

## **Appendix A**

TIMBER FRAMER  
(Rough Carpenter)

O\*NET-SOC CODE: 47-2031.02 RAPIDS CODE: 0069HY

This schedule is attached to and a part of these Standards for the above identified occupation.

### **1. TERM OF APPRENTICESHIP**

The term of the occupation shall be 3 years with an OJL attainment of 5000-7000 hours supplemented by the required hours of related instruction.

### **2. RATIO OF APPRENTICES TO JOURNEYWORKERS**

One (1) apprentice may be employed in each shop department, and/or jobsite employing a qualified journeyworker.

### **3. APPRENTICE WAGE SCHEDULE**

Apprentices shall be paid a progressively increasing schedule of wages based on a percentage of the current journeyworker wage rate.

#### **2 ½ Year Term Example:**

1 <sup>st</sup>	0-6 months - 0-1000 hours = 50% of journeyworker wage
2 <sup>nd</sup>	6 months - 1000 – 2000 hours = 55% of journeyworker wage
3 <sup>rd</sup>	2 <sup>nd</sup> year, 2000 - 4000 hours = 65% of journeyworker wage
4 <sup>th</sup>	3 <sup>rd</sup> year, 4000 hours - completion, (5000 hours minimum) = 75% of journeyworker wage

#### **3 ½ Year Term Example:**

1 <sup>st</sup>	0-6 months - 0-1000 hours = 50% of journeyworker wage
2 <sup>nd</sup>	6 months - 1000 – 2000 hours = 55% of journeyworker wage
3 <sup>rd</sup>	2 <sup>nd</sup> year, 2000 - 4000 hours = 65% of journeyworker wage
4 <sup>th</sup>	3 <sup>rd</sup> year, 4000 hours - 6000 hours (5000 hours minimum) = 75% of journeyworker wage
5 <sup>th</sup>	4th year, 6000 hours - completion, (7000 hours maximum) = 85% of journeyworker wage

### **4. SCHEDULE OF WORK EXPERIENCE (See attached Work Process Schedule)**

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

### **5. SCHEDULE OF RELATED INSTRUCTION (See attached Related Instruction Outline)**

## Appendix A

### WORK PROCESS SCHEDULE

#### TIMBER FRAMER

(Rough Carpenter)

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**DESCRIPTION:** Build finished wooden frame structures of heavy timber, such as residential and commercial buildings, according to blueprints and specifications. Study drawings to determine lengths of timbers and location of wooden or metal joinery. Procure timbers from sawmills and visually grade materials to meet engineering specifications. Understand the behavior of green (unseasoned) timber in a structure and know how to minimize undesirable effects. Efficiently move and manipulate heavy timber in a production shop environment using specialized equipment. Measure and mark materials using squares, measuring tapes and pencils. Use layout techniques that account for variability in nominal size and shape of timber; incorporate round and crooked timber in finished frames. Cut timbers and joinery using specialized equipments such as chain mortisers and large portable circular saws. Finish timbers using portable electric planers and suitable coatings. Assemble timber frames using wooden, pegged joinery and specialized equipment such as come-alongs and clamps. Bore peg holes using electric or hand drill and offset to draw joinery tight during assembly. Erect timber frames on-site using cranes, hoists, ladders, temporary bracing and appropriate fall prevention and protection equipment. Build rough and finished stairs. Install enclosure systems, particularly Structural Insulated Panels (SIPs). Examine, repair and install defective timbers in existing timber framed buildings. Survey and apply sound structural and conservation standards to historic timber structures in need of repair, such as barns, steeples and covered bridges. Employ sound small business practices and project management skills.

The Program is Hybrid, 3-year Apprenticeship with an estimated minimum of 5000 hours and a maximum of 7000 of work experience. However, the apprentice is required to meet the competency standards as established by the sponsor. During the term of Apprenticeship, Timber Frame Apprentices will be given training in the various on-the-job (OJL) work experiences listed below. The order in which this training is given will be determined by the workflow on the job and will not necessarily be in the order listed. The times allotted to these various processes are estimated times that the average Apprentice will require to learn each phase of the trade. They are intended only as a guide to indicate the quality of the training being provided and the ability of the apprentice to absorb this training in an average amount of time. The total term of apprenticeship is indicated below.

