



THE TECHNOMANAGE GROUP

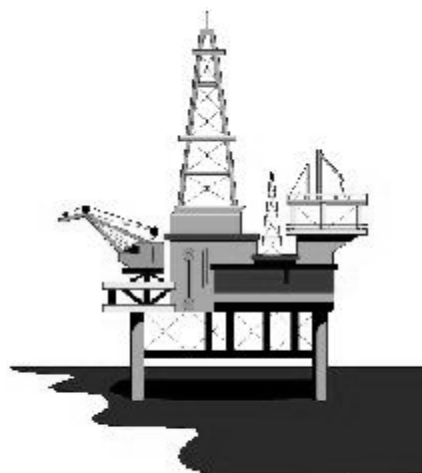
BROCHURE FOR TECHNICAL TRAINING PROGRAMS



**GROUP COMPANIES
TECHNOMANAGE CONSULTANTS
TMT SERVICES**



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THE TECHNOMANAGE GROUP

NEW DELHI

Our Introduction

We are a group of qualified and experienced professionals providing:

- **Technology and management related consultancy** to Oil, Gas Processing, Refinery and Petrochemical industries.
- **Training in technology and management** related to hydrocarbon process industry, for the growth and development of the employees and the organization.

Mission and Objective of the Company

Our Mission

“To carry out business of **knowledge based services to Hydrocarbon and related industries**, by providing solutions in the areas of technology and management, and be a leader in our segment of operation.”

Our Objective

To provide **total customer satisfaction** and evolve a long term relationship and trust.

Our Strength

- **People:** A team of highly qualified and experienced professionals with Industry recognition.
- **Resourceful:** Industry contacts and ability to draw the best of expertise to provide solution.
- **Response:** Prompt and without ambiguity.
- **Quality:** We endeavor to meet the highest quality to the satisfaction of the customer.
- **Cost:** Cost effective solutions meeting the quality requirements.
- **Commitment:** We say what we do, we do what we say.

WITH FOCUS ON PERFECTION

CONSULTANCY IN NICHE AREAS

- Process Design and Audit
- Engineering Audit
- Project Management Consultancy
- Safety Management / HAZOP
- Pre-commissioning and Commissioning Manual

TRAINING

We identify, customize and conduct training programs in the areas of -

- Technology Aspects of Process Industry
- Industry Trends and Economics
- Management and Personal Growth

DATABASE PRODUCTS

We develop, customize and manage database on various facets of industry, technology and market.



Key Management Personnel

Dr. U. K. Dutta

Doctorate in Chemical Engineering from Loughborough University of Technology (U.K), he has over 30 years of experience in Hydrocarbon Industry (upstream and downstream), in the areas of process design and technology, engineering, project management, marketing and organizational development. He had work experience in process design and engineering with major Indian and International companies like EIL, Union Carbide, CE Natco, Lummus Crest, Triune and Rotary Engineering. He has presented papers on Technology Development and Technology Transfer in major International Conferences such as ASCOPE and CHEMTECH. Presently he is running his own consultancy firm, 'Technomanage Consultants' with base at Singapore and India. Has acted as process consultant for technology selection and process design for major Offshore Facilities, Gas Processing Plants and Refinery Projects. He has conducted training for executives for major companies like Petronas (Malaysia), Petrosin (Singapore), Kvaerner (Philippines), Yokogawa (India), Vopak Terminals (Singapore). He regularly conducts open programs for executives in Singapore, jointly with National University of Singapore.

Mr. S. K. Basu

Graduate in Mechanical Engineering and Master's degree holder from Carnegie Institute of Technology, USA. Over 35 years experience in engineering, construction, commissioning of major projects in oil, natural gas, refinery, petrochemical and power industries. Extensive international experience in project assignments with companies like Fluor Daniel (USA), Brown & Root (USA), MW Kellogg (U.K), Davy Engineering (UK), Toyo Engineering (Japan) and others. He had extensive experience in Pipeline design, engineering, construction and commissioning of major natural gas and oil pipelines. During his tenure as General Manager (Engineering) at Engineers India Ltd. and as a Director (Pipelines) in a major EPC Company, he was responsible for major cross-country pipeline projects including responsibility of engineering, construction and commissioning. The pipeline projects executed by Mr. Basu include 1700 KM, 36 inch diameter HBJ Pipeline linking Northern and Western India built by a major French Consortium. He was also responsible for execution of a number of projects of Natural Gas Pipelines and Terminals including Offshore gathering and transmission line.

Mr. D. S. Sodhi

Postgraduate in Management Sciences from Manchester University has extensive experience with major multinational companies in India and overseas such as Mobil (U.K.), Smith, Kline and Beecham (India) and ABB (India). A well-recognized trainer with major companies in India and abroad in management, personal growth and HRD related activities. Responsible for management services and training programs of the company.

Ms. Deepali Dutta

Postgraduate in Social Sciences with a Degree in Education and Natural Sciences, has extensive experience in Education, Training and in the area of Environment Conservation. Known for her organizational abilities, she has won awards and citations for her contribution to Environment Awareness activities in India and Singapore. Responsible for Corporate planning, Business co-ordination and Administration of the company.

Mr. T. K. Mehta

More than 30 years experience in pre-commissioning, commissioning, operations, preparation of operating manuals and project management in oil and gas, refineries, fertilizer and petrochemical plants. Major part of his career has been with Engineers India Ltd. (New Delhi), Sabah Energy Corporation and Sabah Gas Industries (Malaysia), Triveni Engineering and Industries Limited (New Delhi) and Technip KTI (NewDelhi).

Mr. Rizwan Ahsan

Engineer, specialized in software development and trouble shooting for software and hardware, responsible for IT support to the organization and business coordination. Responsibilities include development of large process data base and maintaining the organization's website.

Pool of Consultants and Associates

The core team is supported by associates and pool of experienced engineers and specialists with credibility and reputation in the industry.

Technology and Project Services

Mr. A. C. Kapadia

Post graduate in Chemical Engineering with over 30 years experience in process design, engineering and management of oil production, gas processing, gas distribution and petrochemical industries. Has held the position of Director and CEO in major oil and gas production/distribution companies.

Mr. G. Venkatraman

Chemical Engineer with 15 years experience in plant commissioning, safety management and HAZOP studies for Oil (Offshore/Onshore), Gas and Petrochemical plants.

