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Sector
Interiors, Furniture and Fixtures

Sub-Sector
Furniture Design and Production

Occupation
Furniture Production (Workshop)

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Technical Handbook
Joinery

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Skill Explanation

A joiner generally works on commercial and residential projects. There is a direct relationship between the nature and quality of the product required and the payment made by the customer. Therefore, the joiner has a continuing responsibility to work professionally in order to meet the requirements of the customer and thus maintain and grow the business. Joinery is closely associated with cabinet making and carpentry plus other parts of the construction industry and with the many products that support it, normally for commercial purposes.

The joiner is usually based in a workshop because the formation of various joints requires specialist machinery, but sometimes undertakes installations in the homes of customers and on building sites. He or she will produce and interpret drawings, set out and measure, cut, form joints, assemble, install, and finish to a high standard. The joiner usually produces items such as interior and exterior doors, windows, stairs, tables, and bookshelves.

Work organization and self-management, communication and interpersonal skills, problem solving, innovation and creativity, working precisely and accurately are the universal attributes of the outstanding joiner. Whether the joiner is working alone or in a team the individual takes on a high level of personal responsibility and autonomy. From working safely through to exceptional planning and organizing, accuracy, concentration, and attention to detail to achieve an excellent finish, every step in the process matters. Mistakes are largely irreversible and very costly.

With the international mobility of people, the joiner faces rapidly expanding opportunities and challenges. For the talented joiner there are many commercial and international opportunities; however, these carry with them the need to understand and work with diverse cultures and trends.

The diversity of skills associated with joinery is therefore likely to expand.

Age limit of Competitors

The Competitors must not be older than 22 years in the year of the Competition

Applicable National Occupational Standards (NOS)

1. FFS/N0914: Perform site recce and prepare the product drawings
2. FFS/N0915: Select and prepare the materials into required specifications and dimensions
3. FFS/N0916: Prepare the components with internal and external joints to perform product assembly
4. FFS/N0917: Perform the product finishing and installation based on design specifications
5. FFS/N8211: Execute joinery work with safety and adherence to workplace management standards
6. FFS/N8212: Display effective communication and professional skills at workplace

1. FFS/N0914: Perform site recce and prepare the product drawings

Description

This unit describes the performance outcomes required to perform site assessments with consideration for environmental factors, interpreting drawing dockets, working with drawings, and accuracy in producing joint details.

Scope

The scope covers the following :

- Site Assessment and Environmental Consideration
- Drawing Docket Interpretation
- Working with Drawing
- Accurate Joint Details Production

Elements and Performance Criteria

Site Assessment and Environmental Consideration

To be competent, the user/individual on the job must be able to:

PC1. access the location of the finished product and environmental conditions

PC2. collaborate with experts to gather insights and perspectives of site that may influence the design and construction process.

PC3. measure and record the size and shape of the area in which the completed product will be installed

Drawing Docket Interpretation

To be competent, the user/individual on the job must be able to:

PC4. interpret drawing dockets with precision, optimizing the potential for high-quality construction while considering design intent

PC5. determine and check quantities of materials required for construction, considering factors such as waste minimization and cost-effectiveness.

PC6. seek clarification and correct any missing or incorrect information in drawings, ensuring accuracy and eliminating potential issues in the construction process.

Working with Drawing

To be competent, the user/individual on the job must be able to:

PC7. produce meticulous drawings both to scale and full size, adhering to drawing docket specifications.

PC8. perform the drawing annotation with appropriate dimensional points, specification, conventions and notes on the full-scale drawing

PC9. utilize geometric methods adeptly to determine missing complex angles, joints, and intersections

Pc10. produce lines that are straight, crisp, accurate, meet clearly at intersections, and maintain consistent thickness and correct weight.

PC11. ensure that line types effectively convey different elements of the design and construction process.

Accurate Joint Details Production

To be competent, the user/individual on the job must be able to:

PC12. produce joint details that are accurate, correctly proportioned, and aligned with the overall design intent.

PC13. ensure that all measurements in the working drawing meet specified requirements and align with project specifications.

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Site Assessment and Environmental Consideration	6	12	2	2
PC1. access the location of the finished product and environmental conditions	2	4	-	1
PC2. collaborate with experts to gather insights and perspectives of site that may influence the design and construction process.	2	4	-	-
PC3. measure and record the size and shape of the area in which the completed product will be installed	2	4	2	1
Drawing Docket Interpretation	2	12	6	1
PC4. interpret drawing dockets with precision, optimizing the potential for high -quality construction while considering design intent	2	4	2	1
PC5. determine and check quantities of materials required for construction, considering factors such as waste minimization and cost -effectiveness.	-	4	2	-
PC6. seek clarification and correct any missing or incorrect information in drawings, ensuring accuracy and eliminating potential issues in the construction process.	-	4	2	-
Working with Drawing	10	20	8	4
PC7. produce meticulous drawings both to scale and full size, adhering to drawing docket specifications.	2	4	2	1
PC8. perform the drawing annotation with appropriate dimensional points, specification, conventions and notes on the full scale drawing	2	4	2	1
PC9. utilize geometric methods adeptly to determine missing complex angles, joints, and intersections	2	4	2	1
PC10. produce lines that are straight, crisp, accurate, meet clearly at intersections, and maintain consistent thickness and correct weight.	2	4	2	1
PC11. ensure that line types effectively convey different elements of the design and construction process.	2	4	-	-

Accurate Joint Details Production	4	8	2	1
PC12. produce joint details that are accurate, correctly proportioned, and aligned with the overall design intent.	2	4	2	1
PC13. ensure that all measurements in the working drawing meet specified requirements and align with project specifications.	2	4	-	-
NOS Total	**22**	**52**	**18**	**8**

2. FFS/N0915: Select and prepare the materials into required specifications and dimensions

Description

This unit describes the performance outcomes required to perform material selection and setting out, execute material sawing and drying processes, and create jigs for stationary machines.

Scope

The scope covers the following :

- Material Selection and setting out
- Material Sawing and Drying Process
- Jig Creation for Stationery Machines

Elements and Performance Criteria

Material Selection and setting out

To be competent, the user/individual on the job must be able to:

PC1. select materials, avoiding defects and enhance the overall appearance of the finished product.

PC2. assess the suitability of chosen materials concerning functionality, durability, and industry standards as indicated in drawings

PC3. prepare the cutting list of the product components based on finished and raw dimension specification

PC4. set out materials meticulously to determine all necessary measurements, sections, angles, mitres, and joints

PC5. perform face marking of final dimensions and shapes for fabrication, maintaining fidelity to design specifications.

PC6. make use of digital tools and technology for accurate measurement determination and material set out

PC7. perform labelling on materials and items appropriately to maintain organization and clarity throughout the fabrication process.

Material Sawing and Drying Process

To be competent, the user/individual on the job must be able to:

PC8. perform sawing of materials to match the specifications outlined in the material list, considering factors such as grain direction and project requirements.

PC9. set the sawn materials for drying, ensure the right moisture content.

PC10. perform planing of materials to achieve "squareness" and the desired thickness

Jig Creation for Stationery Machines

To be competent, the user/individual on the job must be able to:

PC11. access the requirement of jigs based on part specification

PC12. select the appropriate tools, material and process specifications for jig fabrication

PC13. produce jigs for stationery machines based on drawings, adhering to safety requirements and ensuring accuracy in manufacturing.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Material Selection and setting out	10	28	14	3
PC1. select materials, avoiding defects and enhance the overall appearance of the finished product.	2	4	2	1
PC2. assess the suitability of chosen materials concerning functionality, durability, and industry standards as indicated in drawings	2	4	2	-
PC3. prepare the cutting list of the product components based on finished and raw dimension specification	-	4	2	-
PC4. set out materials meticulously to determine all necessary measurements, sections, angles, mitres, and joints	2	4	2	-
PC5. perform face marking of final dimensions and shapes for fabrication, maintaining fidelity to design specifications.	2	4	2	1
PC6. make use of digital tools and technology for accurate measurement determination and material set out	2	4	2	1

PC7. perform labelling on materials and items appropriately to maintain organization and clarity throughout the fabrication process.	-	4	2	-
Material Sawing and Drying Process	4	12	6	1
PC8. perform sawing of materials to match the specifications outlined in the material list, considering factors such as grain direction and project requirements.	2	4	2	-
PC9. set the sawn materials for drying, ensure the right moisture content.	2	4	2	1
PC10. perform planing of materials to achieve "squareness" and the desired thickness	-	4	2	-
Jig Creation for Stationery Machines	4	12	4	2
PC11. access the requirement of jigs based on part specification	2	4	-	1
PC12. select the appropriate tools, material and process specifications for jig fabrication	2	4	2	1
PC13. produce jigs for stationery machines based on drawings, adhering to safety requirements and ensuring accuracy in manufacturing.	-	4	2	-
NOS Total	18	52	24	6

3. FFS/N0916: Prepare the components with internal and external joints to perform product assembly

Description

This unit describes the performance outcomes required to prepare components, fabricate internal and external joints for product assembly, perform trial assembly, and execute the final product assembly.

Scope

The scope covers the following:

- Preparing components
- Fabricate internal and external joints for product assembly
- Perform trial assembly
- Product Assembly

Elements and Performance Criteria

Preparing components

To be competent, the user/individual on the job must be able to:

PC1. perform the cutting of panels into required specifications using a cutting machine
PC2. produce shaped elements using jigs on stationery machines, aligning with design specifications
PC3. utilize woodworking machines skilfully to form grooves, rebates, and mouldings
PC4. adapt and refine shaped elements as necessary to meet evolving project requirements and design alterations.

Fabricate internal and external joints for product assembly

To be competent, the user/individual on the job must be able to:

PC5. undertake the preparation of joints with accurate measurements and intersections with no gaps
PC6. use appropriate hand tools and machines for joint preparation
PC7. produce mortices and haunches to the specified depth, width, and length as specified in drawing.
PC8. prepare joints that are parallel, clean, and correct in size to the drawing
PC9. ensure faces, edges, and all shoulders are square straight and to the drawing
PC10. achieve snug fit for the joints, ensuring a smooth "push fit" without excessive tightness or looseness.
PC11. ensure proper checking of joints for strength and durability
PC12. check and confirm the joint geometry conforms with the product drawing

Perform trial assembly

To be competent, the user/individual on the job must be able to:

PC13. perform trial assembly to check that components fit together seamlessly, with no gaps, and conform to the specifications outlined in the working drawing.
PC14. perform rectification to address any discrepancies identified during the trial assembly.

Product Assembly

To be competent, the user/individual on the job must be able to:

PC15. select and prepare the appropriate glue for assembly, considering factors such as material compatibility and project requirements.
PC16. apply glue evenly and attach the edging, ensuring there are no "twists" and that the attachment is "square."
PC17. ensure that joints are complete, well-finished, and aligned with project specifications.
PC18. verify the completeness and quality of joints in the assembled components.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Preparing components	2	16	8	1
PC1. perform the cutting of panels into required specifications using a cutting machine	1	4	2	-
PC2. produce shaped elements using jigs on stationery machines, aligning with design specifications	-	4	2	-
PC3. utilize woodworking machines skilfully to form grooves, rebates, and mouldings	1	4	2	1
PC4. adapt and refine shaped elements as necessary to meet evolving project requirements and design alterations.	-	4	2	-
Fabricate internal and external joints for product assembly	7	24	8	2
PC5. undertake the preparation of joints with accurate measurements and intersections with no gaps	1	4	2	1
PC6. use appropriate hand tools and machines for joint preparation	1	4	2	-
PC7. produce mortices and haunches to the specified depth, width, and length as specified in drawing.	-	4	2	-
PC8. prepare joints that are parallel, clean, and correct in size to the drawing	1	4	2	-
PC9. ensure faces, edges, and all shoulders are square straight and to the drawing	1	2	-	-
PC10. achieve snug fit for the joints, ensuring a smooth "push fit" without excessive tightness or looseness.	1	2	-	-
PC11. ensure proper checking of joints for strength and durability	1	2	-	-
PC12. check and confirm the joint geometry conforms with the product drawing	1	2	-	1
Perform trial assembly	-	8	4	-
PC13. perform trial assembly to check that components fit together seamlessly, with no gaps, and conform to the specifications outlined in the working drawing.	-	4	2	-
PC14. perform rectification to address any discrepancies identified during the trial assembly.	-	4	2	-
Product Assembly	3	12	4	1
PC15. select and prepare the appropriate glue for assembly, considering factors such as material compatibility and project requirements.	1	4	2	-
PC16. apply glue evenly and attach the edging, ensuring there are no "twists" and that the attachment is "square."	-	4	2	1
PC17. ensure that joints are complete, wellfinished, and aligned with project specifications.	1	2	-	-
PC18. verify the completeness and quality of joints in the assembled components.	1	2	-	-
NOS Total	12	60	24	4

4. FFS/N0917: Perform the product finishing and installation based on design specifications

Description

This unit describes the performance outcomes required to perform product finishing and product installation.

Scope

The scope covers the following :

- Product Finishing
- Product Installation

Elements and Performance Criteria

Product Finishing

To be competent, the user/individual on the job must be able to:

PC1. complete the product to the specifications outlined in the drawing

PC2. interpret the quality standard required by customers or trades for further processes

PC3. use appropriate tools to smoothen the surface of the product through sanding by machine and/or by hand to a specified standard

PC4. prepare edging for protection, ensuring durability and longevity.

PC5. maintain the quality of the surface during assembly and installation, e.g., free from glue and any defects or chips

PC6. address and resolve any defects identified during the quality checking process

Product Installation

To be competent, the user/individual on the job must be able to:

PC7. plan installations, repairs, or maintenance to meet customer and related trades needs and expectations

PC8. check the quality and completeness of all components before installation, addressing any discrepancies or issues identified.

PC9. evaluate and select fittings based on both functional requirements and aesthetic considerations

PC10. check where changes may be necessary to the positioning/fixing of components

PC11. ensure prevention of any damage to finishes during the installation process

PC12. ensure quality checks at regular intervals during installation to avoid any defects/ error detection at a later stage

PC13. perform the cleaning of the installed product thoroughly before handover

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Product Finishing	5	28	16	3
PC1.complete the product to the specifications outlined in the drawing	-	6	4	-
PC2.interpret the quality standard required by customers trades for further processes	1	6	4	-
PC3.use appropriate tools to smoothen the surface of the product through sanding by machine and/or by hand to a specified standard	1	6	4	1
PC4.prepare edging for protection, ensuring durability longevity.	1	6	4	1
PC5.maintain the quality of the surface during assembly & installation, e.g., free from glue and any defects or chips	1	2	-	1
PC6.address and resolve any defects identified during the quality checking process	1	2	-	-
Product Installation	7	26	12	3
PC7.plan installations, repairs, or maintenance to meet customer and related trades needs and expectations	1	6	4	-
PC8.check the quality and completeness of all components before installation, addressing any discrepancies or issues identified.	1	2	-	1
PC9.evaluate and select fittings based on both functional requirements and aesthetic considerations	1	6	4	1
PC10.check where changes may be necessary to the positioning/fixing of components	1	2	-	-
PC11.ensure prevention of any damage to finishes during the installation process	1	2	-	-
PC12.ensure quality checks at regular intervals during installation to avoid any defects/ error detection at a later stage	1	2	-	-
PC13.perform the cleaning of the installed product thoroughly before handover	1	6	4	1
NOS Total	12	54	28	6

5. FFS/N8211: Execute joinery work with safety and adherence to workplace management standards

Description

This unit describes the performance outcomes required to adhere to health and safety standards, ensure tools/material safety, plan work areas efficiently, and improve work efficiency through self-evaluation.

Scope

The scope covers the following :

- Adherence to Health and Safety Standards
- Tools, Equipment, and Material Safety
- Work Area Planning and Efficiency
- Work Efficiency and Self-Evaluation

Elements and Performance Criteria

Adherence to Health and Safety Standards

To be competent, the user/individual on the job must be able to:

PC1. follow health and safety standards, rules, and regulations governing the construction environment.

PC2. uphold a safe working environment, implementing measures to ensure the well-being of oneself and others.

Pc3. identify and employ the necessary personal protective equipment, including safety footwear, ear and eye protection, and dust protection.

Tools, Equipment, and Material Safety

To be competent, the user/individual on the job must be able to:

PC4. prudently use, clean, maintain, and store all hand and powered tools and equipment safely, following recommended procedures.

PC5. safely select, use, and store all materials, adhering to established safety guidelines.

Work Area Planning and Efficiency

To be competent, the user/individual on the job must be able to:

PC6. plan the work area to optimize efficiency, incorporating regular tidying and cleaning practices.

PC7. measure accurately to avoid wastage, ensuring efficient use of resources.

Work Efficiency and Self-Evaluation

To be competent, the user/individual on the job must be able to:

PC8. perform work efficiently, regularly checking progress and outcomes to maintain high productivity.

PC9. evaluate personal work, identifying areas for improvement and implementing corrective measures.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Adherence to Health and Safety Standards	6	18	4	2
PC1.follow health and safety standards, rules, and regulations governing the construction environment.	2	6	-	1
PC2.uphold a safe working environment, implementing measures to ensure the wellbeing of oneself and others.	2	6	-	-
PC3.identify & employ the necessary personal protective equipment, including safety footwear, ear and eye protection, and dust protection.	2	6	4	1
Tools, Equipment, and Material Safety	4	12	8	2
PC4.prudently use, clean, maintain, and store all hand and powered tools and equipment safely, following recommended procedures.	2	6	4	1
PC5.safely select, use, and store all materials, adhering to established safety guidelines.	2	6	4	1
Work Area Planning and Efficiency	4	12	8	-
PC6.plan work area to optimize efficiency, incorporating regular tidying and cleaning practices.	2	6	4	-
PC7.measure accurately to avoid wastage, ensuring efficient use of resources.	2	6	4	-
Work Efficiency and Self Evaluation	4	12	4	-
PC8.perform work efficiently, regularly checking progress and outcomes to maintain high productivity.	2	6	4	-
PC9.evaluate personal work, identifying areas for improvement and implementing corrective measures.	2	6	-	-
NOS Total	18	54	24	4

6. FFS/N8212: Display effective communication and professional skills at workplace

Description

This unit outlines the performance outcomes required to perform and foster customer trust, decision making, supplier relations, cost estimation, industry awareness, adaptability, innovation, quality improvement, and effective communication.

Scope

The scope covers the following :

- Customer Trust and Relationship Management
- Decision-Making and Supplier Relations
- Cost Estimation and Industry Awareness
- Adaptability and Innovation
- Quality Improvement and Communication

Elements and Performance Criteria

Customer Trust and Relationship Management

To be competent, the user/individual on the job must be able to:

PC1. gain the trust of customers by interpreting their requirements, managing expectations positively, and delivering on commitments.

PC2. visualize and translate customer wishes, providing advice and recommendations that meet or improve their design and budgetary requirements.

Decision-Making and Supplier Relations

To be competent, the user/individual on the job must be able to:

PC3. positively support and lead decision-making assertively, ensuring alignment with project objectives.

PC4. perform liaising with suppliers to negotiate prices, place orders, and maintain positive relations.

Cost Estimation and Industry Awareness

To be competent, the user/individual on the job must be able to:

PC5. produce accurate cost and time estimates for customers, demonstrating financial and temporal competency.

PC6. keep up to date with changes in the construction industry, staying informed about trends and advancements.

Adaptability and Innovation

To be competent, the user/individual on the job must be able to:

PC7. display willingness to try new methods and embrace change, contributing to a culture of innovation.

PC8. recognize and understand problems swiftly, following a self-managed process for resolution, and challenging incorrect information to prevent future issues.

Pc9. perform tasks, fulfil deadlines, and report progress properly.

Quality Improvement and Communication

To be competent, the user/individual on the job must be able to:

PC10. regularly scrutinize work for accuracy/standard, aiming to minimize potential issues in later stages.

PC11. recognize and comprehend problems as they arise, applying a self-managed process for resolution to prevent escalation.

PC12. proactively challenge incorrect information to avert potential problems and ensure the accuracy of work.

PC13. recognize opportunities to contribute ideas that improve the product and overall industry quality.

PC14. keep abreast of industry developments, ensuring a current understanding of changes and trends.

PC15. display willingness to experiment with new methods, fostering an environment of adaptability and change embracement.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Customer Trust and Relationship Management	4	8	2	-
PC1. gain the trust of customers by interpreting their requirements, managing expectations positively, and delivering on commitments.	2	4	-	-
PC2. visualize and translate customer wishes, providing advice and recommendations that meet or improve their design and budgetary requirements.	2	4	2	-
Decision - Making and Supplier Relations	2	8	4	-
PC3. positively support and lead decision-making assertively, ensuring alignment with project objectives.	-	4	2	-
PC4. perform liaising with suppliers to negotiate prices, place orders, and maintain positive relations.	2	4	2	-
Cost Estimation and Industry Awareness	4	8	2	-
PC5. produce accurate cost & time estimates for customers, demonstrating financial and temporal competency.	2	4	2	-
PC6. keep up to date with changes in the construction industry, staying informed about trends and advancements.	2	4	-	-

Adaptability and Innovation	6	12	4	-
PC7. display willingness to try new methods and embrace change, contributing to a culture of innovation.	2	4	-	-
PC8. recognize and understand problems swiftly, following a self-managed process for resolution, and challenging incorrect information to prevent future issues.	2	4	2	-
PC9. perform tasks, fulfil deadlines, and report progress properly.	2	4	2	-
Quality Improvement and Communication	4	24	8	-
PC10. regularly scrutinize work for accuracy/standard, aiming to minimize potential issues in later stages.	-	4	2	-
PC11. recognize and comprehend problems as they arise, applying a self-managed process for resolution to prevent escalation.	-	4	2	-
PC12. proactively challenge incorrect information to avert potential problems and ensure the accuracy of work.	-	4	2	-
PC13. recognize opportunities to contribute ideas that improve the product and overall industry quality.	-	4	2	-
PC14. keep abreast of industry developments, ensuring a current understanding of changes and trends.	2	4	-	-
PC15. display willingness to experiment with new methods, fostering an environment of adaptability and change embracement.	2	4	-	-
NOS Total	20	60	20	-

Working Instructions to Competitors

For Construction of the task

- After face marking and setting out of the case competitors must bring them to the experts for marking
- Before gluing, the frames must be presented to the experts for marking
- Hand tools can be utilized for finishing your work.
- The competitors must keep track of the time by themselves.
- The timing will be stop by experts, only in cases of illness and accidents
- Workshop Installation-Tools & Equipment positioned by Organizers
- Tool Kit-Tool & Equipment allowed to be brought by competitors for competitions
- All equipment and material will be provisioned by the Organizers at site including raw material and white oak wood

Product Execution Template

Section A: Product Overview

1. Product Details

Product Name	WorldSkills Joinery Test Project
Dimensions	Window:-Thickness:36mm, Width:520 mm, Height:871mm Frame:-thickenss:50mm, width:768mm, Hight: 1160mm
Materials	Hard Wood: - White ash
Design Features	European window and frame
Intended Use	-

Section B: Pre-Execution Readiness

2. Pre-Production Checklist

Ensure all these are addressed before beginning production:

Task	Status (✓/✗)	Remarks
Final approval of product drawings	✓	Must include plan, elevation, section views
On-site space cleaned and prepared	✓	No obstructions or ongoing construction
Room and wall measurements verified	✓	Match drawing specs to physical space
All raw materials, hardware delivered and checked	✓	Verify quality, quantity, moisture content
Availability of Power tools, hand tools	✓	-
Availability of power outlets	✓	For power tool operation (220V preferred)

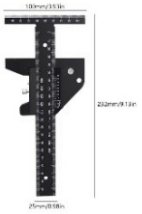
Section C: Materials & Resources

3. Raw Materials Required

Item	Specification/Use	Description	Image
Wood and Panels			
Hard Wood	White Ash is known for its sturdiness and resilience, , as per the requirement	White ash wood	
MDF board	12mm thickness	Engineered wood product made by bonding together thin layers of wood veneer (plies)	

Hardware			
Butt hinge	4inch butt hinge	Provide a limited angle of rotation between two objects	
Screws	Various sizes	Used for structural joining and mounting	
Adhesives & Consumables			
Resin Glue	For joint fixing	PVA-based wood adhesive for edge bonding & surface gluing	
Fast spray glue	Template holding for few minutes	A permanent contact adhesive in an aerosol format	
Orbital Sanding paper	120grid, 180 grid, 220 grid	For wood surface finishing	

4. Tools & Equipment

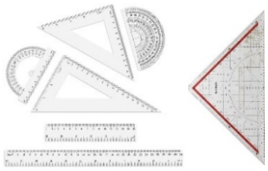
Item	Specification/Use	Description	Image
Hand Tools			
Measuring Tape	3m/5m	For accurate measurements of wood panels	
Steel Ruler	300mm or 600mm 1200mm	Precision steel measuring tool	
T type calliper	100mm 150mm	Used to measure internal sizes like holes, grooves, or slots accurately.	
Head Light	1000 luminous power	Providing visibility	
Vernier calliper	150mm	Measure internal, external, and depth dimensions accurately.	
Bevel Chisel set	10mm 16mm 25mm	Used for precise cutting and cleaning of joints, especially in tight corners.	

