Boom Truck Operator
Level 1
Boom Truck Operator

Unit: A1 Orientation I: Structure and Scope of the Trade

Level: One
Duration: 7 hours
Theory: 7 hours
Practical: 0 hours

Overview:
Jobsite learning and teaching have long been fundamental to trade-practice, including its safety, health, and environmental implications. The chance to gain maximum benefit from workplace trade learning can be shaped by such complex factors as production schedules and jobsite politics. As adult trade-leaners, apprentices at all levels of skill-development are encouraged to use their eyes, ears, prior knowledge, and interpersonal skills to encourage journeypersons to teach as well as to supervise them. This requires understanding the trade’s dynamics, including the roles and responsibilities that order jobsite activity. Unit content outlines the trade’s skill-requirements and long-term career possibilities. It includes suggestions about trade-related learning styles/strategies. It also introduces the concept of skills stewardship, stressing the obligations that apprentices incur in learning from journeypersons to ‘pay it forward’ by assisting other newcomers who will follow them into the trade. The unit’s purpose is to provide this essential information about learning to learn as a Manitoba apprentice. Elsewhere in technical training, senior apprentices explore the importance of learning to teach in trade workplaces – a central and time-honoured foundation of journeypersonwork.

Objectives and Content: Percent of Unit Mark (%)

1. Describe the structure and scope of the modern trade.
   a. Historical background, including apprentice experiences
   b. Structure/scope of the trade
      • International and national characteristics
      • Important features of practicing the trade in Manitoba
      • Trade and construction industry organizations
   c. Opportunities and career ladders
      • Generalists and specialists
      • Lead hands and other immediate supervisors
      • Geographic mobility
      • Job hierarchies and innovations

2. Describe Manitoba’s Apprenticeship Program.
   a. Concept and significance of skills stewardship
      • To the trade
      • To apprentices
      • To journeypersons
      • To employers
   b. Practical Training: on-site component of program
      • Roles/responsibilities of employer and journeyperson(s)
      • Roles/responsibilities of Apprenticeship Training Coordinator (ATC)
      • Roles/responsibilities of apprentice, including record-keeping re: job experience
   c. Technical training: off-site component of program
      • Roles/responsibilities of instructors (including Related’-area faculty)
• Roles/responsibilities of apprentices
d. Attendance requirements
e. Progression requirements
f. Reporting of grades
g. The Trade Regulation and its significance
h. Policies (e.g., on personal conduct, fees, supplemental tests, etc.)
  • Of Apprenticeship Branch, Manitoba Advanced Education and Training (MAET)
  • Of Technical training Provider(s)
i. Other (as may be specified by instructor)

3. Describe special opportunities and challenges re: apprenticeship. 40%
a. Adapting personal learning goals to program contexts
  • Principles of adult learning (including importance of self-direction)
  • Description/recognition of learning and teaching styles
  • Significance of work culture and interpersonal skills re: trade-learning
  • Integrating technical training and practical training content
  • Possibilities and perils of peer learning
  • Budgeting and other necessary personal arrangements
  • Identifying sources of support (e.g., upgrading trade-related math skills)
b. On-site learning challenges and opportunities
  • Significance of jobsite supervision roles and teaching styles (e.g., journey-level skills-coach vs. mentor)
  • Communication with journeypersons and employers
  • Coverage of prescribed tasks/subtasks that define the scope of trade, and the content of the certification exam administered to apprentices who are completing their program
  • Getting help and fixing mistakes
  • Maintaining personal record of trade-learning challenges/achievements (e.g., a learning journal, and/or a personal training plan, if possible, discussed with employers and others supporting the apprenticeship journey to certification)
c. In-school opportunities/challenges
  • Personal arrangements that support progress in technical training
  • “Baggage-handling” – self-assessing potential impacts of previous experiences (favourable/unfavourable) on current learning; availability of supports
  • Techniques for note-taking, record-keeping, and review
  • Relations with instructors (including ‘Related’-area faculty)
  • College resources (library, support services, etc.)

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Boom Truck Operator

Unit: A2 Trade Regulatory Environment
Level: One
Duration: 7 hours
Theory: 7 hours
Practical: 0 hours

Overview:
This Common Core Curriculum unit of instruction introduces Crane and Hoisting Equipment Operator apprentices to the complex system of regulations and legal requirements within which their trade is practiced.

Objectives and Content:

1. Identify and describe the main components and goals associated with the crane-trade regulatory environment.
   a. Agencies for licensing, inspection, and enforcement
   b. Federal components
   c. Provincial components
   d. Local government components
   e. Non-governmental standards and codes of practice
   
2. Identify and describe Manitoba regulations providing for personal health and safety at jobsites.
   a. Right to refuse
   b. Obligation(s) of employer to train and supervise
   c. Obligations and procedures in reporting accidents
   d. Personal protective equipment and clothing
   e. Access/egress and confined space entry
   f. Excavations, trenches, tunnels, and shafts
   g. Work at heights
   h. Rigging, hoisting, and hoists

3. Identify and describe regulations governing the use and transport of crane and hoisting equipment.
   a. Division of powers (federal/provincial/municipal)
   b. Specify major enactments (e.g., Manitoba Highway Traffic Act)
   c. Scope and specific details re: these regulations
      - Weights
      - Dimensions
      - Long and/or wide loads
      - Loading rubber-tired equipment
      - Loading boom components
      - Load safety precautions and procedure
      - Inspection and enforcement
      - Logbooks
      - Securement of cranes
      - Jobsite security
      - Interprovincial variation re: license vs. permit

Percent of Unit Mark (%)

20%

20%

20%
4. **Identify and describe non-governmental standards that regulate the operation of crane and hoisting equipment.**
   40%
   a. Canadian Standards Association (CSA) Z150
      - Scope and significance
      - Defining key terms
      - Structure/function of mobile cranes with rope-suspended booms
      - Structure/function of mobile cranes with hydraulic booms
      - Provisions re: inspection, testing, and maintenance
      - Operation
   b. Industry (employer/union) standards
   c. Manufacturer standards
      - Manuals
      - Load Charts
      - After-market modifications of equipment

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Boom Truck Operator

Unit: A3 Trade Safety Awareness (AC Board Standard)

Level: One
Duration: 7 hours
    Theory: 7 hours
    Practical: 0 hours

Overview:
Safe working procedures and conditions, injury prevention, and the preservation of health are of primary importance to industry in Canada. These responsibilities are shared and require the joint efforts of government, employers, and employees. It is imperative that all parties become aware of circumstances that may lead to injury or harm. Safe learning experiences and environments can be created by controlling the variables and behaviours that may contribute to incidents or injury. It is generally recognized that safety-conscious attitudes and work practices contribute to a healthy, safe, and incident-free working environment. It is imperative to apply and be familiar with the Workplace Safety and Health Act and Regulations. As well, it’s essential to determine workplace hazards and take measures to protect oneself, co-workers, the public, and the environment. Safety education is an integral part of the apprenticeship program both in school and on-the-job. Unit content is supplemented throughout technical training by trade-specific information about safety hazards and precautions presented in the appropriate contexts of discussion and study.

