



Workshop handout

# INTRODUCTION TO THE WOOD LAB

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●	<b>INTRODUCTION</b>	<ul style="list-style-type: none"><li>● <a href="#">Welcome to the course</a></li><li>● <a href="#">Objectives</a></li></ul>
●	<b>AT THE LAB</b>	<ul style="list-style-type: none"><li>● <a href="#">The space</a></li><li>● <a href="#">Machinery and Equipment</a></li></ul>
●	<b>BASICS OF WOOD WORKING</b>	<ul style="list-style-type: none"><li>● <a href="#">Introduction to Wood</a></li><li>● <a href="#">Grain and growth</a></li><li>● <a href="#">Hardwoods and softwoods</a></li><li>● <a href="#">Types of Wood</a></li></ul>
●	<b>USING THE WOOD LAB MACHINERY</b>	<ul style="list-style-type: none"><li>● <a href="#">Checklist before using the Wood Lab machinery</a></li><li>● <a href="#">Step-by-step Instructions</a></li><li>● <a href="#">Cleaning after finishing</a></li></ul>
●	<b>SAFETY</b>	<ul style="list-style-type: none"><li>● <a href="#">Safety Measures</a></li><li>● <a href="#">Risks and safety instructions</a></li><li>● <a href="#">Dos and Don'ts</a></li></ul>
●	<b>CONCLUSION</b>	<ul style="list-style-type: none"><li>● <a href="#">Additional resources</a></li></ul>

# HELLO!

**In this 2-hour workshop you will learn how to use the Wood Lab machines at MotionLab.Berlin.** These machines allow you to prototype parts through subtracting material by drilling, planing, cutting, sanding and milling parts of it. By the end of the session, you will have practiced different types of preparing wood the way you would possibly need it for your future project.

This handout compiles the most relevant information about woodworking, as well as some practical instructions on how to use the Wood Lab at MotionLab.Berlin.

## YOUR LEARNING OUTCOME

During the workshop you will learn how to:

- Rip wood on a band saw
- Plane wood to create a flat board
- Use the router table
- Cut with drop and table saw
- Drill with the drill press
- Use specific tools we have at MotionLab.Berlin





**You can find our Wood Lab behind the 3D printing lab.**

The maximum room capacity is 8 people.

The space is equipped with 1 band saw, 1 thicknesser planer, 1 combination table and router saw, 1 drop saw, 1 drill press, 2 disc sanders, 1 bench sander, 2 workbenches, dust extraction system, carpentry tools, clamps, and some small hand tools, like rulers, hammers, screwdrivers, and ratchet sets. Here you will also find MotionLab's Bosch hand tools.

It also has a first-aid kit and 3 CO2 fire extinguishers.

**THE SPACE**

# MACHINERY & EQUIPMENT



A **bandsaw** is a machine that has a flexible saw blade in a continuous loop. It is used for cutting curved component parts. Narrow blades are used for tight curves in thin wood; wide blades are better for cutting board curves in thick wood and ripping long planks.

## Hammer N4400 Bandsaw

### Machine Specs:

Cutting height: 310 mm

Rip capacity: max. 420 mm

Rip fence: 377 mm

Saw blade length: 3976 mm

Saw blade width: 6 - 25 mm

Saw blade speed: 20 m/sec

Wheel diameter: 440 mm

Table size: 420 x 575 mm

Tilttable table: -10° max. +45°



## [Hammer User Manual](#)

See from page 22 for operation





# MACHINERY & EQUIPMENT



## Hammer A3-41 Thicknesser Planer

### Machine Specs:

Total length: 1933 mm

Overall width: 890 mm

Working height: 850 mm

Total table length: 1800 mm

Surface planing width: 410 mm

A **Thicknesser Planer** is used to create dress boards and equal thickness planks. In use, the order of work is to plane the face side, adjust the fence and plane the fae edge, and then to put the machine into thicknesser mode and plane the other two surfaces so that the edges and sides are parallel and square to each other.