Mortiser chisel set	4mm 6mm 8mm 10mm 12mm	For hard mortise cleaning	
Chisel Set	4mm 6mm 8mm 10mm 12mm	For hard wood cleaning	
Nylon hammer	Nylon surface hammer	Soft-faced hammer with a head made of nylon, often used to strike surfaces without causing damage or marring	
mallet	Wooden mallet	Used for striking or driving other tools, like chisels, or for assembling wooden objects	
Bevel Gauge	Adjustable angle tool	Used to mark and check angles	
Try Square	6"/8"	For marking and checking right angles	
Hand planner	Used to smooth or flatten wooden surfaces	Shaving off thin layers to achieve a desired level of smoothness or shape.	

Marking gauge	Tool used to scribe a line parallel to an edge or surface on a workpiece	This tool is essential for joinery and other woodworking tasks where accuracy & precision are crucial.	
Table vice clamp	Wide jaws, often with wooden faces to protect the material, & a clamping mechanism that allows for even pressure distribution.	A woodworking vice clamp is a tool used to securely hold workpieces	
Japanese saw	Pull-cutting action, are characterized by thin, flexible blades and a unique tooth design	They are generally more precise and require less effort than traditional Western saws due to the pull-cut mechanism	
Router bits	Shank diameter, cutting diameter, cutting length, overall length, & the material of the cutting edge (usually carbide or high-speed steel)	Router bits are cutting tools used with a router to shape wood and other materials	
Quick lever clamp	Mechanical devices used for rapid clamping and release of objects	Allowing for easy removal of the clamped object	
Spokeshave planner	A small plane with a blade fixed between two handles	Shaping of convex and concave curves	
F-clamps	600mm to 1200mm	Holding materials during cutting or glueing	

Power Tools			
Sliding compound mitre saw With Stand	Power tool designed for making precise angled cuts in various materials, particularly wood	Single or double bevel for angled cuts on two planes, & a miter adjustment for angled cuts in the horizontal plane.	
Hand Plunge router	Creating decorative edges, grooves, & rounded corners. Key specifications include motor power	Power tool used to cut and shape wood	
Table router	Woodworking tool that allows for precise & controlled routing operations by mounting a handheld router upside down into a table	outing grooves, edge profiles, and other intricate shapes	
Jigsaw	Straight and curved cuts, including miter cuts up to 45 degrees	Power tool used to make intricate, curved cuts in various materials like wood, metal	
Orbital sanding machine	Sanding pad diameter, orbit diameter, no-load speed (RPM)	Power tool that utilizes a rotating sanding pad to smooth surfaces	
Dust collector	Strong airflow and suction power – delivers a maximum 150-cubic-feet-of-air-per-minute rate (CFM)	Dust cleaning	
Track Saw	Guide rail supported	Precision straight cutting for sheet goods	

Battery Drill Machine	With wood bits	For drilling screw holes or dowel joints	
Hand trimmer	For making groove and precision work	—	
Stand Light	15000 luminus power	Dewalt stand light	
Stand - For Hand Tools	—	Used for tools storage on a arranged manner	
Clamp Stand	Metal body stand	Using for clamp holding	
MFT Table	Using for tools uses	Multifunction table for machine uses	
Working Table	Hard wood working table	—	

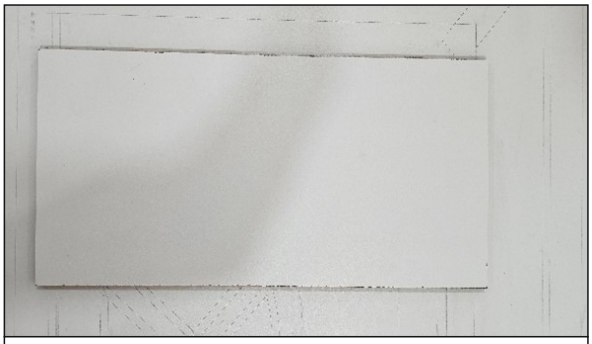
Accessories			
Carpenter's Pencil	Marking (HB, 2H,3H)	Flat pencil for marking wood without rolling off	
SET square	For right angle marking	Minimum length 1000mm	
Tools Bag	—	To carry tool	
Scale	1200mm	Straight line marking	
Safety Gears			
Dust Masks	N95 or similar	Protection from MDF dust	
Hand Gloves	Medium/Large	Prevent glue/chemical contact with skin	
Safety Goggles	ANSI-rated	Eye protection from dust and splinters	
Noise Protection Plugs	Foam type	Ear protection during power tool use	

Fire Extinguisher	CO_2 or dry powder	For immediate response to workshop fires	

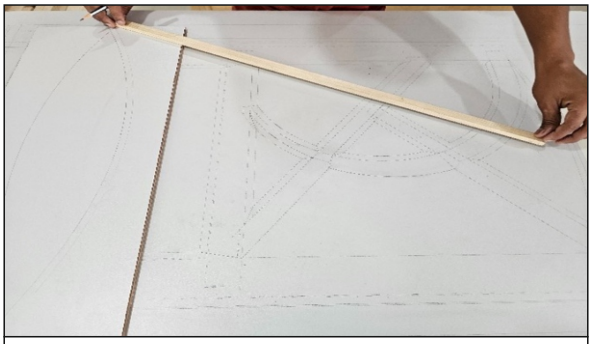
Section D Construction Workflow

5. Step by Step Build Process

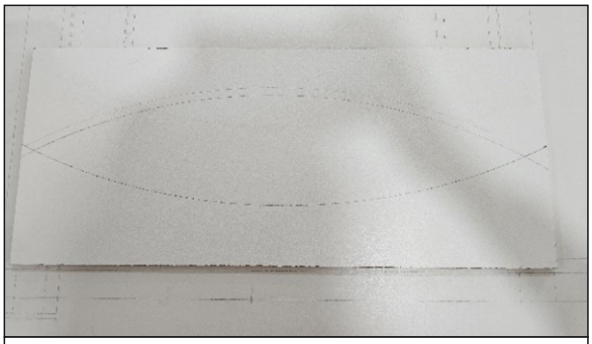
Template cutting process



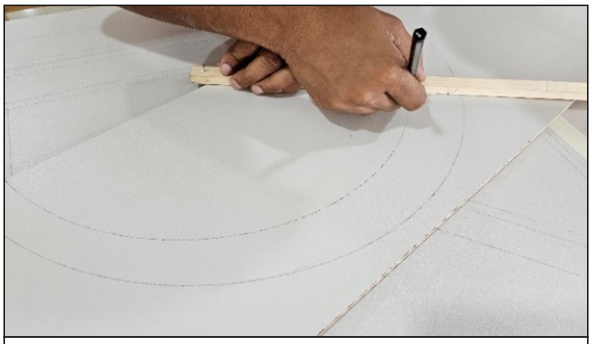
Place template cutting board on drawing board



Using compass, fix the radius then mark on the template

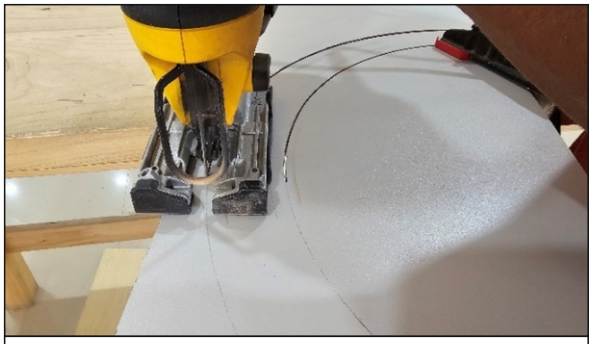


This template used for part 2 and 3 in module 1

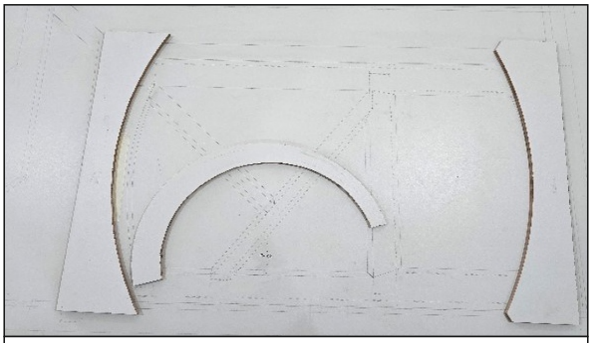


And this is used for part 5 and 6 no in module 1

Using jigsaw machine for template cutting and set smooth cutting blade

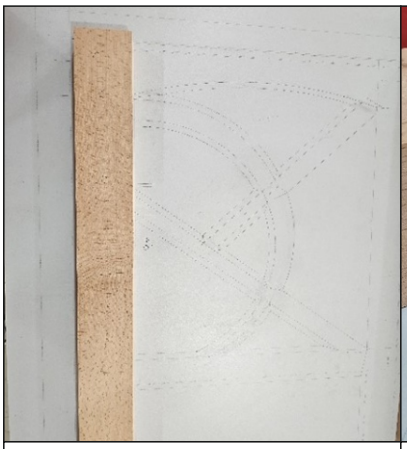


Cut the template

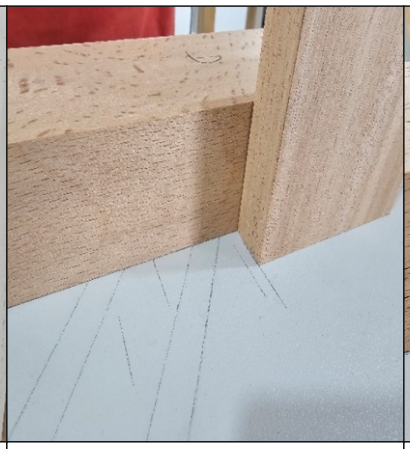


Final template cutting piece

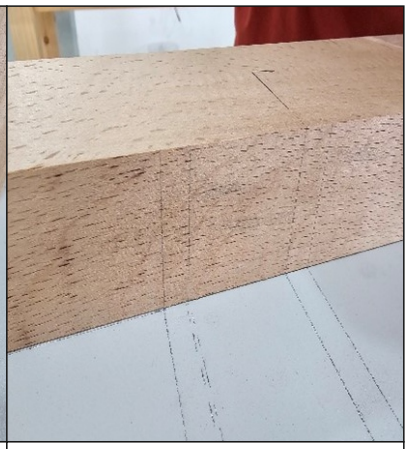
Transfer measurement on materials to drawing



Place material on drawing board



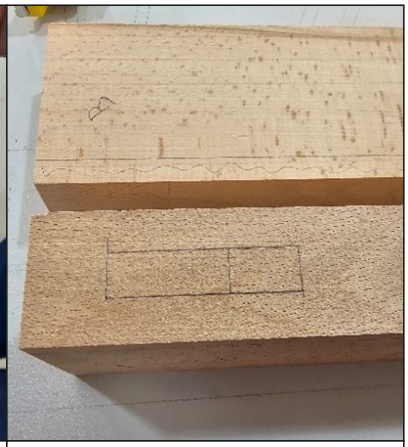
Using a right-angle block for transfer measurement



Final transfer measurement on material

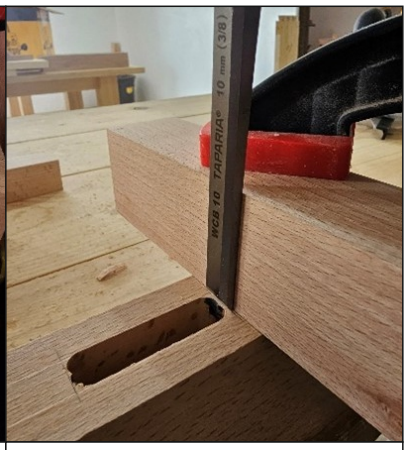
Using try square for front face marking

Using T calliper for mortise marking



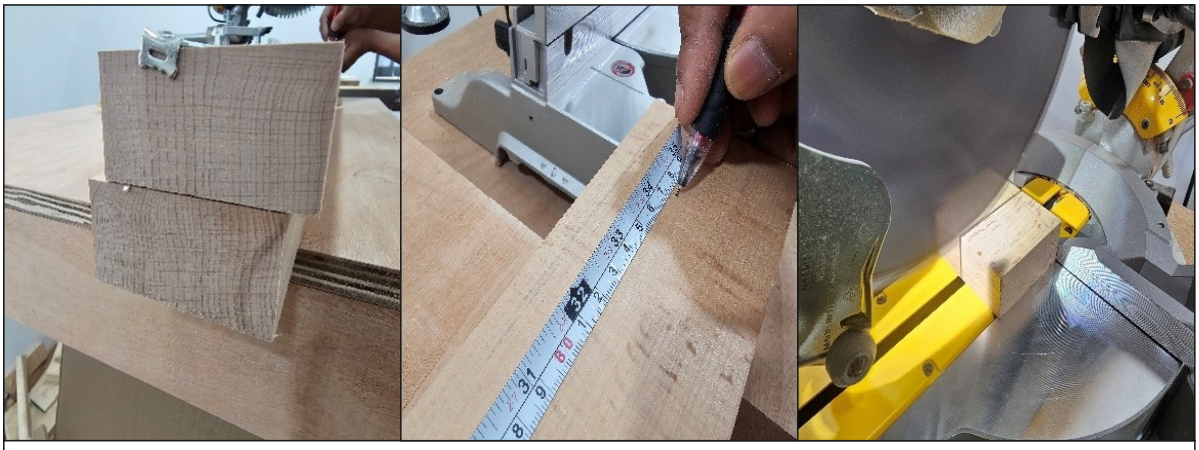
Mortise marking

Mortise making using plunge router

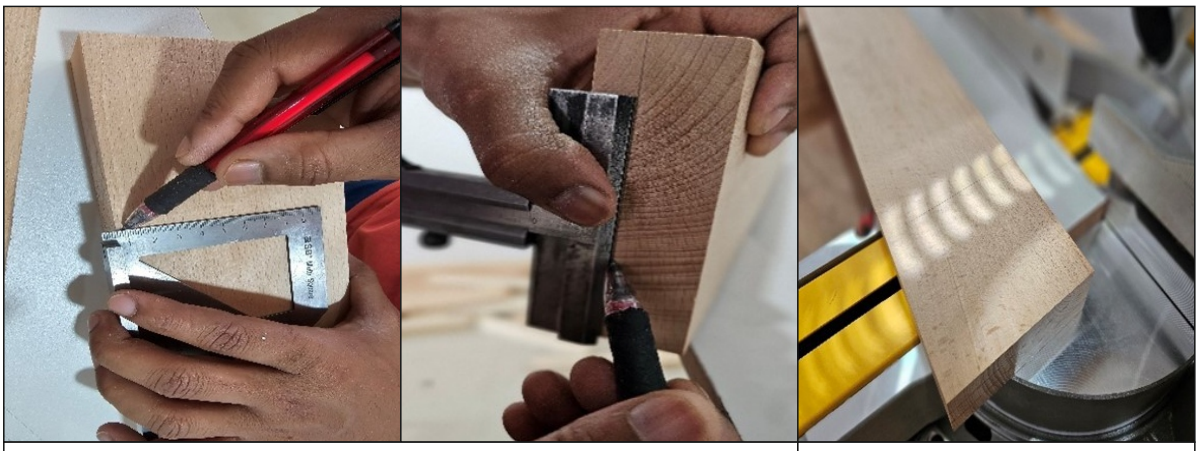
		
Using 12mm router bit and attached in router and always use dust collector	Adjust router fins to set router in marking	Start the router and make mortise (per cut depth 5mm)
		
Router cutting	Using a cut piece for straight cut and support for chiselling	using mortiser chisel and help of back support clean the mortise

final mortise and make all mortise as per drawing

Tenon making part

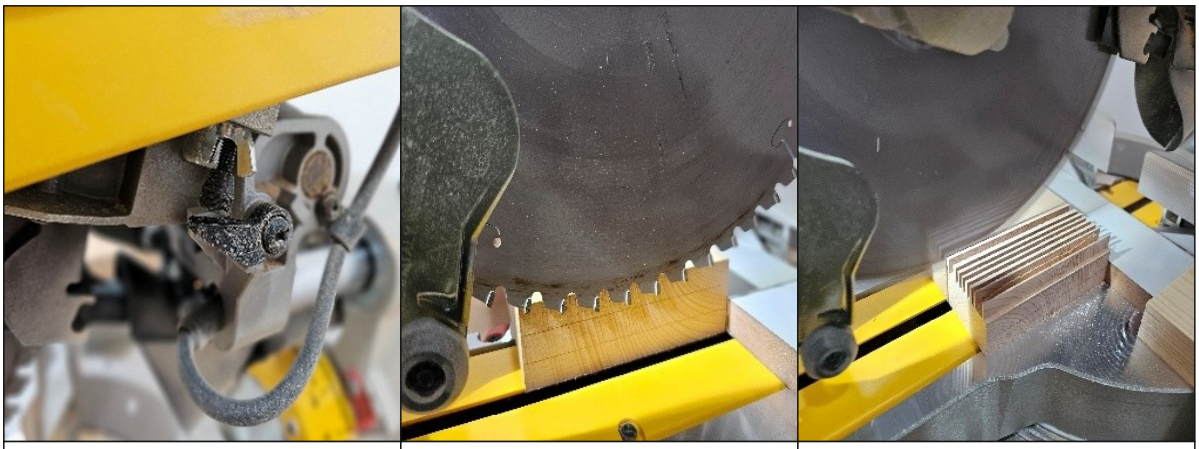


first cut the length as per drawing using mitre saw



Marking for tenon in material as per drawing using try square and T calliper

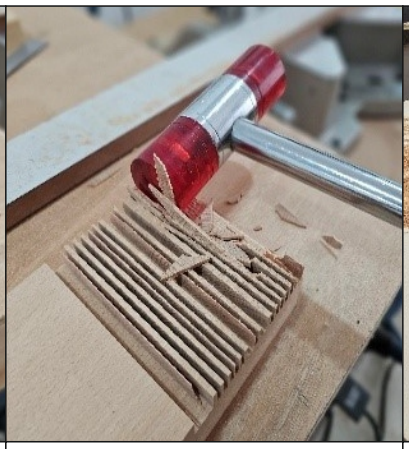
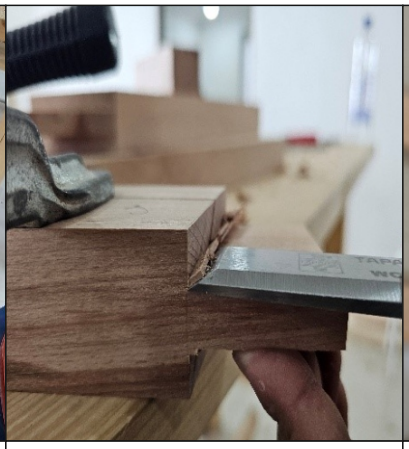
Set piece in mitre saw and match light in marking line

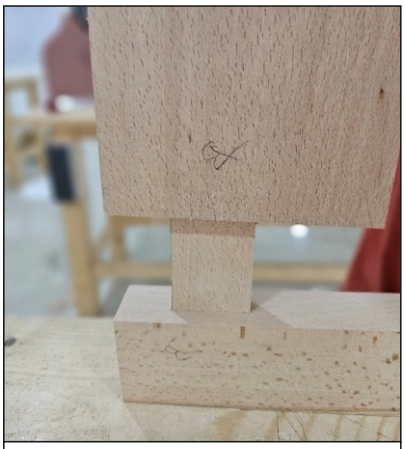


Adjust depth using this nut as per tenon marking

Set and match the blade into the line

Start halflap cutting 2 sides

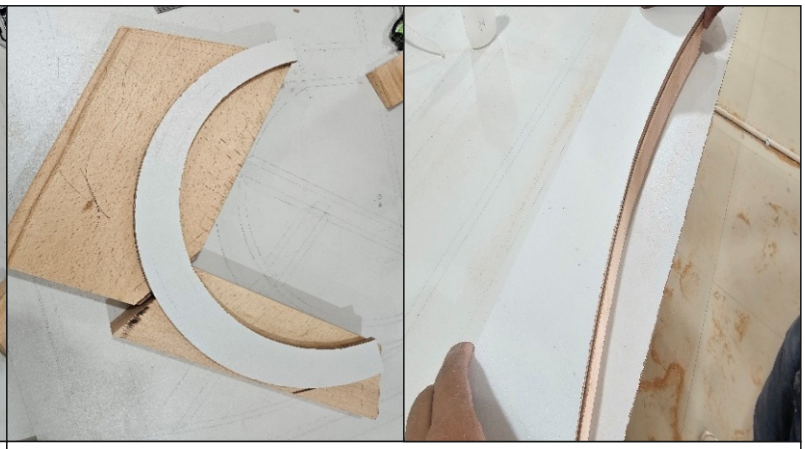
		
Final mitersaw cut	Break the excess part with help of hammer	Then use table router and set dado bit to clean the tenon surface
		
