

Name:

Date:

BEFORE YOU BEGIN: Please save this file with your name and date (ex. Jane Smith 2014.05.02.pdf)

Part of the application process for the Timber Framers Guild Apprenticeship program is awarding credit for previous experience and education. This helps place the applicant at an appropriate level within the program and identifies the focus of their future training and development.

Please review the *Curriculum Outlines* and the *Goals for Successful Completion* for each of the 16 sections of the Guild Training Curriculum. Select a number between 1 and 5 (0 is a placeholder) that best represents your ability to complete the theoretical and practical goals. Journeyworker qualification is satisfied if the applicant indicates competency in 70% of these skills. These assertions can be challenged by the ATC to verify the applicants's self-assessment.

The objective of the program is to reinforce the professional practice, evolving skill set, and continuing education necessary to deliver high quality timber frames, enclosure systems and structures to the marketplace. For the program to succeed the Journeyworker must also be able to contribute to the education and leadership of others.

The rating system goes as follows:

0 I have not filled in this field

1 I know nothing about the material in the section.

2 I know 25% of the material in the section

3 I know 50% of the material in the section

4 I know 75% of the material in the section, but am unsure if I could pass a written or skills test

5 I know the material in the section and could pass a test on it right now.

### **PART ONE - SAFE WORK PRACTICES**

Theory

Practical

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1B SITE SAFETY

1C PERSONAL SAFETY

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- 8I DEVELOPED DRAWING
- 8J TRIGONOMETRY
- 8K RATIOS & PROPORTIONS
- 8L COMPUTER AIDED DESIGN (CAD)
- 8M COMPUTER AIDED ENGINEERING (CAE)
- 8N TIMBER FRAMING TERMINOLOGY

Name:

Theory

Practical

### **PART NINE – TIMBER FRAMING TECHNIQUES**

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9F MILL RULE LAYOUT  
9G MAPPING LAYOUT  
9H COMPOUND JOINERY LAYOUT  
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9K ROUND LOG SCRIBING

### **PART TEN – TOOLS & EQUIPMENT**

10A HAND TOOLS  
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10C CHAINSAWS  
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10G FORKLIFT  
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### **PART ELEVEN – RELATED MATERIALS**

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### **PART TWELVE – RELATED TRADES**

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12C ENCLOSING TIMBER FRAMES  
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13B MAKE HANDLES  
13C FALLING & BUCKING  
13D CARVING  
13E STAIRBUILDING & HANDRAILING

Name:

Theory

Practical

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**PART FIFTEEN – RAISING & RIGGING**

15A SITE PREPARATION  
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15C WEIGHT & CoG CALCULATIONS  
15D CRANES  
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15F RAISING SEQUENCE & FRAME ASSEMBLY  
15G ROPES, KNOTS & RIGGING FOR TIMBER FRAMERS  
15H HAND RAISING (NO TACKLE)  
15I INSTALLING SIP's

**PART SIXTEEN – CONSERVATION TECHNIQUES**

16A ETHICS & STANDARDS  
16B DISMANTLING TECHNIQUES  
16C REPAIR TECHNIQUES  
16D CONSERVATION & PRESERVATION TECHNIQUES  
16E INSPECTION, SURVEYING & RECORDING TECHNIQUES  
16F ESTIMATING REPAIRS

# Curriculum Goals for Successful Completion

## COLOR CODES:

Green: 1<sup>st</sup> year Apprentice Related Training (Classroom) - 144 hours

Blue: 2nd year Apprentice Related Training (Classroom) - 144 hours

Red: 3rd year Apprentice Related Training (Classroom) - 144 hours

Black: On the job (OTJ) Training (ongoing throughout apprenticeship)

Orange: Specialized Training not likely to be available through either OTJ or Classroom; probably Timber Framers Guild workshop would be best venue

## PART ONE - SAFE WORK PRACTICES

### 1A SHOP SAFETY

#### Theory:

- i) Given a multiple choice test of 40 recall/recognition type questions about OSHA regulations and general shop safety rules followed in the timber framing industry, the learner will answer all questions within 30 minutes and score a minimum of 70% or 28 correct answers without reference materials.
- ii) Learners will correctly identify WCB rules and regulations regarding the reporting of an accident or injury at a shop within their state, and demonstrate how to find information for out-of-state WCB rules and regulations.

#### Practical:

- iii) Given sample first aid kit from a typical timber framing shop, learners will correctly determine whether or not the contents meet ANSI Standards.
- iv) Given a selection of 3 portable and stationary power tools in a typical timber framing shop, learners will correctly demonstrate the following:
  - a. One safe method to isolate the power supply to each tool
  - b. One correct method to identify damaged/unsafe shop tools
- v) Given a selection of 3 different fire extinguishers in a typical timber framing shop, learners will correctly determine the following:
  - a. Whether or not each extinguisher is fit for use

- b. For what types of fires each extinguisher should / should not be used

## 1B SITE SAFETY

### Theory:

- i) Given a multiple choice test of 40 recall/recognition type questions about OSHA regulations and general site safety rules followed in the timber framing industry, the learner will answer all questions within 30 minutes and score a minimum of 70% or 28 correct answers without reference materials.
- ii) Learners will correctly identify the emergency services telephone number for their area.
- iii) Learners will correctly identify WCB rules and regulations regarding the reporting of an accident or injury at a site within their state, and demonstrate how to find information for out-of-state WCB rules and regulations.

### Practical:

- iv) Given a sample first aid kit from a typical timber framing site, learners will correctly determine whether or not the contents meet ANSI Standards.
- v) Given a jobsite ladder, learners will perform a visual inspection and determine whether the ladder is safe for use.
- vi) Learners will demonstrate the correct angle for setting a ladder.
- vii) Learners will demonstrate one correct way for tying-off a ladder.
- viii) Given a fixed access scaffold, learners will perform a visual inspection and determine whether the scaffold is safe for use.
- ix) Given a portable scaffold tower, learners will perform a visual inspection and determine whether the scaffold is safe for use.

## 1C PERSONAL SAFETY

### Theory:

- i) Given a multiple choice test of 45 recall/recognition type questions about PPE consisting of:
- Specified Job Tasks (15 Questions)
  - Specified Weather Conditions (15 Questions)
  - Specified Height Safety (15 Questions)
- The learner will answer all questions within 45 minutes and score a minimum of 70% or 32 correct answers without reference materials.

### Practical:

- ii) Given a selection of the following:
- 2 fall arrest harnesses and lanyards in good condition
  - 2 damaged fall arrest harnesses
  - 4 karabiners in good condition
  - 2 damaged karabiners
  - 4 anchor slings in good condition
  - 2 damaged anchor slings
- a. The learner will correctly identify and separate the damaged equipment from the functional equipment within 15 minutes. The learner must identify all damaged equipment.
- b. The Learner will correctly don 1 fall arrest harness within 15 minutes.
- iii) Learners will demonstrate safe body mechanics and lifting techniques to move, lift and roll heavy timbers.
- iv) Given a selection of the following PPE:
- 2 hard hats that are out of date and do not meet ANSI standards
  - 1 hard hat that is suitable for use at work
  - 2 pairs of safety glasses that do not meet ANSI standards
  - 1 pairs of safety glasses that are suitable for use at work
  - 2 pairs of safety boots that do not meet ASNI standards
  - 1 pair of safety boots that are suitable for use at work
  - 2 pairs of hearing protection that do not meet ANSI standards
  - 1 pair of hearing protection that is suitable for use at work
- a. The learner will correctly identify and separate the unsuitable PPE from the functional PPE within 15 minutes. The learner must identify all damaged / out of date equipment.

## 1D FIRST AID

Learners will successfully complete a Basic First Aid at Work course by St John's Ambulance, Red Cross or equivalent.

# 1E HAZARDOUS MATERIALS

## Theory:

- i) Given a multiple choice test of 40 recall/recognition type questions about OSHA regulations and general safety rules followed in the timber framing industry, the learner will answer all questions within 30 minutes and score a minimum of 70% or 28 correct answers without reference materials.

## Practical:

- ii) Learners will select one common controlled product and demonstrate the correct use of MSDS to determine appropriate PPE when working with this product.

## PART TWO - DRAWINGS & SPECIFICATIONS

### 2A READ DRAWINGS & DETAILS

## Theory:

- i) Given a multiple choice test of 45 recall/recognition type questions, learners will correctly identify and describe various components of a drawing package:
  - Title Block (5 Questions)
  - Common Architectural Symbols (15 Questions)
  - Common Architectural Abbreviations (15 Questions)
  - Types of Drawings (5 questions)
  - Specifications, General Conditions & Legal Description (5 Questions)

The Learner will answer all questions within 45 minutes and achieve a minimum score of 70% or 32 correct answers.

## Practical:

- ii) Learners will demonstrate the correct method for 'marking up' a set of drawings as superseded.
- iii) Learners will demonstrate the correct method for folding an architectural drawing.
- iv) Given a complete drawing package for a simple timber frame house, learners will use the drawings to answer 45 questions:



- Specification (5 Questions)
- General Conditions (5 Questions)
- Architectural Drawings & Details (15 Questions)
- Frame Drawings & Joinery Details (15 Questions)
- Conflicts & Errors (5)

The learner will answer all questions within 90 minutes and score a minimum of 70% or 32 correct answers

## 2B SKETCH SHOP DRAWINGS & JOINERY DETAILS

### Practical:

- Learners will sketch 5 common joint details, and include all information necessary for another carpenter to understand and cut the joinery.
- Learners will sketch a simple bent, and include all information necessary for another carpenter to understand, cut and assemble the frame (excluding joinery details).
- Given clear orthographic drawings of 2 typical joinery details, Learners will sketch exploded 3D view of the details.

## 2C MAKE DRAWINGS

### Practical:

- Learners will prepare a complete set of drawings and details for a simple 1 or 2 bay timber framed building, and include all information necessary for:
  - Structural engineering
  - Estimating by all trades
  - Planning permission and building permits
  - Construction by others

## 2D CODES & STANDARDS

### Theory:

- Given a local building code and a multiple choice test of 20 recall/recognition type questions, learners will correctly identify various local code requirements:
  - Access & Egress (5 Questions)
  - Structure (5 Questions)
  - Fire (5 Questions)
  - Stairs, Handrails & Guardrails (5 questions)

The Learner will answer all questions within 60 minutes and achieve a minimum score of 70% or 14 correct answers.

**Practical:**

- ii) Learners will use local or representative building codes and building product information to detail a complete set of drawings for a simple 1 or 2 bay timber framed building.

## **2E TIMBER IDENTIFICATION & LABELLING SYSTEMS**

**Theory:**

- i) Given a sample frame drawing and a list of 20 common frame components, learners will correctly match the frame components to the drawing and achieve a minimum score of 70% or 14 correct answers.

**Practical:**

- ii) Learners will use grid references to mark-up a set of frame drawings for a simple 1 or 2 bay timber framed building. Each timber will have a unique, identifying code that serves to orientate it within the frame.
- iii) Learners will use a traditional method to mark-up a set of frame drawings for a simple 1 or 2 bay timber framed building. Each timber will have a unique, identifying code that serves to orientate it within the frame.
- iv) Learners will label a set of frame drawings for a simple 1 or 2 bay timber framed building to show the correct name of each timber component.

