

# Construction Craft Laborer Standards and Skills

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## Health & Safety Standards

### Standard 1: Safety and Health in a Construction Environment

Students will be able to demonstrate health and safety on a job site and/or in a shop environment, including the management of tools and equipment, use of personal protective equipment (PPE), and workspace ergonomics.

Aligned Industry Recognized Credentials: OSHA 10 – Construction, Preparation toward Apprenticeship, Hoisting Apprentice License

#### Skills:

1. Identify, describe, and demonstrate the effective use of Safety Data Sheets (SDS) to meet documentation requirements.
2. Locate emergency equipment, first aid kit, and emergency action and response plan, including labels and signage that follow OSHA Hazard Communication Program (HAZCOM).
3. Demonstrate safe use, storage, and maintenance of masonry hand tools, power tools, ladders, and scaffolding.
4. Demonstrate safe dress and use of relevant safety gear, personal protective equipment (PPE) and jobsite ergonomics, e.g., safety equipment, gloves, proper footwear, knee pads, earplugs, eye protection and breathing apparatus.
5. Identify fall hazards, demonstrate scaffold safety practices, and effective use of fall arrest systems.
6. Demonstrate safe body mechanics, including appropriate lifting techniques and ergonomics aimed at minimizing injury.
7. Interpret all placards, operation manuals, safety codes and other information pertinent to safe hoisting operations.
8. Demonstrate use, storage, and disposal of various masonry related materials, including cements, sands, mixes, and various chemicals according to manufacturers’ specifications.
9. Demonstrate proper disposal of hazardous waste including solvents and sealants regulated under the Resource Conservation and Recovery Act (RCRA) and enforced by the EPA.
10. Comply with appropriate fire protection regulations, local permit regulations, and state/federal regulations.

## Technical & Integrated Academic Standards

### Standard 2: Role of Construction Craft Laborers in Society

Students will examine the role of construction craft laborers professionals in society.

* Aligned Industry Recognized Credentials: Preparation toward Apprenticeship, Hoisting Apprentice License

#### Skills:

1. Explain the impact of Massachusetts General Laws and regulations on the construction industry and identify key regulations, compliance requirements, and licensing requirements.
2. Apply Massachusetts General Laws and regulations as they relate to hoisting machinery.
3. Explain how modern EPA regulations have changed the construction industries and evaluate industry best practices employed to address these regulations.

### Standard 3: Technical Drawings and Blueprint Reading

Students will be able to read and interpret all aspects of technical drawings, blueprints, and specifications enabling them to plan and execute construction craft laborer projects.

* Aligned Industry Recognized Credentials: Preparation toward Apprenticeship

#### Skills:

1. Interpret print terms, abbreviations, symbols, line types, symbols, and notes of technical drawings and blueprints.
2. Explain the basic layout of a set of prints, as well as the importance of the accompanying job specifications documents in determining work requirements.
3. Interpret and follow drawing dimensions using an architect’s scale.
4. Examine state and local building codes, inspection processes, and zoning regulations.
5. Demonstrate the use of drawing to mark reference points on construction materials to maintain precision and reduce errors.
6. Develop a comprehensive schedule outlining tasks and key checkpoints from project initiation to completion.
7. Calculate the cost of job site preparation to include in project bid.
8. Calculate quantities of materials required for a job and create a material takeoff sheet.
9. Calculate and provide documentation for a project bid, including material, labor, contingencies, and overhead costs.
10. Demonstrate effective communication with clients, contractors, and other tradespeople to understand project requirements, address concerns, and deliver satisfactory outcomes.
11. Explain management roles and responsibility of a job site supervisor/foremen.

### Standard 4: Hand, Power, and Pneumatic Tools

Students will demonstrate safe operation, maintenance, and storage of hand, power, and pneumatic tools.

* Aligned Industry Recognized Credentials: Preparation toward Apprenticeship

#### Skills:

1. Select and use layout, marking, and measuring tools.
2. Select and use fastening, clamping, and dismantling tools.
3. Select and use sawing, drilling, and boring tools.
4. Select and use planing, shaping, and smoothing tools.
5. Set up and operate portable circular saws, portable drills, screw guns, and equipment.
6. Set up and operate diamond-blade wet saws, electric, and gas-powered mixers.
7. Select and use masonry tools for tending.
8. Select and use surveying and pneumatic equipment.