Final surface finishing	Proceed with angle cut using mitersaw	Tenon miter cut
		
Using jigsaw or band saw, for cutting tenon side parts	Now using chisel and clean the side parts	Final tenon



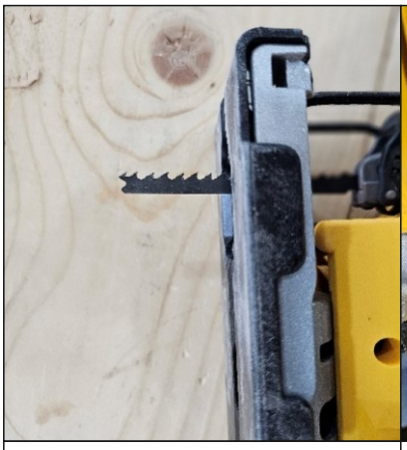
joint fitting check

ARC Material cutting using template

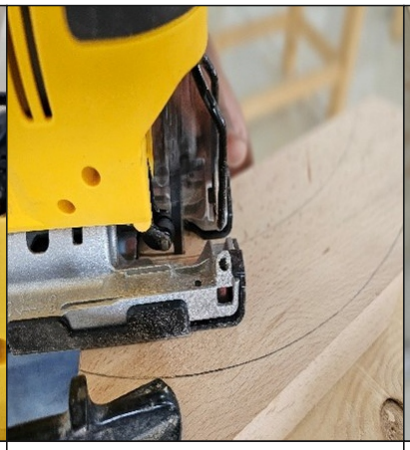
Place the material on drawing board and mark all lines on the material



place the template and marking of arc

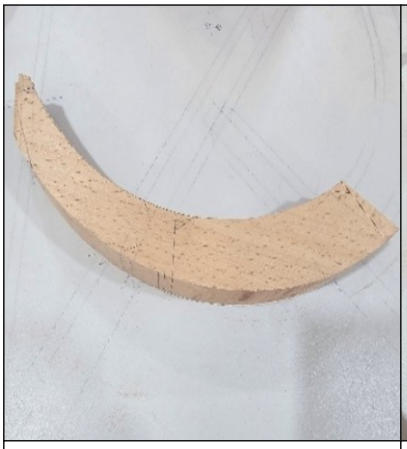
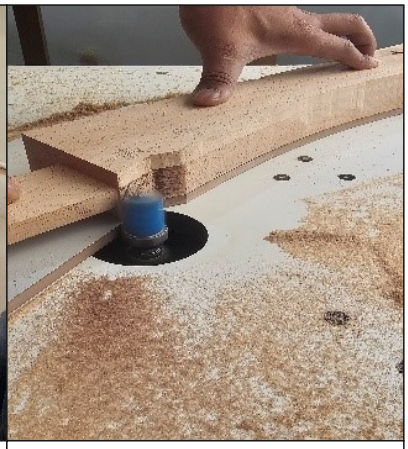


using jigsaw and a rough blade for arc material cutting

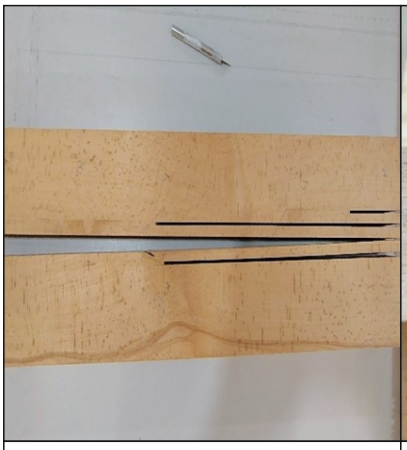


Cut the arc using jigsaw

Clamp the piece properly

		
Final rough cut	Then place the template using fast spray glue	Using flush trim bit and clean all material rough sides using template

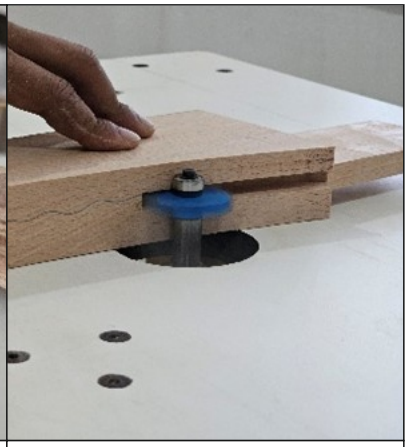
PART 1 sides cuts

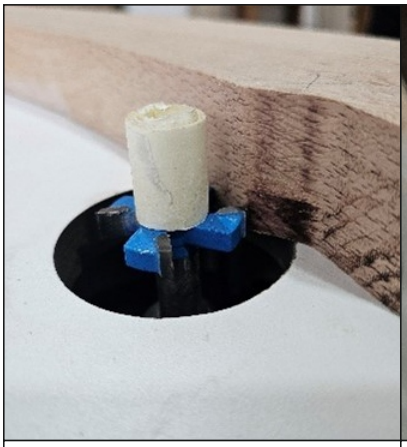
		
Mark the cutting area. Use transfer measurement	Now using tracksaw, cut the marking part	Cutting photo
		
Cutting photo	Now using Japanese saw to cut angle	And used chisel to clean angle of the mortice

Panel cutting process

		
Mark the radius in panel using compass	Final marking	Using tracksaw, cut final panel

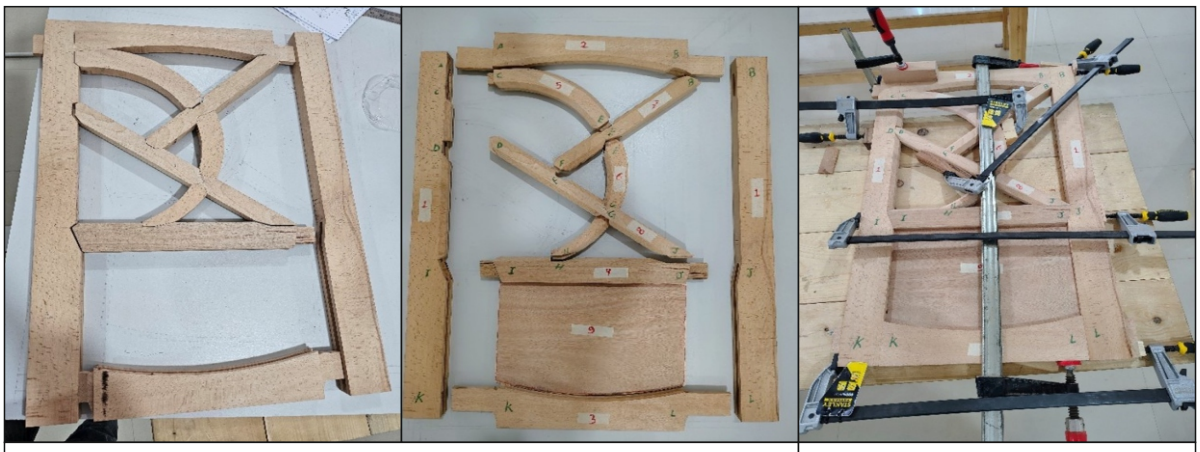
Grooving and rebate process

		
Fix grooving bit in table router	Now adjust the height for grooving	Start the grooving process

		
Then next fix the height of rebate part	Final rebates	

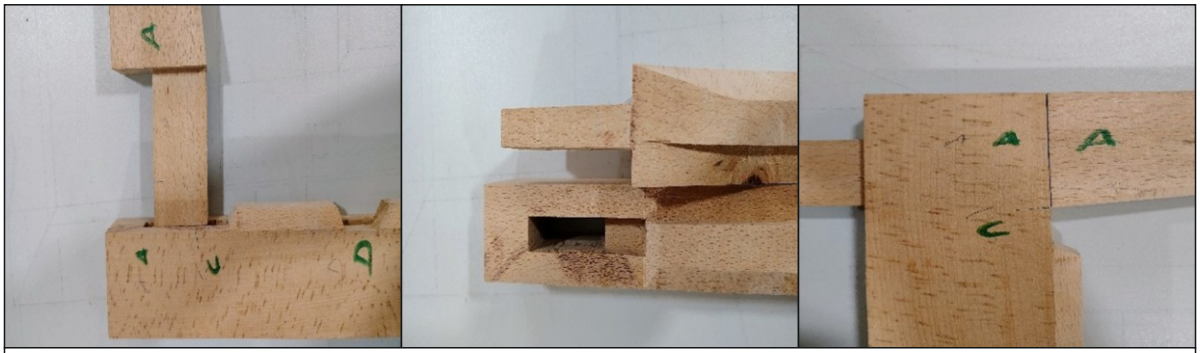
Final grooving	All grooving parts

Final dry assembly process

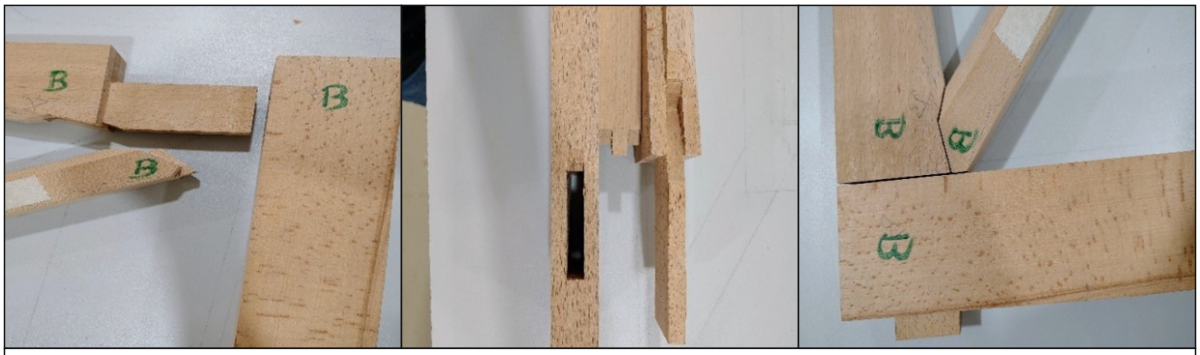


Set all parts and try to fix how joints are working (its fix well or not)	Then try to clamp and check the joints gap

Module 1 Joints details

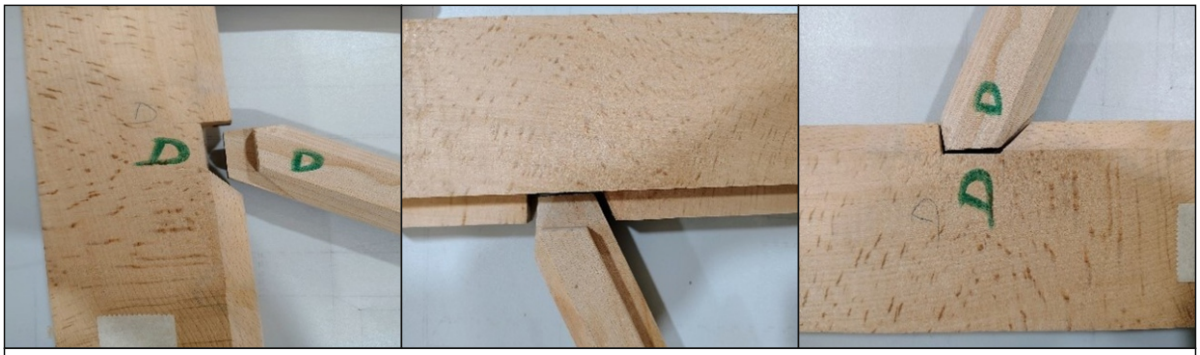


Joint A module 1

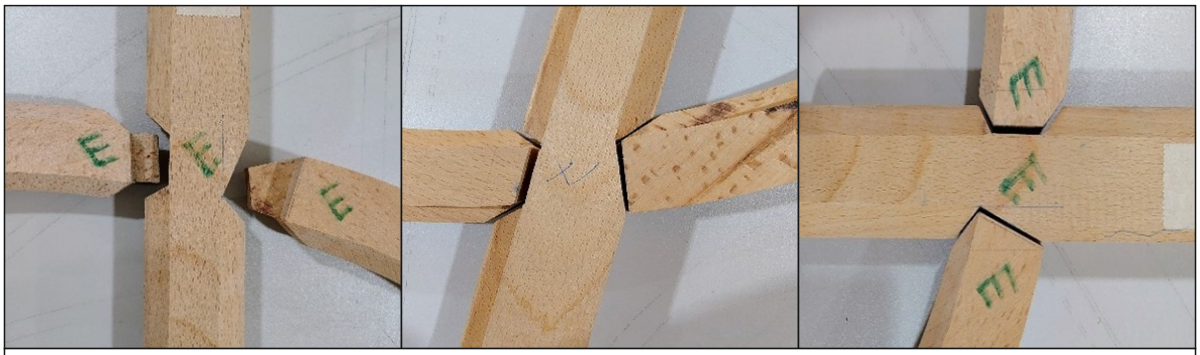


Joint B module 1

Joint C module 1

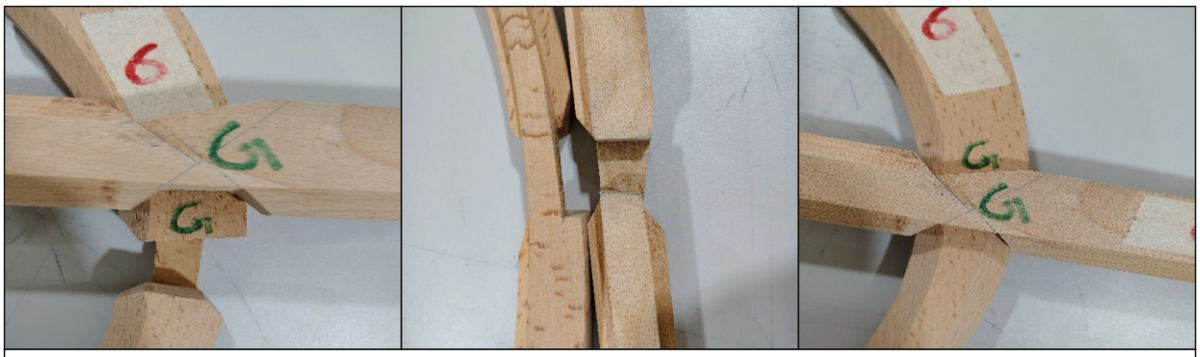


Joint D module 1

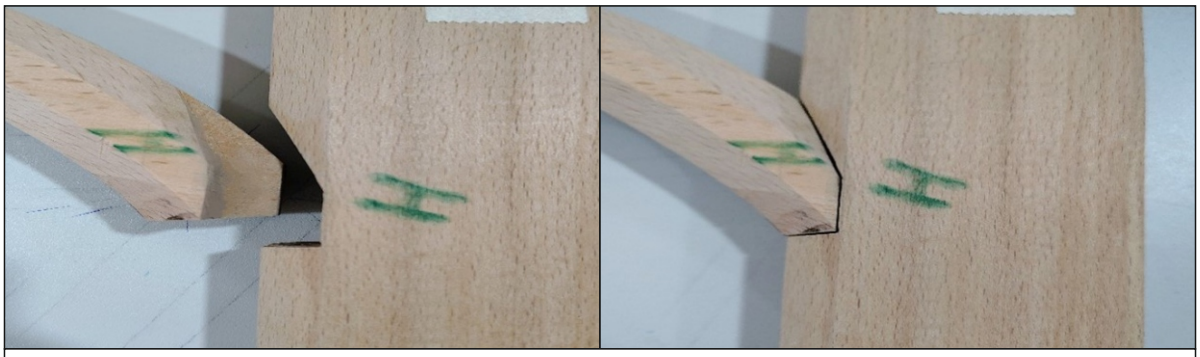


Joint E module 1

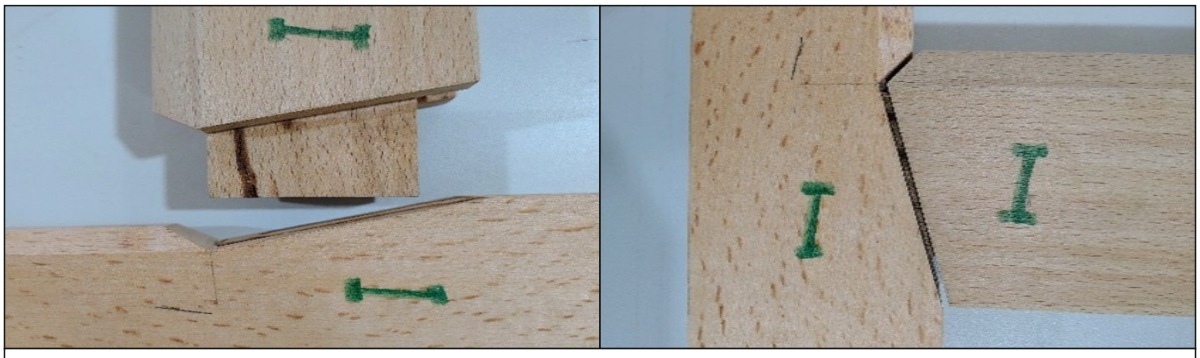
Joint F module 1



Joint G module 1

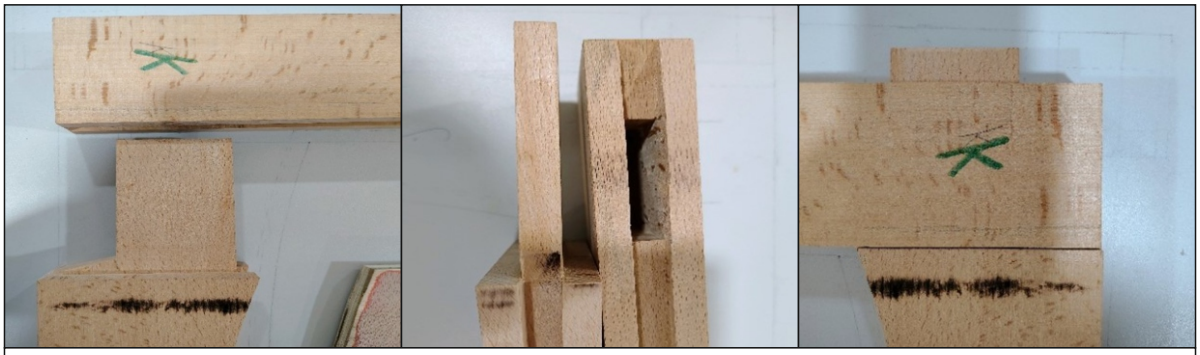


Joint H module 1

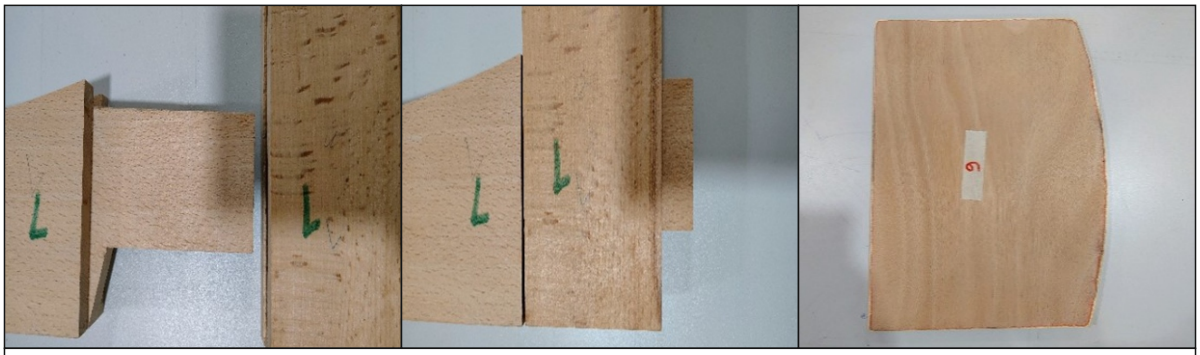


Joint I module 1

Joint J module 1



Joint K module 1



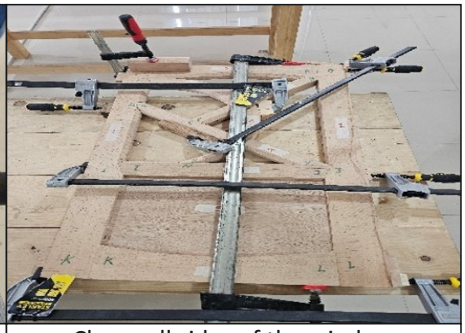
Joint L module 1

Before assembly sanding

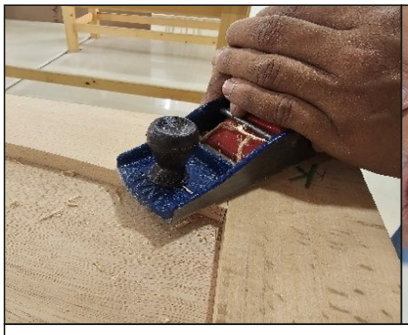
Sanding all module 1 parts Before final assembling the product (sanding paper used 120,180,220 grid) Before sanding is necessary because when we assemble the product, we can't sand inner sides of this product

Module 1 final assembly

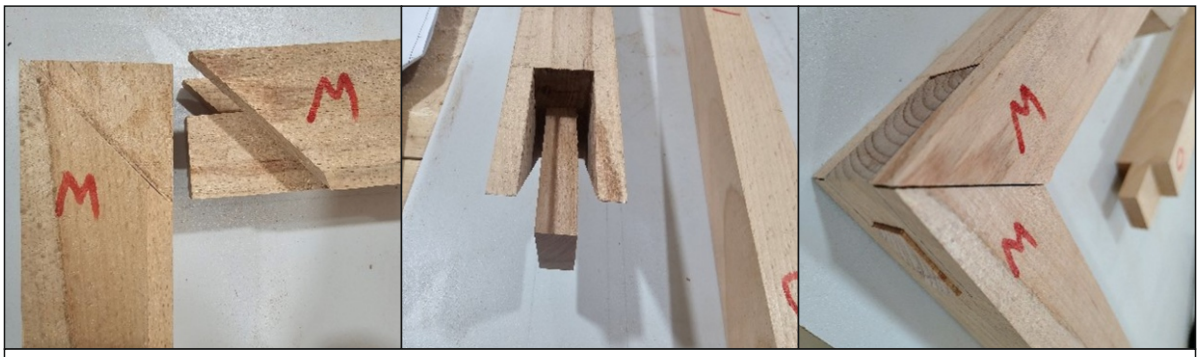
		
Frist apply glue in all joints	Fix the inside panel in groove	Then set all piece like this

	
Used a wooden cut piece front of clamp for avoid material damage	Clamp all sides of the window & tightly fixed & check the joint gap & measuring a outer dimension

