Maintenance and Operation of Rotary Pumps
صيانة وتشغيل المضخات الدوارة
Maint.1

objectives: Deepening The skills of the participants in maintenance and operation of Rotary of pumps

Who Should Attend
Mechanical engineers (maintenance ,operation pipeline engineers and experienced technicians).

Contents

➢ Types of Rotary pumps
  • centrifugal
  • screw
  • positive displacement
➢ Centrifugal pumps
  • Basics of functioning/
    Types and Components
➢ Single and multistage pumps
➢ Seals
  • Basics of Functioning Types and Components
➢ Bearings
➢ Alignment of the pump and Motor
➢ Trouble shooting
➢ Preventive and periodic maintenance
➢ Selection of the pump
➢ Specifications to API standards

Duration
10 days

Venue
Baghdad , Amman , Beirut , Cairo, Istanbul, or any place suitable for client.
Maintenance of Centrifugal Compressors

صيانة الضاغطات الدوارة

Maint.2

Objectives: To enhance the experience of the participants in the maintenance of centrifugal compressors.

Who Should Attend
Mechanical Engineers involved in maintenance and operation of the centrifugal compressors With an experience not less than two years in this field.

Contents

Centrifugal compressors

- Types
- Theory of Operation
- The efficiency
- Main Compressor components
- Bearings
- Seals
- Manufacturing materials and corrosion of Compressors Components
- Kinds of tests
- Predictive maintenance
- Trouble shooting
- Preparation of compressor to API specifications

Duration
10 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Operation and Maintenance of Gas and Steam Turbines

**Objectives**

To Acquaint the participants with the new methods of dealing with Problems associated with operation, and maintenance of the gas and steam turbines

**Who Should Attend**

Engineers and experienced technicians. Working an Operation and Maintenance Of Turbines

**Contents**

- General introduction to the turbine basics
- Gas turbine
  - Main parts of the gas turbine
  - Operation of gas turbine
  - Failure diagnosis during running the gas turbine
  - Programmed and emergency maintenance and Their costs
  - Specifications of the lubricant and the fuel gas
- Steam turbine
  - Operation of steam turbine
  - Cleanliness and Purity of boiler feed water
  - Boiler feed water treatment
  - Failure diagnosis of steam turbine
  - Programmed and emergency maintenance
- Technical / economical comparison between gas and steam turbines

**Duration**

10 days

**Venue**

Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Maintenance of Rotating Equipment
صيانة المعدات الدوارة

Maint. 4

Who Should Attend

Engineers and experienced technicians. Working an Operation and Maintenance Of Rotating Equipment.

Contents:

- Classification of rotating equipment.
- Centrifugal pumps
- Rotary pumps
- Gas Turbines
- Steam Turbines
- Centrifugal & axial compressors
- Operation Theory
- Variables affecting performance of each types
- Maintenance types & objectives
- Planned maintenance
- Predictive maintenance
- Rotating machinery efficiency
- Selection of Rotating Equipment

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Reliability Centered Maintenance (RCM)

**Objective** :- To help participants understand and implement reliability centered maintenance techniques.

**who Should attend:-**

Maintenance engineering and experience technicians

**Contents**

- Reliability engineering and maintenance.
- RCM background, history, basics and concepts.
- Operational reliability concept.
- RCM phases
- Questions addressed by RCM.
- Redundant, standby, and backup functions and components classification.
- Preventive and corrective maintenance integration.
- Critical and potentially critical components.
- RCM steps, tools and sequence.
- RCM implementation, calculations and benchmarking.

**Duration**

6 days

**Venue**

Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Bearing of Rotary Equipment

**Objective:** To provide pertinent information to improve the performance of bearings, which improves the reliability of rotating equipment

**Who Should attend:**

Engineers and technicians involved in maintenance of rotary equipment and operators

**Contents:**

- The function of bearing
- The factors affecting the performance of bearings:
  - Bearing quality
  - Operating environment
- Types of bearings and applications
- Bearing components
- The bearing numbering system and significance of prefix and suffix characters
- Proper bearing mounting and dismounting procedure
- Importance of proper lubrication and proper lubrication practice
- Bearing failure analysis

**Duration**

6 days

**Venue**

Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client
The Intelligent Pigging and Pipeline Rehabilitation

