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The Hane – Client Relationship

Our Commitment to You

Hane Training's goal is to provide you, our customer, with effective training which, when employed on the job, will help you **decrease** maintenance and operational costs and **increase** your quality and productivity. To accomplish our goal we make the following commitments to you:

1. *You will be provided with an instructor who is an experienced troubleshooter in the subject he teaches and who is certified in effective Hane training methodology.*
2. *Every participant will have at least 50% hands-on activities in a workshop.*
3. *Every participant will receive a customized workbook for each course they take. This is not a conventional textbook, but rather a specialized tool designed to actively engage the participants in the workshop, and which makes a particularly suitable "job aid" while troubleshooting on the job.*
4. *All participants who successfully complete the workshop will receive a "Certificate of Achievement" with the appropriate Continuing Education Units (CEU).*
5. *You will receive telephone assistance prior to the workshop to customize the training to suit your exact need and after the training for reinforcement of learning.*
6. *You may videotape the workshop for later retrieval of information by the participants.*
7. *Your operations will be unaffected by Hane during the training – we bring in all our own equipment.*

Unconditional Guarantee

We are so confident that you will benefit from Hane Training, that we offer you an unconditional guarantee of satisfaction. If for any reason you are dissatisfied with the training, and if there is nothing that we can do to remedy the problem to your satisfaction, you will owe us nothing. **No questions asked!**

On-Site Delivery

On-site training has several of the following distinct advantages over other forms of training.

- You save thousands of dollars in travel and per diem costs.
- You have the opportunity to train more people on-site than you could in a public workshop at a lower cost.
- You can customize on-site courses to better suit your plant needs.
- You need not worry about participants unintentionally discussing company proprietary information if the training is confined to your facility.
- You can have an integrated program developed with several courses to meet your specific needs.
- You and your participant's supervisors have the opportunity to sit in on the training – to see what the students are really learning.
- You have a live instructor to answer questions and interact with you and your participants.

Team Based Environment

In accordance with Hane's mission to provide you with total solutions to your training needs. It is very important that we understand your needs and problems before we present you a potential solution.

To achieve your solution multiple people may communicate with you. Every customer has at least one training coordinator, one technical specialist and a member of management at their disposal.

This team is a very powerful combination capable of providing input from all aspects of Hane to ensure that we can provide you an all-inclusive solution to your need.

The Hane Quality Stamp of Approval

Instructor Training Process

New instructor candidates must undergo a rigorous **three-month** training program in course content and Hane methodology.

1. 1 week in orientation and receiving instruction on Hane methodology.
2. 2 weeks in field viewing Hane workshops presented by certified instructors.
3. 2 weeks practicing techniques – including video taping which is critiqued by a professional development team (PDT).
 - Instructor candidate will not proceed to the next phase until the PDT is satisfied that he/she is ready.
4. **“The Dry Run”** – the instructor candidate delivers portions of a workshop before various Hane colleague.
 - If the instructor candidate satisfactorily passes “The Dry Run” he/she may proceed to the next phase.
5. **“The Wet Run”** – the instructor candidate delivers portions of a workshop in the field. Another certified instructor is present.
 - If the instructor candidate’s delivery is satisfactory he/she is allowed to gradually deliver larger and larger portions of the workshop.
 - This phase normally takes 3 to 4 weeks to complete.
 - **A candidate may never proceed to the next phase until they are completely ready.**
6. **“The Solo Run”** – the instructor candidate assumes the role of an instructor and delivers an entire workshop to a client. An additional certified instructor acts as an assistant to ensure no problems.

Only those candidates’ who successfully complete this program become a certified Hane instructor and only in the course that he/she trained for.

Third Party Endorsements

The International Association for Continuing Education and Training (IACET)

IACET is the caretaker of the Continuing Education Units (CEU). Achieving IACET’s organizational certification gives our customers several assurances. First of all, every course at Hane has CEU awarded upon completion. Secondly it ensures our customers that we are devoted to the improvement of the quality and effectiveness of continuing education, training and human resource development.

The American Council on Education (ACE)

A team of college faculty members representing ACE ascertained after a rigorous evaluation of the content and delivery of Hane courses and of our company management processes that many of our courses are equivalent to college level courses. The team recommended that the courses be approved for college transfer credit under ACE’s College Credit Recommendation Service.

Any time you see  in the upper right corner of the page – you know that this course is ACE approved. All the student has to do is ask for ACE, give their social security number as a unique identifier and score at least a 70% on the post-test.

You benefit by having the opportunity to provide training for your employees that has recommended college transfer credit. With an ACE approved course there are many benefits you can receive. Employers can save tuition costs in assisting their employees with college education. This gives employees an additional company benefit, confirms employers’ interest in their welfare, and encourages them to pursue formal post-secondary education, which provides you with a higher quality workforce – and at no additional cost! Your employee’s benefit by being offered the opportunity to earn college credits while receiving company sponsored training, which gives them opportunities for growth, development, and advancement.