Note: No percentage-weightings for test purposes are prescribed for this unit’s objectives. Instead, a ‘Pass/Fail’ grade will be recorded for the unit in its entirety.

Objectives and Content:

1. Identify safety and health requirements.
   a. Overview of the Workplace Safety and Health Act
      • Rights and responsibilities of employees under the Act
      • Rights and responsibilities of employers under the Act
      • Rights and responsibilities of supervisors under the Act
   b. Fourteen (14) Regulations
   c. Codes of Practice
   d. Guidelines
   e. Right to refuse
      • Explanation of right to refuse process
      • Rights and responsibilities of employees
      • Rights and responsibilities of employers
      • Rights and responsibilities of supervisors under the Act

2. Identify personal protective equipment (PPE) and procedures.
   a. Employer and employee responsibilities as related to PPE
   b. Standards: CSA, ANSI and guidelines
   c. Work protective clothing and danger if it fits poorly
   d. Importance of selecting and using appropriate gloves to suit task (e.g., re: chemicals, cold/hot items, slivers, etc.)
   e. Standards and requirements re: selection/use of appropriate headwear
   f. Eye protection – Comparison/contrast eyeglasses, industrial safety glasses and safety goggles

Percent of Unit Mark (%)

n/a
g. Foot protection – when required according to safety standards
h. Hearing protection
  • hazards of various noise levels (hearing protection must be worn)
  • laws
  • types of hearing protection
i. Respiratory protection – Types; selection
j. Fall protection – Manitoba requirements Standards Guidelines
  • ANSI (U.S.A. standards), etc.
k. Ladders and scaffolding
l. Safety principles for working with or around industrial trucks site specific (forklifts, pallet trucks, etc.)

3. Identify electrical safety.
   a. Effects of electric current on the human body
   b. Three factors that affect the severity of an electric shock
   c. The effects of electrical arcs/blasts on the human body and on equipment
   d. Hazards/precautions re: working with energized equipment

4. Identify fire safety.
   a. Types of fires
   b. Types of fire fighting equipment
   c. Classifications of fire extinguishers (A, B and C)
   d. Location of fire extinguishers and fire exits
   e. Fire alarms and drills

5. Identify ergonomics.
   a. Definition of ergonomics and conditions that may affect the body
      • Working postures
      • Repetition
      • Force
      • Lifting
      • Special hazards and precautions re: materials handling
      • Special hazards/precautions re: lifting, carrying, and setting down a load
      • Tools
      • Identify tool and safety equipment
      • Causes of hand tool accidents
      • Equipment

6. Describe hazard recognition and control.
   a. Safe work practices
   b. Basic risk assessment
   c. Injury prevention and control measures
   d. Identification of hazards involved in pneumatic tool use and explanation of how to guard against them

7. Describe the hazards of confined-space entry.
   a. Identification of a confined space
   b. Hazards of a confined space
      • Physical
      • Biological
   c. Working in a confined space
   d. Emergency response plan
   e. Self-Contained Breathing Apparatus (SCBA)

8. Identify First Aid/CPR.
   a. Overview of First Aid Regulation
   b. Obligations of employers regarding First Aid
      • Who is certified to provide First Aid
      • What to do while waiting for help
      • Location of, and access to, First Aid kit
   c. Define First Aid, and explain First Aid requirements and techniques
• Scope and limits of First Aid intervention
• Specific interventions (cuts, burns, abrasions, fractures, suffocation, shock, electrical shock, etc.)
• Interface with other services and agencies (e.g., Workers Compensation claims)
d. Describe basic CPR requirements and techniques
  • Obtaining certification
  • Scope and limits of CPR intervention (include varieties of CPR certification)

9. Identify safety requirements as they apply to WHMIS.
   a. WHMIS as a system
   b. Provincial Regulation under the Safety and Health Act
     • Each province has a WHMIS regulation
   c. Federal Hazardous Products Act
   d. WHMIS generic training:
     • WHMIS defined and the format used to convey information about hazardous materials in the workplace
     • Information found on supplier and workplace labeling using WHMIS
     • Hazardous materials in accordance with WHMIS
     • Compliance with government safety standards and regulations
   e. Description of WHMIS (include varieties of WHMIS Certification)
     • Typology of WHMIS labels, symbols, and classifications
     • Scope and use of Materials Safety Data Sheets (MSDS)

10. Describe the identification and control of specified hazards.
    a. Basic control measures (injury prevention)
    b. Safe work procedures
    c. Explanation on the importance of industrial housekeeping
    d. Employer responsibilities
    e. How and where to store materials
    f. Safety measures related to walkways, stairs and floor openings
    g. Traffic-pathway protection of workers and persons

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Boom Truck Operator

Unit: B1 Trade-Math Skills Refreshment

Level: One
Duration: 7 hours
Theory: 7 hours
Practical: 0 hours

Overview:
This Common Core Curriculum unit offers apprentices the opportunity to refresh their basic math skills, and provides a general overview of the importance of mathematics in the technology and operation of crane and hoisting equipment. In addition to instruction on basic math operations, algebra, geometry, and trigonometry as these relate to the hoisting trades, unit content includes practical current information about the nature of math anxiety, and strategies for overcoming this difficulty.

Note: Although this unit includes a review of math basics, and provides some tools for building skill and confidence in applying them, it is not a remedial math course. Unit content assumes a prior familiarity with math basics. Apprentices who might require upgrading in this area are strongly encouraged to consult with their Apprenticeship Training Coordinator (ATC) and/or their Instructor early in the program to identify suitable options and resources.