القشط الذكي وتأهيل الأنابيب

Maint. 7

 عملية القشط الذكي
 تقويم نتائج القشط الذكي
 حساب اعتراض الضغط للانبوب بعد تقييم نتائج القشط الذكي وفق المواصفة ASME B31.G
 أعمال الصيانة لتأهيل الأنابيب واعادته الى تحمل الضغط المقارب للتصميم

مدة الدورة
 سنة أيام عدد أيام السفر
 مكان الانعقاد
 بغداد - عمّان، بيروت، القاهرة - استانبول أو أي مكان ملائم للجهة المستفيدة
Heat Exchangers, Concepts , Selection , Design , Manufacturing , and Maintenance
المبادلات الحرارية : المفاهيم / الاختيار / التصميم / التصنيع والصيانة

Mant.8

Objectives
To acquaint the participants With The performance of the heat exchanger and the process of heat transfer

Who Should Attend
Mechanical engineers , maintenance engineers , operation and process engineers

Contents
- Definitions (heat exchanger , the transfer of the heat , conduction , convection and radiation)
- Heat transfer coefficient
- The overall conduction of heat
- The processes of evaporation , boiling and condensation
- Friction during the flowing operation
- The average of heat exchange
- Exchanger materials selection
- Design calculations
- Heat capacity determination of the exchanger.
- Physical and thermodynamic properties of the liquids
- The effective specification of liquids passing through the heat exchanger
- Heat conduction
- Contraction and expansion and Loss of pressure
- Manufacturing and inspection
- Performance during operation and inspection
- The maintenance

Duration
10 days

Venue
Baghdad , Amman , Beirut , Cairo, Istanbul, or any place suitable for client .
Maintenance of Air Conditioning and Refrigeration Equipment

Objectives
To promote and deepen the knowledge of the Participants in the maintenance of the refrigeration and air conditioning equipments

Who Should Attend
Mechanical engineers and experienced technicians (not less than three years experience) involved in maintenance of air conditioning and refrigeration equipments

Contents
- Room and central air conditioning equipment
- Refrigeration units
- Methods of control of the air conditioning systems
- Cooling towers
- Checking and inspection of the mechanical and electrical failures
- Equipment and instruments used in inspection and maintenance
- Periodic and emergency maintenance

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.

Mail: apti@apec@yahoocom
Vehicle & Heavy Equipments Maintenance
صيانة السيارات والمعدات الثقيلة

Maint.10

Objectives
To enhance and deepen the knowledge and skills of the participants in vehicle and heavy equipments maintenance

Who Should Attend
Engineers and experienced technicians and supervisors involved in maintenance and spare parts list preparation

Contents

➢ Internal combustion engines - gasoline and diesel engines
➢ The basic systems
  • Fixed parts system
  • Moving parts system
  • Lubricant system
  • Cooling system
  • Diesel fuel system
  • Direct fuel ignition system
➢ Types of heavy equipments
➢ Maintenance of the electrical system
➢ Dynamo
➢ Electrical wiring
➢ Ignition system
➢ Steering system
➢ Wheels and Tires
➢ The principle of hydraulic science, hydraulic pumps, hydraulic valves

Duration
10 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Use and Maintenance of Electrical Equipments in the Oil Industry

**Objectives**
To deepen and enhance the knowledge of the participants in maintenance and operation of the electrical equipments and classification of hazardous area and safety

**Who Should Attend**
Electrical engineers and experienced technicians involved in maintenance and operation of electrical equipments used in oil industries and classification of hazardous areas

**Contents**
- Classification of hazardous areas and safety
- The related oil specification and codes
- Kinds of protections and insulations used in electrical equipments
- Methods of earthing and its importance
- The main types of electrical equipments, motors, generators, transformers, circuit breakers, protection system, by PLC and computers
- Methods of inspection and electrical maintenance
- Types of cables and methods to determine the defect by using modern instruments

**Duration**
6 days

**Venue**
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Function of Measuring Instruments & Control Systems

OBJECTIVES
To improve and deepen the knowledge of the participants in the types and working method of metering and control instruments

WHO SHOULD ATTEND
Instruments engineers and experienced technicians involved in measuring instruments and control systems for two years at least.

CONTENTS
- Types of conventional instruments employed in measuring the different variables (pressure, temperature, flow rate, level, velocity)
- Feedback control
- The principles of the functioning of the metering and control digital instruments
- Analog signal converting instruments to digital signal
- Digital metering instruments of different variables (temperature, pressure, flow rate)
- Maintenance and failure diagnoses
- Calibration

DURATION
6 days

VENUE
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.