## **PART THREE - HISTORIC TIMBER FRAMING**

### **3A - HISTORIC PERIODS**

**Theory:**

- i) Given a multiple choice test of 30 recall/recognition type questions about the historic periods of timber buildings, the learner will answer all questions within 30 minutes and score a minimum of 70%, or 21 correct answers.

## 3B - HISTORIC TOOLS

### Theory:

- i) Given a multiple choice test of 30 recall/recognition type questions about the historic timber framing tools, the learner will answer all questions within 30 minutes and score a minimum of 70%, or 21 correct answers.

### Practical:

- ii) Given a series of timber samples showing saw marks, carpenter's marks and other tools marks, learners will identify the tools and techniques that were used to make the marks, and identify the period from which these tools and techniques belong.

## PART FOUR - TIMBER CONVERSION

### 4A HEWING

### Theory:

- i) Given drawings/photographs of 10 historic tools used for timber conversion, learners will identify the correct names of the tools and their uses for timber conversion, within 10 minutes and score a minimum of 70%, or 7 correct answers.
- ii) Given a multiple choice test of 20 recall/recognition type questions about the safe care, maintenance, storage and sharpening of hewing (omitted words) tools, the learner will answer all questions within 20 minutes and score a minimum of 70%, or 14 correct answers.

### Practical:

- iii) Given the following tools:
  - Carpenter's Pencil
  - Tape Measure
  - 2 Framing Squares
  - Chalk Line / Ink Line
  - 2 ft Spirit Level
  - 2 Log Dogs
  - Plumb Bob
  - Felling Axe
  - Broad Axe or Side Axe (with Sharpening Tools)
  - 2 HD Saw Horses

- 2 Peaveys
- PPE

Learners will perform a visual inspection of the tools and correctly determine if they are fit for use (safe, sharp and appropriate to task, etc). Learners will 'line' a log (min 6ft by 12" diameter), and mark the log butt with plumb and level markings. Learners will then demonstrate one safe and correct method for hewing a square timber to within 1" tolerance of wind and 3/4" tolerance of straightness.

- iv) Given the following tools:
- Carpenter's Pencil
  - Tape Measure
  - 2 Framing Squares
  - Chalk Line / Ink Line
  - 2 Log Dogs
  - Adze (with Sharpening Tools)
  - 2 HD Saw Horses
  - 2 Peaveys
  - PPE

Learners will perform a visual inspection of the tools and correctly determine if they are fit for use (safe, sharp and appropriate to task, etc). Learners will then demonstrate one safe and correct method of surfacing/dressing timbers to within 1/2" tolerance of wind and 1/4" tolerance of flat.

## 4B MILLING PROCEDURES

### Theory:

- i) Given a multiple choice test of 40 recall/recognition type questions about milling procedures, the learner will answer all questions within 30 minutes and score a minimum of 70% or 28 correct answers without reference materials.

### Practical:

- ii) Given the following tools:
- Carpenter's Pencil
  - Tape Measure
  - String Line
  - 2 ft Spirit Level
  - Portable Saw Mill such as a 'Woodmizer' Horizontal Bandsaw (Accompanied by an Experienced Operator / Owner)
  - Appropriate Maintenance Tools & Consumables
  - Operator's Manual for Mill

- PPE

Learners will perform a visual inspection of the mill and correctly determine if it is fit for use (safe, sharp and appropriate to task, etc). Learner will check mill for wind and level, and make any necessary corrections as appropriate. Under the direct supervision of an Experienced Operator, learners will mill a log into a 4-sided timber to a specified tolerance. Learners will demonstrate their understanding of tension / reaction wood, by explaining their strategy for milling; this to achieve minimize waste, optimal timber sizes and grades, and maximum tally. Learners will also remove, replace, 'fold' / 'unfold' (for storage) and correctly tension blades.

## 4C HAND SAW CONVERSION

### Theory:

- i) Given drawings/photographs of 10 historic tools used for timber conversion, learners will identify the correct names of the tools and their uses for timber conversion, within 10 minutes and score a minimum of 70%, or 7 correct answers.
- ii) Given a multiple choice test of 20 recall/recognition type questions about the safe care, maintenance, storage and sharpening of sawing tools, the learner will answer all questions within 20 minutes and score a minimum of 70%, or 14 correct answers.

### Practical:

- iii) Given the following tools:
  - Carpenter's Pencil
  - Tape Measure
  - Chalk Line / Ink Line
  - 2 ft Spirit Level
  - 2 Log Dogs
  - Plumb Bob
  - Saw Pit / Saw Frame
  - Saw Oil & Brush
  - 2 Peaveys
  - 6 Small Wooden Wedges
  - PPE

Learners will perform a visual inspection of the tools and correctly determine if they are fit for use (safe, sharp and appropriate to task, etc). Learners will 'line' a log (min 6ft by 12" diameter), and make a plumb mark on the log butt. Learners will then rip a minimum of 1 slab and 1 live-edge plank to within 1/2" tolerance overall. Learners will demonstrate their understanding of tension /

reaction wood by describing their strategy for milling; this to achieve minimum waste and maximum tally.

## **PART FIVE - TIMBER MANAGEMENT**

### **5A SUSTAINABLE HARVESTING**

**Theory:**

- i) Given a multiple choice test of 60 recall/recognition type questions about sustainable harvesting practices, the learner will answer all questions within 45 minutes and score a minimum of 70%, or 42 correct answers.

### **5B HARVESTING TECHNIQUES**

**Theory:**

- i) Given a multiple choice test of 60 recall/recognition type questions about harvesting, seasoning and shipping techniques, the learner will answer all questions within 45 minutes and score a minimum of 70%, or 42 correct answers.

**Practical:**

- ii) Learners will visit an active harvesting operation to learn how logs are harvested, sorted and stored.

### **5C TREE IDENTIFICATION & PROPERTIES**

**Theory:**

- i) Given a multiple choice test of 60 recall/recognition type questions about tree identification and properties, the learner will answer all questions within 45 minutes and score a minimum of 70%, or 42 correct answers.

**Practical:**

- ii) Learners will visit a forest / woodland with an experienced forester and identify the parts and properties of various trees as appropriate to the area. Emphasis will be placed on the uses of trees for timber production and timber framing.

### **5D ESTIMATING & GRADING 'ON THE STUMP'**

**Theory:**

- i) Given a multiple choice test of 30 recall/recognition type questions about grading 'on the stump', the learner will answer all questions within 45 minutes and score a minimum of 70%, or 21 correct answers.

**Practical:**

- ii) Learners will visit a forest / woodland with an experienced forester and grade various trees 'on the stump' as appropriate to the area. Emphasis will be placed on the uses of trees for timber production and timber framing.

## **PART SIX - TIMBER GRADING**

### **6A VISUAL GRADING**

**Practical:**

- i) Given a current and appropriate set of standard grading rules, learners will visually grade and correctly mark a selection of 10 timbers with their appropriate grades.
- ii) As above, learners will visually grade and correctly mark a selection of 10 salvaged / reclaimed timbers with their appropriate grades.

### **6B TIMBER GRADING & ENGINEERING STANDARDS**

**Theory:**

- i) Given a sample timber species and project location, learners will identify the appropriate standard grading rules that can be used to satisfy local codes.
- ii) Using the example given above, learners will use the NDS to identify the correct design values that should be used (for structural engineering) for various grades of the sample timbers.

**Practical:**

- iii) Given a timber of unknown species and grade, learners will test the piece with measured loads to determine the Modulus of Elasticity of that timber.

## PART SEVEN - TRADE PRACTICES

### 7A PROJECT MANAGEMENT BASICS

#### Theory:

- i) Given a multiple choice test of 45 recall/recognition type questions about project management, consisting of:
- USDOL & OSHA Standards & Regulations (5 Questions)
  - OSHA Standards & Regulations (5 Questions)
  - Contracts & Agreements (5 Questions)
  - Managing Documents & Drawings (5 Questions)
  - Record Keeping & Journals (5 Questions)
  - General Good Practice (20 Questions)

The learner will answer all questions within 90 minutes and score a minimum of 70% or 32 correct answers without reference materials.

#### Practical:

- ii) Learners will demonstrate their ability to correctly construct and communicate the following common documents:
- Request for Quotation
  - Request for Information (RFI)
  - Purchase Order
  - Drawing Issue Sheet
  - Construction Program / Schedule with Milestones
  - Invoice
- iii) Learners will demonstrate their ability to take simple and accurate minutes of meetings.
- iv) Learners will demonstrate their ability to take accurate telephone notes.
- v) Learners will create the following:
- a. Job Log
  - b. Equipment Log
  - c. Vehicle Log

### 7B SMALL BUSINESS BASICS

#### Theory:



- i) Given a multiple choice test of 45 recall/recognition type questions about running a small timber framing business, consisting of:
- USDOL Standards & Regulations (15 Questions)
  - OSHA Standards & Regulations (10 Questions)
  - Contracts & Agreements (10 Questions)
  - General Good Practice for Small Business (10 Questions)

The learner will answer all questions within 90 minutes and score a minimum of 70 or 32 correct answers without reference materials.

**Practical:**

- ii) Learners will generate a 10-page draft business plan for a small (2-6 people) new, timber framing business. This will include the following:
- Executive summary
  - Table of contents
  - Company overview (statement of goals and objectives)
  - Description of products and services to be offered
  - Industry and marketplace analysis (including analysis of competition)
  - Sales and marketing strategy
  - Operations strategy
  - Company organisation (personnel and management)
  - Financial strategy
  - Draft budget for first 4 years operation

## 7C ESTIMATING

**Practical:**

- i) Given a complete set of drawings for a simple (3-4 bay) timber framed building, learners will generate a detailed cost and quantity estimate for all labour, materials and equipment required. This will include the following:
- Brief statement outlining construction strategy (crew size, assembly method, etc)
  - Schedule of joinery and labour required
  - Timber list and total board measurement
  - Schedule of fixings and fasteners required
  - Schedule of machinery and equipment requirements
- ii) Using the results of the above, learners will convert their estimated costs into a square footage price.
- iii) Using the results of above, learners will identify reasonable ways to achieve a 20% reduction in the estimated costs for the project.

## 7D OFFICE SYSTEMS

### Theory:

- i) Given a multiple choice test of 45 recall/recognition type questions about the basic office systems that are necessary to operate an effective timber framing business, the learner will answer all questions within 45 minutes and score a minimum of 70% or 30 correct answers.

