

Machinery Oil Analysis &
Condition Monitoring: Enhanced
Edition: AI-Powered Oil Analysis
for Predictive Maintenance

Condition Monitoring & Predictive Maintenance Series

Mohammed Hamed Ahmed Soliman

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For inquiries: info@personal-lean.org

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MACHINERY OIL ANALYSIS & CONDITION
MONITORING: ENHANCED EDITION:
AI-POWERED OIL ANALYSIS FOR PREDICTIVE
MAINTENANCE

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My Goal for This Edition

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1.2 Maintenance Policies and Strategies

1.3 Predictive Maintenance Techniques

1.4 Reliability KPIs in Maintenance

1.5 Why Use Condition Monitoring Programs?

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**1.7 Integrating AI into Condition Monitoring Workflows
(*New Section*)**

1.8 Summary

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2.4 Role and Types of Oil Additives

2.5 Categories of Oil Analysis Techniques

2.6 Data Types and AI Integration (*New Section*)

2.7 Benefits of AI-Driven Oil Analysis (*New Section*)

2.8 Workflow of AI-Enhanced Oil Analysis (*New Section*)

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3.9 Benefits of AI in Test Interpretation (*New Section*)

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6.4 When Vibration Analysis Outperforms Oil Analysis

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5. Colorimetric Varnish Potential Analysis

6. Water Content (Karl Fischer – ASTM D1744)

7. Particle Count (ISO 4406)

7.3 AI-Enhanced Varnish Prediction Workflow (*New Section*)

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Oil Sampling Worksheet

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Lubricant Information

Sampling Information

Visual Inspection Before Sampling

Requested Laboratory Tests

Follow-Up Actions

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Root Cause Analysis Worksheet

Problem Description

Immediate Symptoms Observed

5 Whys Analysis

Root Cause Category

Corrective Actions

Appendix C: Failure Investigation Worksheet

Failure Investigation Worksheet

Equipment Information

Failure Description

Evidence Collected

Observed Damage

Recommended Actions

Appendix D: Lubricant Selection Worksheet

Lubricant Selection Worksheet

Equipment Details

Lubricant Requirements

Selected Lubricant

Appendix E: Oil Trend Tracking Sheet

Oil Trend Tracking Sheet

Appendix F: Gearbox Oil Analysis Case Study