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Training Center Objectives

Our Capabilities:
Our factory-certified instructors offer operating systems, components, maintenance and repair training on all of our products: Grove, GMK, Manitowoc, National Crane, and Potain.

Manitowoc Crane Care is an innovative leader in advanced crane industry training. Our onsite and online training curriculum is designed with your profits and your safety in mind. With professional and experienced instructors, our training helps you build the knowledge you need to be as productive as possible.

Our Facility:
The training facility in Shady Grove, Pennsylvania offers multiple state of the art classrooms. A large hands-on simulator lab to include simulators of multiple generations of Grove domestic, GMK All Terrain and National Boom Truck operating systems. A multiple bay training building is also used to accommodate multiple products for troubleshooting and is currently equipped with a GMK4100 dedicated solely for training purposes. A current CCS Potain tower crane is onsite dedicated solely for training purposes.

Available lab workstations:

- Three generations of GMK simulators to include RCL’s
- Four generations of Grove domestic RCL simulators
- Four generations of Grove domestic simulators
- GHC simulator to include the RCL
- Multiple National Boom Truck simulators to include RCL’s
- Hydraulic and Electrical workstations
- Tower crane erection / dismantling / troubleshooting
- Mobile crane operation
Training Arrangements

Our Address:
1565 Buchanan Trail East
Shady Grove, PA 17256

Local Airports:
Baltimore/Washington (BWI) International Airport
Washington Dulles (IAD) International Airport
Harrisburg, PA (MDT) International Airport
Hagerstown Regional Airport (HGR)

Rental Car: A rental car will be required for transportation to and from the airport. A rental car will also be required for daily transportation to and from the Manitowoc Training Facility.

If transportation service is required; arrangements must be made prior to the start of class by contacting Toni Pagliaro at Toni.Pagliaro@manitowoc.com. **Please note** all transportation fees incurred will be billed in addition to the cost of the training course you are attending.

Recommended Hotels:

1. Ramada Plaza Hotel, 1718 Underpass Way, Hagerstown, MD  21740
   Phone: (301) 797-2500
2. Country Inn & Suites, 17612 Valley Mall, Hagerstown, MD  21740
   Phone: (301) 582-5003
3. Springhill Suites by Marriott, 17280 Valley Mall, Hagerstown, MD  21740
   Phone: (301) 582-0011
4. Holiday Inn Express, 241 Railway Lane, Hagerstown, MD  21740
   Phone: (301) 745-5644
5. Microtel Inn, 13726 Oliver Drive, Hagerstown, MD  21740
   Phone: (240) 527-2700
6. Hampton Inn, 18300 Peak Circle, Hagerstown, MD  21740
   Phone: (240) 420-1970
7. Country Inn & Suites, 399 Bedington Blvd, Chambersburg, PA  17201
   Phone: (717) 261-0900
8. Holiday Inn Express, 1097 Wayne Ave., Chambersburg, PA  17201
   Phone: (717) 709-9009

Hotel arrangements, hotel expenses, transportation, breakfast and evening meals are the student’s responsibilities.

Manitowoc does provide a catered lunch Monday-Thursday at 12:00 PM and ends at 12:30 PM. No lunches are served on Friday’s. Coffee, sodas, and bottled water are available daily in the training cafeteria at no cost to the students. Snacks are available anytime in the Training Cafeteria vending machine.
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Crane System Theory - Mobile

**Content:**

This 4 ½ day course requires no service knowledge of Grove, GMK or National crane systems and will be used as a prerequisite for all introductory level courses.

The course is designed to provide a basic understanding of hydraulics, electrical and pneumatic principles and how they are applied on the different mobile crane product lines. The course will consist of classroom time utilizing programs covering the basics of hydraulics, electrical and pneumatics along with their components and how these components operate and interact with each other. Schematics are used to help the students gain a basic understanding of schematic layouts and component symbols used on the different mobile product lines.

Hydraulic and Electrical test benches are incorporated into the course to help give the student a better understanding of the hydraulic and electrical theories learned in the classroom portion of the training. Manitowoc Crane Care online systems for parts, service and maintenance will be covered to help the students understand basic navigation and content of the different systems.

**Course Benefits:**

- Have the basic understanding of hydraulic, electrical and pneumatic principles.
- Have a basic understanding of how hydraulic, electrical and pneumatic principles relate to the different mobile crane systems.
- Have a basic understanding of schematic design and layout for the different mobile crane product lines.
- Have a basic understanding of hydraulic, electrical and pneumatic symbols used on mobile crane schematics.
- Have a basic understanding of Manitowoc Crane Care online systems navigation and content.