### Practical:

- ii) Learners will demonstrate their command of basic computer skills by correctly performing the following operations:
  - a) Make and print each of the following simple word processing documents:
    - Invoice
    - Purchase Order
    - Request for Information / Instruction (RFI)
    - Fax Cover
  - b) Make and print each of the following simple spreadsheets such as:
    - Timber Cutting List
    - Fixings & Fasteners List
    - Time Sheet
    - Drawing Issue Sheet
  - c) Use Internet Browser to search online resources for each of the following specific results:
    - OSHA / ANSI Regulation or Standard
    - USDOL Statute or EO
    - Map showing location and anticipated travel times to jobsite or workshop
    - MSDS information for product or material found in workshop or office
    - Weather information (pre-site preparation)
    - Material properties for given wood species
  - d) Use e-mail to request product information or catalogue from a supplier.

## 7E COMMUNICATING WITH CLIENTS & CO-WORKERS

### Theory:

- i) Given a multiple choice test of 20 recall/recognition type questions about HR issues, the learner will answer all questions within 60 minutes and score a minimum of 70% or 14 correct answers.

**Practical:**

- ii) Learners will create a written Job Description for themselves.
- iii) Learners will demonstrate the 'SMART' delegation of technical tasks (Specific, Measurable, Agreed, Realistic & Time-bound) .
- iv) Learners will demonstrate clear, polite and effective communication of job information with clients, professional colleagues and co-workers.

## **7F GOOD WORK HABITS**

**Theory:**

- i) Given a multiple choice test of 20 recall/recognition type questions about good work habits, the learner will answer all questions within 60 minutes and score a minimum of 70% or 14 correct answers.

**Practical:**

- ii) Learners will create a statement of Values for their workplace, and describe how these values might effect day-to-day operations.
- iii) Learners will work with colleagues to create a written definition of 'professional conduct' for timber framers, and de-brief this definition with a competent and experienced facilitator. The definition will be checked for alignment with USDOL Statutes and EO's

## **7G YARD MANAGEMENT**

**Practical:**

- i) Learners will demonstrate the safe and effective stacking, stickering, labeling and protection of all timbers for a small (2 or 3 Bay) timber frame project. Timbers will be stacked for effective workflow.
- ii) Learners will demonstrate the safe and effective care of company / communal tools and equipment.

- iii) Learners will demonstrate the safe and effective storage, labelling and protection of pegs, fixings and fasteners.

## **7H INSTRUCTIONAL TECHNIQUES**

### **Theory:**

- i) Given a multiple choice test of 20 recall/recognition type questions about instructional techniques, the learner will answer all questions within 20 minutes and score a minimum of 70% or 14 correct answers.

### **Practical:**

- ii) Learners will demonstrate their understanding of basic instructional techniques as follows:
- Effectively plan, instruct, assess and then de-brief a 'hard-skills' lesson relating to a common timber framing technique, in a one-to-one setting.
  - Effectively deliver a 10-15 minute Toolbox / Tailgate Talk relating to a common H&S issue for timber framers, to a group of colleagues.

## **7I APPRENTICESHIP LOGBOOK**

### **Practical:**

- i) Learners will compile a permanent logbook of their work history and a journal that reflects their apprenticeship experience. This will include the following:
- Architectural sketches and drawings describing various aspects of the learner's work and / or training
  - Chronological details of the learner's work history
  - Recommendations and comments from employer's and supervisors
  - Photographs of learners work

## **PART EIGHT - TRADE SCIENCES**

### **8A MECHANICAL PROPERTIES OF TIMBER FRAMES**

#### **Theory:**

- i) Given a multiple choice test of 30 recall/recognition type questions about the mechanical properties of timber frames, the learner will answer all questions within 30 minutes and score a minimum of 70%, or 21 correct answers.

- ii) Given a complete set of drawings for a simple (3-4 bay) timber framed building, learners will identify the various types of loads that are likely to effect the design of the frame.
- iii) Given clear illustrations or photos of various common timber components, learners will correctly identify the following:
  - Whether timbers are acting in tension, compression, or a combination of tension and compression
  - Whether the timbers are subject to point loads or distributed loads
  - In which direction timbers are likely to deflect
  - Whether the timbers are cantilevered or simply-supported

## **8B FORCES & STRESSES IN TIMBER FRAMES**

### **Theory:**

- i) Given a multiple choice test of 30 recall/recognition type questions about the forces and stresses that effect timber frames, the learner will answer all questions within 30 minutes and score a minimum of 70%, or 21 correct answers.
- ii) Given a complete set of frame drawings for a simple (2-3 bay) timber framed building, learners will correctly identify all locations of tension joinery.
- iii) Given clear line-drawings of various simple, common truss and frame types showing common load conditions, learners will correctly identify the following:
  - Load paths
  - Which timbers are acting in compression, tension or a combination of tension and compression

## **8C PROPERTIES & REACTIONS OF WOOD**

### **Theory:**

- i) Given a multiple choice test of 30 recall/recognition type questions about the properties and reactions of wood:
  - Parts & Properties of Wood (10 Questions)
  - Shrinkage (10 Questions)
  - Rot, Decay & Insect Attack (10 Questions)The learner will answer all questions within 30 minutes and score a minimum of 70%, or 21 correct answers.

## 8D FORCES & STRESSES IN FASTENERS

### Theory:

- i) Given a multiple choice test of 20 recall/recognition type questions about the forces and stresses in fasteners, the learner will answer all questions within 20 minutes and score a minimum of 70%, or 14 correct answers.
- ii) Learners will correctly identify the failure sequence of typical mortise and tenon style joinery under common load conditions.
- iii) Given clear illustrations of various typical connection details used in timber-framed structures, learners will correctly identify those connection details that require expert and specialized design.

## 8E CALCULATE LOADS

### Practical:

- i) Given the following:
  - Local Building Code
  - USDA Forest Service Wood Handbook
  - Frame Drawings & Joinery Details
  - Specification (to include: Timber Species & Grade)
  - Calculator, Pencil & Scrap PaperLearners will demonstrate their understanding of load calculations by correctly determining the appropriate sizes for various simple, common timber elements such as beams and rafters.
- ii) Using the items listed above, learners will determine the correct proportions of typical wood joinery for the beams and rafters calculated in the previous question.

## 8F DESIGN TIMBER FRAMES

### Theory:

- i) Learners will correctly identify and describe when it is necessary to call upon the services of a professional architect, for their particular geographic area. This will include a discussion of the following:
  - When it is *prudent* to call upon a professional architect
  - Tips for interviewing a professional architect
  - What services a professional architect can typically offer
  - Professional Indemnity and Liability

- What information an architect will require in order to be effective (and how this information should be presented)
- ii) Learners will correctly identify and describe when it is necessary to call upon the services of a professional engineer, for their particular geographic area. This will include a discussion of the following:
  - When it is *prudent* to call upon a professional engineer
  - Tips for interviewing a professional engineer
  - What services a professional engineer can typically offer
  - Professional Indemnity and Liability
  - What information an engineer will require in order to be effective (and how this information should be presented)

**Practical:**

- iii) Learners will create a preliminary frame design for a simple 2-3 bay timber framed building (Wood Shed, Garage, etc) and produce 'stick' sketches (simple line drawings) of all timber-framed components.
- iv) Given a complete set of architectural drawings for a simple (1200 - 1500 sq ft) residence, learners will create a preliminary frame design to suit the building and create 'stick' sketches of all timber-framed components.

## 8G TRADE MATH

**Theory:**

- i) Given an open-book test of 40 practical, multiple-choice style questions about construction math and measurements:
  - Timber Length, Volume & Mass (15 Questions)
  - Building Area (5 Questions)
  - Read Tables & Graphs (5 Questions)
  - Angles (5 Questions)
  - Conversion of Measurements (10 Questions)

The learner will answer all questions within 120 minutes and score a minimum of 70%, or 28 correct answers.

## 8H CONSTRUCTION GEOMETRY

**Theory:**

- i) Given an open-book test of 30 practical, multiple-choice style questions that use construction geometry to solve common estimating problems, the learner will answer all questions within 120 minutes and score a minimum of 70%, or 21 correct answers.

**Practical:**

- ii) Given the following equipment:
- Trammell Points & Rod
  - Ink Line / Chalk Line
  - Pencil
- The learner will:
- a) Construct a straight line
  - b) Construct a new line that is parallel to the previous line
  - c) Bisect one of these lines with a perpendicular line at one end and at a given point along the line
  - d) Bisect one of these lines at 22.5 and 45 degrees.
- iii) Using the equipment listed above, learners will construct a circle of given dimensions and then divide it into segments of 30 degrees.
- iv) Using the equipment listed above, learners will construct a circle of given dimensions and then divide one quadrant into segments of 1 degree.
- v) Using the equipment listed above and a tape measure, learners will construct the following:
- a) Construct a square of given dimensions
  - b) Construct a rectangle of given dimensions
  - c) Construct a right-angle triangle of given dimensions
  - d) Construct an isosceles triangle of given dimensions
  - e) Construct an equilateral triangle of given dimensions
  - f) Construct an octagon of given dimensions.

## **8I DEVELOPED DRAWING**

**Practical:**

- i) Given clear and fully-dimensioned drawings of various roof frames, learners will use developed drawing techniques to identify the triangles that illustrate the following roof components:
- a) Common Rafter
  - b) Hip Rafter (including backing cut)
  - c) Valley Rafter (including backing cut)
  - d) Jack Rafter

## **8J TRIGONOMETRY**

**Practical:**



- i) Given clear and fully-dimensioned drawings of a building site, learners will use trigonometry to solve for all information necessary to layout building lines as follows:
  - a) Set-Backs
  - b) Building Outline
  - c) Grade
  
- ii) Given clear and fully-dimensioned drawings of various regular and irregular roof frames, learners will use trigonometry to solve for all information necessary to cut common roof components as follows:
  - d) Common Rafter
  - e) Hip Rafter (including backing cut)
  - f) Valley Rafter (including backing cut)
  - g) Jack rafter
  - h) Purlin - Hip/Valley Intersections
  
- iii) Given clear and fully-dimensioned drawings of straight, winding and spiral stairs, learners will use trigonometry to solve for all information necessary to cut common stair components as follows:
  - i) Common Tread
  - j) Common Riser
  - k) Starting Riser
  - l) Flight Length
  - m) Winders
  - n) Headroom
  - o) Handrails
  - p) Balustrades

## 8K RATIOS & PROPORTIONS

### Practical:

- i) Learners will use ratio and proportion to layout dovetails and wedges for a variety of common joinery applications.
  
- ii) Learners will use ratio and proportion to solve problems relating to the layout of buildings on sloped grades, and will convert grades expressed as ratios into percentages and degrees.
  
- iii) Learners will use ratio and proportion to solve problems relating to the layout of roofs, and will convert roof slopes expressed as X: 12 ratios into percentages and degrees.

## 8L COMPUTER AIDED DESIGN (CAD)

### Theory:

- i) Given a multiple choice test of 20 recall/recognition type questions about CAD, the learner will answer all questions within 30 minutes and score a minimum of 70% or 14 correct answers.

### Practical:

- ii) Learners will demonstrate their understanding of basic CAD operations by developing a complete set of structural frame drawings for a simple 1-2 Bay timber frame (woodshed, garage, gazebo, etc). This will include all information necessary for construction.

