Mass Timber
HR BLUEPRINT

2023

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Report Introduction

1.1 OBJECTIVE

The project seeks to achieve several objectives to support value added mass timber manufacturing jobs in the province of BC.

- ⮞ Develop baseline of unified job descriptions for mass timber related roles
- ⮞ Help standardize titles, roles, and responsibilities across the mass timber industry
- ⮞ Provide in-depth educational skill set description
- ⮞ Provide reference experience sets for intermediate and senior roles
- ⮞ Provide potential career paths into roles and beyond
- ⮞ Develop gap analysis for missing talent groups, skills sets, and availability of personnel
- ⮞ Provide overview for sourcing of personnel for these roles

The project has been funded by and developed in partnership with the Office of Mass Timber Implementation.

1.2 ABOUT THE AUTHORS

1.2.1 Whirlwind Consultants

An expert leader for mass timber business operations in North America. Whirlwind has managed the project roadmap, role descriptions, employment estimates, and recommendations. Whirlwind brings years of expertise in recruiting for legacy mass timber industries within the provinces of BC and has played a primary role in providing role descriptions, educational, and experience requirements along with overall report compilation and authoring.

1.2.2 Arbutus Search Group

Experienced recruitment firm specialized in mass timber staff working for multiple top North American manufacturers. Arbutus has refined role descriptions, general project research, and provided a primarily focus on gap analysis for the size of existing talent pools and sourcing of potential staff.

1.3 METHODOLOGY

The report worked with a variety of methodologies to develop different data points and in many areas, anecdotal experience for a relatively new start-up industry in North America. Whirlwind's industry experience, combined with a review by Arbutus Group, helped to develop job titles and job descriptions and address the general difficulty of sourcing for roles. Detailed job searches, including data export, tabulation and presentation, were performed through recruitment platforms, primary LinkedIn, and performed by the Arbutus search group. Further, labour gap analysis and what-if scenarios were extrapolated by Whirlwind based on industry experience in designing operational modern mass timber facilities. Recommendations were developed based on these experiences and further discussions within the working group, as well as with the Office of Mass Timber Implementation.

1.4 KEY TECHNOLOGIES

The report makes reference to a number of key technologies closely linked to the mass timber business space but not necessarily required in all definitions of the current business space. These technologies are seen as highly likely component requirements of a world-leading mass timber space for the future of the industry. While some may argue they are not currently standard practice or possibly poorly understood, the consultant believes these attributes are required to support an innovative, efficient and effective mass timber landscape in our environment. Key technologies and their relevance are discussed below.

1.4.1.   BIM

Building Information Modelling (BIM) is quickly becoming a standard practice across the construction industry. However, many "project-based" mass timber firms have been working with BIM for decades. These BIM models are 3D computer models detailing a digital blueprint of all components in the mass timber package, as well as interfaces with other materials in the buildings. These BIM models are required for Computer Numerically Controlled (CNC) machines to perform framing operations on timber pieces. This has led to a natural construction industry leadership of BIM technologies in the mass timber industry. BIM is required for successful mass timber project-based deployment. However, it has been difficult to access staff with both BIM and wood-based skill sets.

1.4.2.   Industry 4.0

Industry 4.0 speaks to the 4th industrial revolution, where the Internet of Things helps automated smart factories produce goods with minimal human intervention and consistent transfer of data from machine centre to machine centre to general operational overview. This allows perfect communication up and down the value chain, as well as the project lifecycle from sales to on-site project delivery. This data-driven environment allows for more efficient processing of goods and services, better production estimates and overall more accurate scheduling and reporting for the overall business operation. The further integration of these systems, the better the flow of information, and thus, product can occur in manufacturing environments. Industry 4.0 is the next step for off-site manufacturing, and mass timber is well-positioned to be an early leader in this space.

02

Mass Timber Labour Overview

Within the mass timber ecosystem there are several critical skill sets and job positions required to make the ecosystem, operations, and specific construction projects possible. As the industry continues to grow, there is an acute shortage of many of these technical roles and skill sets available in present day labour markets. This report seeks to help standardize a set of role descriptions and skill sets, identify key labour shortages, and provide viable pathways to fulfilment of these roles. The report also seeks to clearly illustrate the potential career path growth trajectory for those considering interest or employment in mass timber focused services. While the primary focus of this report is on the manufacturing environment for mass timber and direct support services, it is acknowledged that there is a an equally large, if not larger, array of support positions such as architects, engineers, code officials, technical support, installers, general contracts, and many more that are part of this ecosystem. However, the report focuses on what a mass timber business would require in most internal instances for successful operations. A secondary phase of work could consider the larger business environment and macro economics of the industry through this similar HR lens.

Job grouping has been broken down into the following primary and subcategories for role classification, reporting structure, and skill requirements. While each organization will have their own operational environment, this general structure should function to highlight different areas.
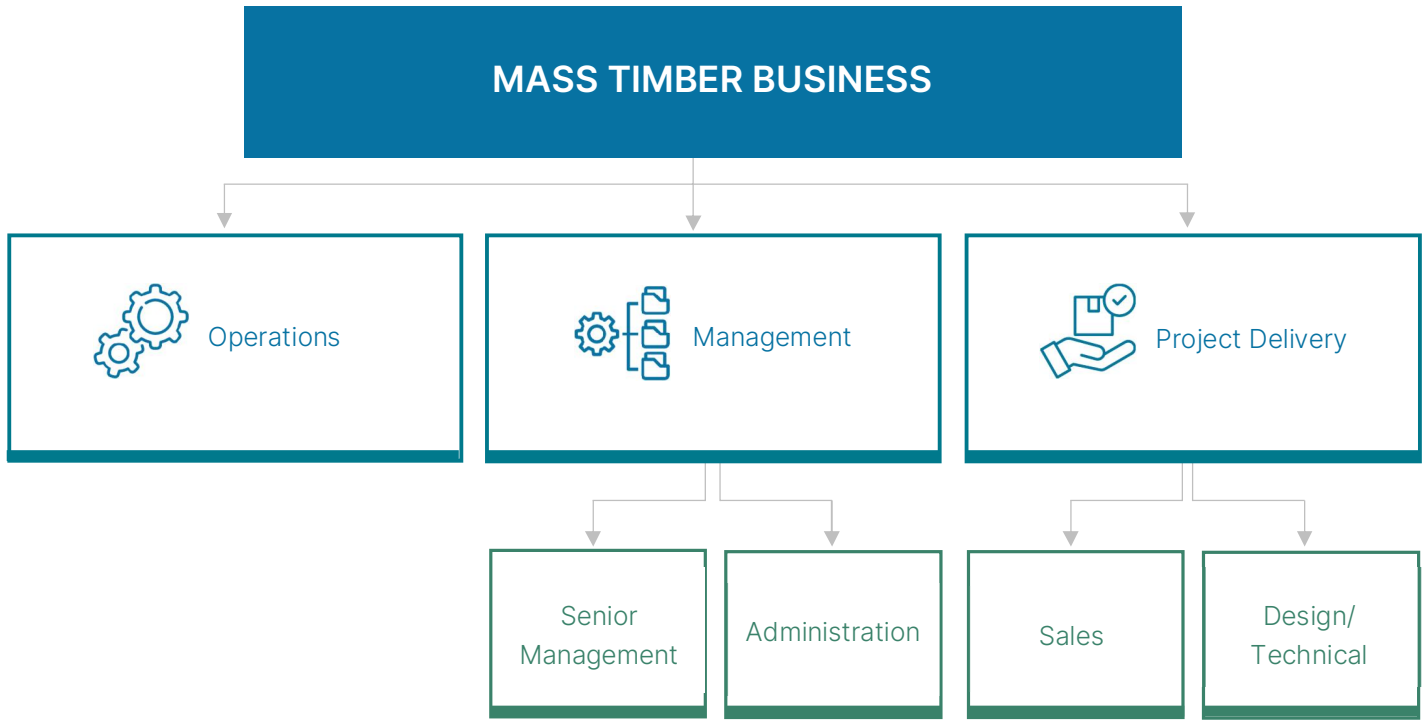
FIGURE 1 - OPERATIONAL STRUCTURE

2.1 REQUIRED ROLES

The high-level outline below covers a list of general roles with short descriptions of each. Section 3 covers select roles with full descriptions, competencies, experience, and desired educational backgrounds.

Certain roles within this list will be subject to the size of the organization, thus hierarchical roles, unless necessary, have been omitted. These would include various finance/accounting roles and directors of various technical groups or leaders or departments.

SELECT ROLES WITH FURTHER DESCRIPTIONS IN SECTION 3 ARE INDICATED WITH SYMBOLIC NOTE.

2.1.1. Operations

General Labour

Movement of materials, light processing of materials, light cleaning. On the job training provided.

Forklift Operator/ Transport Worker

Movement of materials with heavy machinery in tight locations, including nominal logistics management of goods. Required forklift certificate, specialty forklifts often used.

Timber Framer / Finisher

Specialty skill sets and knowledge of wood working, tool use, and safe techniques for task completion. Enhanced skill sets for higher level supervision and value-added operations.

[Full Description, Section 3]

Lumber Grader

Certified lumber grader to Canadian Mill Services Association standards (CMSA). Works with manual grading for entire production operation, or used for specialty spot checks, and quality assurance when digital auto grading system has issues.

Machine Operator

Modern facilities have several computer terminals for machine operations of the production equipment. Subject to each machine centre on-the-job training is provided for equipment operations. Specialty knowledge may or may not be critical to operations at specific machine centres. Overall process understanding and basic computer operation is required.

[Full Description, Section 3]

CNC Operator

Uses CNC code prepared by the CNC coder to run CNC machines within the facility to meet required outputs. Ensuring quality is met, setups performed properly and maintenance issues or troubleshooting accurately identified for further resolution.

[Full Description, Section 3]

Automation Engineer

The master operator for the production process in the plant, understands the full flow of goods through the facility, bottlenecks, and work planning for operations. Ensures that the day's quota of goods can be produced, and trouble shoots process during operations to achieve output requirements. They are responsible for the installation, setup, and maintenance of the systems as related to industry 4.0 principals.

[Full Description, Section 3]

Logistics

Arranges transportation of incoming and outgoing goods, with specific focus on optimized transportation and storage patterns to minimize cost, time, and quality loss issues.

Purchasing

Working with standardized and specialty vendors integrated into Enterprise Resource Planning purchasing systems to ensure efficient delivery of goods and services to the organization.

Maintenance Management

Preventative maintenance scheduling, parts inventory, and total downtime mitigation with integration of maintenance teams and appropriate management.

Maintenance Millwright

Member of the Maintenance department responsible for installing, lining up, maintaining, repairing, troubleshooting and, when necessary, dismantling machinery, conveyor systems, pulleys, compressors, gear boxes, hydraulic and pneumatic control systems. Work requires practical skill and knowledge and journey-level skill as a Millwright.

Industrial Electrician

Systems electrician for integrated power systems, including knowledge of PCL controls, mechatronics systems, encoders, spindles, and modern power standards. Specialty training for complex system integration and management.

[Full Description, Section 3]

Quality Control

Understanding of wood science, statistics, production systems product standard and total quality management processes along with comprehensions and strong organization for codes and standards to follow required protocols.

[Full Description, Section 3]

Production Managers

Can refer to two type of managers, staff management and equipment management. Staff management should have a good overview of timber framing and process principals with an understanding of capabilities and benchmarks. Equipment management overseas a more technical range including weekly production planning, logistics optimization and pairing these two requirements with shifting and maintenance planning. Ideally component leaders who can understand and marry these two groups.

[Full Description, Section 3]

2.1.2. Project Delivery

Sales Director

Oversight of a team of sales staff, high level corporate negotiation, contract understanding, and project development. Ability to manage an integrated sales team and work as top negotiator in contract completion.

[Full Description, Section 3]

Technical Director

Oversight of all technical design, specification, and product development for the company. Heavy integration with sales teams, fabrication design, and quality control.

[Full Description, Section 3]

SALES ENGINEER

Technical background in mass timber engineering, architecture, construction, design or estimating. Ability to speak to mass timber requirements and project impacts providing basic Design for Manufacturing and Assembly, DfMA assistance.

[Full Description, Section 3]

Business Analyst

Gathering and reporting production, sales, and overall business operations data in a coherent and insightful manner to increase leadership's ability to perform data-based management for the organization.

[Full Description, Section 3]

Fabrication Designer / Detailer

Responsible for the development of fabrication level building information models (BIM), typically produced from combining 2D architectural and structural drawings into the production focused BIM model. Technical knowledge of timber detailing, production standards, tolerances, and construction processes along with basic project management required.

[Full Description, Section 3]

CNC Coder

Knowledge of mass timber detailing standards, timber material properties, machine controls, tool maintenance, processing optimization, and preferably baseline understanding of mechatronics or timber framing.

[Full Description, Section 3]

Project Manager

Acting as a manufacturing construction project manager with specific scope to mass timber components, understanding of mass timber construction principals, logistics, dynamic schedules, and 3D modelling critical to success, while being able to integrate with general construction services, providing insights and solutions to project problems and communicating clearly to all stakeholders.

[Full Description, Section 3]

Estimator

Ability to read blueprints, work with baseline 3D models, and do accurate quantity take-offs. Mass timber product and construction knowledge to identify primary problems and highlight them for future resolution.

[Full Description, Section 3]

2.1.3. Administration

CEO

Competent team leader with a strong understanding of integrated business systems, covering the complexity of construction sales projects backed by wood focused manufacturing environments. The leader should be visionary in organising people, equipment processing, and business structure alignment.