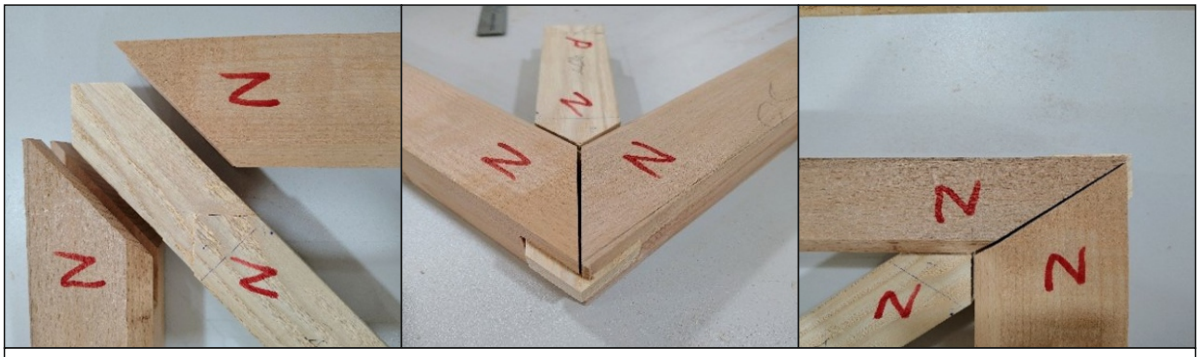
		
Open all clamps when joints was perfectly fix	Then cut the extra tenon part using Japanese saw	Using flush tri bit to clean properly the tenon part

	
Using hand planner for surface planning	

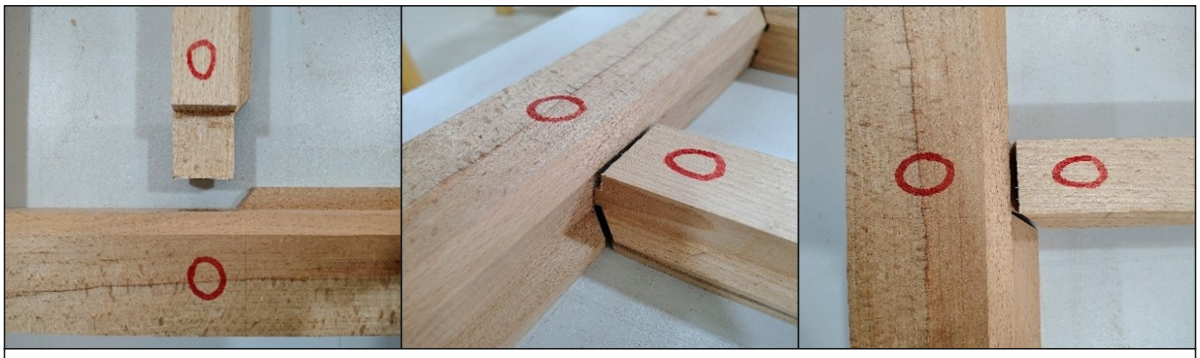
Module 2 Joints details



Joint M module 2

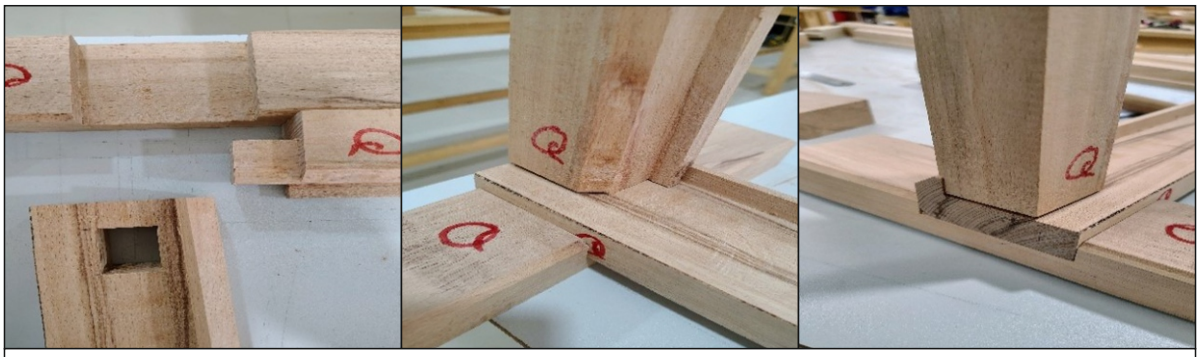


Joint N module 2

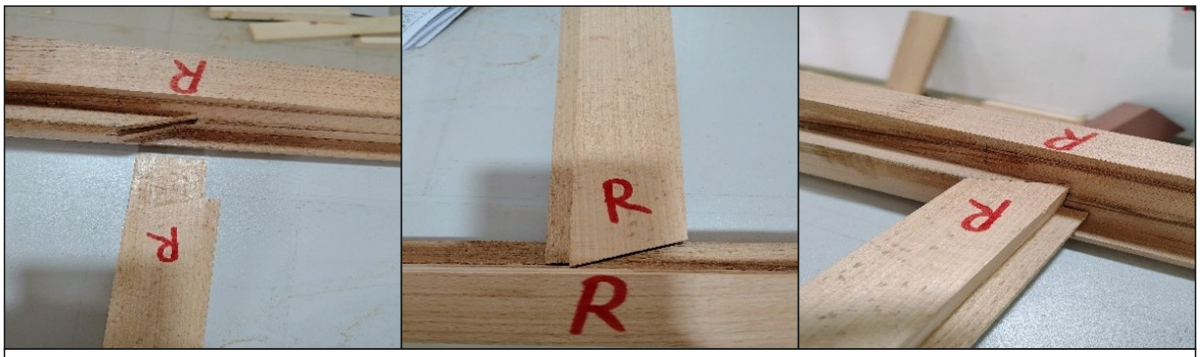


Joint O module 2

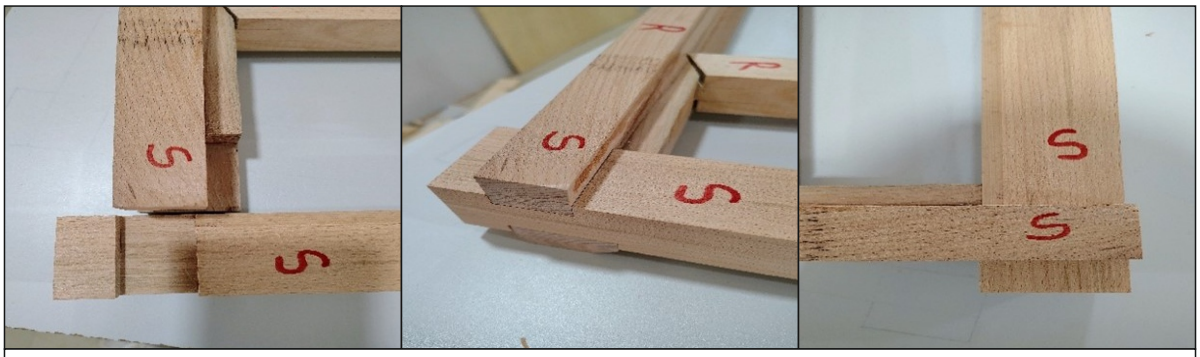
Joint P module 2



Joint Q module 2

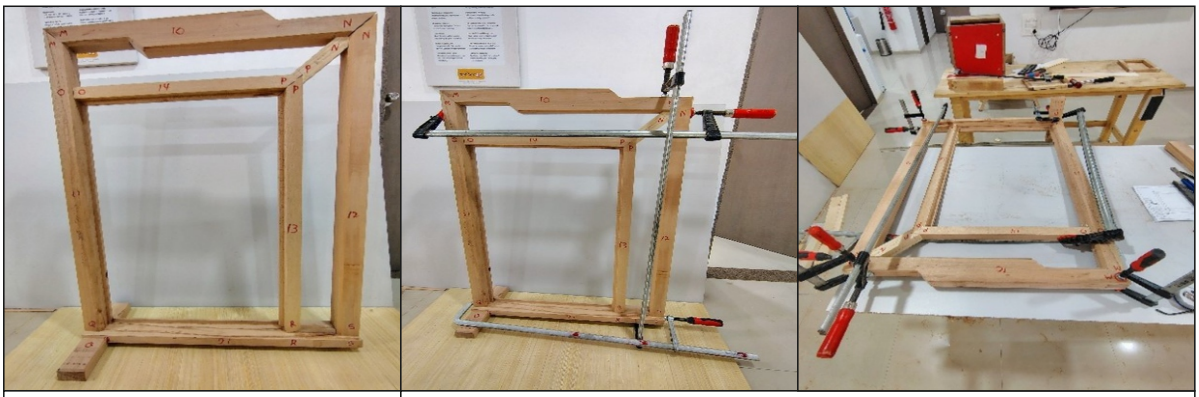


Joint R module 2



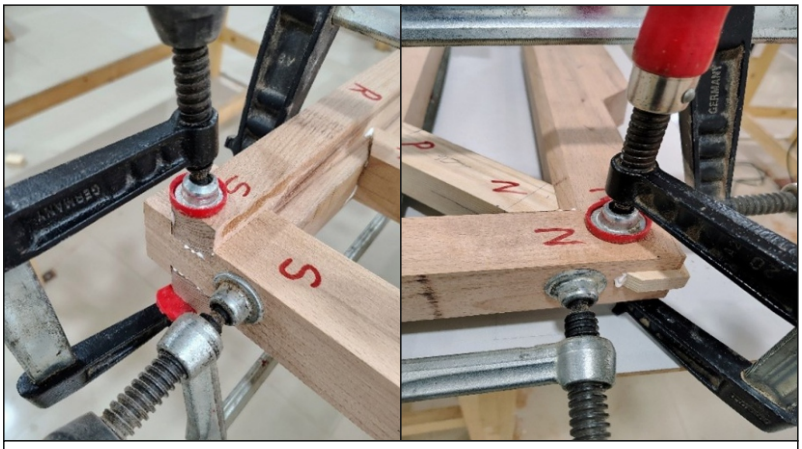
Joint S module 2

Module 2 assembly and finishing



Apply glue in all joints

Now fix all clamps in frame

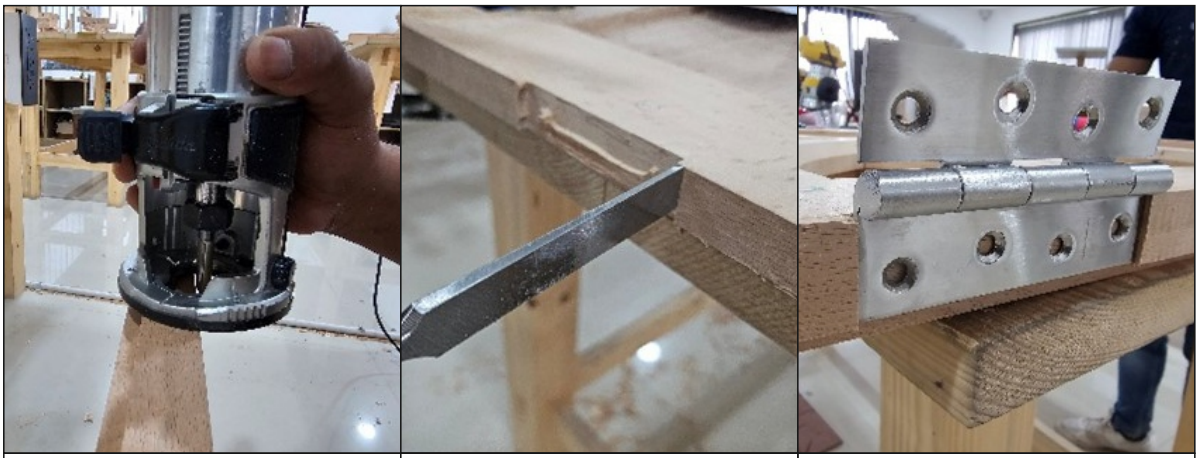


Now fix all clamps in frame

Hinge install in window and frame

Measure the distance for hinge installation

Mark the hinge size cut area



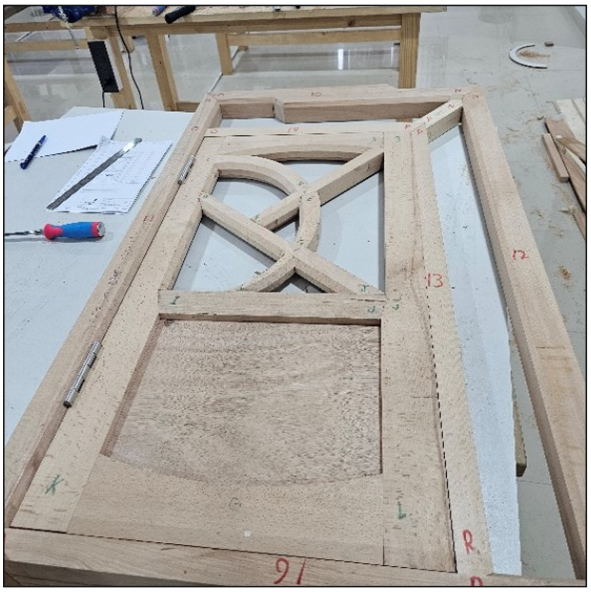
Using trimmer for 5mm do depth cut for hinge

Help of chisel, cut the corner materials

Fix the hinge using screws

		
Fix the hinge using screw	Same cut in frame	Final window install in frame

Final project window with frame



6.Estimated Time Per Stage

Activity	Estimated Time (Hours)
Drawing and Sketch	1.50
Module 1 (Window)	13
Module 2 (Frame)	6
Installation	0.75
Final Sanding/Cleaning/Edge Sanding	0.75
Total	22

Section E: Quality Assurance

7. Quality Checks

Stage	Checkpoint	Inspection Method
Joinery	Flush joints, no glue seepage , No Gap, Finishing (No chisel or any other tool mark)	Visual + feel test
Measurement	Outer and Inner measurement of parts	Measuring Tape, Steel Ruler
Parts Completion	Completion of parts required for assembly as per Test project	Visual & checklist -based
Assembly	Proper Structure, Proper Levelling	Measuring Tape
Final Inspection	Smooth surfaces, Neat and aligned components	Visual & checklist -based

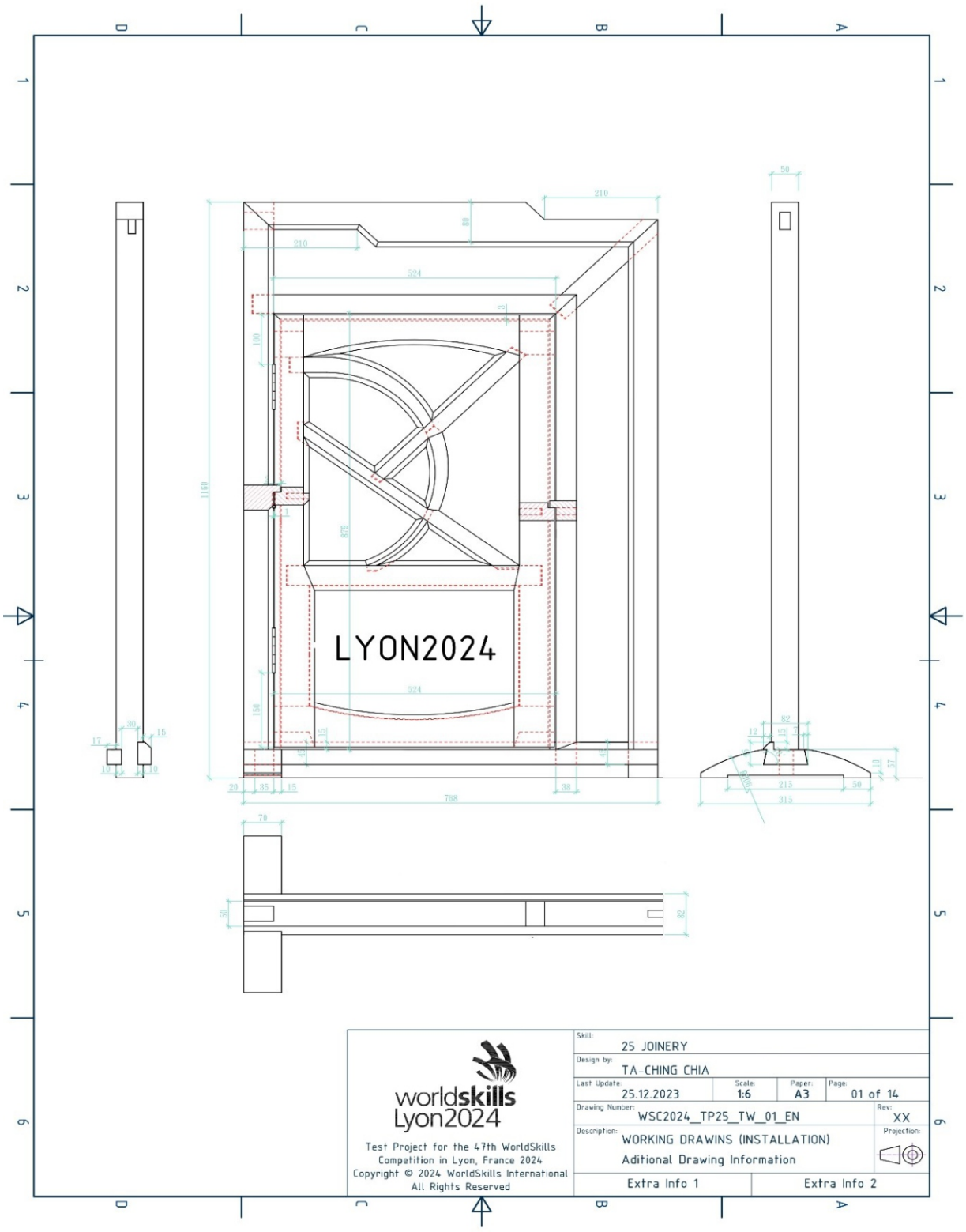
Section F: Handover & Documentation

8. Inspection & Handover Checklist

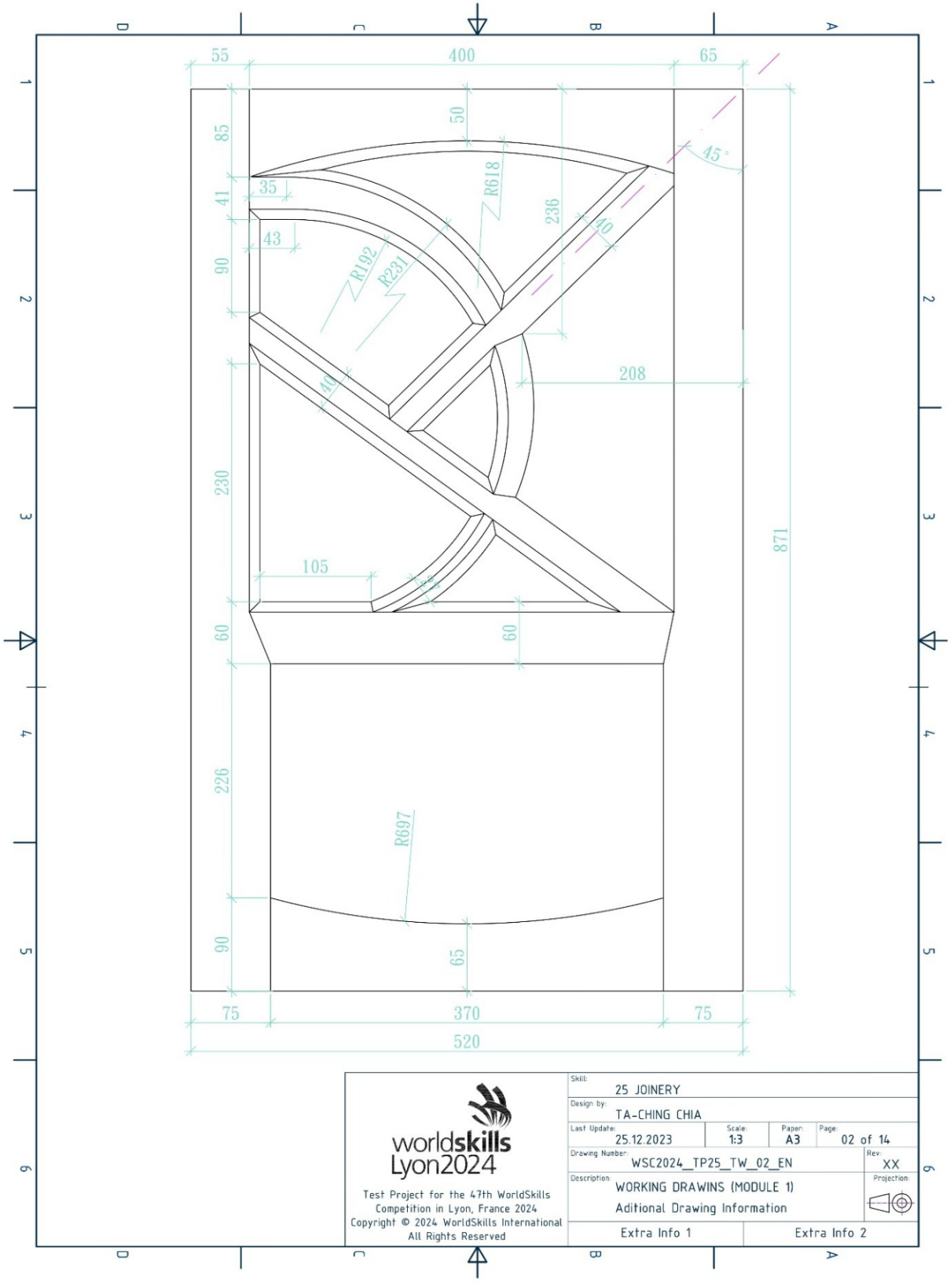
Parameter	Status (✓/✗)	Notes
Maintaining uniform gap between sash and frame for smooth opening and closing	✓	–
All the part fix properly with Glue and Screw Hinge	✓	–
All components damage-free	✓	–
Room cleaned after work	✓	–