Mr. S. K. Gupta

Structural engineer with extensive experience in design and engineering of offshore structures and solution of complex structural design problems. He is a member of our associate "Core Consulting Group".

Management Services and Training

Dr. J. D. Singh

Doctorate in Marketing from Delhi University. Faculty member and Head of Marketing discipline, IMI, Delhi. Twenty years experience specializing in marketing strategy, marketing diagnostic studies and planning for optimal customer satisfaction.

Dr. Bhupen Srivastava

Doctorate in Behavioral Science from Illinois University, USA. Faculty member and Head of Behavioral Science discipline, IMI, Delhi. Several decades of experience specializing in vision-building, organizational development and strategic management.

TECHNICAL TRAINING PROGRAMS

PREAMBLE

“Where shall we begin, please your Majesty?” asked the white Rabbit.

“Begin at the beginning” the king said gravely” and go on
till you come to the end; then stop, “

Alice in Wonderland

Our technical programs are **well recognized in South East Asia and India**. It is supported by some of the best professionals from oil and gas industry available in the country.

All the programs are in computerized format, mostly in power point with **colorful and effectively animated slides**. There are video displays wherever necessary. The programs are conducted in **highly participative** manner and not just by lectures. Each slide calls for participation and discussion.

After each session there are **quizzes and group tasks** to help in effective assimilation.

Our client list includes Petronas (Malaysia), Aker-Kvaerner (Singapore), National Power Co. (Phillipines), Yokogawa (India), MECON (India) and many other reputed companies.



**Keeping Pace
with the
Changing
World**

PROGRAM LIST

(a) Technology and Project Management		
Program Title	Designed For	Duration
<b style="color: #008000;">A to Z of Oil & Gas to Petrochemicals Starts with well-head and takes you through all the blocks covering offshore processing, transportation, LNG, gas processing, refinery and petrochemicals. Presents a macro-level concept of the entire chain, technology trends and business trends.	Engineers, Project Managers, Corporate Managers, Directors	2 – Days or 1 – Day
	Graduate Trainees	3 – Days
	Universities	1 Semester (30 to 50 hrs. plus assignments)
<b style="color: #008000;">A to Z of LNG Complete LNG Chain from gas source to the consumer. Presents the technology, economics and business trends.	Engineers, Business Managers, Corporate Planners	2 – Days
<b style="color: #008000;">A to Z of Natural Gas Pipeline Starts with basics of handling natural gas and goes into conceptualizing, engineering, construction, operations and safety aspect of long distance cross-country as well as sub-sea natural gas pipeline.	Engineers, Project Managers, Graduate Trainees	3 – Days
<b style="color: #008000;">A to Z of Process Automation The program starts with basics of process control and instrumentation engineering covering sizing, specification and selection of hardware. It covers special topics such as Advanced Process Control, DCS, SCADA, PLC, Fieldbus etc.	Process Engineers, Instrumentation and Piping Engineers, Project Managers, Graduate Trainees	5 - Days 2 – Days
<b style="color: #008000;">Centrifugal Compressor System The program covers selection, specification, evaluation, control and operation of centrifugal compressor system along with drive.	Operating Engineers, Technical Services Engineers, Production Managers	2 - Days
<b style="color: #008000;">Process Safety Management A macro level course covering the needs and methods of ensuring safety for entire life cycle from conceptual stage of a project to design, construction and operations.	Engineers, HSE Managers, Project Managers, Graduate Trainees	5 - Days 2 – Days
<b style="color: #008000;">HAZOP Training Covers basics and methodology of conducting HAZOP of a process plant with practice exercises.	Production engineers, Plant Managers, Design Engineers	2 - Days
<b style="color: #008000;">Plant Modification for Performance and Profit Margin Improvement The course covers energy recovery by Pinch Technology along with real life examples and exercises.	Process Engineers, Production engineers, Plant Managers	2 – Days
<b style="color: #008000;">Natural Gas Processing Covers basics of natural gas handling, gas treatment and purification, cryogenic gas processing, design features, safety, controls and trouble shooting aspects.	Process Engineers, Production engineers, Plant Managers, Design Engineers	2 Days to 5 days
<b style="color: #008000;">Offshore Awareness Program Covers process, structural, control and safety features of offshore process platforms.	Offshore Production Personnel and Offshore Design Engineering personnel	2 - Days
<b style="color: #008000;">Reading and Understanding P&IDs What is P&ID, Symbology, conventions and practices in developing P&IDs, operating and safety principles, practice exercises in reading and interpreting P&IDs	Engineers, Project Managers, Graduate Trainees	2 - Days 1 – Day
<b style="color: #008000;">Refinery Processes Separate modules for each of the processes below: <b style="color: #008000;">(a) Refinery Configurations, Processes, Technology Trends and Economics (b) Crude Distillation (c) Hydro-treating and Hydro-desulfurization (d) Hydrocracker (e) FCC (f) Delayed Coking.	Engineers and Graduate Trainees	1 - Day each module
Note: “Management Training programs are given in separate management training brochure”		

THE A TO Z OF OIL AND GAS TO PETROCHEMICALS

Introduction

Crude Oil, a brown sticky liquid gets into most of the things we use daily. The clothes we wear, the bags we carry, packets for food in our fast food corner, the steering wheels of our cars, toothbrushes and what not. How does it happen? The course walks you through the various building blocks or steps by which the transformation takes place from Oil and Gas to Petrochemicals. Presentation is done with information packed colorful slides in Power Point.

The objective of the course is to give an idea of the total system of the value chain, starting from crude oil to fibers and plastics. It is useful for a business executive or a technical expert working in either upstream or downstream of the system, a perspective of how this industry is linked to the rest of the business in hydrocarbons. The course focuses on the practical aspects covering technology, economics and macro-system planning.

Who should attend

1.	Executives from Oil, Gas and Petrochemical Industries , who want to get a total perspective of the industry from oil well to the petroleum refinery, petrochemical downstream and want to understand the opportunities it offers.
2.	Managers, Corporate Executives and Finance Executives , who want to get a macro-level view of all the processing steps, economics and business trends of upstream and downstream of their facilities.