CFO

Strong understanding of cost reporting, cash-flow analysis with integration to operational and business structure impacts. Contract law, liability, significant and payment terms experience an asset.

COO

Strong team leadership and deep understanding of complex integrated systems for optimization between people, equipment, and sales. Clear communication to what is required for successful outcomes and how to adapt to changing environments.

IT Infrastructure Specialist

Enhanced IT infrastructure with knowledge of Enterprise Resource Planning software sets, and enabling flawless data and permission rights throughout the organization while simplifying work process operations

[Full Description, Section 3]

Accounting Clerk

Process data entry and accounting information through ERP systems, multiple specific positions in similar but varied roles.

2.2 SKILL SET MATRIX

A skill set matrix for typical skills and their relation to various departments is illustrated below. These represent generally desired skill sets required in each department for effective operations, understanding, and communications throughout the organization.

Specialty mass timber skill sets highlighted.

TABLE 1 SKILL SET MATRIX

Skill Set	Operations	Senior Management	Administration	Design / Technical	Sales
			Department		
Project Management	X		X		
Timber Engineering					X
Architectural Design					X
Construction Management			X		X
Supply Chain Management		X	X		
Financial Analysis			X	X	
Budgeting and Cost Control		X	X	X	X
Sustainability and Green Building Practices			X		X
Regulatory Compliance		X	X		X
Risk Assessment and Mitigation			X		X
Quality Control and Assurance		X	X		
Health and Safety Management		X	X		
Procurement and Vendor Management		X			X
Market Research and Analysis		X			X
Sales and Marketing			X		X
Business Development					
Strategic Planning			X		
Team Leadership and Management		X	X	X	X
Stakeholder Relationship Management		X	X		X
Environmental Impact Assessment					X
Timber Procurement and Sourcing		X	X		
Logistics and Transportation		X			X
Technology Integration and Automation		X	X	X	X
Continuous Improvement / Lean Manufacturing		X	X		

2.3 MASS TIMBER BASICS – ORGANIZATIONAL SKILL SET

It is relatively important that within a functional mass timber production operation, roles are either defined within a strict set of boundary conditions and rules regarding how to perform a specific job, or team members have a strong understanding of the integration of their role within the organization and how their actions will affect other team members, processes, and final project delivery. As the industry in North America is still quite young with dynamic project types and adaptations coming in the market each year, it is believed that developing a strong understanding of the organizational structure, functional groups, and general business operations is important for all team members to contribute to their best aptitude. This also allows internal team members a better understanding of career advancement opportunities within the organization, or industry as a whole. The following outline provides an overview of recommended cross functional basics of mass timber for any team member to understand.

For the following knowledge items, team members are not expected to have expert level training, however they should understand the basic concepts behind each one and know within their team where to access more information, or who would be proficient in a given area. Within Management roles and Project Delivery teams, it is recommended to have a basic understanding of the following skill attribute areas:

2.3.1. Mass Timber Fundamentals

While it may not be required that every role in the company understands these principles, it does have a strong alignment with the business operations of the company and outline to a degree why the company is likely in business and what purpose it serves. Therefore, all staff should at least have a fundamental knowledge of the following topics.

- ⮱ Wood Science Basics
  - ▪ Tree growth
  - ▪ Common species
  - ▪ Lumber milling process
  - ▪ Wood drying & shrinkage
  - ▪ Lumber measurements
  - ▪ Wood decay
- ⮱ What is Glulam
- ⮱ What is CLT
- ⮱ What is a mass timber building system?
- ⮱ What is Industry 4.0

2.3.2. Estimating and Bidding

Specific to project delivery dealing with providing quotes on new project work and ensuring that awarded quotes are functional for the rest of the team. It is important for all team members to have a basic understanding of how other departments work and thus, increase their ability to provide outputs that are conducive to overall efficiency throughout the organization.

- Reading Blueprints
  - Plan view drawings for beams & columns
  - Plan views for panel types and layout direction
  - Elevations
  - Section views and details
  - Specs and general notes – Engineering details
- Software Takeoffs
  - General navigation with software
  - Scaling tools
  - QTY takeoffs for primary elements (wood)
  - QTY takeoffs for secondary elements (hardware)
  - Take and steel calcs for custom steel
  - Detail markups of included/ excluded scope
  - General guidelines for what is in mass timber scope and what is outside
- QTY take-offs from 3D models
  - Generic models and import processes between software
  - Exporting data and understanding variables
    - Updating material properties for export
  - Basic model component properties
    - Gridlines
    - Adding components
    - Material Types
    - Naming conventions
    - Work point nodes
  - Steel Exports for quote
  - Views, 3D exports
- Sales Template Inputs & Navigation
  - How to input Glulam and all of the grades/ configurations

- How to input CLT and billet lists, understanding nesting & waste factors
- Input of machine time estimates for pieces and understanding its impact
- Input of Hardware/ steel
- Lumber purchasing and quote attainment
- Estimation or Quotation of Detailing, Engineering and Assembly services
- Special Items, finishes, Pressure treating etc., General knowledge.
- Understanding Summary Stats and Projects stats, what is good and what is an indicator of a poor project?
- Understanding of costs to manufacture and value of materials.
- Bid proposal languages and specs

- Price Sourcing
  - Lumber
  - Freight
  - Steel/Hardware
  - Engineering
  - Specialty Items

- Proposal Estimates (Tenders) VS. Budgets
  - Start as Tender, and back tracks to budget, how to address - > Communicate

- Communication & Integration with organizational teams
  - Sales
  - Fabrication Design/ Detailing
  - Project Management
  - Admin
  - Production

- Sold Project Setup
  - How to make a sold project official within company processes

- Thought Principles of mass timber Costing
  - Ability to describe standard sales metrics, how they relate to project success and factors that might positively or negatively affect both sales and project deployment

2.3.3. Quality Control (Operations)

Quality control is a critical backbone to any mass timber operation, and in most cases they are legally required to meet certain production standard such as CSA 0177 for glulam fabrication to produce building code compliant products. Ideally quality control extends beyond simply meeting code standards though and extends to enhancing business efficiency, and customer satisfaction. The right piece of wood needs to get to the right place on site at the right time, this is essentially what is being sold to the client.

- Dimensioning of single piece shop drawings
  - Creating dimensions that are measurable
  - Over dimensioning
  - Dimensioning in a system that works for quick measurements
- Glulam manufacturing process
  - Glulam strength properties in each direction
  - Understand shear perp to grain failure mechanisms
- CLT manufacturing process
  - Size limits on CLT
  - Methods to reduce surface gaps/ checking
  - Basic understanding of bonding principles
  - Wood fibre direction strengths and weaknesses
- Shrinking, swelling and moisture input implications on different products
- Hardware and fastener naming
  - Typical failure mechanisms for fasteners in wood.
- Species of wood used, and baseline properties associated
- Custom steel fabrication process, from detailing to supplier, to receiving quality control and ship out
  - Steel weld call outs
  - Measuring dims on custom steel
  - Costs and weights from drawings to real life
- Rough costs/ weight/ effort in remaking glulam/ CLT if something is incorrect

2.3.4. Manufacturing

While manufacturing is the core of operations many processes have typically been streamlined to strict rule-based manufacturing. How these rules work, where they can be found and their implications on business processes are important to understand for any attempts at business improvement, or production of unique projects. As mass timber is still a rather nascent industry this is likely a helpful culture set and staff understanding to have.

- ➲ Mass timber product process overview (specific to the business)
- ➲ CNC Framing
  - ▪ Understanding critical dimensions on pcs vs. variable dims, or less critical items
- ➲ CNC machine variances in framing and impacts on detailing to consider
  - ▪ Each specific machine has specific performance attributes to understand at a high level
- ➲ Hardware / fastener installation guides and tips – how to provide proper direction to the shop
- ➲ Installing screws
  - ▪ Grab some sample pieces and run screws into them – see how they shear off if over tightened
  - ▪ Installation of pre-engineered connections, layout & minimum of 5 screws installed.
- ➲ Hand framing Clean up
  - ▪ Demonstration/ photos of pieces that need clean up
    - ▪ Chainsaw work
    - ▪ Chisel work/ square out
    - ▪ Chamfer edges for steel fit

2.3.5. Fabrication Design (Detailing)

One of the more complex realms of mass timber project delivery fabrication designers must have a strong understanding of all of the processes outlined in the rest of this training guideline. Every element they produce in their 3D model must have attributes aligned with the organization's manufacturing principles. If they are not aligned, they need to be identified, rectified and aligned with what the company can effectively produce. It is also important for staff in other areas of the company to understand the fabrication design process and impacts of changes, or ways to further simplify their job.

- ➲ Production of 3D models from 2D drawings, Geometry
  - ▪ Gridlines
  - ▪ 3D Elements
  - ▪ Product Attributes

- Connection Detailing
  - Modelling for fasteners
  - Modelling for Custom steel
  - Modelling for Pre-engineered steel
- CNC Machine Principles
  - CNC Capabilities Outline
  - Design for Machine Operations
  - Design for Hand Framing
  - Reference Datum – 0 to Face & 0 to Top, etc.
- Approval Drawings 2D
  - Standardized Views & Layout
  - Dimensioning Standards
  - Detail View Layouts & Standards
  - Clouding & Bringing attention to areas of issue
- Single Piece Shop Drawings
  - Dimensioning standards
  - Shop installed components
- Job Setups and Export Lists
- RFI (Request for Information) Management
- Communication methods
- Schedule control and risk mitigation
- Issued for Fabrication process and implications – Sending an approved job to production

2.3.6. Project Management

Project managers often function as the internal customer, or client representative within the company. They are responsible for ensuring the client gets what they wanted, when they wanted, while being on budget. This means they need a strong understanding of how the process works, where risks might exist and how to trouble shoot or mitigate any number of potential problems that may arise with the project.

- Product Fit & Finish

  Define good product fit and finish, what should client expectations be, how can issues be managed?

- Product Shipping & Logistics

  Define interfaces for shipping & logistics, common issues from customer, and how to rectify issues on the fly

- Comprehensive Understanding of Project Success Metrics

  What attributes drive a project to be considered successfully completed, how does these items interact and balance?

  - Quality – What does quality mean? What are the requirements for quality?

  - Schedule – What is a schedule commitment? How is it maintained? How is updated and how is it communicated? What impacts does this have within the organization and to our customers?

  - Costs – What are the major cost centres on our projects? What levers do we have to prevent / control costs in each area? What constitutes a change order?

- Project Schedules

- Project Submittals

- Contract Language

- Risk Management

  - RFI Support and expediting methods

  - Milestone deliverables internal and external

- Customer Communication

- Conflict Mitigation

- Contract Negotiation

- Navigating loose project input information sets

- Standard PM pinch points to address

  - Revise & Resubmit schedule for drawings

  - Late schedule start

  - Missing design information

  - Integration with 3D Fabrication ready steel Model

  - BIM model integration

  - MEP (Mechanical Electrical Plumbing) integration

  - Site Damages

    - Back charges and documentation

  - Shipping communication

2.3.7. Sales

Sales teams required a general understanding of all of the above training principles, and should be able to speak knowledgably to each topic. Along with this it is important that sales leaders can help resolve customer issues and provide solutions in sync with the rest of the business entity. It is important for other business functional groups to understand how sales works to be able to provide solution sets that function within the overall organization.

- Communication Skills
  - Active listening
  - Written skills
  - Customer empathy
  - Schedule commitments
  - Sticky questions
- Technical & Product Knowledge
  - General building construction
  - Blueprint reading
  - Gravity load design
  - Lateral load design
  - CLT
    - Manufacturing principles
    - Costing associations
  - Glulam
    - Manufacturing principles
    - Costing associations
  - Steel Connections
    - Types
    - Costing and design implementations
- Sales & Business Development
  - Leadership
  - Negotiation skills

03

Detailed Role Descriptions/ Job Profiles

The following roles are deemed critical mass timber-specific, with the large array being defined in Section 2. While base skill sets may come from similar cross-industries, these specific roles are either in short skill set supply or have a variety of highly specific mass timber-related training required to successfully run an operation. These roles have been detailed to allow greater development within academic/trade training arenas, assist potential employers in cross reference, and further develop in-house position descriptions.

A standard template has been used across all roles with low-level descriptions, including suggested titles, availability, mass timber specifics, estimated salary range, training, and NOC (National Occupation Classifications) and TEER (Training, Education, Experiences and Responsibility) levels expected with the specific position.

3.1 TIMBER FRAMER / FINISHER

Training Level	Low - Medium	Canadian Avail.	Low	Global Avail.	Medium
Location	Factory	Experience Level	Low - Medium	Salary Range	$55 - 80 k
Alternative Titles				Reporting	Operations

Framing Operator, Timber Finisher, Carpenter, Framing Labourer

Job Description

Working on the production floor, the Timber Framer completes all final part processes after CNC machine operations. CNC machines may complete 80-95% of operations, but often, there are portions to be timber framed with large tools or complete operations with hand tools. Duties typically include timber framing with power or hand tools, installation of pre-assembled connections, test fitting of connections, QC sign-offs, and finishing of elements with hand touch-ups, patches, and sanding, including potential coatings.

Larger operations may develop standardized processes broken out into different tool / skill groups — with Timber Framers being fewer and more advanced and Finishers being less skilled and only performing specific standard tasks.

Mass Timber Specifics

The production environment will require a variety of timber frame skill levels to keep a facility running adequately. While several team members can be intermediate finishers and framers, there will need to have at least one to two expert timber framers on staff.