Objectives and Content:

1. Identify and explain the importance of math disciplines in the technology and practice of the hoisting trades. 5%
2. Identify “math anxiety,” and explain practical strategies for overcoming it. 5%
3. Review and apply relevant mathematical principles, including use of electronic calculator.
   a. Addition, multiplication, subtraction, and division
   b. Fractions and decimals
   c. Ratios and proportions
   d. Imperial and Standard International (SI) units
   e. Use of conversion factors
   f. Calculating area and volume
   g. Geometrical relationships (rectilinear and circular)
   h. Basic trigonometry functions
   i. Vector addition
   j. Functions/use of electronic calculator
4. Perform trade-related math operations as specified by instructor. 80%
   a. Calculations re: load weights
   b. Calculations re: load distribution
   c. Calculations re: effect(s) of sling angle(s)
   d. Calculations re: sheave friction
   e. Calculations re: parts of line
   f. Calculations re: Safe Working Load (SWL)
   g. Other (specified by instructor)
5. Explain the load chart in terms of applied mathematical principles and relationships. 5%
Boom Truck Operator

Unit: B2 Introduction to Lift Planning and Preparation

Level: One
Duration: 32 hours
Theory: 12 hours
Practical: 20 hours

Overview:
This Common Core unit of instruction introduces the knowledge and procedures required to prepare a crane jobsite and to plan a hoisting operation. Content includes reference to those physical characteristics of the jobsite which Crane and Hoisting Equipment Operators must take into account when planning the lift to ensure safe, efficient practice.

Objectives and Content:

1. **Describe major considerations associated with lift planning/preparation, and their significance.**
   a. Site characteristics (e.g., meteorological conditions; soil/subsoil composition)
   b. Selection of crane and components
   c. Set-up of crane; assembly of crane components
   d. Use/interpretation of lift drawings and other project specifications
   e. Practical demonstration of lift-drawing(s) in planning a hoisting operation
   f. Other (specified by instructor)

2. **Describe lift-planning procedures re: site preparation.**
   a. Role/responsibilities of operator re: site inspection/preparation, including:
      • Identification of operating area(s)
      • Inspection of area
      • Requirements and procedure re: recording and reporting of inspection data
      • Other (specified by instructor)
   b. Inspection criteria (targets) and checkpoints
      • Lift area is compact and graded
      • Lift area is free of hazards
      • Access roads are adequate
      • Access restrictions are defined, communicated, and enforced
      • Operating locations and firm and level
      • Operating locations are no near powerlines, trenches, or other hazards requiring carefully-determined clearances
      • Blocking and/or hardwood mats are available
      • Clearances are sufficient to permit erection of crane
      • Lift personnel are identified; roles and expectations are specified
   d. Other (specified by instructor)

3. **Describe lift-planning procedures re: selection and configuration of equipment.**
   a. Identification of pre-calculated gross load, and of all relevant load factors
   b. Selection/specification of crane configuration
      • Manufacturer specifications
• Statutory and other requirements

c. Other (specified by instructor)

4. Demonstrate procedures required for general crane set-up. 35%
   a. Overview of set-up procedures
   b. Procedure for checking characteristics and suitability of soil (e.g., compactness)
   c. Procedure for outrigger use, including:
      • Tires off ground
      • Pads on solid footing, at right angles, and secured
      • Beams extended per manufacturer specifications
   d. Procedure for calculations re: maximum loading of outriggers and tracks, including:
      • Four blocking/outrigger pads required to distribute ground pressure
      • Ground pressures for crawlers over the sides, over the end, and over the corners
   e. Procedure for leveling crane in relation to grade, including:
      • Raising/lowering outrigger jacks, blocking
      • Use of leveling device(s)
      • Cab-level techniques
      • Carrier deck-level techniques
      • Turntable base-level techniques (including use of carpenter’s level)
      • Using hoist-line
   d. Other (specified by instructor)
Boom Truck Operator

Unit: B3 Introduction to Load-Chart Use

Level: One
Duration: 34 hours
Theory: 24 hours
Practical: 10 hours

Overview:

This Common Core unit of instruction introduces apprentices to the requirements for reading and interpreting load charts. Content includes the terminology, principles, and conventions associated with the construction of load charts, with special emphasis upon their practical use in relation to modern crane and hoisting equipment, and key components of this technology.

Objectives and Content:

1. Describe the technical terminology, principles, and applications associated with load charts.
   a. Comparison/contrast re: load charts in general, vs. specific variations regarding:
      • Mobile crane load charts
      • Boom truck load charts
      • Tower crane load charts
   b. Operating radius and load radius
   c. Boom length and boom angle; boom-point elevation
   d. Capacity: gross, net, and determining factors
   e. Gross load and net load
   f. Structural stability
   g. Areas of operation
   h. Hoist lines
   i. Range diagrams
   j. Load Moment Indicators (LMIs)
   k. Main-boom capacities (with/without attachments)
   l. Boom extension
   m. Dead section
   n. Jib capacities
   o. Factors affecting capacity
   p. Calculation of the percentage of gross load (based on 75%-to-80%)
   q. Determining whether capacity is limited by structural strength or stability
      • Shaded areas used for structural rating
      • Bold line divides areas
      • Asterisks/stars represent structural rating
   r. Using load charts to determine on-rubber rating
      • Pick and carry
      • Over-the front-rating
      • 360-degree rating
   s. Other (specified by instructor)

2. Determine operating quadrants using load charts.
   a. Interpretation of charts involving specified components and conditions
• Without counterweight
• With partial/complete counterweight
• Extended vs. retracted
• With/without live mast
• Boom length
b. Boom angle (including angles that fall between chart entries)
c. Load charts (including radii that fall between chart entries)
d. Boom-hoist lines and load-hoist lines
  • Breaking strength
  • Safety factor, including raising boom above horizontal, crane in working position, and Safe Working Load (SWL)
e. Determining parts of line required as a function of sheave friction, line-pull, and wire-rope’s SWL
f. Determining weight of hoist line required
g. Using range diagrams to determine:
  • Crane configuration
  • Boom clearance
  • Boom-tip headroom
h. Identifying areas of operation
i. Other (specified by instructor)

3. Determine specified upper-structure characteristics and configuration using load charts. 5%
   a. Carrier-mounted (truck) crane types
   b. Carrier-mounted (truck) crane components
      • Undercarriage/chassis
      • Swing circle and ring gear
      • Roller path (turntable)
      • Outrigger boxes, beams, and cylinders
      • Outrigger jacks/stabilizers, pads, and floats
      • Front-bumper jacks/stabilizer
      • Outrigger controls
      • Front-bumper counterweight

4. Use load charts to calculate main boom capacities when no attachments are used. 20%
   a. Lattice booms
   b. Full-power telescopic booms
   c. Method for calculating main-boom capacities involving pinned telescopic booms (dead sections)
   d. Other (specified by instructor)

5. Use load charts to calculate main boom capacities when jibs and boom-extensions are installed. 20%
   a. Lattice booms
   b. Full-power telescopic booms
   c. Method for calculating main-boom capacities involving pinned telescopic booms (dead sections)
   d. Other (specified by instructor)