Annexure - I Furniture Measured Drawings

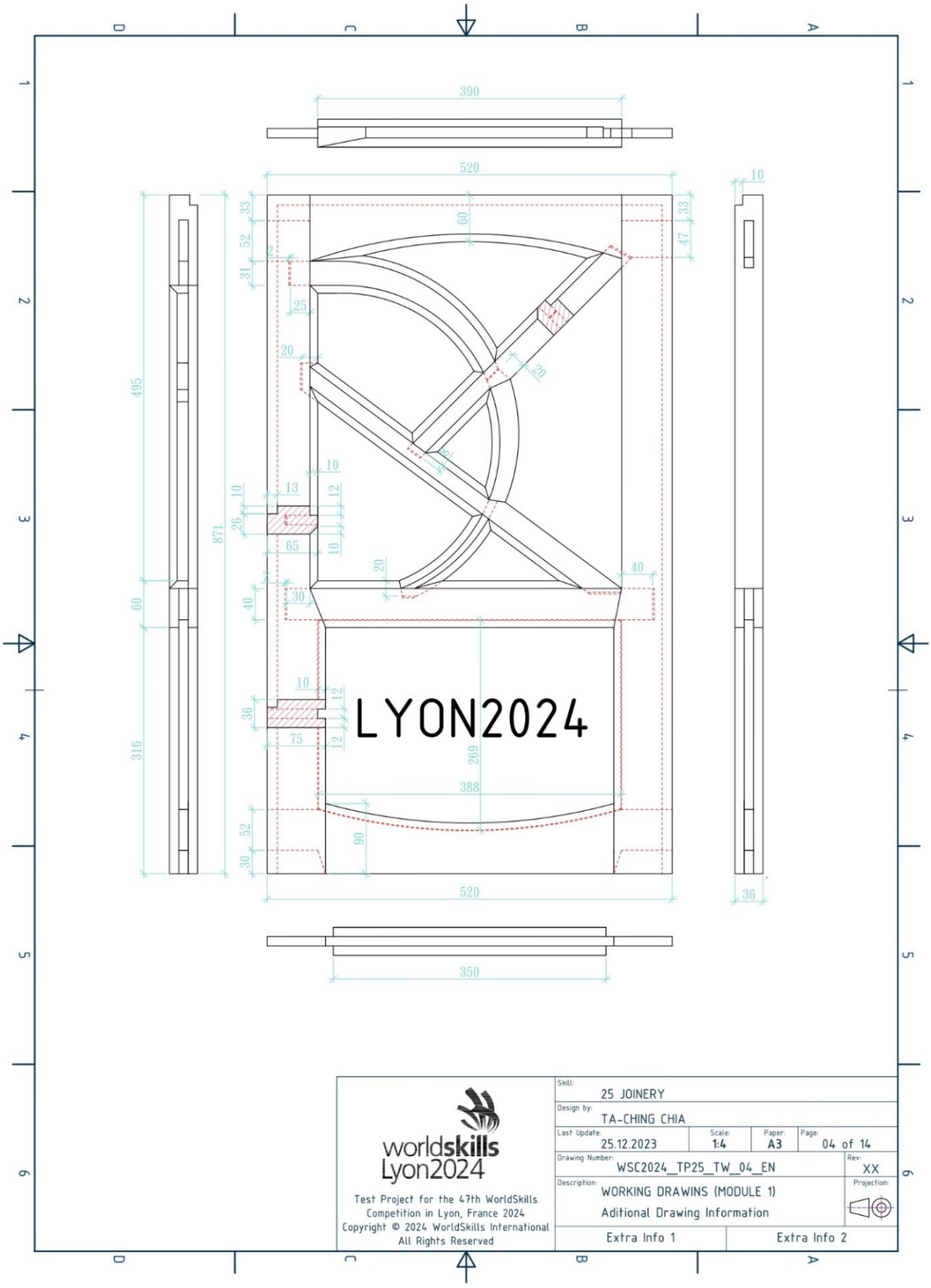
Full-scale Working Drawing:-



INSTALLATION AND ASSEMBLY



MODULE 1



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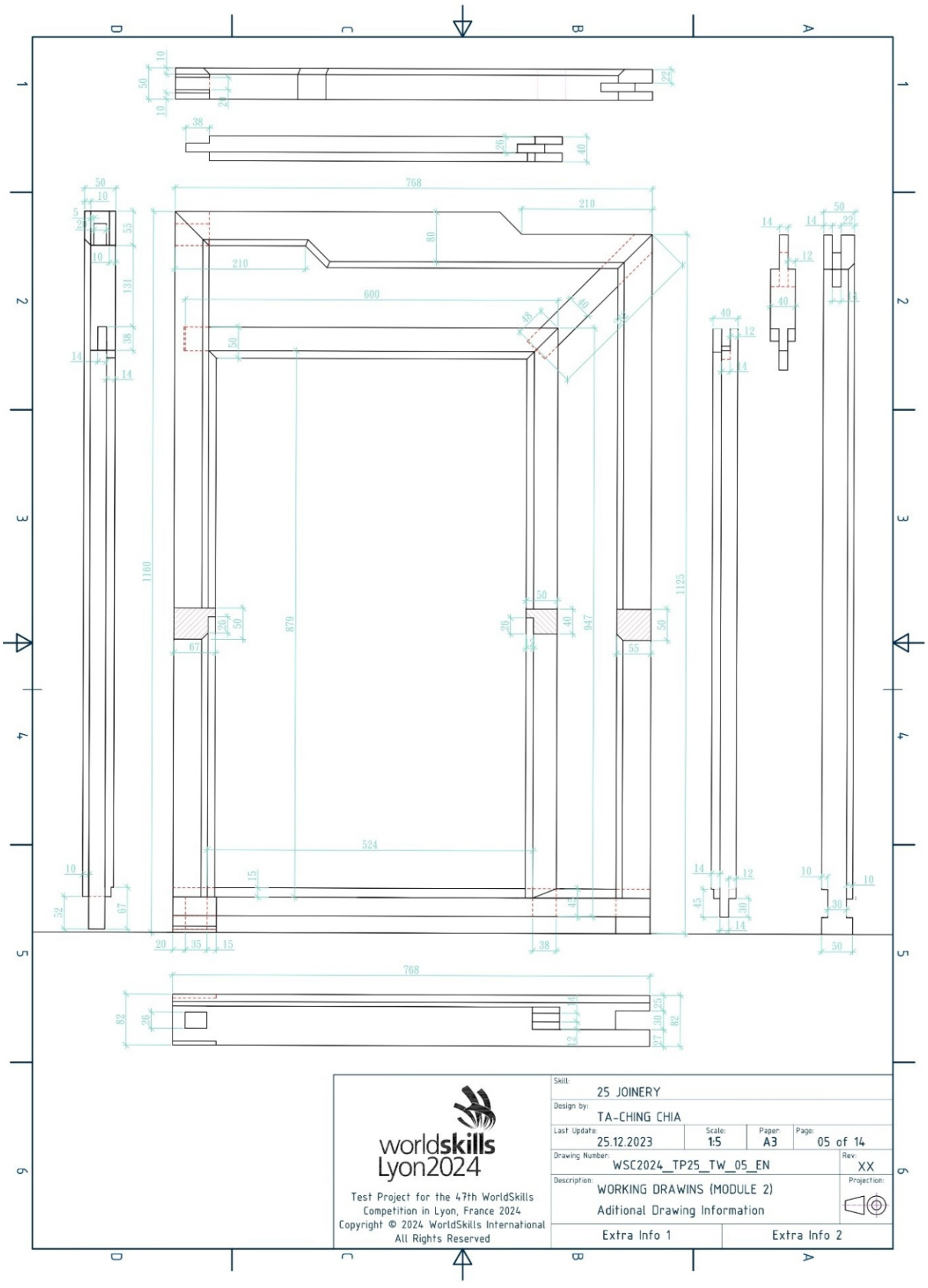
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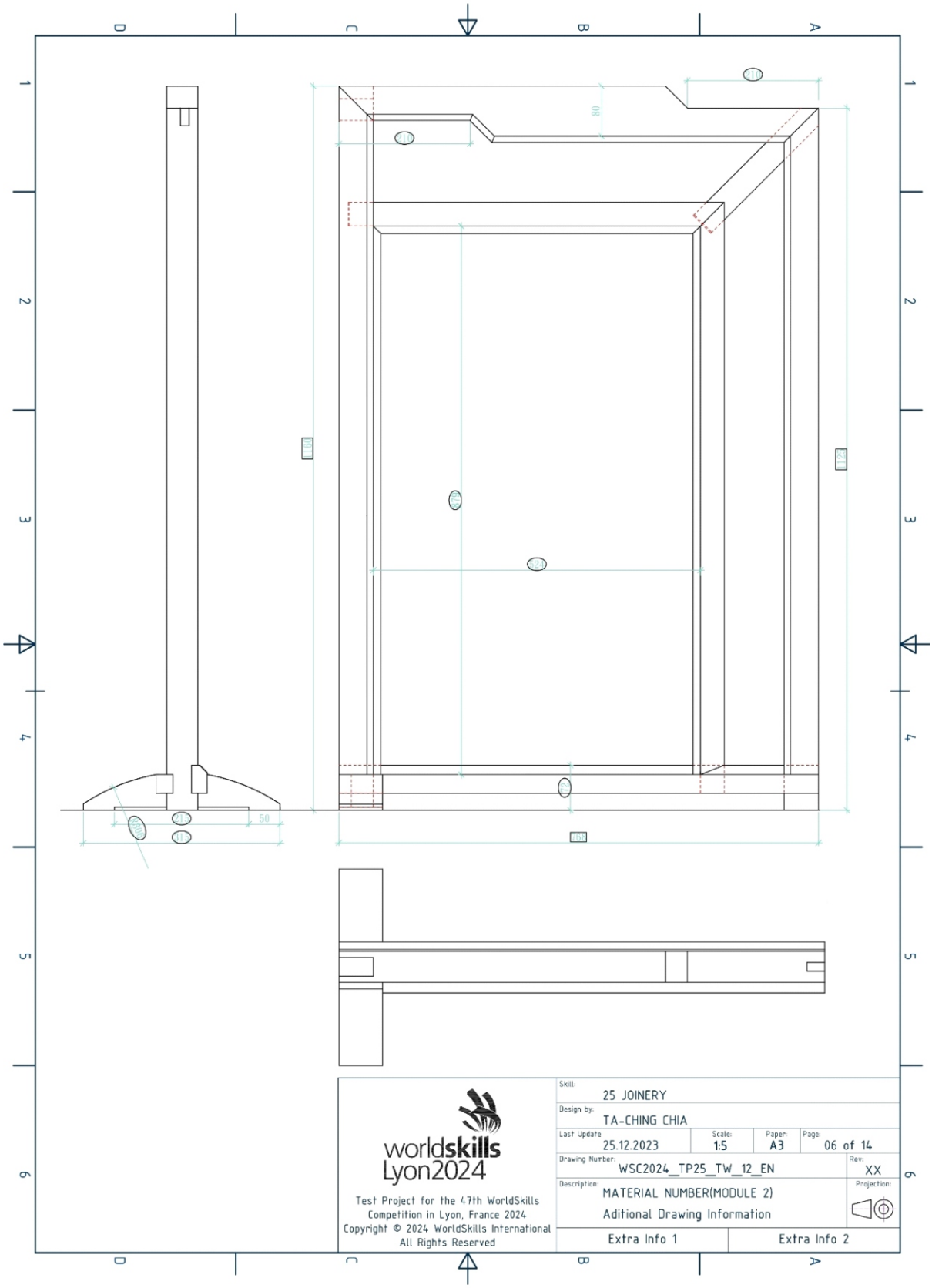
MODULE 2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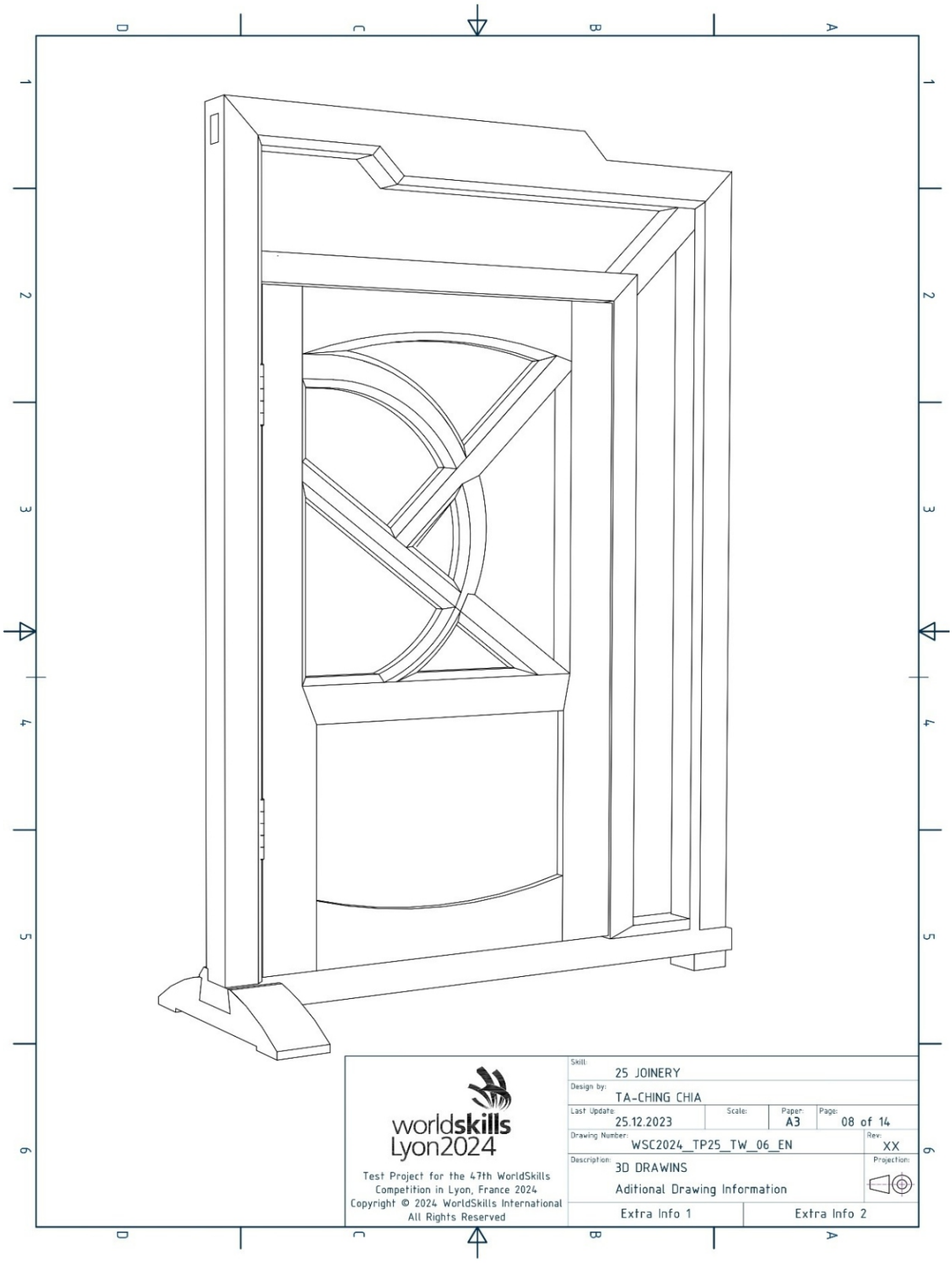
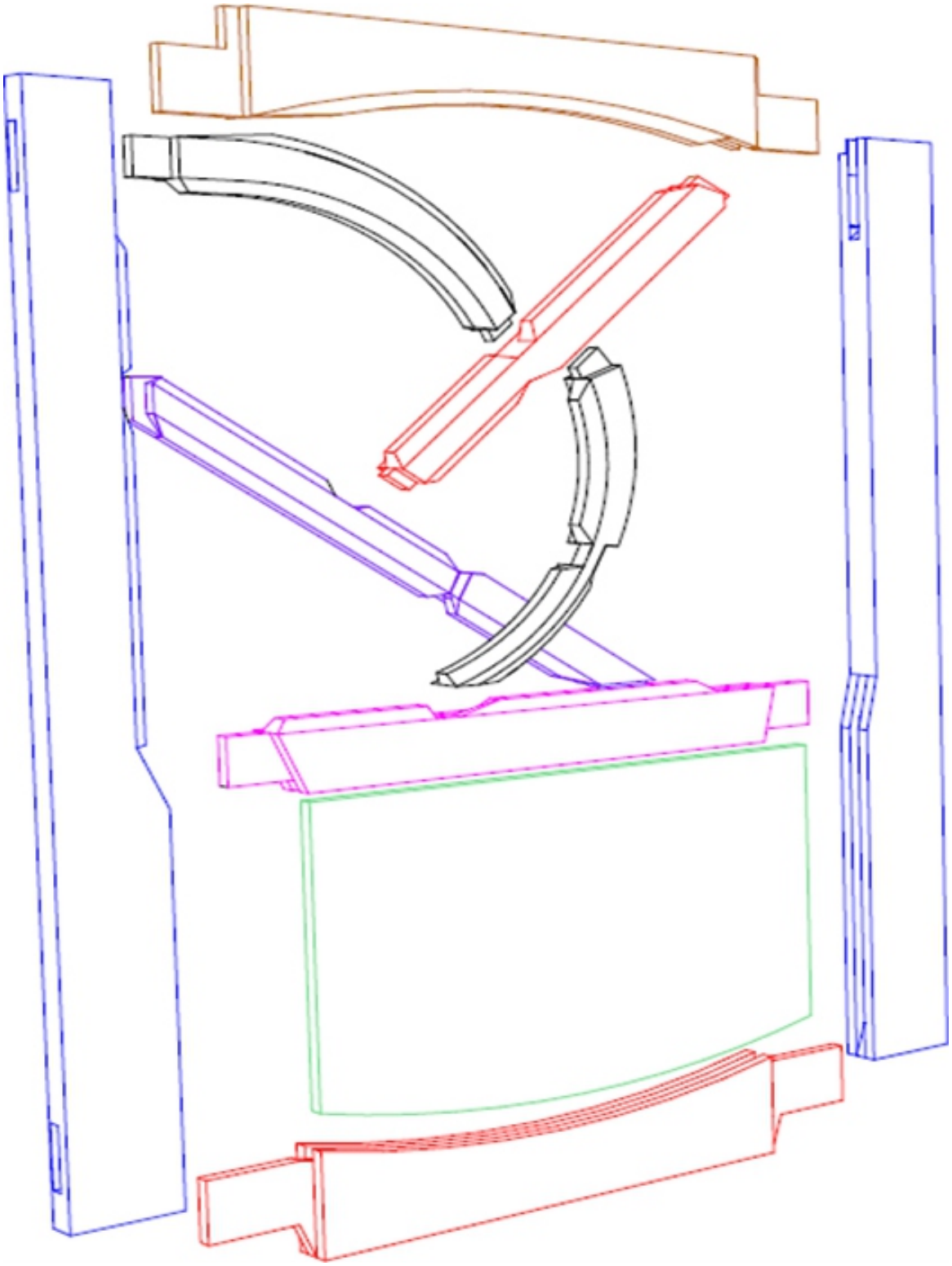
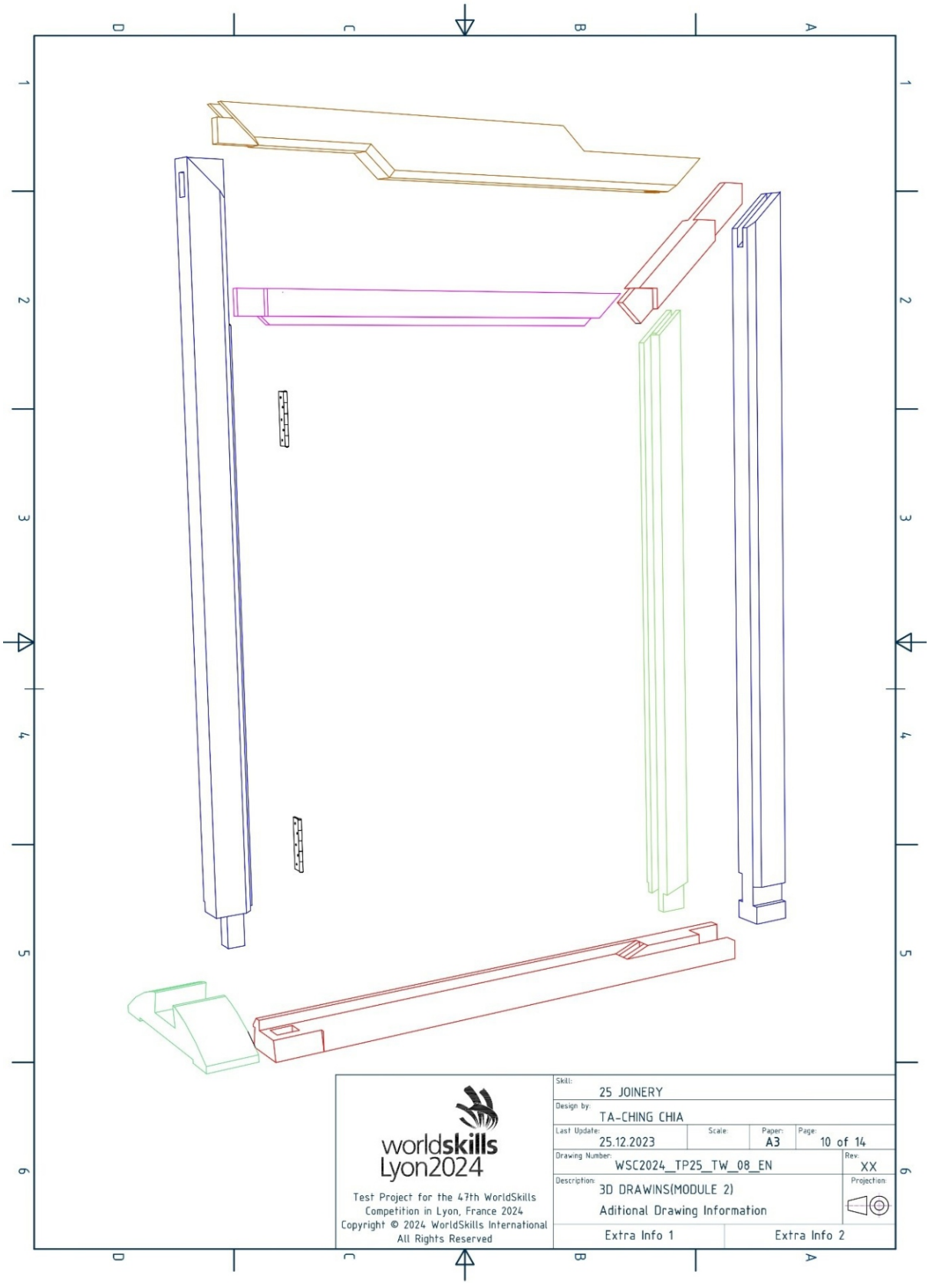


