

Introduction of Analyzer Bus System Analyzer server and Network setup procedure

Software and networking component setup

- Installation and operation
- Analyzer server gateway

Day 5

Modbus mapping and testing Sample Conditioning System

- Sample conditioning system configuration
- Block and bleed valve setup
- · Athmospheric balancing
- · Heat trace setup
- Carrier gas consumption Troubleshooting GC8000 troubleshooting Network troubleshooting Case study

Liquid Analyzers Operation and Maintenance

Training Module Code: LAOM

Duration: 2 Days Objective

This course is designed to provide participants with overall understanding of liquid analyzer hardware, Installation, operation & maintenance

Participants

Plant instrument Engineers and Maintenance Technicians involved in operation and maintenance of liquid analyzers.

Prerequisite

Participants should preferably have knowledge on process instrumentation. However, prior exposure to any other liquid analyzers will be advantage.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

PH analyzer

Analyzer overview

PH measurement principle

PH Sensor and holder

Sensor wiring

Analyzer operation

Sensor diagnostics & Liquid earth

PH sensor calibration & maintenance

Specific Conductivity & Inductive Conductivity

SC Measurement principle and cell constant

ISC measurement principle

conductivity sensors and electrode holders

Day 2

SC & ISC (continue)

SC & ISC sensor wiring

SC & ISC analyzer operation & maintenance

Dissolved Oxygen Analyzer:

Dissolved oxygen theory

Analyzer specification

Air and water calibration

DO analyzer sensor and holder

DO analyzer operation & maintenance

TDLS 200/220 Operation and Maintenance

Training Module Code: TDOM

Duration: 2 Days

Objective

This course is designed to provide participants with overall understanding of TDLS 200/220 hardware, Installation, operation & maintenance

Participants

Plant instrument Engineers and Maintenance Technicians involved in operation and maintenance of TDLS analyzers.

Prerequisite

Participants should preferably have knowledge on process instrumentation. However, prior exposure to TDLS 200/220 or any other TDLS analyzers will be advantage.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

TDLS Basic theory

TDLS 200/220 specification

TDLS hardware and its function

Overview of the electronics and field connections

Process interface systems

Practical demonstration (Hands on)
- Viewing of zero and target gas spectrum

- Transmission and alignment

Day 2

(Practical)

Analyzer startup, shutdown & alignment procedure

Operation and maintenance procedure

Calibration and Validation

Laser module & detector module replacement

Export Data and file review

Alarms - Warnings and Faults

Spectrum, transmission and data review

IR 400 Operation and Maintenance

Training Module Code: IROM

Duration: 2 Days

Objective

This course is designed to provide participants with overall understanding of IR 400 Analyzer hardware, Installation, operation & maintenance

Participants

Plant instrument Engineers and Maintenance Technicians involved in operation and maintenance of IR 400 analyzers.

Prerequisite

Participants should preferably have knowledge on process instrumentation. However, prior exposure to IR 400 or any other IR analyzers will be advantage.

Certification

Participant who attains at least 75% attendance will be awarded Certification of Attendance.

Day 1

Principle of NDIR analyzer

Introduction and overview of IR400 analyzer

Components of IR analyzer and its function

Day 2

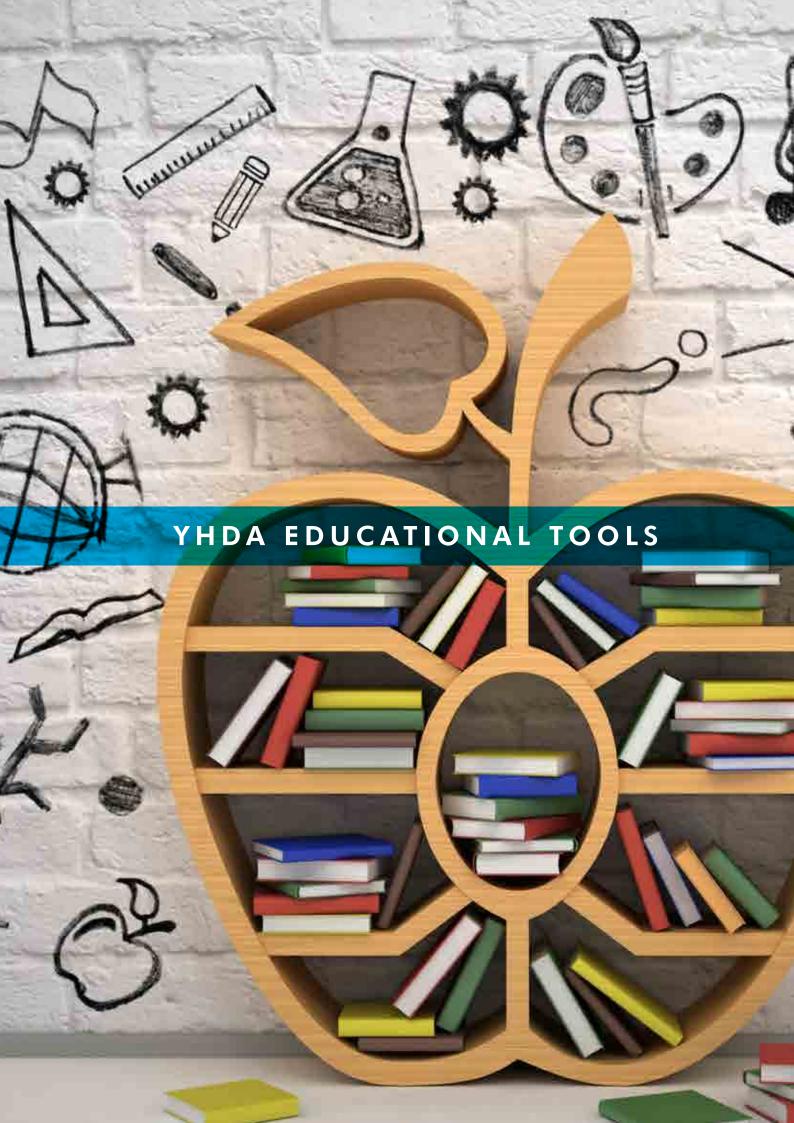
Practical demonstration on analyzer operation