6. Use load charts to calculate boom-extension capacities. 15%
   a. Full-power telescopic booms
   b. Method for calculating main-boom capacities involving pinned telescopic booms (dead sections)
   c. Other (specified by instructor)

7. Use load charts to calculate jib capacities. 15%
   a. Jib types and length
   b. Jib offset
   c. Jib angle in relation to the ground
   d. Jib capacity for lattice booms
   e. Jib capacity for full-power telescopic booms
      • Using one load chart
      • Using two load charts
   f. Other (specified by instructor)
8. Use load charts to explain how specified factors influence crane capacity. 10%
   a. Crane geometry and configuration
   b. Areas of operation
   c. Extension of outrigger beams
   d. Improper use of outriggers
   e. Boom length
   f. Boom angle
   g. Load radius; increase in load radius
   h. Machine condition
   i. Eccentric reeving
   j. Ground condition
   k. Improperly leveled crane
   l. Side-loading
   m. Rapid swing rate
   n. Impact loading
   o. Crane de-rating per manufacturer specifications, including:
      • Dragline work
      • Clamming
      • Placing concrete
      • Erecting steel
      • Other specialties
   p. Atmospheric conditions, including wind, icing, moisture, frost, etc.
   q. Operator's experience, skill, and personal condition (e.g., fatigue)
   r. Other (specified by instructor)

9. Describe the computerization of load moment indicators (LMIs) and explain their use. 5%

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Boom Truck Operator

Unit: C1 The Varieties of Hoisting Equipment

Level: One
Duration: 7 hours
Theory: 7 hours
Practical: 0 hours

Overview:

This unit of instruction introduces apprentices to the main types of hoisting equipment that are used in the modern crane industry, as well as the reasons for specialization of that equipment. Unit content includes information about important features and considerations that are common to all types of crane equipment, but concentrates chiefly on variation as this relates to technological change, operational requirements, and to special regulatory expectations.

Objectives and Content:

1. Describe the major types, configurations, and operational characteristics of modern crane equipment in general. 20%
   a. Boom Trucks, including:
      • Stiff-boom (SB) boom trucks
      • Knuckle-boom (KB) boom trucks
      • Digger-derrick units
   b. Industrial cranes
   c. Lattice-boom cranes
      • Carrier-mounted
      • Crawler-mounted
   d. Telescopic boom cranes
      • Carrier-mounted
      • Crawler-mounted
   e. All-terrain (AT) cranes
   f. Rough-terrain (RT) cranes
   g. Heavy-lift mobile cranes
   h. Tower cranes, including:
      • Hammerhead tower cranes
      • Luffing-jib tower cranes
      • Self-erecting tower cranes
   i. Special-duty adaptations, including:
      • Sidebooms
      • Rail-side/rail-mounted applications
      • Barge, longshore, and marine applications
      • Draglines
      • Pile drivers
      • Clamshells
      • Magnets
      • Demolition
      • Heavy-lift attachments
      • Tower configuration/luffing jib
      • Tandem lifts (multi-lifts)
2. **Identify and describe the structural/operational characteristics of boom trucks and tower cranes.**
   a. Boom truck types
   b. Boom truck components, including:
      - Telescoping vs. articulated boom
      - Truck chassis
      - Rear/front stabilizers
      - Turret
      - Pedestal
      - Swing circle
      - Base (heel) section
      - Telescopic-boom sections: manual; automatic
      - Boom extensions (jibs)
   c. Tower crane types
   d. Tower crane components, including:
      - Pad, footing, and feet
      - Tower
      - Main jib, counter-jib and counterweight
      - Hammerhead crane trolley
      - Luffing-jib
      - Jacking and climbing components
   e. Other (specified by instructor)

3. **Identify and describe the structural/operational characteristics of mobile-crane carrier components.**
   a. Carrier-mounted (truck) crane types
   b. Carrier-mounted (truck) crane components
      - Undercarriage/chassis
      - Swing circle and ring gear
      - Roller path (turntable)
      - Outrigger boxes, beams, and cylinders
      - Outrigger jacks/stabilizers, pads, and floats
      - Front-bumper jacks/stabilizer
      - Outrigger controls
      - Front-bumper counterweight

4. **Identify and describe the structural/operational characteristics of telescopic-boom cranes and specified components.**
   a. Telescopic-boom crane types
   b. Telescopic-boom crane components
      - Boom
      - Hoist or lift cylinder(s)
      - Boom foot pins (hinge pins)
      - Base or heel section
      - Powered telescoping sections
      - Pinned boom sections
      - Main/auxiliary boom-tip sheave(s)
      - Boom extension and jib-stored support
      - Main hook-block and auxiliary hook ball
      - Hoist lines with LMI/anti-two block devices
      - Jib
      - Lattice boom extension (swingaway-type jib)
      - A-frame jib
      - Box section (stinger-type) jib
      - Luffing jib
• Jib deflection sheave
• Tip sheave
• Jib inserts
• Jib backstays (adjustable for jib offset)
• Jib forestays
• Jib mast
d. Other (specified by instructor)

5. **Identify and describe the structural/operational characteristics of lattice-boom cranes and specified components.**

   a. Lattice-boom crane types
   b. Lattice-boom crane components
      • Boom throat (heel or base) section
      • Boom tip (head section)
      • Open-throat tip (offset/in-line)
      • Tapered tip
      • Hammerhead tip
      • Boom inserts (sections)
      • Transition section
      • Main chord
      • Pin connection lugs
      • Lacing/lattice members
      • Boom hoist reeving and drive
      • Boom stops and backstops
      • Boom hoist kick-out
      • Gantry (low; high)
      • Inner ball and equalizer
      • Live mast and bridle
      • Boom pendants (stays)
      • Boom midpoint suspension
      • Boom pendant spreader-bar
      • Boom-tip sheaves (lower; upper)
      • Main hook-block
      • Hoist line with LMI/anti-two block device
      • Jib
      • Jib foot (heel or base) section
      • Jib inserts (sections)
      • Jib tip (head section)
      • Jib mast, strut, and gantry
      • Jib pendants, forestays, and backstays
      • Headache (overhead hook) ball
      • Auxiliary hoist/whipline with LMI/anti-two block device
c. Other (specified by instructor)

6. **Identify and describe the structural/operational characteristics of mobile-crane upperworks (superstructure).**

   a. Machinery deck
   b. Revolving frame
   c. Slewing ring rollers; slewing bearing
   d. Boom foot pins and lugs
   e. High mast foot-lugs
   f. Counterweight
   g. Centre of rotation (centre pin; kingpin)
h. Other (specified by instructor)