Exploded Drawing for Joint Details

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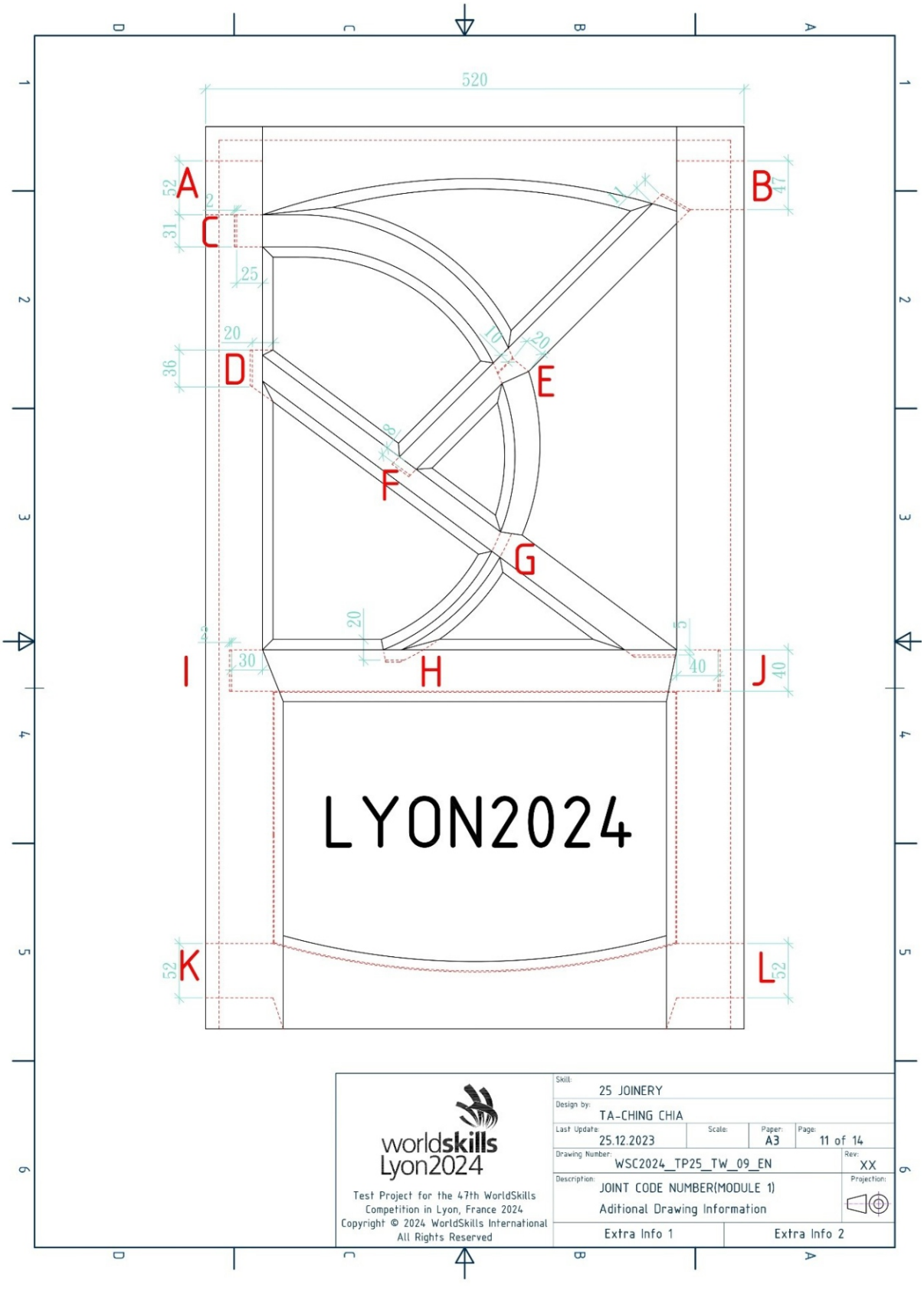
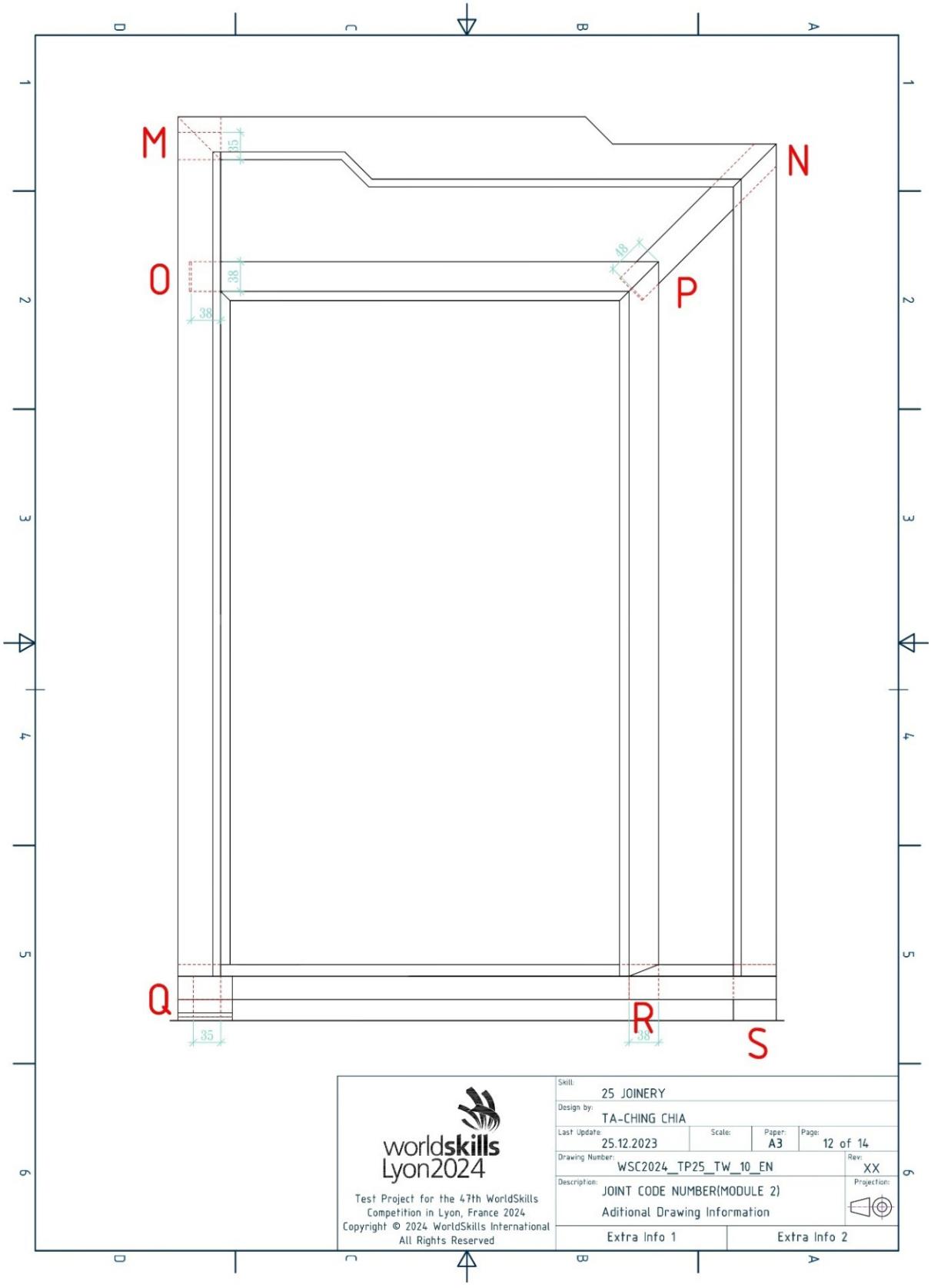


Elevation showing joints for marking



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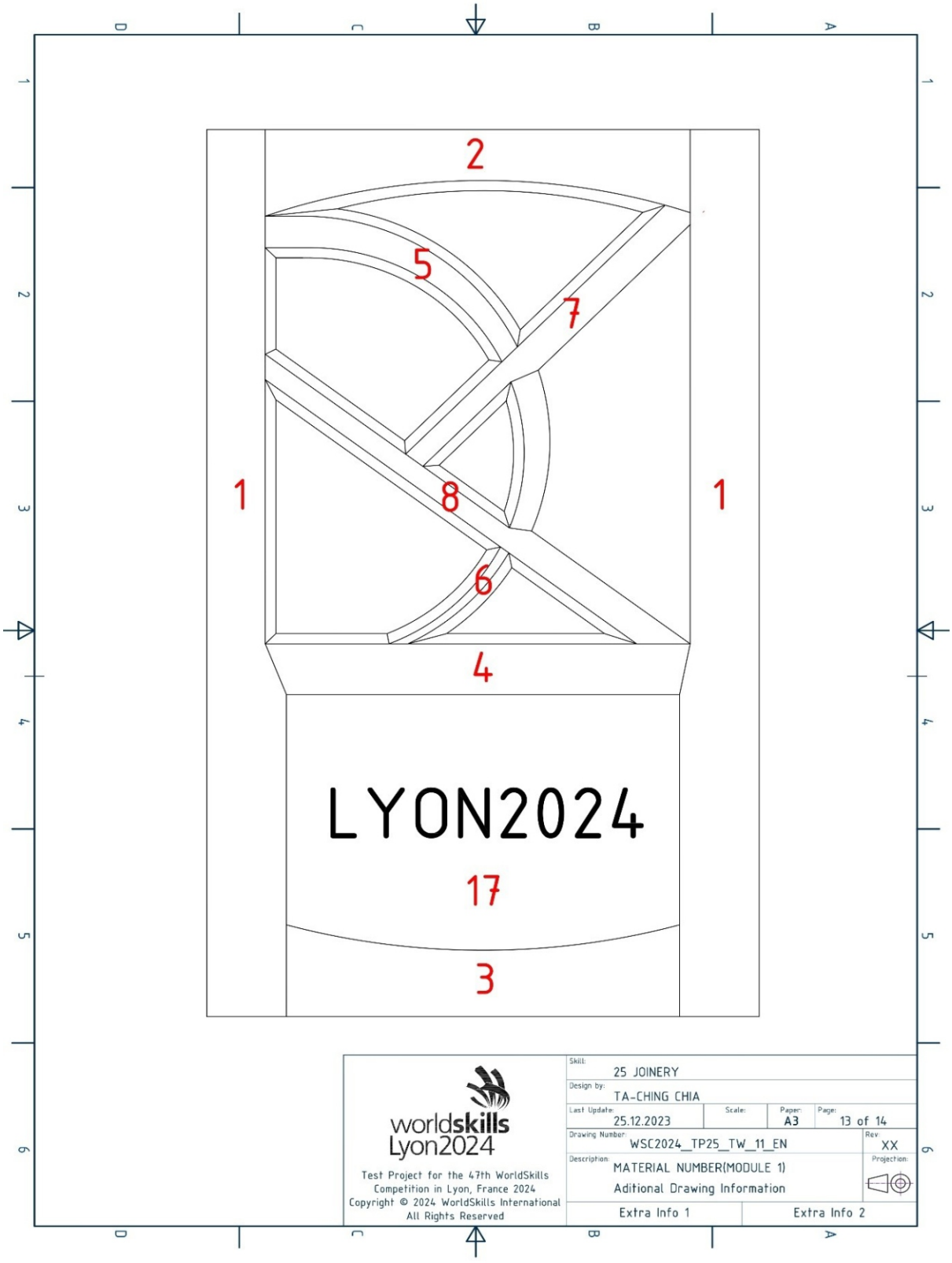

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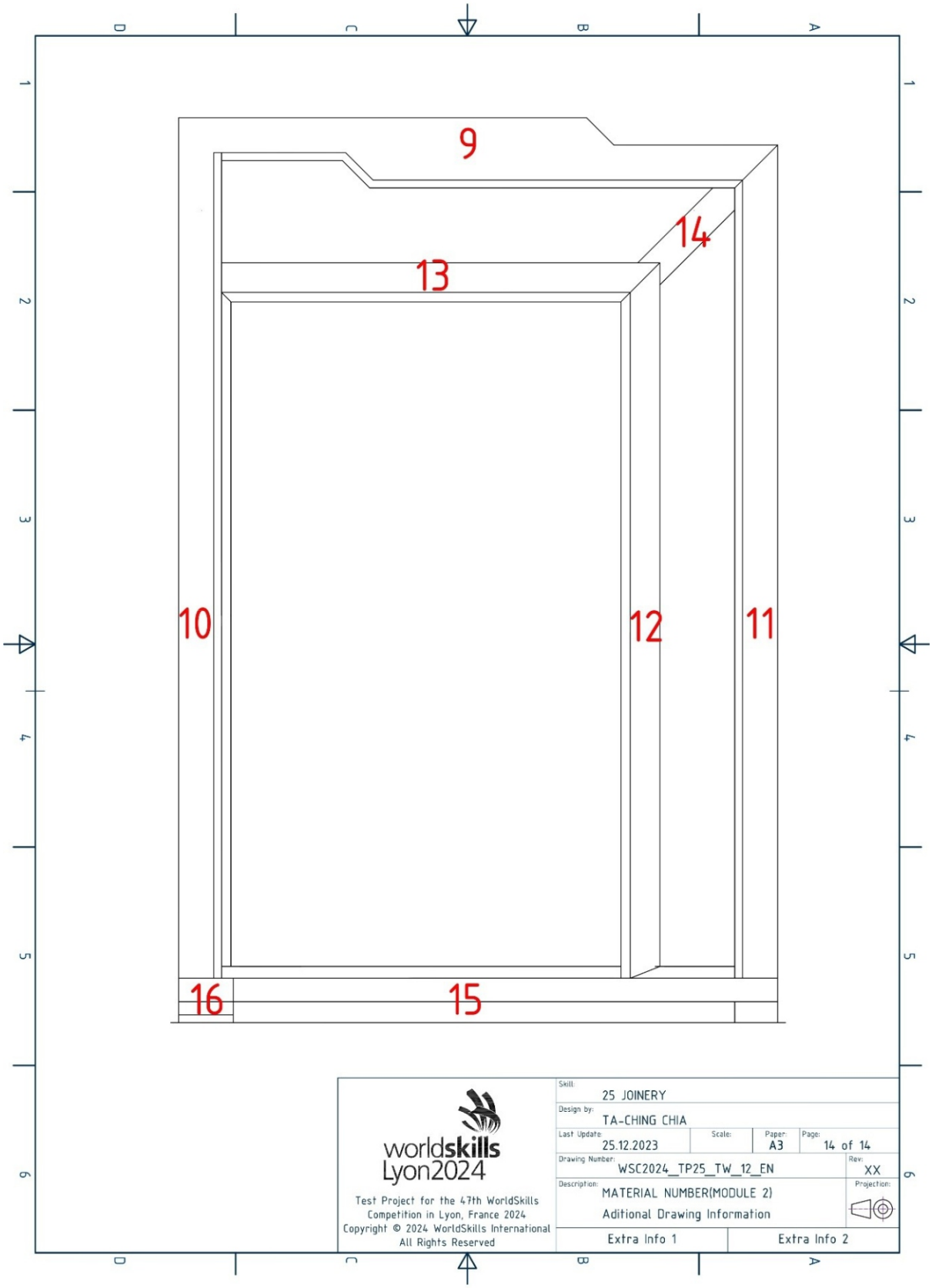

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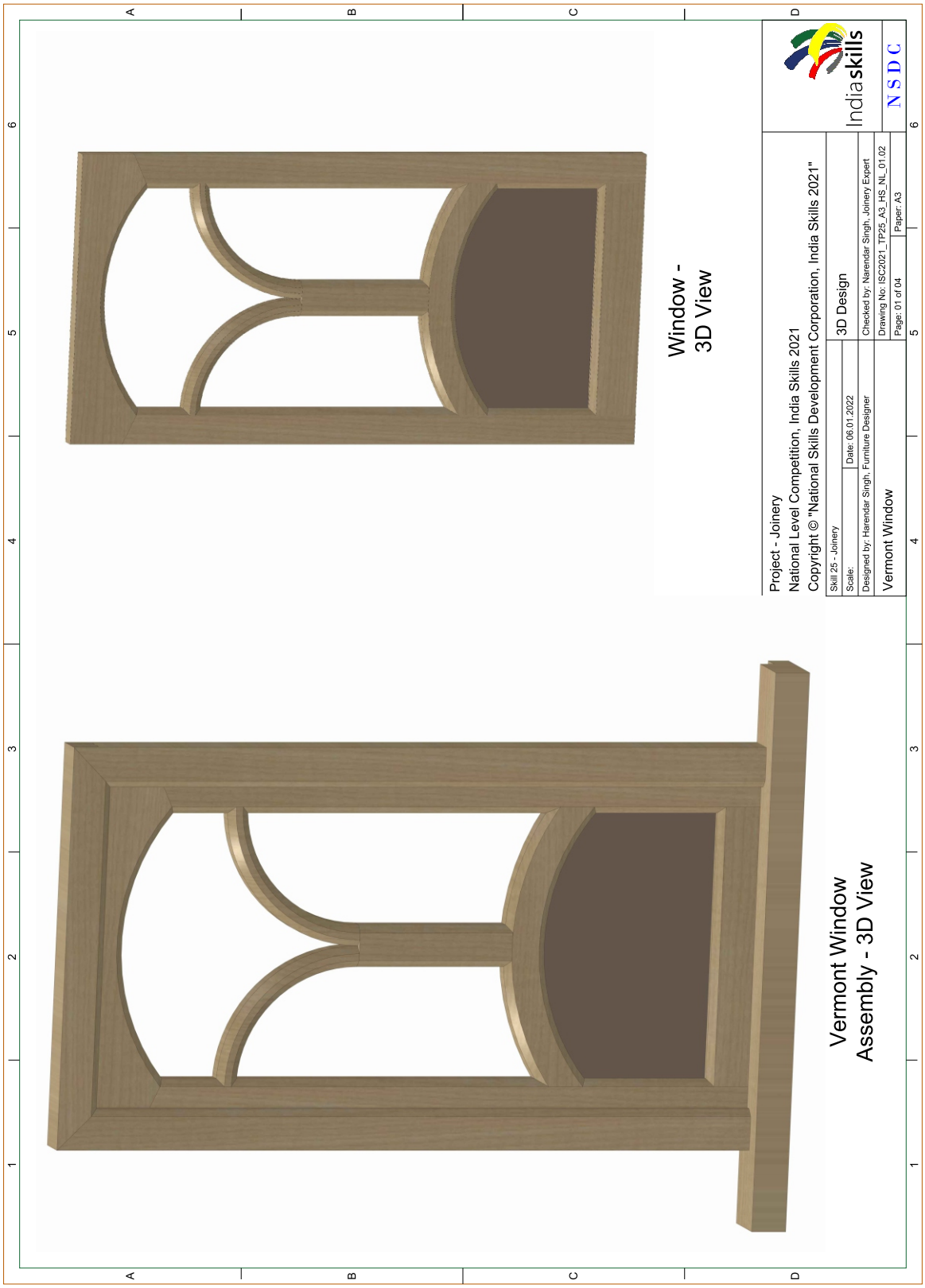
Annexure 2 - 3
Cutting List and Bill of Materials

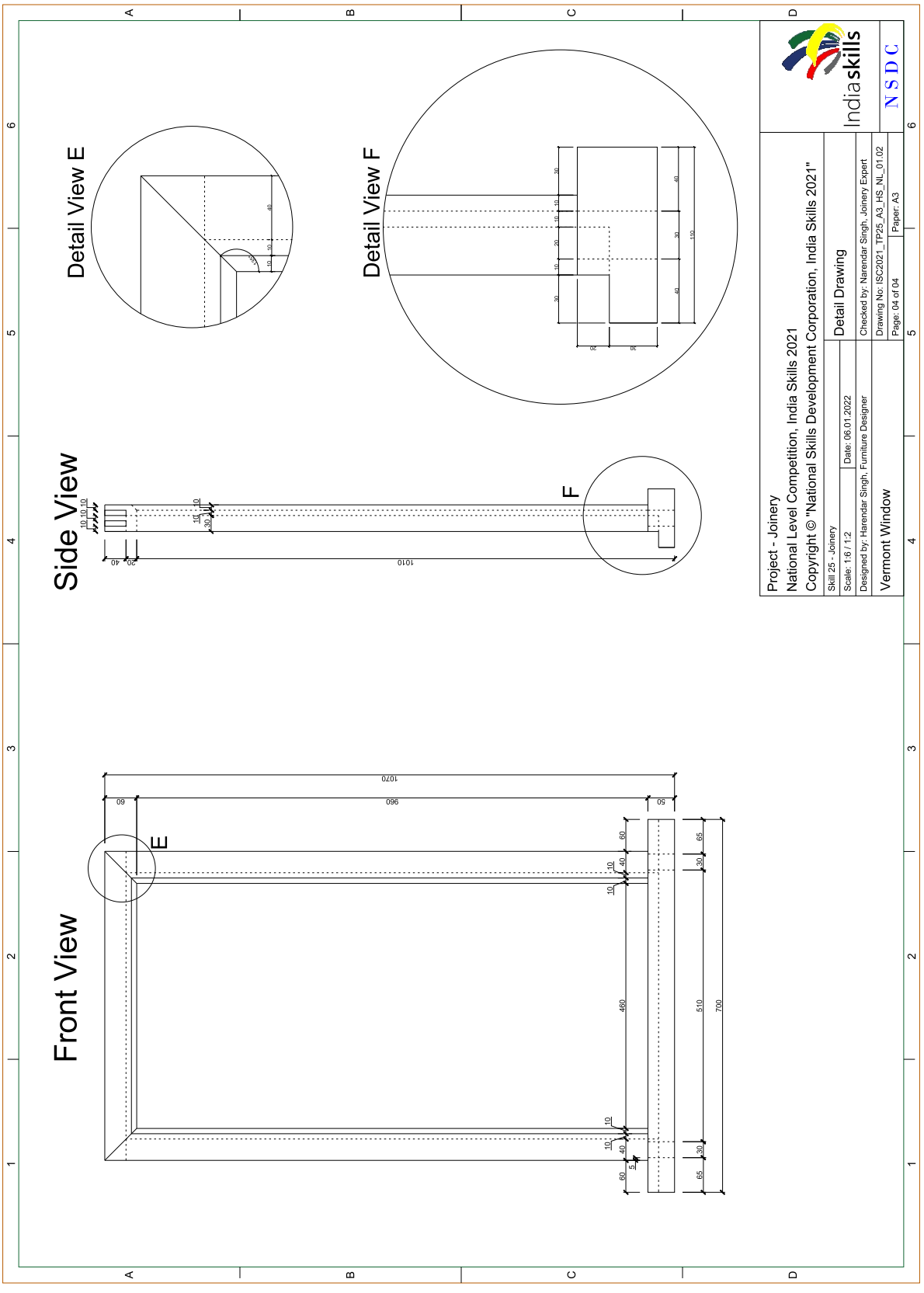
ITEM	WOOD	QUANTITY	LENGTH (mm)	WIDTH (mm)	THICKNESS (mm)	NOTES
1	Oak	2	900	75	36	Module1
2	Oak	1	550	110	36	Module1
3	Oak	1	550	100	36	Module1
4	Oak	1	550	60	36	Module1
5	Walnut	1	350	110	36	Module1
6	Walnut	1	350	100	36	Module1
7	Walnut	1	400	40	36	Module1
8	Walnut	1	530	40	36	Module1
9	Oak	1	800	90	50	Module2
10	Oak	1	1190	67	50	Module2
11	Oak	1	1150	55	50	Module2
12	Oak	1	980	50	40	Module2
13	Oak	1	630	50	40	Module2
14	Oak	1	300	40	40	Module2
15	Oak	1	800	82	45	Module2
16	Oak	1	350	70	60	Module2
17	MDF	1	400	300	12	Module1
18	MDF	1	1200	1050	12	Drawing
19	MDF	1	900	250	12	For template
20	MDF	2	600	75	55	For testing
21	Hinge	2	4”			Other