Methodology of Hane Training

Hane training is designed to ensure that learning occurs. Hane does not leave the learning process to chance. Everything that takes place in a Hane workshop has a carefully thought out purpose and was designed to actively engage participants in the training. One of the key reasons that Hane training has proven to be so effective over the years is the method of instruction that we employ in our training. Hane training has proven to be effective because it takes into consideration the full range of human faculties that can be utilized in the learning process – audio, visual, and kinesthetic.

The main goal of Hane training is to teach participants to effectively and efficiently troubleshoot and correct problems encountered in our clients' equipment. The Hane methodology, with which an Hane instructor must be proficient, has proven to be very successful in accomplishing this.

The Socratic instructional method

This requires the instructor to use skillfully formulated questions to lead the students to predetermined conclusions regarding knowledge of the basics of the subject as well as the use of troubleshooting techniques and repair procedures that apply to the subject.

Periodic review employed to reinforce learning

An appropriate use of repetition has proven time and again to facilitate learning, and if used properly, it allows the materials being presented to be referenced back and tied in with previously covered materials.

At least fifty percent Hands-on

Hane instructors are skilled at teaching students how to use various testing instruments to troubleshoot problems on lab trainers designed by Hane to closely simulate problems found in equipment on the plant floor. Even the discussion portions of the training are highly interactive while the instructor is demonstrating topics; the students are taking measurements and making calculations in their workbooks.

Liberal use of audio-visual aids

The instructors use overhead projectors to display every page as the class moves through the workbook. The workbooks then become particularly suitable job aids for retrieval of information by students while on the job later.

Hane training is enjoyable

Our experience has taught us that the students in our workshops learn best when they enjoy the training; therefore, we do everything possible to make the training fun.

In addition to making them proficient troubleshooters and repairmen, training that is fun produces these additional benefits for students: it reduces their fear and anxiety; it builds their self-confidence; it improves their attitudes; and it permits them to enjoy success.

Effectively trained employees contribute to an increase in the bottom line. We accomplish our mission when we help our clients reduce operational and maintenance costs and increase quality and productivity, and as a result help them to be more competitive and profitable.

Course Numbering System

Hane course numbers have two parts: a two-character department code followed by a three-digit number. The first of the three-digit number represents the level of difficulty, background or prerequisites needed.

For example:

EE 101 – *Electrical Controls* is a fundamental electrical course, which anyone may take.

EE 201 – *Industrial Electronics Maintenance Level One* is more challenging and requires background knowledge.

EE - Electrical / Electronics
 FM - Facilities Maintenance
 FP - Fluid Power
 HS - Health & Safety
 ME - Mechanical
 NC - Computer Numerical Control (CNC)
 PL - Programmable Logic Control (PLC)
 PM - Predictive Maintenance

100 - Fundamental
 200 - Intermediate
 300 - Specialized
 400 - Advanced

Our Most Valued Source of Information...You!

Our goal is to develop and maintain long term relationships by delivering customer focused training that meets or exceeds your expectations. How do we fill such a tall order? The answer is actually very simple, we listen to you.

We welcome and appreciate your input. We use your suggestions and comments in the evaluation, modification, and development of our products and services. We are eager to hear from you. You may submit your comments and suggestions to our web site at www.hanetraining.com, or via email to your customer representative, or contact us toll free at 1-800-777-0753.

Course Development

Our most successful courses have been those in which the customers participated in the development process. If you have a need that we do not address with an existing course offering, we would like to know. It may be a course that we are planning to develop and your input could play an important role in determining the content.

Course Improvement and Enhancement

Through student evaluations, contact reports and customer feed back, we determine necessary modifications and enhancements to our courses. Some of these improvements include updating our training equipment. We strive to provide lab activities that facilitate the most accurate hands-on, real world experience possible. Frequently, we update our course content and materials to respond to the new problems that come with today's rapidly changing industries.

We value your input on course content enhancements. Please feel free to contact our development team at 1-800-777-0753 to submit any course or material improvement suggestions.

References

We have provided a limited client list for your reference. You will find many of our customers are among the prestigious ranks of the Fortune 500. We do not list our customers' contact information for privacy and security reasons. If you need additional information or references, please contact us and we will be happy to accommodate you.