WORK PROCESS SCHEDULE  
TIMBER FRAMER  
(Rough Carpenter)  
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**Competencies**

**Hours Min.-Max.**

**DRAWINGS AND SPECIFICATIONS**

**300-500**

- Identify, read and interpret essential information provided in construction documents.
- Sketch shop drawings & joinery details
- Make technical drawings and details for timber-framed buildings.
- Identify and describe the information required for building codes, estimating, planning, permits, engineering and sub trades.
- Identify and describe various methods for assigning locations of timbers within frames.
- Identify common frame components.

**TIMBER CONVERSION**

**50-100**

- Identify and demonstrate techniques for safely and accurately hewing logs and timbers
- Identify and describe timber milling equipment and procedures
- Identify and describe special considerations for the milling of salvaged timber.
- Demonstrate milling with portable sawmill.

**TRADE PRACTICES**

**50-100**

- Identify and describe the general processes and practices necessary to manage a small timber frame project effectively.
- Demonstrate effective communication with colleagues and co-workers.
- Identify, describe and demonstrate the good work habits necessary to being a responsible and productive member of a timber framing crew.
- Identify and describe effective techniques for yard management.
- Demonstrate the effective care and management of stock, tools and inventory.
- Demonstrate basic instructional techniques for the teaching of hard and soft skills to timber framers.
- Document all timber framing projects that Apprentice has been involved in throughout the period of their apprenticeship.

**TIMBER FRAMING TECHNIQUES**

**1200-1600**

- Select timbers for framing.
- Describe how to safely and effectively store and protect timbers during all timber framing operations from initial delivery to site assembly.
- Demonstrate safe timber handling.

- Describe common work sequences and processes for timber framing shops.
- Describe efficient shop layout.
- Describe the tools and equipment necessary to perform common work sequences for timber framing shops.
- Demonstrate the use of Square Rule Layout, Mill Rule Layout and Mapping for joinery and frame sections.
- Demonstrate the safe and accurate layout and cutting of common joinery.
- Describe, construct and use jigs and templates for timber framing.

## **TOOLS & EQUIPMENT**

**1000-1400**

- Demonstrate the safe care, use and storage of hand and power tools used for timber framing.
- Demonstrate the sharpening of edge tools.
- Identify historic hand tools used for timber framing.
- Identify and describe appropriate PPE for use with hand and power tools.
- Demonstrate the safe care, use and storage of chainsaws for timber framing.
- Identify and describe Computer Numeric Control (CNC) and other machines that are used for timber framing.
- Demonstrate the safe care and use of lifting and hoisting equipment for timber framing.
- Identify, describe and demonstrate the use of survey instruments.
- Demonstrate the safe care and use of forklifts for timber framing.
- Demonstrate the safe care and use of access equipment, including Mobile Elevated Work Platforms (MEWP) for timber framing.

## **RELATED MATERIALS**

**150-200**

- Identify and describe the glues and fasteners and related tools that are commonly used in timber frame construction.
- Identify and describe the general properties and appropriate applications of glues and fasteners that are commonly used in timber frame construction.
- Identify and describe the types of enclosure systems that are commonly used in timber frame construction.

## **RELATED TRADES**

**50-100**

- Identify and describe common general carpentry, finish carpentry and sub-trade (plumbing, electrical, mechanical) processes and practices.
- Identify and describe constructive measures for ensuring an effective interface between general carpenters, finish carpenters, sub-trades and timber framers.
- Identify and describe constructive measures for ensuring a smooth handover between timber frame contractors and general carpenters, finish carpenters and sub-trades.
- Identify and describe common sub-trade (plumbing, electrical, mechanical) processes and practices.

