SKILLEDTRADES BC

PROGRAM OUTLINE

Saw Filer

SKILLED TRADES BC

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SAW FILER

PROGRAM OUTLINE

APPROVED BY INDUSTRY

MARCH 2013

Developed by
SkilledTradesBC
Province of British Columbia

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Section 1

INTRODUCTION

Saw Filer

Foreword

This Program Outline is for use in Saw Filer apprenticeship training classes sponsored by SkilledTradesBC and will be used as a curriculum planning guide for instructors in the formal classroom portions of apprenticeship training.

Practical demonstration and student participation should always be integrated with classroom sessions.

Safe working practices, though not always specified in each of the competencies and learning tasks, are an implied part of the program and should be stressed throughout the apprenticeship.

This Program Outline includes a list of recommended reference textbooks that are available to support the learning objectives and the minimum shop requirements needed to support instruction.

Achievement Criteria set a common minimum standard for training providers to measure achievement of practical competencies. Achievement Criteria are included only for competencies that require a practical assessment. Where Achievement Criteria are specified, the apprentice must achieve the specifications, safety standards and timeframes described.

Competencies that are solely theory-based will be assessed through a multiple choice test(s) for which the apprentice must achieve a minimum score of 70%.

SAFETY ADVISORY

Be advised that references to the WorkSafe BC safety regulations contained within these materials do not/may not reflect the most recent Occupational Health and Safety Regulation (the current Standards and Regulation in BC can be obtained on the following website: http://www.worksafebc.com). Please note that it is always the responsibility of any person using these materials to inform him/herself about the Occupational Health and Safety Regulation pertaining to his/her work.

Acknowledgements

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- Dave Robertson, Tolko Armstrong
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- Allan Jantz, Tolko Kelowna

Consultants retained by the Resource Training Organization of British Columbia to develop standards documentation and to facilitate the project were:

- Dan McFaull - North Pacific Training & Performance Inc.
- Mike McGrath - North Pacific Training & Performance Inc.

SkilledTradesBC would like to acknowledge the dedication and hard work of all the industry representatives appointed to identify the training requirements of the Saw Filer occupation.

How to Use this Document

This Program Outline has been developed for the use of individuals from several different audiences. The table below describes how each section can be used by each intended audience.

Section	Training Providers	Employers/ Sponsors	Apprentices	Challengers
Program Credentialing Model	Communicate program length and structure, and all pathways to completion	Understand the length and structure of the program	Understand the length and structure of the program, and pathway to completion	Understand challenger pathway to Certificate of Qualification
OAC	Communicate the competencies that industry has defined as representing the scope of the occupation	Understand the competencies that an apprentice is expected to demonstrate in order to achieve certification	View the competencies they will achieve as a result of program completion	Understand the competencies they must demonstrate in order to challenge the program
Training Topics and Suggested Time Allocation	Shows proportionate representation of general areas of competency (GACs) at each program level, the suggested proportion of time spent on each GAC, and percentage of time spent on theory versus practical application	Understand the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Understand the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Understand the relative weightings of various competencies of the occupation on which assessment is based
Program Content	Defines the objectives, learning tasks, high level content that must be covered for each competency, as well as defining observable, measureable achievement criteria for objectives with a practical component	Identifies detailed program content and performance expectations for competencies with a practical component; may be used as a checklist prior to signing a recommendation for certification (RFC) for an apprentice	Provides detailed information on program content and performance expectations for demonstrating competency	Allows individual to check program content areas against their own knowledge and performance expectations against their own skill levels
Training Provider Standards	Defines the facility requirements, tools and equipment, reference materials (if any) and instructor requirements for the program	Identifies the tools and equipment an apprentice is expected to have access to; which are supplied by the training provider and which the student is expected to own	Provides information on the training facility, tools and equipment provided by the school and the student, reference materials they may be expected to acquire, and minimum qualification levels of program instructors	Identifies the tools and equipment a tradesperson is expected to be competent in using or operating; which may be used or provided in a practical assessment

Section 2

PROGRAM OVERVIEW

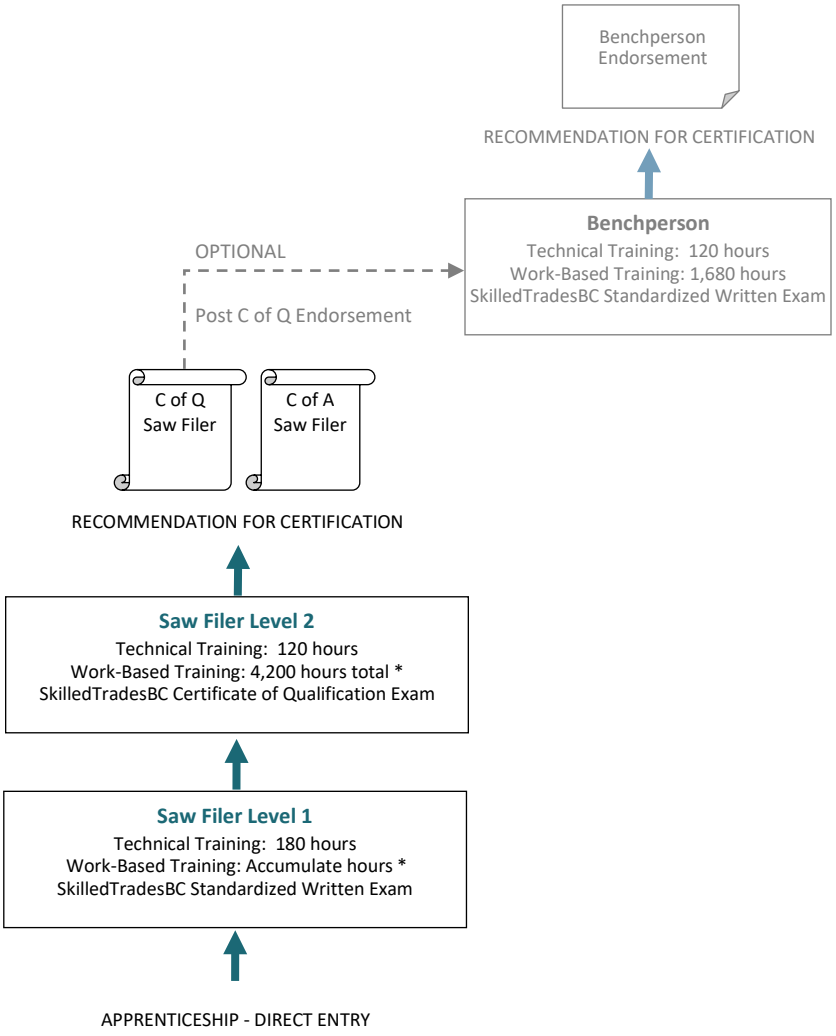
Saw Filer

Program Credentialing Model

Apprenticeship Pathway

This graphic provides an overview of the Saw Filer Apprenticeship pathway.

C of Q = Certificate of Qualification
C of A = Certificate of Apprenticeship



** 840 hours of work-based training in the Saw Filer trade recommended prior to entering Level 1 Technical Training; 2,520 hours of work-based training in the Saw Filer trade recommended prior to entering Level 2 Technical Training*

CROSS-PROGRAM CREDITS
Individuals who hold the credentials listed below are entitled to receive partial credit toward the completion requirements of this program

None

Occupational Analysis Chart

SAW FILER (WITH OPTIONAL BENCHPERSON ENDORSEMENT)

Occupation Description: " Saw Filer" means a person who maintains all types of saws, including circular saws, band saws, gang saws, chain saws, and operates, repairs and adjusts saw sharpening equipment and is also competent to bench all circular and gang saws, including tensioning, welding cracks, welding on teeth and included any other work that is usually performed by a Saw Filer in the Lumber Manufacturing Industry.

SAW FILER TRADES **A**	Describe the Scope of the Saw Filer Trades A1	1					Describe Apprenticeship Program A2	1					Describe Saw Filer Trade Terminology A3	1	2			
SAFE WORK PRACTICES **B**	Describe WorkSafe BC Regulations B1	1					Practice Personal Safety B2	1					Handle Saws and Knives Safely B3	1				
TRADE MATH **C**	Use Measuring Tools and Equipment C1	1					Apply Trade Formulas C2	1	2				Calculate Strain C3					EN
SAW BASICS **D**	Describe Cutting Systems D1	1					Describe and Identify Types of Cutting Tips D2	1					Identify Saw Tooth Problems D3	1				
	Swaging a Saw D4	1					Use Shapers D5	1					Align Teeth D6	1				
	Describe Saw Filing Tools, Equipment and Parts D7	1					Describe Special Purpose Tools D8	1										

EN = Endorsement

BAND SAWS **E**	Fit Band Saw E1	Sharpen Band Saw E2	Handle Band Saws Safely E3	Determine Band Saw Kerf Requirements E4	Swage Band Saws E5	Shape Band Saws E6
	1	1	1	1	1	1
	Grind Band Saw Backs E7	Maintain Band Saw Grinders E8	Troubleshoot Band Saws E9			
	1	1	EN			
CIRCULAR SAWS **F**	Identify Types of Circular Saws F1	Inspect Circular Saws F2	Select Circular Saw Tools and Equipment F3	Use Circular Saw Grinders F4	Maintain Circular Saw Grinders F5	Replace Head Saw Bit and Shank F6
	1	1	1	1	1	2
	Replace Cut-off Saw Teeth and Inserted Teeth F7	Tip Carbide Saws F8	Grind Carbide Saws F9	Troubleshoot Carbide Saws F10	Tip Stellite Circular Saws F11	Grind Stellite Circular Saws F12
	2	2	2	2	2	2
	Troubleshoot Stellite Saws F13					
	2					
GRINDING WHEELS **G**	Use Grinding Wheels Safely G1	Identify Types of Grinding Wheels G2	Calculate Safe Operating Speeds G3	Shape and Dress Grinding Wheels G4	Identify Wheel Dressing Tools G5	Mount Grinding Wheels G6
	1	1	1	1	1	1

EN = Endorsement

KNIVES H	Identify Types of Knives H1	Determine Knife Angles H2	Describe Knife Construction H3	Use Knife Grinders H4	Sharpen Knives H5	Perform Knife Babbitting and Balancing H6
	1	1	1	1	1	1
	Troubleshoot Knives and Chippers H7					
	1					
SAW WELDING I	Use Safe Oxy-Acetylene Welding Practices I1	Use a Portable Oxy-Acetylene Unit I2	Select Oxy-Acetylene Welding Tools and Equipment I3	Adjust Types of Flames I4	Weld Saw Teeth I5	Perform Crack Welding Using Oxy-Acetylene I6
	1	1	1	1	1	1
	Weld Saws using MIG and TIG equipment I7	Weld Band Saws Using Oxy-Acetylene Equipment I8	Use Safe Arc Welding Practices I9	Identify Various Arc Welding Machines I10	Describe Electrode Characteristics and Classifications I11	Weld Saw Plate Using Manual Arc Welding Equipment I12
	1	1	2	2	2	2
	Butt Weld Saws I13					
	EN					
SAW CHAINS J	Identify Types of Saw Chain J1	Calculate Gauge and Pitch of Saw Chain J2	Inspect and Repair Saw Chain J3	Set-up and Sharpen Saw Chain J4	Describe Chain Saw Chain Tools J5	Determine Grinding Wheel Profile J6
	1	1	1	1	1	1

EN = Endorsement

SAW GUIDES **K**	Identify Types of Band Saw Guides K1	1					Identify Types of Circular Saw Guides K2	1					Identify Types of Guide Materials K3	1					Maintain Saw Guides K4	1				
SAW SHEARBOARDS, SCRAPERS, COOLING SYSTEMS AND HYDRAULICS **L**	Identify Types of Shearboards L1	1					Identify Types of Scrapers L2	1					Maintain Band Saw and Circular Saw Cooling Systems L3	1					Describe Hydraulic Systems L4					EN
TENSION, LEVEL AND BENCH SAWS **M**	Describe the Tools for Tensioning and Leveling Saws M1	1					Level Band Saws M2	1				EN	Tension Band Saws M3	1				EN	Level Circular Saws M4	1	2				Tension Circular Saws M5	1	2				Use Safe Saw Handling in Circular Saw Benching M6		2			
	Prepare Circular Saw for Benching M7		2				Select Benching Hand Tools and Equipment M8		2				Maintain Benching Hand Tools M9		2				Plumb Circular Saws M10		2				Describe Band Saw Steel Required Properties M11					EN	Determine Required Tension M12					EN
	Describe Band Saw Benches M13					EN	Maintain Band Saw Back M14					EN	Maintain Band Saw Tire M15					EN	Repair Band Saw Twists M16					EN	Heat Tension Band Saws M17					EN						
PLANNING AND ORGANIZING WORK ACTIVITIES **N**	Plan Project Work N1		2				Participate in Mill Shutdown Planning Procedures N2		2				Interpret LMI Technical Documents N3		2				Create / Update Technical Documents N4		2																

EN = Endorsement

SAW FILING ROOM MACHINES **O**	Set-up and Maintain Circular Saw Bench O1	Use Circular Saw Stretcher O2	Describe Operation and Maintenance of Circular Saw Grinders O3	Maintain Circular Saw Guide Equipment O4	Set-up and Maintain Band Saw Bench O5	Maintain Filing Room Machines and Equipment O6
	2	2	2	2	EN	EN
	Describe Automatic Saw Levellers O7	Describe Saw Control Systems O8				
	EN	EN				
CIRCULAR SAW MACHINES **P**	Perform Circular Head Rig Alignment and Maintenance P1	Align Circular Gang Saws P2	Align Edgers P3	Describe the Main Elements of an Optimizing System P4	Align Cut-Off, Trim and Slasher Saws P5	Perform Laser Alignment of Circular Machines P6
	2	2	2	2	2	2
	Align Chip Canter P7	Troubleshoot Circular Saw Machines P8				
	2	2				
BAND MILLS **Q**	Align Head Saw Band Mill Q1	Align Vertical Resaw Q2	Align Horizontal Resaw Q3	Align Twin and Quad Band Mills Q4	Align Other Saw Mill Machines Q5	Align Band Mill Using Laser Alignment Q6
	EN	EN	EN	EN	EN	EN
	Maintain Band Mill Components Q7	Perform Band Mill Production Shift Inspections Q8	Maintain Strain Systems Q9	Perform Band Mill Wheel Grinding Q10		
	EN	EN	EN	EN		

EN = Endorsement

QUALITY CONTROL	Describe Quality Control Systems					Identify Standards, Measuring Methods and Data				
R	R1					R2				
					EN					EN

EN = Endorsement

Training Topics and Suggested Time Allocation

SAW FILER – LEVEL 1

			% of Time Allocated to:		
		% of Time	Theory	Practical	Total
Line A	**Saw Filer Trades**	**4%**	**100%**	**0%**	**100%**
A1	Describe the Scope of the Saw Filer Trades		✓		
A2	Describe Apprenticeship Program		✓		
A3	Describe Saw Filer Trade Terminology		✓		
Line B	**Safe Work Practices**	**3%**	**60%**	**40%**	**100%**
B1	Describe WorkSafe BC Regulations		✓		
B2	Practice Personal Safety		✓	✓	
B3	Handle Saws and Knives Safely		✓	✓	
Line C	**Trade Math**	**13%**	**50%**	**50%**	**100%**
C1	Use Measuring Tools and Equipment		✓	✓	
C2	Apply Trade Formulas		✓	✓	
Line D	**Saw Basics**	**10%**	**72%**	**28%**	**100%**
D1	Describe Cutting Systems		✓		
D2	Describe and Identify Types of Cutting Tips		✓		
D3	Identify Saw Tooth Problems		✓		
D4	Swaging a Saw		✓	✓	
D5	Use Shapers		✓	✓	
D6	Align Teeth		✓	✓	
D7	Describe Saw Filing Tools, Equipment and Parts		✓		
D8	Describe Special Purpose Tools		✓		
Line E	**Band Saws**	**10%**	**50%**	**50%**	**100%**
E1	Fit Band Saw		✓	✓	
E2	Sharpen Band Saw		✓	✓	
E3	Handle Band Saws Safely		✓	✓	
E4	Determine Band Saw Kerf Requirements		✓	✓	
E5	Swage Band Saws		✓	✓	
E6	Shape Band Saws		✓	✓	
E7	Grind Band Saw Backs		✓	✓	
E8	Maintain Band Saw Grinders		✓	✓	
Line F	**Circular Saws**	**9%**	**55%**	**45%**	**100%**
F1	Identify Types of Circular Saws		✓		
F2	Inspect Circular Saws		✓	✓	
F3	Select Circular Saw Tools and Equipment		✓	✓	
F4	Use Circular Saw Grinders		✓	✓	
F5	Maintain Circular Saw Grinders		✓	✓	

			% of Time Allocated to:		
		% of Time	Theory	Practical	Total
Line G	**Grinding Wheels**	**6%**	**60%**	**40%**	**100%**
G1	Use Grinding Wheels Safely		✓	✓	
G2	Identify Types of Grinding Wheels		✓		
G3	Calculate Safe Operating Speeds		✓	✓	
G4	Shape and Dress Grinding Wheels		✓	✓	
G5	Identify Wheel Dressing Tools		✓		
G6	Mount Grinding Wheels		✓	✓	
Line H	**Knives**	**7%**	**55%**	**45%**	**100%**
H1	Identify Types of Knives		✓		
H2	Determine Knife Angles		✓	✓	
H3	Describe Knife Construction		✓		
H4	Use Knife Grinders		✓	✓	
H5	Sharpen Knives		✓	✓	
H6	Perform Knife Babbitting and Balancing		✓	✓	
H7	Troubleshoot Knives and Chippers		✓	✓	
Line I	**Saw Welding**	**8%**	**55%**	**45%**	**100%**
I1	Use Safe Oxy-Acetylene Welding Practices		✓	✓	
I2	Use a Portable Oxy-Acetylene Unit		✓	✓	
I3	Select Oxy-Acetylene Welding Tools and Equipment		✓	✓	
I4	Adjust Types of Flames		✓	✓	
I5	Weld Saw Teeth		✓	✓	
I6	Perform Crack Welding Using Oxy-Acetylene		✓	✓	
I7	Weld Saws Using MIG and TIG Equipment		✓	✓	
I8	Weld Band Saws Using Oxy-Acetylene Equipment		✓	✓	
Line J	**Saw Chains**	**6%**	**60%**	**40%**	**100%**
J1	Identify Types of Saw Chain		✓		
J2	Calculate Gauge and Pitch of Saw Chain		✓	✓	
J3	Inspect and Repair Saw Chain		✓	✓	
J4	Set-up and Sharpen Saw Chain		✓	✓	
J5	Describe Chain Saw Chain Tools		✓		
J6	Determine Grinding Wheel Profile		✓	✓	
Line K	**Saw Guides**	**5%**	**80%**	**20%**	**100%**
K1	Identify Types of Band Saw Guides		✓		
K2	Identify Types of Circular Saw Guides		✓		
K3	Identify Types of Guide Materials		✓		
K4	Maintain Saw Guides		✓	✓	
Line L	**Saw Shearboards, Scrapers, Cooling Systems and Hydraulics**	**4%**	**75%**	**25%**	**100%**
L1	Identify Types of Shearboards		✓		
L2	Identify Types of Scrapers		✓		
L3	Maintain Band Saw and Circular Saw Cooling Systems		✓	✓	
Line M	**Tension, Level and Bench Saws**	**15%**	**55%**	**45%**	**100%**

			% of Time Allocated to:		
		% of Time	Theory	Practical	Total
M1	Describe the Tools for Tensioning and Leveling Saws		✓		
M2	Level Band Saws		✓	✓	
M3	Tension Band Saws		✓	✓	
M4	Level Circular Saws		✓	✓	
M5	Tension Circular Saws		✓	✓	
	Total Percentage for Saw Filer Level 1	**100%**			