Ford Motor Company

General Motors Corporation

Delphi Automotive

DaimlerChrysler

Visteon Automotive

Pratt & Whitney

Eastman Kodak

Carrier Corporation

International Paper

Georgia Pacific

Procter & Gamble

State Farm Insurance

Lucent Technologies

American Electric Power

Willamette Industries

Weyerhaeuser

Allison Transmission

Anheuser-Busch

Johnson Control

Alcoa

Boise Cascade

Rubbermaid

ZF Batavia



- **Troubleshooting Mechanical Power Systems**
- **Industrial Gearbox Repair (Speed Reducers)**
- **Troubleshooting Worm Gear Reducers**
- **Mechanical Power Systems & Hydraulics for the Operator**
- **Industrial Rigging**
- **Geometric Dimensioning & Tolerancing**
- **Bearing Life Improvement**
- **Maintenance Welding**
- **Mechanical Maintenance Program**
- **Electrical Fundamentals for Mechanical Crafts**
- **Electronics Maintenance for Mechanical Crafts**

Troubleshooting Mechanical Power Systems



Category A	Course Number ME 101
Course Description	This forty hour, hands-on course provides your troubleshooters and mechanical operators with practical knowledge and techniques they can apply immediately to troubleshooting mechanical systems. If you have conveyors in your plant, this is the course for you!
Who Should Attend	Those involved in troubleshooting mechanical devices. This could include operators, millwrights, mechanics, production control supervisors and electromechanical technicians.
Prerequisites	None
Length	40 hours
Class Size	Up to 12
CEU Awarded	3.5
College Transfer Credit	2 credit hours recommended
Format	Hands-on Workshop. One lab station for every two participants.
Learning Objectives	Participants will learn to: <ul style="list-style-type: none">• Demonstrate an understanding of mechanical systems• Demonstrate an understanding of simple and complex machines• Troubleshoot mechanical systems• Demonstrate an understanding of belt and gear drives• Service various types of belt, chain or gear drive systems• Make power measurements• Provide proper lubrication• Use various measuring devices• Demonstrate an understanding of the application of various industrial fasteners
Course Customization	Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.

To Schedule please call 1-800-777-0753. Ask for your Client Representative.

Industrial Gearbox Repair (Speed Reducers)



Category A	Course Number ME 102
Course Description	In this hands-on course participants will learn to troubleshoot, align, install and rebuild gearboxes. The course includes: worm, helical, herringbone, spur, etc. Additionally, the course covers a selection of lubricants and an application of service rating.
Who Should Attend	Maintenance mechanics, millwrights, equipment setup personnel and anyone else involved in maintenance or repair of industrial gearboxes
Prerequisites	None
Length	32 or 40 hours This course can be extended to 40 hours if customers wish to have their own gearboxes brought in for the participants to dismantle and rebuild on the last day of the training.
Class Size	Up to 12
CEU Awarded	2.8 or 3.5
College Transfer Credit	2 credit hours recommended for the forty-hour version
Format	Hands-on Workshop. One lab station for every two participants.
Learning Objectives	Participants will learn to: <ul style="list-style-type: none">• Correctly rebuild gearboxes• Troubleshoot failed gearboxes• Select proper gearbox• Properly install a speed reducer• Correctly repair seals and bearings• Correctly setup a gearbox using shims
Course Customization	Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.

To Schedule please call 1-800-777-0753. Ask for your Client Representative.

Troubleshooting Worm Gear Reducers

Category A	Course Number ME 103
Course Description	This twenty-hour course covers the most widely used type of gearbox – the worm gear reducer.
Who Should Attend	Maintenance mechanics, millwrights, equipment setup personnel and anyone else involved in maintenance or repair of industrial gearboxes.
Prerequisites	None
Length	20 hours
Class Size	Up to 12
CEU Awarded	1.75
Format	Hands-on Workshop. One lab station for every two participants.
Learning Objectives	Participants will learn to: <ul style="list-style-type: none">• Correctly rebuild gearboxes• Troubleshoot failed gearboxes• Select a proper worm gearbox• Properly install a worm gearbox• Correctly setup a worm gearbox using shims
Course Customization	Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.

To Schedule please call 1-800-777-0753. Ask for your Client Representative.

Mechanical Power Systems & Hydraulics for the Operator

Category A	Course Number ME 105
Course Description	This course is designed to provide knowledge needed in a Total Productive Maintenance (TPM) environment or any plant where operators are getting involved in more than pushing the start/stop button and more knowledge of the systems that the operator uses is required.
Who Should Attend	Operators of hydraulic equipment, operators of rotating equipment, apprentices in machine maintenance, new employees, production workers, machine operators, anyone working with gears, belts, transmissions or other power devices, anyone wishing to have a better understanding of hydraulics or mechanical power systems.
Prerequisites	None
Length	40 hours
Class Size	Up to 12
CEU Awarded	3.5
Format	Hands-on Workshop. One lab station for every two participants.
Learning Objectives	Participants will learn to: <ul style="list-style-type: none">• Demonstrate an understanding of machine operation• Eliminate unnecessary downtime whenever possible• Be more involved in the care of the equipment one operates• Deal more effectively with maintenance personnel
Course Customization	Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.