**Prerequisites**

None

**Capacity**

8 students
Cable Technology & Operation

Content:

This 4 ½ day course assumes no basic service and operational knowledge of Grove Rough Terrain, Truck Mounted and All Terrain crane systems.

We start the course with an in-depth review of crane terminology and technologies so the students can relate to a crane’s individual components and systems. Programs covering Grove domestic load charts are used to expose the students to how load charts are constructed and how to properly read and interpret them. After completion of the domestic built cranes, the study will move forward into the GMK product line, here the students will be exposed to the GMK style load charts. Exercises will be conducted in class to assure a full grasp of both product types. Load moment indicating systems operation and function will be covered with an emphasis on proper use, programming, and how the system functions. A session on Wire Rope includes information on wire rope construction, proper maintenance, inspection and installation.

Machine hands-on sessions will allow the students to experience how Grove Cranes function, proper set up and operation. This will give students a working knowledge of a fully functioning Grove Crane and the foundation to continue their studies in Grove Hydraulics and Electrical systems.

Course Benefits:

• Have the basic understanding of how to read and interpret load charts and explain them to operators during machine deliveries.
• Conduct start-up and programming of PAT LMI systems and have basic understanding of how the system functions.
• Have an understanding of how a Grove crane functions and operates.
• Understand wire rope construction, maintenance, inspection, and wire rope installation.
• Have an understanding of operation and set up of a Grove crane, proper programming and use of the LMI system.

Prerequisites
None

Capacity
8 students
Grove 1.1 (Intro to CANBUS)

Content:

This 4 ½ day course will provide the students with an understanding of how CANBus works and is used on current Grove domestic LMI (Load Moment Indicator) systems.

The students begin with a session on how load charts and LMI systems are interrelated. The course takes the students into the inner workings of the DS150, DS350 to include Boom Control, IFlex5 and IFlex5-2 systems through explanations of the overall system schematics. In-depth sessions covering the individual circuits, digital inputs, measuring channels, and basic adjustments will give the student the foundation necessary for the troubleshooting phase. Students will learn how CANBus works by study of the current I-Flex5-2 system. Explanation of CANBus theory along with system schematics will help the students gain an understanding for types of inputs, outputs and troubleshooting techniques.

Hands-on sessions will be conducted that allow students to put into practice what they learned in the classroom.

Course Benefits:

• Have the basic understanding of CANBus systems and circuits.
• Have the basic understanding of how to diagnosis problems of CANBus circuits via troubleshooting procedures.
• Have the basic understanding of LMI systems and circuits.
• Have the basic understanding of how to diagnosis problems of LMI systems and perform basic system adjustments and calibrations.
• Receive and understand the use of software programs.

Prerequisites
Crane System Theory AND Crane Technology & Operation

Capacity
8 students
Grove 2.1 (CANLink/Service Tool)

Content:

This 4 ½ day course assumes basic operational knowledge of Grove domestic cranes and covers domestic Rough Terrain and Truck Mount units to include non CANBus and early version CANBus cranes and does not cover the GMK product line.

Classroom programs covering Grove crane hydraulic systems, electrical systems, schematics and software programs will give the students a working knowledge of a Grove crane and the foundation to learn proper troubleshooting techniques and hydraulic test procedures.

Hands-on sessions are conducted to reinforce classroom studies and include operation of CANLink and Service Tool software programs and proper pressure setting procedures.

Course Benefits:

• Identify superstructure and carrier hydraulic & electrical components and explain their basic functions.
• Identification of hydraulic & electrical symbols.
• Read and understand hydraulic and electrical schematics.
• Troubleshoot possible system problems utilizing hydraulic & electrical schematics.
• Conduct basic system hydraulic & electrical test and troubleshooting procedures using software programs.

Prerequisites
Grove 1.1

Capacity
6 students
Content:

This 4 ½ day course assumes basic knowledge of operation, hydraulic & electrical systems as covered in the previous courses. The course covers current RT and TM/TMS models.

This program covers current CANBus technology used on Grove domestic cranes along with hydraulic, electrical systems and components. Students will gain an understanding of components and systems through the intense study of system schematics. This gives the students a working knowledge of these systems and a foundation for proper troubleshooting techniques and test procedures.

