This Course emphasizes in detail on the Power Generation Plants with thorough understanding of Various Types with applications, design criteria’s, Materials applications (Hardware details) and operational performance requirements, background of Plant Maintenance/Reliability Program as part of the Plant Asset management and will specifically emphasize on issues related to development, implementation and control of maintenance program with additional emphasis on Power Plant performance, Reliability and Operational Cost Analysis.

Asset Management Concept as applied to Plant environment, its systems, structure and components will be discussed in detail. Maintenance strategy and various concepts may reduce cost, but all must be integrated to ensure high reliability levels and lower DOCs and IOCs. Continued compliance with the plant regulatory requirements, while fulfilling the challenges of cost reductions and effective maintenance programs, is of paramount importance. OEMs and Operators should be on the same level of understanding. This course will also provide an insight into such understandings.

Within a 5-days period you will be provided with deep knowledge of Power Plants its components, structure, systems and integration with guidance for the implementation of an optimized Maintenance Program and will focus on the monitoring task and the relevance of the efficiency of the Maintenance Program, in order to fulfill the operational requirements and to avoid unnecessary maintenance cost.

Case studies with practical examples of maintenance Turn Around work-scoops from Thermal, Combined Cycle plants on plant systems, components and BOP will complement this course. The same will be integrated with Life extension study and recommendations on current base line levels, CDC Current dependable capacity evaluation for both Combined cycle and Thermal Power Plants of different configurations.

Continuing safe operations is to be delivered by the Power Plant Manufacturer for the establishment of an approved Plant maintenance program and must contain the necessary details, including frequencies, of all maintenance required to be carried out for a safe and economical Plant operation. Implementation of such maintenance program requires the preparation and planning of the maintenance tasks. These tasks are normally based upon the Maintenance Review Board Report and the Manufacturer’s Maintenance Planning Recommendation as detailed in the Maintenance Planning Document (MPD).

In order to establish an operator’s maintenance programme, the tasks and periods (interval/frequencies) at which each part of the plant, system, components, accessories, equipment, instruments, electrical and communication apparatus, and associated systems and installations should be inspected. Such implementation includes the periods at which items as appropriate should be checked, cleaned, lubricated, replenished, adjusted and tested as well. This course will take you deep into the failure analysis of Power Plant System, components and Controls.

WHO SHOULD ATTEND

- Maintenance Management
- Managers
- Engineers
- Chief Engineers
- Vice Presidents
- Maintenance Staff
- Maintenance Planning Managers

- Maintenance Program Engineers
- Reliability Engineers / Managers
- Power Plant Asset Managers
- Operational Managers
- Operational Engineers
- Finance Professionals in Power Generation
Day 1
Understanding Power Plant
- Power Plant, Plant and People
- Basic Plant Functioning, How it works
- Thermodynamic cycles, limitations
- Role of a Power Plant in Energy Infrastructure.
- Corporate Business Plans and impact on Power Plant Environment

Types of Power Plants
- Thermal Power Plants
- Steam Electric Power Plants
- Combined Cycle Power Plants
- Coal Fired Power Plants

Power Plants Components
- Gas Turbines, Boilers, HRSGs, Steam Turbines, Generators, Transformers, Structures.

Power Plants Systems
- Hydraulic
- Pneumatic or Air
- Fuel
- Lubrication
- Electrical
- Control & Instrumentation

Plant Design Objective/Procurement/ EPC Issues
- Design requirements for a Power Plant
- Power Generation Plants
- Thermal Power Plants
- Combined cycle power plants
- Boilers, Gas turbines HRSG, Steam Turbine and Generators
- Design trends (Typical machines OEM examples)
- Critical Plant Equipment

Day 2
Introduction to Plant Maintenance
- Maintenance Organization Exposition
- Maintenance Philosophies/ Strategies
- Associated Maintenance procedure
- Asset Management Concept for Power Generation Plants
- PAS55-1 / PAS55-2 understanding
- Contents of the Maintenance Program
- Types of Maintenance Strategies for Equipment
- Gas Turbines, HRSG, Boilers, Steam Turbines, Generators
- Critical Power Plant Equipment.
- Misc Rotating & Static Equipment / structures (BOP)

Plant Life Cycle Understanding
- Understanding Plant Life (Design) vs Actual Useful life .
- Effect of Plant Maintenance strategy on life
- Understanding criticality of Power Plant Equipment
- Risk Analysis and Life extension evaluation and recommendations
  - Power Generation Plants
  - Examples, Gas-Turbines, Steam turbines, Boilers, Generators, BOP
  - Complete Risk Report example, criticality Analysis.

Day 3
Power Plant Failure Considerations and Analysis
- Definitions, Philosophy, Fail Safe Design Concept
- System Configuration and Redundancy
- Non Redundant/Redundant Single Path, Parallel, Multiple Path System
- Life Cycle Process, Classification of Failures
- MSG, MSG-2 & MSG-3 Maintenance Process and Decision Logic
- RCM Reliability Centered maintenance program in Plants
- Failure Effect Categorization/ criticality
- Time-to-Failure, Failure scenario's

Power Plant Performance Factors/ Parameters/ Integration
- Performance and Functional Data.
- Types of Data & Collection System, Display and Reporting
- PFD, Reports and Repeaters
- Component Removals and Failures, Trips on Plant.
- Service Difficulty/ Occurrence Report, Structural Irregularity Report
- Analysis Techniques, Six Sigma Tools, Distribution Fitting for Data
- Plant Performance Report, Statistics Summary
- Statistics, Variations, Critical Failure Report
- CDC (Current dependable Capacity) Evaluation

BENEFITS OF ATTENDING THIS COURSE

Audience will have practical insight into the Power Plant Types, Design and Applications, Operational issues, Cost Analysis, Maintenance program and optimization of same with effective Cost control for the same. Will acquire a thorough knowledge of all Power Plants systems, associated hardware, components and controls, maintenance documents, Analysis tools and advanced power plant life cycle concepts. The reliability requirements in Power Plant environment with a thorough understanding of Power Plant Reliability Program with RCM methodologies and practically implementing the same. The course is designed to train the professionals/ Plant People on tools and techniques with practical case studies and mini workshops.