Training Topics and Suggested Time Allocation

SAW FILER – LEVEL 2

			% of Time Allocated to:		
		% of Time	Theory	Practical	Total
Line A	**Saw Filer Trades**	**3%**	**100%**	**0%**	**100%**
A3	Describe Saw Filer Trade Terminology		✓		
Line C	**Trade Math**	**12%**	**50%**	**50%**	**100%**
C2	Apply Trade Formulas		✓	✓	
Line F	**Circular Saws**	**18%**	**50%**	**50%**	**100%**
F6	Replace Head Saw Bit and Shank		✓	✓	
F7	Replace Cut-off Saw Teeth and Inserted Teeth		✓	✓	
F8	Tip Carbide Saws		✓	✓	
F9	Grind Carbide Saws		✓	✓	
F10	Troubleshoot Carbide Saws		✓	✓	
F11	Tip Stellite Circular Saws		✓	✓	
F12	Grind Stellite Circular Saws		✓	✓	
F13	Troubleshoot Stellite Saws		✓	✓	
Line I	**Saw Welding**	**11%**	**65%**	**35%**	**100%**
I9	Use Safe Arc Welding Practices		✓	✓	
I10	Identify Various Arc Welding Machines		✓		
I11	Describe Electrode Characteristics and Classifications		✓		
I12	Weld Saw Plate Using Manual Arc Welding Equipment		✓	✓	
Line M	**Tension, Level and Bench Saws**	**18%**	**55%**	**45%**	**100%**
M4	Level Circular Saws		✓	✓	
M5	Tension Circular Saw		✓	✓	
M6	Use Safe Saw Handling in Circular Saw Benching		✓	✓	
M7	Prepare Circular Saw for Benching		✓	✓	
M8	Select Benching Hand Tools and Equipment		✓	✓	
M9	Maintain Benching Hand Tools		✓	✓	
M10	Plumb Circular Saws		✓	✓	
Line N	**Planning and Organizing Work Activities**	**5%**	**50%**	**50%**	**100%**
N1	Plan Project Work		✓	✓	
N2	Participate in Mill Shutdown Planning Procedures		✓	✓	
N3	Interpret LMI Technical Documents		✓	✓	
N4	Create / Update Technical Documents		✓	✓	

			% of Time Allocated to:		
		% of Time	Theory	Practical	Total
Line O	**Saw Filing Room Machines**	**15%**	**60%**	**40%**	**100%**
O1	Set-up and Maintain Circular Saw Bench		✓	✓	
O2	Use Circular Saw Stretcher		✓	✓	
O3	Describe Operation and Maintenance of Circular Saw Grinders		✓		
O4	Maintain Circular Saw Guide Equipment		✓	✓	
Line P	**Circular Saw Machines**	**18%**	**50%**	**50%**	**100%**
P1	Perform Circular Head Rig Alignment and Maintenance		✓	✓	
P2	Align Circular Gang Saws		✓	✓	
P3	Align Edgers		✓	✓	
P4	Describe the Main Elements of an Optimizing System		✓		
P5	Align Cut-Off, Trim and Slasher Saws		✓	✓	
P6	Perform Laser Alignment of Circular Machines		✓	✓	
P7	Align Chip Canter		✓	✓	
P8	Troubleshoot Circular Saw Machines		✓	✓	
	Total Percentage for Saw Filer Level 2	**100%**			

Training Topics and Suggested Time Allocation

BENCHPERSON (OPTIONAL ENDORSEMENT)

			% of Time Allocated to:		
		% of Time	Theory	Practical	Total
Line C	**Trade Math**	**9%**	**50%**	**50%**	**100%**
C3	Calculate Strain		✓	✓	
Line E	**Band Saws**	**14%**	**50%**	**50%**	**100%**
E9	Troubleshoot Band Saws		✓	✓	
Line I	**Saw Welding**	**3%**	**50%**	**50%**	**100%**
I13	Butt Weld Saws		✓	✓	
Line L	**Saw Shearboards, Scrapers, Cooling Systems and Hydraulics**	**6%**	**100%**	**0%**	**100%**
L4	Describe Hydraulic Systems		✓		
Line M	**Tension, Level and Bench Saws**	**13%**	**55%**	**45%**	**100%**
M2	Level Band Saws		✓	✓	
M3	Tension Band Saws		✓	✓	
M11	Describe Band Saw Steel Required Properties		✓		
M12	Determine Required Tension		✓	✓	
M13	Describe Band Saw Benches		✓		
M14	Maintain Band Saw Back		✓	✓	
M15	Maintain Band Saw Tire		✓	✓	
M16	Repair Band Saw Twists		✓	✓	
M17	Heat Tension Band Saws		✓	✓	
Line O	**Saw Filing Room Machines**	**20%**	**65%**	**35%**	**100%**
O5	Set-up and Maintain Band Saw Bench		✓	✓	
O6	Maintain Filing Room Machines and Equipment		✓	✓	
O7	Describe Automatic Saw Levellers		✓		
O8	Describe Saw Control Systems		✓		
Line Q	**Band Mills**	**29%**	**50%**	**50%**	**100%**
Q1	Align Head Saw Band Mill		✓	✓	
Q2	Align Vertical Resaw		✓	✓	
Q3	Align Horizontal Resaw		✓	✓	
Q4	Align Twin and Quad Band Mills		✓	✓	
Q5	Align Other Saw Mill Machines		✓	✓	
Q6	Align Band Mill Using Laser Alignment		✓	✓	
Q7	Maintain Band Mill Components		✓	✓	
Q8	Perform Band Mill Production Shift Inspections		✓	✓	
Q9	Maintain Strain Systems		✓	✓	
Q10	Perform Band Mill Wheel Grinding		✓	✓	
Line R	**Quality Control**	**6%**	**100%**	**0%**	**100%**

			% of Time Allocated to:		
		% of Time	Theory	Practical	Total
R1	Describe Quality Control Systems		✓		
R2	Identify Standards, Measuring Methods and Data		✓		
	Total Percentage for Benchperson (Endorsement)	**100%**			

Section 3

PROGRAM CONTENT

Saw Filer

Level 1

Saw Filer

LINE (GAC): A SAW FILER TRADES

Competency: A1 Describe the Scope of the Saw Filer Trades

Objectives

To be competent in this area, the individual must be able to:

- Describe the work responsibilities and tasks of journeyperson circular saw filers and benchperson saw filers in a variety of plants and with a variety of saw types.

LEARNING TASKS	CONTENT

1. Describe Saw Filing	• Maintain cutting edges
	• Align and set-up saw filing equipment
	• Maintain the saw plates
	  ○ Circular saws (called anvil work)
	  Band saws (called bench work)
	• Grind knives
	  ○ Chipper knives
	  ○ Profile knives
	  ○ Hog knives
	• Babbitt, shimming and balancing procedures
	• Saw guide maintenance

2. Describe types of plants	• Sawmills • Pulp and paper manufacturing plants • Shingle mills • Remanufacturing plants • Saw repair shops • Waferboard plants
3. Describe responsibilities of journeyperson Circular Saw Filers	• Install and fit all types of saws, including circular saws, band saws and chain saws • Operate, adjust, maintain and repair saw sharpening equipment • Shape, sharpen, replace and build up teeth • Sharpen, babbitt and balance knives • Perform any other work that is usually performed by a Saw Filer in the lumber manufacturing industry • Use a variety of hand tools, power tools and specialized machinery

- Bench all types of saws
- Perform various operations on saws:
  - Sharpening
  - Adjusting
  - Leveling
  - Tensioning
  - Welding cracks
  - Welding teeth
- Use automatic and manual grinding procedures
- Use automatic and manual benching procedures
- Remove twists, level, tension and plumb saws
- Perform maintenance tasks such as aligning all related saws and equipment
- Coordinate maintenance with other trades and departments within the mill

5. Describe responsibilities of Benchperson Saw Filers

- Bench band saws
- Grind band mill wheels
- Align:
  - Head rigs
  - Band
  - Circular
  - Resaws
  - Vertical
  - Horizontal
  - Twins
  - Quads
- Align:
  - Edgers
  - Circular resaws
  - Canterlines
- Align related saws and equipment
- Perform band mill alignment
- Grind band mill wheels and work with balancing personnel
- Troubleshoot the systems
- Set up the filing room equipment
- Maintain a safe working environment

LINE (GAC): A SAW FILER TRADES

Competency: A2 Describe Apprenticeship Program

Objectives

To be competent in this area, the individual must be able to:

- Describe the requirements of Saw Filer apprenticeship programs.
- Describe the responsibilities of apprentices and employers within the Saw Filer apprenticeship programs.

LEARNING TASKS	CONTENT
1. Describe the responsibilities of the apprentice to the employer	• Sponsorship agreement • Employer expectations • Labour code
2. Describe the responsibilities of the employer to the apprentice	• Sponsorship agreement • Apprentice expectations • Labour code
3. Describe the required skills and characteristics	• Educational requirements • Standards • Logbook and how it works

LINE (GAC): A SAW FILER TRADES

Competency: A3 Describe Saw Filer Trade Terminology

Objectives

To be competent in this area, the individual must be able to:

- Define key terms related to saw filing and saw mill equipment.
- Define key terms realted to metals and alloys used in saw manufacturing.

LEARNING TASKS	CONTENT

1. Define saw mill equipment terms	• Saw machines
	  ○ Equipment
	  ○ Systems
	  ○ Related trade terms

2. Define saw filing terms	• Saws
	  ○ Equipment
	  ○ Tools
	  ○ Related trade terms

3. Define metal and alloy terms	• Iron
	  ○ Carbon
	  ○ Nickel
	  ○ Phosphorus
	  ○ Temper
	• Tungsten carbide
	  ○ Cobalt
	  ○ Chrome
	• Babbitt
	  ○ Guide materials
	• Stellite
	• All related materials, metals and alloys
	  ○ Hardening surface materials

LINE (GAC): B SAFE WORK PRACTICES

Competency: B1 Describe WorkSafe BC Regulations

Objectives

To be competent in this area, the individual must be able to:

- Describe WorkSafe BC regulations specifically related to hazards in the lumber manufacturing industry and to saw filing in particular.

LEARNING TASKS	CONTENT

1. Describe WorkSafe BC regulations specific to the Saw Filer Trades	• Crack repair limits
	  ○ Circular saws
	  ○ Band saws
	• Saw handling
	• Hard metal disease prevention
	• Ventilation regs
	• WHMIS Guidelines for all filing room products and materials
	  ○ Grinder fluids
	  ○ Cleaners
	  ○ Fluxes, etc
	• Guard Restrictions (Regs)
	• High voltage equipment

2. Identify industrial hazards	• Carbide hazards
	  ○ Applications
	  ○ Handling
	• Stellite hazards
	  ○ Applications
	  ○ Handling
	• Grinding wheel dust
	  ○ Hazards and protection
	• Coolant hazards
	  ○ Disposal
	  ○ Handling

LINE (GAC): B SAFE WORK PRACTICES

Competency: B2 Practice Personal Safety

Objectives

To be competent in this area, the individual must be able to:

- Describe work clothing appropriate to lumber manufacturing industry worksites and to saw filing tasks in particular.
- Demonstrate personal safety practices for lumber manufacturing industry worksites and for saw filing tasks in particular.

LEARNING TASKS	CONTENT
1. Describe appropriate work clothing	• Close-fitting pants, shirts and jackets • Safety toe workboots • Hard hat • Gloves • High-visibility, fire resistant coveralls
2. Describe protective equipment	• Safety goggles and glasses • Face shield • Ear protection • Leather aprons • Dust masks
3. Practice personal safety	• Appropriate personal protective clothing • Equipment • Grinding • Saw Handling • Welding

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job the learner will demonstrate personal safety practices.
Conditions	Under the direction of a licensed journeyperson in a classroom / shop during training and on the job in a lumber manufacturing industry worksite or in a saw filing room.
Criteria	The learner will score 100% on a rating checklist that reflects the following criteria: • Meets Code requirements • Appropriate work clothing • Appropriate personal protective equipment

LINE (GAC): B SAFE WORK PRACTICES

Competency: B3 Handle Saws and Knives Safely

Objectives

To be competent in this area, the individual must be able to:

- Describe procedures for safe saw and knife handling in the saw filing room and on the mill floor.
- Identify personal safety equipment for safe saw and knife handling.
- Demonstrate procedures for safe saw and knife handling.

LEARNING TASKS	CONTENT

1. Describe safe saw handling procedures in the filing room	• Removal from crates
	• Untying of new band saws
	• Changing hand
	• Placement and removal from grinder
	• Placement and removal from bench
	• General movement of all saws (filing room/mill floor)
	• Changing all saws
	• Storage
	• Saw and knife disposal
	  ○ Cutting up saws
	  ○ Disposal bins

2. Describe safe knife handling procedures	• Personal safety equipment • Grinder safety equipment • Knife carts and boxes • Straight thick knives • Straight thin knives • Bent knives • Profile cutters • Dome tops • Counter knives • Disposable turn knives • Hog knives • Related knives • Pouring babbitt

3. Identify personal safety equipment	• Personal safety equipment
	  ○ Eyes
	  ○ Ears
	  ○ Respiratory
	  ○ Toes

		○ Hands • Follow lock-out procedures
4.	Describe safe saw handling procedures on the mill floor	• Changing saws from machinery • On and off hoists • Cradles • Dollies • Rim clamps • Saw boxes • Cut-off saw rigging
5.	Demonstrate safe handling of saws and knives	• Demonstrate safe saw handling procedures • Demonstrate safe knife handling procedures

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job the learner will demonstrate safe practices for handling saws and knives.
Conditions	Under the direction of a licensed journeyperson in a classroom / shop during training and on the job in a lumber manufacturing industry worksite or in a saw filing room, the learner will be given required tools and equipment.
Criteria	The learner will score 100% on a rating checklist that reflects the following criteria: • Meets Code requirements • Appropriate use of personal protective equipment • Safe procedures, per worksite requirements

LINE (GAC): C TRADE MATH

Competency: C1 Use Measuring Tools and Equipment

Objectives

To be competent in this area, the individual must be able to:

- Demonstrate the use of measuring tools and equipment.

LEARNING TASKS	CONTENT
1. Use a protractor	• Measure angles using a protractor

2. Use a micrometer	• Measure thickness and allowable tolerances
	  ○ Kerfs
	  ○ Guides

3. Use Vernier calipers	• Measure thickness and width
	  ○ Kerfs
	  ○ Guides

4. Use a dial indicator	• Measure run-out, alignment and side clearance
5. Use inside and outside calipers	• Alignment
6. Describe the care, maintenance of all measuring tools and equipment	• Use "No Residue" cleaners • Do not use compressed air • Types of tools

Achievement Criteria

Performance	The learner will demonstrate the use of measuring tools and equipment.
Conditions	The learner will be given: • Measuring tools and equipment • Saw blades and other workpieces to be measured
Criteria	The learner will score 70% or better on a rating sheet that reflects the following criteria: • Correct measuring tool or equipment used for the task • Measurements accurate within accepted tolerances for the task

LINE (GAC): C TRADE MATH

Competency: C2 Apply Trade Formulas

Objectives

To be competent in this area, the individual must be able to:

- Apply trade formulas to solve mathematical problems.
- Calculate saw speeds and tooth profiles.

LEARNING TASKS	CONTENT
1. Solve applied trade mathematics using formulas	• Calculate diameters • Calculate circumferences
2. Solve applied problems involving saw speed	• Pulley speeds • RPM • SFPM
3. Calculate tooth profiles	• Calculate tooth bite • Hook angles • Clearance angles • Included angles • Pitch • Gullet depth • Feeds and speeds • Horsepower required • Key number calculations

Achievement Criteria

Performance	The learner will apply trade formulas to solve practical saw filing problems.
Conditions	The learner will be given sufficient information related to practical saw filing problems and situations.
Criteria	The learner will score 70% or better in applying formulas to calculate solutions to practical problems, including: • Choosing the correct formula • Selecting the right information for use in the formula • Making the correct calculation

LINE (GAC): D SAW BASICS

Competency: D1 Describe Cutting Systems

Objectives

To be competent in this area, the individual must be able to:

- Describe different types of band and circular saws.
- Describe different saw tooth profiles and their cutting characteristics.

LEARNING TASKS	CONTENT

1. Describe different ways of cutting wood fibre	• Ripping
	  ○ Band
	  ○ Circular
	• Cross cutting
	  ○ Circular

2. Describe types and applications of band saw machines	• Single cut • Double sut • Vertical resaw • Horizontal resaw • Twin band saws • Quad band saws

3. Describe types of circular saws	• Cut-off saws
	  ○ Solid tooth
	  ○ Inserted tooth
	  ○ Carbide
	• Head saws
	  ○ Solid tooth
	  ○ Bit and shank
	• Edger saws
	  ○ Solid tooth
	  ○ Carbide
	  ○ Stellite
	• Trim saws
	  ○ Solid tooth
	  ○ Hollow ground
	  ○ Carbide
	• Slashers
	• Lathe
	  ○ Solid tooth
	  ○ Inserted tooth
	  ○ Carbide
	• Scrag saws
	• Related circular saws

4.	Describe various band saw tooth profiles	• Bandsaws
		  ○ Angles
		  ○ Pitch
		  ○ Depth
		  ○ Cam style

5.	Describe circular saw tooth profiles	• Circular
		  ○ K style
		  ○ P style
		  ○ M style
		  ○ R&S style
		  ○ Alternate bevel
		  ○ V-Top

6.	Describe frost teeth	• Bandsaws • Circular saws
7.	Describe the purpose and required kerf	• Bandsaws • Circular saws

LINE (GAC): D SAW BASICS

Competency: D2 Describe and Identify Types of Cutting Tips

Objectives

To be competent in this area, the individual must be able to:

- Describe and identify the different types of cutting tips on band and circular saws.

LEARNING TASKS	CONTENT
1. Describe types of cutting tips used on band saws	• Spring • Swage • Stellite

2. Describe types of cutting tips used on circular saws	• Spring
	• Swage
	• Inserted teeth
	  ○ Rip
	  ○ Cross cut
	• Hollow ground
	• Carbide
	• Stellite
	• Polycrystalline
	• Ceramics

LINE (GAC): D SAW BASICS

Competency: D3 Identify Saw Tooth Problems

Objectives

To be competent in this area, the individual must be able to:

- Identify different types problems with saw teeth.

LEARNING TASKS	CONTENT
1. Identify crumble	• Causes • Cures

2. Identify tooth problems	• Missing corners
	• Bent teeth
	• Operational
	  ○ Swage
	  ○ Loss of back
	• Clamp marks running through swage
	• Missing and broken tips

LINE (GAC): D SAW BASICS

Competency: D4 Swaging a Saw

To be competent in this area the individual must be able to:

- Describe methods for swaging a saw.
- Demonstrate the use of hand swaging equipment.
- Demonstrate the use of air assist swaging equipment.

LEARNING TASKS	CONTENT

1. Identify the use of all types and sizes of swages	• Band saw
	  ○ Hand and air
	• Circular saw
	  ○ Hand and air
	• Shingle

2. Describe and demonstrate set-up and maintenance of swages	• Anvils
	  ○ Carbide
	  ○ Carbon steel
	• Dies
	  ○ Long bite
	  ○ Short bite
	  ○ Extra short bite
	• Clamp screws
	  ○ Carbon steel
	  ○ Carbide
	• Stop bracket and stops
	• Head and front guide arm
	• Anvil setting gauge
	• Circular swage set-up
	• Auto swage and shaper

3. Describe and demonstrate air assist swage equipment and maintenance	• Pressure • Cylinder and gaskets • Valve assemble and gaskets • “O” rings ○ Piston and rod • Air valve • Piston and pin • Speed control • Oiler

4. Describe swage problems

- Bent teeth
- Crumble
- Loss of back
- Screw mark running through swage
- Too thin/thick at the point
- Insufficient swage
- Pulling to one side

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job the learner will diagnose and resolve various swage problems.
Conditions	The learner will be given: • Hand swaging tools and equipment • Air assist swaging tools and equipment • Saws with various swage problems
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct diagnosis of the problem • Correct use of the proper tools and equipment • Problems fully corrected

LINE (GAC): D SAW BASICS

Competency: D5 Use Shapers

Objectives

To be competent in this area, the individual must be able to:

- Identify and describe the use of different types and sizes of shapers.
- Describe the set-up and maintenance of shapers.
- Describe various shaping problems.
- Use and maintain shapers.

