

Essential Care and Inspection Techniques

Course Description and Outline



Introduction/Overview of the Course

The purpose of an Essential Care and Condition Monitoring (ECCM) program is to find failures early in order to get lead-time to plan and schedule corrective maintenance without interrupting operations output.

An ECCM program also provides essential care of the equipment to avoid failures and extend life. Other benefits to ECCM include optimizing of maintenance resources, and to improve safety and environmental related performance.

IDCON's Essential Care and Inspection Techniques course is practical fundamentals training.

Course Objectives/Benefits to Participant

This practical training course teaches how to care for equipment and perform fundamental condition monitoring (inspection) tasks. This understanding and application of tasks at the plant will improve equipment performance, extend component life and uncover potential failures.

Training Method

Using basic theory and practical examples of component inspections and tools used for inspections. Participants will use tools to practice inspections and view failed components.

Recommended Attendees

The course is beneficial to all levels of maintenance crafts, technicians, and operators

Course Outline

1. Introduction. Participants will learn:

- IDCON's vision and mission
- Circle of Continuous Improvement
- Maintenance Definitions
 - Essential Care
 - Fixed time maintenance
 - Condition monitoring
 - Objective and subjective measurements
- Reliability and Maintenance beliefs
- People and technology
- Keeping it simple

2. Essential care- equipment cleaning. Participants will learn:

- Purpose and impact
 - Example of cleaning points
3. Essential care- operations practices. Participants learn:
- Operation procedures that impact reliability
 - Redundancy
4. Essential care- lubrication. Participant will learn:
- 80- 20 rule
 - Properties
 - Temperature impact
 - Water in oil
 - Grease compatibility
 - Storing and handling procedures
 - Managing grease volume
 - Re-lubrication
 - Visual aids
 - Bearing life due to contaminants
 - Particle size (oil and filtration)
 - Clearances of components
 - Cleanliness ratings
 - Tools
 - What to analyze
 - Oil sampling
5. Essential care- alignment basics. Participants learn:
- Bearing life reduction
 - What is shaft alignment
 - Misalignment types
 - How to detect misalignment
 - Measuring
 - Step by step alignment
 - Alignment checklist
 - Targets
 - Thermal growth
 - Soft foot
 - Shims
 - Machine alignment
 - Sheave alignment
6. Essential care- balancing basics. Participants will learn:
- How it works- unbalance
 - Single and two plane balance
 - Correcting
7. Condition monitoring- temperature. Participants will learn:
- IR gun

- IR cameras and principals
 - Field of view
 - Temperature range
8. Condition monitoring- vibration. Participants will learn:
- Most common mechanical problems
 - Failure developing period (FDP)
 - Overall vibration vs. spectrum
 - Severity and ISO standard
 - Where to measure
 - Tools to use
 - Vibration pen
 - Bearing Checker- Shock Pulse Measurements
 - Advanced tools- an overview
9. Condition monitoring- leaks. Participants will learn:
- The cost of leaks
 - Ultrasonic lead detector
 - Leaks for flammable, explosive and hazardous gases
 - Optic gas imaging
 - Water leaks and electricity
10. Condition monitoring- material cracks. Participants will learn:
- Eddy current
 - Magnetic particle
 - Black light
 - Liquid dye penetrant
 - Ultrasonic crack detection
 - Visual
 - Infrared
11. Condition monitoring- corrosion. Participants will learn:
- Corrosion process
 - Types
 - Dissimilar metal corrosion chart
 - Shop and welding procedures
 - Corrosion coupons and on-line monitoring
12. Condition monitoring- bolts and fasteners. Participants will learn:
- How does it work
 - Stress
 - Bolt grades and torque
 - Bolt torque basics
 - What's in your inventory
 - Galling
 - Checking fasteners

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13. Condition monitoring- bearings. Participants will learn:
- How it works
 - Clearance
 - Friction
 - Failure developing period
 - Bearing life
 - Inspecting failed bearings
 - Bearing tools and mounting practices
14. Condition monitoring- shaft couplings. Participants will learn:
- Types
 - What to look for on-the run or during shutdowns
 - On-the-run Stroboscope inspections
 - Modifying guards for inspections
15. Condition monitoring- pumps, packing and seals. Participants will learn
- Pump types
 - Packing
 - What to look for on-the-run
 - Lubrication and oil levels
 - Mechanical seal principals
 - Seal water/liquid
16. Condition monitoring- gear reducers. Participants will learn:
- How it works
 - Oil quality
 - Moisture/contamination control of lubricant
 - Inspections
17. Condition monitoring- belts. Participants will learn:
- How it works
 - V-belts
 - Guards and how to inspect
 - Measuring tension
 - Alignment
18. Condition monitoring- chain drives. Participants will learn:
- How it works
 - Guards and how to inspect
 - Lubrication
 - Slack
 - Alignment
 - Wear, elongation and wear measurements
 - Sprocket wear
 - Chain tension rule of thumb
19. Condition monitoring- hydraulics. Participants will learn:

- How it works
- Fluid cleanliness
- Breathers
- Filters

20. Condition monitoring- AC/DC motors. Participants will learn:

- How they work
- Common failures
- Temperature ratings and insulation
- Motor circuit analyzers
- Rule of thumb life vs. temperature
- Cleanliness' impact on life
- DC motor brush inspections

21. Condition monitoring- motor control centers. Participants will learn:

- How it works
- Basics of electrical PM's
 - Clean
 - Dry
 - Tight
 - Prevent Friction
- Infrared inspections

21. Condition monitoring- control loops (MCCs). Participants will learn:

- How it works
- Rule of thumb of failures
- What to inspect/calibrate
 - Transmitter
 - Control valve
 - Controller
- Self diagnostics and software for "Control Loop Performance Monitoring" system

IDCON In-house Training and On-site Implementation Support

IDCON can customize any of our training courses for your plant and provide the coaching and implementation support to ensure your organization really uses the processes to garner the best results.

IDCON Training and Consulting Services

- Leadership and Organization
- Reliability and Maintenance Assessments
- Planning and scheduling improvement
- Preventive Maintenance/Essential Care and Condition Monitoring
- Operator Essential Care
- Materials and Spare Parts Management
- Root Cause Problem Elimination
- Improving equipment data and technical database