

Mass Timber Construction Sequence & Common Software Functionality for Trades

The purpose of this chart is to help Faculty understand the roles, functionality and strengths of software common to the mass timber industry. This matrix was created in conjunction with the software companies and is meant as an informational guide not a training tool.

Phase	Event	Primary Responsibility	Tradesperson's Role	Software: Dietrich's	Software: Autocad	Software: Revit	Software: Cadwork	Software: CM Builders	Software: HSBCAD
				Module / Functionality	Module / Functionality	Module / Functionality	Module / Functionality	Module / Functionality	Module / Functionality
1. Pre-Design	Site & Feasibility	Owner / Architect	Detailing under supervision of owner/architect	<p>Floor Plan: Import of PDFs, Point-Clouds or Terrain. Used for early-stage layout and site boundary analysis.</p>	<p>2D Reference Tool: Used to import site plans, survey drawings, and boundary layouts as 2D base references. Provides a starting canvas for early massing and site context studies.</p>	<p>Conceptual Mass / Site: Used to create early 3D massing models and explore site placement, orientation, and building footprint. Site tools allow topographic analysis and integration with survey data.</p>	<p>Import & Reference: Imports IFC, DXF/DWG, or point cloud files to establish the project context. Used to set up coordinate systems and site boundaries before timber modeling begins.</p>	<p>Project Setup: Used to initiate the project file and configure site information, project location, and stakeholder data. Typically relies on DXF/IFC imports from the architectural design platform.</p>	<p>Typically, a design would start from the Architectural model itself in either AutoCAD or Revit. Interoperability with other design platforms: Importation of 3D (like IFC) or 2D.</p>
2. Design	Drafting & Detailing	Architect / Tech	Detailing Expert	<p>Floor Module, Wall Modules, Roof module; D-CAM for other details: The "heart" of the system. Under supervision of Architect/Engineer, Trades</p> <ul style="list-style-type: none"> Detail joinery and (standard & custom) metal connections in 3D that are actually buildable. Learn basics of IFC and how to import into Dietrich's. Develop a BIM aligned model. 	<p>2D Drafting & Detailing: Produces precise 2D shop drawings, connection details, and cross-section views. Used alongside 3D platforms to prepare fabrication-ready detail drawings for timber connections and assemblies.</p>	<p>BIM Authoring / Structural Module: Full 3D parametric BIM model creation including structural framing, timber members, and building systems. Supports IFC export for coordination with fabrication software and clash detection workflows.</p>	<p>3D Timber Modeling: Parametric 3D modeling of all mass timber elements (CLT panels, glulam beams, columns, connections). Generates production-ready models with full component data, directly linked to CNC output and BOM. Supports IFC interoperability for multi-discipline coordination.</p>	<p>Component Design: Models prefabricated wall, floor, and roof panels with embedded framing, insulation, and service layers. Generates a digital twin of the assembly for review and downstream fabrication.</p>	<p>hsbcad offers a variety of modules depending on your design needs. All construction methods can be mixed together. These include: Timber, CLT, SIPs, Strickframe, Floor framing, Roof framing (cassettes), Log, LGS and more. Each module automates the design of these systems and helps you create a digital twin.</p>

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				<ul style="list-style-type: none"> Understand constraints of CNC Fabrication. <p><i>Note: If you wish to train your trades to learn building physics, R-value, Dew-point Calculator and how to apply to wall-buildups Dietrich's has appropriate functionality.</i></p>					
3. Preliminary Project Management & Costing	Material Lists & Dimension Take-off	Project Manager	Under supervision of Project Manager (Depends if the project requires certified PM)	Project-Data-Program Module & Project-DB. Extract material lists <ul style="list-style-type: none"> Dimension take-off Developed preliminary quotes. 	No Native Costing Module: AutoCAD does not include built-in quantity take-off or costing tools. Dimension annotations and geometry are typically exported to a spreadsheet or estimating software for manual costing.	Schedules & Quantity Take-off: Automatically generates material schedules, element counts, and area calculations directly from the BIM model. Data can be exported to cost estimation platforms such as Autodesk Insights or third-party estimating tools.	Bill of Materials (BOM): Automatically extracts detailed material lists, cut lists, and dimension take-offs from the 3D model. Supports ERP integrations for direct transfer of material data to project management and procurement systems.	Material & Cost Reports: Generates component-level material lists and preliminary cost estimates from the panel model. Supports RFI and change order tracking as the design evolves.	BOM (including ERP integrations) Coordination with other trades Conceptual design > RFIs
3. Permitting	Legal Approvals	Architect	No direct role	Dietrich's-DC-Statik-Module: Generates verifiable structural documents for building officials. Trades not involved in this phase.	2D Drawing Package: Used to prepare permit drawings including floor plans, elevations, and sections in a format accepted by building authorities. Trades have no direct involvement in this phase.	Drawing Sheet Production: Generates permit drawing sets directly from the BIM model, including plans, sections, and elevations. Structural models can be linked to structural engineering analysis tools for code-compliant documentation.	Structural Documentation: Produces detailed structural plans and member schedules that support engineer stamping and permit submission. Trades are not directly involved; documentation is prepared by the design and engineering team.	No Direct Role: CM Builders does not typically produce permit documentation. Structural and architectural drawings for permitting are generated in Revit or AutoCAD by the design team.	
4. Fab	CNC Fabrication	Fabricator / Trade	CNC Operator	D-CAM: Trades activities:	2D Shop Drawing Output:	No Native CNC Output:	CNC File Generation:	Panel Production Files:	Shop drawings or eShop drawings for a