Manual calibration

Auto calibration

Hardware check points

Preventive maintenance



E-Learning Support

The E-Learning incomparable Strengths:

Increased Productivity: E-Learning is not bound by geography or time, enabling the employees to have greater flexibility to complete their training at their own schedules, across multiple work sites.

Reduce time in achieving learning goals: Employees don't waste time taken out with travel and classroom breaks, learn at their own pace and focus only on the content and learning objectives.

Meeting audit and compliance goals: E-Learning uses a Learning Management System to organize and provides an audit trails, providing full control of consistent, accurate and comprehensive learning data.

Lower Training costs: Deliver around 50% savings compared to traditional training, along with reduced travel and materials costs.

Training large workforces: Projects no longer need to be constrained by the time it used to take to deliver learning to large work force across multiple sites. E-Learning has a much faster delivery time than traditional learning and does away with the physical limitations of building classroom and recruiting

Consistent approach to learning:

E-Learning courses provide greater consistency in the delivery of learning, which ensures that the training goals are met across multiple geographies and cultures.

Up-to-date and relevant: Course content can be easily maintained and updated to ensure that the learners rapidly receive the latest knowledge and training to comply any changes in legislation.

Flexible delivery and deployment:

Available 24/7, 365 days a year with real time access to learners across the business, even in remote locations.

Scalability: E-Learning courses are effective for both individuals and multisite, large population work groups

Environmentally friendly: E-Learning uses less energy and produces less CO2 emissions per student compared to



conventional face to face courses

Freedom to fail: Nobody likes to fail in a classroom full of people and in some cultures this is a real obstacles to learning. E-Learning lets you fail without fear and courses can be repeated and taken again.

Personalized learning: Your teams will learn at their own individual pace. Retention levels will also be higher as your learners will progress through the courses at a pace which suits their own individual needs rather than those of the group.

- Centum VP Virtual Operator Trainer
- Generic E-Learning Modules
 - Instrumentation and Process Control
 - Safe System of Work Range
 - Safety Awareness range
 - Environmental Range
 - Process Operation and technology Range: Oil & Gas
 - Process Operation and Technology Range: Chemical
 - Integrity Management Rage
 - Mechanical engineering Range
 - Oil & Gas Industry Familiarization Range
- International Minimum Industry Safety Training - IMIST

Agenda

Centum VP Virtual Operator Trainer

How to practice/Train on DCS without affecting Live System?

- ◆ Virtual Operator Trainer
- Two Access Possibilities:
 - Private Cloud Server at site
 - From any individual workstation
 - At Training Center & with Instructor
 - In a dedicated room close to Central Control Room
 - Public Cloud Web Services.
 - From any computer or smart phone, anywhere with web access.
- ◆ Centum VP & ProSafe-RS Virtual **Engineering Trainers (VET)**
 - Unsupervised practice & simulation on Engineering



CENTUM.V

CENTUM VP Virtual Operator Trainer for new and experienced operators, delivered around the world 24/7 on-demand through the cloud. Trainees receive instruction and practice on their own private, fully-functioning instance of CENTUM VP Human Interface Station (HIS).



Web-based training on CENTUM VP HIS navigation, basics and standard graphics, trends, system alarms and system overview, process alarms, and operator reports

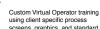


- Skill and knowledge assessments
- Reporting and results tracking via Learning Management System (LMS)
- Completion certificate



Self-paced CENTUM VP Virtual Operator Trainer is ideal for:

- Initial training of new operators
- Conversion of existing operators from different DCS
- Refresher training for experienced
- Practice and improvement of CENTUM VP knowledge and skills



Custom virtual operator training using client specific process screens, graphics, and standard operating procedures, and designed to meet client's training objectives and requirements, is available upon request



Self paced Training ideal

- Initial Training of New Operators
- Conversion of Experienced Operators from different DCS
- Refresher Training for Experienced Operators
- · Practice and improvement of Centum VP knowledge and skills



Grants the operator with a fully functional Centum VP Human Interface Station (HIS)t

Covers all features & Functionalities of Centum VP

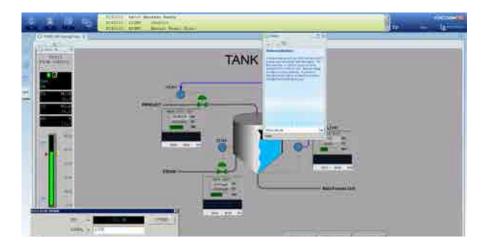
♦ Centum VP VOT delivers:

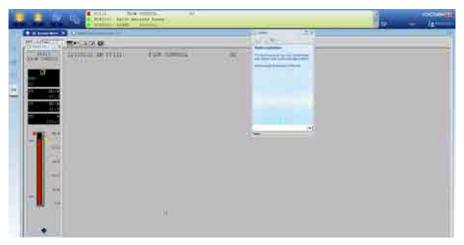
- TWeb Based or Private Cloud accessible training on:
 - HIS navigation
 - Basic and standard graphics,
 - Trends
 - System Alarms