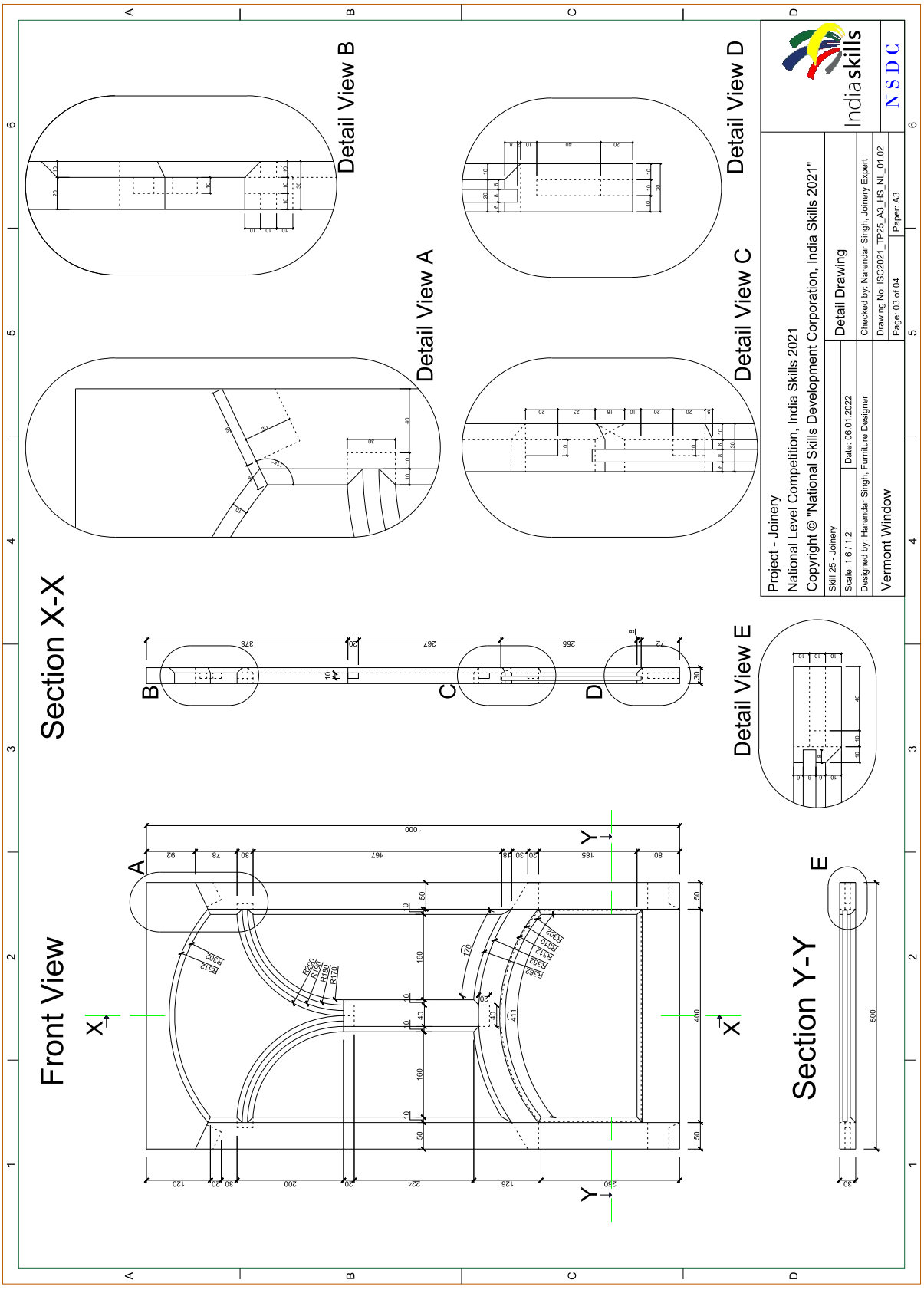
Annexure 4

Sample Drawing

1. India Skills Test project drawing




Detail View E
Detail View F
Side View
F
Front View
E
Project - Joinery
National Level Competition, India Skills 2021
Copyright © "National Skills Development Corporation, India Skills 2021"
Skill 25 - Joinery
Detail Drawing
Scale: 1:6 / 1:2
Date: 06.01.2022
Designed by: Harendar Singh, Furniture Designer
Checked by: Narendar Singh, Joinery Expert
Drawing No: ISC2021_TP25_A3_HS_NL_01.02
Page: 04 of 04
Paper: A3
Vermont Window
indiaskills
NSDC


Front View
Section X-X
Section Y-Y
Detail View A
Detail View B
Detail View C
Detail View D
Detail View E
Project - Joinery
National Level Competition, India Skills 2021
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Skill 25 - Joinery
Detail Drawing
Scale: 1:6 / 1:2
Date: 06.01.2022
Designed by: Harendar Singh, Furniture Designer
Checked by: Narendar Singh, Joinery Expert
Drawing No: ISC2021_TP25_A3_HS_NL_01.02
Vermont Window
Page: 03 of 04
Paper: A3
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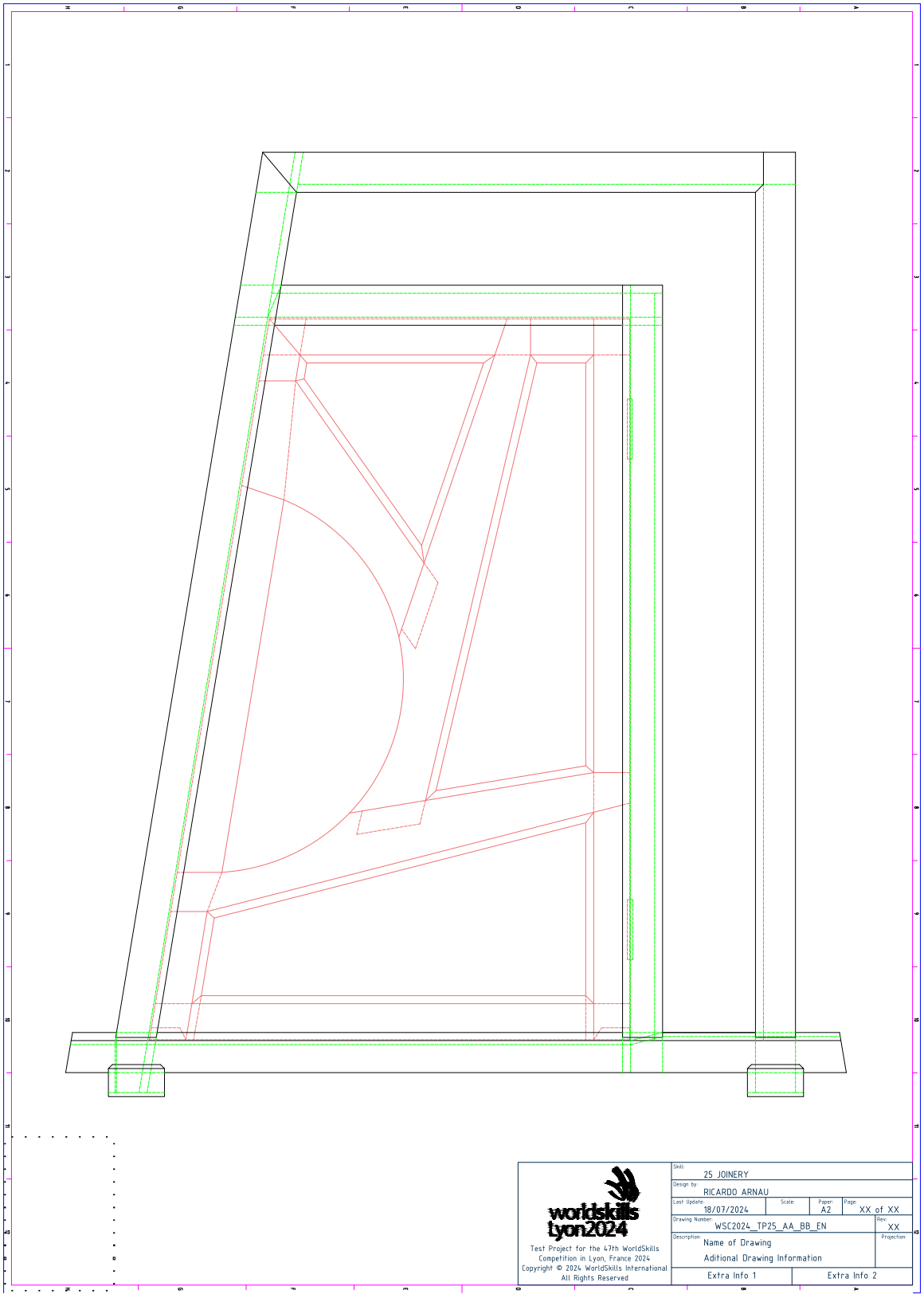
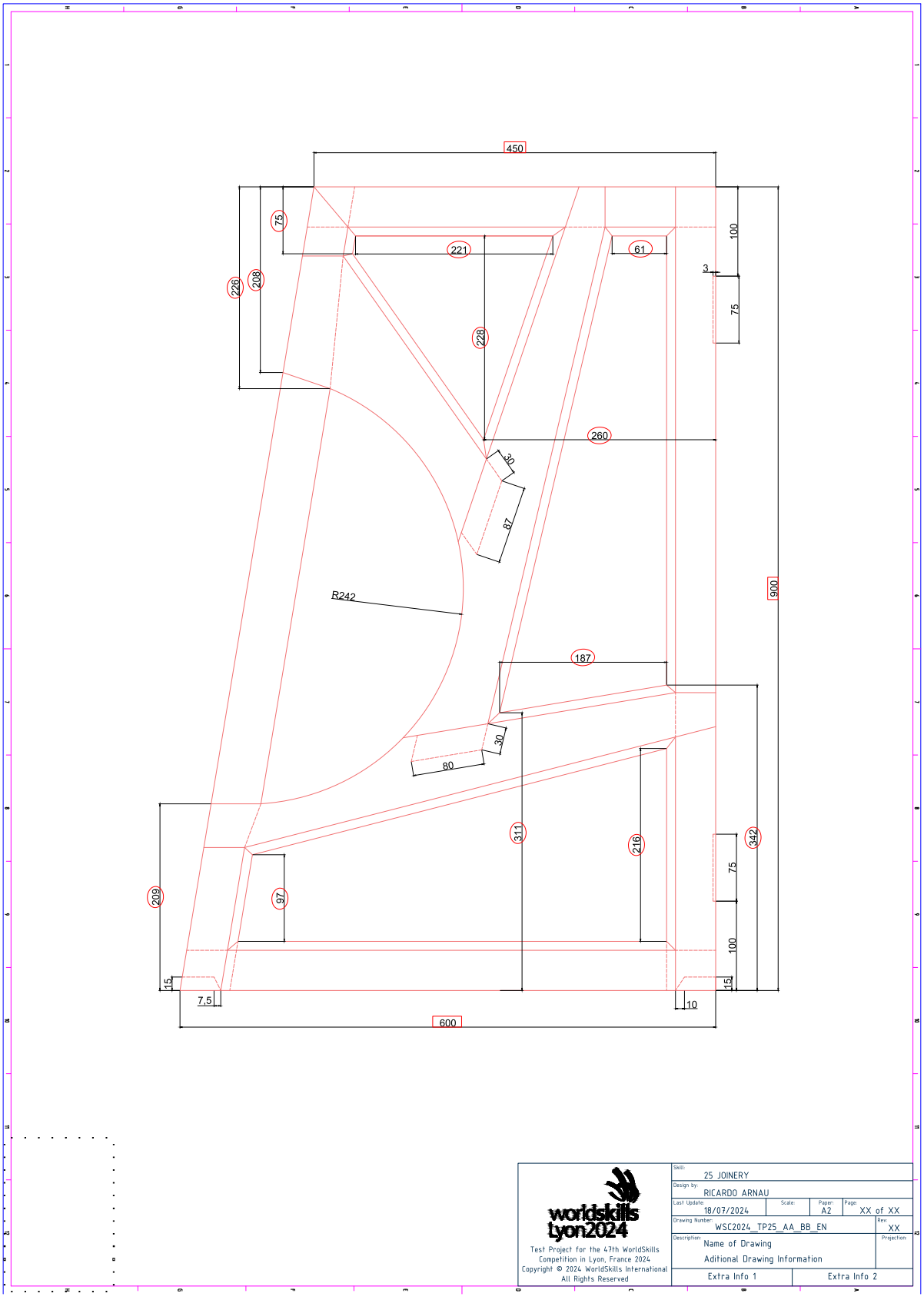
NSDC

2. World Skill Test Project Drawing





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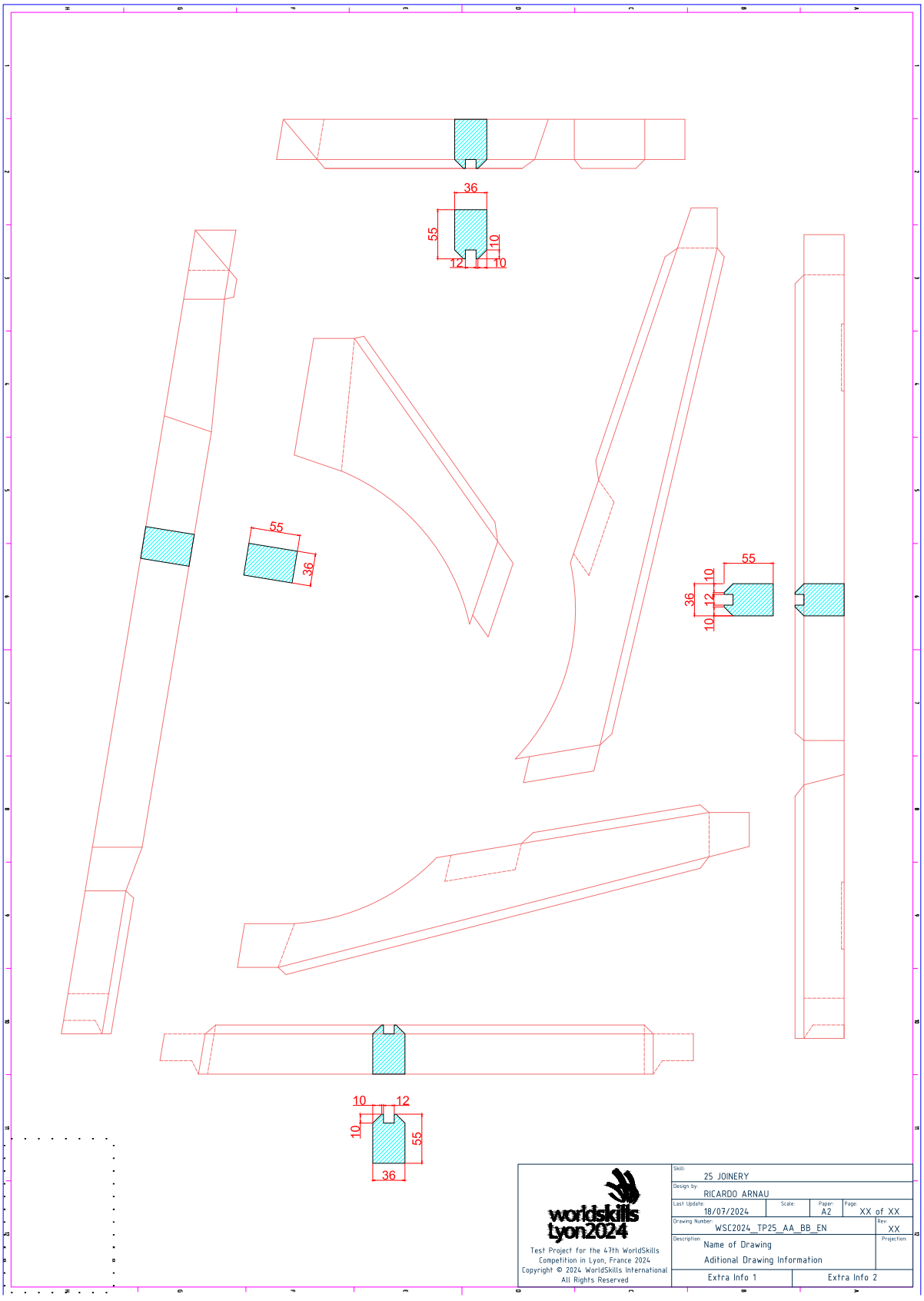

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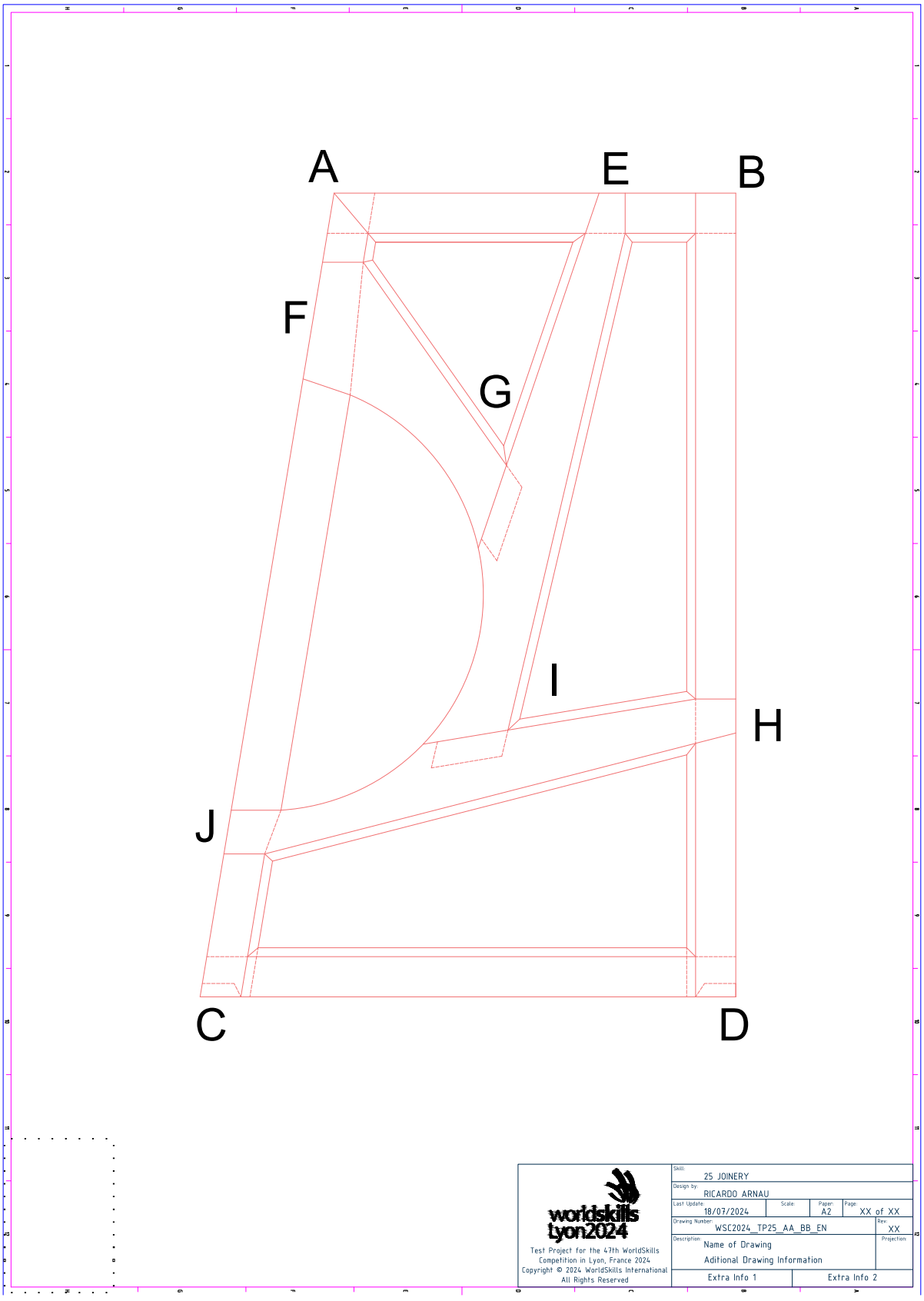

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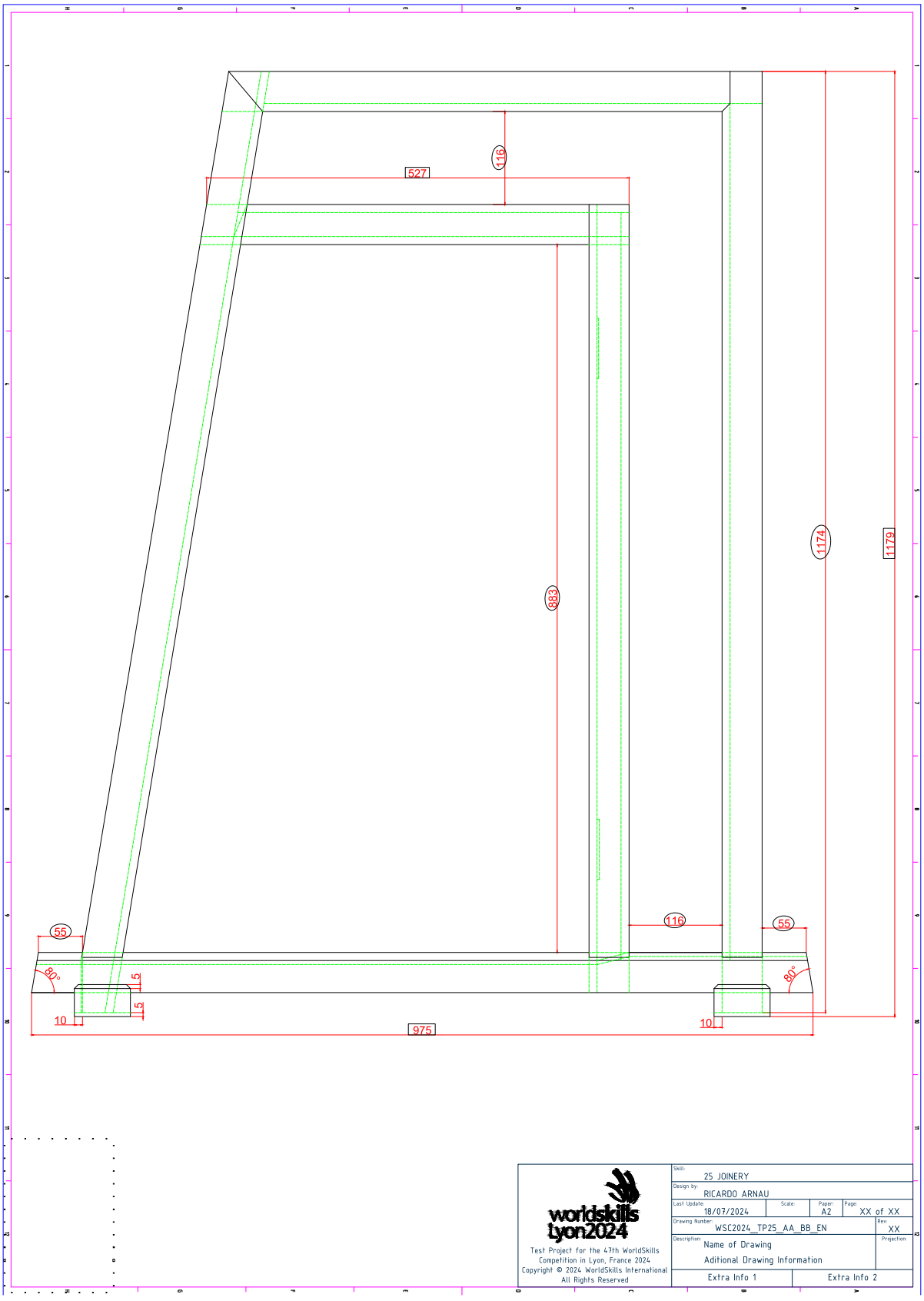