LEARNING TASKS	CONTENT

1. Identify the use of all types and sizes of shapers	• Band saw
	  ○ Hand and air
	• Circular saw
	  ○ Hand and air
	  ○ #5700-C
	  ○ #6900-C
	  ○ #5500-S

2. Describe set-up and maintenance of shapers	• Adjust for kerf • Centre dies • Bevel alignment • Tooth stop • Adjustment to plate thickness • Wear parts
3. Describe shaper problems	• Teeth off to one side • Crumble • Crushed teeth • Too much or too little shape
4. Describe air assist shaper equipment and maintenance	• Pressure • Cylinder and gaskets • Valve assembly and gaskets • “O” rings for piston and rod • Air valve • Piston and pin • Speed control • Oiler
5. Use and maintain shapers	• Demonstrate use of shapers • Demonstrate maintenance of shapers

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job the learner will use and maintain various shapers to solve shaper problems with saws.
Conditions	The learner will be given: • Hand shaper tools and equipment • Air assist shaper tools and equipment • Saws with various problems to be resolved by shaping.
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct diagnosis of the shaping problem • Correct use of the proper shaper tools and equipment • Problems fully corrected

LINE (GAC): D SAW BASICS

Competency: D6 Align Teeth

To be competent in this area the individual must be able to:

- Identify and describe saw tooth alignment problems.
- Use tooth alignment tools to align teeth.

LEARNING TASKS	CONTENT
1. Use tooth alignment tools	• Alignment gauges • Dial indicators • Set wrenches • Dolly • Peen hammer
2. Identify tooth alignment problems	• Bent teeth • Rocked teeth • Crumble • Welded teeth • Missing teeth • Turned over saws
3. Align teeth	• Demonstrate aligning saw teeth

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job the learner will use various tooth alignment tools to align saw teeth.
Conditions	The learner will be given: • Tooth alignment tools and equipment • Saw teeth with various problems to be resolved by alignment
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct diagnosis of the alignment problem • Correct use of the proper alignment tools and equipment • Problems fully corrected

LINE (GAC): D SAW BASICS

Competency: D7 Describe Saw Filing Tools, Equipment and Parts

Objectives

To be competent in this area, the individual must be able to:

- Describe typical saw filing tools, equipment and parts.
- Identify suppliers and manufacturers catalogues.

LEARNING TASKS	CONTENT
1. Identify and specify typical saw filing tools and equipment	• Band saw sharpeners • Filing clamps • Circular saw sharpeners • Automatic swage/shapers • Hand sharpeners • Carbide sharpeners • Stellite sharpeners • Stretcher rolls • Benches • Shears • Welding clamps • Swages (hand and air) • Shapers (hand and air) • Tools (hand and power) • Slabs and anvils • Bandmill wheel grinders • Related trade equipment • Auto tippers • Auto leveler, Band and Circular
2. Identify catalogues	• Different manufacturers • Different suppliers • Related companies
3. Identify and specify typical saw filing parts and equipment	• Use check-lists • Model of machine or equipment • Serial number of machine or equipment • Right or left hand machine • Right or left hand equipment

LINE (GAC): D SAW BASICS

Competency: D8 Describe Special Purpose Tools

To be competent in this area, the individual must be able to:

- Identify and describe the safe use of various special purpose tools used in the saw filing trade.

LEARNING TASKS	CONTENT
1. Describe tool safety	• Recognize minimum size • Change out as required
2. Identify wheel dressers	• Dressing brick ○ Vitrified and resinoid • Diamond stick • Metcalfe dresser • Desmond dresser • Universal dresser • Star dresser • Diamond profile dresser

3. Identify gauges	• Straight edges
	• Circular convex/concave
	• Bandsaw tension gauge
	• Back gauges
	  ○ Solid steel
	  ○ 3 point
	  ○ Dial indicator

4. Identify hammers	• Ball peen • Welding • Dog head • Cross face • Twist face • Related hammers
5. Identify wrenches	• Bit and shank wrenches • Saw wrenches • Collar wrenches • Trade related wrenches

6.	Identify files	• Making of files
		• Length of files
		• File kinds, shape or style
		  ○ Flat
		  ○ Mill bastard
		  ○ Halfround
		  ○ Round
		  ○ Quadrangular
		  ○ Circular
		  ○ Triangular
		• File cut
		  ○ Single cut
		  ○ Double cut
		  ○ Rasp
		  ○ Curved
		• File grade
		  ○ Coarse cut
		  ○ Bastard cut
		  ○ Second cut
		  ○ Smooth cut

7.	Identify hand related tools	• Depth gauges • Wire gauges • Upsets • Anvil setting gauges • Forging tools • Grinding jigs (dies and anvils) • Alignment tools (wheel and teeth) • Chain breakers
8.	Identify power tool safety	• Hand grinders • Uniplanes • Jockey grinders • Related power tools
9.	Describe hand and power tools maintenance	• Manufacturers' specifications

LINE (GAC): E BAND SAWS

Competency: E1 Fit Band Saw

Objectives

To be competent in this area, the individual must be able to:

- Describe inspection procedures for band saws.
- Describe procedures for repairing band saws cracks.
- Decribe procedures for replacing teeth and tips in band saws.
- Fit band saws by repairing cracks and replacing teeth.

LEARNING TASKS	CONTENT
1. Describe band saw inspection procedures	• Kerf • Point-up or swage • Cracks • Lumps and ridges • Twists • Dished and turned over saw • Dullness • Tooth damage
2. Describe procedures for repairs to cracks	• WorkSafe BC regulations • Punching • Welding • Annealing • Dressing • Plate maintenance
3. Describe procedures for replacing teeth and tips	• Welding in blanks • Welding teeth • Building up tips • Low teeth • Out of pitch teeth
4. Fit Band Saw	• Inspect band saws • Repair cracks in band saws • Replace band saw teeth and tips

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job the learner will inspect band saws and repair cracks and replace teeth, as required.
Conditions	The learner will be given: • Saw fitting tools and equipment • Band saws with cracks and with teeth requiring replacement
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct diagnosis of the band saw problems • Correct use of the proper band saw fitting techniques • Problems fully corrected

LINE (GAC): E BAND SAWS

Competency: E2 Sharpen Band Saw

Objectives

To be competent in this area, the individual must be able to:

- Describe procedures for cleaning and sharpening band saws.
- Use various tools and equipment to sharpen band saws.

LEARNING TASKS	CONTENT
1. Describe safe sharpening procedures	• Proper equipment • Sufficient help
2. Describe cleaning procedures	• Sawdust • Pitch
3. Describe filing room set up	• Equipment
4. Describe automatic sharpening of band saws	• Single cuts • Double cuts • Damaged teeth • Swage or point-up • Teeth lubricants • Swage requirements • Shaped to required kerf • Wheel profile • Feed finger position • Crack check and maintenance • Check face, back and gullet to the required standard
5. Describe the use of proctor roll	• Position • Pressure • Maintenance

6. Describe peening	• Hammer and dolly
	• Position
	  ○ On grinder
	  ○ On bench
	• Location of peen

7.	Describe hand sharpening	• Types of files • Proper use of files • Missing corners • Crumble • Welded teeth • Built-up teeth • Rocked teeth
8.	Describe check points on final sharpening	• Missing corners • Face • Back • Gullet • Rocked portion • Crumbled teeth • Welded teeth • Built-up teeth • Teeth alignment
9.	Sharpen band saw	• Demonstrate safe hand sharpening of band saw • Demonstrate use of automatic sharpening equipment • Demonstrate cleaning of band saw • Demonstrate use of proctor roll • Demonstrate peening

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job the learner will inspect band saws and repair cracks and replace teeth, as required.
Conditions	The learner will be given: • Saw sharpening tools and equipment • Band saws requiring sharpening.
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of the proper band saw sharpening tools and techniques • Problems fully corrected

LINE (GAC): E BAND SAWS

Competency: E3 Handle Band Saws Safely

Objectives

To be competent in this area, the individual must be able to:

- Describe safe band saw handling practices and safety equipment.
- Demonstrate safe band saw handling procedures.

LEARNING TASKS	CONTENT
1. Describe safe band saw handling practices	• Removal from crates • Untying of new saws • Changing hand • Placement and removal from grinder • Placement and removal from bench • General movement in filing room • Changing band saws • Storage • Hoists • Cradles • Dollies

2. Identify personal safety equipment required for handling band saws	• Personal safety equipment
	  ○ Eyes
	  ○ Ears
	  ○ Respiratory
	  ○ Toes
	  ○ Hands
	• Describe lock-out procedures

3. Demonstrate safe band saw handling procedures	• Demonstrate safe handling of band saws

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job the learner will safely handle band saws.
Conditions	The learner will be given: • Band saws requiring various handling procedures • Band saw handling equipment and tools
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Safe and correct handling of band saws

LINE (GAC): E BAND SAWS

Competency: E4 Determine Band Saw Kerf Requirements

Objectives

To be competent in this area, the individual must be able to:

- Describe the purpose of set and the amount required for band saws.
- Determine the speed and kerf requirements for various types of timber.

LEARNING TASKS	CONTENT
1. Describe the purpose of set and kerf required for band saws	• Kerf plus deviation • Side clearance each side • Frozen or unfrozen • Head saw • Set and kerf required for band saws and resaws • Thin kerf band saw

2. Determine kerf required for various types of timber	• Spring set
	  ○ Soft wood
	  – Kiln dry
	  – Green
	  – Frozen
	  ○ Hard wood
	  – Kiln dry
	  – Green
	  – Silica
	• Swage tooth
	  ○ Soft wood
	  – Kiln dry
	  – Green
	  – Frozen
	  ○ Hard wood
	  – Green
	  – Dry
	  – Silica
	• Stellite tip
	  ○ Soft wood
	  – Kiln dry
	  – Green
	  – Frozen
	  ○ Hard wood
	  – Green
	  – Dry
	  – Silica

3. Determine SFPM and kerf	• Hard wood • Soft wood • Frozen

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job the learner will determine the speed and kerf requirements for sawing each of various types of timber.
Conditions	The learner will be given: • Band saw equipment of various types • Timber to be sawed.
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct determination of the proper band saw speed and kerf requirements for the timber to be sawed.

LINE (GAC): E BAND SAWS

Competency: E5 Swage Band Saws

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of swaging band saws.
- Swage band saws.

LEARNING TASKS	CONTENT
1. Describe swaging procedures for band saws	• Assess tooth condition • New saws • Rocked saws • Welded teeth • Built up teeth • Tooth lubrication • Check swage set-up • Clamp swage on saw tooth • Push die handle to stop • Bracket and stops adjustment • Release clamp screw • Pull back die handle to stop • Gauge tooth for required width • Proceed to next tooth
2. Describe maintenance problems causing faulty swage	• Insufficient swage • Too much swage • Too thick at point • Pulling to one side • Purpose of stops and bracket • Nicking of side stock
3. Swage band saws	• Demonstrate swaging a band saw

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job the learner will swage various band saws.
Conditions	The learner will be given: • Band saw swaging tools and equipment • Saws with various swage problems
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct diagnosis of the problem • Correct use of the proper tools and equipment • Swage problems fully corrected

LINE (GAC): E BAND SAWS

Competency: E6 Shape Band Saws

Objectives

To be competent in this area, the individual must be able to:

- Describe procedures for shaping band saws.
- Describe shpaing problems and proper maintenance of band saw shapers.
- Shape various types of band saws.

LEARNING TASKS	CONTENT
1. Describe shaping procedure for band saws	• New saws • Rocked saws • Welded teeth • Built up teeth • Check shaper set-up • Shape tooth • Gauge tooth for required kerf • Adjust shaper if necessary for kerf
2. Describe maintenance of shapers	• Tooth stops • Dies (carbide and carbon steel) • Screws • Wear strips • Lubrication
3. Describe maintenance problems causing faulty shaping	• Insufficient side stock • Too much side stock • Pulling to one side • Uneven side stock
4. Shape band saws	• Demonstrate shaping of band saw

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job the learner will use and maintain various shapers to solve shaper problems with band saws.
Conditions	The learner will be given: • Band saw shaper tools and equipment • Band saws with various problems to be resolved by shaping.
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct diagnosis of the shaping problem • Correct use of the proper shaping tools and equipment • Shaping problems fully corrected

LINE (GAC): E BAND SAWS

Competency: E7 Grind Band Saw Backs

Objectives

To be competent in this area, the individual must be able to:

- Describe procedures for grinding band saw backs.
- Demonstrate grinding of band saw backs.

LEARNING TASKS	CONTENT
1. Describe grinding band saw backs	• Band saw backs • Sliver teeth • Grinding sliver tooth back • Maintain proper wheel shape • Remove all the burn • Grinding a back on the bench • Using a mini grinder • Keep the back even • Use band saw grinder if required
2. Grind Band saw backs	• Demonstrate grinding of band saw back

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job the learner will use various grinders to grind band saw backs.
Conditions	The learner will be given: • Band saw grinding tools and equipment • Various band saws requiring back grinding
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of the proper grinding tools and equipment • Problems fully corrected

LINE (GAC): E BAND SAWS

Competency: E8 Maintain Band Saw Grinders

Objectives

To be competent in this area, the individual must be able to:

- Describe maintenance of band saw grinders.
- Demonstrate procedures for safe maintenance of band saw grinders.

LEARNING TASKS	CONTENT
1. Describe safe maintenance	• Lock-out procedures

2. Identify and describe maintenance points on band saw grinders	• Head lift systems
	  ○ Lift cam
	  ○ Head lift screw and nut
	  ○ Treadle
	  ○ Cones
	  ○ Rocker arms
	  ○ Bearings
	• Feed mechanism systems
	  ○ Feed cam
	  ○ Feed finger arm
	  ○ Feed finger and holder
	  ○ Feed assembly
	  ○ Cones
	  ○ Bearings
	• Saw support systems
	  ○ Post brackets
	  ○ Filing clamp
	  ○ Saw carriage
	  ○ Gate assembly
	  ○ Saw lift screw
	  ○ Crown gears
	  ○ Couplings
	  ○ Face plate
	• Grinding head systems
	  ○ Arbour bearing
	  ○ Motor
	  ○ Grinding wheel assembly
	• Bearings
	• Belts
	• Motors
	  ○ Reduction units
	• Non-lubrication points
	• Types of lubrication and oils
	• Related parts and equipment

3. Describe CNC grinder operation (band specific)	• CNC controls

- X-Y controls
- Coordinates systems

4. Maintain saw grinders

- Demonstrate maintenance of band saw grinders

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job the learner will maintain various band saw grinders.
Conditions	The learner will be given: • Various band saw grinders and equipment
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Identify the maintenance points on various band saw grinders • Maintenance completed correctly

LINE (GAC): F CIRCULAR SAWS

Competency: F1 Identify Types of Circular Saws

Objectives

To be competent in this area, the individual must be able to:

- Describe ripping and cross cutting circular saws.

LEARNING TASKS	CONTENT

1. Describe the different types of circular saws.	• Circular saws for ripping
	  ○ Edger saws
	  ○ Gang saws
	  ○ Head saws
	  ○ Scragg saws
	  ○ Shingle saws
	• Circular saws for cross cutting
	  ○ Cut off saws
	  ○ Deck saws
	• Trim saws

LINE (GAC): F CIRCULAR SAWS

Competency: F2 Inspect Circular Saws

Objectives

To be competent in this area the individual must be able to:

- Describe the types of damage to look for in pre-grinding circular saw inspection checks.
- Describe the WorkSafeBC regulations that apply to procedures for repairs, including cracks and replacing teeth and tips.
- Describe the items that must be checked for in a final inspection.

  Inspect circular saws.

LEARNING TASKS	CONTENT

1. Describe circular saw inspection checks before grinding	• Tooth damage
	  ○ Missing
	  ○ Bent and broken
	  ○ Missing tips
	• Kerf (required amount)
	  ○ Swage
	  ○ Point-up
	  ○ Retip
	• Dish
	• Cracks
	  ○ Weld
	  ○ Punch
	  ○ Out of service
	• Welds
	  ○ Previous

.2 Describe procedures for repairs or cracks	• WorkSafe BC Regs
3. Describe procedures for replacing teeth and tips	• Silver soldering blank tips onto saws • Removal and replacement of inserted teeth using a shank wrench or hammer and punch

4.	Describe final inspection	• Missing corners • Face • Back • Kerf and side clearance • Gullet • Rocked portion • Crumbled teeth • Welded teeth • Built up teeth • Damaged carbide • Damaged stellite • Teeth alignment • Visual inspection for sharpness (face and top)
5.	Inspect circular saws	• Demonstrate inspection of circular saws

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job or in a practical demonstration the learner will inspect circular saws for damage and operating readiness.
Conditions	The learner will be given: • A selection of circular saws • Copy of applicable WorkSafeBC regulations • Inspection Checklist • Inspection and repair tools
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Observes WorkSafeBC regulations • Makes repairs as required • Conducts a complete final inspection

LINE (GAC): F CIRCULAR SAWS

Competency: F3 Select Circular Saw Tools and Equipment

To be competent in this area, the individual must be able to:

- Select tools and equipment circular saw needed to maintain cutting edges on circular saws.

LEARNING TASKS	CONTENT

1. Select all necessary tools and equipment for the maintenance of the cutting edge of any given circular saw	• Saw sets
	  ○ Hand
	  ○ Hammer
	  Power
	  ○ Swage and shaper
	• Wheel selection
	• Grinders
	• Auto-tippers
	• Dressers
	• Inserted teeth
	• Carbide tips
	• Stellite
	• Hand and power tools
	• Oxy-acetylene welding equipment

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will select all the tools and equipment required to maintain the cutting edge of any circular saw.
Conditions	The learner will be given a selection of tools and equipment from which he or she must choose the ones needed for maintaining cutting edges on circular saws.
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Selects only the required tools and equipment.

LINE (GAC): F CIRCULAR SAWS

Competency: F4 Use Circular Saw Grinders

Objectives

To be competent in this area, the individual must be able to:

- Describe grinding equipment used to sharpen circular saws.
- Describe the methods used to sharpen circular saws.
- Describe jointing.
- Demonstrate the use of circular saw grinders.

LEARNING TASKS	CONTENT
1. Describe types of circular saw grinding equipment	• Manual • Automatic / Robotic

2. Describe sharpening methods	• Plunge grinding
	• Generative grinding
	• Hand grinding
	• Rip saw grinding
	  ○ Manual and automatic
	• Crosscut saw grinding
	  ○ Manual and automatic

3. Describe jointing	• Grinder set-up • Rip or cross cut • Balance • Spherical
4 Use circular saw grinders	• Demonstrate use of circular saw grinders

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will demonstrate the use of circular saw grinders.
Conditions	The learner will be given: • Manual and automataic/robotic grinders • Circular saws requiring different different grinding techniques
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of the grinders • Application of correct techniques • Saws successfully sharpened

LINE (GAC): F CIRCULAR SAWS

Competency: F5 Maintain Circular Saw Grinders

Objectives

To be competent in this area, the individual must be able to:

- Following applicable safety procedures, maintain circular saw grinders.

LEARNING TASKS	CONTENT
1. Describe safe maintenance	• Lock-out procedures
2. Describe maintenance points on all circular saw grinders	• Feed finger and assembly • Cam set-ups • Gate assembly • Oscillation assembly • Head assembly • Stroke • Multiple lift • Centering cones and devices • Bearings • Saw clamp • Non-lubrication points • Motors • Pneumatic systems • Hydraulic systems
3. Maintain circular saw grinders	• Demonstrate maintenance of circular saw grinders

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will maintain circular saw grinders.
Conditions	The learner will be given: • Manual and Automatic / Robotic grinders • Tools and equipment required to maintain grinders
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of the maintenance tools and equipment • All maintenance points are addressed • Corrrect lock-out procedures followed

LINE (GAC): G GRINDING WHEELS

Competency: G1 Use Grinding Wheels Safely

Objectives

To be competent in this area, the individual must be able to:

- Describe the safety procedures and checks required when using grinding wheels.

LEARNING TASKS	CONTENT
1. Describe personal, equipment and grinding wheel safety	• Personal safety equipment • Grinder safety equipment ○ Guards • Inspect all safety equipment • Lock-out procedures

2. Describe grinding wheel safety checks	• RPM
	• SFPM
	• Cracks
	  ○ Ring test for cracks
	• Blotters
	• Collars-flanges
	• Arbours
	• Bearings
	• Related equipment
	• Run-out
	  ○ Consistency of thickness
	• Initial use run test
	• Remounted wheel inspection & run-test

3. Describe safe storage and handling	• How to store • Where to store • Rotation of stock • Care • Handling
4. Describe ventilation requirements	• WorkSafe BC requirements • Suction • Wheel composition • Filters • Maintenance • Material being ground

5. Use grinding wheels safely

- Demonstrate personal, equipment and grinding wheel safety
- Demonstrate grinding wheel safety checks
- Demonstrate safe storage and handling
- Demonstrate safe grinding wheel use

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will use grinding wheels safely.
Conditions	The learner will be given: • Grinding wheels • Circular saws
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct and safe use of the grinding wheel • Safety checks followed • WorkSafeBC regulations followed • Storage and handling done safely

LINE (GAC): G GRINDING WHEELS

Competency: G2 Identify Types of Grinding Wheels

Objectives

To be competent in this area, the individual must be able to:

- Identify the different types and shapes of grinding wheels.
- Describe grinding wheel materials.