- ◆ Interactive Practice Exercises
 - Practice on Standard Operating Procedures(Static scenarios)
 - Monitors the user and reacts to the actions in HIS, proposing corrections if necessary





- Tracking, Reporting and Results registered in a Learning Management System (LMS)
- ◆ Skills and Knowledge Assessment → certificates





The integrated Learning Management System enables the delivery of a certificate upon completion of the whole training



Centum VP Virtual Operator Trainer

Training Module Code: VOT

Duration: 12 to 18 hours

Objectives / outcomes

Upon completing the course, the learner will be able to exhibit the ability to:

- Identify and define the function of each system component
- Open standard display panels
- Control process equipment
- Acknowledge and respond to alarm messages

Intended audience

 All persons tasked with process operations using the Centum VP System

Knowledge requirements

- Basic file / folder manipulation in MS Windows environment
- Basic downloading and running operations in a MS Windows environment.

Prerequisites

None

Materials

- Private Cloud: Material available on Company Server
- Public Cloud: Course material will be available for download upon completed registration

Requirements to be awarded certification:

Complete all quiz questions with a score of at least 70% or above.

Course Description

The objective of the Virtual Operator Trainer (VOT) is to show the user the overall capabilities of the Centum VP system.

Utilizing Cloud technology. you will run a virtual machine with a Centum VP training project on your desktop.

Downloadable course materials will guide you through the training process. Knowledge retention will be verified throughout through periodic quizzes.

Course progress will be monitored through our Learning Management Software, allowing supervisors to receive updates on course completion.

This training is not intended to replace the normal training environment. It is intended to help the student gain additional Centum VP product knowledge prior to instructor led training or completing OJT.

Items covered:

There is testing throughout the Virtual Operator Trainer (VOT). Quiz questions must be completed satisfactorily in order to move on to the next training topic.

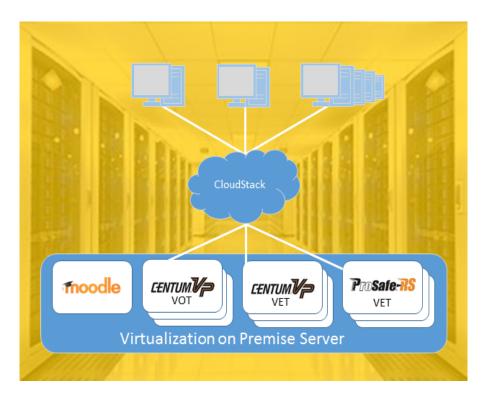
The Virtual Operator Trainer will cover the following topics:

- Centum VP System Overview and Terminology
- Process Operation Screens
- Faceplates Overview
- System and Process Alarm Screens
- Graphic Window Interactions
- System Status Display
- Process Reports
- Historical Report
- Control Programs Overview
- E-Learning is not bound by Geography or Time: flexibility in accessibility
- Training at own pace: No time wasted in travelling, coffee breaks...
- Meeting audit and compliance goals: Any access/practice is recorded in the LMS
- Freedom to fail / higher retention level

More

Centum VP Virtual Engineering Trainer & ProSafe-RS Virtual Engineering Trainer / Simulator

- Centum VP Virtual Engineering Trainer
- ProSafe-RS Virtual Engineering Trainer (VET)



- An actual Centum VP / ProSafe-RS system with engineering, maintenance, debugging, logic simulation and test function capabilities
- Unsupervised learning environment
- Create new RS and SCS projects
- Create variables
- Create programs
- Add I/O modules and wiring variables
- Integration of ProSafe-RS with CENTUM VP
- Run integrity and cross reference analyzers
- Import/export engineering data
- Engineering data is automatically saved upon logging out
- One virtual disk per user























Instructional Design expertise + Learner engagement + flexible LMS + Certification

= Reasons why E-Learning contents are trusted by over 800 customers

- Instructional design combined with continuous assessments and automatic remediation of incorrectly responded questions maximizes knowledge retention.
- Visual quality and graphical format keep permanently the learners engaged.
- The LMS (Learning Management System) allows administrators to store, track, search and analyze e-learning
- outputs to assess the knowledge gained by the participants.
- The courses are designed to ensure that people's learning objectives are met by questioning and certifying the learner at the end of the module.

Target Audience:

- Engineers and Technicians working in the Power and Oil & Gas Industry
- New Starts to the Industry

 Long term development of employees who wish to gain formal vocational qualifications

Target Beneficiary Companies:

- National Oil Companies
- Service companies
- Automation vendors
- EPC companies
- Contractors