### Standard 5: Hoisting and Rigging Skills

Students will be able assist with hoisting and rigging actions by identifying center of gravity of materials to be moved, selecting proper equipment, and using appropriate communication with crane operator. **Schools must pursue a variance with the Office of Public Licensure to allow for students to take the Hoisting Licensure exam at 16. Students must pass the test before operating hoisting equipment.**

* Aligned Industry Recognized Credentials: Preparation toward Apprenticeship, Hoisting Apprentice License

#### Skills:

1. Explain all working parts of hoisting machinery and purposes of rigging components to ensure safe operating practices.
2. Utilize rigging component charts to determine the proper type and size of devices required for specific tasks.
3. Calculate and apply appropriate sling angle in accordance with industry standards.
4. Use appropriate terminology to communicate with the crane operator by headset or radio.
5. Use correct hand signals for collaborating with the crane operator during a lift.
6. Follow visual instructions on displayed posted signs.

### Standard 6: Line and Grading Equipment

Students will be able to set up and operate leveling and grading equipment to accurately identify the specified grade and determine level in accordance with job specifications.

* Aligned Industry Recognized Credentials: Preparation toward Apprenticeship

#### Skills:

1. Interpret project drawings and blueprints to determine desired grades and/or levels of the job site surface.
2. Identify and demonstrate use of measuring devices, grade rods, GPS receivers, plumb bobs, laser auto levels, and engineer’s rules.
3. Maintain clear and direct communication with job site personnel, including use of standardized hand signals to enhance job performance and promote site safety.
4. Maintain accurate and current field documentation to record progress and changes, ensuring compliance with job specifications and regulatory requirements.
5. Demonstrate accurate depth perception within defined parameters to improve job accuracy.

### Standard 7: Ladders and Scaffolds

Students will be able to demonstrate safe techniques for the use, installation, and maintenance of ladders and scaffolding.

* Aligned Industry Recognized Credentials: Preparation toward Apprenticeship

#### Skills:

1. Identify and establish site access and egress to ensure safety and efficiency of construction operations.
2. Select and inspect scaffolding and components to ensure structural integrity.
3. Implement the use load tables to determine the expected load on scaffold and supporting structure.
4. Establish adequate footing in compliance with regulations.
5. Erect scaffold to print specifications including accurate dimensions from the structure.
6. Perform daily inspection of critical structural and safety areas for damage, corrosion, and wear, making alterations or repairs as needed.

### Standard 8: Masonry Support

Students will demonstrate necessary skills to assist with masonry work including selection and preparation of tools, equipment, and required materials.

* Aligned Industry Recognized Credentials: Preparation toward Apprenticeship

#### Skills:

1. Set up appropriate signage and barricades to meet jobsite safety requirements.
2. Select bricklaying and block laying materials to meet job specifications.
3. Use mechanical lifting devices to load, move, unload, locate, and/or install materials.
4. Operate mixing equipment according to manufacturer’s instructions.
5. Calculate and mix mortar to meet specifications of the project.
6. Demonstrate proper cleaning techniques for brick/block work surfaces and cavities to remove excess mortar.

### Standard 9: Concrete Placement

Students will be able to prepare a sites surface, identify required tools, and select appropriate materials for concrete placement.

* Aligned Industry Recognized Credentials: Preparation toward Apprenticeship

#### Skills:

1. Interpret job specifications to determine appropriate materials for forming, scaffolding, and concrete placement.
2. Demonstrate set up and use of differential leveling equipment including lasers, levels, and transits.
3. Clean and prepare surfaces for application of appropriate bonding.
4. Explain and apply soil density and testing practices and procedures.
5. Explain and apply principles of soil compaction in operation of compaction equipment.

### Standard 10: Trenching and Excavation Skills

Students will demonstrate proficiency in operating trenching and excavation equipment to meet the requirements of a given job.

* Aligned Industry Recognized Credentials: Preparation toward Apprenticeship

#### Skills:

1. Locate, layout, and mark indented excavation areas according to job specifications and requirements.
2. Identify service markers or taped areas to prevent damage to underground utilities or infrastructure.
3. Excavate post holes, small pits, and trenches to precise dimensions as specified.
4. Execute procedures to prevent trench collapse effectively.
5. Collaborate with machine operator to ensure predetermined route, line, and depth.

### Standard 11: Pipelaying Skills and Techniques

Students will be able to describe and demonstrate pipelaying skills and techniques aligned to industry expectations.