LEARNING TASKS	CONTENT
1. Identify types of grinding wheels	• Vitrified • Resinoid • Diamond • CBN • Ceramic
2. Describe types of knife grinding wheels	• Cup • Cylinder • Straight • Profile • Segments
3. Identify shapes of grinding wheels	• Straight • Saucer • Flared cup • Cylinder • Segments • Cut-off wheels • V-Top
4. Describe materials used in grinding wheels	• Abrasives • Bonds

LINE (GAC): G GRINDING WHEELS

Competency: G3 Calculate Safe Operating Speeds

To be competent in this area the individual must be able to:

- Explain safe operating speeds for different types of grinding wheels.
- Calculate safe operating speeds for different types of grinding wheels.

LEARNING TASKS	CONTENT

1. Describe safe operating speeds	• Vitrified
	  ○ Band saws
	  ○ Circular saws
	  ○ Knives
	  ○ Stellite
	• Resinoid
	  ○ Band saws
	  ○ Circular saws
	  ○ Knives
	  ○ Stellite
	  ○ Band mill wheel grinding
	• Diamond
	  ○ Carbide
	• CBN
	  ○ Stellite
	  ○ Band saws
	  ○ Circular saws
	• Ceramic
	  ○ Band saws
	  ○ Circular saws
	  ○ Knives
	  ○ Stellite

2. Describe calculations	• Manufacturers recommended speeds
	  ○ RPM
	  ○ SFPM

3. Calculate safe operating speeds	• Manufacturers recommended speeds
	  ○ RPM
	  ○ SFPM

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will calculate safe operating speeds for various grinding wheels.
Conditions	The learner will be given: • Manufacturers' recommended speeds • Different types of grinding wheels
Criteria	The learner will score 70% or better on a series of grinding wheel speed calculation problems.

LINE (GAC): G GRINDING WHEELS

Competency: G4 Shape and Dress Grinding Wheels

Objectives

To be competent in this area, the individual must be able to:

- Describe correct wheel profiles for various types of saws and knives.
- Describe the inspection and dressing procedures for other than the correct profile.
- Using safe procedures, shape and dress grinding wheels.

LEARNING TASKS	CONTENT
1. Describe safe shaping and dressing procedures	• Personal safety equipment • Use of tools • Guards

2. Describe correct wheel profile	• Band saws
	  ○ Standard
	  ○ Stellite
	  ○ Frost tooth
	• Edger saws
	  ○ Standard
	  ○ Stellite
	  ○ Carbide
	  ○ Frost tooth
	• Hollow ground saws
	  ○ Plunge
	  ○ Generative carbide
	• Trim saws
	  ○ Spring set
	  ○ Carbide
	  ○ P style
	  ○ V Top
	• Slasher saws
	• Cut-off saws
	• Profile knives
	• Straight knives
	• Bent knives
	• Related saws and knives

3. Describe inspection and dressing other than for correct profile	• Dirt • Glaze • Oil • Out-of-round • Out-of-balance

4. Shape and dress grinding wheels	• Demonstrate shaping and dressing grinding wheels

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will safely shape and dress grinding wheels.
Conditions	The learner will be given: • Grinding wheels, some of which have the correct profile for their type, and some which do not have a correct profile • Tools and equipment to correct the profile on those grinding wheels that need to be corrected
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct identification of grinding wheels which do not have the correct profile • Correction of grinding wheels needing adjustment to the point where they have the profile which is correct for their type.

LINE (GAC): G GRINDING WHEELS

Competency: G5 Identify Wheel Dressing Tools

Objectives

To be competent in this area, the individual must be able to:

- Describe the tools used to dress wheels.
- Describe how to use dressing tools safely.
- Explain the various grinding wheel dressings and profiles.

LEARNING TASKS	CONTENT
1. Describe safe use of dressing tools	• Personal safety • Correct procedures
2. Describe types of wheel dressing tools	• Dressing bricks • Vitrified • Resinoid • Diamond • Diamond stick • Metcalfe dresser • Desmond dresser • Universal dresser • Star dresser • Diamond profile dresser • Diamond wheel dressing jigs • CBN wheel dressing jigs
3. Describe grinding wheel dressing and profiles	• Tools • Type of grinding wheel • Type of knife • Profile of knife

LINE (GAC): G GRINDING WHEELS

Competency: G6 Mount Grinding Wheels

Objectives

To be competent in this area, the individual must be able to:

- Describe how to mount different grinding wheels on different equipment.
- Mount grinding wheels in a safe manner.

LEARNING TASKS	CONTENT

1. Describe the installation of various grinding wheels on different equipment	• Band saw grinders
	  ○ Face and top
	  ○ Side
	• Circular saw grinders
	  ○ Manual
	  ○ Automatic
	  ○ Face and top
	  ○ Side
	• Knife grinders
	• Carbide saw grinders
	• Stellite saw grinders
	• Hand grinders
	• Power grinders
	• Post grinders
	• Pedestal grinders
	• Bench grinders
	• Related equipment

2. Mount grinding wheels	• Demonstrate mounting grinding wheels

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will mount a variety of grinding wheels on different equipment.
Conditions	The learner will be given: • A selection of grinding wheels • A variety of equipment
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Each piece of equipment is matched with the most suitable grinding wheel • Correct techniques used in mounting the grinding wheels

LINE (GAC): H KNIVES

Competency: H1 Identify Types of Knives

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of knife identification.

LEARNING TASKS	CONTENT
1. Identify types of knives	• Face mounted • Enclosed ○ Clamp type • All makes of chipping heads • Drum • Lily pad • Chipper canter • Slabbing head rig • Veneer chipper • Planer • Molders • Waferizer • Straight thick knives • Straight thin knives • Bent knives • Profile cutters • Dome tops • Counter knives • Disposable turn knives • Hog knives • Related knives
2. Identify incorporated machines that use knives	• Chippers • Edgers • Canters • Log chippers • Chipper canters • Related machines

LINE (GAC): H KNIVES

Competency: H2 Determine Knife Angles

To be competent in this area, the individual must be able to:

- Explain concepts of knife angles.
- Identify knife angles.

LEARNING TASKS	CONTENT
1. Determine knife angles	• Angle gauge • Protractor
2. Identify required angles	• Manufacturers' specifications • Wood species

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will identify required angles.
Conditions	The learner will be given: • Knives with various angles • Angle gauge and protractor
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Angles identified correctly

LINE (GAC): H KNIVES

Competency: H3 Describe Knife Construction

Objectives

To be competent in this area, the individual must be able to:

- Describe the composition analysis of knife steel.
- Describe knife components.

LEARNING TASKS	CONTENT
1. Describe knife steel composition analysis	• Carbon • Silicon • Tungsten • Chrome • Vanadium • Molybdenum • Manganese
2. Describe components of knives	• Anvil • Clamp • Counter knife • Clearances • Bolt identification and selection (grading) • Holders

LINE (GAC): H KNIVES

Competency: H4 Use Knife Grinders

Objectives

To be competent in this area, the individual must be able to:

- Describe the basic types of knife grinders and their set-ups.
- Use knife grinders safely.

LEARNING TASKS	CONTENT
1. Describe basic types of knife grinders	• Fixed head and travelling bed • Fixed bed and travelling head
2. Describe set-up of knife grinders	• Bolting • Magnets • Coolants • Related components
3. Use Knife Grinders	• Demonstrate set-up of knife grinders • Demonstrate using knife grinders

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will set up and use basic types of knife grinders.
Conditions	The learner will be given: • Basic knife grinders • Knives for grinding
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of the knife grinders • Knives sharpened

LINE (GAC): H KNIVES

Competency: H5 Sharpen Knives

Objectives

To be competent in this area, the individual must be able to:

- Describe the process of sharpening knives, including typical knife damage and repair problems.
- Sharpen knives using proper lubrication and coolants.

LEARNING TASKS	CONTENT
1. Describe knife sharpening	• Thick • Thin • Profile • Related knives
2. Describe repairs to damaged portion of knife	• Chips • Cracks • Related damage
3. Describe problems arising when grinding knives	• Too heavy a feed • Hard and soft wheels • Vitrified and resinoid wheels ○ Pros and cons • Dressing cutting edge • Distorted or bent knives • Honing • Mismanufactured knives
4. Describe lubrication and coolants	• Uses • Limitations • Water • Oil and water • Spray • Components
5. Sharpen Knives	• Demonstrate sharpening of knives

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will repair and sharpen a selection of damaged knives.
Conditions	The learner will be given: • Basic knife grinders • A selection of damaged knives • Knife grinding materials (lubricants and coolants)
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct diagnosis of the damage • Correct use of the proper grinder and materials • Damage fully corrected

LINE (GAC): H KNIVES

Competency: H6 Perform Knife Babbitting and Balancing

Objectives

To be competent in this area, the individual must be able to:

- Describe the babbitting and balancing of knives and the tools required.
- Safely babbitt and balance knives.

LEARNING TASKS	CONTENT
1. Describe safe babbitting of knives	• Personal safety equipment • Safe equipment use • Ventilation • Moisture hazard of babbitt pot
2. Describe babbitting of knives	• Straight • Profile • Bent
3. Describe tools required for babbitting of knives	• Babbitt type • Melting pot • Knife jigs • Ladle • Babbitt file • Milling cutter
4. Describe knife balancing	• Thin knives • Thick knives • Profile knives
5. Perform knife babbitting and balancing	• Demonstrate babbitting of knives • Demonstrate balancing of knives

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will babbitt and balance a variety of knives.
Conditions	The learner will be given: • Tools required • A variety of knives to be babbitted and balanced
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct selection of tools required • Correct use of the tools and equipment • Knives correctly babbitted and balanced

LINE (GAC): H KNIVES

Competency: H7 Troubleshoot Knives and Chippers

Objectives

To be competent in this area, the individual must be able to:

- Describe typical knife and chipper problems.
- Troubleshoot knives and chippers.

LEARNING TASKS	CONTENT
1. Describe general knife and chipper problems	• Knife breakage • Bent knives • Babbitt thickness • Counter knife maintenance • Anvil maintenance • Enclosed slot breakage • Component wear ○ Worn knife holders
2. Troubleshoot knives and chippers	• Demonstrate troubleshooting knife problems • Quality control new knives • Demonstrate troubleshooting chipper problems

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will troubleshoot knife and chipper problems, as well as initiating quality control on new knives.
Conditions	The learner will be given: • A series of knives with problems • A series of chippers with problems • New knives
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Systematically resolves the knife problems • Systematically resolves the chipper problems

LINE (GAC): I SAW WELDING

Competency: I1 Use Safe Oxy-Acetylene Welding Practices

Objectives

To be competent in this area, the individual must be able to:

- Describe oxy-acetylene safety requirements and procedures.
- Use safe oxy-acetlyne welding practices.

LEARNING TASKS	CONTENT
1. Describe the precautions to be considered when using oxy-acetylene welding	• Storage and handling of cylinders • Securing and positioning the welding outfit • Fire hazards and extinguishers • Safe working pressures • Proper clothing • Checking for leaks • Eye protection ○ Goggles and screens • Ventilation • Explosive substances • WorkSafe BC health and safety regulations • Consider company specific policies (hot work)
2. Use Safe Oxy-Acetylene Welding Practices	• Demonstrate safe oxy-acetylene welding practices

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will demonstrate safe oxy-acetylene welding practices.
Conditions	The learner will be given: • A scenario to evaluate • A checklist of points to be evaluated
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct interpretation of the scenario • Correct identification of issues in the scenario

LINE (GAC): I SAW WELDING

Competency: I2 Use a Portable Oxy-Acetylene Unit

Objectives

To be competent in this area, the individual must be able to:

- Describe the components and procedures assocated with Oxy-Acetylene welding eqipment.
- Demonstrate the safe and proper use and maintenance of Oxy-Acetylene welding equipment.

LEARNING TASKS	CONTENT

1. Describe the components and features of the oxy-acetylene welding outfit	• Oxygen and acetylene cylinders
	  ○ Construction
	  ○ Safety features
	  ○ Pressures
	• Oxygen and acetylene regulators
	  ○ One and two stages
	• Hoses
	  ○ Construction
	  ○ Colour
	  ○ Maintenance
	• Flash backs and burn backs
	• Gas saver
	• Reverse flow control valves
	• Torch and tip
	  ○ Types
	  ○ Tip sizes
	• Tip cleaners
	• Goggles
	  ○ Glass shade
	• Striker

2. Describe the safe procedure in setting up and shutting down welding equipment	• Secure cylinders and crack valves – acetylene upright • Attached regulators, hoses, torch and tip • Set working pressures • Check for leaks • Shut down equipment safely – bleed hoses

3.	Demonstrate the correct operation of oxy-acetylene welding equipment	• Select appropriate tip size • Clean the tip • Open valves and adjust regulators for working pressure • Light torch and adjust for pre-heat length and neutral flame • Travel at appropriate speed and tip inclination
4.	Describe maintenance of welding equipment	• Welding clamp • Forging hammer • Forging tool • Tips • Torch • Gauges
5.	Use a Portable Oxy-Acetylene Unit	• Demonstrate use of portable oxygen-acetylene unit • Demonstrate set-up and shut down of oxy-acetylene welding equipment • Demonstrate maintenance of oxy-acetylene welding equipment

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will set-up, use and shut down oxy-acetylene welding equipment, and demonstrate how to maintain the equipment.
Conditions	The learner will be given: • Portable Oxy-Acetylene Unit • Oxy-acetylene welding equipment
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use and techniques of the equipment • Welds properly completed • Maintenance properly completed

LINE (GAC): I SAW WELDING

Competency: I3 Select Oxy-Acetylene Welding Tools and Equipment

Objectives

To be competent in this area, the individual must be able to:

- Select oxy-acetylene tools and equipment most appropriate to the job.

LEARNING TASKS	CONTENT
1. Select appropriate tools and equipment	• Personal safety equipment • Welding safety equipment • Proper torch and tip size • Upset and forging tool • Forging hammer • Welding rod • Tip cleaner and striker • Welding clamp • Flux • Related equipment

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will select the oxy-acetylene tools and equipment most appropriate to the job at hand.
Conditions	The learner will be given: • A selection of tools and equipment, from which must be chosen the pieces appropriate to the job • A hypothetical job
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct choice of tools and equipment

LINE (GAC): I SAW WELDING

Competency: I4 Adjust Types of Flame

Objectives

To be competent in this area, the individual must be able to:

- Describe lighting procedures on an oxygen-acetylene unit.
- Adjust all three types of flame.

LEARNING TASKS	CONTENT
1. Describe types of flame	• Oxidizing • Neutral • Carbonizing

2. Describe lighting procedures	• Bleed lines
	• Oxygen
	  ○ Opening
	  ○ Adjusting
	• Acetylene
	  ○ Opening
	  ○ Adjusting
	• Pressure adjustments
	• Flame adjustment

3. Adjust types of flame	• Demonstrate adjusting of types of flame on oxygen-acetylene unit

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will adjust three types of flames.
Conditions	The learner will be given: • Oxy-acetylene unit
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Proper lighting procedures

LINE (GAC): I SAW WELDING

Competency: I5 Weld Saw Teeth

Objectives

To be competent in this area, the individual must be able to:

- Describe how to weld saw teeth.
- Weld saw teeth using oxy-acetylene equipment.

LEARNING TASKS	CONTENT
1. Describe tools and equipment required for teeth welding	• Safety equipment • Proper torch and tip size • Up-set and forging tool ○ Dolly • Forging hammer • Welding rod • Tip cleaner and striker • Welding clamp • Leveling slab • Bench • Grinders • Magnet
2. Describe welding and building up teeth	• Pre-heat • Saw position • Laying in rod • Forging • Shaping • Annealing • Dressing and finishing
3. Weld saw teeth	• Demonstrate welding and building up teeth

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will weld and build up teeth on a saw.
Conditions	The learner will be given: • A saw blade • Oxy-acetylene equipment and associated tools and equipment
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of the oxy-acetylene equipment and associated tools and equipment • Teeth built up to manufacturer standard

LINE (GAC): I SAW WELDING

Competency: I6 Perform Crack Welding Using Oxy-Acetylene

Objectives

To be competent in this area, the individual must be able to:

- Describe the tools, equipment and regulations associated with crack welding processes.
- Weld cracks using oxy-acetylene.

LEARNING TASKS	CONTENT
1. Describe WorkSafe BC regulations regarding band saw cracks	• Refer to WorkSafe BC Regs
2. Describe WorkSafe BC regulations regarding circular saw cracks	• Refer to WorkSafe BC Regs

3. Describe tools and equipment required for crack welding	• Safety equipment
	• Proper torch and tip size
	• Upset and forging tool
	• Forging hammer
	• Welding rod
	• Tip cleaner and striker
	• Welding clamp
	  ○ Positioning
	  ○ Anvil clearance
	• Leveling slab
	• Related tools and equipment

4. Describe crack welding	• Pre-heat • Saw position • Laying in rod • Forging • Annealing • Dressing and finishing • Benching ○ Leveling
5. Perform Crack Welding Using Oxy-Acetylene	• Under the direction of a licensed journeyperson on the job or in a practical demonstration: ○ Demonstrate crack welding using Oxy-Acetylene

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will weld cracks using oxy-acetylene.
Conditions	The learner will be given: • Oxy-acetylene equipment • Cracks that need welding
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Safe and correct use of the equipment • Cracks fully repaired

LINE (GAC): I SAW WELDING

Competency: I7 Weld Saws Using MIG and TIG Equipment

Objectives

To be competent in this area, the individual must be able to:

- Describe MIG and TIG welding procedures.
- Weld saws using MIG and TIG procedures.

LEARNING TASKS	CONTENT
1. Describe saw repair using MIG welding	• Wire used • Machine type • Gases used ○ Argon / Carbon dioxide • Saw preparation • Welding procedure • Annealing • Finish
2. Describe saw repair using TIG welding	• Wire used • Machine type • Gases used • Saw preparation • Welding procedure • Annealing • Finish
3. Demonstrate MIG and TIG welding of saws	• Demonstrate MIG welding of saws • Demonstrate TIG welding of saws

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will be able to weld saws using both MIG and TIG procedures.
Conditions	The learner will be given: • MIG and TIG tools and equipment • Saws
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of each procedure • Welds done correctly

LINE (GAC): I SAW WELDING

Competency: I8 Weld Band Saws Using Oxy-Acetylene Equipment

Objectives

To be competent in this area, the individual must be able to:

- Describe the welding procedures used on band saws.
- Describe the equipment that needs to be maintained.
- Weld and maintain a band saw.

LEARNING TASKS	CONTENT
1. Describe welding procedures	• Penetration • Puddles • Forging • Finishing edges • Annealing
2. Describe equipment maintenance	• Welding clamp • Welding anvil • Hammer face • Forging tool and air hammer • Tips • Related equipment
3. Weld band saws using oxy-acetylene equipment	• Demonstrate welding band saw using oxy-acetylene • Demonstrate equipment maintenance

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will weld a band saw using oxy-acetylene, and performance equipment maintenance.
Conditions	The learner will be given: • Oxy-acetylene equipment and related tools and equipment • Band saw
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of the oxy-acetylene equipment • Band saw repaired and maintained

LINE (GAC): J SAW CHAINS

Competency: J1 Identify Types of Saw Chain

Objectives

To be competent in this area, the individual must be able to:

- Identify and describe types of saw chain.

LEARNING TASKS	CONTENT
1. Identify types of chain	• Pond and deck saw chain • Power saw chain • Low profile • Skip tooth

LINE (GAC): J SAW CHAINS

Competency: J2 Calculate Gauge and Pitch of Saw Chain

Objectives

To be competent in this area, the individual must be able to:

- Define and calculate the gauge and pitch of a saw chain at different points along the chain.
- Calculate gauge and pitch of a saw chain.

