This course covers OSHA requirements for the safe handling of building materials, equipment, and containers. Primarily, it covers the safe use and maintenance of rigging equipment, and proper disposal methods for debris and other construction related waste materials according to OSHA regulations. In addition, this course also addresses safe mechanical and manual materials handling, as well as both hand and power tools and equipment for materials handling.
Introduction to Material Handling

• Course Overview
  – Course Description: training in safe storage, movement, and disposal of materials
  – Estimated Length: 1 hour
  – Audience: Workers, Supervisors, Managers
Introduction to Material Handling

• Module Agenda
  – This course will focus on:
    • Safe handling of building materials, equipment, and containers
    • Safe use and maintenance of rigging equipment
    • Proper disposal methods for debris and other waste
    • Manual and mechanical material handling
    • Hand/powered tools and equipment
• Get Site-Specific Training!
  – This training course:
    • provides basic occupational safety and health information
    • is not intended to be a substitute for knowledge of OSHA and other standards
    • is not a substitute for site-specific, hands-on training and information
Introduction to Material Handling

- Hazards of Material Handling
  - Improper Handling accounts for 25% of work-related injuries
  - Hazards include:
    * Back Injuries
    * Crushing Injuries
    * Exposure to Hazardous and Toxic Materials
    * Damage to utilities and other property
Introduction to Material Handling

• Preventing Accidents and Injuries
  - Evaluate the task:
    • Can job be engineered?
    • Can material be moved by mechanical equipment?
Introduction to Material Handling

• Preventing Accidents and Injuries
  – Before beginning work:
    • Inspect the object: loose or damaged, sharp edges, chemical hazards?
    • Look for hazards in pathway: slipping/tripping, poor lighting, floor openings, etc.
    • Destination level, available, clean?
    • Determine the weight and stability of the load
Manual Handling Techniques

- Manual Handling
  - When lifting/carrying cannot be avoided:
    - Break load into smaller parts
    - Get help with heavy or odd shaped objects
    - Keep load close to your body
    - Avoid lifting above shoulder
    - Use step stool, stepladder, or platform
    - Move slowly and maintain clear line of vision
Manual Handling Techniques

• Handling Techniques
  • Let your legs do the work, not your back!
    • Do not twist your body, move your feet
    • Bend at knees, keeping your back straight
    • Keep fingers, hands, feet away from bottom of object
  • Inspect object first for jagged edges
  • Consider its weight, shape, length, as well as pinch point and other hazards
Manual Handling Techniques

• Specialized Lifting

• When lifting bags/sacks:
  • Grip at opposite top and bottom corner
  • Raise load and rest on hip, then move to shoulder
  • If the load is heavy, awkward, or very long, get help before lifting
  • Do not twist your body!
Manual Handling Techniques

• Specialized Lifting
  – When moving drums, barrels, or cylinders:
    • Use appropriate equipment/tools
    • Remove gauges and replace valve caps from compressed gas cylinders
    • Secure to cart and roll
    • If no cart, then two person lift and carry: Never carry a cylinder by yourself!
    • For crane lift, use approved cart/basket
Manual Handling Techniques

- Two Person Manual Lift and Carry
  - Basic guidelines:
    - Work with someone close to your own height
    - Review lifting procedures and the direction of travel
    - Avoid walking backwards
    - One person should control and give the signal to lift
Manual Handling Techniques

- Two Person Lift and Carry
  - The Lift:
  - Lift load together, keeping it level to reduce chance of overloading one person
  - Carry long objects over opposite shoulders:
    - For example: Lead person carries on right shoulder and rear person on left
  - Watch for ends hitting people or objects!
Non-Powered Handling Equipment

• Non-Powered Equipment
  – Guidelines for Hand Trucks, Dollies, and Carts:
    • Familiarize yourself with safe operating procedures before use
    • Inspect the equipment:
      – Never use damaged/defective equipment
      – Remove/secure attachments before moving
Non-Powered Handling Equipment

• Hand Trucks, Dollies, Carts
  – Further guidelines:
    • Maintain a low center of gravity, placing heavy objects on the bottom
    • Secure the load
    • Maintain clear line of vision
    • Push, do not pull, and never walk backwards with a hand truck
    • Maintain control at all times, watching for drop-offs and uneven surfaces/ground
Powered Industrial Trucks

- Forklifts
  - OSHA regs have very specific operator requirements:
  - See OSHA Standard 1926.602
  - Trained, qualified operator required
  - Inspect equipment prior to use; read instructions
  - Wear seat belt when equipped with ROP
    (Rollover Protective Structure)
Powered Industrial Trucks

• Forklifts
  – Further Guidelines:
  – Face direction of travel
  – Have clear line of sight
  – Do not carry load that obstructs your view
  – Inspect the work area:
    check for uneven surfaces, floor openings, protrusions and blind corners
Powered Industrial Trucks