To Schedule please call 1-800-777-0753. Ask for your Client Representative.

Category A

Course Number **ME 111**

Course Description

In this twenty hour, hands-on course you will learn how to determine safe load limits, figure balance points of loads, and apply the techniques of a skilled rigger.

Who Should Attend

Riggers, crane hookers, equipment setup people, crane maintenance workers, mechanical and electrical maintenance crafts, production employees, shipping and receiving personnel, crane operators, plant managers or anyone involved in the operation of a crane.

Prerequisites

None

Length

20 hours

Class Size

Up to 12

CEU Awarded

1.75

College Transfer Credit

2 credit hours recommended

Format

Hands-on Workshop. One lab station for every two participants.

Learning Objectives

Participants will learn to:

- Inspect the following equipment for safety:
 - Hooks
 - Chains
 - Nylon Sling
 - Chain Slings
 - Wire Rope Slings
 - Hoist Chain
 - Wire Rope
 - Metal Mesh
 - Fiber Rope
 - Metal Mesh Slings
- Determine safe load limits
- Calculate balance point of loads
- Apply the techniques of a skilled rigger
- Demonstrate an understanding of proper and safe sling angles for lifting loads

Course Customization

Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.

To Schedule please call 1-800-777-0753. Ask for your Client Representative.

Geometric Dimensioning & Tolerancing

Category D	Course Number ME 121
Course Description	Translating the intentions of the designer to the machinist has always been a challenge. Geometric Dimensioning & Tolerancing offers a way to communicate those intentions in a consistent way that all can understand. This course provides the knowledge necessary to accomplish GD&T.
Who Should Attend	This program has been specifically designed for engineers, supervisors, machinists and inspectors who require a good understanding of the principles of GD&T in order to be more effective in their jobs.
Prerequisites	None
Length	40 hours
Class Size	Up to 25
CEU Awarded	3.5
Format	Lecture/demonstration/problem solving
Learning Objectives	Participants will learn to: <ul style="list-style-type: none">• Identify basic dimensions and determine where the tolerances for these dimensions are given• Identify and interpret the elements that make up feature control frame• Identify and define datums and list their purpose and function on engineering drawings• List and define the geometric tolerance symbols which are commonly in use today• Calculate positional location of features by converting geometric tolerance to coordinate tolerance• Calculate coordinate and positional tolerances when applying the concept of zero tolerance positioning
Course Customization	Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.

To Schedule please call 1-800-777-0753. Ask for your Client Representative.

Bearing Life Improvement



Category B	Course Number ME 131
Course Description	Many organizations are wasting thousands of dollars per year by continually replacing bearings that have failed. This course will teach your maintenance staff how to diagnose the root cause of bearing failures in order to reduce future problems.
Who Should Attend	Maintenance service, machine repair or plant / facility engineering staff of an industrial plant, OEM facility, institution, public utility or commercial building.
Prerequisites	None
Length	24 hours
Class Size	12
CEU Awarded	2.1
College Transfer Credit	1 credit hour recommended
Format	Workshop includes discussions, demonstrations, and exercises
Learning Objectives	Participants will learn to: <ul style="list-style-type: none">• Determine proper sizes of shafts and housing• Measure straight and tapered shafts• Mount and dismount bearings by participating in hands-on demonstrations• Monitor rolling bearings to prevent catastrophic failure• Identify all types of bearing failures and what is required to prevent future failures• Rework large bearings
Course Customization	Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.
The Rolling Bearing Institute	The Rolling Bearing Institute (RBI) is a leader in bearing failure analysis. With years of experience troubleshooting bearings they created one of the most encompassing courses designed to help you reduce downtime. Hane Training, Inc. has acquired The Rolling Bearing Institute! By adding Hane's trademarked delivery methods to RBI's unsurpassed knowledge, you are sure to receive an excellent course.

To Schedule please call 1-800-777-0753. Ask for your Client Representative.

Maintenance Welding

Category D	Course Number ME 141
Course Description	The use of proper welding procedures improves the safety of your organization and it ensures that your employees will perform with high quality work that will keep your valuable equipment in production.
Who Should Attend	Pipefitters, millwrights and other skilled trades personnel who must perform welding as part of their job duties.
Prerequisites	Participants should have at least a basic knowledge of welding.
Length	32 hours
Class Size	Up to 12
CEU Awarded	2.8
Format	Hands-on Workshop
Learning Objectives	Participants will learn: <ul style="list-style-type: none">• Welding safety for welding and cutting equipment to perform plant maintenance activities• Welding repair and fabrication procedures related to plant maintenance• Proper procedures for using cutting and gouging equipment to prepare weld joints• Proper procedures for using SMAW (ARC), GMAW (MIG) and GTAW (TIG) equipment to make welds in all positions on carbon steel, stainless steel and aluminum
Course Customization	Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.