LEARNING TASKS	CONTENT
1. Define gauge of a saw chain	• Weight/thickness/number of the chain eg. small chainsaw will use a lighter gauge chain than a larger chainsaw
2. Define pitch of saw chain	• Distance between the teeth/distance between the drive cogs
3. Calculate gauge of a saw chain	• Measured at the tang
4. Calculate pitch of a saw chain	• Measure between the rivets
5. Calculate cutting angles	• Manufacturer specification

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will calculate the gauge and pitch of a saw chain at different points along the chain.
Conditions	The learner will be given: • Saw chain • A list of points to calculate
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Calculations are correct

LINE (GAC): J SAW CHAINS

Competency: J3 Inspect and Repair Saw Chain

Objectives

To be competent in this area, the individual must be able to:

- Describe the inspection and repair process of a saw chain.
- Inspect and repair a saw chain.

LEARNING TASKS	CONTENT
1. Describe inspection and repairs of saw chain	• Ties straps • Cutters • Drive links • Tight joints • Crooked cutting • Bars • Nose bars • Related parts
2. Inspect saw chain	• Demonstrate inspection of saw chain
3. Repair saw chain	• Demonstrate repair / replacement of saw chain

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will inspect and repair or replace a saw chain.
Conditions	The learner will be given: • Saw chain in need of repair
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Saw chain is repaired to manufacturer standard, or replaced if deemed necessary

LINE (GAC): J SAW CHAINS

Competency: J4 Set-up and Sharpen Saw Chain

Objectives

To be competent in this area, the individual must be able to:

- Describe saw chain sharpening procedures.
- Set up and sharpen a saw chain.

LEARNING TASKS	CONTENT
1. Describe grinder set-up	• Grinder safety features • Grinder parts • Angle adjustments • Wheel direction

2. Describe sharpening	• Cutters
	  ○ Angles
	  ○ Burn
	  ○ Precautions
	• Depth gauge or raker
	  ○ Angles
	  ○ Precautions
	• Special purpose sharpening
	  ○ Ripping
	  ○ Boring

3. Describe hand sharpening	• Manual • Files • File handles
4. Set-up saw chain	• Demonstrate set-up of saw chain

5. Sharpen saw chain	• Demonstrate sharpening of saw chain
	  ○ Manual sharpening
	  ○ Automatic sharpening

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will sharpen a saw chain using both manual and automatic sharpening techniques.
Conditions	The learner will be given: • Sharpening tools • Saw chain
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of the sharpening tools • Saw chain is sharp

LINE (GAC): J SAW CHAINS

Competency: J5 Describe Chain Saw Chain Tools

Objectives

To be competent in this area, the individual must be able to:

- Describe the tools used to work with saw chains.

LEARNING TASKS	CONTENT
1. Describe chain saw chain tools	• Files • Raker gauge • Chain breakers • Rivet punch • Special wrenches

LINE (GAC): J SAW CHAINS

Competency: J6 Determine Grinding Wheel Profile

Objectives

To be competent in this area, the individual must be able to:

- Describe the grinding wheels and their profiles.
- Determine the grinding wheel profile required for a saw chain.

LEARNING TASKS	CONTENT

1. Describe grinding wheels used for sharpening saw chain	• Types of grinding wheels
	  ○ Vitrified
	  ○ Resinoid
	• Size

2. Describe grinding wheel profiles	• Cutters • Depth gauge or raker • Wheel thickness • Wheel shape
3. Determine grinding wheel profile	• Demonstrate determining grinding wheel profile

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will determine a grinding wheel profile.
Conditions	The learner will be given: • Grinding wheel
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Profile is correctly determined

LINE (GAC): K SAW GUIDES

Competency: K1 Identify Types of Band Saw Guides

Objectives

To be competent in this area, the individual must be able to:

- Describe band saw guides and their maintenance requirements.

LEARNING TASKS	CONTENT
1. Describe band saw guides	• Conventional • Cartridge • Pressure • Back guide
2. Describe maintenance of band saw guides	• Safety procedures • Jigs • Equipment • Adjustment

LINE (GAC): K SAW GUIDES

Competency: K2 Identify Types of Circular Saw Guides

Objectives

To be competent in this area, the individual must be able to:

- Describe circular saw guides.

LEARNING TASKS	CONTENT
1. Describe circular saw guides	• Standard • Head saw • Floating back guides • Plug • Babbitt • Ceramic

LINE (GAC): K SAW GUIDES

Competency: K3 Identify Types of Guide Materials

Objectives

To be competent in this area, the individual must be able to:

- Describe the types and makeup of guide materials.

LEARNING TASKS	CONTENT

1. Describe types of guide materials	• Phenolic laminate
	• Ceramic
	• Lignum vitae
	  ○ Natural wood
	• Babbitt
	  ○ Lead free

2. Describe make up of guide material	• Laminate • Paper base • Cloth base • Ceramic • Babbitt

LINE (GAC): K SAW GUIDES

Competency: K4 Maintain Saw Guides

Objectives

To be competent in this area, the individual must be able to:

- Describe the maintenance of guide and circular saw guide materials.
- Maintain guide materials.
- Maintain circular saw guide materials.

LEARNING TASKS	CONTENT

1. Describe maintenance of guide materials	• Personal safety
	• Equipment systems
	• Ventilation
	• Uniplane
	• Router
	• Milling machine
	• Related grinders
	• Set-up jigs
	• Adjustments
	• Cleaning of guides
	  ○ Prior to saw change
	  ○ Prior to dressing
	• Dressing guides
	• Size control
	  ○ Calipers
	  ○ Micrometer
	• Lube and cooling systems
	  ○ Adjust and maintain
	  ○ Circular guides
	  ○ Bandsaw guides

2. Demonstrate maintenance of guide materials	• Demonstrate maintenance of guide materials
3. Describe circular saw guide maintenance	• Milling machines • Granite leveling slabs • Clearances • Calculations
4. Demonstrate circular saw guide maintenance	• Demonstrate circular saw guide maintenance

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will maintain guide materials and circular saw guides.
Conditions	The learner will be given: • Guide materials • Circular saw guide
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Maintenance is completed according to manufacturer standard

LINE (GAC): L SAW SHEARBOARDS, SCRAPERS, COOLING SYSTEMS AND HYDRAULICS

Competency: L1 Identify Types of Shearboards

Objectives

To be competent in this area, the individual must be able to:

- Identify types of shearboards and their materials.
- Describe the wear area and shearbord adjustment.

LEARNING TASKS	CONTENT

1. Identify types of shearboards	• Single cuts
	• Double cuts
	• Resaws
	  ○ Vertical
	  ○ Horizontal
	• Twins
	• Quads

2. Identify shearboard material	• Aluminum • Brass • UHMW • Related materials • Phenolic laminates
3. Describe shearboard adjustment	• Wear area • Adjustment

LINE (GAC): L SAW SHEARBOARDS, SCRAPERS, COOLING SYSTEMS AND HYDRAULICS

Competency: L2 Identify Types of Scrapers

Objectives

To be competent in this area, the individual must be able to:

- Describe various aspects of band saw wheel scrapers.

LEARNING TASKS	CONTENT

1. Describe band saw wheel scrapers	• Types
	• Sizes
	• Location
	• Material
	  ○ Plate steel
	  ○ Brass
	  ○ Copper
	  ○ UHMW
	  ○ Related material
	• Bevels
	• Wear area
	• Adjustments
	• Purpose

LINE (GAC): L SAW SHEARBOARDS, SCRAPERS, COOLING SYSTEMS AND HYDRAULICS

Competency: L3 Maintain Band Saw and Circular Saw Cooling Systems

Objectives

To be competent in this area, the individual must be able to:

- Describe types of cooling systems and aspects of saw lubrication.
- Maintain circular and band saw cooling systems.

LEARNING TASKS	CONTENT
1. Describe types of cooling systems used in the trade	• Band mills • Edgers • Circular head rigs • Grinders • Grinding wheels

Describe saw lubrication	• Environmentally safe
	• Reduce saw water
	• Reduce fire hazard
	• Reduce pitch build up
	• Reduce guide wear
	• Reduce wheel maintenance
	• Help resist
	  ○ Wear
	  ○ Rust
	  ○ Oxidation
	  ○ Foaming
	  ○ Misting
	• Wash off resistant
	• Ensure cooling capability at high speeds
	• Compressed air
	• Flow ratios

Demonstrate the maintenance of circular and band saw cooling systems	• Air pressures • Oil pressures • Water pressures • Flow rates • Line maintenance • Interaction with other trades - oilers

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will demonstrate the maintenance of circular and band saw cooling systems.
Conditions	The learner will be given: • Circular saw cooling system • Band saw cooling system
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct reading of pressures, flow rates • Correct line maintenance procedures • Positive interaction with oilers

LINE (GAC): M TENSION, LEVEL AND BENCH SAWS

Competency: M1 Describe the Tools for Tensioning and Leveling Saws

Objectives

To be competent in this area, the individual must be able to:

- Describe the tools used in tensioning and leveling saws.

LEARNING TASKS	CONTENT
1. Describe hammers	• Dog head • Cross face • Twist face • Weights • Care
2. Describe gauges	• Straight edges • Band saw tension gauges • Circular saw tension gauges • Lengths • Convex • V gauge • Concave
3. Describe anvils	• Steel • Soft • Hard faces • Crowned
4. Describe leveling slabs	• Purpose • Structure • Size • Band saw slabs • Circular slabs

5. Describe stretcher rolls	• Purpose
	• Rolls
	  ○ Tensioning
	  ○ Dishing
	• Band saw
	• Circular saw

6. Describe bench set-ups	• Band saws • Circular saws • Purpose • Height • Lighting

LINE (GAC): M TENSION, LEVEL AND BENCH SAWS

Competency: M2 Level Band Saws

Objectives

To be competent in this area, the individual must be able to:

- Describe the techniques used to level a bandsaw.
- Level a bandsaw.

LEARNING TASKS	CONTENT

1. Describe basic leveling of a band saw	• Leveling tools
	  ○ Stick
	  ○ Block
	  ○ Rollers
	  ○ Pins
	• Localized lumps
	• Ridges
	• Cross bumps
	• Hollows
	• Detecting un-level saw plate
	• Eliminating un-level saw plate

2. Level a band saw	• Demonstrate techniques for leveling band saws ○ Sample section of a band saw

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will level a band saw.
Conditions	The learner will be given: • Band saw • Leveling tools
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct leveling of a bandsaw in accordance with leveling standards and requirements

LINE (GAC): M TENSION, LEVEL AND BENCH SAWS

Competency: M3 Tension Band Saws

Objectives

To be competent in this area, the individual must be able to:

- Describe the concepts of tensioning.
- Tension a bandsaw.

LEARNING TASKS	CONTENT
1. Describe reasons for basic tensioning of band saws	• Counteract expansion which takes place during the cutting action • Stiffen the cutting edge so that the saw will cut a straight line • Ensure that the saw will run in a constant position on the band mill wheels
2. Describe areas of tension	• Body • Tire • Back
3. Tension a band saw	• Demonstrate basic tensioning of a bandsaw

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will tension a band saw.
Conditions	The learner will be given: • Bandsaw • Band mill wheels
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Band saw performs according to manufacturer standard after tensioning.

LINE (GAC): M TENSION, LEVEL AND BENCH SAWS

Competency: M4 Level Circular Saws

Objectives

To be competent in this area, the individual must be able to:

- Explain the concepts of circular saw leveling.
- Demonstrate the basic leveling of a circular saw.

LEARNING TASKS	CONTENT
1. Describe reasons for basic leveling of circular saws	• Localized lumps • Ridges • Cross bumps • Hollows • Detecting un-level saw plate • Eliminating un-level saw plate
2. Level a circular saw (basic)	• Demonstrate basic leveling of circular saws

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will level a circular saw.
Conditions	The learner will be given: • A circular saw
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Circular saw is leveled to standard required.

LINE (GAC): M TENSION, LEVEL AND BENCH SAWS

Competency: M5 Tension Circular Saws

Objectives

To be competent in this area, the individual must be able to:

- Explain the concepts of tensioning circular saws.
- Tension a circular saw.

LEARNING TASKS	CONTENT
1. Describe reasons for basic tensioning of circular saws	• Pre-stressing • Thermal stressing
2. Describe areas of tensioning circular saws	• Eye • Body • Rim
3. Tension a circular saw (basic)	• Demonstrate basic tensioning of circular saws

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will tension a circular saw.
Conditions	The learner will be given: • Circular saw
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct tensioning of the saw

Level 2

Saw Filer

LINE (GAC): A SAW FILER TRADES

Competency: A3 Describe Saw Filer Trade Terminology

Objectives

To be competent in this area, the individual must be able to:

- Explain saw filer trades terminology.

LEARNING TASKS	CONTENT

1. Define saw filer terms	• General saw terminology
	  ○ Carbide tip
	  ○ Gullet
	  ○ Shoulder
	  ○ Outside diameter
	  ○ Saw body
	  ○ Various bores
	  ○ Pinholes
	  ○ Bolt circle
	  ○ Ceramic coating
	  ○ Stellite tips
	  ○ Chroming of saws
	  ○ Splines etc.
	• Tooth geomentry terminology
	  ○ Tooth pitch
	  ○ Tooth width
	  ○ Plate thickness
	  ○ Side clearance
	  ○ Top bevel angle
	  ○ Hook angle
	  ○ Top back angle
	  ○ Face bevel angl
	  ○ Radial clearance angle
	  ○ Tangential clearnace angle
	  ○ Should back-off angles
	  ○ Tip-to-shoulder overhand
	  ○ Tip face overhang
	  ○ Spline
	  ○ V Top
	  ○ Bore
	• Conventional cut
	• Climb cut
	• General saw design terminology
	  ○ Arbour RPM
	  ○ Rim speed
	  ○ Feed speed
	  ○ Tooth bite
	  ○ Actual gullet capacity
	  ○ Required gullet capacity
	• Hammering terminology
	  ○ Blister

    - Dish
    - Drawing the saw out
    - Opening the saw
    - Plumbing the saw
    - Lump
    - Twist
    - Leveling
    - Tensioning
    - Fast or open
    - Tight
- Related terms

LINE (GAC): C TRADE MATH

Competency: C2 Apply Trade Formulas

Objectives

To be competent in this area, the individual must be able to:

- Explain trade formula concepts.
- Make calculations based on trade formulas.

LEARNING TASKS	CONTENT
1. Define tooth bite	• Circular saws • Band saws
2. Calculate tooth bite	• Circular saws • Band saws
3. Define feed and speed	• Circular saws • Band saws
4. Calculate feed and speed	• Circular saws • Band saws
5. Define horsepower required	• Circular saws • Band saws
6. Calculate horsepower required	• Circular saws • Band saws
7. Calculate gullet formulas	• Gullet area • Gullet areas per minute • Gullet sawdust capacity

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will make calculations using trade formulas.
Conditions	The learner will be given scenarios for circular and band saws that require calculation for: • Tooth bite • Feed and speed • Horsepower required • Gullet area, areas per minute and sawdust capacity
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct answers for each problem

LINE (GAC): F CIRCULAR SAWS

Competency: F6 Replace Head Saw Bit and Shank

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts surrounding the replacement of head saw bit and shank.
- Replace head saw bit and shank.

LEARNING TASKS	CONTENT
1. Describe rip saw teeth	• Bit
2. Describe holder	• Shank
3. Describe different styles of bits	• Standard • Carbide • Simolock
4. Describe different styles of shanks	• Standard • Simolock • Simojet • Frost
5. Describe materials	• Carbon steel • Chromes • High speed steel • Inlaid • Carbide
6. Select tools required	• Safety equipment • Shank wrenches • Drift • Punch and hammer
7. Describe installation of bits and shanks	• Safety • Removal • Lubrication • Replacement
8. Replace head saw bit and shank	• Demonstrate replacement of head saw bit and shank

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will select the required tools and replace a saw bit and shank.
Conditions	The learner will be given: • Circular saw • Bit and shank • Tools required for the task
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Bit and shank are replaced according to manufacturer standards required • Correct use of the tools required for the task

LINE (GAC): F CIRCULAR SAWS

Competency: F7 Replace Cut-off Saw Teeth and Inserted Teeth

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of replacing cut-off and inserted saw teeth.
- Select tools required.
- Replace cut-off and inserted saw teeth.

LEARNING TASKS	CONTENT
1. Describe styles of cut-off teeth	• Standard • Jumbo • #2 ½ pattern • Hollow face/carbide • Hollow top • V rail type
2. Describe materials	• Carbon steel • High speed steel • Stainless steel • Inlaid • Carbide
3. Select tools required	• Safety equipment • Punches • Drift • Hammer • Rivets • Pneumatic air gun
4. Describe installation of cut-off teeth	• Safety • Removal • Lubrication • Replacement
5. Replace cut-off saw teeth and inserted teeth	• Demonstrate replacement of cut-off saw teeth and inserted teeth

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will select the required tools and replace cut-off and inserted saw teeth.
Conditions	The learner will be given: • Saw requiring new cut-off and/or inserted teeth. • Tools for replacing the teeth
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Tools are selected and used correctly • Teeth are replaced to required manufacturer standards

LINE (GAC): F CIRCULAR SAWS

Competency: F8 Tip Carbide Saws

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of tip carbide saws.
- Select correct tools and tip a carbide saw.

LEARNING TASKS	CONTENT

1. Describe re-tipping	• Safety
	• Torch set up
	• Removal of worn or damaged tips
	• Seat grinding
	• Gullet grinding (gumming)
	• Tips
	  ○ Size
	  ○ Tinning
	  ○ Pre-tinned
	• Cleaning solution
	• Silver solder
	• Flux
	• Soldering/brazing
	• Annealing
	• Finish

2. Select tools and equipment required	• Safety equipment
	• Torch fixture
	• Tipping
	  ○ Single tip jig
	  ○ Rotary multi-tip table
	• Positioning tool
	• Brass brushes
	• Tweezers
	• Dial indicator
	• Related tools and equipment
	• Tipping anvil
	  ○ Adjustable
	  ○ Solid
	• Auto tipper
	• Post grinder

3. Tip carbide saws	• Demonstrate carbide saw tipping

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will select required tools and equipment and tip a carbide saw.
Conditions	The learner will be given: • Tools and equipment • Carbide saw • Tips
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of the tools and equipment • Saw correctly tipped

LINE (GAC): F CIRCULAR SAWS

Competency: F9 Grind Carbide Saws

Objectives

To be competent in this area, the individual must be able to:

- Explain the concepts of carbide saw grinding.
- Grind a carbide saw.

LEARNING TASKS	CONTENT

1. Describe grinding of carbide tipped saws	• Face grinding
	  ○ Hook angle
	  ○ Face angle
	• Side grinding
	  ○ Radial clearance
	  ○ Tangential clearance
	• Top grinding
	  ○ Top clearance
	  ○ Top bevel angles

2. Describe carbide grinders	• Top/face grinders
	  ○ Manual
	  ○ Automatic
	• Side grinder
	  ○ Manual
	  ○ Automatic

3. Describe grinding wheels	• Diamond
	  ○ Wet
	  ○ Dry

4. Grind carbide saws	• Demonstrate grinding carbide saws

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will grind a carbide saw.
Conditions	The learner will be given: • Carbide-tipped saw • Grinder • Grinding wheel
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of the grinder and grinding wheel ○ Saw ground to specifications

LINE (GAC): F CIRCULAR SAWS

Competency: F10 Troubleshoot Carbide Saws

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of carbide saw troubleshooting.
- Troubleshoot a carbide saw.

LEARNING TASKS	CONTENT

1. Describe troubleshooting problems	• Gullet cracking
	• Carbide tip loss
	  ○ Complete
	  ○ Partial
	• Chill lines
	• Improperly ground cutting planes
	• Carbide tip overheating
	• Grinding issues

2. Troubleshoot carbide saws	• Demonstrate troubleshooting carbide saws

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will troubleshoot a carbide saw.
Conditions	The learner will be given: • Carbide saw with one or more problems
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Identify the source of the problem(s)

LINE (GAC): F CIRCULAR SAWS

Competency: F11 Tip Stellite Circular Saws

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of tipping stellite circular saws.
- Tip a stellite circular saw.

LEARNING TASKS	CONTENT
1. Describe tipping methods	• Tungsten inert gas (TIG) • Metal inert gas (MIG) • Plasma arc/plasma • Resistant • Oxy-acetylene
2. Describe forms of stellite	• Bare rod • Coated electrodes • Tubular wires • Solid wires • Powder • Pre-formed tips
3. Tip stellite circular saws	• Demonstrate tipping stellite circular saws

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will tip a stellite circular saw.
Conditions	The learner will be given: • Stellite circular saw
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Use of the appropriate tipping method • Tipping is done to manufacturer standard

LINE (GAC): F CIRCULAR SAWS

Competency: F12 Grind Stellite Circular Saws

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of stellite circular saw grinding.
- Grind a stellite circular saw.