Tel: 00964 7270000003-00964 7270000002 -P.O Box :6037 Al-Tajiyat-Baghdad –Iraq- E.Mail : aptiaopec@yahoo.com
Maintenance of Digital Instrument and Control Systems
صيانة اجهزة ومنظمات التحكم الرقمية
Maint.13

Objectives
To enhance and improve the participants experience and skills in Modern digital Instrument and control system in chemical and other industrial Processes and their maintenance

Who Should Attend
Engineers and experienced technicians involved in maintenance of digital control system

Contents
- Programmable logic control system (PLC)
- History of PLC
- Comparison between PLC and other systems
- Architecture of PLC and its component
- How to communicate outside measuring elements with the control
- Study the processing method and the manner of control and programming by LADDER language
- Modern digital instrument (pressure, temperature, level, flow rate, velocity, etc)
- Modification of classical control systems to DCS system
- Organizational structure and job description for management and maintenance of DCS system
- SCADA system and its control uses
- Components of the system, methods of connection with Field Instrument, Display screen and control protocols
- Training the engineering and technical cadre

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Objective :- To enhance understanding of Pneumatic system component and their role in monitoring and control.

who Should attend:-

Instrumentation engineers and experienced instrumentation technicians

Contents

- Introduction to pneumatic instrumentation.
- Characteristics and application of pneumatics.
- Fundamentals of pneumatics.
- Constructional details of non-return, flow, pressure, valves and valves combinations.
- Symbols and standards of pneumatics.
- Direct control of single acting pneumatic.
- Actuator and double acting pneumatic actuator.
- Sizing and selection of components of typical pneumatic system.
- The use of logic in switching sequences and pneumatic circuits.
- Maintenance and troubleshooting procedures for pneumatic systems.

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Electric Submersible Pumps ESP

المضخات الغاطسة الكهربائية

Maint.15

Objective:
The Design and troubleshooting of ESP systems

Who Should attend
Engineers, technicians, field supervisors, and others who select, design, install, evaluate, or operate ESP

Contents:

- Introduction to ESP operation
  - ESP system
  - Selection
  - Completion Scheme
- ESP components
  - Downhole (pumps, motors, protectors, gas separators, cables, sensors, shrouds)
  - Surface equipment (switchboard, VSD, etc.)
- System performance analysis
- ESP design
- ESP system installation and servicing
- Control of ESP operation and optimization
- Trouble analysis methodology
- Optimizing ESP operation

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.

Tel: 00964 7270000003-00964 7270000002 - P.O Box: 6037 Al-Tajiyat-Baghdad - Iraq - E.Mail: aptiapec@yahoo.com
Electrical Protection relays and systems
Maint.16

Objective :-

To enhance participants understanding of relay types selection and calculation and their applications.

who Should attend:-

Engineers and experienced technicians who are responsible for testing, maintenance and calibration of relays.

Contents

- Typical short circuit calculations.
- Type of protection relays.
- IEEC directors and ANSI device numbers.
- Relay selection guide.
- Protective devices maintenance.
- Integration of protective devices in electrical network.
- Factors affecting choice of circuit breakers or power fuses, practical examples.

Duration

6 days

Venue

Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Maint.17

2. saq isra faryus awaluh uslahi 22 saq, laghiy kuryah kury olsnjajam 22 saq saq nekaw.

Tahaqly yahar yusoz omait as saq i 22 saq. Laghiy yahar kury saledajam 22 saq deeq
Tahaqly yusoz omait as saq i 22 saq. Laghiy kurya kury olsnjajam 22 saq mawla.

1. saqiy yusoz omait as saq i 22 saq. Laghiy yahar yahar yusoz yahar yahar as saq i 22 saq.

NAME UZMATZ

1. saqiy kurya al manabady fasah kury saledajam yahar yahar kury 2-1

2. (OBDI + OBDI) fahis saledajam yahar yusoz omait as saq 2-2

3. al asal saledajam yahar yahar kury olsnjajam 2-2

4. al asal saledajam yahar yahar kury olsnjajam 2-4

5. al asal saledajam yahar yahar kury olsnjajam 2-5

6. al asal saledajam yahar yahar kury olsnjajam 2-6

7. al asal saledajam yahar yahar kury olsnjajam 2-7

8. saqiy kurya al manabady fasah kury olsnjajam 2-8

9. yahar yahar yahar kury yahar yahar kury 2-9

10. saqiy yahar yahar kury yahar yahar yahar as saq 2-10

11. olsnjajam 2-11

12. saqiy kurya al manabady fasah kury yahar yahar kury 2-12

13. saqiy yahar yahar kury yahar yahar kury yahar yahar kury 2-13

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The Safe use of Lubricating Oils

The use of the oils in the different types of engines, the correct use of the lubricating oils, their specifications and methods of manufacturing.