## 8M COMPUTER AIDED ENGINEERING (CAE)

### Theory:

- i) Given a multiple choice test of 20 recall/recognition type questions about CAE packages, the learner will answer all questions within 30 minutes and score a minimum of 70% or 14 correct answers.

### Practical:

- ii) Given a complete set of frame drawings for a simple timber frame structure, learners will demonstrate their understanding of basic CAE operations by determining the correct section-sizes for a variety of timbers in the design

## 8N TIMBER FRAMING TERMINOLOGY

### Theory:

- i) Given clear illustrations, learners will match 100 illustrated items that are commonly found in North American timber framing to a list of given terms within 45 minutes and score a minimum of 70%, or 70 correct answers.
- ii) Given clear illustrations, learners will match 100 illustrated items that are common to world framing traditions, log-building and general construction, to a list of given terms within 45 minutes and score a minimum of 70%, or 70 correct answers.

## **PART NINE - TIMBER FRAMING TECHNIQUES**

### **9A TIMBER SELECTION**

#### **Practical:**

- i) Given a complete set of working drawings for a small (3-4 Bent) timber-framed building and a timber specification, learners will demonstrate one method to 'mark-up' the drawings and prepare a detailed cutting list for a sawmill. The dimensions, lengths and grades of each timber will be clearly identified in the cutting list, and any special requirements for milling / handling the order will be noted.
- ii) Using the information generated above, learners will correctly sum the total volume of the timber package and calculate the weight of the order for transportation.
- iii) Learners will select timbers for framing and designate them (by marking-up) with respect to their 3D positions in a frame. Learners will determine reference faces, top/bottom, and rough-check all joinery positions re: timber defects. Timbers must be clearly identified and labelled for easy identification by another framer.

### **9B TIMBER HANDLING**

#### **Theory:**

- i) Given a multiple choice test of 30 recall/recognition type questions about the safe handling of timbers, the learner will answer all questions within 30 minutes and score a minimum of 70%, or 21 correct answers.

#### **Practical:**

- ii) Learners will demonstrate a safe and correct method for rolling, lifting and carrying heavy timbers by hand.
- iii) Learners will demonstrate a safe and correct method for rolling, lifting and carrying heavy timbers with 2 people by hand.
- iv) Learners will demonstrate a safe and correct method for rolling, lifting and carrying heavy timbers with 6-8 people by hand.

Learners will use dunnage, stickers and banding equipment to construct safe and efficient timber packs in preparation for transportation of timbers to site.

## 9C SHOP FLOW

### Practical:

- i) Learners will visit 3 different timber-framing shops and identify and describe the shop flows of each. This should include at least one CNC-based shop. Learners will prepare a brief written summary for each shop that is visited and de-brief these with their instructor.

## 9D SQUARE RULE LAYOUT

### Practical:

- i) Given the following tools:
  - Carpenter's Pencil
  - Tape Measure
  - 2 Framing Squares
  - Combination Square
  - Chalk Line / Ink Line

Learners will demonstrate their understanding of Square Rule by laying out a variety of simple mortise and tenon type joinery on 8" timbers to within 1/16" tolerance over all.

- ii) Using only the tools listed above, learners will use Square Rule to layout a simple bent section (including at least one pair of braces) for cutting. Layout will be accurate to 1/8" tolerance overall.

## 9E SCRIBE RULE LAYOUT

### Practical:

- i) Given the following tools:
  - Carpenter's Pencil
  - Tape Measure
  - 2 ft Spirit Level
  - Framing Square / Steel Rule
  - Combination Square
  - Chalk Line / Ink Line
  - Dividers
  - Plumb Bob (preferably French type)

Learners will demonstrate their understanding of Scribe Rule by laying out a simple mortise and tenon joint on two connecting timbers. Layout will be accurate to 1/16" tolerance over all.

- ii) Using only the tools listed above, learners will demonstrate their understanding of Scribe Rule as follows:

- Lay out a simple frame section or truss on workshop floor in full-scale. Identify Critical dimensions and Datums.
- Line Timbers
- Position Principal Timbers (level) over layout to within 1/16" tolerance using plumb bob and level.
- Scribe all necessary joinery to within 1/16" tolerance.

## 9F MILL RULE LAYOUT

Practical:

- i) Given the following:
- Carpenter's Pencil
  - Tape Measure
  - Framing Square

Learners will demonstrate their understanding of Mill Rule by laying out a variety of simple mortise and tenon type joinery on 8" timbers to within 1/16" tolerance over all.

- ii) Using only the tools listed above, learners will use Mill Rule to layout a pair of centred braces in preparation for cutting. Layout will be accurate to 1/16" tolerance overall.

## 9G MAPPING LAYOUT

Practical:

- i) Given the following tools:
- Carpenter's Pencil
  - Tape Measure
  - 2 Framing Squares
  - Combination Square
  - Chalk Line / Ink Line
  - 2 ft Spirit Level
  - String Line
  - Adjustable Bevel Gauge

Learners will demonstrate their understanding of Mapping by successfully recording joinery information from one previously cut timber and transferring this information onto another uncut timber (as for a simple repair or replacement) without placing the timbers side by side at any time. Joinery layout will be accurate to within 1/16" tolerance over all.

## 9H COMPOUND JOINERY LAYOUT

Theory:

- i) Given a complete set of frame drawings for a simple, hip and valley type, timber framed roof construction, learners will develop a clear set of line drawings to illustrate the following:
- a. Common rafter lengths and angles
  - b. All common rafter joinery
  - c. Hip and valley lengths and angles
  - d. All hip and valley joinery
  - e. Jack rafter lengths and angles
  - f. All jack rafter joinery
  - g. Backing cuts for hips and valleys
  - h. Saw angles for jack rafters, hips and valleys

**Practical:**

- ii) Using the information and drawings from above, learners will construct a scale roof model from softwood. This model will illustrate all plumb cuts to ridge, birds' mouths to plate and backing cuts (hips and valleys) for the following elements:
- a. Common rafter
  - b. Hip rafter
  - c. Valley rafter
  - d. Jack rafter

## **9I LAY OUT & CUT JOINERY**

**Practical:**

- i) Learners will layout, cut and assemble a variety of common timber joints in timbers, to within 1/16 " tolerance. To include the following:
- a) Butt Joint
  - b) Lapped Joint
  - c) Bridle Joint
  - d) Square Mortise & Tenon
  - e) Angled Mortise & Tenon (as for a knee brace)
  - f) Square & Squinted Housings
  - g) Scarf Joint
  - h) Wedged half Dovetail
  - i) Dovetail Lap
  - j) Cog

## **9J JIGS & TEMPLATES**

**Practical:**

- i) Learners will gain experience of using a variety of commercially available tools and jigs for timber framing, and then design and make a selection of common templates from scratch. This will include the following:
- q) Scarf Template
  - r) Mortise & Tenon Checkers
  - s) Borneman Layout Template
  - t) Circular Saw Guide
  - u) 'Scnarf-Schnarf'
  - v) Tenon Gauge
  - w) Drill Guide
  - x) Router Template
  - y) Modified Rafter Square

## 9K ROUND LOG SCRIBING

### Practical:

- i) Given the following tools:
- Carpenter's Pencil
  - Tape Measure
  - 2 ft Spirit Level
  - Framing Square / Steel Rule
  - Combination Square
  - Chalk Line / Ink Line
  - Bubble Scribe

Learners will demonstrate their understanding of round log scribing by laying out a variety of simple notches on two connecting logs. Layout will be accurate to 1/16" tolerance over all.

## PART TEN - TOOLS & EQUIPMENT

### 10A HAND TOOLS

#### Theory:

- i) Given drawings/photographs of 120 contemporary and historic hand tools used for timber framing, learners will identify the correct names of the tools and their uses for timber framing, within 60 minutes and score a minimum of 70%, or 84 correct answers.
- ii) Given a multiple choice test of 30 recall/recognition type questions about the safe care, maintenance, storage and sharpening of hand tools, the learner will answer all questions within 45 minutes and score a minimum of 70%, or 21 correct answers.

#### Practical:

- iii) Learners will demonstrate the correct method of 'backing', setting and sharpening both crosscut and rip saws.
- iv) Learners will demonstrate the correct method of grinding and honing chisels, slicks and planes.
- v) Learners will demonstrate the correct method of filing auger bits.
- vi) Learners will demonstrate the correct method of filing and honing axes and adzes.
- vii) Given the following tools:
  - Carpenter's Pencil
  - Tape Measure
  - Combination Square & 2 Framing Squares
  - Chalk Line / Ink Line
  - PPE

Learners will perform a visual inspection of the tools and correctly determine if they are fit for use (safe and appropriate to task, etc). Learners will 'line' 2 - 8" timbers, and check for twist / wind, crown / crook & bow. Learners will accurately square lines around a timber. Learners will then layout a series of marks along the length of the timber to indicate joinery locations / layout datums, and these marks will be made to within 1/32" tolerance accumulatively and overall.

- viii) Learners will use ripsaws and crosscut saws to cut 8" timbers to within 1/16<sup>th</sup> of a finely scribed line.
- ix) Learners will demonstrate their ability to tune a hand plane by producing long, fine shavings.
- x) Learners will demonstrate their ability to tune a framing chisel by producing fine shavings from end-grain timber.
- xi) Given the following tools:
  - Carpenter's Pencil
  - Tape Measure
  - Combination Square & Framing Square
  - Rip Saw
  - Crosscut Saw
  - Brace & Bits (1 1/2" & 3/4")
  - 1 1/2" Chisel & Corner Chisel
  - Mallet
  - PPE



Learners will perform a visual inspection of the tools and correctly determine if they are fit for use (safe, sharp, appropriate to task, etc). Learners will safely and correctly layout and cut 2 mortises and tenons in 8" timbers, including off-set peg holes, to within 1/16<sup>th</sup> overall tolerance of finely scribed lines and predetermined proportions.

## 10B PORTABLE POWER TOOLS

### Theory:

- i) Given drawings/photographs of 30 portable power tools used for timber framing, learners will identify the tools and their uses within 15 minutes and score a minimum of 70%, or 21 correct answers.
- ii) Given a multiple choice test of 30 recall/recognition type questions about the safe care, maintenance, storage of portable power tools, the learner will answer all questions within 45 minutes and score a minimum of 70%, or 21 correct answers.
- iii) Learners will correctly describe at least one appropriate method for identifying and marking a damaged portable power tool, and removing it from service.

### Practical:

- iv) Given the following tools:
  - Carpenter's Pencil
  - Tape Measure
  - Combination Square & Framing Square
  - HD ½" Drill
  - Appropriate Maintenance Tools & Consumables
  - Operator's Manual for Drill
  - Long ¾" Auger
  - PPE

Learners will perform a visual inspection of the tools and correctly determine if it is fit for use. This will include the inspection (and replacement as necessary) of electrical brushes, switch and power cord. Learners will correctly remove, replace and secure the bits (must include isolating power supply). Learners will safely and correctly layout and drill 'peg holes' through 8" timbers, and the lead screw of the auger will exit the timber within ¼" of predetermined position 5 times consecutively. Learners will select and use all appropriate PPE.