Course Content

No.	TOPIC	DESCRIPTION
1.	Basic Definitions, Concepts and Terminologies	Definitions of Raw Materials – What is Crude Oil? What is Natural Gas? What are LNG, LPG and NGL? Their types, properties and characteristics. The Macro-system - Oilfield to the Plastics and Fibers ... a bird's eye view Exploring for Oil – A quick look on methods and technologies.
2.	Oilfield Processing	Oilfield Processing – Why and How Process Systems - Offshore and Onshore - Gathering, Separation, Dehydration of oil and gas, Gas Sweetening, Compression, Pumping , Condensate Processing, Flare System Offshore Production Systems - Platforms and FPSO, Early Production Systems
3.	Transportation	Transportation Aspects of Oil and Gas: <ul style="list-style-type: none"> ♦ Trucks and Railcars ♦ Marine Tankers- Oil and LNG ♦ Pipeline Oil at Refinery Doorstep – Sources and economics
4.	Natural Gas Processing	Gas treating – Sweetening, Dehydration Recovery of LPG Petrochemical feedstock - Recovery of Ethane and Propane LNG .- The LNG Cycle at macro level

No.	TOPIC	DESCRIPTION
5.	Refinery	<p>The Raw Material and Products – Characteristics and Specifications</p> <p>Why Refining – The objective of processing and significance of various process units.</p> <p>Basic Processes – An Overview of Separation Process (Distillation), Residue Minimization (Cracking), Gasoline Octane Improvement (Reforming) and Trends on Sulfur Specification and related processing.</p> <p>Development of Refinery Configurations – How it has developed and changed over the years. How the economics, environmental specifications and changing product specification changes the configuration.</p>
6.	Petrochemicals	How Crude Oil and Gas provide the raw materials and how they are converted to plastics, synthetic fibers and chemicals. A macro-level view of the petrochemical industry and important technologies.
7.	Costs, economics and industry perspective.	<p>Oilfield: Crude oil and gas price trends, typical investments and operating costs, profit margins.</p> <p>Refinery Economics – Why many refineries worldwide are closing down? How integrated operation increases profitability, current economic trends and factors affecting them.</p> <p>Petrochemicals: Business Cycle and trends.</p>
8.	Technological aspects.	Trends on Technology - Key technology areas and current trends, open art processes and licensed processes.

Methodology of presentation

- Microsoft Power Point colorful slides packed with information.
- Highly interactive with total involvement of the participants.
- Interesting and Interactive Quiz Sessions, group tasks for better assimilation.

THE A TO Z OF LNG

Introduction

The course has been specially developed for planners, engineers, technical services personnel and operators involved with the **Natural gas** and **LNG industry**. The course has been conducted for major companies in SE Asia as part of technical program curricula. It covers a range of topics from the source of LNG to gas processing, liquefaction, transportation and utilization.



Course Content

No.	TOPIC	DESCRIPTION
1.	The LNG Cycle	What is Natural Gas, Gas fields and reserves? Natural Gas Composition, Hazardous properties of Natural Gas. Why LNG? LNG Cycle – Source to the consumer Major LNG producers
2.	LNG Upstream – Process and Economics	<ul style="list-style-type: none"> • Production System for Gas – offshore and onshore • Gas Purification – Dehydration, Sweetening, Mercury removal • Basics of Refrigeration • Liquefaction of Natural Gas • Storage and transportation of LNG • LNG Tankers – capacity and loading system
3.	LNG Downstream – Process and Economics	<ul style="list-style-type: none"> • LNG Receiving Terminal and Storage • Re-vaporization of LNG, Heat Recovery • Cross country pipeline and consumer development • Economics of LNG Receiving Terminal • Cost of gas at battery limit
4.	Safety and Environment	<ul style="list-style-type: none"> • Hazards in Natural Gas and LNG handling • Safety features in processing of LNG • Safety features in storage and transportation of LNG • Accident case histories and causes
5.	Macro-economics and Trends	<ul style="list-style-type: none"> • Upstream and Downstream Process Economics • Factors affecting LNG price • Current LNG price trends • Economic LNG plant capacity • LNG supply contracts • Small scale LNG plants • Current trends in technology

Methodology of presentation

- Microsoft Power Point with colorful slides packed with information.
- Highly interactive with total involvement of the participants.
- Interesting and Interactive Quiz Sessions, group tasks for better assimilation.

THE A TO Z OF NATURAL GAS PIPELINE

Introduction

The course is specially developed for operators, engineers, technical services personnel, planners and business development personnel involved with natural gas transportation. The course has been conducted for major companies including Kvaerner (Philippines), Petronas (Malaysia).



Course Content

No.	TOPIC	DESCRIPTION
1.	Fundamentals and basics of natural gas	What is Natural Gas, Gas fields and reserves, Natural gas composition and utilization, Macro-system – Gas production to gas utilization, Physical and hazardous properties of natural gas
2.	Flow properties, Pipe Sizing and Specifications	<ul style="list-style-type: none"> • Fluid Dynamics Principles • Friction factor and properties affecting it. • Water and condensate formation in pipeline • Hydrate formation and prevention • Two phase flow characteristics • Computer model of flow dynamics and pressure drop • Wall thickness of pipe • Line pipe specification • Pipeline cost break-up • List of standards
3.	Cross Country Pipeline Hardware	<ul style="list-style-type: none"> • Long distance pipeline configuration and flow diagram • Gas Compression system • Valves, fittings and accessories • What is hydrate? • Hydrate formation in pipeline • How to control hydrate formation
4.	Pipeline Construction	<ul style="list-style-type: none"> • Stages in Pipeline Construction • Route Survey • Right of Way (ROW) • Site Preparation • Stringing of Pipes • Inspection • Coating • Laying of Pipes • Testing • Mechanical Completion
5.	Typical Gas Pipeline Terminal Facility	<ul style="list-style-type: none"> • Pig Receiver and Launcher • Filter • Pressure Reducing Station • Metering • Gas Heater • Corrosion Control • Flare and venting • Control and SCADA
6.	Pigging Operation	<ul style="list-style-type: none"> • What is Pig and Pigging? • Objective of Pigging • Types of Pigs and their application • Selection of Pig • Pig Launcher, Pig Receiver • Selection of Pig • Pig Tracing • Intelligent Pigs and their application
7.	SCADA System	<ul style="list-style-type: none"> • What is SCADA? • Objectives • Architecture • Hardware aspects • Software aspects • Typical Pipeline SCADA • Features and benefits of Pipeline SCADA

