

Introduction:

This course is designed to enhance the decision-making abilities of professionals in operations and maintenance by providing them with essential skills and knowledge. Topics covered include project management, business analysis, data management and analysis, and maintenance management. The curriculum is built to incorporate best practices in operations management, ensuring participants become proficient in decision-making and risk analysis techniques.

The program focuses on lean thinking and techniques for decision analysis, emphasizing the importance of responsiveness to customer needs. Decision-making, an intrinsic human activity, is essential for survival and involves more than just choosing the best alternative. It requires prioritizing options for resource allocation and analyzing the impact of changes on initial judgments.

Target Audience:

- Operations professionals
- Maintenance professionals
- Reliability professionals
- Key operations supervisors
- Internal improvement consultants

Course Objectives:

By the end of this course, participants will be able to:

1. Improve productivity through the use of better, more timely information.
2. Understand how leading organizations solve common asset management challenges.
3. Optimize planning and scheduling of resources.
4. Perform optimized failure analysis.
5. Optimize asset management budgets by reducing unplanned equipment failures.
6. Develop a practical action plan to implement these techniques in their areas of responsibility and integrate them into the overall strategy while measuring their benefits.

Targeted Competencies:

- Breaking down a problem into components within a hierarchical framework.
- Ranking alternatives by establishing their importance or priority to approach the problem systematically.
- Applying Multi-Criteria Decision-Making (MCDM) to real-world problems.
- Introduction to various operational research and management science methods.
- Enhancing decision-making by setting goals, criteria, and demonstrating how to measure and rank them.

Course Content:

Unit 1: Introduction to Decision Making

- The scope and significance of decisions.
- The decision-making process.
- Choosing between options by predicting likely outcomes.
- Decision tree analysis: low probability, high-consequence events, valuing additional information and control.
- Monte Carlo simulation: optimization advantages and limitations.

Unit 2: Implementing Multiple Criteria Decision Analysis

- Definition of decision analysis.
- Reasons why poor decisions are made.
- Problems with traditional decision-making methods.
- Guidelines for making sound decisions.

Unit 3: The Analytic Hierarchy Process (AHP)

- Introduction to AHP.
- Using a comparative matrix.
- Consistency and sensitivity analysis.
- Benefit/cost analysis and resource allocation.
- Applications of AHP (e.g., Concorde case, maintenance strategy, highway planning).

Unit 4: Risk Management through Failure Mode and Effect Analysis (FMEA)

- Risk mitigation strategies.
- Fault tree analysis.
- Risk priority number and criticality matrix.
- Equipment criticality grading.
- Case studies from industries like oil and gas.
- Modeling system reliability, including series and parallel systems and redundancy concepts.

Unit 5: MRP and ERP Systems

- Development of Enterprise Resource Planning (ERP) systems.
- Material Requirements Planning (MRP) and MRP II systems.
- Planning and control processes.
- The bill of materials and master production schedule.
- Scope of decisions within MRP and ERP systems.

Unit 6: Optimum Performance Measurement

- Challenges with performance measures.
- Using performance measures as part of a continuous improvement process.

- Desirable features of maintenance performance measures.
- Best and worst practices in performance measurement.

Unit 7: Overall Equipment Effectiveness (OEE) as a Best Practice in Maintenance

- Advantages of OEE as part of an improvement program.
- Using OEE in lean maintenance.
- Analysis of the six major losses in equipment effectiveness.

Unit 8: The House of Quality

- Basics of design evaluation.
- Converting customer feedback into engineering solutions for better design.
- Applying the House of Quality concept in practical cases.

Unit 9: Decision Analysis for Optimization of Maintenance Activities

- Maximizing the benefits of Computerized Maintenance Management Systems (CMMS).
- Benefits resulting from the use of CMMS.
- Making optimal decisions for maintenance policies.
- Identifying unmet needs in responsive maintenance.
- Key features of next-generation maintenance systems.
- Transforming data into actionable decisions.