- Knowledge of wood working principles
- Joinery Techniques

- Knowledge of product grades, strengths, applications
- 3D modelling navigation / computer use
- Knowledge of connection principles
- Hand / Power tools & safety

Core Competencies

- Attention to detail
- Ability to read shop drawings
- Safety when working with tools

NOC & TEER

- 75119 Other trades helpers and labourers –TEER 5
- 72310 Carpenters – TEER 2

Training / Education

In North America, training is often offered on the job as candidates advance through various levels of finishing and tool users training certifications. Formal training is available from the timber framer's guild, specific trade schools in North America and many general trade schools in Europe.

While a journeyman carpenter could be beneficial, their skills are generally not focused on mass timber.

Experience

Ideally, it requires more than two years of experience. However, no experience is required if both the staff and employer are willing to train. Timber framer floor managers should have more than five years of experience and formal training in carpentry or timber framing.

3.2 AUTOMATION ENGINEER

Training Level	Medium - High	Canadian Avail.	Low	Global Avail.	Medium
Location	Factory	Experience Level	Low - Medium	Salary Range	$70 - 90 k
Alternative Titles				Reporting	Operations

Production Analyst, Automation Specialist, Process Engineer, Production leader

Job Description

The Automation Engineer is the master operator of the production process in the plant and understands the full flow of goods through the facility, bottlenecks, and work planning for operations. Ensures that the day's quotas of goods can be produced for production KPIs, and continuously works to achieve uninterrupted production. Troubleshoot processes during operations to achieve output requirements, including both mechanical and programming issues in equipment.

Uses company-based production control systems to map project production planning to equipment lines, taking into account logistics optimizations to reduce downtime.

For larger operations, an expanded role of PCS (Production Control System) Engineer exists to oversee the entire digital and machinery operation and synchronization. Ensuring the system is properly designed and operational to deliver real-time, reliable solutions and production insights.

Mass Timber Specifics

Understanding of project delivery processes, monthly production and financial targets and integration with day-to-day production operations.

- Process optimization
- Logistics planning of materials

- Mass timber product production process

Core Competencies

- Attention to detail
- Balancing of multiple KPI metrics
- Process optimization to minimize downtime

NOC & TEER

21321 Industrial Manufacturing Engineers - TEER 1

22301 Mechanical Eng. Technologists – TEER 2

Training / Education

Junior Candidates: Mechatronics tech diploma

Ideal / Senior Candidates:

- Computer science, production automation, or industrial engineering degree

Production Control System, PLC, and PC programming knowledge

Experience

Ideally experienced with operations of the facility as a machine operator, lead hand, or "mechatronics" technician. Five years of experience in production line environments, computer systems and machinery integration required.

3.3 MACHINE OPERATOR

Training Level	Low	**Canadian Avail.**	Medium	**Global Avail.**	High
Location	Factory	**Experience Level**	Low	**Salary Range**	$50 - 75 K
Alternative Titles				**Reporting**	Operations

Equipment operator, Production technician, Operator

Job Description

The Machine Operator is part of a team of operators and will be responsible for overseeing and managing the successful operations of production machinery on a scheduled basis. This role includes pre-shift inspections, lubrication, equipment cleaning, safety, quality control, and calibration checks. Machine Operator would include such roles as a grading line operator, press operator, planer operator, or several other specific pieces of machinery.

Attention to detail, work preparation, and lean manufacturing concepts are key to success and advancement in the role.

Mass Timber Specifics

- Basic wood properties knowledge
- Production process knowledge
- Lumber grading a significant benefit

Core Competencies	NOC & TEER
- Following protocols - Safety - Basic computer operational skills - Team player - Communication	94120 Sawmill machine operator – TEER 4

Training / Education

A technical diploma or degree in CNC Programming, Computer-Aided Design (CAD), Manufacturing Technology, or a related field is preferred.

Certification in CNC programming software, such as _____ or similar, is highly advantageous.

Additional training in mass timber manufacturing processes, CNC machine operation, and safety protocols is beneficial.

On-the-job training is usually provided.

Experience

More than two years of experience in a similar production environment is recommended with automated equipment and production processes.

3.4 CNC OPERATOR

Training Level	Low - Medium	Canadian Avail.	Moderate	Global Avail.	Moderate
Location	Factory	Experience Level	Low - moderate	Salary Range	$60 – 80 k
Alternative Titles				Reporting	Operations

Advanced Machine Operator, CNC Technician

Job Description

The CNC Operator manages cutting files at a specific CNC site, ensuring that machine-cut files match input materials, controlling and monitoring cutting speed, quality and maintenance. This often includes calibration and basic troubleshooting of the machine while optimizing cutting processes for the best output results.

Mass Timber Specifics

- Tool path calculations and loading
- Wood science basics
- Timber framing processes
- Mechatronics comprehension
- Cutter head knife loading
- Tool sharpening

Core Competencies	NOC & TEER
- Technical troubleshooting - Quality control	94129 Wood processing machine operators – TEER 4

Training / Education

A technical diploma or degree in CNC Programming, Computer-Aided Design (CAD), Manufacturing Technology, or a related field is preferred.

Certification in CNC programming software, such as _____ or similar, is highly advantageous.

Additional training in mass timber manufacturing processes, CNC machine operation, and safety protocols is beneficial.

On-the-job training is usually provided.

Experience

Minimum of two years of experience in timber hand framing, or CNC equipment operation.

3.5 INDUSTRIAL ELECTRICIAN

Training Level	Medium - High	**Canadian Avail.**	High	**Global Avail.**	High
Location	Factory	**Experience Level**	Medium	**Salary Range**	$75 – 110K
Alternative Titles				**Reporting**	Operations

Maintenance Electrician, Manufacturing Plant Electrician

Job Description

The Industrial Electrician will be responsible for ensuring the proper functioning and maintenance of electrical systems and equipment within the manufacturing facility. The Industrial Electrician will play a vital role in minimizing downtime, maximizing productivity, and ensuring a safe working environment. The role entails the installation of new, modified, and repaired equipment, maintenance, testing, troubleshooting and repair of industrial electrical equipment and associated electrical and electronic controls for sequenced and automated industrial manufacturing equipment.

Familiarity with safety codes and regulations is critical while being professional, technical, and mechanically proficient.

Mass Timber Specifics

Minimal mass timber specifics are required for this role. However, an understanding of complex integrated control systems, as well as both European and North American power and electrical wiring standards, is required.

- Complex control systems
- European and North American standards

Core Competencies

- Safety & lock out procedures
- Procurement relations
- Problem solving
- Ability to read schematics and blueprints

NOC & TEER

72201 Industrial Electrician – TEER 2

94203 Assembler, fabricators, industrial electrical motors and transformers – TEER 4

Training / Education

Completion of an apprenticeship program in electrical maintenance or a related field is required.

Experience

Minimum of three to five years of experience as a maintenance electrician in an industrial or manufacturing environment. Experience working with electrical systems and equipment specific to mechatronics, sawmill processing, or mass timber is a plus. Proficiency in reading electrical schematics and using diagnostic tools is required.

3.6 QUALITY CONTROL

Training Level	Medium - high	Canadian Avail.	Low	Global Avail.	Low
Location	Factory	Experience Level	Medium	Salary Range	$65 - 120K
Alternative Titles				Reporting	Operations

Quality Assurance, Quality Analyst, Standards Manager

Job Description

The Quality Control personnel will be responsible for ensuring the highest level of quality and adherence to standards throughout the mass timber manufacturing process. The Quality Control professional will collaborate with various teams to implement quality control measures, perform daily inspections, quality control processes per standard, and maintain product reports and statistical records.

Quality control represents total quality processes, including standard conformance as well as final fit and finish of product to customer satisfaction.

Mass Timber Specifics

Strong understanding of mass timber manufacturing processes and wood science details. A specific focus is typically on finger jointing tension tests and surface bond delamination quality tests.
- Familiar with Mass timber production standards (PRG-320, CSA o122, etc)
- Wood Science specifics

- Mass timber construction principles
- Industry 4.0 digital management principles

Core Competencies

- Statistical analysis
- MS Excel
- Documentation, Reporting

NOC & TEER

94123 Lumber grades and other wood processing inspectors – TEER 4
22302 Industrial engineering and manufacturing technologists and technicians – TEER 2
21321 Industrial and Manufacturing Engineers – TEER 1

Training / Education

A bachelor's degree in Engineering, Wood Science, Quality Management, or a related field is preferred.
Additional certifications or training in quality control, lean manufacturing, or mass timber technologies are advantageous.

Experience

A lumber grading certificate is a benefit.
Minimum of three to five years of experience in quality control or assurance, preferably in the manufacturing industry.
Experience in the wood products industry, specifically in mass timber manufacturing, is highly desirable.
Proficiency in using quality control tools and techniques, such as statistical process control (SPC) and root cause analysis, is a plus.

3.7 PRODUCTION MANAGERS

Training Level	Medium - High	Canadian Avail.	Low	Global Avail.	Low
Location	Factory	Experience Level	Medium	Salary Range	$100-160K
Alternative Titles				Reporting	Operations

Operations Manager, Manufacturing Manager, Plant Manager

Job Description

The Production Manager will be responsible for overseeing and optimizing the mass timber production process to ensure efficient operations, high-quality output, and timely delivery. The Production Manager will lead a team of production personnel, collaborate with various departments, and drive continuous improvement initiatives. The Production Manager will be a strong driver of key performance indicators (KPIs) and rallying the team around key targets while providing valuable feedback and continuous improvement communications to the rest of the organizational team to refine sales and production standards.

Mass Timber Specifics

Having a comprehensive overview of all mass timber manufacturing processes from sales to customer delivery. Understanding in-depth how production processes can impact and improve overall product delivery experiences.
- Lumber grading
- Sawmill processing
- Finger Jointing
- Production Control Systems

- Timber Framing
- CNC Operations
- Lean manufacturing
- Lumber Planing

Core Competencies

- Safety
- Statistical control
- Communication
- Team leadership

NOC & TEER

70012 Facility operation and maintenance managers – TEER 0
90010 Manufacturing Managers – TEER 0
92024 Supervisors, other products manufacturing and assembly – TEER 2

Training / Education

Bachelor's degree in Engineering, Operations Management, Manufacturing, or a related field is preferred. Additional certifications or training in lean manufacturing, production planning, or mass timber technologies are advantageous.

Experience

Minimum of five to seven years of experience in production management, preferably in the wood products or manufacturing industry.
Proven track record of successfully managing mass timber production processes and leading production teams. Strong knowledge of lean manufacturing principles and continuous improvement methodologies.

3.8 SALES DIRECTOR

Training Level	Medium - High	Canadian Avail.	Moderate	Global Avail.	High
Location	Office / Remote	Experience Level	High	Salary Range	$90-160K
Alternative Titles				Reporting	Sales & Operations

Mass Timber Specialist, Mass Timber Regional Manager, Project Delivery Manager, Sales Manager

Job Description

The Sales Director oversees a regional division of sales staff for the operation. Working with specific sales strategies, relationship development, and regional market trends to continue to drive sales growth. The Sales Director ensures that regional client support, technical requirements, and project bidding are met while developing and implementing sales strategies and leading a high-performing sales team. The Sales Director will collaborate with clients, architects, engineers, and other stakeholders to promote our mass timber products and expand our market presence. Forward-thinking ability to remove technical barriers and develop conceptual solutions is a strong asset.

Mass Timber Specifics

Has developed a core understanding of business operations and the given business model to successfully provide mass timber projects to market on both the client's and operation's terms.

- Mass timber technical basics
- Product specification
- Industry standards

- Design for durability

Core Competencies

- Relationship building
- Team leadership
- Understanding of sales impacts on production

NOC & TEER

60010 Corporate sales manager – TEER 0

Training / Education

Bachelor's degree in Business, Marketing, Engineering, Architecture, or a related field is preferred.
Additional certifications or training in sales, business development, or the mass timber industry are advantageous.

Experience

Multiple years of experience in Mass timber project delivery, ideally with a base technical background in one of the core areas of mass timber project development.
Proven track record of driving sales growth and achieving sales targets.
Experience in the construction, building materials or timber industry is highly desirable.

3.9 TECHNICAL DIRECTOR

Training Level	Medium - High	Canadian Avail.	Moderate	Global Avail.	High
Location	Office / Remote	Experience Level	High	Salary Range	$90-160K
Alternative Titles				Reporting	Sales & Operations

Director Engineering, Timber Engineer Lead

Job Description

The Technical Director may directly oversee an arm of sales, estimating or fabrication design, or stand alone as a key technical support role. The Technical Director is responsible for the organization's product development, certification, testing, and development of all technical materials (design guides, span tables, and product reports). The Technical Director will need to work well with integrated teams and be able to explain and expand on complex systems in simple terms to communicate effectively within and beyond the organization.

Mass Timber Specifics

Has developed a core understanding of business operations and the given business model to successfully provide mass timber projects to market on both the client's and operation's terms.
- Mass timber technical basics
- Product specification
- Industry standards

- Design for durability
- Connection design
- Mass timber fire performance
- Mass timber structural engineering

Core Competencies

- Relationship building
- Team leadership
- Understanding of sales impacts on production

NOC & TEER

- 20010 Engineering Managers – TEER 0
- 21321 Industrial and Manufacturing Engineers – TEER 1
- 21300 Civil Engineers – TEER 1

Training / Education

Bachelor's degree in Engineering, Architecture, Wood Science, or Manufacturing is required.
Master's degree in the associated technical field desired.
Additional certifications or training in sales, business development, or the mass timber industry are advantageous

Experience

Multiple years of experience in mass timber project delivery, with a strong technical background in one vertical of mass timber project development, preferably engineering.
Proven track record of solving project issues, developing products and providing technical materials.
Experience in the construction, building materials, or timber industry is required.