- v) Given the following tools:
- Carpenter's Pencil
  - Tape Measure
  - Combination Square & Framing Square
  - 10" Circular Saw
  - Appropriate Maintenance Tools & Consumables
  - Operator's Manual for Circular Saw
  - Spare Blade
  - HD ½" Drill with depth stop
  - 1 ½" and ¾" Augers
  - PPE

Learners will perform a visual inspection of the tools, and correctly determine if they are fit for use (safe, sharp, appropriate to task, etc). This will include the inspection (and replacement as necessary) of electrical brushes, switch and power cord. Learners will correctly remove, replace and secure the blades and bits (must include isolating power supply). Learners will safely and correctly layout and cut 2 mortises and tenons in 8" timbers, including off-set peg holes, to within 1/16<sup>th</sup> overall tolerance of finely scribed lines and predetermined proportions. Learners will select and use all appropriate PPE.

- vi) Given the following:
- Carpenter's Pencil
  - Tape Measure
  - Combination Square & 2 No Framing Squares
  - Power Plane or Beam Plane
  - Appropriate Maintenance Tools & Consumables
  - Operator's Manual for Power Plane or Beam Plane
  - Spare Blades

Learners will perform a complete visual inspection, and correctly determine if the plane is fit for use (safe, sharp, all guards and safety devices in place, etc). This will include the inspection (and replacement as necessary) of electrical brushes, switch and power cord. Learners will correctly remove, replace and secure the blades (must include isolating power supply). Learners will safely and correctly layout and surface all four sides of an 8" timber (minimum 6ft length), to within 1/16<sup>th</sup> overall tolerance of predetermined proportions. Learners will select and use all appropriate PPE.

- vii) Given the following:
- Carpenter's Pencil
  - Tape Measure
  - Combination Square & Framing Square
  - Router or Bed Router

- Appropriate Maintenance Tools & Consumables
- Operator's Manual for Router
- Selection of Straight-cutting Router Bits

Learners will perform a complete visual inspection, and correctly determine if the router is fit for use (safe, sharp, all guards and safety devices in place, etc). This will include the inspection (and replacement as necessary) of electrical brushes, switch and power cord. Learners will correctly remove, replace and secure the bits (must include isolating power supply). Learners will make a router template for cutting housings and use this to safely and correctly layout and cut housings (for Square-rule type joinery) in 8" timbers, to within 1/16<sup>th</sup> overall tolerance of predetermined depth and proportions. Learners will select and use all appropriate PPE.

## 10C CHAINSAWS

### Theory:

- i) Given a multiple choice test of 20 recall/recognition type questions about chainsaw safety consisting of:
- PPE (5 Questions)
  - Hazards (10 Questions)
  - Maintenance (5 Questions)

The learner will answer all questions within 20 minutes and score a minimum of 90% or 18 correct answers without reference materials.

### Practical:

- ii) Given the following:
- Chainsaw
  - Chainsaw Sharpening & Maintenance Kit
  - Operator's Service & Maintenance Manual for Saw
- Learners will strip down the chainsaw in order to perform a complete visual inspection, and correctly determine if it is fit for use (safe, sharp, all guards and safety devices in place, etc). Learners will then perform thorough maintenance as per Operator's Manual. Learners will correctly sharpen and tension chain and bar.
- iii) Given the following:
- Chainsaw
  - PPE & Safety Equipment
- Learners will perform a visual inspection of the chainsaw, and correctly determine if it is fit for use (safe, sharp, appropriate to task, etc). Learners will safely and correctly make a variety of cross-cuts, rips and plunge-cuts into round logs and squared

timbers. Learners will select and use all appropriate PPE, and demonstrate safe body mechanics throughout.

## 10D STATIONARY POWER TOOLS

### Theory:

- i) Given drawings/photographs of 20 stationary power tools used for timber framing, learners will identify the tools and their uses within 10 minutes and score a minimum of 70%, or 14 correct answers.
- ii) Given a multiple choice test of 30 recall/recognition type questions about the safe care, maintenance, storage of stationary power tools, the learner will answer all questions within 45 minutes and score a minimum of 70%, or 21 correct answers.
- iii) Learners will correctly describe at least one appropriate method for identifying and marking a damaged stationary power tool, and removing it from service.

### Practical:

- iv) Given the following tools:
  - Carpenter's Pencil
  - Tape Measure
  - Table Saw
  - Service & Maintenance Manual for Saw
  - Appropriate Maintenance Tools & Consumables
  - Blades & Dado Cutters
  - Saw Wrench for above
  - PPE & Push Sticks

Learners will perform a visual inspection of the table saw and correctly determine if it is fit for use (safe, sharp blades, guards in place, appropriate to task, etc). This will include the inspection (and replacement as necessary) of electrical brushes, switch and power cord. Learners will demonstrate the safe and correct method for changing and setting blades (must include isolating power supply).

Learners will then use the table saw to:

- i) Rip rough stock into blanks for 1 ½" thick structural splines to within 1/32" tolerance of predetermined widths.
- ii) Demonstrate safe set-up of dado blade and cut examples of dados / rabbets, lap joints to predetermined sizes.
- iii) Learners will select and use all appropriate PPE, and demonstrate the correct use of guards, push-sticks, feather boards, auxiliary fences and other safety equipment.

iv) Learners will demonstrate proper crosscutting techniques by using the mitre gauge to cut spline material in lengths of 1/32" tolerance of a predetermined length.

v) Given the following tools:

- Carpenter's Pencil
- Tape Measure
- Thickness Planer
- Service & Maintenance Manual for Thickness Planer
- Appropriate Maintenance Tools & Consumables
- Knife Wrenches for above
- PPE

Learners will perform a visual inspection of the planer and correctly determine if it is fit for use (safe, sharp blades, guards in place, appropriate to task, etc). This will include the inspection (and replacement as necessary) of electrical brushes, switch and power cord. Learners will demonstrate the safe and correct method for changing and setting blades (must include isolating power supply). Learners will then use the planer to thickness spline blanks to within 1/32" tolerance of a predetermined thickness. Learners will select and use all appropriate PPE, and demonstrate the correct use of guards and jigs throughout.

vi) Given the following tools:

- Carpenter's Pencil
- Tape Measure
- Jointer
- Service & Maintenance Manual for Jointer
- Appropriate Maintenance Tools & Consumables
- Knife Wrenches for above
- PPE & Push Sticks / Push Blocks

Learners will perform a visual inspection of the jointer and correctly determine if it is fit for use (safe, sharp knives, guards in place, appropriate to task, etc). This will include the inspection (and replacement as necessary) of electrical brushes, switch and power cord. Learners will demonstrate the safe and correct method for changing and setting all knives (must include isolating power supply). Learners will take a 4' rough board and joint one face smooth and free of all warp and then joint one edge 90 to reference face to predetermined size.

vii) Given the following tools:

- Carpenter's Pencil
- Tape Measure
- Mitre Saw or Radial Arm Saw

- Service & Maintenance Manual for Saw
- Appropriate Maintenance Tools & Consumables
- Saw Wrenches for above
- PPE

Learners will perform a visual inspection of the saw and correctly determine if it is fit for use (safe, sharp blades, guards in place, appropriate to task, etc). This will include the inspection (and replacement as necessary) of electrical brushes, switch and power cord. Learners will demonstrate the safe and correct method for changing and setting blades (must include isolating power supply). Learners will then use the saw to:

- i) Crosscut, 1 ½" thick structural splines to within 1/32" tolerance of predetermined lengths.
- ii) Crosscut brace blanks (Square-rule type) to within 1/32" tolerance of predetermined lengths and angles.

Learners will select and use all appropriate PPE, and demonstrate the correct use of guards and safety jigs throughout.

## 10E LIFTING & HOISTING EQUIPMENT

### Theory:

- i) Given a multiple choice test of 40 recall/recognition type questions about OSHA regulations and general safety rules regarding the care and use and inspection of lifting and hoisting equipment, the learner will answer all questions within 30 minutes and score a minimum of 80% or 32 correct answers without reference materials.

### Practical:

- ii) Given a selection of the following:
  - 2 soft slings in good condition
  - 2 damaged soft slings
  - 4 shackles in good condition
  - 2 damaged shackles
  - 4 wire rope slings / chains in good condition
  - 2 damaged wire rope slings / chains
  - b) The learner will correctly identify and separate the damaged equipment from the functional equipment within 15 minutes. The learner must identify all damaged equipment.
  - c) The Learner will correctly determine the SWL's of all equipment within 15 minutes.
- iii) Given a selection of the following:
  - 2 Come-alongs in good condition
  - 1 damaged Come-along

- 2 Turfor or Griphoist winches in good condition
  - 1 damaged Griphoist or Turfor winch
  - 2 blocks in good condition
  - 1 damaged block
- a) The learner will correctly identify and separate the damaged equipment from the functional equipment within 15 minutes. The learner must identify all damaged equipment.
- b) The Learner will correctly determine the SWL's of all equipment within 15 minutes.
- iv) Learners will demonstrate the safe and correct use of hoisting and lifting techniques to assemble frame sections.

## 10F SURVEYING INSTRUMENTS

### Theory:

- i) Given a multiple choice test of 30 recall/recognition type questions about the safe care and use of survey instruments, the learner will answer all questions within 45 minutes and score a minimum of 70%, or 21 correct answers.

### Practical:

- ii) Learners will demonstrate the correct method of carrying and setting up an optical survey instrument, and then demonstrate one method for determining whether or not the instrument has been correctly calibrated.
- iii) Learners will demonstrate the correct method of using a surveying instrument for checking a building foundation or sub-floor deck for level and recording any discrepancies so that posts can be cut to correct lengths.
- iv) Learners will demonstrate the correct method for laying out a flat, complex shape (minimum of 12 inside and outside corners total, such as the footprint of a small building), using a transit. Layout must be correct to within 1/500 tolerance at every diagonal (IE: ½ in. over 20 ft). No time restriction.
- v) Learners will demonstrate the correct method for laying out a flat, complex shape (minimum of 12 inside and outside corners total, such as the footprint of a small building), using a multi-axis laser level. Layout must be correct to within 1/500 tolerance at every diagonal (IE: ½ in. over 20 ft). No time restriction.

## 10G FORKLIFT

### Theory:

- i) Given a multiple choice test of 40 recall/recognition type questions about forklift safety consisting of:
- PPE & Working around Forklifts (10 Questions)
  - Hazards (10 Questions)
  - Safe Operation & Loads (10 Questions)
  - Maintenance (10 Questions)

The learner will answer all questions within 40 minutes and score a minimum of 80% or 32 correct answers without reference materials.

### Practical:

- ii) Given the following:
- Forklift
  - Forklift Maintenance Kit & Consumables
  - Operator's Service & Maintenance Manual for Forklift
- Learners will perform a complete visual inspection, and correctly determine if it is fit for use (safe, all safety features/devices in operable condition, suitable for application, etc). Learners will then perform routine maintenance as per Operator's Manual. Learners will correctly determine the load limits of the machine.