LEARNING TASKS	CONTENT

1. Describe grinding of stellite tipped circular saws	• Face grinding
	  ○ Hook angle
	  ○ Face angle
	• Side grinding
	  ○ Radial clearance
	  ○ Tangential clearance
	• Top grinding
	  ○ Top clearance
	  ○ Top bevel angles

2. Describe stellite grinders	• Top/face grinders
	  ○ Manual
	  ○ Automatic

3. Describe grinding wheels	• Aluminum oxide • Silicon carbide • Cubic-boron-nitride (CBN)
4. Grind stellite circular saws	• Demonstrate grinding stellite circular saws

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will grind a stellite circular saw.
Conditions	The learner will be given: • Stellite grinder • Stellite circular saw • Grinding wheel(s)
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of tools • Saw is ground to manufacturer standard

LINE (GAC): F CIRCULAR SAWS

Competency: F13 Troubleshoot Stellite Saws

Objectives

To be competent in this area, the individual must be able to:

- Explain troubleshooting concepts for stellite saws.
- Troubleshoot a stellite saw.

LEARNING TASKS	CONTENT

1. Describe troubleshooting problems	• Stellite tip failure
	  ○ Too much heat
	  ○ Too little heat
	  ○ Deposit size
	  ○ Chill lines
	• Craters in stellite tip
	• Annealing

2. Troubleshoot stellite saws	• Demonstrate troubleshooting stellite saws

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will troubleshoot a stellite saw.
Conditions	The learner will be given: • Stellite saw with one or more problems
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct identification of the problem(s)

LINE (GAC): I SAW WELDING

Competency: I9 Use Safe Arc Welding Practices

Objectives

To be competent in this area, the individual must be able to:

- Explain safety precautions that need to be taken when using arc welding equipment.
- Apply safe arc welding practices.

LEARNING TASKS	CONTENT
1. Describe the precautions to be considered when using arc welding equipment	• Location of machine • Good machine and cable connection • Electric shock • Fire hazards and extinguishers • Proper clothing – arc burn • Eye protection, proper helmet and screens • Ventilation • Explosive substances • WorkSafe BC Regulations
2. Use Safe Arc Welding Practices	• Demonstrate Safe Arc Welding Practices

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will demonstrate safe arc welding practices.
Conditions	The learner will be given: • Tools, equipment, materials • Arc welder
Criteria	The learner will score 90% or better on a rating checklist that reflects the following criteria: • Explanation and demonstration of arc welder safety practices meet mill standards

LINE (GAC): I SAW WELDING

Competency: I10 Identify Various Arc Welding Machines

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of different types of arc welding machines.
- Demonstrate machine settings on different types of welding machines.

LEARNING TASKS	CONTENT
1. Describe the basic principles of operation of different types of welding machines	• DC motor driven generator • DC engine driven generator • AC transformers • AC and DC rectifiers
2. Describe and demonstrate settings on different types of welding machines	• Polarity • Amperage • Voltage • Arc force • Arc length

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will use various settings of different types of welding machines. Settings will control polarity, amperage, voltage, arc force and arc length.
Conditions	The learner will be given: • A variety of welding machines
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correctly set machine settings

LINE (GAC): I SAW WELDING

Competency: I11 Describe Electrode Characteristics and Classifications

Objectives

To be competent in this area, the individual must be able to:

- Explain the concepts of electrodes.

LEARNING TASKS	CONTENT

1. Describe the function and classification of welding electrodes	• Coating
	  ○ Types
	  ○ Effects
	• Wire or rod size
	• Arc stream, gas shield and slag
	• Fusion, penetration and reinforcement
	• Electrode classification
	  ○ Tensile
	  ○ Strength
	  ○ Position used
	  ○ Rod characteristics

LINE (GAC): I SAW WELDING

Competency: I12 Weld Saw Plate Using Manual Arc Welding Equipment

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of welding saw plates with manual arc welding equipment.
- Weld a saw plate using manual arc welding equipment.

LEARNING TASKS	CONTENT
1. Select and set-up an arc welding machine	• Type of machine • Good cable connectors • Initial machine settings • Safety considerations
2. Describe circular saw arc welding	• Preparation • Comfortable position • Striking and maintaining arc • Arc length and rod angle • Manipulation of welding rod • Deflects and corrections • Annealing • Finishing
3. Weld saw plate using manual arc welding equipment	• Demonstrate welding saw plate using manual arc welding equipment

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will weld a saw plate using manual arc welding equipment.
Conditions	The learner will be given: • Manual arc welding equipment • Supporting tools and equipment
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of the welding equipment • Saw plate weld meets specifications

LINE (GAC): M TENSION, LEVEL AND BENCH SAWS

Competency: M4 Level Circular Saws

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of leveling circular saws.
- Select supporting tools and equipment and level a circular saw.

LEARNING TASKS	CONTENT

1. Describe circular saw leveling	• Removal of all:
	  ○ Lumps
	  ○ Ridges
	  ○ Cross bumps

2. Describe areas of leveling	• Eye • Body • Rim

3. Select tools and equipment	• Hammers
	  ○ Cross face
	  ○ Twist face
	  ○ Dog head
	• Straight edges
	  ○ All sizes
	• RPM gauges
	• Dishing rolls
	• Related equipment

4. Use correct method of holding and reading RPM gauges and straight edges	• Concave side • Convex side • Straight edge for eye • Straight edge for plumbing • Straight edge for body
5. Describe different conditions for any given saw plate	• Fast • Tight • Open • Stiff • Dish • Twisted • Plumb • Out of plumb

6.	Describe leveling method when using	• Straight edge and slab • RPM gauge and anvil • Stretcher rolls • Automatic leveling equipment • Leveling block
7.	Level circular saw	• Demonstrate leveling of circular saws (advanced)

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will select applicable tools and equipment and level a circular saw.
Conditions	The learner will be given: • Circular saw • Supporting tools and equipment
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Most appropriate leveling method selected • Appropriate tools and equipment selected • Correct use of tools, equipment and methods • Saw is leveled within manufacturer standard

LINE (GAC): M TENSION, LEVEL AND BENCH SAWS

Competency: M5 Tension Circular Saws

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of tension circular saws.
- Tension a circular saw.

LEARNING TASKS	CONTENT

1. Describe reasons for circular saw tensioning	• Pre-stressing or tensioning
	  ○ Forces caused by high speed rotation
	• Thermal stress
	  ○ Forces caused by friction and heat
	• Maintain a stiff rim under sawing conditions

2. Describe areas of tensioning	• Eye • Body • Rim
3. Use correct method of holding and reading RPM gauges and straight edges	• Concave side • Convex side • Straight edges
4. Describe different conditions for any given circular saw plate	• Fast • Tight • Open • Stiff • Dish • Quartered • Unlevel
5. Describe tensioning methods	• RPM gauge and anvil (hard and soft) • Slab • Stretcher rolls • Automatic tensioning equipment • Pads
6. Tension circular saw	• Demonstrate tensioning of circular saws (advanced)

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will tension a circular saw.
Conditions	The learner will be given: • Circular saw with different conditions • Supporting tools and equipment
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Most appropriate tensioning method selected • Appropriate tools and equipment selected • Correct use of tools, equipment and methods • Saw is tensioned within manufacturer standard

LINE (GAC): M TENSION, LEVEL AND BENCH SAWS

Competency: M6 Use Safe Saw Handling in Circular Saw Benching

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of safe saw handling in circular saw benching.
- Bench a circular saw using safe handling procedures.

LEARNING TASKS	CONTENT
1. Describe safe handling procedures	• Cut-off saws • Edger saws • Trim saws • Gang saws • Clusters • All related saws
2. Describe safe inspection	• Approved inspection procedures

3. Describe safe use of cleaning agents	• Cleaning agents
	  ○ Scrapers
	  ○ Dip tanks
	  ○ Liquid solutions

4. Use safe saw handling procedures in circular saw benching	• Demonstrate safe handling of circular saws • Demonstrate safe inspection • Demonstrate safe use of cleaning fluids

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will demonstrate the safe handling and inspection of circular saws while using cleaning fluids in a safe manner.
Conditions	The learner will be given: • Appropriate tools and materials • Circular saw types
Criteria	The learner will score 90% or better on a rating checklist that reflects the following criteria: • Safe handling for each type of saw • Inspection procedures to manufacturer standard • Correct use of tools, equipment and methods • Saws are cleaned to manufacturer standard

LINE (GAC): M TENSION, LEVEL AND BENCH SAWS

Competency: M7 Prepare Circular Saw for Benching

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of preparation of circular saws for benching.
- Prepare a circular saw for benching.

LEARNING TASKS	CONTENT
1. Describe cleaning of circular saws	• Safety equipment • Cleaning • Dip tank • Removal of pitch and oil • Wire brush • Cleaning fluids

2. Describe preliminary inspection of circular saw	• Visual inspection
	  ○ Cracks
	  ○ Dishing
	  ○ Saw damage

3. Prepare circular saw for benching	• Demonstrate cleaning of circular saws • Demonstrate preliminary inspection of circular saws

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will clean and conduct a preliminary inspection of circular saws.
Conditions	The learner will be given: • Circular saws • Supporting tools, equipment and materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of the cleaning tools and materials • Inspection to manufacturer standard • Saw fully cleaned

LINE (GAC): M TENSION, LEVEL AND BENCH SAWS

Competency: M8 Select Benching Hand Tools and Equipment

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of selecting benching hand tools and equipment.
- Select tools appropriate to a given circular saw.

LEARNING TASKS	CONTENT
1. Describe safe use and proper holding practices	• Hammers • Straight edges • Saw gauges • Sets
2. Describe care and maintenance of hand tools	• Hammers • Gauges • Straight edges
3. Select proper hammers, straight edges and gauges for given circular saw	• Cut off • Hollow ground • Insert tooth edger • Thin kerf swage • Thin kerk carbide • Thin kerf stellite • Circular head saw • Scrag • Step saws • Related saws
4. Select proper anvils or slabs	• Tensioning • Leveling • Pads

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will select the proper hand tools and equipment to bench a saw.
Conditions	The learner will be given: • A choice of hand tools and equipment • Circular saw
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct choice of hand tools and equipment for the saw

LINE (GAC): M TENSION, LEVEL AND BENCH SAWS

Competency: M9 Maintain Benching Hand Tools

Objectives

To be competent in this area, the individual must be able to:

- Explain the concepts of benching hand tool maintenance.
- Maintain hand tools.

LEARNING TASKS	CONTENT
1. Describe maintenance of circular saw hand tools	• Hammer faces ○ All types • Straight edges • Tension gauges

2. Describe the making of straight edges and tension gauges	• Level
	• Twist removal
	• Grinding
	  ○ Circle
	  ○ Straight
	• Finish
	• V-gauge

3. Describe the making of leveling blocks	• Leveling blocks
4. Perform hand tool maintenance	• Demonstrate maintenance of circular saw hand tools • Demonstrate making of straight edges and tension gauges • Demonstrate the making of leveling blocks

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will maintain circular saw hand tools and demonstrate the making of straight edges, tension gauges and leveling blocks.
Conditions	The learner will be given: • Required tools and materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Maintenance is conducted to required standards • Straight edges, tension guages and leveling blocks are built to manufacturer standard

LINE (GAC): M TENSION, LEVEL AND BENCH SAWS

Competency: M10 Plumb Circular Saws

Objectives

To be competent in this area, the individual must be able to:

- Explain the concepts of plumbing a circular saw.
- Plumb circular saws.

LEARNING TASKS	CONTENT
1. Describe plumbing a circular saw	• On the floor • On the bench • Tools required • Safety equipment
2. Plumb a circular saw	• Demonstrate plumbing a circular saw

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will plumb a circular saw.
Conditions	The learner will be given: • Circular saw on the floor • Circular saw on the bench • Required tools • Safety equipment
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of tools, equipment and methods • Saw is plumbed to manufacturer standard

LINE (GAC): N PLANNING AND ORGANIZING WORK ACTIVITIES

Competency: N1 Plan Project Work

Objectives

To be competent in this area, the individual must be able to:

- Explain the concepts of planning project work.
- Plan project work.

LEARNING TASKS	CONTENT
1. Describe organizing weekend maintenance	• Examine, measure, design, and make sketches or notes of the work to be performed • Process and scheduling description
2. Read drawings, blueprints/operators manual	• Required drawings and key information from blueprints • Visual examination of project site • Operating requirements and work to be performed
3. Coordinate with all departments, stakeholders	• Communication (operations, other trades) • Consulting with operators • Crew/parts required
4. Ensure all parts and tools/equipment are on site to complete task	• Test equipment and tools required • Material required from suppliers or plant stores • Take-offs from blueprints and technical drawings (i.e. tool and equipment lists)
5. Ensure timelines for completion of project are within guidelines	• Project completion window • Scheduling requirements (personnel, equipment, material)

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will plan the work for a project.
Conditions	The learner will be given: • Tools, materials, equipment
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Drawings read and understood • Effective communication with all departments and stakeholders • Timelines fall within guidelines

LINE (GAC): N PLANNING AND ORGANIZING WORK ACTIVITIES

Competency: N2 Participate in Mill Shutdown Planning Procedures

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of planning for a mill shutdown.
- Participate in mill shutdown.

LEARNING TASKS	CONTENT
1. Describe maintenance planning process	• Attend operational meeting/coordinate availability of machine center/people/other trades/outside help • Submitting a plan for approval
2. Participate in shutdown	• Shutdown order • Personnel and equipment affected • Operations to be accomplished • Discrepancies, omissions, mistakes

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will participate in a mill shutdown.
Conditions	The learner will be given: • Shutdown information
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Completed plan submitted for approval • Operations completed according to plan

LINE (GAC): N PLANNING AND ORGANIZING WORK ACTIVITIES

Competency: N3 Interpret LMI Technical Documents

Objectives

To be competent in this area, the individual must be able to:

- Read blueprints of machine centers targeted for maintenance or repair.
- Interpret LMI technical documents.

LEARNING TASKS	CONTENT
1. Describe use of technical documents	• Read blueprint of machine centers that require maintenance or repair
2. Use technical documents	• Blueprints • Logic diagrams • Schematic diagrams • Equipment specifications • Maintenance procedures • Testing procedures • Quality standards • Operating procedures • Installation procedures • Job Safety Procedures • Environmental protection standards and procedures • Take-offs from technical drawings

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will interpret technical documents.
Conditions	The learner will be given: • Machine centre that requires maintenance or repair • Technical documents as required
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Documents are selected and read appropriately for the job at hand

LINE (GAC): N PLANNING AND ORGANIZING WORK ACTIVITIES

Competency: N4 Create / Update Technical Documents

Objectives

To be competent in this area the individual must be able to:

- Explain the need for creating or updating technical documents.
- Work with technical documents.

LEARNING TASKS	CONTENT
1. Describe process documentation	• Hard copy at each work station/computer documentation/reports generated from computer entry to generate trends
2. Working with technical documents	• Computer access/exit • Relevant software • File management • Modifying text • Drawing conversion • Saving and printing • Modifying drawings • New drawing creation

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will update or create technical documents.
Conditions	The learner will be given: • A selection of technical documents to be updated • A request for development of a technical document(s)
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Documents are updated according to guidelines • Documents are created according to guidelines

LINE (GAC): O SAW FILING ROOM MACHINES

Competency: O1 Set-up and Maintain Circular Saw Bench

Objectives

To be competent in this area, the individual must be able to:

- Explain the concepts of circular saw bench set up and maintenance.
- Set up and maintain a circular saw bench.

LEARNING TASKS	CONTENT
1. Describe circular saw bench set-up and maintenance	• Cut-offs • Circular head saw • Scraggs • Edger saws • Anvils • Slabs • Lighting • Related components
2. Set-up and maintain circular saw bench	• Demonstrate set-up of a circular saw bench • Demonstrate maintenance of a circular saw bench

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will set up and maintain a circular saw bench.
Conditions	The learner will be given: • Tools, equipment and materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Set-up is to accepted practices • Maintenance is conducted according to schedule and maintenance standards or guidelines

LINE (GAC): O SAW FILING ROOM MACHINES

Competency: O2 Use Circular Saw Stretcher

Objectives

To be competent in this area, the individual must be able to:

- Explain the concepts of circular saw stretchers.
- Use a circular saw stretcher.

LEARNING TASKS	CONTENT
1. Describe use of circular saw stretcher rolls	• Tensioning • Leveling • Pressure • Dishing
2. Describe maintenance of circular saw stretcher rolls	• Set-up • Roll grinding • Dishing rolls • Lubrication
3. Describe hazards of stretcher roll	• Hazards
4. Use circular saw stretcher	• Demonstrate use of circular saw stretcher rolls • Demonstrate maintenance of circular saw stretcher rolls

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will use and maintain circular saw stretcher rolls.
Conditions	The learner will be given: • A circular saw stretcher roll • Tools, equipment and materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of the circular saw stretcher and supporting tools, equipment and methods • Saw is stretched within manufacturer standard

LINE (GAC): O SAW FILING ROOM MACHINES

Competency: O3 Describe Operation and Maintenance of Circular Saw Grinders

Objectives

To be competent in this area, the individual must be able to:

- Explain the concepts of operating and maintaining circular saw grinders.

LEARNING TASKS	CONTENT
1. Describe operation of manual circular saw grinders	• Jointing • Bevels • Depth • Grinding wheel choice • Grinding wheel profile
2. Describe operation of automatic circular saw grinders	• Cut-off and “N” style • “K” style (rip) • “M” style (slasher) • “P” style (trim and hollow ground) • Plunge grinding • Generative grinding
3. Describe adjustments of manual and automatic circular saw grinders	• Feed fingers • Wheel selection • Wheel profile • Stroke • Depth and tooth profile • Long teeth on one side • Oscillation (rip and cross-cut) • Cams • Clamp gate and pressure
4. Describe maintenance of automatic and manual grinders	• Lubrication • Cams and rollers • Feed finger • Bevel cam switch • Lift screw and crown gears • Rack and pinion gears • Related parts

LINE (GAC): O SAW FILING ROOM MACHINES

Competency: O4 Maintain Circular Saw Guide Equipment

Objectives

To be competent in this area, the individual must be able to:

- Explain the concept of maintaining circular saw guide equipment.
- Maintain circular saw guide equipment.

LEARNING TASKS	CONTENT
1. Describe circular saw guide surfacing equipment	• Manual • Automatic • Stationary milling machines • Jigs • Granite slabs • Related equipment • Precision measuring tools
2. Maintain circular saw guide equipment	• Demonstrate maintaining circular saw guide surfacing equipment

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will maintain circular saw guide surfacing equipment.
Conditions	The learner will be given: • Circular saw guide surfacing equipment • Supporting tools, equipment and materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of tools, equipment and methods • Equipment is maintained to manufacturer standard

LINE (GAC): P CIRCULAR SAW MACHINES

Competency: P1 Perform Circular Head Rig Alignment and Maintenance

Objectives

To be competent in this area, the individual must be able to:

- Explain the concepts of circular head rig alignment and maintenance.
- Perform circular head rig alignment and maintenance.

LEARNING TASKS	CONTENT
1. Describe the procedure for alignment of a circular head rig	• Safety procedures • Track • Arbour • Feed works • Husk • Bottom and top saw • Motor • Guides • Lead • Collars and flanges • Bearings
2. Describe the conditions which must be met	• Straight • Plumb • Level • Square
3. Describe alignment tools and equipment	• Squares • Levels • Wire • Jigs (track alignment) • Related equipment
4. Perform c head rig alignment and maintenance	• Demonstrate alignment of a circular saw head rig • Demonstrate maintenance of a circular saw head rig

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will align and maintain a circular saw head rig.
Conditions	The learner will be given: • Supporting tools and equipment
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of tools, equipment and methods • Correct application of alignment and maintenance procedures • Equipment is aligned to manufacturer standard • Equipment is maintained to manufacturer standard

LINE (GAC): P CIRCULAR SAW MACHINES

Competency: P2 Align Circular Gang Saws

Objectives

To be competent in this area, the individual must be able to:

- Explain the concepts of aligning circular gang saws.
- Align circular gang saws.