Objectives
Deepening the knowledge of the participants about the safe and correct use of the different kinds of the lubricating oils, specification and methods of manufacturing.

Who Should Attend
Operation and maintenance engineers, supervisors and technicians.

Contents
- Abstract about the technical and economical aspects
- Importance of the correct use of lubricating oil
- The correct use of lubricating oils
- Motion, friction and wear
- Extraction processes of lubricating oil
- Types of additives and improvers
- Specifications and compositions of oils used for different purposes (turbines, compressors, gasoline and diesel engines, metals cuttings, refrigeration, hydraulic oils, heat treatment, electrical uses)
- The international specifications of lubricating oils
- Re-refining used oil and the and Utilization
- Standard tests and checking of new and used lube. Oils
- The safe use and environment protection from usage of the lubricating oil

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Balancing and Vibration Analysis

الموازنة وتحليل الاهتزازات

**Maint.19**

**Objectives:** To acquaint the participants with the nature, causes and treatment of the vibrations and methods of balancing

**Who Should Attend:**
Maintenance and equipment repair engineers

**Contents**

- Vibration causes, absence of balancing, problems of the bearing, excessive load, absence of the electrical balance
- Vibration concepts (vibration definition, repetition, speeds, ultrasonic noise)
- Predictive maintenance and its relation to vibration analysis
- Solving the problems of the vibration (control of the manufacturing specifications, modifications of the equipment, modification of operation methods)
- Balancing and its Procedures
  - Balancing in one level
  - Balancing in two levels
  - Determination of the weights positions
  - Balancing objectives

**Duration**
6 days

**Venue**
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Computer Aided Maintenance Management (CAMM)

Objectives
To develop the knowledge and the skills of the participants about the justifications and the methods of using the computer in the management, control and documenting the maintenance operations.

Who Should Attend
Programmed and planned maintenance engineers.

Contents
- Introduction to the maintenance activities and its position in the cycle of the equipment life.
- The economical importance of the maintenance.
- Types of maintenance: Planned, preventive, emergency, etc...
- Maintenance requirements.
- Failure causes of the equipments and sets.
- Selection of suitable method of maintenance.
- Justifications of utilization the computer for running the maintenance activities.
- Programmed maintenance system by computer.
- Repair work order system.
- Requirements of the computerized sets.
- Design and application of the computerized system.

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for the client.
Pressure Vessels Inspection (API 510 Code)
(advanced program)
فحص أوعية الضغط
Maint.21

who should Attend
Engineers Involved in Inspection and Maintenance Of Pressure Vessels

Objectives:
To Acquaint the participants with the In-Service Inspection, Rating, Repair and Alteration Of Pressure Vessels According to API 510 Code

Contents:

PRESSURE VESSELS (API 510 CODE)

1. DEFINITIONS
2. INSPECTION PRACTICE
   2.1 - Preparatory Work
   2.2 - Modes Of Deterioration and Failure
   2.3 - Corrosion – Rate Determination
   2.4 - Maximum Allowable Working Pressure Determination
   2.5 - Defect Inspection
   2.6 - Inspection Of Parts
   2.7 - Corrosion and Minimum Thickness Evaluation
   2.8 - Fitness – For- Service Evaluation
1. INSPECTION AND TESTING PRESSURE VESSELS AND PRESSURE – RELIEVING DEVICE
   1.1 - Risk – Based Inspection
   1.2 – external Inspection
   1.3 – Internal and On-Stream Inspection
   1.4 – Pressure Test
   1.5 Pressure – Relieving Devices
   1.6 – Records
2. REPAIRS , ALTERATIONS AND RERATING OF PRESSURE VESSELS
   2.1 – Welding
   2.2 – Rerating
3. ALTERNATIVE RULES FOR EXPLORATION AND PRODUCTION PRESSURE VESSELS
   5.1- Glossary Of Terms
   5.2- Inspection Program

Duration
6 days

Venue
Baghdad , Amman , Beirut , Cairo, Istanbul, or any place suitable for client.