Orchestra Software will be loaded onto student’s laptops for the purpose to conduct hands-on sessions covering proper software operation and troubleshooting techniques. A portion of the class will cover current OMS (Outrigger Monitoring System) systems used on today’s domestic RT and TM/TMS models.

Course Benefits:

• Identify hydraulic and electrical components used on current Grove domestic cranes and explain their basic function.
• Read and understand current Grove domestic hydraulic & electrical schematics.
• Make system checks using recommended test procedures and be able to understand the indicated readings.
• Troubleshoot system problems using the foundation information from this course and utilizing schematics and service software.

Prerequisites
Grove 2.1

Capacity
6 students
Grove 4.1 (Hybrids)

Content:

This 4 ½ day course assumes basic knowledge of operation, hydraulic & electrical systems as covered in the previous courses. The course covers the TMS9000E and RT9150E models.

This program covers current CANBus technology used on Grove hybrid cranes along with hydraulic, electrical systems and components. Students will gain an understanding of components and systems through the intense study of system schematics. A session will familiarize the students with the operation of the ECOS and EKS systems used on these models.

Sessions on reading ELAN schematics and Service Software operation will give students the basics for applying trouble shooting techniques. Hands on sessions will be conducted to re-enforce classroom material on system operation and diagnostics.

Course Benefits:

- Identify hydraulic and electrical components used on current Grove hybrid cranes and explain their basic function.
- Read and understand current Grove hybrid hydraulic & ELAN electrical schematics.
- Make system checks using recommended test procedures and be able to understand the indicated readings.
- Troubleshoot system problems using the foundation information from this course and utilizing schematics and service software.

Prerequisites
Grove 3.1

Capacity
6 students
**Content:**

This 4 ½ day course will cover the new operating system that will be across all Manitowoc products in the future. Only Grove domestic products will be covered.

The course will walk the students through overall setup and navigation of new components such as the displays and all other cabin related CCS system setup. After the system itself is thoroughly understood, Students will be walked through the entire crane electrically and hydraulically with the aid of schematics.

The final portion of the class will cover the new CST service software which will be used to diagnose electrical issues and calibrate sensors. The Peak Can Dongle will be supplied for attending and PASSING the class.

**Course Benefits:**

- Have the basic understanding of how to read and interpret the displays and error codes and explain them to operators during machine deliveries.
- Have a full understanding of CCS hydraulic and electrical systems, components and schematics.
- Have the foundation to troubleshoot system problems by utilizing the schematics and service software procedures on current production CCS cranes.

**Prerequisites**

Grove 4.1 or Grove Certification

**Capacity**

8 students
Grove 6.1 (Flashing)

Content:
This 4 ½ day course will cover FLASHING and CALIBRATION of the following.

1. Flashing / loading software for Gen.1, Gen.2, & Gen.3 HED based machines. Including loading of 770 charts, can open transducer calibration along with use of Application Configurator program to upload error logs for diagnostics.
2. Flashing of all Hirschman Components I-Flex 2/I-Flex 5 and current Expert systems 2/5. All central units and Displays will be covered.
3. Flashing of all ECOS related control units both esx’s and gviom’s. RT9150 and TMS 9000 related.
4. Flashing of Wylie I-3500, I-4300, I-4500 LMI’s for yard Boss/Shuttle lift
5. Flashing and Calibration of new Crane Control System (CCS)

Course Benefits:
• Flash and Calibrate all major components of Grove Domestic cranes.

Prerequisites
Grove 5.1

Capacity
6 students
Grove Certification

Content:

Certification is a 2 day battery of tests to prove a technicians ability to troubleshoot, diagnose, and resolve issues with Grove domestic cranes of both current and post production.

The testing will consist of a written general knowledge test of items incurred across all Grove RT and TMS product lines. Testing may involve any pre-CANBus crane models, non-current CANBus crane models and current CANBus crane models.

Systems tested may include CANLINK, Service Tool, Orchestra and LMI control systems.

Hands-on testing can include troubleshooting / diagnostics of any or all of the following: basic and/or advanced electrical, basic and/or advanced hydraulics, programming, systems calibration and mechanical operations. Simulators may be used where applicable.

Course Benefits:

• Show proficiency and expertise in troubleshooting, diagnosis and repair of any pneumatic, hydraulic, electrical, or electronic control system utilized in Grove domestic cranes.
• Upon successful completion of the tests the technician will be issued a photo ID card showing his capacity as a Factory Trained Grove Domestic Service Rep.