3.10 SALES ENGINEER

Training Level	Medium - High	Canadian Avail.	Low	Global Avail.	Moderate
Location	Office / Remote	Experience Level	Medium	Salary Range	$90-160k
Alternative Titles				Reporting	Sales& Operations

Technical Sales Engineer, Mass Timber Specialist, Sales Consultant

Job Description

The Sales Engineer will play a pivotal part in driving sales and supporting the sales and project deployment of mass timber projects. The Sales Engineer will combine technical expertise with strong interpersonal and communication skills to effectively engage with clients, architects, engineers, and other stakeholders, building a relationship with the project team and working as a solution provider to help resolve issues, making the overall project a success.

Mass Timber Specifics

Detailed knowledge of manufacturing process to advise clients on impacts of specific design decisions, ability to help optimize a given project for proficient manufacturing solutions.
- Mass timber manufacturing process
- Mass timber project delivery process
- Common risks and mitigation

- System related impacts for design decisions
- Basic structural engineering
- Mass timber connections and risks

Core Competencies	NOC & TEER
Relationship building	20010 Engineering Managers – TEER 0
Team leadership	21321 Industrial and Manufacturing Engineers – TEER 1
Understanding of sales impacts on production	21300 Civil Engineers – TEER 1

Training / Education

Bachelor's degree in Engineering, Architecture, Wood Science, or Manufacturing is required.
Additional certifications or training in sales, business development, or the mass timber industry are advantageous

Experience

Minimum of three to five years of experience in technical sales, preferably in the construction or building materials industry. Proven track record of successfully selling technical products or solutions to architects, engineers, contractors, or similar clients.
Experience with mass timber or wood products is highly desirable.

3.11 FABRICATION DESIGNER / DETAILER – JUNIOR

Training Level	Medium	Canadian Avail.	Low	Global Avail.	Moderate
Location	Office / Remote	Experience Level	Low-Moderate	Salary Range	$55 – 70 k
Alternative Titles				Reporting	Project Delivery

Detailer, 3D modeller, Virtual Construction Specialists, CAD Technician, 3D Drafter

Job Description

The Fabrication Designer primarily works with 3D BIM modelling software to advance Architectural and Structural project information into a fabrication-ready 3D model for final production and CNC processing. The Fabrication Designer must possess a strong understanding of how a successful project can be delivered, combined with a strong knowledge of the operation's capabilities. The Fabrication Designer must have excellent interpersonal skills that display a genuine concern for our customer's needs, responsiveness to design developers, and organization skills for project tracking, Request for information tracking (RFI), and 3D model organization.

Junior positions will work on small projects self-managed or as a team member working on a larger project under the direction of additional leadership.

Mass Timber Specifics

Needs to be in the process of developing a comprehensive knowledge of mass timber production systems, including engineering applications, manufacturing processes, delivery risks, and construction sequencing.
- Mass timber manufacturing process
- Mass timber tools / connections / systems

- 3D BIM Models
- Steel Weldment fabrication
- Connection tolerances
- CNC machine capabilities
- Design for durability

Core Competencies

- 3D modelling
- 2D drafting, blueprint reading
- Clear communication
- Computer proficient

NOC & TEER

22210 Architectural Tech – TEER 2
22212 Drafting Tech – TEER 2
22300 Civil Eng Tech – TEER

Training / Education

Minimum two-year Architectural, Engineering, and Construction Diploma.
Preferred four-year Architectural or Engineering degree.
Proficiency in 3D modelling software, such as AutoCAD, Revit, or Tekla Structures.
Additional training in mass timber design and detailing, BIM (Building Information Modeling), and relevant industry software is advantageous.

Experience

Prior AEC experience in estimating, construction, design or some area to provide project lifecycle and process insight.
Preferred experience in estimating, blueprint reading and issue communication.
Familiarity with mass timber manufacturing processes and collaboration with cross-functional teams is highly desirable.

3.12 FABRICATION DESIGNER / DETAILER – SENIOR

Training Level	Medium - High	Canadian Avail.	Low	Global Avail.	Moderate
Location	Office / Remote	Experience Level	High	Salary Range	$80 – 130K
Alternative Titles				Reporting	Project delivery

Virtual Construction Lead, CAD Leader

Job Description

The Fabrication Designer primarily works with 3D BIM modelling software to advance Architectural and Structural project information into a fabrication-ready 3D model for final production and CNC processing. A senior Fabrication Designer leads large projects and integrated teams of multiple members to produce coordinated BIM models while resolving constructability issues within schedule constraints. The senior Fabrication Designer must possess a strong understanding of how a successful project can be delivered, combined with a strong knowledge of the operation's capabilities. The Fabrication Designer must have excellent interpersonal skills that display a genuine concern for customers' needs, responsiveness to design developers, and organization skills for project tracking, Request for information tracking (RFI), and 3D model organization.

Senior positions will work on large projects self-managed or as a team leader directing up to 10 additional detailers.

Mass Timber Specifics

Hold comprehensive knowledge of mass timber production systems, including engineering applications, manufacturing processes, delivery risks, and construction sequencing.

- Mass timber manufacturing process
- Mass timber tools / connections / systems
- Engineering principles

- 3D BIM Models
- Steel Weldment fabrication
- Connection tolerances
- CNC machine capabilities
- Design for durability

Core Competencies

- Clear communication
- 3D modelling
- 2D drafting, blueprint reading
- Team leadership

NOC & TEER

20011 Architecture Manager – TEER 0
20010 Engineering Manager – TEER 0
22210 Architectural Tech – TEER 2
22212 Drafting Tech – TEER 2
22300 Civil Eng Tech – TEER 2

Training / Education

Minimum two-year Architectural, Engineering, and Construction Diploma.
Preferred four-year Architectural or Engineering degree.
Proficiency in 3D modelling software, such as AutoCAD, Revit, or Tekla Structures.
Additional training in mass timber design and detailing, BIM (Building Information Modeling), and relevant industry software is advantageous.

Experience

More than five years of AEC BIM modelling construction experience.
More than two years of mass timber BIM modelling experience.
Preferred site installation, shop framing or timber framing experience a strong asset.

3.13 CNC CODER

Training Level	Low - medium	Canadian Avail.	Low	Global Avail.	Moderate
Location	Factory	Experience Level	Low-moderate	Salary Range	$80 – 130K
Alternative Titles				Reporting	Operations

CNC Programmer, CNC Machining Specialist, CAD/CAM Programmer, Cambium Programmer

Job Description

The CNC Coder/Programmer will be responsible for creating, optimizing, and maintaining CNC code for CNC machinery used in mass timber production, specifically _____ machines and programming tool paths and material processing within _____ environments. The CNC Coder/Programmer will collaborate with fabrication designers, CNC operators, timber framers, and production managers to ensure accurate and efficient manufacturing processes.

Mass Timber Specifics

- Tool path calculations and loading
- Wood science basics
- Timber framing processes
- Mechatronics comprehension

Core Competencies	NOC & TEER
- Technical troubleshooting - Quality control	94124 Woodworking machine operator – TEER 4

Training / Education

A technical diploma or degree in CNC Programming, Computer-Aided Design (CAD), Manufacturing Technology, or a related field is preferred.

Certification in CNC programming software, such as _____ or similar, is highly advantageous.

Additional training in mass timber manufacturing processes, CNC machine operation, and safety protocols is beneficial.

Experience

Minimum of three to five years of experience in CNC programming, preferably in the woodworking or mass timber industry.

Proven expertise in programming CNC machinery, including proficiency in CAD/CAM software and G-code programming.

Experience with CNC machinery used in mass timber manufacturing, such as Hundegger, SCM, or similar, is highly desirable. Preferably coming from an internal background role as a CNC Operator.

3.14 PROJECT COORDINATOR

Training Level	Moderate	Canadian Avail.	Medium to high	Global Avail.	Medium to high
Location	Office / Remote	Experience	Low - moderate	Salary Range	$65 – 80 K
Alternative Titles				Reporting	Project Delivery

Junior Project Manager,

Job Description

The Project Coordinator will play a key part in coordinating and overseeing the execution of mass timber projects. The Project Coordinator will collaborate with various stakeholders, including architects, engineers, contractors, and internal teams, to ensure successful project delivery and customer satisfaction. Communicating customer schedules internally and working as the customer representative while externally communicating key milestones and potential project hold-downs.

Mass Timber Specifics

Specific knowledge of mass timber logistics, construction sequencing, trucking standards and handling of goods is critical to success in the role.

- Production and project delivery process comprehension
- Logistics management and optimization
- Construction sequencing

- Mass timber quality control
- Mass timber handling

Core Competencies

- Collaborative communication
- Issue tracking, RFIs
- Quality assurance
- Blueprint reading

NOC & TEER

13201 Production logistics coordinators – TEER 3
72013 Contractors and supervisors, carpentry – TEER 2

Training / Education

Bachelor's degree in Engineering, Construction Management, Architecture, or a related field is preferred.
Additional certifications or training in project management, construction coordination, or mass timber technologies are advantageous.

Experience

Internal candidate experience in estimating or fabrication design builds strong abilities for success in project coordination and management.
Minimum of one to two years of experience in project coordination, preferably in the construction or manufacturing industry.
Experience working with mass timber or wood products is highly desirable.
Proficiency in project management software and tools (e.g., Microsoft Project, Asana, Jira) is a plus.

3.15 PROJECT MANAGER

Training Level	Moderate - high	Canadian avail.	Medium	Global Avail.	Medium
Location	Office / Remote	Experience	Moderate - high	Salary Range	$80–120K
Alternative Titles				Reporting	Project delivery

Job Description

The Project Manager will be responsible for overseeing and managing the successful execution of mass timber projects, from initial planning to final delivery. The Project Manager will collaborate with cross-functional teams, coordinate resources, and ensure projects are completed on time, within budget, and to the highest quality standards. Responsible for final contract negotiation, schedule conformance, and customer satisfaction.

Mass Timber Specifics

Project managers need to be aware of acceptable manufacturing processes, potential bottlenecks, design process inputs and risk mitigation strategies relevant to mass timber.

- Manufacturing principles
- Quality Control
- Design for Durability
- Construction principles

- Project risk mitigation
- Project schedule management

Core Competencies

- Project planning
- Communications
- Team collaboration
- Risk mitigation

NOC & TEER

70010 Construction Managers – TEER 0

72013 Contractors and supervisors, carpentry – TEER 2

21300 Civil Engineers – TEER 1

Training / Education

Bachelor's degree in Construction Management, Engineering, Architecture, or a related field is preferred.
Project Management Professional (PMP) certification or equivalent is highly advantageous.
Additional training in mass timber construction, project scheduling, and risk management is beneficial.

Experience

Minimum of five to seven years of experience in project management, preferably in the construction or mass timber industry.
Proven track record of successfully managing complex projects from initiation to completion.
Experience with mass timber projects, including coordination with design teams, contractors, and suppliers, is highly desirable.

3.16 JUNIOR ESTIMATOR

Training Level	Low	Canadian Avail.	High	Global Avail.	High
Location	Office / Remote	Experience Level	Low	Salary Range	$55-75 K
Alternative Titles				Reporting	Project delivery

Quantity Surveyor, Bid Specialist, Timber Project Estimator, Construction Cost Estimator

Job Description

The Estimator performs quantity takeoffs in estimating software or 3D modelling software, gathering accurate quantities for all elements within the intended project scope. The Estimator plays a key role in clarifying scope inclusions and preliminary identification of potential construction conflicts or project risks related to mass timber. Attention to detail, an analytical mindset, and a strong understanding of mass timber construction and manufacturing processes are desired attributes that will contribute to project success and the company's growth.

Mass Timber Specifics

The Junior Estimator position necessitates a solid understanding of mass timber manufacturing processes, product comprehension, dimensional tolerances, and production methodologies. Knowledge of industry standards and regulations pertaining to mass timber will be crucial for preparing precise estimates and aiding both customers and design teams.

- Mass timber products
- Production and installation tolerances
- Durability by design
- Shipping and handling requirements

Core Competencies

- Computer proficient
- MS Excel, BIM, PDFs
- Collaborative communication
- Ability to read blueprints

NOC & TEER

22303 Construction Estimators - TEER 2

Training / Education

A bachelor's degree in Civil Engineering, Construction Management, or a related field is preferred. A two-year AEC (Architectural, Engineering, Construction) technologist diploma is also acceptable.
Relevant certifications or coursework in cost estimation, project management, or mass timber technologies are advantageous.

Experience

Construction, Drafting, or quantity analysis experience and asset. No formal experience required.

3.17 SENIOR ESTIMATOR

Training Level	High	Canadian Avail.	Moderate	Global Avail.	High
Location	Office	Experience Level	High	Salary Range	$55-75 K
Alternative Titles				Reporting	Project delivery

Lead Estimator, Senior Timber Estimator, Senior Construction Cost Estimator

Job Description

Covering baseline tasks of a Junior Estimator when necessary, however, generally working on large marque projects or systematically developing more proficient estimating systems to enable high accuracy, along with decreased estimation timelines. Proficient with change tracking and communication of project impacts related to the overall effectiveness of the project's intended design and deployment pathway. Helps develop formalized project proposals and outlines strict scope inclusions and exclusions. Aids in the development of cost metric data and sales performance data to enable total sales management processes.