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Tel: 00964 7270000003-00964 7270000002 -P.O Box :6037 Al-Tajiyat-Baghdad –Iraq
INSPECTION AND MAINTENANCE OF PROCESS PIPING

(Objectives)
To Acquaint The Participants With Inspection and Repair, Alteration, and Rerating of In-Service System Of Process Piping and According To API 570.

Who should Attend
Engineers Involved in Inspection and Maintenance Of Pressure Piping

Contents:
PROCESS PIPING

- Inspection and Testing Practices
  - Risk-Based analysis
  - Preparation
  - Inspection For Specific Types of Corrosion and Cracking
  - Types of Inspection and Surveillance
  - Thickness Measurement Locations
  - Thickness Measurement Methods
  - Pressure Testing of Piping System
  - Material Verification and Traceability
  - Inspection of Valves
  - Inspection of Welds in-Service
  - Inspection of Flanged Joints

- Frequency and Extent Of Inspection
  - Piping Service Classes
  - Inspection Intervals
  - Extent of Visual External Corrosion Under Insulation (CUI)
  - Extent of Thickness Measurement Inspection
  - Extent of Small-bore Auxiliary Piping and Threaded-connections Inspection

- Inspection Data Evaluation, Analysis, and Recording
  - Corrosion Rate Determination
  - Maximum Allowable Working Pressure Determinations
  - Retirement Thickness Determination
  - Assessment of Inspection Findings
  - Piping Stress Analysis
  - Reporting and Recording For Piping System Inspection

- Repair, Alteration, and Rerating of Piping System
  - Repairs and Alterations
  - Welding and Hot Tapping
  - Rerating

Duration
6 days
Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Tank Inspection, Repair, and Reconstruction
(API Standard 653)
فحص وصيانة الخزانات و إعادة بنائها
Maint.23

Objectives: TO enhance the participants in Tank Inspection, Repair Alteration, and Reconstruction

who should Attend
Engineers Involved in Maintenance, Construction, and Inspection of Oil Tank

Contents

1. DEFINITION
2. SUITABILITY FOR SERVICE
   2.1 Tank Roof Evaluation
   2.2 Tank Shell Evaluation
   2.3 Tank Bottom Evaluation
   2.4 Tank Foundation Evaluation
3. BRITTLE FRACTURE CONSIDERATION
   3.1 Basic Consideration
   3.2 Assessment Procedure
4. INSPECTION
   4.1 Inspection Frequency Consideration
   4.2 Inspection From The Outside of The Tank
   4.3 Internal Inspection
   4.4 Alternative to Internal Inspection to Determine Bottom Thickness
   4.5 Preparatory Work for Internal Inspection
   4.6 Inspection Checklists
   4.7 Records
   4.8 Reports
   4.9 Non-Destructive Examination
5. MATERIALS
   5.1 New Materials
   5.2 Original Materials For Reconstructed Tank
   5.3 Welding Consumables
6. DESIGN CONSIDERATION FOR RECONSTRU TANK
   6.1 New Weld Joints
   6.2 Existing Weld Joints
   6.3 Shell Design
   6.4 Shell Penetration
   6.5 Wind girders and Shell Stability
   6.6 Roofs
7. TANK REPAIR AND ALTERATION
   7.1 Removal and Replacement of Shell Plate Material
   7.2 Shell Repairs Using Lap-Welded Patch Plates
   7.3 Repair of Defects in Shell Plate Material
   7.4 Alteration of Tank Shells To Change Shell Height
   7.5 Repair of Defective Welds
   7.6 Repair of Shell Penetration
   7.7 Addition or Replacement Shell Penetration
   7.8 Alteration of Existing Shell Penetration
   7.9 Repair of Tank Bottoms
   7.10 Repair of Fixed Roofs
   7.11 Floating Roofs
   7.12 Repair or Replacement of Floating Roof Perimeter Seals

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
RISK-BASED INSPECTION
الفحص الهندسي المؤسس على الخطر
Maint.24

Objectives:
To Acquaint The Participants With Basic Elements For developing and Implementation a Risk-Based Inspection Program

Who should Attend
Engineers involved in inspection Main- Tenancy , Design and Operation