Instrumentation and Process Control

Training Session	Duration	Reference
Instrumentation and Control: Introduction to Process Control	120 min	rvt100_07_018_3_l1_eng_101
Precision Measurement Tools	60 min	rvt100_01_009_3_l1_eng_101
Introduction to Pressure and Temperature Instrumentation	30 min	AT218_026_001
Instrumentation and Control: Measurement of Level and Flow	120 min	rvt100_07_052_3_l1_eng_101
Instrumentation and Control: Measurement of Pressure and Temperature	120 min	rvt100_07_051_3_l1_eng_101
Temperature and Temperature Measurement - Part 1	60 min	rvt100_07_042_3_l1_eng_101
Temperature and Temperature Measurement - Part 2	60 min	rvt100_07_043_3_l1_eng_101
Pressure and Pressure Measurement	60 min	rvt100_07_046_3_l1_eng_101
Fluid Flow Measurement - Part 1	60 min	rvt100_07_049_3_l1_eng_101
Fluid Flow Measurement - Part 2	60 min	rvt100_07_050_3_l1_eng_101
Instrumentation and Control: Measurement of Concentration	120 min	rvt100_07_055_3_l1_eng_101
Instrumentation and Control: Measurement of Density, Clarity, and Moisture	120 min	rvt100_07_056_3_l1_eng_101
Distributed Control Systems Introduction	60 min	rvt100_07_057_3_l1_eng_101
Ilnstrumentation and Control: Introduction to Control and Data Systems	120 min	rvt100_07_019_3_l1_eng_101
Combined Cycle: Distributed Control Systems	120 min	rvt100_08_041_3_l1_eng_101
Instrumentation and Control: The Human-Machine Interface	120 min	rvt100_07_017_3_l1_eng_101
Instrumentation and Control: Automatic Process Control - Part 1	120 min	rvt100_07_053_3_l1_eng_101
Instrumentation and Control: Automatic Process Control - Part 2	120 min	rvt100_07_054_3_l1_eng_101
Introduction to Subsea Control Systems	60 min	AT218_002_001
Introduction to Safety Systems Part 1	30 min	AT218_028_001
Introduction to Safety Systems Part 2	30 min	AT218_029_001
Process Control and Fault Diagnosis	120 min	ATL001_01_081_1_L1_ENG_003
Operator Responsibilities: Basic Operator Responsibilities	60 min	rvt100_03_006_3_l1_eng_101
Programmable Logic Controllers: Architecture	M0 min	rvt100_07_027_3_l1_eng_101
Programmable Logic Controllers: Introduction to Programming - Part 1	60 min	rvt100_07_023_3_l1_eng_101
Programmable Logic Controllers: Introduction to Programming - Part 2	60 min	rvt100_07_024_3_l1_eng_101

Safety Awareness Range			
Training Session	Duration	Reference	
Abrasive Wheels	30 min	AT211_035_001	
Asbestos Awareness	30 min	AT211_015_001	
ATEX/PED	90 min	AT211_026_001	
Compression Fittings and Small Bore Tubing	85 min	AT211_002_001	
COSHH Awareness	60 min	AT211_016_001	
Display Screen Equipment Awareness (DSE)	30 min	AT211_027_001	
Drill Floor and Drill Derricks	30 min	AT211_007_001	
Dropped Objects	47 min	AT211_032_001	
Gantry Cranes	20 min	AT211_011_001	
Gas Hydrates Awareness Learning Objectives	90 min	AT211_014_001	
Hand Safety	30 min	AT211_041_001	
Hand Arm Vibration (HAVS) Awareness	40 min	AT211_031_001	
Hydrogen Sulphide Awareness	30 min	AT211_019_001	
Launches and Personnel Transfers	20 min	AT211_012_001	
Lifting Operations Awareness (LOLER)	60 min	AT211_025_001	
Malaria Awareness	20 min	AT211_036_001	
Manual Handling Awareness	60 min	AT211_017_001	
Mercury Awareness	30 min	AT211_022_001	
Nitrogen Awareness	30 min	AT211_003_001	
Noise Awareness	30 min	AT211_021_001	
NORM / LSA Scale Awareness	30 min	AT211_020_001	
Personal Protective Equipment (PPE)	40 min	AT211_034_001	
Personal Safety and Security	40 min	AT211_024_001	
Pressure Vessel Inspection	20 min	AT211_004_001	
Provision and Use of Work Equipment Regulations (PUWER)	40 min	AT211_030_001	
Rigs Under Tow	30 min	AT211_010_001	
Safe Driving at Work	150 min	N/A	
Shared Common Induction	60 min	AT211_001_001	
Slips, Trips and Falls	15 min	AT211_029_001	
Stress Awareness	40 min	AT211_028_001	
The Basics of Confined Space Entry	30 min	AT211_009_001	
Travel Risks	30 min	AT211_008_001	
Welding, Grinding and Machinery	30 min	AT211_005_001	
Working with Electricity	20 min	AT211_006_001	
Working at Height	20 min	AT211_013_001	
Pressure Testing	60 min	AT211_023_001	

Safe System of work range		
Training Session		
Authorized Gas Testing(Hybrid)		
Authorized Gas Testing - Level 1		
Authorised Gas Testing - Level 2		
Authorised Gas Testing - Level 3		
Confined Space Entry		
Electrical Safety Rules		
Integrated Safe System of Work (ISSoW) PA		
Integrated Safe System of Work (ISSoW) PU		
Mechanical Isolations		
Task Risk Assessment		

Environmental range

Training Session	Duration	Reference
Atmospheric Emissions	30 min	AT212_007_001
Chemicals	35 min	AT212_005_001
Environmental Awareness	30 min	AT212_001_001
Environmental Compliance	45 min	AT212_003_001
Environmental Impact Assessment (EIA)	45 min	AT212_004_001
Introduction to Environmental Management	15 min	AT212_002_001
Oil Discharge to Sea	45 min	AT212_006_001
Oil Pollution Emergency Planning	45 min	AT212_009_001
Onshore Waste Management and Awareness	30 min	
Onshore Office Environmental Management and Awareness	25 min	
Waste Management	45 min	AT212_008_001