- iii) Given the following:
- Forklift
  - PPE

Learners will perform a visual inspection of the forklift, and correctly determine if it is fit for use (safe, all safety features/devices in operable condition, suitable for application, etc). Learners will safely and correctly operate the forklift and perform a variety of common tasks. Learners will select and use all appropriate PPE, and demonstrate correct start-up, parking and shut-down procedures

## 10H ACCESS EQUIPMENT

### Theory:

- i) Given a multiple choice test of 40 recall/recognition type questions about OSHA regulations and general safety rules regarding the care and use of access equipment, the learner will answer all questions within 30 minutes and score a minimum of 80% or 32 correct answers without reference materials.

### Practical:



- ii) Given a selection of the following:
    - 2 ladders in good condition
    - 1 damaged ladder
    - 2 Super-planks in good condition
    - 1 damaged Super-plank
    - 20 timber scaffold planks in good condition
    - 2 damaged timber scaffold planks
    - 20 sections of modular scaffolding in good condition
    - 2 damaged sections of modular scaffolding
  - b. The learner will correctly identify and separate the damaged equipment from the functional equipment within 20 minutes. The learner must identify all damaged equipment.
  - c. The Learner will correctly determine the SWL's of all equipment within 15 minutes. (If SWL is not marked, learners will state reasonable limit of use...IE 'Two fat framers plus hand tools', etc)
- iii) Given a complete portable scaffold tower in good condition, learners will perform a visual inspection and determine whether the scaffold tower is safe for use and then correctly erect, level and disassemble the tower on uneven ground. The tower must be erected plumb, level and on a sound footing.
  - iv) Given a 4-6 frame (min) modular scaffold in good condition, learners will perform a visual inspection and determine whether the scaffold tower is safe for use and then correctly erect, level and disassemble the tower on uneven ground. The scaffold must be erected plumb, level and on a sound footing. An access ladder should be correctly fixed to scaffold at an appropriate angle and securely tied off.

## 101 ACCESS MACHINERY

### Theory:

- i) Given a multiple choice test of 40 recall/recognition type questions about MEWP equipment safety consisting of:
  - PPE & Working around MEWP equipment (15 Questions)
  - Hazards (10 Questions)
  - Safe Operation & Loads (10 Questions)
  - Maintenance (5 Questions)

The learner will answer all questions within 40 minutes and score a minimum of 80% or 32 correct answers without reference materials.

### Practical:

- ii) Given the following:
  - Telescopic & Articulated Boom type MEWP

- Maintenance Kit & Consumables for above
- Operator's Service & Maintenance Manual for above

Learners will perform a complete visual inspection, and correctly determine if the MEWP is fit for use (safe, all safety features/devices in operable condition, suitable for application, etc). Learners will correctly determine the load limits and operating envelope of the machine.

iii) Given the following:

- Telescopic & Articulated Boom type MEWP
- PPE

Learners will perform a visual inspection of the MEWP, and correctly determine if it is fit for use (safe, all safety features/devices in operable condition, suitable for application, etc). Learners will safely and correctly operate the MEWP and perform a variety of common tasks. Learners will select and use all appropriate PPE, and demonstrate correct start-up, parking and shut-down procedures.

## PART ELEVEN - RELATED MATERIALS

### 11A FASTENERS

Theory:

- Given drawings/photographs of 60 contemporary and traditional fasteners and associated tools used for making timber connections, learners will identify the correct names and uses of each within 30 minutes and score a minimum of 70%, or 42 correct answers.
- Given a multiple choice test of 30 recall/recognition type questions about the properties, capacities and applications of various timber fasteners, the learner will answer all questions within 30 minutes and score a minimum of 70%, or 21 correct answers.

Practical:

- Learners will safely and correctly select, layout, prepare, apply and remove a variety of fasteners to timbers. These will include the following:
  - $\frac{3}{4}$ " & 1" pegs and dowels, off-set
  - $\frac{3}{4}$ " & 1" pegs and dowels, no off-set
  - Bolts and washers, to specified torque
  - Split Ring Connector
  - Shear Plate Connector

- iv) Given clear drawings and general specifications of 10 different timber connections, learners will identify an appropriate fastener and determine the following:
  - a. Correct method of application
  - b. Appropriate application tools
  - c. Approximate load capacity of fastener
  - d. Any associated maintenance issues
  
- v) Given a current and complete copy of the NDS for Wood Construction, learners will correctly locate and identify information relating to pre-engineered timber connectors (relating to common connection details used by timber framers).

## **11B GLUES**

### **Theory:**

- i) Given a multiple choice test of 30 recall/recognition type questions about the properties, capacities and applications of various glues, the learner will answer all questions within 30 minutes and score a minimum of 70%, or 21 correct answers.

### **Practical:**

- ii) Given clear drawings and general specifications of 5 different timber connections and common repairs where glues are required, learners will identify an appropriate glue for the job and determine the following:
  - a. Correct method of application
  - b. Any associated hazards and relevant MSDS
  - c. Appropriate application tools
  - d. PPE required for application
  - e. Anticipated lifespan of glue
  - f. Any associated maintenance issues
  - g. Coverage, quantities and cost of glue
  
- iii) Learners will demonstrate at least 2 correct methods for gluing-up and clamping common repairs to both green and dry timbers (IE over-cutting of housing, mortise patch, etc).

## **11C STRUCTURAL INSULATED PANELS (SIP's & SSP's)**

### **Theory:**

- i) Given a multiple choice test of 30 recall/recognition type questions about the properties, capacities and applications of SIP's and SSP's, the learner will answer all questions within 30 minutes and score a minimum of 70%, or 21 correct answers.

## **PART TWELVE - RELATED TRADES**

### **12A GENERAL CARPENTRY**

#### **Theory:**

- i) Given a complete set of frame and construction drawings for a small (3-4 bay) timber frame, learners will highlight all timber-framed elements that interface with the work of general carpenters. Learners will determine appropriate tolerances for these areas of interface, and methods for ensuring that the work will flow smoothly on site. This will be discussed in a group setting, with an experienced general carpenter.

#### **Practical:**

- ii) Learners will de-brief the construction of a timber framed building with the general carpenters who performed the work.

### **12B FINISHING CARPENTRY**

#### **Theory:**

- i) Given a complete set of frame and construction drawings for a small (3-4 bay) timber frame, learners will highlight all timber-framed elements that interface with the work of finishing carpenters. Learners will determine appropriate tolerances for these areas of interface, and methods for ensuring that the work will flow smoothly on site. This will be discussed in a group setting, with an experienced finishing carpenter.

#### **Practical:**

- ii) Learners will de-brief the construction of a timber framed building with the finishing carpenters who performed the work.

### **12C ENCLOSING TIMBER FRAMES**

#### **Theory:**

- i) Given a multiple choice test of 30 recall/recognition type questions about the properties, capacities and applications of common enclosure systems and materials, the learner will answer all questions within 30 minutes and score a minimum of 70%, or 21 correct answers.

## 12D PLUMBING, MECHANICAL & ELECTRICAL SUB-TRADES

### Theory:

- i) Working with an experienced electrical contractor who is accustomed to wiring timber frames, learners will discuss the interface of electrical and timber-framing trades. Discussion will focus on strategies for ensuring a smooth interface between trades, and techniques for ensuring effective rough-in at site. Learners will discuss ways that timber frames can be shop-cut to allow for electrical chases and review common details for this.
- ii) Working with an experienced plumbing contractor who is accustomed to working on residential timber frames, learners will discuss the interface of plumbing and timber framing trades. Discussion will focus on strategies for ensuring a smooth interface between the trades, and techniques for ensuring effective rough-in at site. Learners will discuss ways that timber frames can be shop-cut to allow for plumbing chases and review common details for this.

### Practical:

- iii) Learners will de-brief the construction of a timber-framed building with the electrical, mechanical and plumbing contractors who performed the work.

## PART THIRTEEN - RELATED SKILLS

### 13A MAKE PEGS

### Practical:

- i) Given the following tools and materials:
  - Felling Axe
  - Froe and Mallet
  - Shaving Horse
  - Sharp Drawknife
  - Tape Measure & Carpenter's Pencil

- 12" Green Hardwood Billets or Rounds

Learners will demonstrate their ability to layout and cut a variety of different types of pegs from green hardwood, using only hand tools. Learners will safely and correctly make at least 20 pegs of  $\frac{3}{4}$ " or 1" diameter, to within a  $\frac{1}{16}$ <sup>th</sup> tolerance of predetermined proportions.

## 13B MAKE HANDLES

**Practical:**

i) Given the following tools and materials:

- Axe
- Froe and Mallet
- Shaving Horse
- Sharp Drawknife
- Sharp Spoke Shave
- Rasp
- Small Sharp Hand Knife
- Handsaw
- Tape Measure & Carpenter's Pencil
- Template Material
- Handle Stock (appropriate to task)

Learners will demonstrate their ability to layout, cut and fit a variety of different types of handles from hardwood blanks or rough stock, using only hand tools. Learners will make and fit handles to the following tools as a minimum:

- a. Hammer (any type)
- b. Socketed Framing Chisel
- c. Axe (any type)

## 13C FALLING & BUCKING

**Theory:**

i) Given a multiple choice test of 30 recall/recognition type questions about falling and bucking consisting of:

- OSHA Regulations & OSHA Statistics (5 Questions)
- PPE & Chainsaw Safety (5 Questions)
- Falling & Bucking Hazards (10 Questions)
- Good Falling & Bucking Practice (10 Questions)

The learner will answer all questions within 45 minutes and score a minimum of 90% or 27 correct answers without reference materials.

**Practical:**

ii) Given the following:

- Appropriate Chainsaw
- PPE & Safety Equipment

Learners will perform a visual inspection of the chainsaw, and correctly determine if it is fit for use (safe, sharp, appropriate to task, etc). Working under the direction of an experienced faller, learners will safely and correctly fall a variety of sound trees of a diameter equal to or less than the length of the chainsaw bar that they are using. Learners will demonstrate the following throughout:

- e) Good work planning (identify hazards, etc)
- f) Correct body mechanics
- g) Maintain the 2 tree-length rule (does not include instructor)
- h) Brushing of effective escape routes (no exceptions)
- i) Correct use of appropriate PPE (no exceptions)
- j) Correct use of saw brake (no exceptions):
- k) Setting of falling wedges at earliest opportunity (no exceptions)
- l) Facing the tree at all times (no exceptions):

iii) Given the following:

- Appropriate Chainsaw
- PPE & Safety Equipment
- Logger's Tape

Learners will perform a visual inspection of the chainsaw, and correctly determine if it is fit for use (safe, sharp, appropriate to task, etc). Working under the direction of an experienced buckler, learners will safely and correctly crosscut a variety of sound trees to predetermined lengths. Learners will demonstrate the following throughout:

- m) Good work planning (identify hazards, etc)
- n) Good body mechanics
- o) Correct use of appropriate PPE (no exceptions)
- p) Correct use of saw brake (no exceptions):
- q) Bucking from uphill / up slope

iv) Learners will accompany an experienced logger / faller on a walk through woodlands in order to discuss and learn how to identify danger trees and falling hazards. Learners will correctly identify a variety of danger trees and falling hazards.