LEARNING TASKS	CONTENT

1. Describe the procedure for alignment of a circular gang saw	• Safety procedures
	• Arbour
	• Feed rolls
	  ○ Infeed
	  ○ Outfeed
	• Press rolls
	  ○ Infeed
	  ○ Outfeed
	• Feed tables
	  ○ Infeed
	  ○ Outfeed
	• Straight edge
	• Guide system
	• Drive system
	• Coolant system

2. Describe the conditions which must be met	• Straight • Plumb • Level • Square
3. Align circular gang saw	• Demonstrate alignment of a circular gang saw

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will align a circular gang saw.
Conditions	The learner will be given: • Circular gang saw • Supporting tools, equipment, materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of supporting tools, equipment, materials • Safety procedures followed • Saw is aligned according to manufacturer standards (straight, plumb, level, square)

LINE (GAC): P CIRCULAR SAW MACHINES

Competency: P3 Align Edgers

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of aligning edgers.
- Align edgers.

LEARNING TASKS	CONTENT

1. Describe the procedure for alignment of a circular shifting edger	• Safety procedures
	• Arbour
	  ○ Keyway and key
	  ○ Spline
	• Feed rolls
	  ○ Infeed
	  ○ Outfeed
	• Press rolls
	  ○ Infeed
	  ○ Outfeed
	• Feed tables
	  ○ Infeed
	  ○ Outfeed
	• Shifter bars and guide bars
	• Straight edge
	• Guide systems
	• Set works
	• Coolant system

2. Describe the conditions which must be met	• Straight • Plumb • Level • Square

3.	Describe types of circular re-saws	• Conventional selective edgers • Spline arbour circular saw edgers • Double arbour conventional circular saw gang edgers • Spline arbour, double arbour gangs • Pocket edgers • Chipping edgers • Remanufacturing edgers • Optimizing edgers • Related machines
4.	Describe alignments of circular re-saws	• Safety procedures • Arbours • Feed rolls • Press rolls • Feed tables • Line bars • Related components
5.	Align edgers	• Demonstrate alignment of a circular shifting edger • Demonstrate alignment of a circular re-saws

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will align a circular shifting edger and a circular re-saw.
Conditions	The learner will be given: • Circular re-saw(s) • Shifting edger • Supporting tools, equipment, materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of supporting tools, equipment, materials • Alignment and safety procedures followed • Saws are aligned according to manufacturer standards (straight, plumb, level, square)

LINE (GAC): P CIRCULAR SAW MACHINES

Competency: P4 Describe the Main Elements of an Optimizing System

Objectives

To be competent in this area, the individual must be able to:

- Explain the concepts of an optimizing system.

LEARNING TASKS	CONTENT
1. Describe an optimizing system	• Optimized scanning • Computer • Servo or other positioner • Transport system • Cutting system • Piece-count • Real time measuring

LINE (GAC): P CIRCULAR SAW MACHINES

Competency: P5 Align Cut-Off, Trim and Slasher Saws

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of aligning cut-off, trim and slasher saws.
- Align cut-off, trim and slasher saws.

LEARNING TASKS	CONTENT
1. Describe the alignment of various types of circular cutting systems	• Safety procedures • Arbours • Lead • Chains • Buckets or spurs • Bearings • Guide systems • Belts • Related equipment

2. Align Cut-Offs, Trim and Slasher Saws	• Demonstrate alignment of a circular cutting systems including:
	  ○ Cut-off saws
	  ○ Trim saws
	  ○ Slasher saws

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will align circular cutting systems, including cut-off saws, trim saws and slasher saws.
Conditions	The learner will be given: • Cut-off saw • Trim saw • Slasher saw
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of supporting tools, equipment, materials • Alignment and safety procedures followed • Saws are aligned according to manufacturer standards

LINE (GAC): P CIRCULAR SAW MACHINES

Competency: P6 Perform Laser Alignment of Circular Machines

Objectives

To be competent in this area, the individual must be able to:

- Explain the concepts for performing laser alignments on circular machines.

LEARNING TASKS	CONTENT
1. Describe the procedure for alignment of circular saw machines using laser alignment equipment	• Safety procedures • Laser components • Set-up procedures • Alignment procedures
2. Perform laser alignment of circular machines	• Demonstrate alignment of a circular saw machines using laser alignment equipment

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will align a circular saw using laser alignment equipment.
Conditions	The learner will be given: • Circular saw • Laser alignment equipment
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Safety procedures followed • Set-up and alignment procedures are followed in accordance with manufacturer guidelines and standards • Saw is aligned to manufacturer standard

LINE (GAC): P CIRCULAR SAW MACHINES

Competency: P7 Align Chip Canter

Objectives

To be competent in this area, the individual must be able to:

- Explain the concepts of aligning a chip canter.
- Align a chip canter.

LEARNING TASKS	CONTENT
1. Describe the procedure for alignment of chip canters	• Safety procedures • Chipping heads • Infeed chains or rolls • Guide bars • Press rolls • Shear plates • Related components
2. Align Chip Canters	• Demonstrate alignment of a chip canters

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will align a chip canter.
Conditions	The learner will be given: • Chip canter • Supporting tools, equipment and materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Safety procedures followed • Set-up and alignment procedures are followed in accordance with manufacturer guidelines and standards • Chip canter is aligned to manufacturer standard

LINE (GAC): P CIRCULAR SAW MACHINES

Competency: P8 Troubleshoot Circular Saw Machines

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of troubleshooting circular saw machines.
- Troubleshoot circular saw machines.

LEARNING TASKS	CONTENT

1. Describe circular saw machine maintenance procedures	• Circular head rigs
	• Edgers
	  ○ Single arbour
	  ○ Double arbour
	• Trimmers
	• Cut-offs
	• Scrags
	• Chip canters
	• Related circular saw machines

2. Describe various maintenance points of circular saw machines	• Collars and spacers • Spline arbours • Double key ways • Taper lock • Chipping heads • Feed systems • Bearings • Wear strips • Related equipment
3. Describe noise abatements and equipment	• Tooth patterns • Adjusting saw tension • Enclosures • Rim slots • Related factors • Belt design

4.	Describe guide and cooling system troubleshooting	• Guide maintenance – All types • Water • Air and water • Oil mist • Jets and fittings • Positioning • Drilled arbours • Related components
5.	Troubleshoot circular saw machines	• Demonstrate maintenance and troubleshooting of circular saw machines • Demonstrate troubleshooting of guide and cooling systems

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will maintain and troubleshoot circular saw machines and troubleshoot guide and cooling systems.
Conditions	The learner will be given: • Circular saw machine with one or more typical problems • Guide and cooling systems with one or more typical problems
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Safety procedures followed • Maintenance and troubleshooting procedures are followed in accordance with manufacturer guidelines and standards • Machine problems are correctly identifed

Benchperson

Optional Endorsement

LINE (GAC): C TRADE MATH

Competency: C3 Calculate Strain

Objectives

To be competent in this area, the individual must be able to:

- Calculate strain.

LEARNING TASKS	CONTENT
1. Define key number	• Band saws • Circular saws
2. Calculate key number	• Band saws • Circular saws
3. Calculate tooth bite	• Maximum • Minimum
4. Calculate strain	• Conventional strain • High strain • Strain ratio
5. Calculate weight required	• Conventional strain

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will calculate different types of strain.
Conditions	The learner will be given: • Problems to be solved

Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria:
	• Correct answers to problems presented on:
	  ○ Key number
	  ○ Tooth bite
	  ○ Strain
	  ○ Weight required

LINE (GAC): E BAND SAWS

Competency: E9 Troubleshoot Band Saws

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts related to troubleshooting bandsaws.
- Troubleshoot bandsaws.

LEARNING TASKS	CONTENT

1. Describe troubleshooting saw problems	• Saw overheats
	  ○ Wood
	  ○ Feedworks
	  ○ Saw
	• Saw snakes in cut
	  ○ Feedworks
	  ○ Saw
	  ○ Band mill
	• Saw runs forward when entering cut
	• Saw dodges when entering cut
	• Saw deviates constantly
	• Saw dishes
	• Saw vibrates
	• Saw oscillates on wheels
	• Saw twist
	• Related problems

2. Describe troubleshooting equipment problems	• Alignment • Carriage • Set works • Tapers • Feed • Related equipment

3.	Identify problems that cause the saw plate to crack or break	• Tire line • Tension • Burnt gullets • Bearings • Feed speeds • Strain • Vibration • Cross-line • Steel rubbing on plate • Starting equipment • Worn wheel face • Tooth profile • Gullet profile • Scratches across saw plate • Metal impregnated into guide material • Sawdust buildup on wheel
4.	Troubleshoot band saws	• Demonstrate troubleshooting band saws and related equipment

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will troubleshoot band saws and related equipment.
Conditions	The learner will be given: • Band saws with a series of problems
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Safety procedures followed • Maintenance and troubleshooting procedures are followed in accordance with manufacturer guidelines and standards • Band saw problems are correctly identifed

LINE (GAC): I SAW WELDING

Competency: I13 Butt Weld Saws

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts related to butting weld saws.
- Butt weld saws.

LEARNING TASKS	CONTENT
1. Describe shearing	• Proper length • Required hand • Single cut • Double cut

2. Describe preparation of a band saw to be butt welded	• Cutting to length
	• Placement in saw clamp
	  ○ Gap
	  ○ Alignment
	• Anvil clearance

3. Describe oxy-acetylene welding of butt weld	• Penetration • Puddles • Forging • Annealing • Finishing
4. Describe MIG welding a butt weld	• Preparation • Annealing • Finishing
5. Butt weld saws	• Demonstrate shearing • Demonstrate butt welding saws including preparation using oxy-acetylene or MIG equipment

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will demonstrate shearing. The learner will also prepare for and demonstrate butt welding a saw using oxy-acetylene or MIG equipment.
Conditions	The learner will be given: • Band saw • Oxy-acetylene or MIG welding equipment
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Shearing is performed in accordance with accepted shearing procedures • Correct use of tools and procedures • Saw is butt welded to standard

LINE (GAC): L SAW SHEARBOARDS, SCRAPERS, COOLING SYSTEMS AND HYDRAULICS

Competency: L4 Describe Hydraulic Systems

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of hydraulic systems.

LEARNING TASKS	CONTENT
1. Describe principles of hydraulics	• Force • Resistance • Energy • Work • Power • Horsepower • Pressure • Related principles
2. Describe hydraulic fluids	• Types • Intensity • Pressure • Forces • Gauges • Transmission
3. Describe hydraulic system components	• Check valves • Cylinders • Motors • Flow control valves • Directional control valves • Simple conductors and connectors • Related components

LINE (GAC): M TENSION, LEVEL AND BENCH SAWS

Competency: M2 Level Band Saws

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of band saw leveling and bench maintenance.
- Level band saws.

LEARNING TASKS	CONTENT

1. Describe band saw leveling	• Removal of all
	  ○ Lumps
	  ○ Ridges
	  ○ Cross bumps

2. Describe maintenance of benches	• Interwoven with:
	  ○ Level
	  ○ Tension
	  ○ Back of saw
	• Gullet area
	• Body
	• Back
	• Welded area
	• Crack area

3. Describe correct method of holding and reading straight edges	• 90 degrees to saw plate • Determine ridge and bump location • Cross leveling
4. Describe leveling using stretcher rolls	• Dishing rolls • Leveling jigs
5. Level band saws	• Demonstrate leveling band saws • Demonstrate bench maintenance • Demonstrate correct method of holding and reading straight edges • Demonstrate leveling using stretcher rolls

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will level band saws, using the correct methods of holding and reading straight edges, and using the correct method of using stretcher rolls. The learner will also maintain the bench.
Conditions	The learner will be given: • Band saw • Straight edges and stretcher rolls • Supporting tools, equipment and materials • Bench
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Approved procedures followed • Correct leveling of bandsaw in accordance with leveling standards and requirements • Bench maintained in accordance with maintenance requirements

LINE (GAC): M TENSION, LEVEL AND BENCH SAWS

Competency: M3 Tension Band Saws

Objectives

To be competent in this area, the individual must be able to:

- Explain the concepts of tensioning band saws.
- Tension band saws.

LEARNING TASKS	CONTENT
1. Describe tensioning terms	• Fast • Tight • Open • Stiff • Dished • Tire • Back of saw • 1/64" in 5 feet back • Related terms

2. Describe areas of tensioning	• Interwoven with:
	  ○ Level
	  ○ Tire
	  ○ Back of saw
	• Tire lines
	  ○ Front
	  ○ Back
	• Body
	• Butt weld
	• Welds
	• Cracked area

3. Describe correct method of holding and reading tension gauges	• 90 degrees to saw plate • Determine tight areas • Determine open areas • Convex/straight edge • Light gap • Amount required
4. Tension band saws	• Demonstrate tensioning of band saws using tension gauges

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will tension band saws using tension gauges.
Conditions	The learner will be given: • Band saw in need of tensioning • Tension gauges
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of the proper gauges and equipment • Tension adjusted to manufacturer standard

LINE (GAC): M TENSION, LEVEL AND BENCH SAWS

Competency: M11 Describe Band Saw Steel Required Properties

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of saw steel required properties.

LEARNING TASKS	CONTENT
1. Describe the required properties of circular and band saw steel	• Impact strength • Good metal flow • Hardness and wear resistance • Elasticity and structural uniformity • Fatigue resistance • Ability to take high temperature

2. Describe saw steel composition	• Iron
	  ○ Softness
	• Carbon
	  ○ Hardness
	• Nickel
	  ○ Toughness
	• Phosphorous
	  ○ Impurities
	• Temper (manganese, sulphur, silicon, chrome, molybdenum)
	  ○ Stresses

LINE (GAC): M TENSION, LEVEL AND BENCH SAWS

Competency: M12 Determine Required Tension

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of band saw tension requirements.
- Determine correct amount of tension.

LEARNING TASKS	CONTENT
1. Describe reasons for band saw tension	• Counteract expansion during cutting • Stiffen cutting edge to cut straight • Ensure saw runs in a constant position on band mill wheels.
2. Determine correct amount of tension	• Width and thickness of saw plate • Diameter and crown of band mill wheels • Flat wheels • Grooved wheels • Amount of strain • Feed speed • Type of wood sawed

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will determine the correct amount of tension on a band saw.
Conditions	The learner will be given: • Band saw • Different tensioning requirements
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of the proper gauges and equipment • Tension adjusted to manufacturer standard

LINE (GAC): M TENSION, LEVEL AND BENCH SAWS

Competency: M13 Describe Band Saw Benches

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of band saw benches.

LEARNING TASKS	CONTENT

1. Describe components of band saw benches	• Moveable end wheels
	• Air cylinder strain mechanism
	• Stretcher rolls
	• Leveling slabs
	  ○ Upper
	  ○ Lower
	• Welding clamp
	• UMHW conveyor rolls
	• Inspection lift assembly
	• Hard anvil
	• Lights

2. Describe maintenance of benches	• Lubrications • Set-up • Alignment

LINE (GAC): M TENSION, LEVEL AND BENCH SAWS

Competency: M14 Maintain Band Saw Back

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of band saw back maintenance.
- Maintain band saw backs.

LEARNING TASKS	CONTENT

1. Describe purpose of back curvature on band saws	• Single cut
	  ○ Head rig
	  ○ Standard
	  ○ Silver tooth
	  ○ Resaws
	  ○ Twins
	  ○ Quads
	• Types of band mill wheels
	  ○ Crowned
	  ○ Straight
	  ○ Grooved

2. Describe the use of back gauges	• Dial • 3 point • Solid steel
3. Describe types of band saw backs	• Straight • Sliver tooth
4. Describe grinding of band saw backs	• On the grinder • On the bench
5. Maintain band saw back	• Demonstrate use of back gauges • Demonstrate grinding of band saw backs • Demonstrate maintaining band saw backs

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will use different types of back gauges and grinders to maintain band saw backs.
Conditions	The learner will be given: • Band saw backs • Required tools, equipment and materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of the proper gauges and equipment • Maintenance completed to manufacturer standard

LINE (GAC): M TENSION, LEVEL AND BENCH SAWS

Competency: M15 Maintain Band Saw Tire

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of band saw tire maintenance.
- Maintain band saw tires.

LEARNING TASKS	CONTENT

1. Describe the tire of band saws	• Purpose
	• Area of tire
	  ○ Front
	  ○ Back
	• Interwoven
	  ○ Tension
	  ○ Level
	  ○ Back of saw
	• Peening
	• Proctor roll
	• Even and uniform

2. Describe lack of tire	• Loose cutting edge • Cracks • Oscillation
3. Maintain band saw tire	• Demonstrate maintaining band saw tire

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will maintain a band saw tire.
Conditions	The learner will be given: • Band saw tire • Required tools, equipment and materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of the tools and equipment • Maintenance completed to manufacturer standard

LINE (GAC): M TENSION, LEVEL AND BENCH SAWS

Competency: M16 Repair Band Saw Twists

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of band saw twists repair.
- Repair band saw twists.

LEARNING TASKS	CONTENT
1. Describe band saw twist removal	• Manual • Stretcher roll • Hammer
2. Describe causes of twists	• Helical twists • Overloading during sawing • Oscillation • Band saw wheels out of line • Guides set wrong • Careless leveling • Hammer face not parallel
3. Repair band saw twists	• Demonstrate removal of band saw twists • Demonstrate repair of band saw twists

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will remove and repair band saw twists, demonstrating all three methods of removal.
Conditions	The learner will be given: • Band saws with twists • Required tools, materials and equipment
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Determine best removal and repair method for each twist. • Correct use of the proper tools and equipment • Twists removed to manufacturer standard

LINE (GAC): M TENSION, LEVEL AND BENCH SAWS

Competency: M17 Heat Tension Band Saws

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of tension band saw heating.
- Heat tension band saws.

LEARNING TASKS	CONTENT
1. Describe heat tensioning of band saws	• Purpose • Area • Applications • Crawler
2. Heat tension band saws	• Demonstrate heat tensioning of band saws

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will heat tension band saws.
Conditions	The learner will be given: • Band saws • Required tools, equipment and materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of tools and equipment • Tensioning attained to manufacturer standard

LINE (GAC): O SAW FILING ROOM MACHINES

Competency: O5 Set-up and Maintain Band Saw Bench

Objectives

To be competent in this area, the individual must be able to:

- Explain the concepts of setting up and maintaining a band saw bench.
- Set up and maintain a band saw bench.

LEARNING TASKS	CONTENT
1. Describe band saw bench set-ups	• Hand (right or left) • Planer mill resaws • Resaws • Twins • Quads • 38’ to 60’ • Wide thin plates

2. Describe bench component set-up and maintenance	• Stretcher rolls
	  ○ Roll radius
	  ○ Alignment to leveling slabs
	  ○ Level
	  ○ Lubrication of gears and bearings
	  ○ Plate dishing
	  ○ Twist removal
	  ○ Handle pressure
	  ○ Handle position (equal both edges)
	• Leveling slabs (single and double cut)
	  ○ Solid
	  ○ With core holes
	  ○ Hard faced
	  ○ Double cuts
	  ○ Trunnions
	  ○ Length
	  ○ Thickness
	  ○ Width
	• Elevating assembly
	• Saw leveling stretchers
	• Leveling weights
	• Peening anvils
	• Weld clamp set-up
	• Lighting systems

3. Set-up band saw bench	• Demonstrate set-up of band saw bench

4. Maintain band saw bench

- Demonstrate maintenance of band saw bench

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will set-up and maintain a band saw bench.
Conditions	The learner will be given: • Band saw bench • Required tools, materials and equipment
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of the proper tools and equipment • Bench set up and maintained to manufacturer standard

LINE (GAC): O SAW FILING ROOM MACHINES

Competency: O6 Maintain Filing Room Machines and Equipment

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of filling room machines and equipment maintenance.
- Maintain filling room machines and equipment.

LEARNING TASKS	CONTENT
1. Describe set-up and maintenance of gauge grinder	• Safety procedures • Straight edge • Convex • Concave • Measuring devices • Grinding wheel
2. Describe set-up and maintenance of uniplane	• Safety procedures • Cutterd • Guide jigs
3. Describe maintenance of saw transportation systems	• Saw dollies • Saw carts • Related equipment
4. Describe maintenance of back gauges	• Dial • Solid steel • 3 point

5. Maintain filing room machines and equipment	• Demonstrate maintenance of filing room machines and equipment
	  ○ Gauge grinder
	  ○ Uniplane
	  ○ Saw transportation systems
	  ○ Back gauges

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will maintain gauge grinders, uniplanes, saw transportation systems and back gauges.
Conditions	The learner will be given: • Gauge grinders • Uniplanes • Saw transportation systems • Back gauges • Required tools, equipment and materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of the proper tools and equipment • Machines and equipment maintained to manufacturer standard

LINE (GAC): O SAW FILING ROOM MACHINES

Competency: O7 Describe Automatic Saw Levellers

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of automatic saw levellers.