7. **Identify and describe the structural/operational characteristics of mobile-crane crawler components (substructure).**

   a. Car-body frame and axles
   b. Swing circle, ring gear, and roller path (turntable)
   c. Side frames (extendable/non-extendable)
d. Idler rollers
e. Track (support) rollers
f. Sprockets (drive; tread)
g. Drive-shaft sprockets and drive-chains
h. Traction shafts
i. Hydrostatic track-drive systems (on crawler cranes)
j. Other (specified by instructor)
Boom Truck Operator

Unit: C2 Crane Technology and Mechanical Systems

Level: One

Duration: C2 hours
Theory: 35 hours
Practical: 0 hours

Overview:

This Common Core unit of instruction introduces the applied scientific knowledge required to understand the structure, function, and required physical characteristics (e.g., stability) associated with the engineering and performance of modern hoisting equipment. Unit content includes a basic overview of relevant science concepts as they relate to the hoisting trade practice, with particular attention to the principles of leverage, stability, and areas of operation. A further focus concerns basic information about crane mechanical systems and components, including hydraulic and electrical systems, power trains, suspensions, and diesel systems/sub-systems.

Objectives and Content:

1. Review specified scientific concepts and principles as they relate to the technology and practice of the crane and hoisting equipment operator’s trade. 10%
   a. Force and force vectors
   b. Resolution of forces
   c. Mass
   d. Motion (including circular motion) and inertia
   e. Equilibrium/balance
   f. Velocity and acceleration
   g. Gravity
   h. Area
   i. Volume
   j. Density
   k. Energy
   m. Power and work
   n. Mechanical advantage
   o. Leverage
   p. Momentum
   q. Pressure
   r. Heat
   s. Friction
   t. Electricity
   u. Hydraulics
   v. Units of measure (SI; Imperial) and scientific notation
   w. Other (specified by instructor)

2. Explain the principles of leverage, stability, and areas of operation as they apply to crane and hoisting equipment operation and equipment components. 40%
   a. Key terms/concepts
      • Stability – including forward stability and backward stability of a crane
      • Centres of gravity and rotation
      • Fulcrum, and leverage of a crane and of a load
• Area(s) of operation and quadrants
• Weight and other load characteristics, including effective weight
• Load moment (including tipping moment; resisting moment)
• Sweep
• Tipping axis
• Other (specified by instructor)

b. Determining gravitational centres
• Of crane
• Of crane components (including boom, carrier, upperworks, and counterweight)
• Of load

c. Dynamics of load leverage
• Static vs. dynamic loads
• Effect of structural strength and leverage on hoisting capacity
• Mechanical advantage of the leverage-systems used in craning
• Relationship(s) between leverage and stability
• Relationship between stability and instability
• Effect of relocating tipping-axis re: capacity and stability
• Other (specified by instructor)

d. Stability rating re: backward stability and forward stability
• Percentage of tipping for crawler trucks
• Percentage of tipping for truck cranes and rough terrain (e.g., outriggers; on rubber)

e. Implications and impacts of upperworks rotation, including:
• Change in crane leverage (most/less/least stable area)
• Change in capacity (most/less/least)
• Shift in location of tipping axis

f. Effect of load on booms, including:
• Lattice booms (e.g., compression)
• Telescopic booms (e.g., load on boom-hoist; high-angle cylinders; etc.)
• Effects of overloading (e.g., structural/tipping/mechanical failures)

g. Effect of pendant angle on lattice booms (gantry; live mast; high mast)

h. Areas of operation (‘working areas’)
• Significance and applicability of concept
• Identification of sweep area and sweep-area quadrants

i. Significant comparisons/contrasts among mobile cranes, boom trucks, and tower cranes re: leverage, stability, and areas of operation

e. Other (specified by instructor)

3. Describe the structure and function of hoisting-equipment chassis components, power trains, and suspension systems. 15%

a. Description of crane-chassis components
• Main frame
• Mounting supports
• Outrigger supports
• Power systems and components

b. Description of power systems and system components
• Engine
• Clutch
• Torque converters
• Manual transmissions (main; auxiliary)
• Automatic transmissions
• Drive lines
• Drive shaft and universal joints
• Axles (including read axle assemblies, shafts, and housings)
• Axles suspensions (front; rear)
• Differential assembly (including drive unit)
• Planetary hub assembly
• Steering systems
• Brake systems

c. Description of crane wheels/tires and their maintenance requirements
• Wheel and rim types (including RT cranes) and applications
• Bearings, lubrication, and lug-tightening
4. **Describe the application of hydraulics to crane-equipment engineering and operation.** 20%
   a. Principles of power transfer through hydraulic systems
      - Principles of hydraulics
      - Open/closed hydraulic systems
   b. Engine-power transfer and crane hydraulics
      - Extension/retraction of hydraulic booms
      - Swinging and slewing
      - Hydraulics pumps and motors
   c. Major components and basic operation of crane hydraulic system
      - Cylinders (including types; piston cylinders)
      - Pumps and pump displacement
      - Valves
      - Fluids
      - Motors
      - Electrical subsystems
      - Accumulators
      - Filters
      - Reservoirs
      - Monitoring devices
      - Hoses and fittings
      - Adapters
      - SAE O-rings; flange heads
      - Seals
      - Other (specified by instructor)
   d. Types of hydraulic systems on all mobile cranes, boom trucks, and tower cranes, including:
      - Open/closed systems
      - Independent/combined systems
      - Independent clutch/steering
      - Hydraulically powered units (lattice cranes)
      - Speed-O-Matic (link belt)
      - Grove Cranes including hydraulic systems (boom lift/extensions and swing; outriggers; exterior counterweight)
      - Lattice-boom crane upperworks (independent hydraulic systems; independent hydrostatic drive system)
   e. Routine maintenance/inspection of crane hydraulic systems
      - Precautions and practices
      - Cleanliness and inspection
      - Leaks and contaminants
      - Leakdown (outrigger; boom-hoist cylinder; boom-extension cylinder)
   d. Other (specified by instructor)