Prerequisites
Grove 6.1

Capacity
2 students
Content:

This 4 day advanced parts course allows distributor parts personnel to become more familiar with the Grove RT/TMS, GMK AT and National Boom Truck crane models. Topics covered during the course include hydraulic and electrical theory, hydraulic and electrical schematics, load charts, RCL systems, and machine setup and operation.

The course begins with hydraulic theory to include components, symbols and schematics. Day 2 covers electrical theory to include components, symbols and schematics. Day 3 will focus on machine load charts to include crane configurations and RCL setup and operation. A walk around of a crane on day 4 will allow students to locate and identify components related to the hydraulic and electrical teachings of the previous 2 days. Also students will get a chance to setup and operate a machine applying what they learned day 3.

Course Benefits:

• Better understand the theory and operation of hydraulic and electrical components used on the Grove, GMK and National products
• Have an understanding of how to navigate hydraulic and electrical schematics used on the Grove, GMK and National products
• Understand load charts and RCL systems used on Grove, GMK and National products
• Be better equipped to communicate with service personnel.

Prerequisites
Intro to Crane Care Parts, or 1 year of Grove Parts experience

Capacity
8 students
Grove Hydraulic Crawler 1.1

Content:

This 4 ½ day course focuses on GHC. The course starts with an in depth review of GHC terminology and technologies so the students can relate to individual components and systems.

Programs covering the GHC load charts are used to expose the students to how load charts are constructed and how to properly read and interpret them. Sessions on GHC hydraulic and electrical systems will expose the students to schematic layout and symbols with focus on individual circuits as to their purpose and function within the overall system. These sessions will give the students a working knowledge of a fully functioning GHC crane and the foundation to learn proper troubleshooting techniques and test procedures.

The final portion of the course will be focused on the LMI system and the breakdown of the machine electrically.

Course Benefits:

- Have the basic understanding of how to read and interpret load charts and explain them to operators during machine deliveries.
- Have a full understanding of GHC hydraulic and electrical symbols, components and schematics.
- Have the foundation to troubleshoot system problems by utilizing the schematics and service manual procedures on current production GHC cranes.

Prerequisites
Crane System Theory - Mobile

Capacity
8 students
Content:

This 4 1/2 day course focuses on Yardboss/Shuttlelift models. The course starts with an in-depth review of Industrial terminology and technologies so the students can relate to individual components and systems.

Programs covering the Industrial load charts are used to expose the students to how load charts are constructed and how to properly read and interpret them. Sessions on Industrial hydraulic and electrical systems will expose the students to schematic layout and symbols with focus on individual circuits as to their purpose and function within the overall system. These sessions will give the students a working knowledge of a fully functioning Industrial crane and the foundation to learn proper troubleshooting techniques and test procedures.

The final portion of the course will be focused on the various LMI systems. Machines covered: YB4409, 5520, 7725. Operator aids PAT DS85, Wylie i3500 and i4300/4500 systems will also be covered.

Course Benefits:

- Have the basic understanding of how to read and interpret load charts and explain them to operators during machine deliveries.
- Have a full understanding of Industrial hydraulic and electrical symbols, components and schematics.
- Have the foundation to troubleshoot system problems by utilizing the schematics and service manual procedures on current production Industrial cranes.

Prerequisites
Crane System Theory - Mobile

Capacity
8 students
GMK 1.1 (Setup & Operation)

Content:

This 4 ½ day course is designed for individuals who are new to GMK cranes but would also be an excellent refresher course for more experienced technicians. The course covers the setup and operation focused toward current production GMK cranes. All classroom presentations will be reinforced with practical hands-on operation of the carrier and superstructure systems. The course will be approximately 40% classroom and 60% practical.

The course features a GMK4100 and will begin with an overview of the carrier controls and continue through the proper use of transmission and driving controls, outriggers, suspension and rear steering systems. During day two, fundamental safety for crane operators’ overview will be covered followed by load chart and outrigger pad load table explanations. Superstructure cab controls will be covered including the proper setup of the ECOS & EKS systems. Day three will began with an overview of the ECOS display and the Twin-lock boom control system. This will be reinforced with actual operation of the boom by each student. Day four will primarily be used for hands-on operation of the boom in semi-automatic and automatic modes. Each student will be expected to demonstrate proficiency in all aspects of crane setup and operation. Each student will also be given tasks to complete during the week to include load chart, outrigger pad load, maintenance manual, and operator’s manual exercises.