No.	TOPIC	DESCRIPTION
8.	Health, Safety and Environment	(A) Handling of Natural Gas <ul style="list-style-type: none"> Hazardous properties of natural gas Flammability and Toxicity Safety aspects for H₂S handling
		<ul style="list-style-type: none"> Safe Handling of Gases Factors affecting safety and the integrity of the pipeline Real life accident cases and their analysis
		(B) Prevention by Ensuring Pipeline Integrity <ul style="list-style-type: none"> Safe Systems Monitoring Protection from Corrosion Inspection and Maintenance
		<ul style="list-style-type: none"> Patrolling and Surveillance of ROW Quiz and group exercise
9.	Corrosion and Corrosion Control	<ul style="list-style-type: none"> Principles of corrosion Internal and External corrosion Corrosion due to H₂S and CO₂ External corrosion principles Control of internal and external corrosion
		<ul style="list-style-type: none"> Cathodic protection <ul style="list-style-type: none"> Types Basic parameters Selection guidelines Corrosion monitoring
10.	Maintenance	<ul style="list-style-type: none"> Inspection of pipeline before commissioning Periodic inspection Patrolling of ROW Routine inspection during operation Corrosion monitoring Detection of dent, buckle Leak detection
		<ul style="list-style-type: none"> Corrosion monitoring using gauging pigs and/or intelligent pigs Maintenance of Cathodic Protection Valves and safety devices inspection Remedial measure. Line repair.

Methodology of presentation

- Microsoft Power Point with colorful slides packed with information.
- Highly interactive with total involvement of the participants.
- Interesting and Interactive Quiz Sessions, group tasks for better assimilation.

THE A TO Z OF PROCESS AUTOMATION

Introduction

This is a macro-level course covering all aspects of Controls and Instrumentation from the simplified basic principles to complex computer based plant automation systems. The course is meant for those who need to know about process control but are not instrumentation specialists. The course is designed for process specialists, engineers and project managers who have to interact with control system engineers for engineering or operation.



Course Content

No.	TOPIC	DESCRIPTION
1.	Basics of Process and its Control Characteristics	<ul style="list-style-type: none"> • Basic Concepts and Definitions • Basic Control Loop – The five elements • Process Characteristics and Dynamics • Degrees of freedom for Control • Examples and exercises • Terminologies and Symbols
2.	Measuring Means	<ul style="list-style-type: none"> • Brief description of Measuring Techniques • Temperature Measurement • Pressure Measurement • Flow Measurement • Analysis and Properties Measurement
3.	The Control Loop	<ul style="list-style-type: none"> • Control Loop Type • Analysis of Common Control Scheme / Loops • Basic Regulatory Control Loop • Controller Mechanism • Lead, Lag, Dead Time
4.	Control Algorithm	<ul style="list-style-type: none"> • On-off Control • PID Controller • Proportional Control • Integral Control • Proportional plus Integral Control • Derivative Control • Proportional plus Derivative Control • Proportional plus Integral plus Derivative Control
5.	The Final Control Element – Valves	<ul style="list-style-type: none"> • The control valve • Principle of operation • Control Valve Components • General Categories of Control Valves • Valve Actuators • Valve Positioners and Accessories • Valve Characteristics and Selection • General Selection Criteria • Control Valve Performance and flow characteristics • Control Valve Engineering

No.	TOPIC	DESCRIPTION
6.	Control System Application in Practice	<ul style="list-style-type: none"> ● Boiler Control Overview <ul style="list-style-type: none"> ▪ Overview of Boiler Control System ▪ Boiler Control Schemes ▪ Typical Pressure Control Scheme ▪ Three Elements Feed Water System ▪ Steam Temperature Control ▪ Safeguarding Boiler Operation ● Steam Turbine <ul style="list-style-type: none"> ▪ Types of Turbine ▪ Description of Control Systems ▪ Control Applications ● Centrifugal Compressor <ul style="list-style-type: none"> ▪ Characteristic Curve and Definition of Surge ▪ Surge Control ▪ Surge Control at Constant Speed ▪ Compressor Control with Variable Speed Drive ▪ Surge Control for Gas Molecular Weight Changes ▪ Incipient Surge ● Distillation Column Control <ul style="list-style-type: none"> ▪ General Principles ▪ Typical Control System for Distillation ▪ Pressure Control, Temperature Control And Product Quality Control Methods ● Batch Process Control <ul style="list-style-type: none"> ▪ Batch Versus Continuous Processes ▪ Batch Automation Functions ▪ Batch Control Strategy
7.	Computers and Controls	<ul style="list-style-type: none"> ● An Overview of Distributed Control System (DCS) ● An Overview of Programmable Logic Controllers (PLC Systems) ● Supervisory Control And Data Acquisition (SCADA) Overview ● Open Control System ● Fieldbus Applications ● Modern Human Interfaces / Computer Interfaces ● Fundamentals of Communication and Networking
8.	Safeguarding System	<ul style="list-style-type: none"> ● Introduction and Major Safety Standard ● Safety Life Cycle ● Safety Instrumentation System ● Fire and Gas Shutdown System ● Basic Fire Concepts ● Emergency Shutdown Systems

Methodology of presentation

- Microsoft Power Point with colorful slides packed with information.
- Highly interactive with total involvement of the participants .
- Interesting and Interactive Quiz Sessions, group tasks for better assimilation.

CENTRIFUGAL COMPRESSOR SYSTEM: DESIGN, SELECTION, INSTALLATION AND OPERATION

Introduction

- **Production Executives** and Operating Staff from Oil & Gas Processing Plants, Gas Transportation and Distribution companies, Refinery and Petrochemical plants, where large compression facility is used.
- **Engineers from EPC** companies who specify and select compressors.