Mass Timber Specifics

- Mass Timber Manufacturing process
- Logistics optimization as related to production processes and sales impacts
- Detailed CNC capabilities and timber framing concepts
- Fabrication design estimating and scheduling

Core Competencies	NOC & TEER
- Advanced cost estimation - Comprehensive mass timber knowledge - Collaborative leadership - Communication abilities	22303 Construction Estimator – TEER 2

Training / Education

A bachelor's degree in Civil Engineering, Construction Management, or a related field is preferred.

Relevant certifications or advanced coursework in cost estimation, project management, or mass timber technologies are highly advantageous.

Experience

Minimum of five years of experience in cost estimation, preferably in the construction or manufacturing industries.

Extensive experience working with mass timber or wood products is highly desirable.

Proficiency in using estimation software and tools (e.g., Bluebeam, Timberline, ProEst, PlanSwift, Excel) is a plus.

3.18 BUSINESS ANALYST

Training Level	High	Canadian Avail.	Low	Global Avail.	Low
Location	Factory	Experience Level	High	Salary Range	$85 - 150K
Alternative Titles				Reporting	Operations / MGMT

Production Analyst, Database Analyst

Job Description

The Business Analyst will be responsible for gathering requirements, coordinating data, conglomerating, and presenting data, discovering and reporting trends, proposing solutions, and collaborating with various teams to optimize business processes from sales and manufacturing to overall project delivery. Your expertise will contribute to the successful implementation and maintenance of ERP systems and other IT solutions across the organization.

Work closely with the senior management, IT infrastructure specialist, and automation engineers to develop comprehensive operation data, analytics and trend projections while setting KPIs for the organization.

Mass Timber Specifics

Understanding of project delivery processes, monthly production and financial targets and integration with day-to-day production operations.
- Process optimization
- Mass timber product production process
- Industry standard production proforma
- Manufacturing limitations

Core Competencies

- Attention to detail
- Balancing of multiple KPI metrics
- Process optimization to minimize downtime
- Clear communication

NOC & TEER

21223 Database analyst and data administrator – TEER 1

41402 Business Development officers and market research and analysts – TEER 1

Training / Education

Significantly integrated experience or ability to quickly pick up new skill sets and understandings. A combination of the following training and education sets would be ideal.
- Business Degree
- Computer Science degree
- Industrial Engineering degree
- MBA with technical reporting

Experience

Ideally, experienced with complex manufacturing environments, quantifying and collecting business operations data from different locations within a company and presenting this data in a concise format easily understood by management and operational users.

More than five years of manufacturing and data environment management experience.

3.19 IT INFRASTRUCTURE SPECIALIST

Training Level	Medium - High	Canadian Avail.	Moderate	Global Avail.	Moderate
Location	Office / Remote	Experience	Medium - High	Salary Range	$80–130K
Alternative Titles				Reporting	Administration*

ERP Specialist, IT Systems Integration Engineer, IT Infrastructure Analyst

Job Description

The position plays a crucial role in ensuring seamless integration of the Enterprise Resource Planning (ERP) system within the mass timber manufacturing operations. The specialist will be responsible for designing, implementing, and maintaining the IT infrastructure required for effective ERP integration, which effectively runs the operations process for the company. Must be able to leverage the full potential of ERP systems, taking into account Industry 4.0 production principles for optimizing business processes, data management, and decision-making capabilities.

Mass Timber Specifics

Collaboration with cross-functional teams from operations, sales, project management, purchasing, and finance to ensure integrated systems deliver results as expected while enhancing the visibility and performance of the overall operation.

- Production planning and scheduling comprehension
- Industry 4.0 comprehension

Core Competencies	NOC & TEER
- ERP integration expertise - IT Infrastructure management - Collaborative problem solving	20012 Computer and information systems managers – TEER 0 21230 Computer systems developers and programmers – TEER 1 21222 Information systems specialists – TEER 1

Training / Education

Bachelor's degree in Computer Science, Information Technology, or a related field.
Relevant certifications in ERP systems (e.g., SAP, Oracle, Microsoft Dynamics) and IT infrastructure management (e.g., CCNA, MCSE) are highly desirable.
Continued professional development to stay updated with the latest trends and best practices in ERP integration and IT infrastructure management.

Experience

Minimum of five years of experience in IT infrastructure management and ERP integration.
Proven track record of successful ERP integration projects, preferably in a manufacturing environment.
Experience with mass timber or wood product manufacturing operations is highly advantageous.

04

Career Pathway Maps

A series of theoretical career paths have been mapped out, building on internally developed skill sets and supplemented by potential training or educational opportunities. These career paths are subject to each participant's aptitude. These example pathways create an outline for both industries looking to upgrade internal talent and persons looking for a career in the field of mass timber. The following career paths were chosen as existing observed progression lines for potential staff. Many additional career paths exist, and these function to portray real-world examples. From an industry perspective, there is a need for career paths that develop into fabrication designers and sales engineers.

Career Pathway ONE

Recruited out of high school with on-the-job training supplemented by a two-year part-time diploma. Advancement to senior management role.

01 **Enter the workforce as a Timber Frame Labourer, no specific training (Age 17-20)**
- Undertake Timber Framer's guild course, two weeks.
- 1 - 2 years framing experience on shop floor

02 **Undertake a two-year part-time diploma in Construction Technology.**
- Civil tech, Architectural tech, or other AEC-related diploma

03 **Move to estimate roll within MT business, perform take-offs for project bids**
- 1 - 2 years' experience in the role

04 **Move to Fabrication Design (Detailing) to develop 3D BIM models for construction of projects**
- 1 - 2 years' experience in the role

05 **Move to Project Management or Sales**
- 2 - 4 years' experience in the role

06 **Move to Department Management**
- 2 - 4 years' experience in the role

07 **Move to Senior Management**

Total time estimate: 9 – 16 years, including education.

Major skill upgrade: 2-year technical diploma, on the job technical and management experience.

Career Pathway TWO

Recruited out of post-secondary 4-year degree with on-the-job experience gained over the course of career.

01   **Hired into Project Management roles as a Project Coordinator**
- 1 - 2 years' experience in role

02   **Move to Project Manager or Sales Engineer role**
- 2 - 4 years' experience in role

03   **Move to Department Management**
- 2 - 4 years' experience in role

04   **Move to Senior Management**

Total time estimate: 9 – 14 years, including education.

Major skill upgrade: On the job technical and management experience.

Career Pathway THREE

Enter mass timber operations employment as a mature, low-skill worker with minimal relevant experience.

01   **Hired into Operations as a labourer**
- Two months experience in the role

02   **Move to Timber Framing / Finishing**
- Undertake on-the-job training and 2-week specialty skills course at a trade school
- 4-6 years' experience in the role

03   **Advance to Timber Frame lead hand, management of timber frame staff for shift**
- 2 - 4 years' experience in the role

04   **Move to Operations Management**

Total time estimate: 8 – 12 years, no formal education.

* Formal education and training courses would be recommended to enable candidates to work at a proficient level in operations management.

Major skill upgrade: On the job technical and management experience.

05

Gap Analysis

5.1 FACILITY ALIGNMENT – HOW MANY PEOPLE?

Subject to each organization's sizing, workflow, equipment, and specific business operations, a different volume of staff and skill sets will be required. There is also a significant difference in the number of people required for traditional manufacturing environments with low levels of automation compared to modern manufacturing environments with higher levels of automation. Furthermore, when producing low-margin, high-volume commodity products versus project-specific kit-of-parts mass timber projects requiring a high level of technical support services, technical roles are limited on the project support and sales side of the equation.

These operations configurations do not match standard operations in Europe, where highly regional dedicated markets are available, often driven by single-family home construction and local timber framers who provide value-added and risk mitigation services. In North American markets, the reach of the operation in terms of distance and project type configuration attributes are much different than European norms. For instance, a North American supplier will likely have less than 10% of this project funnel with single-family homes, and the rest of the funnel will be large-

scale construction with multi-family residential, commercial, industrial, or academic projects. Meanwhile, in Europe, it is common to have more than 85% of a mass timber manufacturer's project funnel filled with single-family homes. While multi-family housing is quickly growing in Europe with mass timber, it is not yet the largest industry driver. With these very different market models, European suppliers are often provided with "fabrication ready" cut files, which is a perfect 3D model of exactly what is to be produced. In North America, the supplier typically needs to develop the 3D BIM model from scratch, produce drawings, and have this verified by the project team. This takes significant time, risk, and technical expertise. With this in mind, it is critical to have enhanced technical design and project delivery teams in North America to carry out tasks that are frequently carried out by upstream partners in Europe. This may evolve over the next 10-15 years. However, it is currently the norm in the North American mass timber market. It is important to keep these considerations in mind when reviewing potential total employment volumes and trying to compare operations in the two markets.

Staffing estimates were based on multiple mass timber business plans from both existing and conceptual modern facilities in North America. Averages were developed and then extrapolated based on revenue projections for how much work each position might be able to complete. If a project manager could handle $15,000,000 of project revenue per year, this is factored into total staff estimates. While the variation here may be significant between various operations, the data presented below is believed to represent an accurate baseline performance from industry experience. Pure revenue estimates have been excluded from the report, and numbers normalized to cubic meters of production based on 2023 volume cost averages.

Four rough scenarios were developed, including the following outlined operational attributes based on market feasible production capacity per year:

01

Traditional Glulam Operation (Non-Automated)
- Approximately 20,000 cubic meters per year
- Three shift operations configuration

02

Modern Small Scale Glulam Operation
- Approximately 30,000 cubic meters per year
- Two shift operation configuration

03

Integrated Mass Timber Operation (CLT+Glulam)
- **Mid-Size:** 70,000 cubic meters per year
- Two and half shift operation configuration

04

Integrated Mass Timber Operation (CLT+Glulam)
- **Large Size:** 120,000 cubic meters per year
- Three shift operation configuration

While in many cases it may be preferred to have better trained and educated staff, a bare minimum education requirement context was placed on most roles to state that with "X" amount of specific training, they should be able to competently achieve job requirements. Training has been aligned with National Occupational Classification (NOC) Training, Education, Experience, and Responsibilities (TEER) classifications. Although many specific roles do not cleanly align multiple NOCs, possible alignments have been identified for each role and added to the description.

Shifting conditions varied based on industry experience with production volumes and different machinery configurations. All final values are highly subject to a specific operation. Results showed operations between 75-225 staff. These generally align with real-world staffing examples for these types of facilities.

Shifting operations multiply the number of operations staff per shift by the number of shifts.

TABLE 1 STAFF SIZING AND EDUCATION

FACILITY SIZE TO STAFFING AND EDUCATIONAL REQUIREMENTS	Operation Size & Type				Education (TEER Category)					
	Traditional Glulam Operation (Non-Automated) ~20,000 m3/yr	Modern Glulam Operation ~30,000 m3/yr	Integrated Mass Timber Operation (CLT+Glulam) Mid Size 70,000 m3/yr	Integrated Mass Timber Operation (CLT+Glulam) Large Size 120,000 m3/yr	No Req (TEER 5)	Basic Certification (TEER 4)	2 yr diploma (TEER 3)	Trade Cert (TEER 2)	4 yr degree (TEER 1)	Advanced Deg./Experience (TEER 0)
Overhead Staff										
CEO	1	1	1	1						●
CFO	1	1	1	1						●
COO	1	1	1	1						●
Purchasing	2	2	4	7			●			
Logistics	2	3	6	10			●			
Accounting & Clerks	2	3	6	10			●			
Sub Total	**9**	**11**	**19**	**30**						
Technical Staff										
IT Infrastructure	1	2	3	5					●	
Quality Control	1	1	2	4					●	
Sales Director	1	1	3	4					●	
Technical Director	1	1	2	3						●
Project Management	3	5	10	17					●	
Estimator	2	3	7	12			●			
Sales Engineer	2	2	5	8					●	
Fabrication Design	7	10	23	38			●			
CNC Programmer	1	1	2	2			●			
Business Analyst	0	1	1	2					●	
Maintenance Management	1	1	2	3			●			
Maintenance Team	2	3	7	12				●		
Production Management	1	2	3	5			●			
Sub Total	**23**	**33**	**70**	**115**						
Production Staff per Shift										
Forklift	1	1	2	2	●					
General Labour	12	2	3	2	●					
Timber Framer	6	4	6	6		●				
Lumber Grader	1	1	1	1			●			
Technician	0	1	2	2			●			
Machine Operator	3	4	6	8		●				
CNC Operator	2	2	3	4			●			
Automation Engineer	0	1	2	2				●		
Sub Total	**25**	**16**	**25**	**27**						
Likely # of Production Shifts	**3**	**2**	**2.5**	**3**						
Production Staff Estimate	75	32	62.5	81						
Total Staff Estimate	**107**	**76**	**151.5**	**226**	12%	21%	42%	7%	15%	3%