Course Benefits:

- Have a basic understanding of how to read and interpret load charts and outrigger pad load tables
- Be able to conduct pre-operational checks and be aware of basic maintenance checks
- Conducted properly set up of GMK for highway travel or lifting operations.
- Be able to operate the boom telescope in semi automatic and automatic modes
- Have knowledge of basic error codes for ECOS and EKS systems.

Prerequisites
Crane System Theory AND Crane Technology & Operation

Capacity
6 students
GMK 2.1 (Intro to ECOS)

Content:

This 4 ½ day course assumes the student has completed all prerequisites and has basic crane knowledge. The program begins with a review of GMK terminology and technology used on Generation # 1 & # 2 ECOS models. The program will also include an explanation of schematic symbols used on GMK system drawing, with emphasis on ELAN & SEE electrical schematics.

Day #1 and #2 will include a systems tour of the typical Generation #1 carrier and ECOS superstructure systems using pneumatic, hydraulic, and ELAN electrical schematic format. The basic theory of operation of a Generation #1 ECOS machine will be covered, including a detailed explanation of each circuit. Emphasis will be placed on the boom telescope Twin Lock system. Day #3 will begin with a study of a typical Generation #2 ECOS model beginning with the carrier system similarities as compared to Generation #1 machines. Day #4 will continue with the study of Generation #2 superstructure systems with emphasis on basic function of each circuit from a hydraulic and electrical point of view. The day will conclude with component identification exercise using GMK4100. Participants will be provided with an opportunity to relate the machine system components to the schematic drawings, pneumatic, hydraulic and electrical.

Course Benefits:

- Interpret and navigate GMK hydraulic and pneumatic schematics
- Have intermediate understanding of basic carrier system on standard GMK Gen. #1 & #2 machines
- Have knowledge of system theory of operation on Generation #1 ECOS superstructure systems.
- Have knowledge of system operation of Generation #2 ECOS machine including differences and similarities between both generations of ECOS.
- Navigate and interpret “E-lan” and “SEE” electrical schematic

Prerequisites
GMK 1.1

Capacity
8 students
GMK 3.1 (Generation 1 ECOS)

Content:
This 4 ½ day course is an in depth look at the Generation 1 ECOS control systems utilized on past production GMK cranes. The program concentrates on computer-controlled operations of pneumatic, hydraulic and electrical systems of Generation 1 ECOS GMK machines. Technicians will review the crane’s systems and how ECOS controls each function. Particular attention is paid to the telescope system and its related components. Primary emphasis is not machine specific, the course focus is on the electrical applications of the control system via a model by model comparison of ECOS elements, CAN-Bus technology, service software, diagnostics, telescoping control and hydraulic differences.

Most of instruction is class room theory and simulator with specifically designed tasks that give the technicians the opportunity to experience the control system and software applications.

Course Benefits:
- Identify the PC skills required for operating, servicing, and troubleshooting the Generation 1 crane control system.
- Have the skills needed to understand and diagnose system generated error codes.
- Have a basic understanding of the system software and its many applications.
- Understand working concepts of the GMK 5100, GMK 5200, GMK 6220L, GMK 6250 and GMK 6300.
- Receive, upon successful completion of the final test, the ECOS Generation 1 software, dongle and cabling.

Prerequisites
GMK 2.1

Capacity
8 students
GMK 4.1 (Generation 2 ECOS)

Content:

This 4 ½ day course covers crane models utilizing the Generation 2 ECOS control system. The primary emphasis is not model specific. The course focus is on the electrical applications of the ECOS control system(s) via a model by model comparison. Differences in technology of the CAN-Bus, module function, service software, diagnostics, and adjustments between Generation 1 and Generation 2 ECOS systems are covered. Differences in hydraulic control elements via model are also discussed.

Hands-on sessions are conducted utilizing a GMK 4100 model crane and, where applicable, ECOS simulators.

Course Benefits:

• Identify and troubleshoot the different CAN-Bus structures utilized in the Generation 2 ECOS control platform,
• Distinguish differences of ECOS module inputs/outputs and their effects on the control system.
• Identify, troubleshoot and correct faults in the control system utilizing the laptop service programs.
• Make corrective adjustments to the ECOS software via laptop service programs.

Prerequisites
GMK 3.1

Capacity
8 students
GMK 4.2 (CCS Intro & Diagnostics)

Content:

This 4 ½ day course covers technology and diagnostics pertaining to the new CCS control system used on the GMK 3060, GMK5180 and 5250L models. Mode of instruction is primarily classroom theory and practical hands on utilizing a GMK CCS simulator.