Objectives

Upon successful completion of this course, the participant will be able to:

- **Understand** the **operating principles** of centrifugal compressors, types of compressors and selection criteria.
- **Understand** the **functions** and **purpose** of the **components and hardware** in centrifugal compressor.
- **Determine** if the **compressor** is **operating efficiently**, for the given operating conditions and performance requirements.
- **Specify** design criteria, **evaluate** a manufacturer's proposal, and monitor the start up of a compressor package, for the given process conditions.
- Use compressor **performance map** to predict the **head and flow capabilities and Horsepower**.
- Describe the causes and symptoms of **surge** and basic principles of surge control

Course Content

No.	Topics	Description
1.	System and Hardware Description	<ul style="list-style-type: none"> ▪ Centrifugal Compressor Description ▪ Centrifugal Compressor Applications ▪ Prime Movers – Turbine and Motor ▪ Overall System and its Components ▪ Casing ▪ Rotor Assembly ▪ Impellers ▪ Diffusers ▪ Diaphragms ▪ Guide Vanes ▪ Bearing and Seal Assemblies ▪ Seal Oil and Lube Oil Systems
2.	Driver Information	<ul style="list-style-type: none"> ▪ An Overview of Gas Turbines ▪ An Overview of Steam Turbines ▪ An Overview of Motor Drives

No.	Topics	Description
3.	Compressor Characteristics	<ul style="list-style-type: none"> ▪ System and Operating Curves ▪ Efficiency ▪ Performance Curves ▪ Surge Phenomenon ▪ Stonewall Phenomenon ▪ Gas Density ▪ Critical Speed
4.	Compressor Control System	<ul style="list-style-type: none"> ▪ Principles of Capacity Control ▪ Constant Speed Capacity Control <ul style="list-style-type: none"> • Single Unit • Compressors In Series • Compressors In Parallel ▪ Variable Speed Capacity Control <ul style="list-style-type: none"> • Single Unit • Compressors In Series • Compressors In Parallel ▪ Speed Control Limitation ▪ Surge Control
5.	Safety Protection Systems	<ul style="list-style-type: none"> ▪ Monitoring and Protection of Compressors ▪ Monitoring Instruments and Points of Measurement ▪ Alarm and Shutdown Protection ▪ Startup/Shutdown Alarms ▪ Process Alarm and Shutdown ▪ Mechanical Failure Alarm and Shutdown ▪ Lube Oil and Seal Oil Alarm and Shutdown ▪ Condition Monitoring
6.	Design and Engineering Aspects	<ul style="list-style-type: none"> ▪ Compressor Performance Specification ▪ Selection of Compressors ▪ Mechanical Specifications ▪ Aspects of Safety Specifications ▪ Summary of API 617 Requirements ▪ Compressor Testing
7.	Startup and Shutdown Procedures	<ul style="list-style-type: none"> ▪ Typical Compressor Installations ▪ Manual Startup & Shutdown Procedure ▪ Automatic Start and Stop ▪ Routine Operating Checks ▪ Lube Oil System Operation ▪ Seal Oil System Operation ▪ Compressor Operating Principles ▪ Performance Maps ▪ Factors Affecting Compressor Performance
8.	Case Studies	<ul style="list-style-type: none"> ▪ Example of Pipeline Compressors ▪ Example of Process Compressors

Methodology of Training

- Interactive with Power Point Presentation
- Real Life Experiences
- Case Studies
- Quizzes and Q&A.

PROCESS SAFETY MANAGEMENT

Introduction

Knowledge of process safety concepts and tools is essential for those who design, operate, and maintain hazardous systems. This course presents basic principles of safety management that will help design better systems, identify hazards, effectively participate in hazard analyses and understand how to implement safety in the plant life cycle. It also highlights relevant codes and standards that go with engineering, construction and operation of plants. The target audience is executives of design engineering companies, operations and technical services in a plant. Two day to five day modules can be customized according to the client's needs and detailing required.



Course content

No.	TOPIC	DESCRIPTION
1.	The Basic Concepts	<ul style="list-style-type: none"> • Definitions and terminologies • Types and examples of hazards • How to identify hazards • Toxicological and ecological information • Flammability and explosion • Safety in plant life cycle • Codes and standards
2.	Case Histories	<ul style="list-style-type: none"> • Frequently encountered oversights in design and operation leading to accidents • Case – 1 lacunae in process design and engineering • Case – 2 safety in construction • Case – 3 safety in operation and maintenance • Lessons from the case studies • Case study – safety in plant life cycle
3.	Process Hazard Analysis	<ul style="list-style-type: none"> • Identification of hazards • Overview of basic risk assessment methodologies • HAZOP – What it is and how to conduct it • FMEA • Fault Tree analysis • Corrective actions
4.	Safety Practices in the Hydrocarbon Industry	<ul style="list-style-type: none"> • Safety in transportation of natural gas • Safety features in storage and transportation of LNG • Handling of LPG • Storage and handling of hazardous chemicals • Case studies • Relevant codes and standards
5.	Safety Management	<ul style="list-style-type: none"> • Safety Management in Design Stage • Safety Management in Construction Stage • Safety Management in Operation • Developing Emergency Response Plan

Methodology of presentation

- Microsoft Power Point with colorful slides packed with information, Video Clips.
- Highly interactive with total involvement of the participants.
- Interesting and Interactive Quiz Sessions, group tasks for better assimilation.

HAZOP FOR PLANT SAFETY

About the Course

The training course covers related knowledge on HAZOP technique and its practical real life application.

The course structure has been designed to be intensively interactive with ample stress on simple exercises for familiarization with HAZOP technique followed by case studies, workshop and exercises on the owner's plant documents and drawings.

The target participants are Plant Production and Technical Services Engineers, Operating Personnel, Safety Engineers, HSE Managers and Design Engineers.



Course Benefits

The benefits the participants will draw out of this course are:

- Understanding the use of HAZOP as a tool to identify hazardous deviation or situation and identify where the problems exist.
- Will be able to analyze the problems and evolve a creative and cost effective approach for finding the solution.

Course Content

No.	TOPIC
1.	An overview of current approaches to safety analysis techniques
2.	Hazard & Operability Study – Methodology and Applications – Session I
3.	Hazard & Operability Study – Methodology, roles, efforts, requisites and follow-up – Session II
4.	Hazard & Operability Study – Methodology, roles, efforts, requisites and follow-up – Session III
5.	Quiz, Q/A Session
6.	Case Studies
7.	HAZOP Study – A Simple Exercise
8.	HAZOP Software Demonstration – Hands-On Training
9.	Live Exercise-I on client's plant P&ID's – Session I (forming teams)
10.	Live Exercise-I on client's plant P&ID's – Session I (forming teams)
11.	HAZOP Review Meeting format, Report formatting and contents
12.	Live Exercise-II on plant P&ID's – Session I (Simulated full-fledged HAZOP Review meeting)
13.	Live Exercise-II on plant P&ID's – Session II (Simulated full-fledged HAZOP Review meeting)
14.	Review of earlier sessions, feedback, clarifications
15.	Concluding session