* Aligned Industry Recognized Credentials: Preparation toward Apprenticeship

#### Skills:

1. Identify authorities responsible for site isolation and required traffic control.
2. Classify and provide detailed descriptions of pipelayer types, including their characteristics, technical capabilities, and limitations.
3. Explain and apply pipelayer and attachment operating techniques.
4. Demonstrate methods of changing machine attachments.
5. Apply terminology commonly used in civil construction.
6. Explain the importance of and apply basic soil technology principles for civil work projects.
7. Explain and apply the significance of groundwater characteristics in civil construction work.
8. Operate drills needed for pipelaying tasks.
9. Maintain inventories of explosives and associated materials.
10. Identify and apply types of valves and their functions.
11. Inspect, evaluate, and repair any shorted casings in a pipeline system.
12. Examine and apply characteristics of various coating systems.
13. Select and use appropriate equipment to apply methods of cleaning.

### Standard 12: Demolition Sites

Students will be able to demonstrate practices of demolition, including safe use of equipment, identification of hazardous materials and proper disposal, and site cleanup procedures.

* Aligned Industry Recognized Credentials: Preparation toward Apprenticeship

#### Skills:

1. Interpret the specifications of the site demolition plan.
2. Confirm that all existing services have been disconnected.
3. Select tools and equipment consistent with the requirements of the demolition site.
4. Set up and operate an air compressor and hoses, pneumatic tools, and various safety equipment in preparation to demolish a pre-poured reinforced concrete slab.
5. Identify hazardous materials for handling in accordance with workplace requirements and current industry standards.

### Standard 13: Metal Arc Welding

Students will be able to demonstrate safe welding operations, including the set up and use of shielded arc welding and oxy-acetylene welding equipment.

* Aligned Industry Recognized Credentials: Preparation toward Apprenticeship

#### **Skills**:

1. Demonstrate the selection of welding personal protective equipment (PPE).
2. Demonstrate shielded metal arc welding skills to fabricate various metal products.
3. Identify, place, and operate fire extinguishers effectively.
4. Apply preventive strategies to avoid safety hazards posed by welding in a wet environment or by exposed current-carrying elements.
5. Identify the polarities used in welding operations to ensure desired weld quality.
6. Describe and demonstrate the operation and safety procedures of oxy-acetylene welding.

### Standard 14: Weatherization

Students will be able to explain and demonstrate weatherization techniques, including the significance of adequate ventilation and the principles of energy conservation.

* Aligned Industry Recognized Credentials: Preparation toward Apprenticeship

#### Skills:

1. Apply the whole house approach to weatherization.
2. Describe the types of energy systems and how they work.
3. Differentiate and apply the Thermal Envelope and the Pressure Envelope.
4. Select insulation materials for optimizing energy efficiency and maintaining comfortable indoor temperatures including consideration of R-Values and U-Values.
5. Describe the tools and materials used to construct and seal a new home.
6. Demonstrate and explain the procedures involved in sealing the Building Envelope.
7. Explain the importance of proper ventilation in a home and demonstrate techniques for identifying air leakage in a home.
8. Compare, select, and use products to seal leaks and maximize energy efficiency.

## Employability Standards

### Standard 15: Employability Skills

Students will understand and demonstrate the roles of professional communication, critical thinking, problem solving, professionalism, teamwork, and collaboration within the context of construction craft laborer careers.

**Skills:**

1. Demonstrate understanding of the overall dynamics of a construction project, including the role of a contractor and specifically the role of a construction craft laborer.
2. Apply the concept of teamwork to a commercial project to improve outcomes.
3. Describe effective methods of communication with clients about products, procedures, and policies.

## Entrepreneurship Standards

### Standard 16: Entrepreneurship

Students will be able to describe opportunities for entrepreneurship and be able to evaluate the value proposition of business ownership in the construction field.

#### Skills:

1. Evaluate the licensing, regulatory, and tax implications of self-employment and business ownership in construction compared to W-2 employment.
2. Evaluate the role of a labor union in the career development and security of a career as a construction craft laborer.
3. Describe a business model of a company that employs construction craft laborer professionals.

## Digital Literacy Standards

### Standard 17: Digital Literacy

Students will be able to demonstrate the use of common software and information technology in a construction craft laborer environment.

#### Skills:

1. Describe the use of online resources in licensing and professional development as a construction craft laborer.
2. Demonstrate the use of common scheduling, resource management, and customer relationship software systems.
3. Understand where to find online resources that support effective construction craft laborer work and how to be a safe and ethical consumer and creator of digital content.
4. Apply strategies for using digital tools and technology to drive business and commerce.