LEARNING TASKS	CONTENT

1. Describe automatic levelers	• Safety procedures
	• Purpose
	  ○ Improved level of saw plate
	  ○ Filers time
	  ○ Improve sawing accuracy
	  ○ Reduce guide friction
	  ○ Help attain target sizes
	  ○ Eliminate down time
	• Set-up
	  ○ Saw size
	  ○ Width
	  ○ Diameter
	• Operation
	• Electronics
	• Maintenance
	• Related components

LINE (GAC): O SAW FILING ROOM MACHINES

Competency: O8 Describe Saw Control Systems

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of saw control systems.

LEARNING TASKS	CONTENT

1. Describe saw control systems	• Sensor
	  ○ Monitors saw blade
	  ○ Lateral movement
	  ○ Vibration
	  ○ Displacement/offset
	• Oscilloscope
	  ○ Saw movement
	  ○ Counters

2. Describe basic systems operation	• Sensor • Oscilloscope • Alarms • Print outs • Screens
3. Describe purpose of system	• Increased production • Recovery • Crack detection • End snipes • Feed speeds • Dull saws • Bearing failure • Guide wear • Guide rail misalignment • Track or line bar misalignment

LINE (GAC): Q BAND MILLS

Competency: Q1 Align Head Saw Band Mill

Objectives

To be competent in this area, the individual must be able to:

- Explain the concepts of head saw band mill alignment.
- Align a head saw band mill.

LEARNING TASKS	CONTENT
1. Describe safety procedures	• Personal safety equipment • Lock-out

2. Describe tools used in alignment	• Steel tapes
	• Straight edges
	• Key steel
	• Machinist squares
	• Machinist levels
	• Plum bobs
	• Dial indicators
	• Callipers
	  ○ Inside
	  ○ Outside
	• Track jig

3. Describe track alignment	• “V” rail • Flat rail • Square • Plumb • Straight • Level • Track jig

4.	Describe band mill alignment	• Plumb
		• Square
		• Straight
		• Level
		• Bottom wheel to “V” rail
		• Plumb bottom wheel
		• Crossline top wheel to bottom wheel
		• Top wheel and bottom wheel end alignment
		• Plumb saw from top wheel to bottom wheel
		• Square bed skids of carriage to saw
		• Set guides
		  ○ Conventional
		  ○ Pressure
		• Related system components

5.	Align head saw band mill	• Demonstrate track alignment • Demonstrate alignment of head saw band mill

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will track alignment and align a head saw band mill.
Conditions	The learner will be given: • Head saw band mill • Required tools, equipment and materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Safety requirements followed • Correct use of the proper tools and equipment • Head saw band mill tracked and aligned to manufacturer standard

LINE (GAC): Q BAND MILLS

Competency: Q2 Align Vertical Resaw

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of vertical resaw alignment.
- Align a vertical resaw.

LEARNING TASKS	CONTENT
1. Describe safety procedures	• Personal • Machine • Lock-out
2. Describe alignment	• Plumb • Square • Straight • Level • Plumb bottom wheel • Cross-line top wheel to bottom wheel • Top wheel and bottom wheel end alignment • Plumb saw from top wheel to bottom wheel • Extend saw lines • Set rolls • Set line bar • Set guides
3. Align vertical resaw	• Demonstrate alignment of vertical resaw

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will align a vertical resaw.
Conditions	The learner will be given: • Vertical resaw • Required tools, equipment and materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Correct use of the proper tools and equipment • Alignment is within manufacturer standards

LINE (GAC): Q BAND MILLS

Competency: Q3 Align Horizontal Resaw

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of horizontal resaw alignment.
- Align horizontal resaw.

LEARNING TASKS	CONTENT
1. Describe safety procedures	• Personal • Machine • Lock-out
2. Describe alignment	• Plumb • Square • Straight • Level • Plumb bottom wheel • Cross-line top wheel to bottom wheel • Top wheel and bottom wheel end alignment • Plumb saw from top wheel to bottom wheel • Extend saw lines • Feed table (slat bed • Infeed table • Tail table • Related systems
3. Align horizontal resaw	• Demonstrate alignment of horizontal resaw

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will align a horizontal resaw.
Conditions	The learner will be given: • Horizontal resaw • Required tools, equipment and materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Safety requirements followed • Correct use of the proper tools and equipment • Saw is aligned within manufacturer standards

LINE (GAC): Q BAND MILLS

Competency: Q4 Align Twin and Quad Band Mills

Objectives

To be competent in this area, the individual must be able to:

- Explain twin and quad band mill alignment.
- Align twin and quad band mills.

LEARNING TASKS	CONTENT
1. Describe safety procedures	• Personal • Machine • Lock-out
2. Describe alignment	• Plumb • Square • Straight • Level • Level Band Mill • Bottom wheels in line with each other • Plumb the top wheels to the bottom wheels • Cross-line • Set guide pressure • Slack in dovetail slides
3. Describe system alignment	• Infeed system • Outfeed system
4. Align twin and quad band mills	• Demonstrate alignment of twin and quad band mills

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will align twin and quad band mills.
Conditions	The learner will be given: • Twin and quad band mills • Required tools, equipment and materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Safety requirements followed • Correct use of the proper tools and equipment • Band mills aligned to manufacturer standards

LINE (GAC): Q BAND MILLS

Competency: Q5 Align Other Saw Mill Machines

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of alignment on other saw mill machines.
- Align other saw mill machines.

LEARNING TASKS	CONTENT

1. Describe other benchperson alignment responsibilities	• Gang saws
	  ○ Circular
	• Trimmers
	  ○ Arbours
	  ○ Feed chains
	  ○ Depth of cut
	• Edgers
	  ○ Arbour
	  ○ Press rols
	  ○ Feed roll systems
	  ○ Straight edge
	• Cut offs
	  ○ Circular
	  ○ Chains
	• Chip canter
	  ○ Feed systems
	  ○ Sawing systems
	• Related equipment

2. Align other saw mill machines	• Demonstrate aligning othe saw mill machines including:
	  ○ Gang saw
	  ○ Trimmer
	  ○ Edger
	  ○ Cut-off
	  ○ Chip canter

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will align gang saws, trimmers, edgers, cut-offs and chip canters.
Conditions	The learner will be given: • Gang saw • Trimmer • Edger • Cut-off • Chip canter • Required tools, equipment and materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Safety requirements followed • Correct use of the proper tools and equipment • Machines aligned to their respective manufacturer standards

LINE (GAC): Q BAND MILLS

Competency: Q6 Align Band Mill Using Laser Alignment

Objectives

To be competent in this area, the individual must be able to:

- Explain the concepts of aligning a band mill using laser alignment.
- Align a band mill using laser alignment.

LEARNING TASKS	CONTENT
1. Describe the procedure for alignment of all band saw machines using laser alignment equipment	• Safety procedures • Laser components • Set-up procedures • Alignment procedures
2. Align band mill using laser alignment	• Demonstrate aligning band mill using laser alignment equipment

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will align a band mill using laser alignment equipment.
Conditions	The learner will be given: • Band mill • Required tools, equipment and materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Safety requirements followed • Correct use of the proper tools and equipment • Band mill aligned to manufacturer standards

LINE (GAC): Q BAND MILLS

Competency: Q7 Maintain Band Mill Components

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of band mill component maintenance.
- Maintain band mill components.

LEARNING TASKS	CONTENT
1. Describe safety procedures	• Personal safety equipment • Machinery safety equipment • Lock-out procedures • Shift inspection • Regular maintenance • Follow WorkSafe BC regs

2. Describe parts of a band mill	• Foundation
	• Top wheel
	  ○ Solid
	  ○ Spokes
	  ○ Balanced
	• Bottom wheel
	  ○ Driver
	  ○ Belts
	  ○ Motors (AC/DC)
	• Wheel arbours
	  ○ Bearings
	  ○ Rotating
	  ○ Non-rotating
	• Strain system
	• Wheel tilt
	• Strain gauge
	• Guides
	  ○ Conventional
	  ○ Pressure
	• Controls
	• Husk
	• Shearboards
	• Scrapers
	• Cooling system
	• Related components

3.	Describe track and carriage parts	• Foundation
		• Tracks
		  ○ Flat rail
		  ○ “V” rail
		• Carriage
		  ○ Bed skids
		  ○ Knees
		  ○ Dogs
		  ○ Tapers
		• Set works
		• Carriage wheels
		  ○ Scrapers
		• Related parts

4.	Describe bearing inspection	• Adjustment ○ Clearance • Lubrication • Assembly and installation • Types
5.	Check wheel balance	• Static • Dynamic

6.	Inspect guides and ways	• Alignment
		  ○ Crossline guides
		• Ways
		• Types
		  ○ Conventional
		  ○ Pressure
		  ○ Cartridge type

7.	Perform maintenance of band mill components	• Demonstrate maintenance of band mill components • Demonstrate inspection of bearings • Demonstrate checking wheel balance • Demonstrate inspection of guides and ways

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will maintain band mill components, inspect bearings, check wheel balance and inspect guides and ways.
Conditions	The learner will be given: • Band mill components • Required tools, equipment and materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Safety requirements followed • Correct use of the proper tools and equipment • Maintenance, inspection and checks of band mill components are to manufacturers' standards

LINE (GAC): Q BAND MILLS

Competency: Q8 Perform Band Mill Production Shift Inspections

Objectives

To be competent in this area, the individual must be able to:

- Explain the concepts of band mill production shift inspections.
- Carry out band mill production shift inspections.

LEARNING TASKS	CONTENT
1. Describe guide care and maintenance	• Purpose • Materials • Replacement • Set-up • Resurfacing • Tools and equipment
2. Describe coolant systems care and maintenance	• Purpose • Types • Nozzles
3. Describe shearboard care and maintenance	• Purpose • Material • Wear and maintenance • Adjustment
4. Describe wheel scrapers care and maintenance	• Purpose • Material • Angles • Counterweights • Wheel cleanliness
5. Describe rim cleaners	• Materials • Shape • Size
6. Perform band mill production shift inspections	• Demonstrate band mill production shift inspections

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will conduct band mill production shift inspections.
Conditions	The learner will be given: • Required tools, equipment and materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Safety requirements followed • Correct use of the proper tools and equipment • Inspection and maintenance of procedures are to mill standards

LINE (GAC): Q BAND MILLS

Competency: Q9 Maintain Strain Systems

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of strain system maintenance.
- Maintain strain systems.

LEARNING TASKS	CONTENT
1. Describe types of strain systems	• Weight and lever • Hydraulic and accumulator • Air diaphragm • Air spring • Air spring and levers • Steel spring • Rubber spring/block
2. Describe strain points and sockets	• Angles • Hardness • Maintenance
3. Describe maintenance points	• Check list • Manufacturers' recommendations
4. Calculate required strain on conventional systems	• Hydraulic • Mechanical • Air diaphragm • Rubber spring/block
5. Maintain strain systems	• Demonstrate maintenance of strain systems

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will maintain strain systems.
Conditions	The learner will be given: • Variety of strain systems • Required tools, equipment and materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Safety requirements followed • Correct use of the proper tools and equipment • Maintenance procedures are to manufacturers' standards

LINE (GAC): Q BAND MILLS

Competency: Q10 Perform Band Mill Wheel Grinding

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of band mill wheel grinding.
- Grind band mill wheels.

LEARNING TASKS	CONTENT
1. Describe safety procedures for grinding band mill wheels	• Follow live lock-out procedures • Personal safety equipment • Machine safety equipment • Working on live machinery • Determine wheel thickness for grinding (WorkSafe BC)
2. Describe band mill preparation	• Lock-out • Blowdown • Removal of guides • Removal of shearboards • Removal of scrapers • Locked strain • Locked tilt • Power head or ribbons • Solid installation

3. Describe grinder preparation	• Clean
	• Square end brackets
	• Screws
	• Barrel screw
	• Head
	• Power head
	• Remote control unit
	• Bearnings
	• Grinding wheel
	  ○ Resinoid
	  ○ Size
	  ○ Ceramic

4.	Describe grinding band mill wheels	• Tape wheels (Pi Tape)
		• Determine wear
		• Scribe line
		• Mount grinder
		  ○ Secure
		  ○ Free of vibration
		• Align barrel with wheel
		• Precision square
		• Mount grinding head or power head
		• Adjust as necessary
		• Recheck all measurements
		• Recheck all installations
		• Grind
		• Retape (Pi tape)
		• Brick edges

5.	Describe wheel face	• Flat
		• Crowned
		  ○ Position
		• Edge measurements
		  ○ 1 in. from all edges
		• Log all measurements

6.	Perform band mill wheel grinding	• Demonstrate band mill preparation • Demonstrate grinder preparation • Demonstrate grinding band mill wheels

Achievement Criteria

Performance	Under the direction of a licensed journeyperson on the job, the learner will prepare band mills and grinders, and then grind band mill wheels.
Conditions	The learner will be given: • Various band mills • Various grinders • Other required tools, equipment, materials
Criteria	The learner will score 70% or better on a rating checklist that reflects the following criteria: • Safety requirements followed • Correct use of the proper tools and equipment • Preparation and grinding are to manufacturer standards

LINE (GAC): R QUALITY CONTROL

Competency: R1 Describe Quality Control Systems

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of quality control systems.

LEARNING TASKS	CONTENT
1. Describe systematic objectives and the importance of quality control	• Establish sizing targets • Ensure that size targets are being met • Aid in correcting size and sawing problems • Provide a decision making tool • Recognize machine induce lumber defects
2. Identify size control program	• Measure sawing variance for each machine • Prevent operating “out of control” • Aid in effective maintenance • Provide feedback to the filing room • Reduce lumber processing costs • Improve lumber recovery

LINE (GAC): R QUALITY CONTROL

Competency: R2 Identify Standards, Measuring Methods and Data

Objectives

To be competent in this area, the individual must be able to:

- Explain concepts of standards, measuring methods and data identification.

LEARNING TASKS	CONTENT
1. Describe main elements of an optimizing system	• Method to accurately locate and measure board geometry • Computer • Servo or other positioner • Transport system • Cutting system • Piece-count
2. Describe operating, calibrating and maintaining saw control systems	• Sensor • Oscilloscope • Alarms • Print outs • Screens • Amp draw systems

Section 4

TRAINING PROVIDER STANDARDS

Facility Requirements

Classroom Area

- 900 sq. ft. for a class size of 12 – 16 students, with moveable tables and chairs
- Instructional media to include multimedia projector, projection screen, DVD player and whiteboard

Shop Area

- 50 sq. ft. per student
- Well heated and ventilated
- 12 ft. high ceilings
- Lighting appropriate to detailed work

Lab Requirements

- N/A

Student Facilities

- N/A

Instructor's Office Space

- 150 sq. ft. per instructor, with desk and chairs and materials storage/filing cabinet

Tools and Equipment

Shop Equipment

Required

- Knives:
  - Chipper canter
  - Hog
  - Profile
  - Face mounted
  - Enclosed
  - Clamp type
  - Drum
  - Lily pad
  - Slabbing head rig
  - Veneer chipper
  - Planer
  - Molders
  - Waferizer
  - Straight thick knives
  - Straight thin knives
  - Bent knives
  - Dome tops
  - Counter knives
  - Key knives
- Power Tools:
  - Hand grinders
  - Uniplanes
  - Jockey grinders
- Hand Tools:
  - Wrenches:
    - Set
    - Bit and shank wrenches
    - Saw wrenches
    - Collar wrenches
  - Dolly
  - Hammers
    - Ball peen
    - Welding
    - Dog head
    - Cross face
    - Twist face
    - Forging
  - Forging tools
  - Upsets
  - Grinding jigs (dies and anvils)

  - Files
    - Flat
    - Mill bastard
    - Halfround
    - Round
    - Quadrangular
    - Circular
    - Triangular
  - Drift
  - Punches
  - Positioning tool
  - Brass brushes
  - Wire brush
  - Tweezers
- Portable Oxy-Acetylene Equipment:
  - Oxy-Acetylene Unit
  - Welding clamp
  - Tips
  - Torch
  - Gauges
  - Upset and forging tool
  - Welding rod
  - Tip cleaner and striker
  - Flux
  - Welding curtain
- Saw Blades (examples with different tips and requiring maintenance):
  - Circular
  - Band
  - Chain
- Swages:
  - Band saw
  - Hand and air
  - Circular saw
  - Hand and air
  - Shingle
- Anvils:
  - Steel
  - Soft
  - Hard faces
  - Crowned

- Measuring Tools and Gauges:
    - Protractor
    - Micrometer
    - Vernier calipers
    - Outside and inside calipers
    - Dial indicator
    - Alignment gauges
    - Straight edges
    - Circular convex / concave
    - Bandsaw tension gauge
    - Circular saw tension gauges
    - Back gauges
        - Solid steel
        - 3 point
        - Depth gauges
        - Wire gauges
        - Anvil setting gauges
        - V gauge
        - Steel tapes
        - Key steel
        - Machinist squares
        - Machinist levels
        - Plum bobs
        - Track jig
- Swage Maintenance Tools:
    - Anvils
    - Carbide
    - Carbon steel
    - Dies
    - Long bite
    - Short bite
    - Extra short bite
    - Clamp screws
    - Carbon steel
    - Carbide
- Shapers:
    - Band saw
    - Hand and air
    - Circular saw
    - Hand and air
    - #5700-C
    - #6900-C
    - #5500-S
- Saw Filing Tools and Equipment:
    - Gauge grinder
    - Filing clamps
    - Hand sharpeners
    - Stretcher rolls (36 in.)
    - Work benches
    - Bandmill wheel grinder

- Wheel Dressers:
    - Dressing brick
    - Vitrified and resinoid
    - Diamond stick
    - Metcalfe dresser
    - Desmond dresser
    - Universal dresser
    - Star dresser
    - Diamond profile dresser
    - Diamond wheel dressing jigs
    - CBN wheel dressing jigs
- Saw sets:
    - Hand
    - Hammer
    - Power
    - Swage and shaper
- Grinding Wheels:
    - Vitrified
    - Resinoid
    - Diamond
    - CBN
    - Ceramic
    - Knife grinding wheels
    - Cup
    - Cylinder
    - Straight
    - Profile
    - Segments
- Chain Saw Tools:
    - Files
    - Raker gauge
    - Chain breakers
    - Rivet punch
    - Special wrenches
- Leveling Slabs:
    - Circular slabs

Student Equipment (supplied by school)

Required

- Face shield
- Leather aprons
- Dust masks

Student Tools (supplied by student)

Required

- Safety toe workboots
- Hard hat
- Gloves
- Safety goggles and glasses
- Ear protection

Recommended

- Close-fitting pants, shirts and jackets

Reference Materials

Required Reference Materials

- Instructional materials for the Saw Fitter, Saw Filer and Benchperson trades (4 manuals) published by ITAC, 2002

Recommended Resources

- Saws - Design, Selection, Operation and Maintenance; ED M. Williston, Miller Freeman, ISBN 0-87930-221-6
- Sawmill Machinery Alignments; Julien Pleau, Forintek Canada Corp.; January 1997, ISBN 0-86488-522-1
- Wood Bandsaw Balde Manual; Uddenholm Strip Steel AB, 2001

NOTE:

This list of Reference Materials is for training providers. Apprentices should contact their preferred training provider for a list of recommended or required texts for this program.

Instructor Requirements

Occupation Qualification

The instructor must possess:

- Lumber Manufacturing Industry – Benchperson Certificate of Qualification, or
- Saw filer Certificate of Qualification with Benchperson endorsement

Work Experience

A minimum of ten years experience working in the industry as a Lumber Manufacturing – Benchperson, and/or Saw filer.

Instructional Experience and Education

It is preferred that the instructor also possesses one of the following:

- Provincial (BC) Instructor Diploma or completion of a similar trainer training or instructional methods program
- Two years of supervisory or administrative experience
- Demonstrated effectiveness of communication skills – instructional and interpersonal
- Experienced user of relevant software programs for:
    - Word processing
    - Spreadsheets
    - Presentations
    - CAD