Process operation and technology range - Oil & Gas			
Training Session	Duration	Reference	
Compressed Air	20 min	AT213_013_001	
Floating Production, Storage and Offloading (FPSO) Vessels	180 min	AT213_003_001	
Fuel Systems	20 min	AT213_014_001	
Gas Compression	160 min	AT213_002_001	
Gas Treatment	120 min	AT213_008_001	
HVAC	20 min	AT213_018_001	
Natural Gas Liquids and Liquified Natural Gas	180 min	AT213_007_001	
Oil and Gas Extraction	150 min	AT213_010_001	
Oil and Gas Metering, Sampling and Pigging	240 min	AT213_009_001	
Process and Instrument Diagrams	90 min	AT213_003_001	
Potable Water	20 min	AT213_016_001	
Power Generation	20 min	AT213_015_001	
Produced Water	150 min	AT213_003_001	
Seawater and Firewater	20 min	AT213_017_001	
Separation	170 min	AT213_001_001	
Water Injection	210 min	AT213_006_001	

Process operation and technology range - Oil & Gas			
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Seawater and Firewater	20 min	AT213_017_001	
Separation	170 min	AT213_001_001	
Water Injection	210 min	AT213_006_001	

Integrity range		
Training Session	Duration	Reference
Corrosion Awareness	40 min	AT214_005_001
Hazards of Hydrocarbons	112 min	AT215_014_001
Loss of Containment	45 min	AT215_012_001
Managing Pressure and Leak Testing	80 min	AT215_003_001
Pipeline Integrity	80 min	AT215_006_001
Piping Vibration	122 min	AT215_015_001
Well Integrity Management Systems	35 min	AT215_007_001

Electrical Engineering range		
Training Session	Duration	Reference
Batteries and UPS	20 min	AT216_011_001
Control and Distribution of Power	20 min	AT216_008_001
Electrical Standards and Plant Loads	20 min	AT216_004_001
Electric Motors	20 min	AT216_009_001
Introduction to Power System Design	20 min	AT216_006_001
Motor Performance	20 min	AT216_005_001
Power Generation	20 min	AT216_010_001
Power Production Capacity	20 min	AT216_001_001
Power Systems Design Options	30 min	AT216_002_001
Protection Systems	20 min	AT216_007_001
Safety in Design	20 min	AT216_003_001

Mechanical Engineering range		
Training Session	Duration	Reference
Introduction to Friction and Lubrication	35 min	AT217_011_001
Introduction to Centrifugal Compressors and Knock-out Drums	30 min	AT217_009_001
Introduction to Furnace Operations	20 min	AT217_004_001
Introduction to Reciprocating Compressors	30 min	AT217_008_001
Introduction to Seals	60 min	AT217_012_001
Introduction to Valves	20 min	AT217_007_001
Introduction to Diesel Engines	20 min	AT217_003_001
Introduction to Gas Turbines	20 min	AT217_002_001
Introduction to Heat Exchangers	20 min	AT217_005_001
Introduction to Pumps	20 min	AT217_001_001
Introduction to Tank Storage and Ullage	20 min	AT217_006_001
Mechanical Joint Integrity	478 min	AT217_010_001

Oil & Gas Familiarization			
Training Session	Duration	Reference	
Drain Systems	35 min	AT218_031_001	
Flare and Vent Systems	50 min	AT218_030_001	
Introduction to Gas Compression		AT218_008_001	
Introduction to Basic Process Science Part 1	30 min	AT218_019_001	
Introduction to Basic Process Science Part 2	30 min	AT218_020_001	
Introduction to Basic Process Science Part 3	30 min	AT218_021_001	
Introduction to Basic Process Science Part 4	30 min	AT218_022_001	
Introduction to Basic Turbo Expander Process	30 min	AT218_014_001	
Introduction to Centrifugal Compressor Control	30 min	AT218_017_001	
Introduction to Dehydration Methods	30 min	AT218_007_001	
Introduction to Gas Dehydration	30 min	AT218_006_001	
Introduction to Gas Processing	30 min	AT218_005_001	
Introduction to Glycol Regeneration	30 min	AT218_013_001	
Introduction to NGL Stabilisation	30 min	AT218_009_001	
Introduction to Problems Associated with Separation	30 min	AT218_012_001	
Introduction to Produced Water Part 1	30 min	AT218_023_001	
Introduction to Produced Water Part 2	30 min	AT218_024_001	
Introduction to Produced Water Part 3	30 min	AT218_025_001	
Introduction to Separator Construction	30 min	AT218_011_001	
Introduction to Separator Start Up and Shut Down	30 min	AT218_015_001	
Introduction to Separators	30 min	AT218_010_001	
Introduction to the Theory of Gas Compression	30 min	AT218_016_001	
Introduction to Basic Refrigeration Process	30 min	AT218_018_001	
Introduction to Distillation	20 min	AT218_003_001	
Introduction to Flow and Level Instrumentation	30 min	AT218_027_001	
Introduction to Gas Lift	20 min	AT218_004_001	
Introduction to the Oil and Gas Industry Features	118 min	AT218_001_001	



International Minimum Industry Safety Training (IMIST)





















In partnership with OPITO and

Atlas, the mission is to enhance skills knowledge and reduce operational risks related to safety subjects and maximize our customersbusiness performance

Courses translated in 10 languages among which:

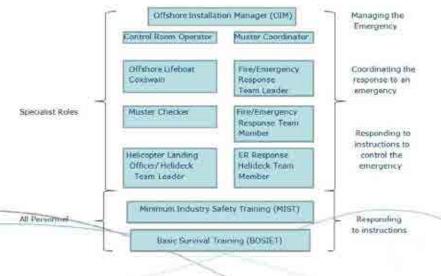
UK English, American English, Hindi, Arabic, French,

IMIST has been designed to enable existing workers to demonstrate their knowledge and awareness of the necessarysafety standards to reduce risks and incidents.

