FMRIMS	Electrical Motor Reliability Improvements	Reliability, Integrity & Maintenance Training
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Course Description

The course covers reliability management program development and implementation for electrical motor to lead an oil & gas company to a pacesetter performance comprising of:

- Assessment of current performance in reliability, availability and maintenance costs for electrical motors.
- Comparison to pacesetters and identification of gaps. Benchmarking
- Defining what Best Practices and Degradation Templates need to be implemented to close the gap.
- Development and management of the plan for close gaps, operation and functional departments.
- Key Performance Indicator, Goal Setting & Performance Monitoring for Electrical Motors

Who Should Take the Course

The course is ideal for persons with assigned responsibilities improvements in the reliability and maintainability area, as well as managers who want to increase awareness of the payoffs of improvements managements.

Engineers who need to know the reliability management as they apply to developing reliability improvement programs for electrical motors. Design engineers, technical specialists, maintenance specialists, operations technical specialists, reliability specialists, and product/program managers will benefit from the course.

What Will You Learn

The participants will gain knowledge of programs and methods to achieve reliability improvements for electrical motors to reach target performance. They will learn the proven Best Practices and Degradation Templates that are appropriate to apply for different development situations as well as the basics of implementing the practices to reach reliability, availability and maintenance cost reduction targets.

Included Materials: Attendees will receive a copy of:

- Electrical Motors Design Handbook
- RAM Guide
- ISO 20815 Reliability Management
- Use of FMRIMS Software During the course
- Course Text Book
- Course Slides

Course Outline

- **Establishing plant and system reliability and availability targets**

- **Electrical Motors Reliability System Elements**
  Assessment of current reliability considering reliability system elements

- **Plant/systems reliability analysis**
  Asset Reliability KPI's
  Bench marking

- **Applying Reliability principles to focus on systems and equipment based on criticality:**

Identifying types of failures and their consequences
Identifying loss for various failures
Prescribing the overall reliability approach and Methodologies "Mix"

- **Equipment assessment process to meet RAM requirements**
  Operational history
  Robustness in design
  Maintainability
  Life cycle cost determination
  After sales service

- **Applying reliability principles to equipment management**
  Mean Time Between Failures (MTBF) Strategies (age or random)
  Arresting deterioration
  Performing RCA on "bad actors"
  Improving reliability by component substitution
  Monitoring equipment condition to determine optimal overhaul/replacement

- **Applying best practices technology tools to ensure ongoing reliability**
  Risk Based Methodologies (FMRIMS)
  Degradation Templates outline:

	Degradation Mechanism
• **COOLING FAN**	**Cooling Fan Unbalanced**
• **COLING FAN**	**Cooling Fan Loose**
• **POWER CABLE**	**Power Cable Line Insulation Degradation**
• **PROTECTIVE RELAY**	**Protective Relay Contact Corrosion**
• **CIRCUIT BREAKER**	**Circuit Breaker Mechanical Linkage Sticky**
• **TERMINAL BOX**	**Terminal Box Gasket Degradation**
• **TERMINAL BOX**	**Solid Dielectric Insulation Degradation**
• **STATOR/ROTOR WINDINGS**	**Stator/Rotor Windings Insulation Degradation**
• **INSTRUMENTATION**	**Calibration Drift**
• **HEATER**	**Heater Failure**
• **FAN**	**Cooling Fan Air Passage Blocked**
• **BEARINGS**	**Bearing Wear**
• **BEARINGS**	**Bearing Lubrication System Failure**

- **Interdisciplinary Reliability Focus Team**
  Organizing for Reliability
  Understanding human factors in Reliability
  Operator Driven Reliability

Course Instructor: Namik Kosaric is a Canadian Professional Engineer with experience with PETRONAS, Bahrain Petroleum Company and ESSO Petroleum Canada in reliability improvements and maintenance cost reduction, mechanical design, project engineering and technical support of Oil Refineries and Oil Production Facilities.

For the last 8 years in PETRONAS Namik Kosaric was responsible for providing technical and knowledge leadership in development, coordination and implementation of plant reliability and integrity improvements and program to PETRONAS OPU's to improve and support the overall Petroliam Nasional Berhad objectives.

In BAPCO, Namik Kosaric, pioneered and implemented a root cause failure analysis of lost profit opportunities and chronic failures using a multi-disciplinary teams to improve plant reliability, availability, safety and to ultimately reduce operating costs. Significant cost savings were achieved as a result of over 200 completed investigations.

For 23 years in ESSO Petroleum Canada, Namik Kosaric has made significant contribution worldwide in reliability improvements, design, projects and maintenance cost reduction in upstream and downstream facilities.