Methodology

The course is ideally for actual demonstration for an operating facility. The presentation is through power point slides, dummy exercises and actual in plant HAZOP exercise. Ideally the client should provide the following -

- a. HAZOP software (HAZOP-Pro5, DNV-Pro5, Primatch or equivalent) Note: If not available with the client, we can organize lease of the software for the duration.
- b. One set of P&ID's for each of the participants
- c. One set of following documents for reference during HAZOP Study:
 - (i) Project Design Basis (including process design basis, environmental stipulations)
 - (ii) Equipment Data Sheets
 - (iii) Instrument Data Sheets
 - (iv) Cause and Effect diagrams
 - (v) Fire & Gas Philosophy and lay-out of detectors, sprinklers, deluge, actuation valves
 - (vi) Electrical Single Line Diagram
 - (vii) Electrical Area Classification
 - (viii) Drains, catch pits, underground sewer system showing location of sealed manholes as applicable
 - (ix) Project piping specification
- d. One set of full size P&ID and layout to be displayed on the wall and marked with highlighters. These will be treated as HAZOP Master and form part of HAZOP Report

PLANT MODIFICATION FOR PERFORMANCE AND PROFIT MARGIN IMPROVEMENT

Introduction

In today's competitive world, process plant operators and managers have to achieve profitability criteria ensuring plant safety, quality of products and meeting environment stipulations. This puts enormous pressure to run the plant with optimum energy consumption and peak performance of the processing equipment and systems.

This program presents practical concepts for optimal energy conservation and ensuring maximum efficiency out of each process equipment system in a plant. Each concept is substantiated by real life case studies of plant performance improvement with minimum modification and shortest pay-back on capex. These concepts can also result in reduction in pollution, improvement of capacity and redundancy of unproductive equipment.

A typical process plant configuration is first analyzed to identify potential areas of improvement. Techniques like simulation, modeling and pinch technology are then applied for this purpose. The target areas of the program are distillation columns, heat exchanger train, furnaces and even reactor modeling.

The course also covers methodology of execution of the concepts with real life examples. The lectures and programs on the subject have been appreciated in World Refining Conference at Abu Dhabi and by major international companies like Technip.

Who should attend

1.	Engineers involved in Technical Services in refinery and petrochemical plants covering process, mechanical, piping and instrumentation aspects.
2.	Engineers responsible for operations and performance improvement of the plant. Research and development engineers in an operating company.
3.	Managers and decision makers responsible for plant performance and profitability.



Course Content

No.	TOPIC	DESCRIPTION
1.	Basic Definitions and Concepts	Typical process configuration, terminologies, target areas of performance improvement. Description of the tools used for performance analysis, concepts of simulation, modeling and pinch technology. Global optimization concept in a plant.
2.	Heat Exchanger Train Synthesis and Optimization	A typical heat exchange system configuration, potential of improvement in energy recovery, simple example of development of appropriate scheme, multiple exchanger network analysis, case study of a refinery, energy saving targets and capex. Quiz session.

No.	TOPIC	DESCRIPTION
3.	Distillation Column Targeting	Basic concepts, distillation column energy profile, application of pinch concept for improved energy conservation, modification of reboiler, condenser and other energy systems, modification of column configuration including feed location and reflux. Case study.
4.	Total Site Process Integration	Concepts of total site process integration by using pinch technology through optimization of steam power network of an entire refinery complex. Case study.
5.	Evaluation and Improvement of Equipment Performance	Modeling to improve equipment performance such as ejectors, dryers, venturi scrubber, fired heaters and even reactors. Case studies.
6.	Conclusion	Interactive session to exchange real life experiences on performance improvement by the participants. Question Answer Session.

Methodology of presentation

- Microsoft Power Point colorful slides packed with information.
- Highly interactive with total involvement of the participants.
- Interesting and Interactive Quiz Sessions, group tasks for better assimilation.

NATURAL GAS PROCESSING

Objective

The course provides basic understanding of gas processing plants starting from basics of gas handling gas receiving terminal with slug catcher to sweetening dehydration low temperature processing and compression to pipeline. The course is designed for operating and production personnel in gas processing plants. It is also suitable for design engineers involved in design and engineering of gas processing plants.



Course Content.

No.	Topic	Content
1.	Basic Principles	<ul style="list-style-type: none"> • Characteristics of natural gas • Composition of natural gas • Physical properties • Hazardous properties • Concept of standard volume • Hydrocarbon phase behavior • Water hydrocarbons phase behavior • Hydrate formation <p>Quiz Session</p> <ul style="list-style-type: none"> • Quiz on general understanding of natural gas properties and composition <p>Exercise</p> <ul style="list-style-type: none"> • Review of typical drawings and P&IDs
2.	Gas Liquid Separation	<ul style="list-style-type: none"> • Separators – description, types and selection, • Slug formation during transportation • Slug catcher • Condensate stabilization.
3.	Gas compression	<ul style="list-style-type: none"> • Types of compressors and selection • Drive • Compressor Performance Curves • Compressor controls and trips • Surge control <p>Quiz Session</p> <ul style="list-style-type: none"> • Operation and Trouble shooting • Q/A Session
4.	Acid Gas Sweetening	<ul style="list-style-type: none"> • Sweetening processes and process selection criteria • Amine processes – description • Amine processes – operating variables and controls • Equipment description – Absorber, Stripper, Flashing, Recirculation Pump • Understanding of P&IDs • Common problems and trouble shooting in Gas sweetening Plants <p>• Quiz Session</p>

No.	Topic	Content
5.	Gas Dehydration	<ul style="list-style-type: none"> • Types of Processes, their application and selection • Absorption & Adsorption processes • Dehydration & regeneration – process description • Equipment description • Common problems and trouble shooting <p>Exercise and Group Task</p> <ul style="list-style-type: none"> • Review and understanding of typical P&IDs
6.	Cryogenic & Fractionation System	<ul style="list-style-type: none"> • External Refrigeration based processes • Turbo expander based processes • Combination of the two types of processes • Equipment description • Heat transfers & heat exchangers and Chillers (Cold Boxes) <p>Exercise and Group Task</p> <ul style="list-style-type: none"> • Review of drawings and P&IDs • Special maintenance problems • Common operating problems and troubleshooting
7.	Health, safety and Environment	<ul style="list-style-type: none"> • Normal Hazards in a Gas Plant • Hazardous Properties of Natural Gas • Accident Case Histories and Causes • Handling Gas Fire • Case Studies • Handling Hydrogen Sulfide • Gas Detection and Safety Systems in Gas Processing Plant • Emergency Response Plan • Overview of Hazard Identification Techniques – overview of HAZOP, Risk Analysis, FMEA <ul style="list-style-type: none"> • Quiz Session

Methodology of Presentation

- Microsoft Power Point with colorful slides packed with information
- Real life P&ID exercises
- Highly interactive with total involvement of the participants.
- Interesting and Interactive Quiz Sessions, Group Tasks for better assimilation.