OF JOBS AND EDUCATIONAL REQUIREMENTS

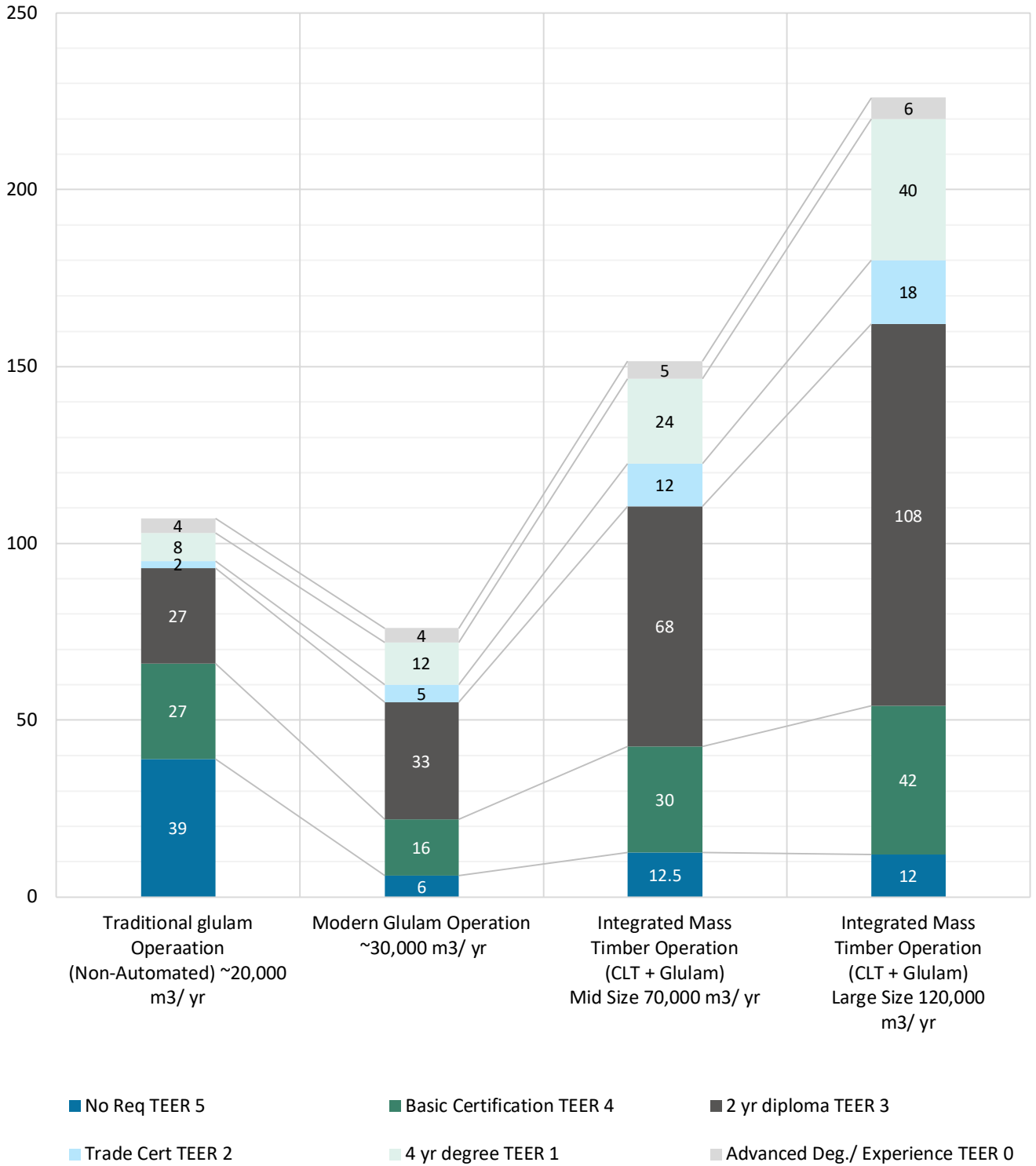|	No Req TEER 5	Basic Certification TEER 4	2 yr diploma TEER 3
	Trade Cert TEER 2	4 yr degree TEER 1	Advanced Deg./ Experience TEER 0

FIGURE 1 JOBS VS. EDUCATION REQUIRMENTS

5.2 SEARCH RESULTS

LinkedIn recruiter search module was used to analyse potential labour pools across BC, Canada and in global markets. LinkedIn Recruiter enables 40 advanced filters, keyword & Boolean search, and sorting by proprietary filters with no limit on the number of results while also allowing saved searches and specialty data exports. A variety of search terms were used to assess the number of individuals with specific skill sets and role titles. While these searches are certainly not exhaustive, they can be used to indicate the prominence of role/skill set combinations in the industry and the ability to easily find candidates meeting these requirements.

TABLE 2 POSITION/SKILL SEARCH RESULTS

	REGIONAL RESULTS		
Position	**BC**	**Canada**	**Global**
Project Manager (MT)	108	232	2500
Quality Control	8	18	173
Fabrication Designer/Detailer	14	26	104
CNC Coder (MT)	7	11	53
CNC Coder (Any Industry)	246	3200	52000
IT Infrastructure Specialist	40	385	8400
Senior Estimator (MT)	4	6	32
Senior Estimator (Any Industry)	504	3400	60000
Junior Estimator (MT)	3	3	45
Junior Estimator (Any Industry)	171	1000	140000
Project Coordinator	33	63	150
Sales Engineer	9	20	165
Sales Director	10	37	804
Production Manager	16	43	856
Industrial Electrician	342	2400	19000
Automation Engineer	666	6400	220000
Timber Framer/Finisher	51	119	882
Technical Director	9	19	226

A full list of role titles and specific search terms used has been included in the appendix.

5.3 PROJECTION OF LABOUR DEMAND

Over the coming years, the province of BC has developed a plan to encourage the addition of multiple mass timber manufacturing facilities, helping BC evolve from a commodity lumber producer to a prefabricated construction powerhouse of low-carbon buildings.

The BC Mass Timber Action plan outlines a potential to see up to the equivalent of 10 new mid-sized factories by 2035, equating to roughly one new production facility every 14 months. In this report, a mid-sized facility is outlined as having a production capacity of around 70,000 m3 on a 2.5-shift capacity. With labour estimates outlined above, this would employ an estimated 1515 persons directly at the mass timber production facilities, based on current automation technologies likely to be implemented and a high level of prefabricated component service.

There is a wide range of employment possibilities across different types of mass timber production facilities. The four sample facilities have had their employment estimates converted to people/1000 m3 of product to show the potential difference in employment rates per operating conditions. For modern production operations, these rates vary between 1.9 – 2.5 direct jobs per 1000 m3 of product. It is important to note that these jobs include complex fabrication design, project management, estimating and technical services that are not found at similar mass timber facilities in Europe, where they are, instead, carried out by exterior contractors and timber frame companies. Legacy mass timber facilities with low levels of automation support more direct jobs, closer to 5.5 jobs per 1000 cubic meters of product output. However, these are unlikely to continue to be built in the future due to poor scaling and economic abilities.

TABLE 3 JOB TO PRODUCTION SIZE ESTIMATES

	Traditional Glulam Operation (Non-Automated) ~20,000 m³/ yr	Modern Glulam Operationer ~30,000 m³/ yr	Integrated Mass Timber Operation (CLT+Glulam) Mid Size 70,000 m³/ yr	Integrated Mass Timber Operation (CLT+Glulam) Large Size 120,000 m³/ yr
Direct Jobs per 1000 m³ product	5.4	2.5	2.2	1.9
Direct Jobs per 10 plants	1070	760	1515	2260
Direct Jobs per 1,000,000 m³	5350	2533	2164	1883
% Overhead Positions	8%	14%	13%	13%
% Technical Positions	21%	43%	46%	51%
% Production Positions	70%	42%	41%	36%

This set of scenarios illustrates a picture of labour and job skills requirements that are likely needed in the future to support mass timber development. All modern manufacturing plants have heavy lean-to-technical role requirements followed by production roles.

Another lens to look at total potential labour and expertise demand would be to calculate the number of positions based on "X" amount of product produced in the province. This would certainly come out as a blend of different suppliers, but if the province were to figuratively have 1,000,000 m^3 of value-added mass product by 2035, skill set demand and job position scenarios can be obtained from the table above based on these estimates.

Within the technical role areas, the three most critical jobs with the highest requirements are 1) Fabrication Designers, 2) Project Management, and 3) Maintenance Team. While all roles are critical for a mass timber facility's operational success, these three roles will be in high demand and likely have a shortage of candidates with appropriate training.

For illustrative purposes, scenario 3, an integrated mass timber supply operation with a yearly capacity of 70,000 m^3 on a 2.5 shift configuration, has been taken for further examination if the province were to attain ten additional manufacturers in this configuration by 2035. The result would be the following demand for roles, also comparing the role demand next to search results acquired from the earlier talent analysis.

TABLE 4 POSITION PROJECTIONS & TRAINING ESTIMATES

Overhead Staff	Persons Req'd	Search Results	% observed	Estimated Cross Training Timeline
CEO	10			
CFO	10			
COO	10			
Purchasing	40			
Logistics	60			
Accounting	60			
Sub Total	**190**			
Technical Staff				
IT Infrastructure	30	40	133%	2 week microcredential
Quality Control	20	8	40%	2 year diploma
Sales Director	30	10	33%	6 month certification
Technical Director	20	9	45%	N/A
Project Management	100	138	138%	6 month certification
Estimator	70	508	726%	2 week microcredential
Sales Engineer	50	9	18%	6 month certification
Fabrication Design	230	14	6%	6 month certification
CNC Programmer	20	253	1265%	2 week inhouse course
Business Analyst	10			2 month certification
Maintenance Management	20			2 week microcredential
Maintenance Team	70			2 week microcredential
Production Management	30	43	143%	2 week microcredential
Sub Total	**700**			
Production Staff per Shift				
Forklift	20			
General Labour	30			
Timber Framer	60	51	85%	6 month certification
Lumber Grader	10			
Technician (Non MT)	20	342	1710%	2 week microcredential
Machine Operator	60			2 week microcredential
CNC Operator	30			2 week microcredential
Automation Engineer (Non MT)	20	666	3330%	2 week microcredential
Sub Total	**250**			
Likely # of Production Shifts	2.5			
Production Staff Estimate	**625**			
Total Staff Estimate	**1515**			

While it is important to understand that search results generally indicate people who are fully employed, it does illustrate that there is a baseline of talent in the province. However, for many of the roles below 100%, this provides a strong indication that even within existing operations, there is a deficiency in talent under the specific role job titles and search terms used to source potential candidates. IE: Roles with low results, such as fabrication designer, indicate that there are few people currently employed in the province in this role, and further support and training networks may need to be developed.

In general, this labour demand would result in a training demand of twenty-three fabrication designers per year, ten project managers per year, and seven maintenance team technicians per year for the critical roles discussed above. Critical shortages of trained existing professionals exist again within Fabrication Design and Sales Engineers, also including technical directors, sales directors and quality control specific to mass timber experiences. The table has also been augmented with a brief estimate of how much training may be required to cross-train someone from another similar industry into a new role in mass timber.

5.4 TRAINING AND EDUCATION FACILITIES

Within the province of BC, there are several educational facilities that have Mass timber specific or heavily related training programs. These include UBC, BCIT, and UNBC. So far, each institution has some degree of specialization in different skill sets and career opportunities they support. With the collection of these programs, it does appear that there are likely adequate or near-adequate training resources to support the growth of mass timber within the province directly related to manufacturing. However, coupled with construction direct services (architects, installers, engineers, code officials, general contractors) who will also pull from this talent pool, there will likely continue to be shortages in skills and experience sets for the coming years.

5.4.1 UBC Wood Products Processing

Transitioning to the new program designation, Wood Products Major with a Bachelor of Science in Natural Resources, this revised program includes classes that will help with production management, business analysis, quality control, and, to a lesser extent, fabrication design/project management. This program generally accepts 20-30 students per year.

UBC has also developed four WOOD courses targeted to civil engineering students that will hopefully go on to create a new minor in sustainable timber-built environments. The intent is to launch this program in 2024.

5.4.2 BCIT Mass Timber

BCIT is currently in the development and rollout of a number of micro-credential and certificate training courses to further support mass timber project implementation and success. The following courses are currently offered, many

of which are highly applicable to providing pathways from legacy programs or career environments into the field of mass timber.

- **Mass Timber Estimating**

Pilot course: 20-24 students. Diversity of experience to see how they do. Nine weeks each, three credits part-time online. There is no essential limit to capacity after the pilot. Certificate program.

- **Digital Project Delivery**

Pilot course: 20-24 students. Diversity of experience to see how they do. Nine weeks each, three credits part-time online. There is no essential limit to capacity after the pilot. Certificate program. This capacity, if filled, would go a long way to help provide for the critical shortage of fabrication designers required.

- **Introduction to Mass Timber**

Micro-credential, wide audience – part-time, 100% online, eight weeks (max). 4-5 modules, BIM, DfMA, Products, Installation, Fire, Acoustics. Registration is open at any time with an online process.

There is no limit on program capacity (about 400 students have gone through the program so far).

- **Associate certificate**

Building installers, carpenters and iron workers, six months, 15 credits, five courses. Four online, one in-person with practicum, and two weeks full-time.

One intake per year, starting in January until the end of June. In-person during the last two weeks of June. Including a survey of the site to ensure proper placement. Program capacity: 16 – 20 per year.

Intend to develop a covered structure for holding the course inside, allowing more offerings per year.

- **Industrial Wood Processing**

Two large inlets per year, roughly 80 students per year.

- **Business of Sawmilling**

Associate certificate program

Through these programs, it is anticipated that training from BCIT will support roles such as Project Managers, Estimators, Fabrication Designers, Business Analyst, Production Managers, Technicians and Automation Engineers.

5.4.3 UNBC

With two primary programs, UNBC generally supports highly technical roles for positions such as technical director, fabrication design leadership, project management and engineering for mass timber buildings.

- **Mass Timber Development**

Micro credential highly focused on digital process flows for mass timber project fabrication. This credential would help significantly in the process of fabrication designer training development while also supporting more advanced sales engineers and estimators. This appears to be the most advanced program in support of this critically needed skill set.

- **Master of Engineering in Integrated Wood Design**

While this master's program covers a number of wood construction focus areas, graduates from the program generally have a civil engineering background. This ideally places them in a role as sales engineers, project managers, or possibly technical directors when they acquire enough experience. The theoretical maximum capacity is 20 students per year, but the program has yet to attain this level of attendance.

