Training - Upstream Maintenance Engineer

INGMAIN-EN-P | Face-to-face only | 60 days

This training provides the technical knowledge to quickly and successfully integrate maintenance or design teams of Oil & Gas production facilities

IFP Training Certificate

Graduate Certificate

Level

Knowledge

Public

Engineers and technical executives, wishing to get specialized in the maintenance of Oil & Gas and energy production installations. Junior engineers with one of the following positions: site engineer, support engineer, design/engineering engineer or project engineer. Senior engineers in the framework of a retraining or skill development

Objectives

Attendees will be able to implement the following skills:

- Explain operation and maintenance of static equipment (well head, pipe, line elements, tanks, thermal equipment...)
- Master the technology, working principle, operation, maintenance and safety of the rotating machines used in Oil & Gas production and energy production
- Understand the behavior of items such as bearings and seal packings in the machines
- Identify the electrical power production and distribution, the instrumentation and the control of the systems
- Participate in or carry out the maintenance management of one or several production sites

Pedagogical & technical resources

- Interactive animation by industrial, maintenance and energy specialists
- Numerous applications and illustrations
- Understanding of all energy and the system maintenance areas
- Disassembly, expertise, measurements, re-assembly of pumping equipment in an equipped workshop
- Practical application of new knowledge: site energizing project, organization of major machines overhaul, use of manufacturer folders... (10 days and assessment by a jury)

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives, including final project presentation in front of a mixed jury of assessors composed of Company representatives and IFP Training Lecturers

Prerequisites

No prerequisites are necessary to follow this course

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Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

WELL EQUIPMENT & WELL EFFLUENT TREATMENTS — 2 days

Notions of drilling/completion. Artificial lift: pumping, gas lift. Oil field processing (stabilization, dehydration, sweetening) and water processing (production and injection water). Gas processing and conditioning (dehydration, sweetening).

TECHNOLOGY & MAINTENANCE OF STATIC EQUIPMENT — 3 days

Wellhead, pipe, fittings and line equipment, safety valve, tanks, pressure vessel. Thermal equipment: heat exchangers, boilers, heaters, condensers. Standards, design, operation, inspection, maintenance. PFD, P&ID, isometric drawings.

TECHNOLOGY & MAINTENANCE OF PUMPS — 5 days

Pumping fundamentals (pressure, flow rate, conservation of energy, mechanical and hydraulic powers...). Dynamic pumps. Functional approach: different types of dynamic pumps and integration into the processes; generic functional study (process, sealing, supporting/guiding, lubrication). Positive displacement pumps: different types (piston pumps and rotary pumps); operating principles, influence of the clearances, internal leaks, impact of the type of product on the flow rate and pressures.
Preventive maintenance, condition-based maintenance (measurement of vibrations, oil analysis, thermography), corrective maintenance (troubleshooting and repair techniques). Analysis of manufacturer folders and P&ID.

PRACTICE IN MECHANICAL WORKSHOP — 5 days

Technical drawing convention: 2D and isometric views, projections, sections and cut-away views, perspectives, technical vocabulary. Parts and mechanical systems dimensioning, ISO tolerances and main adjustments. Dimensional tolerances and operating clearance. Geometric tolerances and surface condition characterization. Presentation and implementation of the tools in a metrology workshop, performances and rules of use. Disassembly, expertise, measurements and re-assembly of single-shaft and double-shaft ends pumping equipment.

TECHNOLOGY & MAINTENANCE OF COMPRESSORS — 5 days

Compression fundamentals (ideal gas, real gas, isentropic compression, polytropic compression).
Dynamic compressors: different types and integration into the processes; technology of essential and auxiliary elements: stator, rotor, bearings, thrust, sealing, oil circuit, sealing devices... Reciprocating compressors: different types and integration into the processes; technology of essential and auxiliary elements (cylinder, piston, valves, sealing, spacers, crankshaft, rod, moving part and cylinder lubrication, cooling circuit, sealing devices, connection to the flare). Rotary compressors (screws, liquid ring, lobes, vanes). Preventive, condition-based maintenance. Troubleshooting and repair techniques. Analysis of information folders and P&ID. Troubleshooting.

TECHNOLOGY & MAINTENANCE OF DRIVING MACHINES — 5 days

Gas and steam turbines. Diesel motors. Technology, working principle, main and auxiliary equipment operation and maintenance. Operation and performances (impact of the operating conditions). Driven machine/driving machine coupling.

COMMON ELEMENTS OF MACHINES & STRUCTURES — 5 days

Moving part lubrication: grease, oil (designation, characteristics). Pressurized and bubbled lubrication, sealing

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rings. Rotors and shafts: balancing (unbalance, eccentricity, balancing class) and shafts geometric alignment. Roller bearings (designation, internal clearances, assembling rules), plain bearings (calculations, incidents, instability) and magnetic bearings. Shaft output seals: braided packings, mechanical seals (functioning, description of the different types, conditions of stability, auxiliaries); P&ID study of a complex mechanical seal, of a centrifugal compressor. Couplings and alignment. Machine shaft alignment techniques. Corrosion: main types. Corrosion prevention and basics of inspection.

TECHNOLOGY & MAINTENANCE OF ELECTRICAL EQUIPMENT — 5 days

Sources of electrical power (alternator, generator) and motors (alternate and direct current): functioning, technology, operation, maintenance, safety. Electrical power distribution and networks: constitution of HV and LV networks, distribution philosophy, control and protection elements, transformers, circuit breakers; redundancy of sources and supply means. Earthing and neutral systems. Protection against the electrical risks and hazardous areas and ATEX standards.

INSTRUMENTATION, CONTROL, SAFETY INSTRUMENTED SYSTEMS — 5 days

Simple and complex measuring devices, technologies and functional study. Signals and signal transmission. Control and safety devices (control valve, on/off valves). Control structures: role, working principle, direct or inverted action, operating modes. Control loops: simple, cascade and split-range. Distributed Control Systems (DCS) and Safety Instrumented Systems (SIS): safety loops, HIPS, ESD, EDP, F&G technologies.

HSE DURING MAINTENANCE WORKS — 5 days

Identification of the hazards and specific risks on site, in maintenance situation. Job safety analysis procedures and steps, permit to work. Audit and improvement of HSE performance. Safety in construction and maintenance works (lifting and rigging, sand blasting, test, works on electrical equipment, in confined spaces, welding...). HSE management system: SIMultaneous OPerationS (SIMOPS), management of changes, downgraded situation, human factors.

MAINTENANCE MANAGEMENT — 5 days

Maintenance policies and types: financial objectives. Maintenance cost versus failure cost. Different types of maintenance and respective importance: systematic preventive, condition-based, predictive, corrective. Preventive maintenance tools, measurement, follow-up and reliability engineering (fault tree, Pareto, identification of the “bad actors”). Methods and current trends: criticality analysis, Japanese and American methods, risk analysis-based decisions. Studied methods application: criticality rankings, levels of emergency, stocks of spare parts. Outsourcing and subcontracting, shutdown management, improvement plans.

PROJECT: MAINTENANCE ENGINEERING - JURY — 10 days

During the final project, participants will work as teams and develop a project related to the maintenance, the energizing, the functioning of the support, the management of a machine overhaul, a manufacturer brief... This 10-day project is based on existing data. Participants are coached all along the project to help them reach the objectives set: writing a report and presentation to a jury of personnel from the company and IFP Training.

To French entities : IFP Training is referenced to DataDock ; you may contact your OPCO about potential funding.
Please contact our disabled persons referent to check the accessibility of this training program : referent.handicap@ifptraining.com

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