To Schedule please call 1-800-777-0753. Ask for your Client Representative.

Mechanical Maintenance Program

Category D	Course Number ME 151
Course Description	This intensive program provides a way to quickly get mechanical trades personnel “up to speed” on proper and effective mechanical maintenance procedures.
Who Should Attend	Mechanical apprentices and those involved in troubleshooting mechanical devices.
Prerequisites	None
Length	200 hours
Class Size	Up to 12
CEU Awarded	17.5
Format	Hands-on Workshop. One lab station for every two participants.
Learning Objectives	Participants will learn to: <ul style="list-style-type: none">• Demonstrate an understanding of mechanical systems• Demonstrate an understanding of simple and complex machines• Troubleshoot mechanical power systems• Determine safe load limits• Figure the balance point of loads• Read pneumatic schematics• Identify and understand common hydraulic and pneumatic components• Troubleshoot fluid power systems• Identify common electronic components• Use a multimeter to take voltage, current and resistance readings• Perform reverse dial indicator alignment• Perform single and dual plane balancing• Diagnose vibration problems• Measure phase and vibration
Course Customization	Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.

To Schedule please call 1-800-777-0753. Ask for your Client Representative.

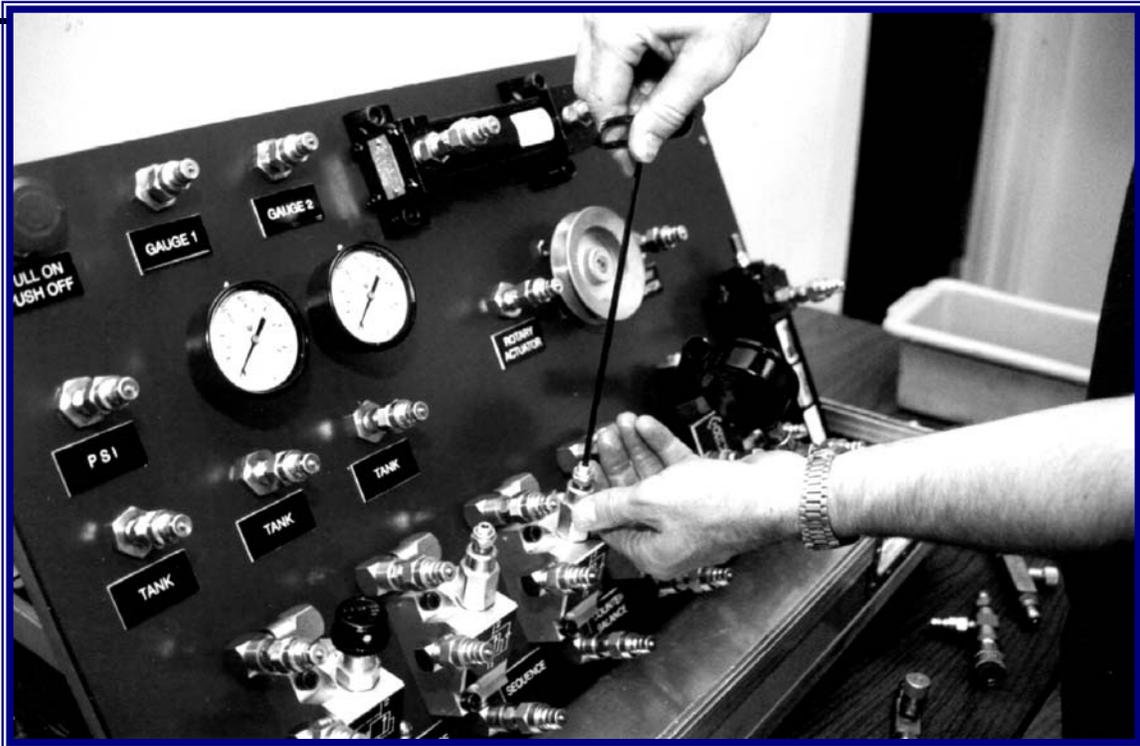
Category A	Course Number EE 102
Course Description	This forty-hour, hands-on course is an introduction to electrical fundamentals targeting mechanics. It emphasizes basic electrical components, terminology, working safely with electricity and troubleshooting skills.
Who Should Attend	Millwrights, mechanics and other skilled trades personnel who are cross training from other areas.
Prerequisites	None
Length	40 hours
Class Size	Up to 12
CEU Awarded	3.5
College Transfer Credit	2 credit hours recommended
Format	Hands-on Workshop. One lab station for every two participants.
Learning Objectives	Participants will learn to: <ul style="list-style-type: none">• Work safely with electricity• Use Ohm's law to calculate voltage drops, current and resistance• Read resistor value from color code• Use a multimeter to take voltage, current and resistance readings• Determine time constant for resistor capacitor circuits• Test relays, solenoids, contactors, switches and motor starters• Read control-circuit ladder diagrams• Identify component parts in schematics and ladder diagrams• Demonstrate a basic understanding of AC and DC motors
Course Customization	Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.