### [Hammer \[User Manual](#)

See from page 41 for  
operation



# MACHINERY & EQUIPMENT



## B3 Winner Comfort Saw/Spindle Combo

### Machine Specs:

Cutting Length: 2050mm

Cutting Width: :800 mm

Cutting Height: 103mm

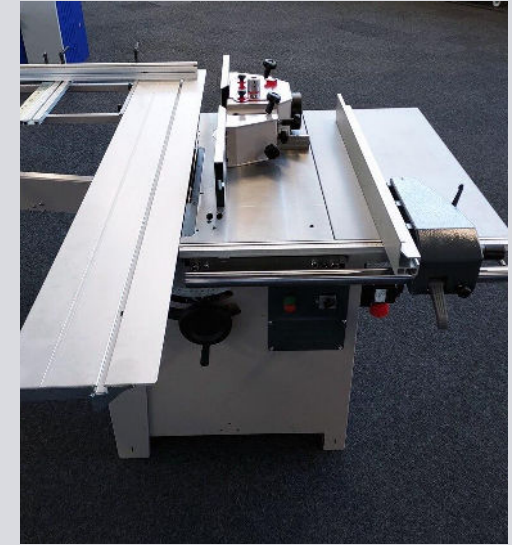
90 to -45 degree tilt

### Router Selectable speeds:

3,000/6,000/8,000 and 10,000 rpm.

Interchangeable tool diameters

A **table saw** is used for sawing stock width and length and for cutting details such as grooves, channels and mitres. It is a table with a spinning saw disc at the centre, a rip fence to the right-hand side and a sliding or extending table to the left. In use, you true up one edge of the wood, set the rip fence to the desired width, and then use your hands and a push-stick to move wood through.



A **spindle moulder** is used for cutting profiles - such as slots, channels, rebates, complex curves and window sections. In use, you fit the appropriate cutters, set the fence in place, organize the table, and then run the wood through or past.

## Hammer User Manual

See from page 67 for  
operation



# INTRODUCTION TO WOOD

**Wood** is probably the most versatile of all materials; it is easily cut and shaped, incredibly strong and available in hundreds of colours, textures and grain patterns. Each piece of wood is unique and its surface appears different each time it is cut. It is available as massive sections of tree trunk, sawn planks of various sizes, small precious pieces for woodturning, and as thin sheets of decorative veneer.