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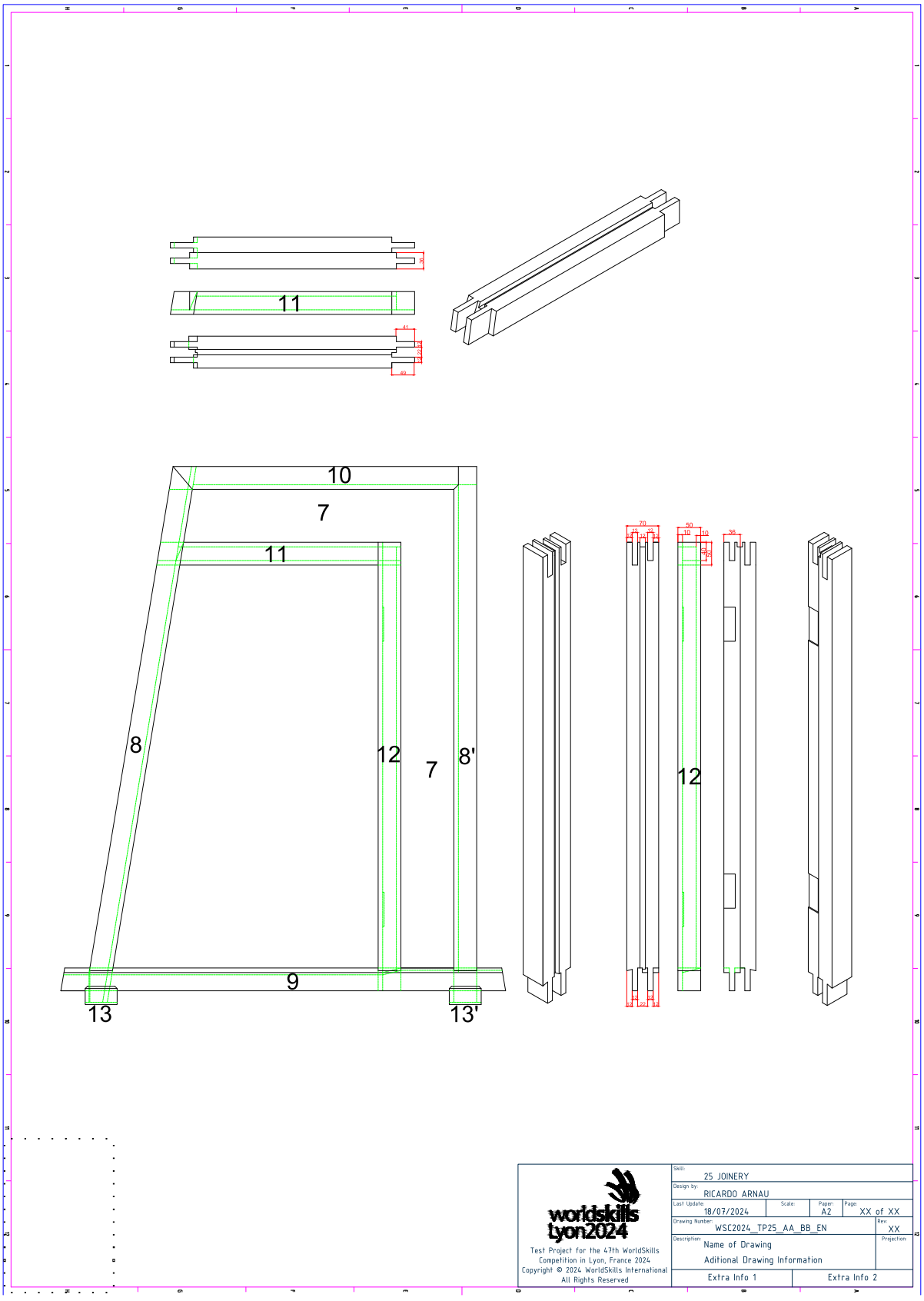

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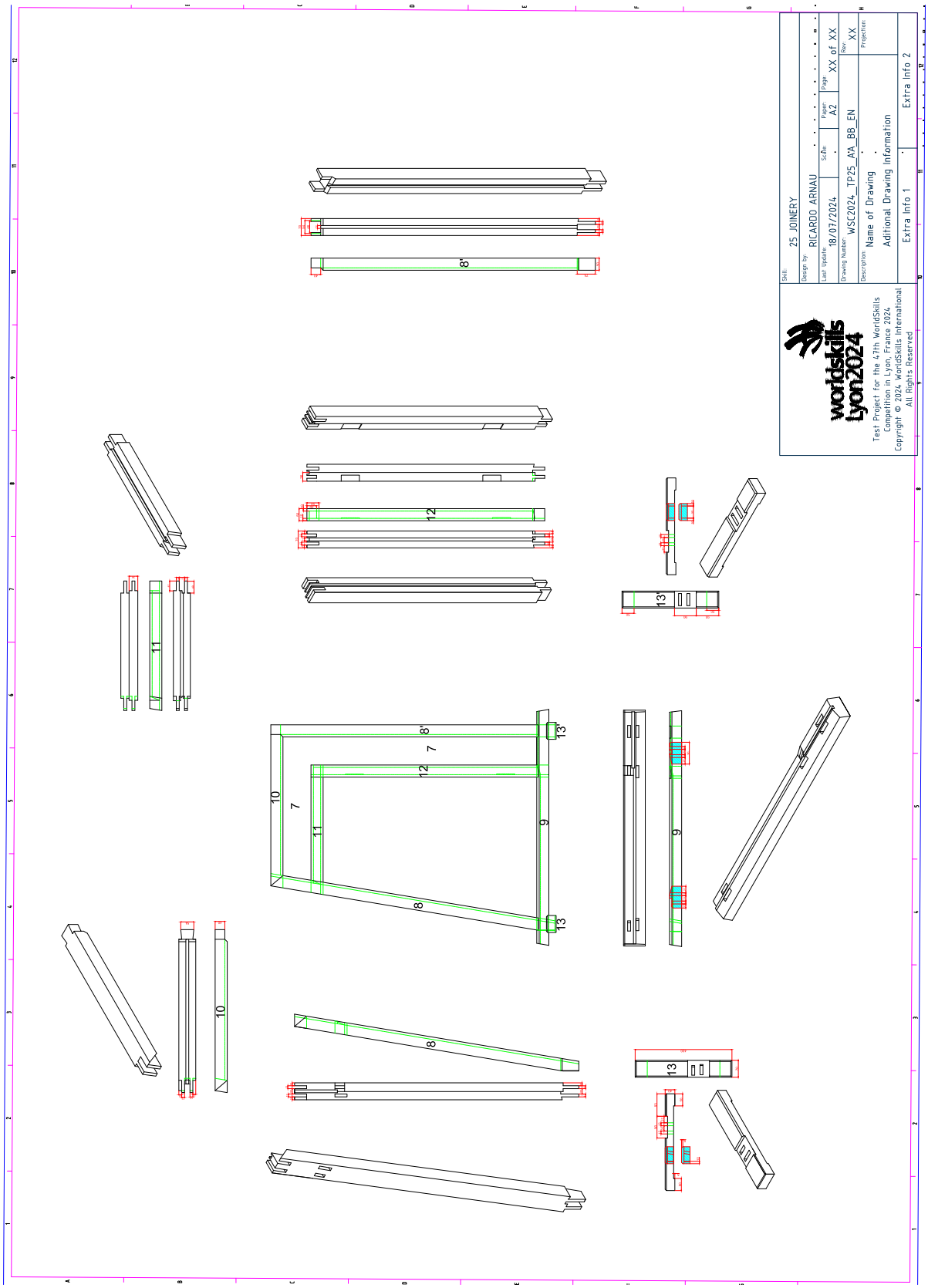
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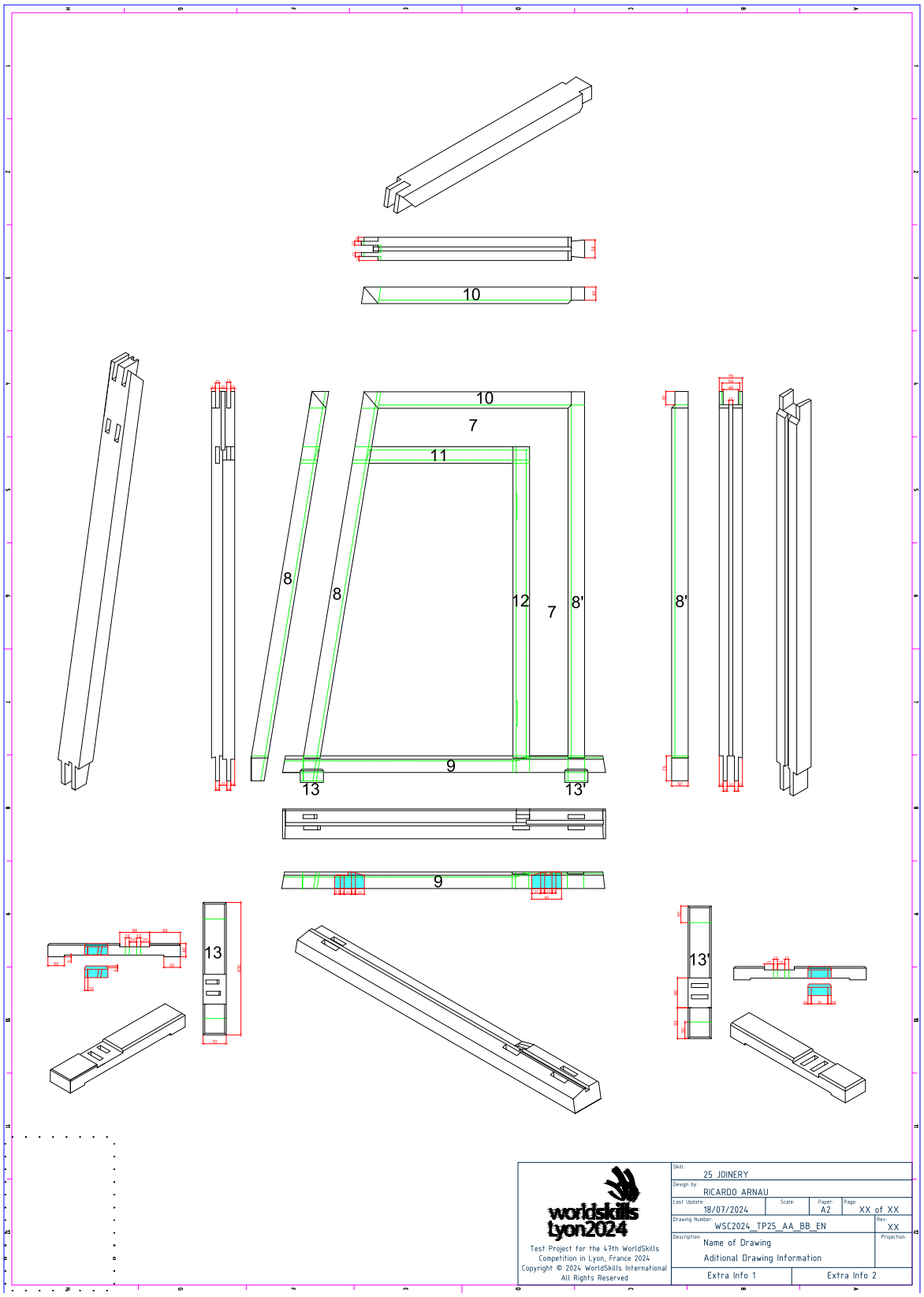

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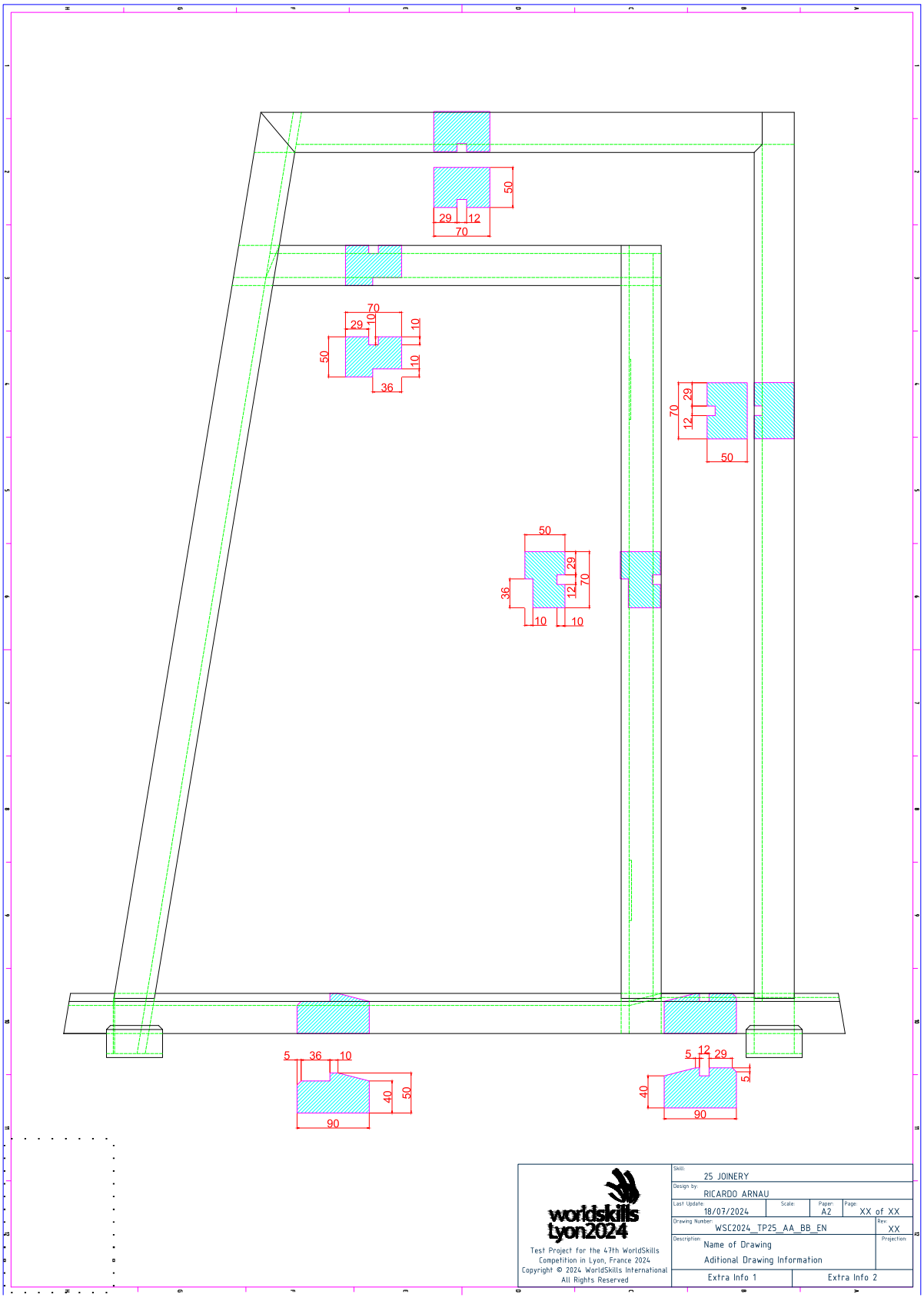
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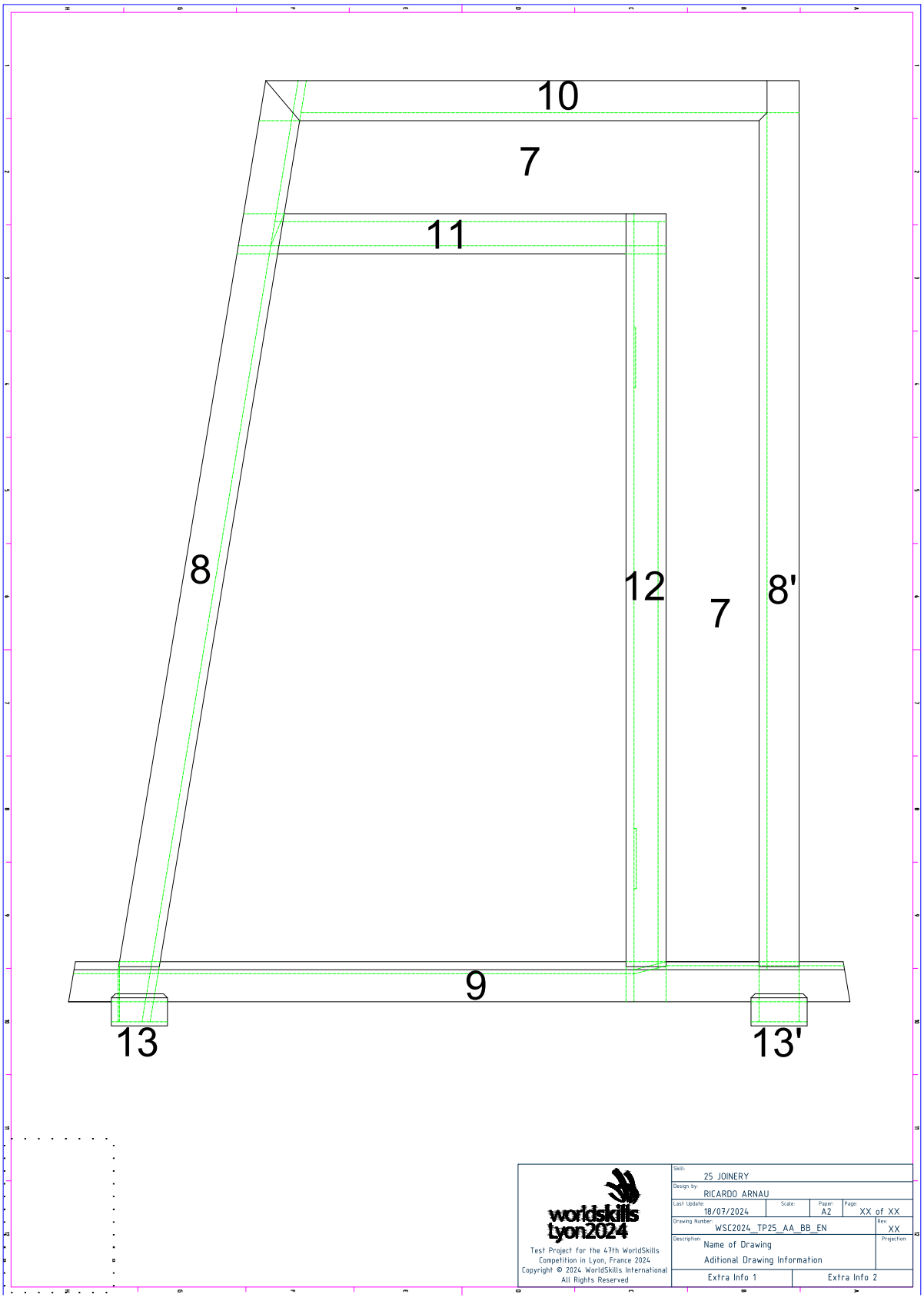

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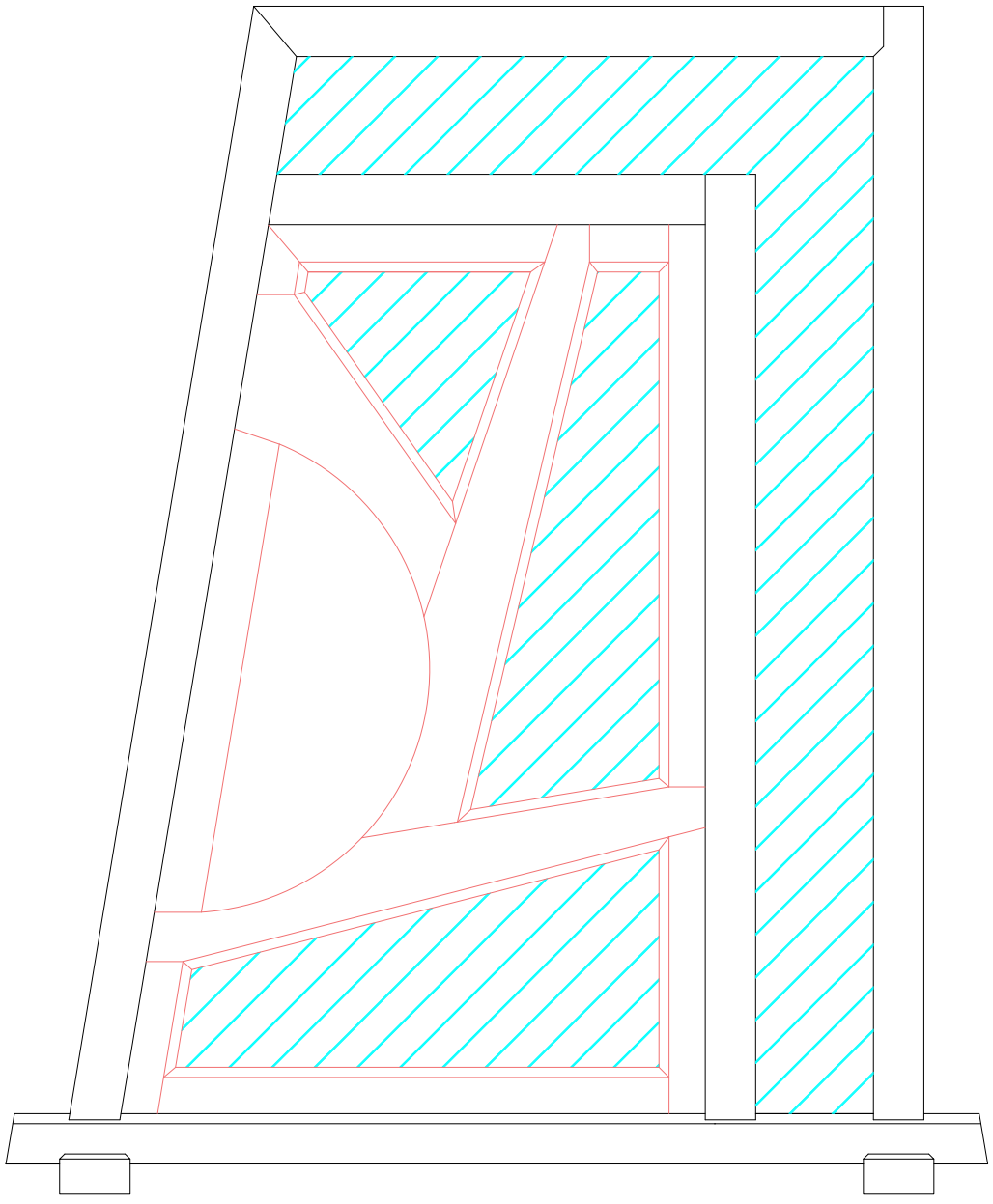

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