5. **Describe diesel systems and system components re: air-intake, fuel, electrical and air-system functions.** 15%
   a. Basic principles and components of diesel-system engineering and function
   b. Air-intake system components and procedures
      - Air filters
      - Intake manifold
      - Supercharger
      - Turbocharger
      - Intake air heater
      - Air-system monitoring device
      - Starting aids, including precautions re: glow plugs and gaseous mixture
   c. Demonstration of procedures for maintaining diesel air-intake systems
      - Maintenance scheduling
      - Inspection
• Cool-down procured
• Pre-cleaner servicing
• Filter changing
• System cleaning
d. Fuel system components and associated procedures
  • Fuel grades and types
  • Reservoir
  • Filters
  • Refuelling/restarting an engine that stopped due to lack of fuel
  • Maintaining filters and other fuel-system components
e. Diesel engine electrical systems and associated procedures
  • Batteries (including classification, capacities, and maintenance requirements)
  • Circuitry and wiring
  • Starting systems and charging systems
  • Ignition systems
  • Voltmeter and ammeter readings
  • Shut-down solenoid
f. Air systems
  • Compressors
  • Air-tank location and drainage (including
  • Coolers
  • Controls
  • Air dryer
  • Effects of condensation/extreme cold temperatures on air system)
g. Other (specified by instructor)

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Boom Truck Operator

Unit: C3 Maintaining and Troubleshooting Hoisting Equipment

Level: One

Duration: 21 hours
Theory: 7 hours
Practical: 14 hours

Overview:
Jobsite This Common Core unit of instruction introduces the skills and knowledge required to inspect cranes and crane components. Unit content forms the basis for the ongoing development of troubleshooting skills.

Objectives and Content:

1. Explain the requirements and purposes associated with hoisting-equipment logbooks.
   a. Types/contents of logbooks and log-book documentation
   b. Uses of logbook
   c. Operator responsibilities
      • Statutory/regulatory
      • Other (employer/owner; manufacturer, etc.)
   d. Employer requirements and procedures
   e. Other (specified by instructor)

2. Describe/demonstrate procedure for pre-ignition yard checks.
   a. Inspection targets, criteria and standards per manufacturer specifications (e.g., manual)
      • Fluid levels, including fuel, crankcase oil, coolant, hydraulic cylinders, etc.
      • Battery electrolyte level
      • Radiator hoses and belts
      • Fasteners, including bolts and mountings around engines
      • Air cleaner and connections
      • Drain cocks
      • Control-panel gauges
      • Safety guards
      • Evidence of vandalism
   b. Procedure(s) for inspection(s) per manual
   c. Maintenance/inspection schedules per manual
   d. Use/selection of tools for conducting preoperational checks, including:
      • Wheel wrench
      • Tire gauge and/or hammer
      • Flashlight
   e. Other (specified by instructor)

3. Describe/demonstrate procedure for yard checks performed with engine running.
   a. Special hazards and precautions re: performing checks with engine running
   b. Required conditions for performing these checks, including:
      • Leveled crane on firm base
      • Engine brought to recommended operating temperature
   c. Checks re: engine operation
• Oil pressure gauge
• Temperature gauge
• Battery (not discharging; ammeter and voltmeter readings normal)

d. Checks re: air and hydraulic systems
• Gauge indicates correct operating pressure
• Hoses free of cuts, abrasions, and bulges; all connections secure and leak-free

e. Checks re: hydraulic system
• No oil leaks
• Filters; gauges/warning system(s)

f. Checks re: crane controls
• Hoist
• Swing
• Boom
• Telescoping (equally by sections and/or per manufacturer specifications)
• Raise/lower load-line
• Cab lock/brake
• Travel lock (dog with pin-positive)
• Anti-two blocking devices
• Warning devices (including back-up alarm, flashers, and bells/horns)

g. Checks re: accuracy/calibration of load-weighing and load moment devices

h. Checks re: wire rope
• Wear
• Kinking
• Abrasion
• Birdcaging
• Broken wires
• Reeling
• Replacement requirements per manufacturer specifications

i. Checks re: tires
• Soundness
• Pressure

j. Checks re: braking system
• Service brakes
• Emergency brake and parking brakes

k. Checks re: steering system
• Alignment
• Responsiveness

l. Checks re: lighting
• Headlights, running/clearance lights, flood lights, dome light, back-up lights
• Dashboard and control-panel lights/display

m. Checks re: fastening devices – e.g., pins and keepers properly placed/secured

n. Checks re: hooks and hook-blocks
• Hook rotates freely, and is free of cracks/deformation
• Sheave rotates freely, and is free of excessive wear

o. Other (specified by instructor)

4. Describe/demonstrate basic maintenance procedures. 20%

a. Special hazards and precautions re: performing basic maintenance

b. Significance/interpretation of manufacturer specifications and owner requirements re: maintenance and maintenance scheduling

c. Interpretation of manual re: lubrication schedule
• Types/methods of lubrication (including classification, characteristics, and use)
• Schedule

d. Selection/use of lubrication tools
• Hand-operated oilers and guns
• Pneumatic and pressure-driven tools
• Mobile lubricators and lube dispensers

e. Engine maintenance
• Clean/replace oil filter
• Correct coolant levels and condition
• Correct oil selection and condition
f. Maintain hydraulic system
   • Clean/replace oils and filters
   • Correct oil selection and condition
   • Store oil

  g. Maintain air systems
     • Replace filters
     • Drain tanks

  h. Other (specified by instructor)

5. Describe/demonstrate common precautions required when maintaining equipment. 10%
   a. Common hazards
   b. All controls in ‘off’ position, secured and tagged
   c. Engine immobilized
   d. Boom is secured
   e. Maintenance person(s) visible; accompanied by partner in dangerous situations
   f. Pump is disengaged
   g. Hydraulic- and oil-system pressures are relieved before components are loosened
   h. All components checked before being returned to service
   i. Other (specified by instructor)
Boom Truck Operator

Unit: D1 Assembling Crane and Hoisting Equipment

Level: One

Duration: 18 hours
   Theory: 4 hours
   Practical: 14 hours

Overview:

This Common Core unit of instruction provides both theoretical background and practical exposure to the techniques and precautions associated with the assembly/disassembly of modern hoisting equipment.

Objectives and Content:

1. Explain general requirements for transporting crane equipment. 20%
   a. Loading/unloading
      • Highway
      • Barge
      • Railway
   b. Driving on highway
   c. Special requirements for RT, crawler, and tower cranes

2. Describe/demonstrate procedure for assembling/disassembling lattice-boom cranes. 40%
   a. Rigging the upperworks
      • Counterweights
      • Boom components
      • Rope terminations
      • Special lift attachments
      • Track and car body
   b. Requirements for safety and ongoing inspection
   c. Importance of manufacturer specification and procedures
   d. Other (specified by instructor)

3. Describe/demonstrate procedure for assembling/disassembling hydraulic cranes. 40%
   a. Comparison/contrast with lattice-boom crane assembly
   b. Importance of manufacturer specifications
   c. Use of outriggers, including:
      • Trailing axles
      • Special attachments/extensions
      • Counterweights
      • Rope terminations
      • Reieving
   d. Other (specified by instructor)
Boom Truck Operator

Unit: D2 Introduction to Rigging-Theory/Practice

Level: One
Duration: 28 hours
  Theory: 14 hours
  Practical: 14 hours

Overview:
This Common Core unit of instruction introduces the theoretical knowledge, practical procedures, and the tools/equipment associated with rigging in the hoisting trades.