- Safety Guidelines
  - Safety devices in good working order:
    - Back up warning devices must be operational
    - Horns, mirrors, seatbelts, fire extinguisher
Powered Industrial Trucks

• More Safety Guidelines
  – For work in confined area with gas/diesel lift:
    • Air quality must be monitored
    • Electric or propane powered equipment may be required
    • Refer to confined space and tunnel section of OSHA regs
Powered Industrial Trucks

• Forklift Rules of the Road
  – No riders unless equipped with approved seat
  – Obey speed limits, signs and floor markings
  – Drive slowly, with eyes on the road
  – Pedestrians always have the right-of-way!
Powered Industrial Trucks

- **Rules of the Road**
  - Don’t let anyone stand or walk under elevated forks
  - Don’t drive with forks raised
  - Go up and down slopes slowly
  - Keep the load pointed up the slope
  - Raise the load just high enough to clear the road surface
  - Always keep your hands, arms, and legs inside the forklift
Powered Industrial Trucks

- Rules of the Road
  - Remember the potential hazards and take steps to avoid them
  - Study the operator’s manual and your company’s safety manual
  - Use the right forklift for the job and the associated hazards
  - Know emergency procedures
Powered Industrial Trucks

• Parking/Shutting Down
• When parking this equipment always:
  • Park away from traffic on a flat surface; chock wheels if on a slope
  • Don’t block aisles, doors, exits, electrical panels, fire extinguishers
  • Lower forks to ground and tilt them flat
  • Put control in neutral, set brake, and remove key
• **Load Capacity**
  – The operator should know:
    • Weight of materials to be moved
    • Limitations of equipment
    • Load capacity chart
  – The operator should ensure:
    • Surfaces are level, free of hazards, and designed to withstand load
  – At no time should equipment be modified without approval from the manufacturer.
Powered Industrial Trucks

- Refueling/Recharging
- General rules for refueling:
  - Turn off forklift and set brake
  - Bond and ground equipment and fuel container/hose
  - Use only approved safety containers
  - Wear PPE to protect against battery acid and other splash hazards
Powered Industrial Trucks

- Refueling/Recharging
  - Read and follow operator’s manual
  - Report and clean up spills quickly
  - Have a working fire extinguisher in close proximity
  - Check extinguisher to ensure it is charged, sealed, and classified to type of fire that could occur
Conveyors

- Hazards include:
  - pinch points
  - moving rollers and belts that can catch clothing, jewelry, or long hair
  - falling materials
  - stored energy
  - falls and many more
Conveyors

• Avoiding Hazards
  – Remember:
  – Don’t walk beneath a conveyor!
  – Keep hands, arms, legs, and clothing away from moving parts
  – Inspect before use; never operate if guards are not in place
Conveyors

- Other Considerations
  - Know that:
    - You must Lockout/ tagout (LOTO) before maintenance
    - Know location of emergency shut-off switches, which should be clearly labeled
    - No one should ever ride on conveyor
    - Fall Protection procedures must be established as necessary
Cranes, Hoists, and Rigging

- Cranes and Hoists
  - In the construction industry:
    - mobile and tower cranes are most widely used
    - each type has its benefits/hazards
  - see OSHA Standards 1926.550 - 556
Cranes, Hoists, and Rigging

- **Safety Guidelines**
  - **Basic Safety Guidelines:**
    - Only qualified, trained, authorized personnel allowed to operate cranes and hoists
    - Inspect cranes and hoist prior to each use
    - Controls must be clearly marked.
Cranes, Hoists, and Rigging

- Load Charts
  - The operator must:
    - Know the weight of the load and capacity of your equipment
    - Ensure area of travel is clear, level, and safe
    - Check overhead utilities, swing radius
    - Never lift over other personnel!
Cranes, Hoists, and Rigging

• Rigging
  – Wire Ropes, Slings, Chains, Grabs, Hooks, Shackles, and Ropes
  • Each piece of rigging has specific rated capacities:
    – must be clearly marked
    – must not be exceeded
  • Inspect rigging before and after using, and at a minimum of once every 12 months by competent person—don’t use if damaged!
Cranes, Hoists, and Rigging

• Rigging

  – The qualified rigger should:
  – Inspect load for sharp edges which must be padded to prevent cutting of slings
  – Identify the center of the load, and manufactured lifting eyes
  – Limit the angle of slings and chains (distribute load equally)
  – Never tie knots in chains for hoisting
Cranes, Hoists, and Rigging

- Chains and Chain Slings
  - Steel Alloy Chains:
    - Widely used and often the preferred tool
    - Greater flexibility than other slings/chokers
    - Can withstand high temperatures
Cranes, Hoists, and Rigging