## **RELATED SKILLS**

**200-400**

- Identify and define stair building and handrailing terms.
- Identify and describe common stair building and handrailing details.
- Calculate the angles and dimensions necessary to construct basic straight and winding stairs to satisfy building code requirements.
- Make straight stairs and handrails for timber framed buildings.

## **FINISHING TIMBERS**

**500-600**

- Identify and describe various chamfering tools, techniques and profiles.
- Demonstrate the safe and effective cutting of common chamfers and stops with hand and power tools.
- Identify and describe various planning tools and techniques used in timber framing.
- Demonstrate the safe and effective planning of timbers with hand and power tools.
- Identify and describe the general properties and appropriate applications of finishes that are commonly used in timber frame construction.
- Describe common work sequences, tools, equipment and processes for applying surface finishes to timbers.
- Describe common work sequences, tools, equipment and processes for applying surface protection to timbers.

## **RAISING & RIGGING**

**1000-1400**

- Identify and describe procedures for preparing a job site for the erection of a timber-framed building.
- Identify and describe procedures for checking foundations and floors in preparation for the erection of a timber-framed building.
- Identify and describe procedures for the safe and efficient loading / unloading of timber frames on trucks.
- Identify the various types of vehicles commonly used for frame deliveries, and describe appropriate and economical uses for each.
- Calculate the weights and centers of gravity of timbers and frame assemblies.
- Determine appropriate rigging points for frame assemblies.
- Identify and describe hazards associated with using cranes to raise timber buildings.
- Identify and describe common crane types and their applications for timber framing.
- Demonstrate correct hand signals for communicating with crane operators.
- Determine appropriate sling angles for lifting with cranes.
- Demonstrate safe and correct inspection of lifting tackle.
- Demonstrate safe slinging / rigging of loads for cranes.
- Demonstrate how to plan, organize and run a safe and efficient frame raising.
- Demonstrate pre-work planning and perform raising briefings.
- Demonstrate the correct tying of common knots and hitches and describe their uses for timber framing.
- Identify and describe hazards associated with installing structural insulated panels (SIP's).
- Demonstrate safe and correct installation of SIPs.
- Identify and describe tools for cutting and modifying SIPs.
- Identify and describe safe and correct methods for cutting and modifying SIPs.

**CONSERVATION TECHNIQUES****500-600**

- Demonstrate how to plan and organize a safe frame dismantling.
- Demonstrate pre-work planning and perform dismantling briefings.
- Demonstrate how to safely and effectively dismantle a timber-framed building.
- Identify and describe common types of repairs for timber structures.
- Demonstrate simple timber repairs.
- Demonstrate simple metalwork repairs.
- Demonstrate simple chemical repairs.
- Describe the effects of shrinkage on various repair types.
- Describe the effects of water / moisture on various repair types.

**TOTAL****5000-7000**

RELATED INSTRUCTION OUTLINE  
TIMBER FRAMER  
(Rough Carpenter)  
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Hours

**YEAR 1**

**SAFE WORK PRACTICES**

**24**

- Identify pertinent legislation and regulations
- Identify and describe common shop and site hazards
- Identify and describe shop and site safety equipment and practices
- Identify and describe safety committees
- Identify and describe procedures for reporting an injury at the shop and at the site
- Identify and describe safe shoring and bracing of timber frames
- Demonstrate inspection and safe use of ladders, scaffolds and access equipment
- Identify and describe Personal Protective Equipment (PPE)
- Describe and demonstrate safe lifting and manual handling
- Identify and describe basic first aid requirements for timber framing.
- Complete basic first aid training and demonstrate basic first aid techniques.
- Identify and describe common controlled products used and stored at a commercial timber framing operation.
- Use Material Safety Data Sheets (MSDS) to identify and describe safety precautions for storage and handling of hazardous materials.
- Use MSDS to identify appropriate PPE for use of common hazardous materials.

**HISTORIC TIMBER FRAMING**

**12**

- Identify and describe the history and evolutionary progress of timber framing and joinery techniques.
- Identify and describe the key historic periods of development in timber framing style and form.
- Identify the general types and forms of timber buildings.
- Determine the age of a building by examining details of its construction.
- Identify and describe historic timber framing tools and the markings that they make.