Objectives and Content:

1. Describe rigging hardware and tools. 15%
   a. Special hazards and precautions re: selection/use of rigging hardware and tools
   b. Calculation of Safe Working Load (SWL)
   c. Ground rules and procedures (including equipment selection)
   d. Definition of lead-pull
   e. Calculation(s) for lead line
   f. Special precautions
   g. Drums and winches
   h. Sheaves
      • Sketch of sheave
      • Definition of sheave size
      • Equalizer sheave (uses; advantages/disadvantages)
   i. Hooks
   j. Rings, links, and swivels.
   k. Shackles
   l. Eye bolts and lugs
   m. Turnbuckles
   n. Come-alongs and chain hoists
   o. Spreader, lift, and equalizer beams
   p. Load binder
   q. Crane load blocks
   r. Wire rope blocks
   s. Tackle blocks
   t. Tandem blocks
   u. Cable clamps
   v. Other (specified by instructor)

2. Describe hoisting ropes, including their use and maintenance. 12.5%
   a. Special hazards and precautions re: hoisting ropes
   b. Types and functions
      • Wire
      • Strand
      • Core (fibre; wire; strand)
c. **Rope lay**
   - Regular lay
   - Lang lay
   - Right/left lay
   - Alternate lay
   - Herringbone (twin-strand) lay
   - Specialty ropes

d. **Grading and techniques**
   - Size, grade, and classification group (strand classification) of wire rope
   - Pre-formed ropes compared with others
   - Wire rope’s resistance to fatigue and abrasion
   - Breaking strengths and safety factors (rigging slings; running/standing ropes)
   - Procedure for cutting wire rope
   - Procedure for installing end fittings and connections
   - Procedure for inspecting, lubricating, and cleaning
   - Procedure for changing hoist-rope
   - Procedure for reeving and lacing load blocks
   - Procedure for calculating Safe Working Load (SWL) – divide catalogue breaking strength by factor of safety
   - Regulation re: minimum number of rope-windings around drum
   - Uses of non-rotating/rotation-resistant ropes
   - Criteria for taking slings and hoist-rope out of service (pendant lines; broken wire; core failure; localized damage; lubrication; etc.)
   - Other (specified by instructor)

3. **Describe slings and their use.** 12.5%
   a. Special hazards and precautions re: selection/use of slings
   b. Calculation and other considerations re: Safe Working Load (SWL)
   c. Ground rules and procedures for heavy lifts
   d. Wire rope slings
   e. Nylon slings
   f. Polyester and Kevlar slings
   g. Sling configurations
   h. Single vertical hitch
   i. Bridle hitch
   j. Single/double basket hitch
   k. Double-wrap basket hitch
   l. Single/double choker hitch
   m. Double-wrap choker hitch
   n. Sling angles
   o. Safe working loads
   p. Rule-of-thumb formulas
   q. Criteria
   r. Chain
   s. Other (specified by instructor)

4. **Describe reeving.** 5%
   a. Special hazards and precautions re: reeving
   b. Mechanical advantage (including drum-line pull)
   c. Friction
   d. Types/methods of reeving (including lacing, long-splice, etc.)
   e. Advantages/disadvantages of reeving
   f. Other (specified by instructor)

5. **Describe rigging practices re: derricks, guy wires, and winches.** 2.5%
   a. Special hazards and precautions re: derricks, guy wires, and winches
   b. Calculation and other considerations re: Safe Working Load (SWL)
   c. Selection/use of guy wires
   d. Definition of “dead man”, including tie-off location
   e. Selection/use of derricks
   f. Selection/use of winches
g. Winch drum and capacity  

h. Torque on winch (line pull) and its significance/application  
i. Other (specified by instructor)  

6. Demonstrate procedure for handling materials using basic rigging equipment and techniques.  

a. Determine load limits  
b. Determine placement of load  
c. Determine Safe Working Load (SWL)  
d. Use of slings and hitches  
e. Proficiency re: knots and splices  
f. Other (specified by instructor)  

7. Demonstrate procedure for placing chokers and slings to lift special-requirement loads.  

a. Hazards and precautions re: placing chokers and slings  
b. Smooth, heavy loads  
c. Long, flexible loads  
d. Imbalanced loads  
e. Heavy, fragile loads  
f. Determination of gravitational centres and balance points  
g. Structural members of different designations  
h. Regular plates  
i. Precast components  
  • Methods of choking  
  • Methods of transferring loads  
j. Machinery  
k. Definition of choker-stress formula  
l. Application of SWL to specified load/sling combinations  
m. Other (specified by instructor)  


a. Special hazards and precautions  
b. Mechanical-advantage calculations for block-and-tackle systems  
c. Reeving methods and (e.g., square/skip/tandem; equalizer sheaves; lacing; simple and multi-blocks up to eight parts; etc.)  
d. Determination of maximum load when given a specified rigging arrangement  
e. Determination of lead-line force when given a specified number of parts, line-weight, and a rope-size  
f. Specification of factors determining the wire-rope requirements of a reeving system  
g. Identification of kinds of sheaves, friction bearings, and frictional coefficient (expressed as percentage)  
h. Reeving skip square and lacing with equalizer  
i. Application of U-bolts (cable clips) re: parallel splice and other splices  

9. Demonstrate procedure for rigging, hoisting, and jacking operations re: all safety regulations and requirements.  

a. Rig for straight lifts  
b. Rig for drifting  
c. Rig for turning  
d. Other (specified by instructor)  

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Boom Truck Operator

Unit: D3 Introduction to Hoisting-Equipment Operation

Level: One
Duration: 28 hours
Theory: 7 hours
Practical: 21 hours

Overview:
This Common Core unit of instruction integrates the theory and practical knowledge required to perform basic load- and boom-manipulating operations common to many lift situations.