The course contains the following nine modules:

- 1. Introduction to the Hazardous Environment
- 2. Working Safely
- 3. Understanding the Risk Assessment Process
- 4. Tasks that Require a Permit to Work
- Personal Responsibility in Maintaining Asset Integrity
- 6. Using Manual Handling Techniques Every Day
- 7. Controlling the Use of Hazardous Substances
- 8. Knowledge and Processes of Working at Height
- 9. Being Aware of Mechanical Lifting Activities

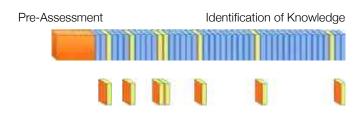
Voicegaw's Middle East & Africa 6, S. C. (c) IMIST PROVIDED AT ION GOVERN/) 97 Dec 2003



Standard 9 Module E-learning Course



IMIST-Online Fast Track



- Less down time
- · Relevant content only



Educational Kits and Skids

The Yokogawa Human Development Academy (YHDA) developed the Automated Training Simulator (ATS), a Field Instrumentation training Simulator associated to a DCS/SIS to incorporate the fundamental principles of instrumentation and process control.

The ATS was Co-Innovated in collaboration with all of our partners, Major National Oil and Chemical Companies in Middle East and Africa, as well as Colleges, Universities and Technical Training Institutes. Benefiting of more than a Century of experience, it was specifically adapted to deliver courses certified by the Society of Automation, Instrumentation, Measurement and Control (SAIMC).

The ATS aims at giving "hands on" training to all personnel involved in instrumentation and process Control, from technician to engineer level.

In the current context of Industrial Revolution 4.0, Yokogawa "Synaptic Business Automation" approach was key for creating sustainable value on this Simulator through:

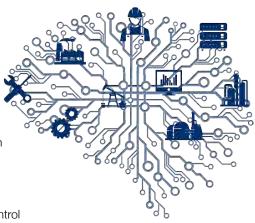
Con-innovation with customers and partners

Synaptical synthesis of all available information and experience

Optimum utilization of expertise and proven solutions

The facility is equipped to comply with the electronic section of the latest Control & Instrumentation Trade Test incorporating measuring Principles of Pressure, Temperature, Flow, Level, Liquid Analysis, Cascade Control, Control Valves and DCS and FCS System with HIM.

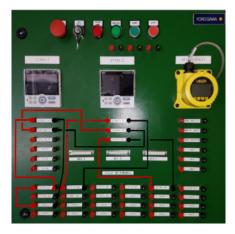
The simulator can be used to teach principle of operation, calibration (local and remote) and fault finding. It requires only water, compressed air (5 Bar) and power to operate, making it practical for on-site training or classroom use. Plug & Play, it is built on a steel frame with casters for maximum mobility, with dimensions allowing it to fit through a standard doorway.



The associated educational material includes Videos and lab workbook presenting a range of realistic exercises and practical cases, for the users to learn and experiment without the expense and risks of on-the-job training. The tutorial exercises have been elaborated and fine-tuned over the years jointly with the end-users: They are adapted to external operators and technicians as well as to Control Room personnel.

The principles incorporated are:

- Flow (Magnetic flow meter & Vortex flow meter).
- Level (Radar Transmitter & DP Bubbler).
- Temperature (Thermocouple with hockey puck transmitters and RTD with YTA610 Temperature Transmitter).
- Pressure (Differential).
- Liquid Analysis (pH & Conductivity).
- Pump Control (Start, Stop & Trip) utilizing a Yokogawa DCS
- Cascade Control Utilizing the UT55A's with local connectiondiagram.



Additional to the local Controllers, the Plant Simulator can also be controlled by a Distributed Control System (DCS) remotely.

- The Plant Simulator can be connected to a Yokogawa Field Control Station (FCS) and monitored by a Human Interface Station (HIS)
- Additional licensing is included so that the HIS doubles up as an Engineering station for the programming of the DCS/SIS with all the required software
- The Yokogawa DCS-SCS Training Simulator is designed to give you the flexibility of testing loops using our engineering and SCS blocks without having to use live equipment:

Hands on experience in a safe working environment









Control

- Cascade Loop
- Single Loop
- Local / PLC



Analytical

- рН
- . Conductivity



Flow

Electromagnetic



Level

- Ultrasonic
- dP Bubbler
- Tuning Fork



Temperature

- · Thermocouple
- RTD
- Heated Tank



Pressure

- Differential Pressure
- Gauge Pressure



Portable

 Fully Portable Stackable cases on wheels

Robust Case

Robust Aluminum case with removable front and back covers

Engineering

- Engineering
- PID Tuning
- ESD programming
- Testing without stopping a real plant

Faultfinding

- Faultfinding
- IOP, OOP, ANS+, ANS-
- Network troubleshooting

Commissioning Tool

Combine with a YokoSimor PiaB for real time plant commissioning

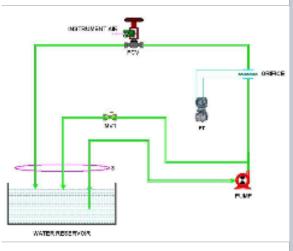
HIS - Dual Screens

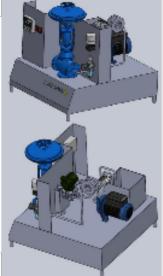
- Includes HIS with dual
 screens
- All relevant Centum VP licenses

Some alternative solutions have been developed, with smaller size elements, allowing to demonstrate each and every single modules individually and on a classroom table or workshop bench.