OFFSHORE AWARENESS PROGRAM

Introduction

The course has been specially designed for Graduate Trainees of a company doing business in the area of Oil and Gas production facility **offshore**. It is also beneficial for experienced engineers who are new to the offshore production industry, to orient themselves towards offshore platform facilities.

It briefly covers description, definitions, terminologies, concepts, standards, special features and some important practices in the offshore oil and gas industry.



Course Content

No.	TOPIC	DESCRIPTION
1.	Introduction, Definitions and Terminologies	<ul style="list-style-type: none"> • Hydrocarbon Reservoir • Characteristics of Well Fluid, Petroleum, Crude Oil and Natural Gas • Oil Field, Gas Field and Condensate Field • Onshore Field and Offshore Field • Exploration and Production Techniques • Fixed Production Facilities - Fixed Platform • Mobile Production Facilities -Floating Production and Storage Facilities
2.	Typical Offshore Production Complex Configuration	<ul style="list-style-type: none"> • Typical Offshore Configuration <ul style="list-style-type: none"> • Fixed Platforms • FPSO Configuration • Deep Sea Production Configuration • Type of Fixed Platforms <ul style="list-style-type: none"> • Well Platform • Production Platform • Central Processing Platform • Living Quarters Platform • Flare Tripod • Personnel and Utilities Bridge • Flare Bridge • Platform Descriptions <ul style="list-style-type: none"> ▪ Topside Superstructure ▪ Jacket ▪ Foundation ▪ Piling ▪ Decks ▪ Modular Configuration of Topside Facilities

No.	TOPIC	DESCRIPTION
3.	Topside Facilities of Well Platform	<ul style="list-style-type: none"> • Wellheads and Manifold • Test Manifold and Test Separator • Emergency Well Shutdown System • Fire Fighting System with Diesel Engine Driven Water Pump • Electrical Generator(Duel Fuel Engine) with Associated Switchgear • Telemetry, Telecontrol and Communication Facilities • Pedestal Crane • Navigational Aids • Temporary Shelter for Operators
4.	Topside Facilities in a Central Processing Platform – Process System	<ul style="list-style-type: none"> • Flow Lines • Test Manifold and Test Separator • Production Manifold • Three Phase Production Separators- 2 Stage,/3 Stage • Crude Oil Pumping and Metering System • Gas Compression • Gas Dehydration System • Glycol Regeneration • Gas Metering • Oil and Gas Export
5.	Topside Facilities in a Central Processing Platform - Utility Systems	<ul style="list-style-type: none"> • Fuel Gas • Diesel Fuel, Jet Fuel System • Closed Drains, Open Drains • Flare and Relief System • Utility Air System, Instrument Air System, Nitrogen System • Utility Seawater, Firewater System • Seawater Cooling • Fire and Gas Detection System • Potable Water • Cooling Medium • Chemical Injection • Sewage • Power Generation and Distribution • Navigational Aids • Produced Water Treatment and Disposal • Process Control System • Communication System
6.	Requirement for Water Injection and Gas Lift	<ul style="list-style-type: none"> • Configuration • Terminologies • System and Equipment Required
7.	Codes and Standards	<ul style="list-style-type: none"> • List and overview of codes and standards used

No.	TOPIC	DESCRIPTION
8.	Safety and Shutdown System	<ul style="list-style-type: none"> • API RP 14-C • Emergency Shutdown System (ESD) • Process Shutdown System (PSD) • Other Shutdown Systems • Area Classification • Fire and Gas System • Platform Safety Standards – an Overview
9.	Transportation and Installation of Jacket and Topside	<ul style="list-style-type: none"> • Installation Methods • Topside • Jacket • Loadout and Transportation • Piling • Stabbing • Engineering Aspects of Installation
10.	Submarine Pipeline	<ul style="list-style-type: none"> • Determination of Size and Thickness • Stability Consideration • Concrete Coating • Riser • PLEM • Engineering Aspects of Installation

Methodology of Presentation

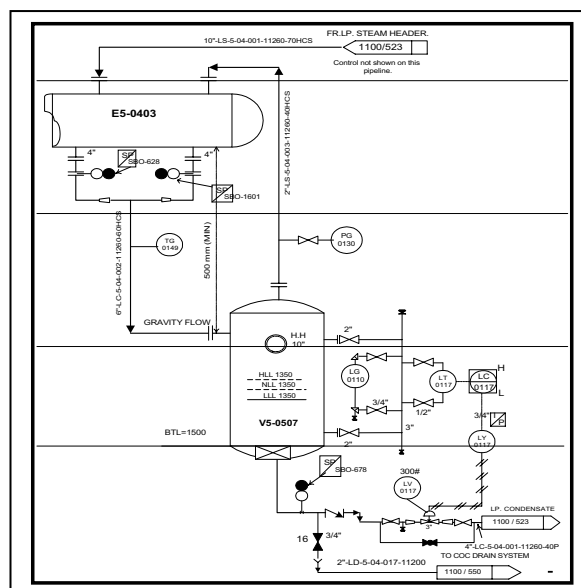
- Microsoft Power Point with colorful slides packed with information
- Real life P&ID exercises
- Highly interactive with total involvement of the participants.
- Interesting and Interactive Quiz Sessions, Group Tasks for better assimilation.

READING AND UNDERSTANDING P&IDs

Introduction

Understanding P&IDs and the ability to develop P&ID is the heart of engineering and operation of process plants. The course is designed for Process Engineers and specialist engineers from Piping and Instrumentation Departments of Engineering or Operating Companies. It gives an excellent understanding on P&IDs to graduate trainees of all disciplines working in the process industry.

It is a one-day or two day program customized to suit the specific industry. Generally the focus is on the practices in Oil, Gas and Petrochemical industries.