**TIMBER MANAGEMENT**

**12**

- Identify and describe the environmental and economic impacts of non-sustainable forestry.
- Identify and describe the environmental and economic benefits of sustainable forestry.
- Identify and describe the 'value added' concept.
- Identify and describe the principals behind sustainable-yield forest management for timber production.
- Identify and describe standards and certification for sustainable forest management and timber production.
- Describe the process of timber harvesting, shipping and seasoning.

- Identify common tree species used by timber framers.
- Identify general characteristics and properties of common tree species used by timber framers.
- Demonstrate the correct method of determining the timber volume and quality of living trees.

**TIMBER GRADING** **16**

- Identify natural-growth, manufacturing and seasoning defects in timbers
- Demonstrate the correct use of visual grading rules to grade timbers.
- Identify design values for timbers.

**TRADE SCIENCES** **40**

- Demonstrate the use of common mathematical formulas and measurement systems used for construction.
- Demonstrate the use of geometry to solve problems that are commonly found in construction.
- Demonstrate the use of developed drawing to illustrate roof planes and joinery.
- Demonstrate the use of trigonometry for solving common construction problems.
- Use ratio and proportion to solve common construction problems.
- Identify and describe the full range of terms that are commonly used by timber framers to describe their frames, frame components and joinery.

**TRADITIONAL RAISING AND RIGGING** **40**

- Identify and describe hazards associated with using traditional rigging and raising equipment to erect timber buildings.
- Identify and describe common types of traditional raising and rigging equipment and their applications for timber framing.
- Identify and describe design and specification issues for traditional lifting systems.
- Demonstrate safe and correct communication with lifting crew.
- Determine appropriate sling angles for lifting.
- Demonstrate safe and correct inspection of lifting tackle.
- Demonstrate safe and effective raising and down-rigging of Gin Poles, A-Frames and Derricks.
- Demonstrate safe slinging / rigging of loads with traditional raising and rigging equipment.
- Demonstrate the correct method for reeving blocks and tackle.
- Identify and describe hazards associated with hand-raising timber frames without lifting tackle.
- Demonstrate safe and correct communication with hand-raising lifting crew.

**TOTAL YEAR 1** **144**



## YEAR 2

### TRADE PRACTICES

48

#### PROJECT MANAGEMENT

- Identify and describe the general processes and practices necessary to manage a small timber frame project effectively.
- Identify and describe record keeping, and the use of site journals for project management.
- Identify and describe protocols and procedures for effectively managing and issuing drawings, details and specifications.
- Identify and describe protocols and procedures for effectively managing and issuing correspondence relating to the construction of timber frames.
- Identify and describe protocols and procedures for effectively tracking costs and quantities.

#### SMALL BUSINESS BASICS

- Identify and describe employer and employee obligations.
- Identify and describe basic client agreements.
- Identify and describe basic contracts of employment.
- Identify and describe the general processes and practices necessary to promote and operate a small, successful, timber frame business.
- Identify and describe the principals of good business practice for timber framing companies.

#### ESTIMATING

- Identify and quantify the materials, labor and equipment necessary to construct timber-framed buildings.
- Demonstrate the calculation of board measurements and timber volume for estimating.
- Compile and organize estimates of material, labor and equipment quantities.
- Calculate the costs and times associated with material, labor and equipment quantities.
- Identify and describe the various common factors that have an effect on the cost of timber frame construction.

#### OFFICE SYSTEMS

- Identify and describe the basic office systems that are necessary to operate an effective timber framing businesses.
- Identify and describe commonly available computer hardware and software for timber frame offices.
- Demonstrate the effective use of computers to perform basic tasks.

## **TIMBER FRAMING TECHNIQUES**

**80**

- Demonstrate the use of Scribe Rule for joinery and frame sections.
- Demonstrate the layout and cutting of joinery in round log work.
- Demonstrate the use of various tools for the development of compound joinery layout and member angles.