- **Steel Alloy Chains**
  - Guidelines:
  - Stamped “A”
  - Require a permanent tag - size, grade, rated capacity and manufacturer’s name
  - No tag--don’t use!
  - Attachments must have rated capacity equal to chain’s
Cranes, Hoists, and Rigging

• Steel Alloy Chains
  – More Guidelines:
  – Clean before and after use
  – Competent Person to inspect every 12 months
  – Document all inspections
Cranes, Hoists, and Rigging

• Steel Alloy Chains
  – Check for:
    • bent links
    • cracks in weld areas
    • transverse nicks
    • stretched or oblong links
    • inspect hook for cracks
Slings

• Wire Rope Slings
  – The preferred equipment in many cases!
    • Wire ropes have great strength, durability, integrity in changing weather conditions
    • Consider size, shape, and weight of load
    • Ensure slings are correct length and capacity
• **Wire Rope Slings**
  – Inspect sling and read tag:
    Do not use without identification tag!
  – **Sling** Maintenance & storage
    • Lubricate
    • Keep clean and dry
Slings

- Inspection & Maintenance of Wire Rope Slings
- Check for:
  - abrasions, “bird caging”, stretching, corrosive and rusting, nicks, gouges or other abuse and damage
  - ten randomly distributed wires in one lay or five wires in one strand are broken
- If any of these conditions exist, dispose of the damaged sling
• Ropes
  – Fiber Ropes and Rope Slings
    • Manila (abaca), sisal, nylon, polyester
  – Limitations of fiber rope and rope slings include damage from:
    • Temperature extremes
    • Direct sunlight for long periods
    • Exposure to corrosives and acids
    • Sharp edges
• Synthetic Fiber Slings
• Inspect and clean before and after use
• Inspect for:
  – Abnormal wear
  – Powdered fiber between strands
  – Broken or cut fibers.
  – Variations in the size or roundness of the strands
  – Discolored or rotted
  – Distortion of hardware in the sling
• Synthetic Fiber Slings
  – Tag must be attached to sling:
    • Tag states size, grade, rated capacity, manufacturer’s name
Slings

- Grabs, hooks, spreader-bars, etc
  - Grabs, hooks, spreaders or any other attachment should:
    - Have lifting capacity equal or greater to slings in use
  - Job or shop built hooks/links should not be used for hoisting
  - All lifting devices clearly marked and proof-tested at 125%
Slings

• Specialty and Custom Designed Equipment
  – Ratchet hoists and pulleys:
    • used for horizontal pulling of loads and vertical lifting of loads
    • some designed for both horizontal pulling and vertical lifting
• Ratchets Hoists and Pulleys
  – Guidelines for Hoists and Pulleys:
    • Do not overload: some units have stress link in handle which will break if overloaded
    • Do not use chains, ropes, or steel cables that have kinks or knots
    • Prior to use, inspect ratchet mechanism, grab hooks, and the chain, rope, or steel cable
    • Proof-test at 125% of load
Storage and Disposal

• Material Storage
  – Evaluate route and storage location --
    Consider:
    • load capacity of flooring
    • location of emergency equipment i.e fire extinguishers, exits, sprinklers
    • incompatible materials
    • ease of loading/unloading and general access and egress
    • Compatibility of materials/activities in area
    • ventilation
Storage and Disposal

• General Requirements
  – Consider sliding, falling, or collapse
  – Aisle, passages, exits, and equipment to be kept safe and clear: never block emergency equipment/signs
  – Tiered materials must be racked, stacked, choked or interlocked to prevent unplanned movement
    • 6 feet from floor opening or hoistways
    • 10 feet from exterior walls
Storage and Disposal

- Masonry blocks
- Masonry blocks should not exceed the rated capacity
  - The stack must be tapered on a one-half block per tier over 6 foot
  - New lumber must not be stacked any higher than 20 feet with mechanical equipment and never higher than 16 feet when stacked manually
  - Round Stock - chock and secure
Storage and Disposal

• Disposal of Waste Material

• Prior to disposal consider:
  – PPE
  – MSDS
  – If materials dropped from elevated areas, the area below must be barricaded

• When over 20 feet, a debris chute is required
Housekeeping

- Good housekeeping:
  - Reduces accidents
  - Important for productivity and morale
- Debris should be removed immediately
- Nails removed or bent over
- Solvents and other wastes kept in fire resistant containers until removal from site
Final Considerations

• Summary
  – This course has addressed:
    • OSHA requirements for safe handling and storage of building materials, equipment, and containers
    • Regulations for safe use and maintenance of rigging equipment
    • Disposal methods for debris and other waste
    • Safe Manual and Mechanical material handling
    • Hand and powered material handling tools and equipment