Contents

1. DEFINITIONS AND ACRONYMS
2. BASISC CONCEPTS
3. INTRODUCTION TO RISK-BASED INSPECTION
4. PLANNING THE RBI ASSESSMENT
5. PLANNING THE RBI ASSESSMENT
6. DATA AND INFORMATION COLLECTION FOR RBI ASSESSMENT
7. IDENTIFYING DETERIORATION MECHANISMS AND FAILURE MODES
8. ASSESSING PROBABILITY OF FAILURE
9. ASSESSING CONSEQUENCES OF FAILURE
10. RISK-DETERMINATION , ASSESSMENT AND MANAGEMENT
11. RISK-MANAGEMENT WITH INSPECTION ACTIVITIES
12. OTHER RISK MITIGATION ACTIVITIES

Duration
6 days

Venue
Baghdad , Amman, Beirut, Cairo, Istanbul, or any place suitable for client.

Tel: 00964 7270000003-00964 7270000002 -P.O Box :6037 Al-Tajiyat-Baghdad –Iraq- E.Mail : aptiaopec@yahoo.com
Standard Destructive Tests of Engineering

Materials and its Applications

الفحوصات الأتلافية القياسية للمواد الهندسية وتطبيقاتها

Maint.25

Objectives: To enhance the knowledge of the participants in the destructive tests of the engineering materials and its applications in related engineering fields.

Who Should Attend
Inspection, maintenance, welding, design and construction engineers.

Contents
- Analysis, assessment and applications of following tests
- Tensile tests according to API 1104 for the qualification of welding procedure and welders
- Tensile tests according to ASTM A-270 for plate pipes and fittings
- Tensile tests according to API 5L for the pipes used in transmission and transportation pipeline
- Impact test according to ASTM A-270 and its significance in specifying the material of pipes, fittings, vessels, working at low temperatures
- Hardness tests and results analysis
- The effects of the hardness on weldability and corrosion rates
- The relation between the hardness and other mechanical properties

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.

Tel: 00964 7270000003-00964 7270000002 - P.O Box : 6037 Al-Taijyat-Baghdad - Iraq - E.Mail: aptiapec@yahoo.com
Non –Destructive Inspection Techniques

Objectives
To acquaint participants with non – destructive tests Techniques, and its importance in quality control

Who Should Attend
Welding, maintenance, construction, design and inspection engineers

Contents
➢ Radiography examination
➢ Ultrasonic examination
➢ Dye Penetrant examination
➢ Magnetic particles examination
➢ Eddy current examination
➢ Acoustic emission examination

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Corrosion and Corrosion Control
التآكل والسيطرة عليه
Maint.27

Objectives
To acquaint the participants with all kinds of corrosion and The methods To control it

Who Should Attend
Corrosion and cathodic protection engineers inspection and maintenance engineers , and design engineers working in design field.

Contents
- Corrosion and corrosion damage
- Classification of corrosion
- Corrosion resistance
- Corrosion rate expressions
- Electrochemical aspects of corrosion
  - Electrochemical reactions
  - Polarization
  - Passivity
- Environmental effects on the rate of corrosion, oxygen and oxidizers , velocity , temperature, concentration of the corrosive media , galvanic coupling .
- Metallurgical effects on the rate of corrosion, composition , permanent stresses due to cold working and welding etc ...
- Types of corrosion, general corrosion ,bi – metallic (galvanic) corrosion , Intergranular corrosion , crevice corrosion , pitting corrosion , selective leaching , stress corrosion , corrosion by erosion ,corrosion due to bacteria
- Corrosion in The Oil industry and its mitigation

Duration
6 days

Venue
Baghdad , Amman , Beirut , Cairo , Istanbul, or any place suitable for client .
In - line Inspection and Rehabilitation of Pipeline
فحص وتأهيل خطوط الأنابيب وهي في التشغيل
Maint.28

Objectives
To acquaint the participants with modern and standard methods of inspection and rehabilitation of liquid hydrocarbon and gas pipeline

Who should Attend
The engineers involved in inspection and maintenance of the pipeline catholic protection

Contents
- Specification of the pipes and fittings to API and ASTM standards
- The existing operating pressure
- The design pressure
- Kind of services
- History of the pipeline
  - Positions and date of pipeline leaks
  - modifications and maintenance executed to the pipeline
  - status of the cathodic protection system
  - population density around the pipeline
- Engineering inspections
  - analysis of pipe to soil potential for The Previous five years
  - field survey for the pipeline
  - cover removal of the pipeline at hot spots
  - close interval potential survey
  - intelligent pigging
  - collecting and analysis of the data
- Defining level of the rehabilitation related to the maximum operating pressure required, according to ASME code B31.G
- Maintenance of pipeline according to ASME B 31.4 and ASME B31.8
- Hot tapping operation
- Stopping operation