## **RELATED SKILLS**

**16**

- Demonstrate the safe and effective making of riven pegs with hand tools.
- Demonstrate the safe and effective making of handles for common woodworking tools.
- Identify and describe the hazards that are commonly associated with falling trees and bucking logs.
- Correctly identify tension and compression wood in trees and logs.
- Identify and describe the principles of best practice for the safe and effective falling of trees and bucking of logs under a variety of common woodland conditions.
- Demonstrate the safe and effective felling of small diameter trees and bucking of logs.
- Demonstrate the correct layout and chip carving of letters and numerals.

## **TOTAL YEAR 2**

**144**

## **YEAR 3**

### **TRADE SCIENCES**

**124**

#### **MECHANICAL PROPERTIES OF TIMBER FRAMES**

- Identify and describe the various loads that effect timber framed structures and the causes of these loads.
- Identify and describe the various load conditions of timber posts and beams.
- Identify and describe how and why timber framed structures fail.

#### **FORCES & STRESSES IN TIMBER FRAMES**

- Identify and describe the various forces and stresses that act upon a timber framed building and it's individual timber components.
- Identify tension joinery.

#### **PROPERTIES & REACTIONS OF WOOD**

- Identify and describe the parts and properties of hardwood and softwood.
- Describe the various types of shrinkage that effect timbers.
- Describe the effects of timber shrinkage on timber shapes and dimensions.
- Identify and describe the processes of rot, decay and insect attack in timber.

## **FORCES & STRESSES IN FASTENERS**

- Describe how loads are transmitted through connections and how various fasteners resist these loads.
- Identify and describe the various properties and issues of common timber fasteners.
- Identify connection types that require specialized and expert design.

## **CALCULATE LOADS**

- Demonstrate how to calculate simple loads for timbers and frames.
- Demonstrate how to calculate simple loads for timber connections.
- Identify and describe when a professional engineer is required.

## **DESIGN TIMBER FRAMES**

- Identify and describe the general principals of frame design.
- Identify and describe the various processes that are necessary for generating frame designs.
- Identify cost-effective frame designs.
- Identify and select appropriate frame and truss types for specific applications.
- Identify and describe when a professional engineer is required.
- Identify and describe when a professional architect is required.

## **COMPUTER AIDED DESIGN (CAD)**

- Identify and describe commonly available CAD packages and their uses for timber frame design.
- Compare and distinguish between commonly available CAD packages and their applications and limitations for timber frame design.
- Demonstrate the use of CAD for the production of simple frame drawings.

## **COMPUTER AIDED ENGINEERING (CAE)**

- Identify and describe commonly available CAE packages and their uses for timber frame design.
- Compare and distinguish between commonly available CAE packages and their applications and limitations for timber frame design.

## **CONSERVATION TECHNIQUES**

**20**

- Identify and describe the national and international bodies that govern the conservation of historic timber buildings.
- Identify and describe current standards and guidelines for the conservation of historic timber buildings.
- Identify and describe preservation ethics as they pertain to the conservation of historic timber buildings.
- Identify, describe and discuss issues of timber supply related to the conservation of historic timber buildings.
- Identify, describe and discuss the significance of preserving historic craft techniques and how this relates to the conservation of historic timber buildings.

- Identify and describe common practices used to conserve and preserve historic timber buildings.
- Identify and describe the tools and techniques that are commonly used for investigating, quantifying and documenting historic timber buildings.
- Demonstrate how to document, measure and label a historic timber building in accordance with the recommendations of the Traditional Timberframe Research and Advisory Group (TTRAG).
- Create a survey report for an historic timber building.
- Identify and quantify the materials, labor and equipment necessary to repair timber-framed buildings.
- Compile and organize estimates of material, labor and equipment quantities for repairs of timber buildings.
- Calculate the costs and times associated with material, labor and equipment quantities for repairs of timber buildings.
- Identify and describe the various common factors that have an effect on the cost of timber frame restoration and repair work.

**TOTAL YEAR 3**

**144**

**Total hours of Related Instruction**

**432**