- Power Plant Types, Applications, Design
- Power Plant Materials in Components, systems
- Power Plant Life cycle Understanding
- Power Plant Performance standards and Monitoring
- Power Plant Regulatory standards
- Plant Maintenance program development
- Plant reliability Program Implementation and control
- Maintenance Cost control & Optimization
- Maintenance & reliability Data Analysis tools and techniques.
- Life extension and Evaluation, Recommendations for repair and Replace program
- CDC, Current dependable capacity
COURSE OUTLINE

Operational Considerations for Power Plants
- Thermal Performance
- Mechanical Performance
- Maintenance Performance
- Availability, maintainability Factor
- Operating Envelop for Various Equipment / Power plant
- Capacity / Load factors
- Consideration
- OEE Calculations for Power Plant Equipment

Day 4

Power Plant Reliability Programs
- Reliability Analysis
- Understanding a Reliability Program Implementation
- Cost vs ROI on reliability program
- Performance Measurement and Parameters

Monthly Plant Reliability Report
- Plant, Systems, components, structures, Critical systems.
- Critical systems and rotating equipment.
- Reliability Based Inspections.
- MRB, RCB and RRB functioning (base lines)
- Implementing RCB recommendations in practical environment.

Maintenance Program Implementation in Power Plant
- Documents (OEM, MPD, Operator specific Maintenance program, Modification)
- Plant Operator’s Maintenance Program, General Requirements
- Scheduled/Unscheduled Maintenance
- Task / Function Codes
- Logistics and Man hour planning aspects
- Maintenance Task Packaging
  - Turn around Checks
  - Equalized Programs
  - Phased Programs
- Maintenance Task Cards, CMMS
- Maintenance Program Implementation and Development
  - Staggered Implementation Plan
  - Service Experience
  - Periodic Review
  - Inspection Interval Escalations
  - Successive reviews and amendments
- Efficiency & Effectiveness of maintenance Program
- Inventory Monitoring to Support Maintenance Program

Power Plant Maintenance work scopes
- Work-scope planning guides (OEMs)
- Work-scope Examples
- Gas Turbines, Boilers, HRSG, Steam Turbines, Generators, BOP, Rotating Equipment, Systems viz, fuel, electrical, hydraulic, air etc.
- Understanding work-scope cost with Turn Arounds
- HARD / SOFT time threshold for
  - Systems, Components, Structure, BOP.

Day 5

Power Plant Operational Cost
- Direct and Indirect Cost Associated with Power Plant
- Maintenance Cost Baselines
- Maintenance Contracts – Cost Aspects
- Maintenance Cost Reporting, Data Analysis
- Cost Benefit Model, Change Proposals
- Cost Analysis DOC / IOC
- Power Plant Engineering procedures manual
- Associate Maintenance procedures
- Reliability Reports Monthly
- Documents / manuals
- Overall Exposition manual

Power Plant life extension and Evaluation
- Developing a base line study level for Power Plant
- Combined Cycle
- Thermal Power Plant
- Remaining Life Assessment
- Current reliability levels/Last shutdown/turaround reports
- RBIs current state / Future
- Life Evaluation questionnaire for a typical Installation
- Risk assessment of systems/ components
- Recommendations for life extensions, work-scope
- Investments into plant assets to Increase CDC
- Case study 1400 MW plant life extension & Performance Evaluation.

Case Studies
- Power Plant Performance Audit report
- Risk Report Study For Thermal Power Plant
- Reliability Improvement Program (Example)
- Maintenance Planning (Case Study / workshop )
- Maintenance Cost Analysis (Workshop)

Conclusion

SPEAKER

S Nadeem

S. Nadeem has over 20 years of diverse engineering experience in Industrial sectors through his career as a Mechanical Engineer within the Manufacturing and Engineering Maintenance Repair Overhaul Industry.

For the past 14 years, he has been working with PIA Engineering MRO facility on Maintenance Repair, Overhaul, Testing and Evaluation of Turbo Machinery including Aero and Aero derivative Gas Turbine Power Plants. He has diversified experience on General Electric, Rolls Royce and Pratt & Whitney Machines.

His present assignments include the Lean Six Sigma Integration with Reliability Programs and third Party MRO Business Development of Aero Gas Turbine / Aero derivative Gas Turbine Repair, Refurbishment and Overhaul.

Syed Nadeem is also an International Conference Speaker/ Event Trainer, addressing Gas Turbine Power Plants, Rotating equipment, Reliability Asset Management Management, lean Six Sigma. He has trained a number of professionals in the same area within and outside organization.

Provisioned Process companies (Power Generation, Oil and Gas etc) on Effective Reliability Improvement Progras, Maintenance Management Strategies, Lean Maintenance and Six Sigma Process Improvement Strategies integrating the same with reliability solutions.

He obtained his Masters in Mechanical Engineering from University of Engineering & Technology Lahore, Pakistan with a Major in Thermal Power Systems Engineering.