Objectives and Content:

1. Describe the personnel, responsibilities, and communication requirements associated with hoisting-equipment operation in general. 10%
   a. Personnel and responsibilities
      • Crane operator(s) and apprentice operators
      • Rigger
      • Signal person
      • Site supervisor
      • Maintenance person(S)
      • Crane owner
      • Other jobsite personnel
   b. Hazards and precautions at specified danger points in vicinity of lift
      • Between counterweight and carrier
      • Between counterweight and obstruction
      • On ‘bad side’ of crane
      • Between upper works and carrier
      • Machine deck
      • Swing area of crane (during operation)
      • Outrigger jacks (when lowering)
      • Extension/retraction of outrigger beams
      • Avoiding overhead lifts above persons/property
      • Use of barricades
      • During welding operations
      • Specifications in job rules, regulations, and other technical documents
      • Other (specified by instructor)
   c. Communication/coordination, including:
      • Interaction with supervisors
      • Use of International Hand Signals
      • Use of audio communication technology
   d. Other (specified by instructor)

2. Describe/demonstrate basic operational concerns re: rigging and load requirements. 25%
   a. Weight and other load characteristics
      • Use of devices to determine load weight
      • Use of trade formulas to estimate load weight
• Use of other information sources to establish load weight (drawings, shipping bills, catalogues, etc.)

b. Gravitational centre of loads
   • Stable centre and unstable centre
   • Centre under crane hook
   • Centre relative to rigging position and sling force

c. Demonstration of procedures and precautions for rigging up/down

d. Demonstration re: procedure for measuring load radius

e. Demonstration of procedures for determining pre-/post-lift load replacement
   • Total load and load capacity chart
   • Total load and area diagram
   • Total load and range diagram

f. Other (specified by instructor)

3. Describe/demonstrate basic operational concerns re: site and set-up requirements.  25%
   a. Special hazards and precautions re: site and set-up requirements
   b. Identification of tower-crane climbing procedures and associated components, controls, and standards
      • Stable vs. unstable ground; gradient (grade) of site
      • Calculations to determine crane and ground pressure
      • Techniques for reducing ground-pressure using outriggers, pads, and blocking
      • Techniques and reference points for leveling the crane (cab-level; carrier-level’ deck-level; turntable base-level; hoist-line, etc.)
   c. Weight, radius, and gravitational-centre determinations during set-up
   d. Procedure for using boom-angle indicators, including:
      • Boom deflection vs. boom-angle indicators
      • Exact radius over boom angle
   e. Common faults: causes/effects
      • Slack rope on drums and uneven spooling
      • Rope incorrectly installed on drum
      • Incorrect fleet angle
      • Poorly-lubricated sheaves and/or cold-weather icing of sheaves
      • Impact of sidewind(s) on hoist line
      • Abruptly-halted hoist; abrupt change in rope tension
      • Hook block and/or headache ball is too tight
      • Excessive speed when lowering hook/headache ball
   f. Other (specified by instructor)

4. Describe/demonstrate basic operational concerns re: “pick-and-carry” hoisting.  20%
   a. Special hazards and precautions re: pick-and-carry operations
   b. Manufacturer specifications
      • Travel speed
      • Swing lock and house lock engaged
   c. Pick-and-carry chart notes
   d. Boom position/extension
      • Telescoping of boom (including manufacturer specifications)
      • “Over the front” (RT cranes)
      • “Over the rear” (truck mounted cranes, when permitted)
      • Boom in line with crane axis
      • Minimization of boom-length and boom-height
   d. Load position
      • Minimization of distance to ground
      • Minimization of distance to carrier
      • Tie to carrier or control with tag-lines
   e. Sudden stops/starts
   f. Orient movement toward load whenever possible
   g. Other (specified by instructor)

5. Describe/demonstrate basic operational concerns re: specified conditions and situations.  20%
   a. Practical implications/procedures re: operating cranes near high-voltage equipment, including:
• Statutory requirements (limits of approach, mandatory signalperson, electrical transmitters, personnel responsibilities, etc)
• Procedure/responsibilities should electrical contact occur (obligation to warn/notify; inspection/recertification requirements, etc.)
• Procedures/protocols re: electrical grounding

b. Practical implications/procedures re: climatic extreme conditions, including:
• Manufacturer specifications (sometimes unreliable or under-developed)
• Operation within maximum capacity
• Hot weather
• Lubricants, fuels, coolants, antifreeze, and other fluids
• Metallurgical impact(s) of extreme cold, and of temperature fluctuation
• Protocols and procedures re: equipment warm-up (especially hydraulic components)
• Avoidance of dynamic or shock loading of structural components
• Reduced rate of operation; smooth and infrequent lifting only
• High winds
• Heavy precipitation
• Other (specified by instructor)

c. Practical implications/procedures re: boom obstructions and two-blocking
• Load strikes or touches boom
• Boom touches or rests upon structure
• Procedure after a boom is contacted
• Causes/prevention of two-blocking
• Telescoping/lowering boom
• Hook-block/headache ball pulled into boom-tip sheaves
• Other (specified by instructor)

d. Practical implications/procedures re: crane unattended for long/short periods
• Manufacturer specifications and regulatory requirements
• Landing of attached loads
• Landing of hooks and blocks on clean, dry surface
• Hydraulic booms retracted, lowered into cradle
• Parking site: safe, secure, level, and stable
• Raising of vehicle; application of brakes and locking devices; use of blocks
• Power source and batteries
• Openings (air cleaner, turbocharger, breather, etc.)
• Locking of controls and doors; disposition of keys

f. Other (specified by instructor)

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Boom Truck Operator

Unit: D4 Job-Site Communication for Hoisting Operations

Level: One
Duration: 14 hours
Theory: 2 hours
Practical: 12 hours

Overview:

This unit of instruction explores the crane operator’s jobsite from the viewpoint of the several communication systems – spoken, written, visual, and technological – and the workplace social relationships which order it. Participants are encouraged to develop a deeper but also practical appreciation of the importance of communication skills to the safety and efficiency of their trade. The unit includes basic instruction on the use of hand signals and two-way radios, and lays the groundwork for more advanced training involving teamwork and documentation skills. Although the unit is not primarily concerned with remedial reading needs, some instruction is offered regarding the cognitive and communicative requirements involved in the effective use of manuals, logbooks, charts, engineered lift plans, and other common types of trade-related technical materials.

Objectives and Content:

1. Describe job requirements that relate to communications. 35%
   a. Information exchange with supervisors, coworkers and other site personnel
   b. Use of manuals and other technical documentation to maintain and operate equipment
   c. Readings gauges, meters and other measuring equipment
   d. Preparing and interpreting lift plans
   e. Jobsite etiquette
   f. Billing and invoice procedures
   g. Logbook maintenance and other record-keeping
   h. Map reading, route planning, and arranging permits

2. Explain and demonstrate hand signals and their use. 40%

3. Explain and demonstrate radio communication and its use. 15%

4. Explain basic reading strategies for using and interpreting technical literature. 10%

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