To Schedule please call 1-800-777-0753. Ask for your Client Representative.

Electronics Maintenance for Mechanical Crafts

Category A	Course Number EE 202
Course Description	This forty hour, hands-on course provides persons from the mechanical crafts with many of the electronic fundamentals they need to maintain industrial equipment containing electronics.
Who Should Attend	Millwrights, mechanics and other skilled craftspersons who are cross training from other disciplines.
Prerequisites	Have workshop <i>Electrical Fundamentals for Mechanical Crafts (EE 102)</i> or equivalent knowledge.
Length	40 hours
Class Size	Up to 12
CEU Awarded	3.5
Format	Hands-on Workshop. One lab station for every two participants.
Learning Objectives	Participants will learn to: <ul style="list-style-type: none">• Work safely with industrial electronics - protecting people and equipment• Use simple math to calculate voltage drops, current, resistance and power• Demonstrate an understanding of resistors, capacitors, inductors, SCR's, TRIAC's and other solid-state devices used in typical industrial circuits• Read and understand electronic drawings and diagrams• Use multimeters and scopemeters to observe, checkout and troubleshoot electronic circuits similar to those used in many industrial maintenance operations• Demonstrate an understanding of power supplies, operational amplifiers and digital switching circuits and some of their applications in industry• Understand fundamentals of industrial electronics so participants can pursue additional training as required
Course Customization	Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.

To Schedule please call 1-800-777-0753. Ask for your Client Representative.



- **Troubleshooting & Repair of Liquid Process Pumps**
- **Troubleshooting Fluid Power Equipment**
- **Troubleshooting Industrial Hydraulic Equipment**
- **Hydraulics for Electricians & Electronic Technicians**
- **Troubleshooting Pneumatic Controls & Equipment**
- **Applying Troubleshooting to Industrial Hydraulic Systems**
- **Interpreting Fluid Power Ladder Diagrams**
- **Troubleshooting Industrial Air Logic**

Troubleshooting & Repair of Liquid Process Pumps

Category A	Course Number FP 101
Course Description	This twenty hour, hands-on course teaches troubleshooting, diagnosis and repair of failed seals; installation of piping, flanges, bearing, pumps and couplings. Participants tear down and rebuild pumps in this course.
Who Should Attend	Those involved in troubleshooting liquid process pumps. This could include millwrights, plumbers, pipefitters, mechanics and electromechanical repair technicians.
Prerequisites	None
Length	20 hours
Class Size	Up to 12
CEU Awarded	1.75
Format	Hands-onWorkshop. One lab station for every two participants.
Learning Objectives	Participants will learn to: <ul style="list-style-type: none">• Troubleshoot, diagnose and repair failed seals• Align pumps• Read pump curves• Install piping and flanges correctly• Properly replace and maintain bearings• Properly install pumps• Reduce fugitive emissions• Repack and adjust pump stuffing boxes• Install standard shaft couplings
Course Customization	Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.

To Schedule please call 1-800-777-0753. Ask for your Client Representative.

Troubleshooting Fluid Power Equipment



Category A	Course Number FP 111
Course Description	Many troubleshooters are responsible for the maintenance of both hydraulic and pneumatic equipment. This forty hour, hands-on course covers both.
Who Should Attend	Those involved in troubleshooting industrial hydraulic and/or pneumatic equipment. Fluid power equipment troubleshooters could include millwrights, plumbers, pipefitters, steamfitters, mechanics, machinery maintenance mechanics and electromechanical repair technicians.
Prerequisites	None
Length	40 hours
Class Size	Up to 12
CEU Awarded	3.5
College Transfer Credit	2 credit hours recommended
Format	Hands-on Workshop. One lab station for every two participants.
Learning Objectives	Participants will learn to: <ul style="list-style-type: none">• Read pneumatic schematics• Identify and understand common hydraulic and pneumatic components• Demonstrate an understanding of common circuit applications• Troubleshoot fluid power circuits• Learn the proper procedures to perform preventive maintenance
Course Customization	Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.

To Schedule please call 1-800-777-0753. Ask for your Client Representative.

Troubleshooting Industrial Hydraulic Equipment



Category A	Course Number FP 121
Course Description	This forty hour, hands-on course provides your troubleshooters with practical knowledge and techniques they can apply immediately in the troubleshooting of hydraulic equipment.
Who Should Attend	Those involved in troubleshooting industrial hydraulic equipment. This could include millwrights, plumbers, pipefitters, mechanics, machinery maintenance mechanics and electromechanical repair technicians.
Prerequisites	None
Length	40 hours
Class Size	Up to 12
CEU Awarded	3.5
College Transfer Credit	2 credit hours recommended
Format	Hands-on Workshop. One lab station for every two participants.
Learning Objectives	Participants will learn to: <ul style="list-style-type: none">• Read hydraulic schematics• Identify and demonstrate an understanding of common hydraulic components• Troubleshoot hydraulic power circuits• Learn proper procedures to perform preventive maintenance
Course Customization	Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.