- The different proposed modules are:
- Flow Control Trainer Kit
- Level Control Trainer Kit
- Pressure Control Trainer Kit
- Temperature Control Trainer Kit
- Cascade Control Trainer Kit
- Study of I/P Converter & P/I Converter
- Control Valve Characteristics

Optionally these simulators can be connected with Control System such as DCS, PLC or any other SCADA.



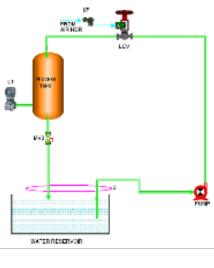


Flow Control Experiments:

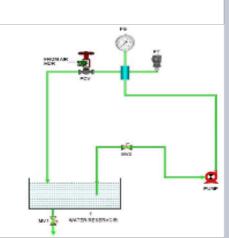
- Study of Valve Flow Measurement
- Study of Control Valve Operation
- Study of DP Transmitter Calibration
- Study of Controller PID Tuning
- Study of Modbus Communication

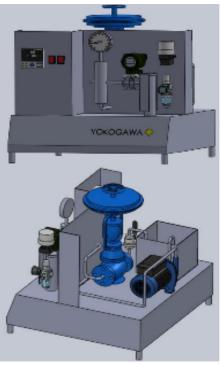
Level Controls Experiments:

- Study of Level Measurement
- Study of Control Valve Operation
- Study of Level Transmitter Calibration
- Study of Controller PID Tuning
- Study of Modbus Communication
- Study of ON/Off Controller
- Study of Closed Loop method







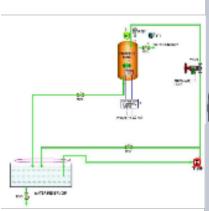


Pressure Control Experiments:

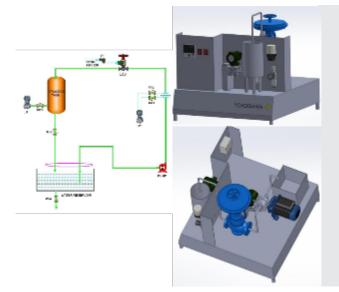
- Study of Pressure Measurement
- Study of Control Valve Operation
- Study of Pressure Transmitter Calibration
- Study of Controller PID Tuning
- Study of Modbus Communication
- Study of ON/Off Controller
- Study of Closed Loop method

Temperature Control Experiments:

- Study of Temperature measurement
- Study of Temperature Transmitter Calibration
- Study of Controller PID Tuning
- Study of Modbus Communication
- Study of ON/Off Controller
- Study of Closed Loop method





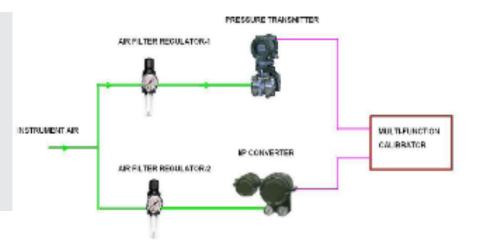


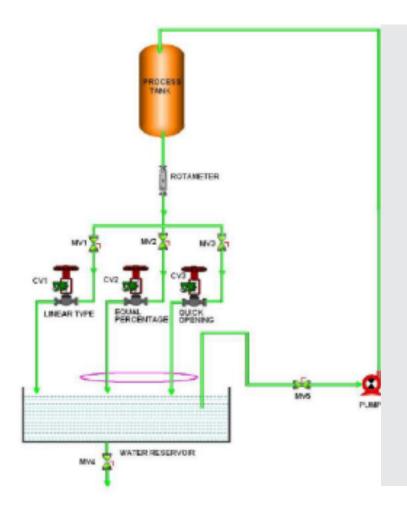
Cascade Control Experiments:

- Study of Cascade Control Measurement
- Study of Flow, Level and Cascade Control Loop
- Study of Control Valve Operation
- Study of DP Transmitter Calibration
- Study of Controller PID Tuning
- Study of Modbus Communication
- Study of ON/Off Controller
- Study of Closed Loop method

I/P & P/I Converters Experiments:

- I/P Converter Working Principle & Calibration
- P/I Converter Working Principle & Calibration
- Digital Calibrator Working & operation





Control Valves Experiments:

- Study of Valve Flow Characteristics
- Study of Valve Positioner
- Study of inherent Characteristics
- Study of Hysteresis of Control Valve



Training Simulators

In our industrial world where risks are obvious, the professional associations have defined and imposed clear rules and procedures, particularly in training, by introducing and enhancing the utilization of simulator training as an essential training component, in order to create some reflex reactions and eliminate potential dangerous initiatives.

Abnormal Situation Management Consortium statistics estimate that more than one third of the financial losses in the US Chemical Industry are due to human error and insufficient knowledge.

International Atomic Engineering Section report in 2004 also states that: "Safety analysis and operational experience consistently indicate that human error is the greatest contributor to the risk of a severe accident in a nuclear power plant".

And in Civil aviation, it is said that Human error is the biggest obstacle to 100% flight safety.

Wrong actions performed by operators remain a major risk and it has been shown that, most of the non compliant behaviors can be explained by:

- Deficient procedures
- Complicated or ill-defined procedures
- Operators experiences that lead them to believe that their own way of operating the plant is safer, more economical or more efficient that stared in the procedure.