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				<ul style="list-style-type: none"> Convert 3D designs into machine-ready files (BVN/BNX/BTL x/Other) for CNC. Shop drawings where needed. 	<p>Produces 2D fabrication drawings including dimensioned cut sheets, connection details, and assembly diagrams for the shop floor.</p> <p>Does not generate CNC machine files directly; used as a visual reference for fabricators.</p>	<p>Revit does not produce CNC machine files directly.</p> <p>The BIM model is typically exported via IFC or a Revit add-in to a fabrication platform such as cadwork or Dietrich's for CNC file generation.</p>	<p>Translates the 3D timber model directly into machine-readable CNC files (BTL, DSTV, or custom formats) for automated cutting, drilling, and milling.</p> <p>Also generates electronic shop drawings (eShop) for a paperless production environment, and supports nesting/part optimization for material efficiency.</p>	<p>Generates fabrication instructions and cutting lists for panelized wall, floor, and roof assemblies.</p> <p>Outputs can be used to guide manual or semi-automated panel production in the shop.</p>	<p>paperless environment</p> <p>Multiwalling (Stitching elements for equipment efficiencies)</p> <p>Part optimizations (Nesting)</p> <p>CNC file generation</p>
5. Logistics	Sequencing	Project Manager	Logistics Lead	<p>Load-Planning, Assembly-Order</p> <ul style="list-style-type: none"> Elements are assigned truck loading order and staging sequence. 	<p>No Native Sequencing:</p> <p>AutoCAD does not include logistics or sequencing tools. Installers may use AutoCAD drawings as a visual reference to understand component layout and delivery sequence.</p>	<p>4D Simulation (with add-ins):</p> <p>With tools such as Autodesk Navisworks, the Revit model can be animated to simulate construction sequence and delivery phasing. Helps the logistics lead visualize crane pick zones and just-in-time delivery windows.</p>	<p>Assembly Sequence & Logistics:</p> <p>Assigns installation order to each timber element and links sequencing data to truck loading plans. Ensures components are fabricated and delivered in the correct order to support crane sequence on site.</p>	<p>Delivery Sequencing:</p> <p>Panel and component IDs are linked to delivery schedules to coordinate truck loads with on-site installation sequence. Ensures prefabricated panels arrive ready for immediate installation.</p>	<p>Truck loading load out plan.</p> <p><i>Note: This typically happens before production as it drives production sequencing</i></p>
6. Erection	Assembly	Mass Timber Trade	Lead Installer	<p>D-CAD 2D / 3D Viewer:</p> <ul style="list-style-type: none"> Trades use the model to view lifting points and assembly order. 	<p>2D Assembly Reference:</p> <p>Printed or PDF floor plans and elevation drawings are used on site by the installation crew to verify element placement and orientation. No interactive 3D viewing; used as a static reference tool.</p>	<p>3D Model Viewer (Viewer Apps):</p> <p>The Revit model can be published to BIM 360 or Autodesk Docs for field access on tablets or phones. Installers can view 3D element positions, assembly order, and connection details directly on site.</p>	<p>3D Site Reference:</p> <p>The cadwork model is accessible via viewer applications that allow the installation crew to inspect element orientation, lifting points, and connection details in 3D. Supports issue tracking and field verification against the digital model.</p>	<p>Panel Installation Guide:</p> <p>Provides numbered panel maps and assembly diagrams that guide the installation crew on placement sequence and alignment. Mobile-accessible versions support on-site reference without printed drawings.</p>	<p>hsbShare allows viewing of elements through a web browser for 3D views, status updates, issue tracking and references to important documentation</p>
7. Envelope	Systems	Specialized Trades	MEP and HVAC	<p>Wall/Roof Modules:</p> <p>Dietrich's wall and roof modules can model</p>	<p>MEP Overlay Drafting:</p>	<p>MEP Systems Modeling:</p>	<p>Service Penetration Modeling:</p>	<p>MEP Pre-Integration:</p> <p>Panels can be designed to include</p>	<p>Our design solution does integrate with MEP. They can be</p>

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			Systems Installer	building envelope layers including cladding, insulation, and air barriers. MEP penetrations through mass timber elements can be incorporated into the model for coordination.	Used to produce 2D coordination drawings showing mechanical, electrical, and plumbing routing relative to the timber structure. Helps identify potential conflicts between services and structural members before installation.	Full 3D MEP modeling within the Revit environment allows coordination between structural timber, mechanical ducts, electrical conduit, and plumbing. Clash detection between services and structure is run through Navisworks, identifying conflicts before they reach the site.	Models service openings, block-outs, and penetrations through timber panels and beams. Coordinates with MEP trades to ensure holes, chases, and access points are pre-cut at the factory rather than field-cut on site.	pre-installed rough-in services such as electrical boxes, plumbing stubs, and HVAC penetrations. Factory integration of MEP reduces on-site coordination time and minimizes disruption to finished timber surfaces.	included in the shop drawings or the access points (holes/box framing) can be done in the plant.