The course begins with component identification, operational aspects and system overview to include electrical and hydraulic schematics. The class concludes with the students using and understanding the CST service software to include troubleshooting, calibration and flashing of system components.

Course Benefits:

- Understand operation of the CCS control system
- Troubleshoot the electrical and hydraulic systems utilized in the CCS control system.
- Perform calibration and flashing procedures necessary for proper operation of the CCS control system.
- Receive, upon successful completion of the final test, the CST service software, switchbox and cabling.

Prerequisites
GMK 3.1

Capacity
8 students
GMK 5.1 (Flashing)

Content:
This 4 ½ day course assumes the student has an advance understanding of ECOS and EKS operation as related to crane functions. The course begins with a review of the EKS 4 LMI system utilized in Generation 1 ECOS equipped cranes.

Primary focus will be centered on the “Flash Programming” of the EKS 5 LMI system and related peripherals and the ECOS ESX system and peripherals. Mode of instruction is classroom theory/discussion, bench top module programming exercises, hands-on practical testing utilizing a GMK 4100 model crane and various simulators as applicable.

The course conclusion will entail a written final exam.

Course Benefits:
• Fully reprogram / re-flash operating software into all EKS and ECOS controls modules and related peripherals as applicable.
• Transfer all eeprom data from one computer module to another as applicable.
• Identify and calibrate all peripheral sensors associated with the LMI and ECOS systems.
• Identify and troubleshoot sensor faults on the LMI and/or ECOS control system.
• Receive, upon successful completion of the final test, the flashing software, dongle and cabling.

Prerequisites
GMK 4.1

Capacity
6 students
GMK 6.1 (Transmissions & Ad-Blue)

Content:

This 3 ½ day course covers the operational control and troubleshooting of 2 variations of the fully automated Mercedes G-240 transmission utilized in 6 GMK crane models. Also covered in this course is the ZF Astronic transmission used in the GMK4080 and GMK6400 crane models along with the Mercedes AD-Blue system.

Mode of instruction is classroom theory/discussion and hands-on practical exercises utilizing a GMK 4100 model crane and simulators as applicable. Day 1 and 2 will focus on the Mercedes G240 transmission components, troubleshooting using the Minidiag II service tool and driving applications. Day 3 will focus on the ZF Astronic transmission components and troubleshooting overview of the Testman Pro along with Mercedes AD-Blue system and components to include troubleshooting aspects of the Minidiag II. The course is finished on day 4 with a written exam.

Course Benefits:

- Understand operational aspects of the Mercedes G240 transmission.
- Troubleshoot and calibrate the Mercedes G240 transmission and AD-Blue system using the Minidiag II.
- Provide driving/operation instruction to customers when delivering machines equipped with the Mercedes transmission.
- Understand operational aspects of the ZF Astronic transmission.
- Understand the use of the Testman Pro for the ZF Astronic Transmissions.
- Understand operational aspects of the Mercedes AD-Blue system.

Prerequisites
GMK 5.1

Capacity
6 students
GMK 7.1 (Steer By Wire)

Content:

This 3 ½ day course covers the ECOS “Steer-By-Wire” control system utilized in 4 GMK crane models.

Mode of instruction is classroom theory/discussion and practical exercises utilizing a GMK model crane equipped with Steer-By-Wire control or simulator. Content will include electrical and hydraulic overview of system requirements, mechanical alignment, programming of control modules, and calibration of systems controls.

Course Benefits:

- Troubleshoot the electrical and hydraulic systems utilized in the Steer-By-Wire control system.
- Perform the mechanical alignment of the steering system necessary for proper operation.
- Program and calibrate the Steer-By-Wire controls.

Prerequisites
GMK 6.1

Capacity
8 students
GMK Certification

Content:

This 2 day certification is a battery of tests to prove a technicians ability to troubleshoot, diagnose, and resolve issues with GMK cranes of both current and post production.

The testing will consist of a written general knowledge test of items incurred across all GMK product lines. Testing may involve any pre-ECOS GMK/KMK crane models, Generation 1 ECOS crane models, Generation 2 ECOS crane models, and any ECOS equipped domestic Grove crane models (TMS 900E & 9000E and the RT9150E).

Systems tested may include: ECOS system control, EKS 3, 4, and 5 LMI systems.