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
**Inspection of Pressure Vessels Towers, Drums Reactors, Heat Exchangers and Condensers – API RP 572**

الفحص الهندسي للآواكية والإبراج والفاعلات والمبادلات الحرارية

**Maint.29**

**Objective** :- To enhance the experience of the participants in inspection of Vessels.

**Who Should Attend**
Engineers, involved in inspection, maintenance, construction of petroleum plants

**Contents** :-
- Types of pressure vessels
- Construction standards
- Reasons for inspection
- Causes of deterioration
  - Corrosion mechanisms
  - Metallurgical and physical changes
  - Faulty material
  - Faulty fabrication
- Frequency and time of inspection
- Inspection methods and limitation
  - External inspection
  - Internal inspection
  - Thickness measuring methods
  - Special methods of detecting mechanical defects
  - Metallurgical changes and In-situ analysis of metals
  - Testing
  - Limits of thickness
- Methods of repair

**Duration**
6 days

**Venue**
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.

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CORROSION METALLURGY
ميتالورجيا التآكل
Maint.30

Objectives
To enhance the Knowledge of the participants in the Corrosion by understanding the effects of metallurgical Factors in the rate of corrosion and the practical Application to prevent or mitigate the corrosion

who should Attend
The engineers involved in design process maintenance Inspection & operation

Contents:

1. TYPES OF CORROSION
   1.1 Uniform
   1.2 Pitting
   1.3 Galvanic corrosion
   1.4 Crevice corrosion
   1.5 Stress corrosion cracking
   1.6 Intergranular corrosion
      1.6.1 Weld Decay
      1.6.2 Knife-line attack
      1.6.3 Hydrogen attack

2. BASIC THEORETICAL PRINCIPLES OF CORROSION AND THEIR APPLICATION
   2.1 Thermodynamic principles
   2.2 Free energy change and cell potential

3. KINETICS OF CORROSION
   3.1 Polarization
   3.2 Passivity

4. BASICS OF METALLURGY
   4.1 Production of iron and steel
   4.2 Crystalline structure of metal
   4.3 Thermal equilibrium diagram
   4.4 Heat Treatment of carbon steel
   4.5 Sensitizing of stainless steel
   4.6 Alloys of steel

5. CORROSION PREVENTION BY METALLURGICAL METHODS
   5.1 Intergranular corrosion
      5.1.1 Weld decay
      5.1.2 Knife-line attack
   5.2 Stress corrosion cracking
      5.2.1 Hydrogen stress corrosion cracking
      5.2.2 Sulfide stress corrosion cracking

Duration
6 days

Venue
Baghdad , Amman , Beirut , Cairo, Istanbul, or any place suitable for client.
Objective: -To Improve the experience of participants in the inspection of fired Boilers and Heaters

Who Should Attend
Engineers ,involved in inspection , maintenance and construction

Contents: -

- Common Boilers and heaters designs
- Boilers and heater mechanical reliability
- Deterioration mechanisms
- Frequency and timing of inspection
- Safety precaution ,preparatory Tory work and cleaning
- Outage inspection programs
- Boilers outage inspection programs
- On-stream inspection program
- Tube reliability assessment
- Methods of inspection for foundations ,settings and other appurtenances
- Repairs
- Records and reports

Duration
6 days

Venue
Baghdad , Amman , Beirut , Cairo, Istanbul, or any place suitable for client .
Air Cooled Heat Exchangers for General Petroleum Services API 661
المبردات الهوائية في الصناعة النفطية

**Maint.32**

**Objective** :-To acquaint the participant with the design of the air cooled heat exchangers used in petroleum industries.

**Who Should Attend**
Engineers involved in design, construction, maintenance and inspection of large welded pressure tanks

**Contents :-**

- Terms and definitions
- Design
  - Tube bundle design
  - Air –side design
  - Structure design
- Material
  - Headers
  - Louvers
  - Other components
- Fabrications of tube budle
  - Welding
  - Post weld heat treatment
  - Tube –to –tubesheet joints
  - Gasket contact surfaces
  - Thread Lubrication
  - Alignment and tolerances
  - Assembly
- Inspection, examination and testing
  - Quality control
  - Pressure test
  - Shop run –in

**Duration**
6 days

**Venue**
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Failure analysis and Prevention
تحليل ومنع الفشل
Maint.33

**Objective** :- To acquaint the participant with the types of failures expected in oil industry and general approach to failure analysis.

