

COURSE OVERVIEW ME0114(AD4)-4D
Bearing & Bearing Failure Analysis

Course Title

Bearing & Bearing Failure Analysis

Course Date/Venue

October 14-17, 2024/Ajman Meeting Room,
 Grand Millennium Al Wahda Hotel, Abu Dhabi,
 UAE

Course Reference

ME0114(AD4)-4D

Course Duration/Credits

Four days/2.4 CEUs/24 PDHs



Course Description



This practical and highly-interactive course includes practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.



Equipment productivity and reliability depends on the skillful accomplishment of maintenance practices and there is a clear relationship between maintenance practices, equipment productivity and bottom-line profit.



It is an industry recognized fact that in excess of 90% of premature bearing failures can be attributed to lubrication, contamination or installation issues. Determining the true cause of bearing failure, subsequently correcting this problem and then adopting the correct fitting procedures can dramatically increase bearing life and resulting in an overwhelming increase in equipment reliability and a dramatic reduction in unplanned downtime.

This course introduces a maintenance employee to the basic types of bearings and common nomenclature used. Bearing design, installation and maintenance is discussed with a focus on preventing premature failure. The participant is also trained to analyze failed bearings so a similar occurrence will not happen again.



Upon the successful completion of this course, each participant will be able to identify common sources of premature machinery failure and define precision mechanical maintenance practices to improve performance and extend machinery life. This course is designed to get the most critical part of a Machinery Improvement program into action. Skills and awareness to both maintain and considerably improve your equipment are presented and practiced in an easy to understand format.

This course is designed in order to make participants familiar with how to remove, inspect, maintain, select, design, handle, install, and troubleshoot bearings according to manufacturers' instructions and best practices. Participants learn how to identify replacement bearings and install and maintain the bearings properly using the right tools.

Course Objectives

Upon the successful completion of the course, each participant will be able to:-

- Apply and gain a good working knowledge on bearing and bearing failure analysis
- Discuss the technology, loads and lubrication, components, quality and operating environment of bearing
- Carryout proper installation and maintenance practices of bearing
- Illustrate different techniques of bearing clearance measurement
- Perform mounting and dismounting procedures covering mounting process, precaution, bearing adjustment and test running
- Identify bearings trouble signs and employ condition monitoring, troubleshooting and solution of bearings
- Recognize bearing failure causes and analysis as well as troubleshoot and maintain bearing in a professional manner
- Determine bearing lubrication covering the fundamentals of lubricants and the selection parameters for oil or grease

Exclusive Smart Training Kit - H-STK®



Participants of this course will receive the exclusive “Haward Smart Training Kit” (H-STK®). The H-STK® consists of a comprehensive set of technical content which includes **electronic version** of the course materials, sample video clips of the instructor’s actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.

Who Should Attend


This course provides an overview of all significant aspects and considerations of bearing for all level of maintenance engineers, supervisors and other technical staff in medium and large industries.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Certificates are accredited by the following international accreditation organizations: -


- 

The International Accreditors for Continuing Education and Training (IACET - USA)

Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units (CEUs)** in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology Middle East will award **2.4 CEUs** (Continuing Education Units) or **24 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

- 

British Accreditation Council (BAC)

Haward Technology is accredited by the **British Accreditation Council for Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:



Mr. Manuel Dalas (Emmanouil Amygdalas), MSc, BSc, is a **Senior Mechanical & Maintenance Engineer** with over **25 years** of industrial experience in **Oil, Gas, Refinery, Petrochemical, Power and Nuclear** industries. His wide expertise includes **Bearing & Bearing Failure Analysis, Root Cause Failure Analysis, Rotating Equipment Maintenance & Failure Analysis, Failure Analysis Methodologies** for Mechanical Engineers, **Reliability Centered Maintenance & Root Cause Failure Analysis, Machinery Failure Analysis, Prevention & Troubleshooting, Machinery Failure Analysis, Machinery Root Cause Failure Analysis (RCFA), Machinery Diagnostics & Root Cause Failure Analysis,**