## 13D CARVING

Practical:

i) Learners will demonstrate one accurate method for scaling and laying out letters and numerals on timber beams. Learners will then

demonstrate the safe and accurate chip-carving of 1" and 2" letters and numerals to within 1/16" tolerance of finely scribed lines.

## **13E STAIRBUILDING & HANDRAILING**

### **Theory:**

- i) Learners will identify and correctly match the names of 30 common stair parts and components to corresponding drawings/photographs, within 20 minutes and score a minimum of 70%, or 21 correct answers.
- ii) Learners will solve 20 common geometry problems relating to the design of stairs within 90 minutes and score a minimum of 70%, or 14 correct answers.
- iii) Given a copy of their local Building Code, learners will look up and correctly identify the requirements of 10 issues affecting the design of simple stairs. No errors.

### **Practical:**

- iv) Learners will demonstrate their understanding of basic wooden stair construction by laying-out and constructing a straight flight of safety-access stairs (minimum 6 risers) with open treads and risers. This will be completely in accordance with local building codes (copy of local building code to be provided), and constructed to predetermined overall dimensions of total rise and total run. Learners will make and fit a simple balustrade and safety handrail to the above.

## **PART FOURTEEN - FINISHING TIMBERS**

### **14A CHAMFERING & EMBELLISHMENT**

### **Practical:**

- i) Learners will demonstrate their ability to layout and cut a variety of chamfers and stops on timbers using only hand tools. This will be done safely and precisely to within a 1/16<sup>th</sup> tolerance of predetermined lengths and proportions.
- ii) Learners will demonstrate their ability to layout and cut a variety of chamfer and stops on timbers using portable power tools. This will be done safely and precisely to within a 1/16" tolerance of predetermined lengths and proportions. Appropriate PPE will be used



at all times (no exceptions). Note that learners will only demonstrate the use of tools that they have been properly trained to use.

## **14B PLANING & TEXTURING**

### **Theory:**

- iii) Learners will explain why anyone in their right mind would possibly want to ruin an otherwise perfectly good timber by distressing it with power-hewing tools to look like it had been chewed by a pack of angry beavers.

### **Practical:**

- iv) Learners will demonstrate one safe and correct method for hand-planing 8ft long rough timbers smooth, to within 1/16" tolerance of a finely scribed line running end to end, and within 1/16" of wind.
- v) Learners will demonstrate one safe and correct method for power-planing 8ft long rough timbers smooth, to within 1/16" tolerance of a finely scribed line running end to end, and within 1/16" of wind.

## **14C TIMBER FINISHES & TECHNIQUES**

### **Theory:**

- i) Given a multiple choice test of 30 recall/recognition type questions about timber finishes, the learner will answer all questions within 30 minutes and score a minimum of 70%, or 21 correct answers.

### **Practical:**

- ii) Learners will safely and correctly apply end sealant to green logs or timbers to mitigate the effects of shrinkage during drying.
- iii) Learners will safely and correctly apply at least 3 different finishes to hardwood or softwood timbers in a shop environment. Learners will demonstrate the correct use of appropriate PPE at all times (no exceptions). This will include 1 each of the following:
  - a. Wax-based Sealer
  - b. Natural Oil-based Finish
  - c. Timber Preservative
- i) Given 3 different selection criterion for timber finishes (species of timber, area to be finished, building environment, purpose of finish,

aesthetic requirements, etc) learners will identify an appropriate product and determine the following:

- e. Correct method of application
- f. Any associated hazards and relevant MSDS
- g. Appropriate application tools
- h. PPE required for application
- i. Anticipated lifespan of finish
- j. Any associated maintenance issues
- k. Coverage, quantities and cost of finishes

## **14D SURFACE PROTECTION**

**Practical:**

- i) Learners will demonstrate 3 different ways to effectively protect finished timbers from the effects of water, sunlight and handling damage during storage and transport to site.

## **PART FIFTEEN - RAISING & RIGGING**

### **15A SITE PREPARATION**

**Theory:**

- i) Learners will prepare a complete set of documents and briefing notes for the erection of a small timber frame. This will include the following:
  2. Method Statement / Raising Plan
  3. Risk Assessment
  4. Lifting plan
  5. Equipment / Kit List
  6. Fasteners & Fixings List
  7. Pre-work Briefing Agenda / Notes
- ii) Given a multiple choice test of 20 recall/recognition type questions about site preparation, the learner will answer all questions within 20 minutes and score a minimum of 70%, or 14 correct answers.

**Practical:**

- iii) Learners will brief colleagues in preparation for the erection of a small timber framed building. This will include a review of the following:
  8. Erection Method
  9. Lifting Plan

## 10. Tools & Equipment

Learners will create brief and accurate minutes of the briefing and circulate these to all crew.

### 15B LOADING & UNLOADING TRUCKS

#### Theory:

- i) Given a variety of typical load sizes and site restrictions / requirements, learners will correctly determine the most efficient and cost-effective type of vehicle to be used for each application.

#### Practical:

- ii) Learners will demonstrate the safe and efficient loading / unloading of a timber frame on and off a delivery truck.
- iii) Learners will identify common load sizes and restrictions for road transport.
- iv) Learners will identify common bridge and underpass restrictions for loaded trucks.

### 15C WEIGHT & CoG CALCULATIONS

#### Theory:

- i) Given clear drawings to illustrate examples of various timber lifts, and examples of different timber species, learners will correctly determine the weights and locate the centers of gravity in order to identify the following:
  - l. Total mass of lift
  - m. Appropriate rigging points
  - n. Appropriate sling angles
  - o. Sling loads
- ii) As above, learners will correctly determine a - d for a tandem lift using 2 cranes, spreader bar tackle and multiple lifting points.

### 15D CRANES

#### Theory:

- i) Given a multiple choice test of 45 recall/recognition type questions about rigging for cranes, consisting of:
  - OSHA Regulations (5 Questions)
  - Crane Types & Applications (5 Questions)
  - Hazards (10 Questions)

- Hand Signals (10 Questions)
- Sling Angles & Sling Loads (5 Questions)
- Inspection of Slings & Rigging (10 Questions)

The learner will answer all questions within 45 minutes and score a minimum of 70% or 32 correct answers without reference materials.

**Practical:**

- ii) Given a selection of the following:
- 2 round slings in good condition
  - 2 damaged round slings
  - 4 shackles in good condition
  - 2 damaged shackles
  - 2 wire rope slings in good condition
  - 2 damaged wire rope slings

The learner will correctly identify and separate the damaged equipment from the functional equipment within 15 minutes. The learner must correctly identify all damaged equipment.

- iii) Learners will correctly calculate a variety of lift loads to within 10% of the actual weight.
- iv) Learners will perform a complete pre-work inspection of a mobile telescopic boom crane with a qualified crane operator.
- v) Learners will assist a qualified crane operator to extend a fly-jib and then rig a whip-line on a mobile telescopic boom crane.
- vi) Learners will correctly sling / rig various timber loads for a crane and safely and effectively direct the crane to perform a variety of common tasks, while demonstrating the following:
- p. Correct use of all hand signals
  - q. Use of appropriate PPE at all times
  - r. Safe and correct sling selection
  - s. Safe and correct shackle selection
  - t. Correct use of tag lines at all times
- vii) Learners will use a bridge crane / gantry crane to safely and effectively move timbers inside a timber framing shop. Appropriate PPE will be worn at all times, and the learners will demonstrate effective communication with colleagues / co-workers before and during the lift.

## **15E TRADITIONAL RAISING & RIGGING EQUIPMENT**

**Theory:**

- i) Given a multiple choice test of 45 recall/recognition type questions about traditional raising and rigging equipment, consisting of:
- OSHA Regulations (5 Questions)
  - Rigging & Equipment Types & Applications (10 Questions)
  - Hazards (10 Questions)
  - Hand Signals & Communication (5 Questions)
  - Sling Angles & Sling Loads (5 Questions)
  - Inspection of Slings & Rigging (10 Questions)

The learner will answer all questions within 45 minutes and score a minimum of 70% or 32 correct answers without reference materials.

### Practical:

- ii) Given a selection of the following:
- 2 round slings in good condition
  - 2 damaged round slings
  - 4 shackles in good condition
  - 2 damaged shackles
  - 2 wire rope slings in good condition
  - 2 damaged wire rope slings
- The learner will correctly identify and separate the damaged equipment from the functional equipment within 15 minutes. The learner must correctly identify all damaged equipment.
- iii) Learners will correctly calculate a variety of lift loads to within 10% of the actual weight.
- iv) Learners will demonstrate one safe and correct method for raising and down-rigging at least 2 of the following:
- a. Gin Pole
  - b. A-frame / Shear Legs
  - c. Derrick
- v) Learners will sling / rig various timber loads with traditional lifting equipment demonstrate the following:
- a. Effective communication with lifting crew
  - b. Use of appropriate PPE at all times
  - c. Safe and correct sling selection
  - d. Safe and correct shackle selection
  - e. Correct use of tag lines at all times

## 15F RAISING SEQUENCE & FRAME ASSEMBLY

### Theory:

- i) Given a multiple choice test of 40 recall/recognition type questions about planning and organising safe frame raisings, the learner will answer all questions within 40 minutes and score a minimum of 70%, or 28 correct answers.
- ii) Learners will prepare a complete set of documents and briefing notes for the erection of a small timber frame. This will include the following:
  - a. Method Statement / Raising Plan
  - b. Risk Assessment
  - c. Lifting Plan
  - d. Bracing & Shoring Plan
  - e. Kit List
  - f. Fasteners & Fixings List
  - g. Pre-work Briefing Agenda / Notes

**Practical:**

- iii) Learners will brief colleagues in preparation for the erection of a small timber framed building. This will include a review of the following:
  - a. Erection Method
  - b. Lifting Plan
  - c. Bracing & Shoring Plan
  - d. Tools & EquipmentLearners will create brief and accurate minutes of the briefing and circulate these to all crew.
- iv) Learners will demonstrate their ability to safely and effectively organize a crew of at least 4 people (plus experienced instructor) in the raising of a small frame (assembly of 2 or more frame sections / bents plus all connecting members). This will include the following:
  - a. Follow a pre-planned work method
  - b. Brief crew and double-check that all crew understand their duties/roles specific to the day
  - c. Brief crew regarding location of emergency equipment and procedures
  - d. Ensure that correct PPE used by all crew at all times (no exceptions)
  - e. Use safe work practices all times (no exceptions)
  - f. Clear access and escape routes for all crew at all times
  - g. Correct rigging with tag lines
  - h. Correct use of tools
  - i. Ladders tied off
  - j. Ensure appropriate lunch and coffee breaks are taken

- k. Ensure that crew remains productive (no idle crewmembers)
- l. Ensure that public, press and spectators are managed
- m. Ensure that frame is assembled plumb, level and true
- n. Ensure that frame is correctly braced and secured at all times (no exceptions)
- o. Ensure that all tools, equipment, fixings, etc are securely stored at completion.
- p. Ensure that site is tidy throughout.
- q. Ensure that site is safe at completion (ladders down, handrails secure, extra bracing, etc)
- r. Praise crew and individual efforts

## 15G ROPES, KNOTS & RIGGING FOR TIMBER FRAMERS

### Theory:

- i) Given a multiple choice test of 20 recall/recognition type questions about rigging tools and techniques, the learner will answer all questions within 20 minutes and score a minimum of 70%, or 14 correct answers.