Who Should Attend
Engineers involved petroleum industry

**Contents :-**

- General approach to failure analysis
  - Causes of failures and mechanism
  - Chemical causes
  - Physical causes
  - Chemical and physical causes
  - Manufacturing causes
  - Others
- General methods of failure prevention
  - Codes and standards
  - Quality control
  - Corrosion mitigation
  - Safety-related issues
  - Regulations

**Duration**
6 days

**Venue**
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Block Valves and Process Control Valves Technology

Maint. 34

Objective :-To enhance participants understanding of valves types, selection and application

who Should attend:-

Design, operation and maintenance engineers and experienced technicians.

Contents

- Introduction to block valves and control valves.
- Valves and control valves types.
- Valve and control valves (actuators, ratings, accessories).
- Valves and control valves sealing material and troubleshooting.
- Valves and control valves selection, sizing and performance.
- Valves and control valves testing and installation.
- Valve and control valves inspection and maintenance.

Duration

6 days

Venue

Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Objective :-
To enhance participants knowledge in the theory and practices of earthing and grounding systems and protection from related hazards.

who Should attend:-
Electrical, safety and inspection engineers and experienced technicians who are involved in design, construction, maintenance, inspection of electrical grounding systems.

Contents

➢ Basic theory of grounding system network.
➢ Mathematical equations for potential potentials and ground resistance in multilayer soil.
➢ Influence of rods on grounding grids performance in stratified soil.
➢ Type of grounding systems and design.
➢ Standardization of earthing systems.
➢ Earthing system equipment.
➢ Testing procedure for grounding system.
➢ Maintenance of grounding system.
➢ Source of static electricity and fire protection:
   ✓ Flammable liquid transfer, storage, transportation and filling stations.
   ✓ Pipeline and faxable pipelines
➢ Lightening and electrical shock.
➢ Definition of electrical shock and electrical shock treatment.
➢ Codes and standards.

Duration
6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Pipeline Hydraulic Analysis
Maint.36

Objectives
To enhance the knowledge of the participant in
the pipeline hydraulic analysis

Who should attend
Pipeline, maintenance and design engineers.

Contents
➢ Thermodynamic principles and flow properties
  of the different flow transported by pipelines
➢ Flow calculations for gases, liquids and multiphase pipelines
➢ Problems caused by changes in flow condition
during the pipeline’s operations (wax and hydrate formation, etc)
➢ 4. Exercise on flow calculations
  Duration
  6 days

Venue
Baghdad, Amman, Beirut, Cairo, Istanbul, or any place suitable for client.
Advanced Pipeline Risk Management

ASME B31.8S, API 1160

**Maint.37**

**objectives**

The course will provide attendees with a broad overview of risk concepts and Definitions and an understanding of quantitative and qualitative risk analysis, assessment and management techniques for hazardous pipelines.

**How should attend**

Pipeline engineers and designers who require knowledge of risk assessment and management. This course is suitable both for managers and engineers who are involved in risk assessment and management, or engineers who require a good, broad understanding of these topics.

**contents**

- Basics of hazard and risk assessment
- Concepts and definitions
- What is a hazard, risk etc.? What is risk analysis, risk assessment and risk management?
- Why do we need risk assessment for pipelines? What to expect from a risk assessment?
- Hazard identification techniques
- Hazard identification exercise
- Risk assessment methods
- Introduction to different approaches
- Qualitative, Quantitative
- Duration
- 6 days

**Venue**

Baghdad , Amman , Beirut , Cairo, Istanbul, or any place suitable for client.

- Index/scoring methods
- Semi-quantitative
- Quantitative
- Code approaches to risk assessment
- Failure frequency and consequence analysis
- How to determine pipeline failure frequency
- Historic data and prediction
- Safety, environmental, financial and other consequences
- Safety consequence analysis
- Risk calculation and risk acceptability
- Calculation of risk
- Individual and societal risk
- Risk acceptability
- Individual and societal risk acceptance
- Regulatory style and risk acceptance
- Risk management methods
- Control and mitigation of risks
- Control of frequency and consequences
- Control of risk by design, operations and inspection
- Risk management systems for pipelines

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