OTS will allow increasing the level of understanding of the operators and revisiting the procedures, for instance by dividing them into several steps.

Globally, the risk of human error gets reduced by extensive use of OTS.

In this view, the primary objectives of OTS are:

- To provide the plant operational staff with practical experience on how to operate complex plant process systems in various situations. These include:
 - Normal operations at different throughputs and feeds
 - · Plant malfunctions and upsets
 - · Normal startups and shutdowns of

the process units

- · Emergency shutdowns
- Recovery form various malfunctions and upsets
- To assess the performance level of the trainees

Operator Training System (OTS) provides a virtual plant on computer, allowing plant operators to train in plant operations ahead of plant start-up and throughout plant lifecycle. OTS enables the plant operators to gain experience in an off-line, non-intrusive environment without any damage on the actual plant, for both inexperienced and experienced plant operators.

OmegaLand OTS & MIRROR PLANT



With more than 200 systems in Oil and Gas, Refining, Petrochemical, Chemical and Power industries distributed worldwide, **OmegaLand high fidelity OTS** is one of the leading OTS solution in such industries.

The OmegaLand high fidelity OTS reproduces actual plant behaviors, accurately giving the ability to provide realistic operations training. The identical DCS, SIS, and graphical user interface gives the ability to provide realistic operation training environment. High fidelity plant models built for OTSs are

able to be leveraged to other purposes throughout the plant lifecycle.

MIRROR PLANT is a solution based on OmegaLand technology and is able to leverage OTS models for the operation phase. As MIRROR PLANT constantly synchronizes with the plant control system, it is able to predict plant internal states and plant responses, contributing to optimized plant operations.

OTS Benefits

- Training on a virtual plant which has the identical look and feel, reproducing realistic plant behaviors with identical DCS and SIS operational environments
- Gaining plant start-up, shut-down and normal plant operations
- Acquiring how to respond against equipment malfunctions and other emergency situations (early recognition, avoidance, and corrective action)
- Capturing and transferring plant operation knowledge among plant operators
- Increasing process knowledge and confidence in operators (experienced and inexperienced) for better plant operations
- Ability to leverage OTS assets over the plant lifecycle, from the design phase to the operation phase. The OTS assets can contribute to reduce design time and cost, evaluate and improve control strategy, and improve productivity and efficiency



Advanced Solutions:

OTS Enterprise Solution provides standard emulated PCS functions through the WEB or over the COMPANY network where applicable.

Objective:

- Training for Company wide users.
- Training is conducted via the corporate intranet
- Trainees self e-learning training course

- Network based Instructorless and trainee self training/evaluation
- Network based remote interactive training
- Concurrent multi-user multi-simulation training
- Utilizing intranet with a SCORM conformant link to the Company's Corporate Learning Management System (LMS)



At own desk or at each control room



Instructor-Led Online Training Instructor-Led Training

Trainee can perform an application uniquely and also several trainees can perform it together.

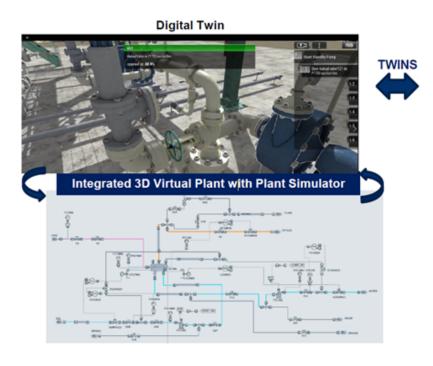


At a training center



At own desk or at each control room

The Digital Twin:



Real/Physical Plant



The Digital Twin replicates the plant with a high level of fidelity.

It offers:

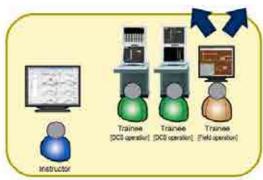
- Realistic 3D virtual environment.
- Realistic and accurate plant process simulation (Through Omegaland OTS or KBC Petro-Sim)
- Training and Test mode

With its capacity of storing employee's training records, it is the perfect tool to train, assess and qualify the technical plant personnel.

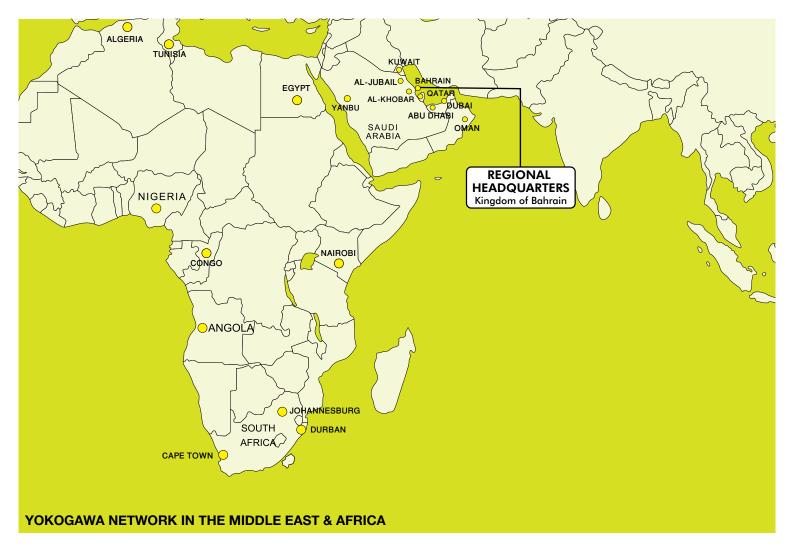












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