Hydraulics for Electricians & Electronic Technicians

Category A	Course Number FP 123
Course Description	If your company is going to a multicraft situation or is in a cross training mode, this course is designed to provide your other skilled trades personnel with a solid background in understanding hydraulic systems.
Who Should Attend	Electricians, electronic technicians and others who are cross training or require knowledge of hydraulics due to a change in job requirements.
Prerequisites	None
Length	40 hours
Class Size	Up to 12
CEU Awarded	3.5
Format	Hands-on Workshop. One lab station for every two participants.
Learning Objectives	Participants will learn to: <ul style="list-style-type: none">• Read hydraulic schematics• Identify and demonstrate an understanding of common hydraulic components• Demonstrate an understanding of common circuit applications• Troubleshoot hydraulic power circuits• Perform preventive maintenance procedures
Course Customization	Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.

To Schedule please call 1-800-777-0753. Ask for your Client Representative.

Category A	Course Number FP 131
Course Description	Learn how to read pneumatic schematics, identify and understand common pneumatic components, read and interpret ladder diagrams and understand common power circuits.
Who Should Attend	Those involved in troubleshooting industrial pneumatic controls and equipment. This could include millwrights, plumbers, pipefitters, mechanics, machinery maintenance mechanics and electromechanical repair technicians.
Prerequisites	None
Length	40 hours
Class Size	Up to 12
CEU Awarded	3.5
College Transfer Credit	2 credit hours recommended
Format	Hands-on Workshop. One lab station for every two participants.
Learning Objectives	Participants will learn to: <ul style="list-style-type: none">• Read pneumatic schematics• Identify and demonstrate an understanding of pneumatic components• Troubleshoot pneumatic control circuits• Read and interpret ladder diagrams• Demonstrate an understanding of common circuit applications• Demonstrate knowledge of safety awareness when working with pneumatic systems• Demonstrate knowledge of air preparation terminology, symbology, function and maintenance
Course Customization	Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.

To Schedule please call 1-800-777-0753. Ask for your Client Representative.

Maintenance & Repair of Plumbing Fixtures

Category D	Course Number FP 151
Course Description	This course will demonstrate the theory of operation of a multitude of commonly used plumbing fixtures. Through step-by-step, hands-on lab activities, participants will gain a working knowledge of repair and maintenance.
Who Should Attend	Anyone involved in the installation and troubleshooting of plumbing fixtures: millwrights, plumbers, pipefitters, mechanics, machinery maintenance mechanics and electromechanical repair technicians, facilities/building maintenance technicians.
Prerequisites	None
Length	24 hours
Class Size	Up to 12
CEU Awarded	2.1
Format	Hands-on Workshop. One lab station for every two participants.
Learning Objectives	Participants will learn to: <ul style="list-style-type: none">• Install, adjust and repair flush valves• Troubleshoot, repair and maintain faucets• Understand and maintain interceptors• Understand and maintain water hammer arrestors• Repair, troubleshoot and maintain pressure regulators• Maintain, repair and troubleshoot back flow preventers• Maintain water cooler flow controls• Troubleshoot, maintain and repair electric water heaters
Course Customization	Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.

To Schedule please call 1-800-777-0753. Ask for your Client Representative.

Applying Troubleshooting to Industrial Hydraulic Systems



Category A	Course Number FP 321
Course Description	This forty hour, hands-on course focuses more on specific problem areas you may be having in your plant. Your prints will be incorporated into the training.
Who Should Attend	Pipefitters, plumbers, millwrights, steamfitters, machine repairmen and anyone else involved in troubleshooting hydraulic systems.
Prerequisites	Have Workshop <i>Troubleshooting Industrial Hydraulic Equipment (FP 121)</i> or equivalent knowledge.
Length	40 hours
Class Size	Up to 12
CEU Awarded	3.5
College Transfer Credit	2 credit hours recommended
Format	Hands-on Workshop. One lab station for every two participants.
Learning Objectives	Participants will learn to: <ul style="list-style-type: none">• Troubleshoot your own equipment from your own prints• Demonstrate an understanding of the “dos and don’ts” of proportionals• Avoid pitfalls of installation procedures• Determine why proportional valves fail and how to reduce the chances of failure• Interpret from the schematic the operation of logic or cartridge technology and the function of these cartridges• Read and interpret schematics to aid in troubleshooting• Demonstrate an understanding of servo valve technology and how to properly setup various types of servos
Course Customization	Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.