5.5 DIVERSITY

Anecdotally, most career candidates in the mass timber space appear to be overwhelmingly male. Estimates place this at 75-85% of new career entrants, while the legacy industry is almost completely male-dominated. Some areas within the industry appear to be doing a better job of recruiting new female talent, namely in engineering, sales, and to some degree project management. However, many of the remaining positions continue to be dominated by males. A survey count of male/female gender was completed on roles sourced in BC, identifying 13% of skill attributes with females and 87% with males.

TABLE 5 SEARCH RESULTS BY GENDER

LABOUR FORCE BY GENDER FOR ALL ROLES (BC ONLY)

BC (Female), 167, 13%   BC (Male), 1153, 87%

■ BC (Male)   ■ BC (Female)
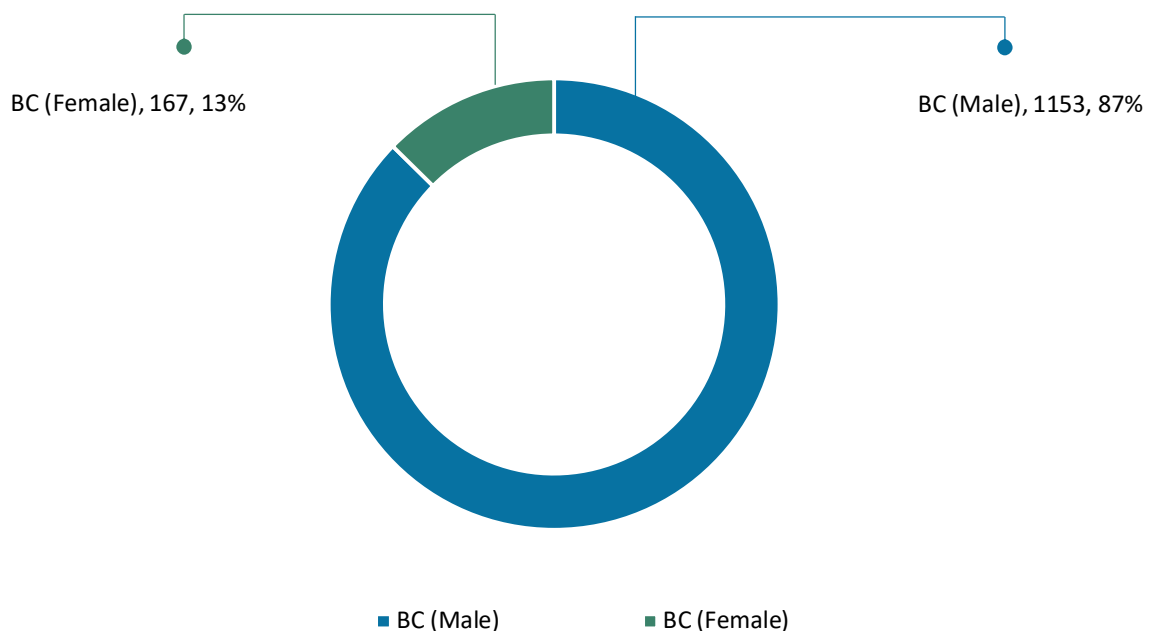
While on recent tours of manufacturing facilities in Europe, it was noted that staff in both the production landscape and office environment were nearly equally balanced between male and female. This can likely be attributed to multiple factors, but cleaner, quieter, and more automated work environments, along with progressive social policies paired with proper facilities (change rooms), seemed to make room for a more balanced inclusion of staff.

Indigenous participation also appears relatively low. However, it is difficult to determine without a formal survey. There are many potentials on the horizon for Indigenous leadership in this sector as land management rights are increasingly transferred back to Indigenous landholders, and new facilities are often considered industrial locations on treaty-based Indigenous lands. These opportunities open up conditions ripe for co-investment and eventual leadership in the space should a group of nations choose to become leaders in this developing industry.

06

Career Pipeline Development

6.1 MASS TIMBER FIRMS

Approach One: Build from Within

Within the mass timber industry, it is highly recommended to set up a dedicated career pipeline map to develop expert internal talent. However, many younger workers appear to transition jobs and roles frequently. This is partially due to a lack of a clear pathway for advancement, training, financial freedom, and overall betterment of the employee. If this pathway is created within the company and clearly illustrated, developing expert in-house talent and reducing overall employee turnover is much easier.

These career pathways may represent a process outlined in section 4 above; however, they must be clearly illustrated as examples. The company must support training opportunities for staff and set clear guidelines/benchmarks for performance attributes and performance reviews to help move junior staff into more advanced roles. This corporate culture takes a dedicated vision, demonstration of process, and time.

An example program of success has been developed with Telus in their Management training program. Each year, a new cohort of future leaders enters the program and takes on a series of roles in a leadership training capacity-specific leadership career track for young professionals. This approach must be adopted by the employer and supported by educational institutions and even the government where possible.

Approach Two: Recruitment

The second approach involves large recruitment strategies and is deployed by many new entrant firms. The recruitment strategy has several potential issues, the largest of which is that many mass timber operational environments are located in rural settings where it is often more difficult to find existing talent or attract talent from outside the region. This brings up the remote work question which has been successfully demonstrated for many staff roles, including fabrication design, sales, and project management. Unfortunately, there are several physical hands-on or hybrid roles where remote work does not function for the role.

With the global interest in mass timber, major recruitment strategies have significantly increased employee salary expectations to attain A-class or even B-class candidates. This is great for the employee; however, there is often little commitment and culture to make it desirable for an employee to stay for a long time with one group under this scenario as other groups continue to deploy similar tactics. Cross-pollination of employee experience can be great for the industry overall but does not necessarily lead to foundational team building.

It is recommended to deploy a tactic of both internal career development as well as recruitment.

6.1.1 Sourcing Locations

Central Europe has been developing a strong mass timber culture for decades and contains a large variety of skilled tradespeople, business managers, and design experts. While some other locations have notable mass timber construction knowledge (Japan), they do not appear to have significantly large amounts of exportable talent. They have not been further analysed by this report.

European production, design, and project deployment methods vary greatly from norms in North America. What works in Europe does not translate to a 1:1 operational outcome in North America. When looking for talent from European markets, it is important to look for people with an open mind who can and want to build a long life and career in North America. For many Europeans, this decision is lifestyle and opportunity-related.

Unfortunately, most North American firms offer a less progressive work-life balance than European counterparts, making it more difficult to recruit overseas staff.

Where the norm in North America might be 40-hour work weeks, three weeks paid vacation with ten statutory holidays, many Europeans might be used to something like 35-hour weeks, five weeks paid vacation, and 18 statutory holidays. This gives a yearly total of 1880 working hours in North America, and 1519 working hours in Europe, a difference of 361 hours, or nearly 45 days. This dynamic quickly makes North American working environments unpalatable for many Europeans in the long term unless they have some larger vision they are seeking to attain.

Previously, this larger vision often correlated with owning significant amounts of land in rural areas and having more freedom to do what they want with the land. However, recent rushes on Canadian real-estate markets have made this less viable.

In general, it is still relatively easy to recruit European talent for a 1-2 year period. However, from experience, more than 80% will return to their homeland after this period. There are also significant difficulties in recruiting more senior talent members from Europe as they tend to be more embedded with family considerations.

There are multiple timber framing, mass timber, and prefabrication-focused higher educational establishments in Europe. Trade schools also do a significantly better job of creating pathways from Journeyman Carpenter to Structural Engineer if the candidate student desires to continue their training.

A few key institutions to recruit new talent from include:

- ⮞ Berner Fachhochschule – Biel, Switzerland
- ⮞ Roshenheim Fachhochschule – Rosenheim, Germany
- ⮞ École supérieure du bois – Nantes, France
- ⮞ TU Graz – Austria – Graz, Austria

As part of section 5, efforts were made to find roles in Germanic and Francophone regions of timber expertise. It is acknowledged that A) these search terms were likely not perfectly fit for regional role descriptions, and B) In many other regions, LinkedIn is not as prevalent for business profile services and may, thus, have less users. Not all roles were searched in German or French languages, but the same region was searched in both cases for the following roles: Timber framer, Automation Engineer, Production Manager, Sales Engineer, and Project Manager. In all cases, the candidates had to have something related to timber framing, mass timber, or prefabrication of wood structures in their profile.

Overall, a low number of additional profiles were sourced, possibly due to the reasons outlined above. However, there were several key results in German for timber framers and project managers with mass timber experience. This matches the expected results as this is a strong area and training backbone for mass timber. However, it is either not as large as potentially thought, the search terms were poor, or members of this area simply do not have LinkedIn profiles.

6.2 EDUCATION INSTITUTIONS

While many educational facilities in BC are currently revamping or developing their mass timber-related programs, it is clear that a better job could be done promoting diverse student candidates for jobs as documented in the gender identification for BC skill sets. The following guidelines can be used as recommendations for educational institutions to further build a strong base of mass timber professionals. While many of these recommendations have already been undertaken, it is important to refresh potential solutions.

6.2.1 DIRECT SOLUTIONS

1. **Education and Awareness:** Launch comprehensive government marketing campaigns targeted at multiple levels of education, from high school, colleges, and trade schools specializing in mass timber construction to universities, emphasizing the benefits and opportunities of a career in the mass timber industry. These campaigns should highlight the industry's sustainability, innovation, and opportunities for career growth.

2. **Student Scholarships and Grants:** Introduce scholarships, grants, and financial incentives for students pursuing mass timber-related studies, with a focus on underrepresented groups. This will encourage diverse talent to enter the industry and help offset education costs.

3. **Collaborative Industry Engagement:** Establish partnerships between the government, educational institutions, and industry stakeholders to develop a curriculum that includes mass timber-related courses, workshops, and certifications. Encourage cross-disciplinary education to cater to both engineering and skilled trades audiences. To a large extent, this is currently undergoing significant development. (Example BCIT Mass Timber Training Hub)

4. **Upskilling of Existing Workforce:** Develop continuing education programs and workshops for skilled trades, engineers, and technologists in collaboration with industry associations and universities. These programs can help current professionals transition into the mass timber industry from more traditional construction approaches. BCIT has set this a focus of their operations with key micro-credentials and educational upgrading opportunities. UNBC has also developed a program to aid the development of fabrication designers along this pathway.

6.2.2 MARGINAL SOLUTIONS

5. **Industry Apprenticeships and Internships:** Promote the creation of apprenticeship and internship programs within mass timber companies. These hands-on experiences will provide students and professionals with practical knowledge and mentorship, bridging the gap between theory and practice.

   a. This may be a significant challenge to implement as many companies view the effort of training new staff as significant and would prefer them to stay engaged with operations for a longer period.

6.3 GOVERNMENT

The BC, as well as the federal government, have developed several programs promoting Canadian wood products and value-added wood products. Recent developments have further seen a strong focus on mass timber implementation, primarily in BC, although there is significant interest across the country. While many actions are already being taken, it is important to refresh an outline for key principles and processes that can continue to promote training and trade development to better support this growing industry.

1. Refinement of National Occupation Codes (NOCs) and associated Training, Education, Experience and Responsibility codes. Currently, there is poor alignment with many jobs in value-added wood products, prefabricated construction, and manufactured mass timber occupations.

2. Continued funding for educational institutions in mass timber and prefabrication development programs. Further emphasis on creating Industry 4.0 prefabrication systems and BIM requirements in construction.

3. Implement 3D BIM model plan check reviews and incentives, thereby increasing demand and knowledge associated with prefab 3D BIM models and, thus, auxiliary support networks for fabrication designers and processes.

4. Provide pre-emptive Labour Market Impact Assessments for mass timber-related fields and refined NOCs, allowing quicker acquisition of staff from abroad and easier, clearly defined work permit solutions.

5. Develop specialty pathways for 1-2 year work permit for mass timber training processes including hiring expert talent from European nations to lead a team and build knowledge for a limited period. Continued support for Networking Events and Conferences: Organize conferences, seminars, and networking events to bring together students, professionals, and industry leaders. These gatherings will provide opportunities for knowledge exchange, career insights, and collaboration. (Example International Mass Timber Conference)

   a. Potentially deploy career-specific conferences / training events, larger scale project tours, factory tours and learning sessions with new graduates or persons considering further career development. (Mass Timber Interest Event)

6. Research and Innovation Grants: Allocate funds for research projects in collaboration with academic institutions and industry experts. This will advance mass timber technology and innovation, attracting talent-seeking opportunities for cutting-edge research.

7. International Collaboration: Learn from successful strategies employed by European countries in promoting their mass timber industries. Study their approaches to talent development, education, and industry partnerships, adapting relevant practices to the Canadian context.

   a. Heavy emphasis should be conducted on reviewing European-based trade and skill development programs, specifically in Germany, Austria, and Switzerland.

8. Long-Term Sustainability: Ensure that the government, educational institutions, and industry partner's efforts are sustained over the long term by integrating mass timber education and workforce development into broader national strategies for sustainability, infrastructure, and economic growth. This will need to be a multi-pronged approach, providing financial incentives to industry partners and creating jobs for graduating students.

9. Measurement and Evaluation: Regularly assess the impact of the strategy through data collection and analysis:

    a. Tracking the number of students entering mass timber-related programs in BC,

    b. The available talent pool with mass timber experience and training,

    c. The number of available trades jobs in mass timber in BC,

    d. The diversity of the talent pool,

    e. The overall growth of the industry.