### Practical:

- ii) Learners will correctly tie the following knots and hitches:
  - a. Bowline & Bowline on a Bight
  - b. Figure of Eight & Figure of Eight on a Bight
  - c. Figure of Nine
  - d. Alpine Butterfly
  - e. Clove Hitch
  - f. Cat's Paw
  - g. Round Turn with Half- Hitches
  - h. Double Fisherman's
  - i. Water Knot
  - j. Truckers' Hitch (or other adjustable load hitch)
  - k. Prussik Hitch
  - l. Stopper Knot
  - m. Single & Double Constrictor Knot
  - n. Constrictor Knot on a Bight
  - o. Monkey's Fist (or other throwing knot)
  - p. Lashing suitable for temporary handrails
- iii) Learners will demonstrate one correct method for coiling and securing rope from the end and from the middle.

iv) Given a length of rope and 3 karabiners or shackles, learners will demonstrate one correct method for making simple rope pulley systems.

v) Given a selection of the following:

- 3-strand fibre rope
- Marlingspike
- Cotton or Nylon Twine
- Rigging Knife

The learner will make a simple back-splice, short splice and eye splice.

vi) Given a selection of the following:

- Braided fibre rope
- Marlingspike
- Cotton or Nylon Twine
- Rigging Knife

The learner will make a simple back-splice and eye splice.

## 15H HAND RAISING (NO TACKLE)

### Theory:

i) Given a multiple choice test of 20 recall/recognition type questions about hand raising without tackle, consisting of:

- OSHA Regulations (5 Questions)
- Hazards (10 Questions)
- Communication (5 Questions)

The learner will answer all questions within 20 minutes and score a minimum of 70% or 14 correct answers without reference materials.

### Practical:

ii) Learners will demonstrate the safe and correct method for directing a crew to perform synchronised dead lifts and carries of timbers / frame sections.

iii) Learners will correctly calculate a variety of lift loads to within 10% of the actual weight.

iv) Learners will demonstrate one safe and correct method of parbuckling.

v) Learners will demonstrate the safe and correct method for directing a crew to perform hand raisings of frame sections, and demonstrate the following:

- a. Effective communication with lifting crew



- b. Synchronised lifting
- c. Use of appropriate PPE at all times
- d. Safe and correct body mechanics
- e. Correct use of tag lines at all times

## 15I INSTALLING SIP'S

### Theory:

- i) Given a multiple choice test of 20 recall/recognition type questions about the installation of SIPs consisting of:
  - Health & Safety issues (5 Questions)
  - Tools & Techniques including Lifting (10 Questions)
  - Sealing & Detailing (5 Questions)

The learner will answer all questions within 20 minutes and score a minimum of 70% or 14 correct answers without reference materials.

### Practical:

- ii) Learners will demonstrate one safe and correct method of storing SIP's at site.
- iii) Learners will demonstrate safe and correct methods for slinging and rigging a variety of SIP's with a crane. Tag lines must be used.
- iv) Learners will demonstrate the safe and correct method for installing SIP's on a timber frame building to within predetermined specifications and tolerances.

## PART SIXTEEN - CONSERVATION TECHNIQUES

### 16A ETHICS & STANDARDS

### Theory:

- i) Given a multiple choice test of 30 recall/recognition type questions about the ethics and standards of conserving historic timber buildings, the learner will answer all questions within 30 minutes and score a minimum of 70%, or 21 correct answers.
- ii) Learners will correctly define the following terms and give illustrative examples of how each term might apply to historic timber buildings:

- Conservation
  - Preservation
  - Reconstruction
  - Rehabilitation
  - Stabilization
  - Renovation
  - Alteration
- iii) In an group environment, learners will discuss the different ways that countries and cultures interpret and put into practice the above terms.

**Practical:**

- iv) Learners will develop a brief (1-2 page) written statement outlining their own conservation philosophy, and present this to colleagues in a group setting for the purpose of discussion.
- v) In a group environment, and using examples of important timber buildings, learners will discuss the relevance of timber supply to the conservation of historic timber buildings.
- vi) In a group environment, and using case studies of major restoration / reconstruction projects, learners will discuss the relevance of preserving historic craft techniques to the conservation of historic timber buildings.

## **16B DISMANTLING TECHNIQUES**

**Theory:**

- i) Given a multiple choice test of 40 recall/recognition type questions about planning and organising safe frame dismantling, the learner will answer all questions within 40 minutes and score a minimum of 70%, or 28 correct answers.
- ii) Learners will prepare a complete set of documents and briefing notes for the dismantling of a small, historic timber frame. This will include the following:
- a. Method Statement / Dismantling Plan
  - b. Risk Assessment
  - c. Lifting Plan
  - d. Bracing & Shoring Plan
  - e. Kit List

- f. Access & Scaffolding Plan
- g. Timber Identification & Storage Plan
- h. Pre-work Briefing Agenda / Notes

**Practical:**

- iii) Learners will brief colleagues in preparation for the dismantling of a small, timber framed building (not necessarily an historic building). This will include a review of the following:
  - a. Work Method
  - b. Risk Assessment
  - c. Lifting Plan
  - d. Bracing & Shoring Plan
  - e. Access & Scaffolding Plan
  - f. Tools & Equipment

Learners will create brief and accurate minutes of the briefing and circulate these to all crew.

- iv) Learners will demonstrate their ability to safely and effectively organise a crew of at least 4 people (plus experienced instructor) to dismantle a small frame (2 or more frame sections / bents plus all connecting members). This will include the following:
  - a. Follow a pre-planned work method
  - b. Brief crew and double-check that all crew understand their duties/roles specific to the day
  - c. Brief crew regarding location of emergency equipment and procedures
  - d. Ensure that correct PPE used by all crew at all times (no exceptions)
  - e. Use safe work practices all times (no exceptions)
  - a. Clear access and escape routes for all crew at all times
  - b. Correct rigging with tag lines
  - c. Correct use of tools
  - d. Ladders tied off
  - f. Ensure appropriate lunch and coffee breaks are taken
  - g. Ensure that crew remains productive (no idle crewmembers)
  - h. Ensure that public, press and spectators are managed
  - i. Ensure that frame is dismantled in a way that minimizes damage to all components
  - j. Ensure that all components are labelled and stored in an effective manner that will expedite repairs and/or re-erection
  - k. Ensure that frame is correctly braced and secured at all times (no exceptions)
  - l. Ensure that all tools, equipment, fixings, etc are securely stored at completion.

- m. Ensure that there are no exposed nails and minimise other handling hazards throughout.
- n. Ensure that site is tidy throughout.
- O. Ensure that site remains safe from beginning to completion (ladders down, handrails secure, extra bracing, traps/holes covered, etc)
- p. Praise crew and individual efforts

## 16C REPAIR TECHNIQUES

### Theory:

- i) Given a multiple choice test of 30 recall/recognition type questions about repairs to timber structures:
  - Timber Repairs (10 Questions)
  - Metalwork Repairs (10 Questions)
  - Chemical Repairs (10 Questions)The learner will answer all questions within 30 minutes and score a minimum of 70%, or 21 correct answers.

### Practical:

- ii) Learners will demonstrate the safe and correct layout, cutting and assembly of the following timber repairs in irregular, 8" section timbers to an overall tolerance of 1/16<sup>th</sup> inch:
  - a. Scissor scarf new end to post base and fix with recessed metal lag bolts and plugs. All joinery planes must shed water.
  - b. Simple stopped and splayed scarf for new end to beam. Fix with skew dowels and tapered keys.
  - c. Replacement of shouldered tenon including peg hole, fix with peg. Only peg to be visible.
  - d. Replacement of mortise wall (side patch with squinted and locking side abutments) including peg hole, fix with screws and plugs
- iii) Learners will demonstrate the safe and correct layout, cutting and assembly of a hidden flitch plate in the top centre of a beam to an overall tolerance of 1/16<sup>th</sup> inch. Fix with threaded rod and plugs.
- iv) Learners will demonstrate the safe and correct layout, preparation and assembly of the following chemical repairs in timbers to an

overall tolerance of 1/16<sup>th</sup> inch (correct PPE must be employed at all times, no exceptions):

- e. Consolidate a small section of degraded (frassy) timber surface with epoxy resin
- f. Create new joist housing in beam to predetermined dimensions. Patch with dry timber and fix with synthetic adhesive only.
- g. Replace mortise wall (side patch with perpendicular abutments) including peg hole and fix with epoxy resin.

## 16D CONSERVATION & PRESERVATION TECHNIQUES

Theory:

- i) Given a multiple choice test of 30 recall/recognition type questions about the preservation of historic timber buildings, the learner will answer all questions within 30 minutes and score a minimum of 70%, or 21 correct answers.

Practical:

- ii) Create a preservation strategy for an historic timber building and make a brief presentation to colleagues for the purpose of discussion. Strategy to include the following:
  - a. General description of building, historical significance, current status and general condition. Summary of any relevant legislation, protection or standards. (1-4 pages)
  - b. Introductory statement of conservation strategy to summarise rationale of interventions and explain proposed conservation ethic (1- page or less)
  - c. Detailed schedule of repairs and recommendations to include strategy for lightning and fire protection. (1-10 pages as appropriate)
  - d. Maintenance strategy (1 page)
  - e. Feasibility assessment (1 page or less)

## 16E INSPECTION, SURVEYING & RECORDING TECHNIQUES

Theory:

- i) Given a multiple choice test of 30 recall/recognition type questions about surveying and recording of historic timber buildings, the

learner will answer all questions within 30 minutes and score a minimum of 70%, or 21 correct answers.

**Practical:**

- ii) Learners will demonstrate their understanding of basic inspection / survey techniques by measuring and documenting 4 historic timber buildings in accordance with the recommendations of the Traditional Timberframe Research and Advisory Group (TTRAG).
- iii) Using the information gathered during 1 of the above inspections / surveys, learners will create a written summary of recommendations for repairs. All visible damage that poses a threat to the buildings stability must be addressed in this recommendation and the learners must not recommend unnecessary repairs and/or alterations to the building.

## **16F ESTIMATING REPAIRS**

**Practical:**

- i) Learners will create a complete schedule of repairs for a historic timber building, to include a detailed cost and quantity estimate for all labour, materials and equipment required. This will include the following:
  - a. Brief statement outlining repair strategy (crew size, access method, etc)
  - b. Timber-by-timber schedule of all labour, timber and fixings required
  - c. Summary timber list and total board measurement
  - d. Summary list of fixings and fasteners required
  - e. Schedule of machinery and equipment requirements