Hands-on testing can include troubleshooting / diagnostics of any or all of the following: basic and/or advanced electrical, basic and/or advanced Hydraulics, programming, systems calibration, mechanical operations, and engine, driveline, suspension systems. Simulators may be used where applicable.

Course Benefits:

- Show proficiency and expertise in troubleshooting, diagnosis and repair of any pneumatic, hydraulic, electrical, or electronic control system utilized in GMK cranes.
- Upon successful completion of the tests the technician will be issued a photo ID card showing his capacity as a Factory Trained GMK Service Rep.

Prerequisites
GMK 7.1

Capacity
2 students
Content:

This 4 ½ day course covers new technology pertaining to the MegaDrive system used on the 6400, Xentry Diagnostic tool for Mercedes and CCS control system overview.

Mode of instruction is primarily classroom theory/discussion and practical exercises utilizing a GMK model crane when available. Content will include electrical, hydraulic and calibration overviews of the Mega-Drive system. Overview and operation of the Xentry diagnostic tool and overview of the CCS system being introduced on 3060 and 5250 models.

Course Benefits:

- Troubleshoot the electrical and hydraulic systems utilized in the Mega-Drive control system.
- Perform calibration procedures necessary for proper operation of the MegaDrive system.
- Understand proper operation of the Xentry diagnostic tool for troubleshooting Mercedes engine, transmission and DEF systems.
- Understand operation of the CCS system

Prerequisites
GMK 7.1 or GMK Certification

Capacity
8 students
Content:

This 4 ½ day course focuses on National models not equipped with CANBus operational systems. The course starts with an in depth review of boom truck terminology and technologies so the students can relate to individual components and systems.

Programs covering the National load charts are used to expose the students to how load charts are constructed and how to properly read and interpret them. Sessions on National hydraulic and electrical systems will expose the students to schematic layout and symbols with focus on individual circuits as to their purpose and function within the overall system. These sessions will give the students a working knowledge of a fully functioning National crane and the foundation to learn proper troubleshooting techniques and test procedures.

The final portion of the course will be focused on the OMS (Outrigger Monitoring System) used on the National product. Software download and procedures will be covered giving the technician hands on experience with calibration procedures. Machines covered: NC-600E-2, 900A, 1300H, 1400A, NBT 45 and Operator aids DS150, DS160, Mentor, and the Hydraulic Capacity Alert System.

Course Benefits:

- Have the basic understanding of how to read and interpret load charts and explain them to operators during machine deliveries.
- Have a full understanding of National hydraulic and electrical symbols, components and schematics.
- Have the foundation to troubleshoot system problems by utilizing the schematics and service manual procedures on current production National cranes.
- Perform calibration of the OMS and understand system software.

Prerequisites
Crane System Theory - Mobile

Capacity
8 students
National 2.1 (CANBus)

Content:

This 4 ½ day course assumes basic knowledge of operation, hydraulic and electrical systems as covered in the previous courses. The course begins with programs covering current National Crane CANBus systems to include hydraulic and electrical systems and components. Students gain an understanding of components and systems through the intense study of the system schematics.

Programs covering software, service and troubleshooting procedures will give the students a working knowledge of the systems and the foundation for proper troubleshooting techniques and test procedures. The shop (hands on) session of the training reinforces classroom studies. Students will have the opportunity to review the hydraulic, electrical systems and components utilized on a specific crane model. Machines covered: NBT 15, NC 900H-1, NBT 30H, NBT 50 and NBT 60.

Course Benefits:

• Identify hydraulic and electrical components used on current production National cranes and explain their basic function.
• Read and understand current production National crane hydraulic and electrical schematics.
• Make system checks by using recommended test procedures and understand the indicated reading on current production National cranes.
• Have the foundation to troubleshoot system problems by utilizing the schematics and service manual procedures on current production National cranes.
• Have the foundation to understand and use software programs for the purpose of troubleshooting and servicing current production National CANBus cranes.

Prerequisites
National 1.1

Capacity
6 students
National Certification

Content:

Certification is a 2 day battery of tests to prove a technicians ability to troubleshoot, diagnose, and resolve issues with National Cranes of both current and past production.

The testing will consist of a written general knowledge test of items incurred across all National Crane products. Testing may involve any pre-CANBus crane models, non-current CANBus crane models and current CANBus crane models. Systems tested may include Orchestra and LMI control systems.

Hands-on testing can include troubleshooting / diagnostics of any or all of the following: basic and/or advanced electrical, basic and/or advanced hydraulics, programming, systems calibration and mechanical operations. Simulators may be used where applicable.