07

Summary

As the province of British Columbia aligns internal actions to build a stronger value-added forestry sector with a manufacturing foundation and carbon-neutral solutions with mass timber, there are many considerations to implement to help ensure a successful future. One of these critical areas is talent training and recruitment within human resources. In these respects, the goals of this report have been to;

- Develop a baseline of unified job descriptions for mass-related roles
- Help standardize titles, roles, and responsibilities across the mass timber industry
- Provide in-depth educational skill set description
- Provide reference experience sets for intermediate and senior roles
- Provide potential career paths into roles and beyond
- Develop gap analysis for missing talent groups, skill sets, and availability of personnel
- Provide an overview for sourcing of personnel for these roles

The province has progressed in creating a strong alignment between education institutions and industry for upcoming demand. The intent is that this report will serve to further outline the exact roles required and break down barriers to developing these skill sets within the region. Critical roles in short supply include fabrication designers, project managers, and sales engineers. There are several other roles that only require slight mass timber specifics, such as automation engineers, where people can be pulled from adjacent industries. However, a strong process of marketing to these candidates and painting a clear picture of career potential is required to ensure this success. Development of these roles will not only help mass timber succeed in BC but several value-added, prefabrication, and automation production environments.

The report delves into the critical skill sets and job positions required for mass timber operations and construction projects. It highlights the shortage of technical roles in the growing industry and aims to standardize role descriptions, identify labour shortages, and propose pathways to fulfillment.

Roles are categorized into Operations, Project Delivery, and Administration. Each role is defined, outlining the responsibilities, competencies, experience, and educational backgrounds required. Notable roles include Timber Framer/Finisher, CNC Operator, Automation Engineer, Technical Director, Fabrication Designer, and Sales Engineer.

Different operational scenarios are presented based on production capacity, automation, and shift configurations. The report estimates the number of staff required for each scenario and analyzes the potential labour demand for various types of mass timber facilities. Estimates range between 76 – 226 people per facility, subject to size and configurations. Extrapolating this to BC's planned goal of 10 new facilities by 2035 would result in somewhere between 1880 and 2550 new roles created, with key shortages projected among technical groups, sales engineers, and fabrication designers.

BC's educational institutions, such as UBC, BCIT, and UNBC, offer programs that support mass timber-related roles. These institutions provide training for roles such as Project Managers, Estimators, Fabrication Designers, Business Analysts, and Automation Engineers.

The report acknowledges the gender imbalance within the mass timber industry, with the majority of career candidates being male. It highlights efforts to improve diversity in roles like engineering, sales, and project management.

The final recommendations are to continue with government programs already in place, with a key tactical development for further fine-tuning in training on specific roles, better industry integration and refinement of NOCs, and finally, continued sponsorship and enhancements of labour programs for both training and work permit approvals.

In summary, this report offers an overview of BC's mass timber industry's labour needs. It outlines critical roles, skill sets, career pathways, and training opportunities to support the growth of mass timber manufacturing jobs in the province. The province, with coordinated efforts, appears to be on a path to successful implementation. However, as outlined in the report, labour demand shortfalls will likely be a key limiting factor in the successful deployment of this industry.

08

Appendix

8.1 ADDITIONAL RESOURCES

It is important to remember that mass timber is currently being adopted around the globe and that there are many potential organizations in different jurisdictions to review how they have further helped enable their local industries. The organizations are structured similarly to Wood-Works and the larger Canadian Wood Council (CWC). They include strong public-private partnerships combined with extensive educational opportunities for trades and engineers. Programs with such a multi-pronged approach to keep in mind:

Austria

Austria is known for its expertise in wood-based construction and has implemented various educational and promotional programs to encourage careers in the timber industry. Example initiatives by organizations like Holzcluster Steiermark (Styrian Wood Cluster).

Germany

Germany has a strong tradition of timber construction and sustainable building practices. Explore websites related to organizations like Deutscher Holzwirtschaftsrat (German Wood Industry Council) and the Bundesverband Deutscher Fertigbau (German Prefabricated Building Association).

Sweden

Sweden is another leader in timber construction. Organizations like Svenskt Trä (Swedish Wood) and Swedish universities with architecture and engineering programs might provide insights into educational and promotional efforts.

Switzerland

Switzerland has a reputation for innovation in architecture and sustainable design, including timber construction. Research institutions, architecture associations, and engineering organizations for relevant information, including ETHZ Timber Structures and world-renowned timber-focused schools such as Bern University of Applied Sciences in Biel.

Finland

Finland has a strong timber industry and expertise in wood-based construction. Look into organizations like Puuinfo (Woodinfo) for insights.

Norway

Norway also has a focus on sustainable construction and timber architecture. Organizations like TreFokus and educational institutions could offer valuable insights.

8.2 LINKEDIN SEARCH RESULTS & SEARCH TERMS

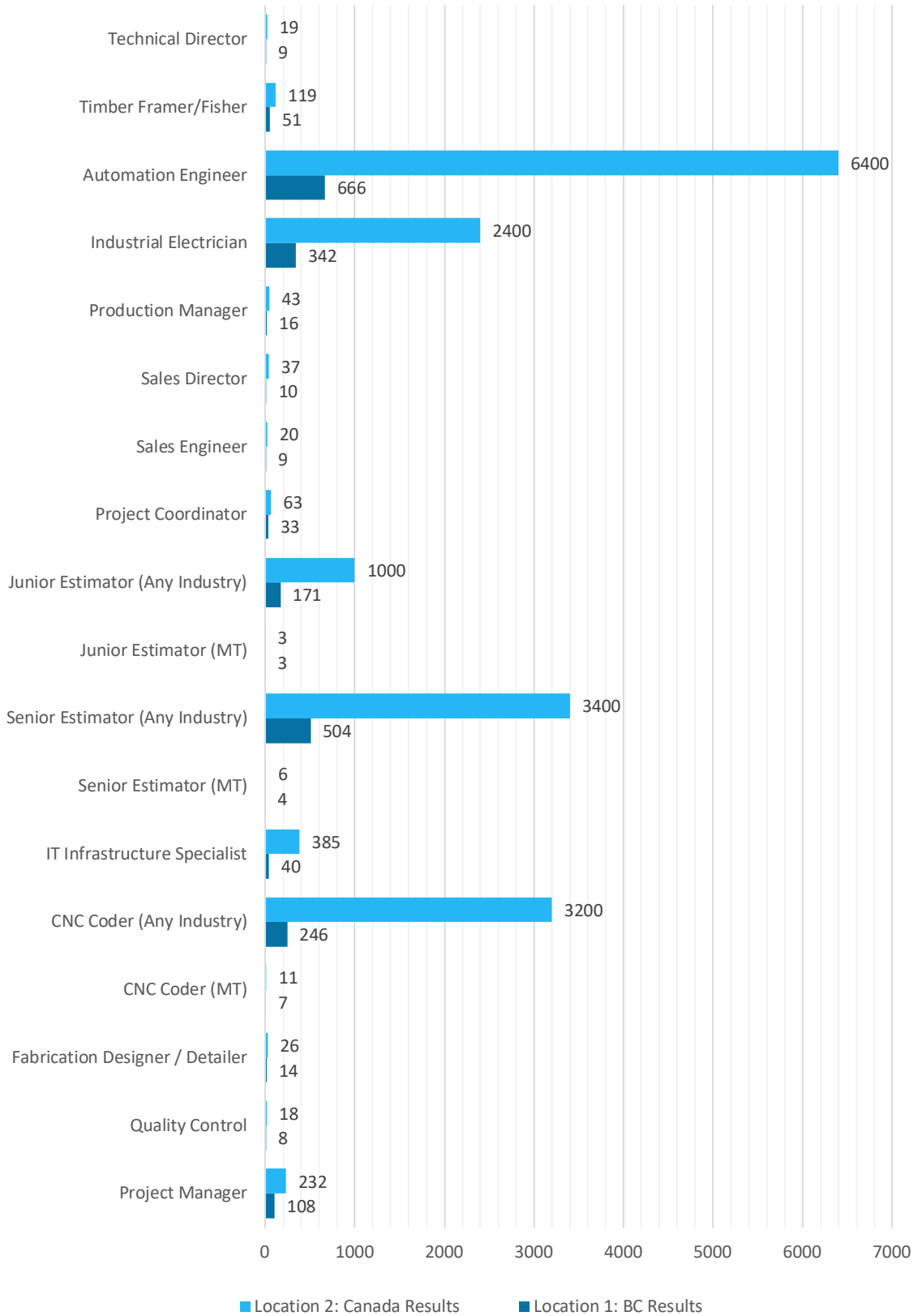| Regional results				Job Title	Keywords
Position	**BC**	**Canada**	**Global**		
Project Manager	108	232	2500	Project Manager	Glulam OR CLTOR "mass timber" OR "heavy timber" OR Prefab
Quality Control	8	18	173	Quality Control OR Fabrication Assurance OR Quality Analyst OR Standards Manager	Glulam OR CLTOR "mass timber" OR "heavy timber"
Fabrication Designer/Detailer	14	26	104	Fabrication Designer OR fabrication detailer OR fabrication detailer OR fabrication detail OR Detailer OR 3D modeller OR Virtual Construction Specialist OR CAD Technician OR 3D Drafter OR Virtual Construction Lead OR CAD Leader OR drafter	Glulam OR CLTOR "mass timber" OR "heavy timber" OR Cadwork
CNC Coder (MT)	7	11	53	CNC Coder OR CNC Programmer OR CNC Machining Specialist OR CAD/CAM Programmer OR Cambium Programmer OR CNC Machinist OR Virtual Construction Lead OR CAD Leader OR drafter	Glulam OR CLTOR "mass timber" OR "heavy timber" OR Cadwork
CNC Coder (Any Industry)	246	3200	52000	CNC Coder OR CNC Programmer OR CNC Machining Specialist OR CAD/CAM Programmer OR Cambium Programmer OR CNC Machinist OR CNC OR Computer Numerical Control	0
IT Infrastructure Specialist	40	385	8400	IT Infrastructure Specialist OR ERP Specialist OR IT Systems Integration Engineer OR IT Infrastructure Analyst	Glulam OR CLTOR "mass timber" OR "heavy timber" OR ERP OR Manufacturing

Senior Estimator (MT)	4	6	32	Senior Estimator OR Lead Estimator OR Senior Timber Estimator OR Senior Construction Cost Estimator OR Cost Consultant OR Cost Engineer	Glulam OR CLTOR "mass timber" OR "heavy timber" OR "wood Construction"
Senior Estimator (Any Industry)	504	3400	60000	Senior Estimator OR Lead Estimator OR Senior Timber Estimator OR Senior Construction Cost Estimator OR Cost Consultant OR Cost Engineer	0
Junior Estimator (MT)	3	3	45	Junior Estimator OR Quantity Surveyor OR Bid Specialist OR Timber Project Estimator OR Construction Cost Estimator	Glulam OR CLTOR "mass timber" OR "heavy timber" OR "Wood Construction"
Junior Estimator (Any Industry)	171	1000	140000	Junior Estimator OR Quantity Surveyor OR Bid Specialist OR Timber Project Estimator OR Construction Cost Estimator	0
Project Coordinator	33	63	150	Project Coordinator OR Junior Project Manager	Glulam OR CLTOR "mass timber" OR "heavy timber"
Sales Engineer	9	20	165	Sales Engineer OR Technical Sales Engineer OR Mass Timber Specialist OR Sales Consultant	Glulam OR CLTOR "mass timber" OR "heavy timber" OR timberframe OR "timberframe"
Sales Director	10	37	804	Sales Manager OR Mass Timber Regional Manager OR Project Delivery Manager OR Sales Director	Glulam OR CLTOR "mass timber" OR "heavy timber" OR timberframe OR timberframe
Production Manager	16	43	856	Production Manager OR Operations Manager OR Manufacturing Manager OR Plant Manager	Gulam OR CLTOR "mass timber" OR "heavy timber" OR prefab
Industrial Electrician	342	2400	19000	Industrial Electrician OR Maintenance Electrician OR Manufacturing Plant Electrician	Gulam OR CLTOR "mass timber" OR "heavy timber" OR Sawmill OR manufacturing

Automation Engineer	666	6400	220000	Automation Engineer OR Production Analyst OR Automation Specialist OR Process Engineer OR Production leader	Gulam OR CLTOR "mass timber" OR "heavy timber" OR manufacturing OR Sawmill
Timber Framer/Finisher	51	119	882	Timber framer OR timber finisher OR Framing Operator OR Carpenter OR Framing Labourer	Gulam OR CLTOR "mass timber" OR "heavy timber" OR timberframe OR "timber frame"
Technical Director	9	19	226	Technical Director OR Director Engineering OR Timber Engineer Lead	Gulam OR CLTOR "mass timber" OR "heavy timber" OR timberframe OR "timber frame"

FIGURE 2 SEARCH RESULTS & TERMS

LABOUR FORCE BY GENDER (BC ONLY) %

BC (Male) %   BC (Female) %

Role	Location 2: Canada Results	Location 1: BC Results
Technical Director	19	9
Timber Framer/Fisher	119	51
Automation Engineer	6400	666
Industrial Electrician	2400	342
Production Manager	43	16
Sales Director	37	10
Sales Engineer	20	9
Project Coordinator	63	33
Junior Estimator (Any Industry)	1000	171
Junior Estimator (MT)	3	3
Senior Estimator (Any Industry)	3400	504
Senior Estimator (MT)	6	4
IT Infrastructure Specialist	385	40
CNC Coder (Any Industry)	3200	246
CNC Coder (MT)	11	7
Fabrication Designer / Detailer	26	14
Quality Control	18	8
Project Manager	232	108

■ Location 2: Canada Results   ■ Location 1: BC Results

8.3 IMAGE CREDITS

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