Course Content

No.	TOPIC	DESCRIPTION
1	The Basic Concepts	<ul style="list-style-type: none"> • Definitions and Abbreviation • Purpose of PFD and P&ID • Information Provided on PFD and P&ID <ul style="list-style-type: none"> ➢ Process Related Information ➢ Piping Related Information ➢ Instrumentation and Control Related Information ➢ Special Information
2	Generic Symbology And Numbering Systems	<ul style="list-style-type: none"> • Symbols <ul style="list-style-type: none"> ◆ Piping ◆ Valve ◆ Control Valve and Actuator ◆ Instruments • Notation, Numbering & Tag System <ul style="list-style-type: none"> ◆ Equipment ◆ Instrument ◆ Pipelines ◆ Instrumentation and Control ◆ Combining Process and Hardware ◆ Piping Specialty Code
3	Understanding PFDs	<ul style="list-style-type: none"> • Why PFD • Relating PFD Information to P&ID <ul style="list-style-type: none"> ◆ Relevance of Heat and Mass Balance ◆ Relevance of Operating Conditions ◆ Relevance of Physical Property Information

No.	TOPIC	DESCRIPTION
4	Understanding and Developing P&ID	<ul style="list-style-type: none"> • Equipment and System • P&ID and Datasheets • Development of A Simple Basic P&ID • Valves – Type and Application • Development of Control Loops • Need and Location of Measuring Instruments • Depiction of DCS and RTU • Developing Piping Information • Safety System in P&ID • Incorporation of Information in P&ID • Detailed Study of P&IDs
5	Offshore P&ID	<ul style="list-style-type: none"> • Specific Requirements & Special Information • Safety, Redundancy and Application of API RP-14C • Study of Few Offshore P&ID • Development of Safe Chart • Emergency Shutdown Systems (ESD)
6	Case Studies and Classroom Exercise	<ul style="list-style-type: none"> • Simple P&ID • Control Loops • Detailed P&ID • Practical Use of Information Provided on P&ID • Case Studies and Exercise, Specific to Hydrocarbon Industry. • Batch Process P&ID

Methodology of Presentation

- Microsoft Power Point with colorful slides packed with information
- Real life P&ID exercises
- Highly interactive with total involvement of the participants.
- Interesting and Interactive Quiz Sessions, Group Tasks for better assimilation.

References

Consultancy

(a) Project Consultancy

EPC Company, Singapore (Confidential)

Review, Audit and Project Management Consultancy for a EPC Gas Processing Project. Our scope included complete review and technical audit of process, front-end engineering, detailed engineering and project management strategies. The objectives were to ensure accuracy and consistency in engineering as well as project cost saving.

Confidential Client, India

Feasibility Study for a MTBE Plant covering process selection, process and facilities descriptions, broad specifications of facilities, cost estimate and financial analysis.

Darul Karisma Sdn. Bhd., Malaysia

Technology selection for a complex waste disposal problem for a petrochemical complex of Petronas.

Al Manhal Group, UAE, and their Indian Associate

Consultancy related to project development and project management for a major LNG Project in India, being planned by an overseas company.

Petroleum India International

Project Management Consultancy for preparation of an International turnkey bid in oil production and transportation facilities.

EPC Contractor, Singapore (Confidential)

Design of Floating Roof Tanks for Gasoline and Crude Oil

Petra, Malaysia

Commissioning Plan for Offshore Revamp Project

Marine Engineering Services Pte. Ltd., (MESPL), Singapore

Review of process design of an offshore platform facility.

Idemitsu Engineering Company, Singapore

Database report on market opportunities in Indian Refinery and Petrochemical Industry, Ports and LPG Terminals. In addition the scope included details on Indian operating companies, engineering companies (competitors) and developing a strategy for market entry for Idemitsu.

b) Operating Manuals / Technology Manuals

- Pre-commissioning / Commissioning Manual for Offshore Facilities- for Technip, Malaysia.
- Technology Manual for Process Automation- for Petronas, Malaysia.
- Start-up and Operating Manuals for Pulau Offshore Facilities modification, Petronas Carigali (Malaysia)
- Start-up and Operating Manuals for Helang Offshore Facilities, Nippon Oil (Malaysia)
- Start-up and Operations Planning for Offshore Platform modification project for Petra Resources (Malaysia).

Training and Placement

(a) Training

Petronas, Malaysia (through Dexcel Sdn. Bhd.)

Training to corporate executives and engineers on Oil, Gas processing, and Refinery Technology, Economics and Macro-level Hydrocarbon Infrastructure Planning methods. Training of Operators for Offshore Platform Operation and Safety. Training on Hydrocarbon Processing System.

Joint Technical Program with National University of Singapore

Conducted training program on hydrocarbon process technology and industry trends jointly with National University of Singapore, for corporate executives from Oil and Gas industry.

EPC Company, Singapore (Confidential)

Training on Safety Aspects of LPG Plant Design, Handling and Operation.

Kvaerner Philippine Corp., Philippine.

Training on Design, operation, and maintenance of natural gas pipeline for NPC, Philippines.

Vopak Terminals Pte Ltd., Singapore

Training on Hydrocarbon Processing with special stress on Petrochemical.

The Yokogawa Group, India

Training on "A to Z of Oil/ Gas Processing to Petrochemicals"

John Brown Technologies, India

Training on "A to Z of Oil and Gas to Petrochemicals"

MECON, India

Training on "A to Z of Oil and Gas to Petrochemicals"

Corporate Management Training Programs conducted by us and associates:

A short list of programs conducted for major companies such as Siemens, Crompton Greaves, Smith Kline & Beecham, KTI and others are:

- Management of Self
- Cross Cultural Relations for Better Team Synergy in Global Context
- Business Etiquette and Manners for Executives
- Selling and Negotiating Skills
- Role Clarification and Goal setting for Managers
- Interpersonal Relationships of Executives and their Spouses

(b) Executive Search and Placement:

Facilitated selection and placement for several managerial and technical positions for major companies such as Endress+ Hauser (Mumbai) and John Brown Technologies (India).

RJ Associates (Engineers) Pvt. Ltd., Mumbai

Carried out marketing assignments for engineering services.

John Brown Technologies (India) Pvt. Ltd.

Long term agreement of association with the company and marketing of their engineering services for international companies.

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