Course Benefits:

• Show proficiency and expertise in troubleshooting, diagnosis and repair of any hydraulic, electrical, or electronic control system utilized in National Cranes.
• Upon successful completion of the tests the technician will be issued a photo ID card showing his capacity as a Factory Trained National Crane Service Rep.

Prerequisites
National 2.1

Capacity
2 students
Content:

This 4 ½ day course will cover the new model NBT30H-2, FLASHING and SOFTWARE SETUP of the following.

1. Flashing / loading software with I-flash for the Hirschmann Mentor System equipped on various models.

2. Flashing/loading software and specific files for National Crane models with HED systems.

Course Benefits:

• Troubleshoot the new NBT30H-2 and flash/load software specific to the systems used on National Crane products.

Prerequisites
National 2.1

Capacity
2 students
Content:

This 4 ½ day course requires no service knowledge of Potain Tower Cranes or their schematics.

The course is designed to be an intense learning of the Potain French Schematics. The course will go through the complete schematics of a contactor driven slewing and hoisting system, along with a frequency driven trolley and includes the Drivers stand drawings and all options.

The course will consist of classroom time utilizing current French schematics to trace the entire system from power in to the last circuit and how they interface, along with the schematic layouts and component symbols used on the French schematics. The class will also utilize a tower crane turntable for hands on to aid in their troubleshooting techniques.

Course Benefits:

- Understand the layout and proper use of the French Schematics
- Have more thorough understanding of how to use a Multi-meter
- Understand how to read the schematics so they can tell what type of contactor goes in a particular spot
- Understand how to find an electrical circuit that seems to go or come in from nowhere
- Be able to successfully navigate the schematics to answer questions and trouble shoot the Tower Crane electrical systems

Prerequisites
None

Capacity
8 students
Content:

This 4-1/2 day course includes the analysis of information contained in the top climbing chapter of the crane manual. This top climbing course also contains a “hands on” segment that requires students to physically climb and secure themselves to an erected tower crane using the documented safety procedures found in the crane manual. Each student will have the opportunity to learn and perform dual roles in the top climbing procedure. The roles taught are: Crew Member: Students will learn to be a member of the crew, and will learn the wind restrictions for top climbing the crane. They will learn to follow the correct top climbing sequential steps, observe/confirm the proper balance and movement of components, and the component’s interaction with each other. They will report to the crew lead person any improper movement, lack of clearances or imbalance in the moving members. Students will learn the proper method of preparing, lifting and landing the mast on the mono rail beams, and finally, the actual insertion and securing of the mast onto the crane. They will learn the correct operation of the climbing pump, cylinder tilting, yoke engagement and locking, and the proper operation of the safety dogs.

Crew Lead: After successfully being a member of the crew, each student will have the opportunity to become the lead person and direct the crew in the proper operation and sequence of the climbing cage and general climbing operation. This will include the insertion and removal of a mast section thus successfully completing a full insertion/removal cycle of the top climbing operation. The crew lead will control the pump used in the process of climbing. Each student will be tested on their practical knowledge of the proper methods, procedures, and restrictions involved to safely top climb the erected tower crane. Each student will also take a written exam during the class.

Prerequisites
None

Capacity
8 students
Content:

This 4-1/2 day course is designed for individuals who are new to Potain GMA tower cranes but would also be an excellent refresher course for more experienced operators. The course covers a wide variety of subjects all focused toward current production Potain GMA Self erecting tower cranes. The class size will be limited to six (6) students. All classroom presentations will be reinforced with practical hands-on operation of the HDT80 Tower crane. The course will be approximately 40% classroom and 60% practical: The course will begin with an overview of Potain company history and tower crane model review. A nomenclature presentation will be provided showcasing the HDT80. Operational safety instructions for tower cranes will be reviewed, with the main focus on safe operating practices. Site preparation will also be reviewed in the classroom. Erection and dismantling procedures will be reviewed in detail, followed by a machine walk around.

During the training course each student will have an opportunity to erect and dismantle the HDT80. Maintenance procedures and operators manuals will be reviewed in detail during the course. Each student will be expected to demonstrate proficiency in all aspects of crane setup and operation. The course will conclude on day five with a final assessment and review of the course.

Course Benefits:

- Have a basic understanding of how to read and interpret documents provided with Potain machines.
- Be able to Erect & dismantle the HDT80
- Conduct pre-operational checks and be aware of basic maintenance checks.

Prerequisites
None

Capacity
8 students
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