Water Well, Transfer & Network Systems Operation, Water Network Systems & Pumping Stations, Instrument, Control & Protection Systems, Plumbing Network Systems & Building, Water Distribution & Pump Station, Boiler Operation & Water Treatment, Pipeline Simulations, Pipe Stress Analysis using CAESAR II, CAESAR II Application, Piping Dynamic, Static & Other Special Analysis using CAESAR II, Expansion Joints Design & Analysis, Impact Load Analysis, Piping Systems, Piping Codes Used in CAESAR II, RFP Pipe Maintenance & Repair, Relief Valve Analysis, Safety Relief Valve, Tanks & Tank Farms, Seismic Loads, Tank Shell, Tank Failure, Vacuum Tanks, Tank Design & Engineering, Tank Contractions, Material Cataloguing, Maintenance Planning & Scheduling, Reliability Centered Maintenance (RCM), Reliability Maintenance, Condition Based Maintenance & Condition Monitoring, Asset & Risk Management, Vibration Condition Monitoring & Diagnostics of Machines, Reliability Improvement & Vibration Analysis for Rotating Machinery, Effective Maintenance Shutdown & Turnaround Management, Engineering Codes & Standards, Rotating Equipment Maintenance, Mechanical Troubleshooting, Static Mechanical Equipment Maintenance, Plant Reliability & Maintenance Strategies, Fans, Blowers & Compressors, Process Control Valves, Piping Systems & Process Equipment, Gas Turbines & Compressors Troubleshooting, Advanced Valve Technology, Pressure Vessel Design & Analysis, Steam & Gas Turbine, High Pressure Boiler Operation, Rotating Machinery Best Practices, Diesel Engine Operations, Maintenance & Troubleshooting, PD Compressor & Gas Engine Operation & Troubleshooting, Process Piping Design, Construction & Mechanical Integrity, Stack & Noise Monitoring, HVAC & Refrigeration Systems, BPV Code, Section VIII, Division 2, Facility Planning & Energy Management, Hoist - Remote & Basic Rigging & Slings, Mobile Equipment Operation & Inspection, Heat Exchanger, Safety Relief Valve, PRV & POPRV/PORV, Bearing & Lubrication, Voith Coupling Overhaul, Pump & Valve Technology, Lubrication Inspection, Process Plant Optimization, Rehabilitation, Revamping & Debottlenecking, Engineering Problem Solving and Process Plant Performance & Efficiency. Currently, he is the **Technical Consultant of the **Association of Local Authorities of Greater Thessaloniki** where he is in charge of the mechanical engineering services for piping, pressure vessels fabrications and ironwork.**

During his career life, Mr. Dalas has gained his practical and field experience through his various significant positions and dedication as the **Technical Manager, Project Engineer, Safety Engineer, Deputy Officer, Instructor, Construction Manager, Construction Engineer, Consultant Engineer, Water Network Systems Engineer, Maintenance Engineer and Mechanical Engineer** and **CAESAR II Application Consultant** for numerous multi-billion companies including the **Biological Recycling Unit** and the **Department of Supplies of Greece, Alpha Bank Group, EMKE S.A, ASTE LLC** and **Polytechnic College of Evosmos.**

Mr. Dalas has a **Master's degree in Energy System** from the **International Hellenic University, School of Science & Technology** and a **Bachelor's degree in Mechanical Engineering** from the **Mechanical Engineering Technical University of Greece** along with a **Diploma in Management & Production Engineering** from the **Technical University of Crete.** Further, he is a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership and Management (ILM)**, a **Certified Project Manager Professional (PMI-PMP)**, a **Certified Instructor/Trainer**, a **Certified Energy Auditor for Buildings, Heating & Climate Systems**, a **Member of the Hellenic Valuation Institute** and the **Association of Greek Valuers** and a **Licensed Expert Valuer Consultant** of the **Ministry of Development and Competitiveness.** He has further delivered numerous trainings, courses, seminars, conferences and workshops internationally.



Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures
- 20% Practical Workshops & Work Presentations
- 30% Hands-on Practical Exercises & Case Studies
- 20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Course Fee

US\$ 4,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: Monday, 14th of October 2024

| | |
|-------------|--|
| 0730 - 0800 | <i>Registration & Coffee</i> |
| 0800 - 0815 | <i>Welcome & Introduction</i> |
| 0815 - 0830 | PRE-TEST |
| 0830 - 0900 | <i>Bearing Basics</i> |
| 0900 - 0930 | <i>Fundamentals of Bearing Technology</i> |
| 0930 - 0945 | <i>Break</i> |
| 0945 - 1100 | <i>Bearing Components</i> |
| 1100 - 1230 | <i>Terminology</i> |
| 1230 - 1245 | <i>Break</i> |
| 1245 - 1315 | <i>Loads & Lubrication</i> |
| 1315 - 1345 | <i>Bearing Quality</i> |
| 1345 - 1420 | <i>Operating Environment</i> |
| 1420 - 1430 | <i>Recap</i> |
| 1430 | <i>Lunch & End of Day One</i> |

Day 2: Tuesday, 15th of October 2024

| | |
|-------------|---|
| 0730 - 0830 | <i>Installation</i> |
| 0830 - 0930 | <i>Maintenance Practices</i> |
| 0930 - 0945 | <i>Break</i> |
| 0945 - 1030 | <i>Different Techniques of Bearing Clearance Measurement</i> |
| 1030 - 1130 | <i>Mounting & Dismounting</i> |
| 1130 - 1230 | <i>Preparation for Mounting</i> |
| 1230 - 1245 | <i>Break</i> |
| 1245 - 1330 | <i>Mounting Process & Precaution</i> |
| 1330 - 1420 | <i>Bearing Adjustment</i> |
| 1420 - 1430 | <i>Recap</i> |
| 1430 | <i>Lunch & End of Day Two</i> |



Day 3: Wednesday, 16th of October 2024

| | |
|-------------|--|
| 0730 - 0830 | <i>Test Running</i> |
| 0830 - 0930 | <i>Hand & Hydraulic Tools</i> |
| 0930 - 0945 | <i>Break</i> |
| 0945 - 1030 | <i>Bearings Trouble Signs Identification</i> |
| 1030 - 1130 | <i>Listen, Feel, Look & Lubricate</i> |
| 1130 - 1230 | <i>Bearings Condition Monitoring, Troubleshooting & Solution</i> |
| 1230 - 1245 | <i>Break</i> |
| 1245 - 1330 | <i>Vibration Analysis</i> |
| 1330 - 1420 | <i>Bearing Defect Frequency Analysis</i> |
| 1420 - 1430 | <i>Recap</i> |
| 1430 | <i>Lunch & End of Day Three</i> |

Day 4: Thursday, 17th of October 2024

| | |
|-------------|---|
| 0730 - 0830 | <i>Envelope Detection</i> |
| 0830 - 0930 | <i>Overheated Bearing</i> |
| 0930 - 0945 | <i>Break</i> |
| 0945 - 1030 | <i>Noisy Bearing</i> |
| 1030 - 1130 | <i>Unsatisfactory Equipment Performance</i> |
| 1130 - 1230 | <i>Bearing is Loose on the Shaft</i> |
| 1230 - 1245 | <i>Break</i> |
| 1245 - 1230 | <i>Shaft is Difficult to Turn</i> |
| 1230 - 1345 | <i>Peak View & Spike Energy</i> |
| 1345 - 1400 | <i>Course Conclusion</i> |
| 1400 - 1415 | POST-TEST |
| 1415 - 1430 | <i>Presentation of Course Certificates</i> |
| 1430 | <i>Lunch & End of Course</i> |





Simulator (Hands-on Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the state-of-the-art simulator “iLearnVibration”.



iLearnVibration Simulator

Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org