To Schedule please call 1-800-777-0753. Ask for your Client Representative.

Interpreting Fluid Power Ladder Diagrams

Category A	Course Number FP 331
Course Description	This forty hour, hands-on course will teach participants how to read and interpret the newer fluid power ladder diagrams. They will also be able to successfully build a complex pneumatic circuit by the end of the class working strictly from ladder diagrams.
Who Should Attend	Millwrights, plumbers, steamfitters, mechanics, machinery maintenance mechanics and electromechanical repair technicians.
Prerequisites	Have workshop <i>Troubleshooting Industrial Hydraulic Equipment (FP 121)</i> , <i>Troubleshooting Pneumatic Controls & Equipment (FP 131)</i> or equivalent knowledge.
Length	40 hours
Class Size	Up to 12
CEU Awarded	3.5
Format	Hands-on Workshop. One lab station for every two participants.
Learning Objectives	Participants will learn to: <ul style="list-style-type: none">• Read and work with fluid power ladder diagrams• Understand the meaning of ladder diagramming symbols• Develop ladder symbols from ANSI• Develop ANSI from ladder symbols
Course Customization	Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.

To Schedule please call 1-800-777-0753. Ask for your Client Representative.

Troubleshooting Industrial Air Logic

Category A	Course Number FP 332
Course Description	This forty hour, hands-on course is for experienced mechanics and other skilled trades workers who must troubleshoot, repair and maintain industrial air logic systems. Working safely with air logic systems is emphasized throughout the course.
Who Should Attend	All skilled trades workers whose responsibilities include air logic controls for industrial machinery and automation.
Prerequisites	Participants should have a working knowledge of pneumatics or have completed Hane workshop <i>Troubleshooting Pneumatic Controls & Equipment (FP 131)</i> .
Length	40 hours
Class Size	Up to 12
CEU Awarded	3.5
Format	Hands-on Workshop. One lab station for every two participants.
Learning Objectives	Participants will learn to: <ul style="list-style-type: none">• Demonstrate and identify good safety procedures and repair air logic systems• Identify long-term symptoms associated with a lack of preventive maintenance• Match the circuit function of a variety of air logic valves to their symbols• Identify the various characteristics of a directional control valve when given its schematic symbol• Assemble the circuits and verify their operation in a lab setting• Identify and describe components used in a typical controlled air supply used to power air logic circuits• Safely connect, operate and analyze the operation of a variety of circuits• Identify the proper name and function of air logic components• Match the air logic component name with its schematic symbol• Identify component when given a description or picture of a component• Identify the basic circuits and sequences of operation from an air logic print
Course Customization	Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.

To Schedule please call 1-800-777-0753. Ask for your Client Representative.



- **Vibration Analysis, Alignment & Balancing**
- **Alignment & Balancing of Rotating Equipment**

Vibration Analysis, Alignment & Balancing



Category B	Course Number PM 101
Course Description	This forty hour, hands-on course provides mechanics with an understanding of vibration analysis, alignment and balancing techniques.
Who Should Attend	Mechanics and other maintenance personnel, operators or anyone concerned with optimal performance from machinery.
Prerequisites	None
Length	40 hours
Class Size	Up to 12
CEU Awarded	3.5
College Transfer Credit:	2 credit hours recommended
Format	Hands-on Workshop
Learning Objectives	Participants will learn to: <ul style="list-style-type: none">• Diagnose vibration problems• Measure phase and vibration• Analyze a spectrum• Choose transducers• Use spike energy• Determine resonance• Do reverse dial indicator alignment• Compensate for thermal growth• Deal with a missing position• Do rim and face alignment• Do jackshaft alignment• Determine balance weight• Perform single and dual plane balancing
Course Customization	Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.

To Schedule please call 1-800-777-0753. Ask for your Client Representative.

Alignment & Balancing of Rotating Equipment

Category A	Course Number PM 102
Course Description	This sixteen hour, hands-on course teaches techniques necessary to properly align and balance rotating equipment.
Who Should Attend	Mechanics and other maintenance personnel, operators or anyone concerned with optimal performance from machinery.
Prerequisites	None
Length	16 hours
Class Size	Up to 12
CEU Awarded	1.4
Format	Hands-on Workshop
Learning Objectives	Participants will learn to: <ul style="list-style-type: none">• Perform reverse dial indicator alignment• Compensate for thermal growth• Deal with a missing position• Perform rim and face alignment• Perform jackshaft alignment• Determine balance weight• Combine balance weights• Perform single plane balancing• Perform dual plane balancing
Course Customization	Call 1-800-777-0753 for a detailed outline or for information about tailoring this course to your specific needs.

To Schedule please call 1-800-777-0753. Ask for your Client Representative.