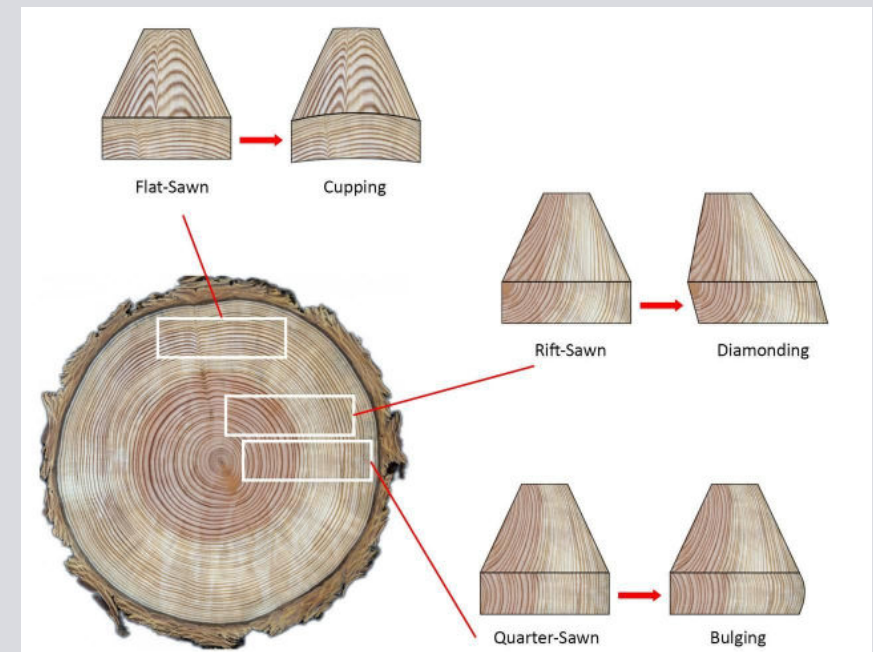
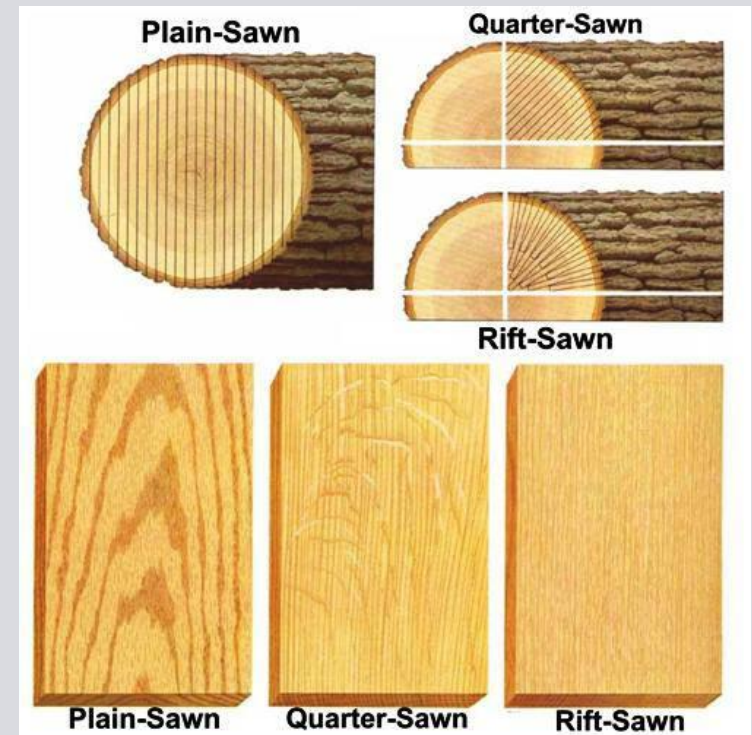




# GRAIN AND GROWTH

The **grain**, or patterns and textures, that we see in a length of planed wood is directly related to the **growth** of the tree. Many characteristics of grain are inherent to species - straight-grained lime, coarse-and wavy-grained European oak - but grain is also affected by growth. For example, slow and even growth results in a close grain, fast growth in a coarse grain, and irregular growth in a cross-grain and badly aligned grain.

A slice through a tree will reveal loosely packed sapwood at the outer edges, and densely packed heartwood at the centre, with good and bad growing years being shown by wide or narrow annual rings. Generally, the central heartwood of a slow-grown timber, with its compacted rings and full colour, is considered to be the best wood.



# HARDWOODS AND SOFTWOODS

**Hardwood** comes from broad-leafed deciduous trees that drop their leaves annually, and softwood comes from coniferous, cone-bearing evergreens that retain their foliage (but there are exceptions.). Hardwood is generally harder in texture, harder to work, more dense in structure, heavier, stronger and more durable than softwood (but there are exceptions.) For example, cedar is a softwood (soft in texture, light in weight) but it is more durable than many hardwoods; and lime (basswood) is a hardwood but is soft in texture and easy to work. And, while a hardwood such as European oak is durable, American red oak is not.

## Hardwoods

- Tends to take a long time to grow
- Is expensive
- Available in wide boards (from large trunks) with few knots
- Often used for furniture-making

## Softwoods

- Normally grows quickly
- Is cheap
- Available as narrow planks (from small trunks) with many knots
- Often used for paper-making, house-building and low-cost furniture
- Softwood furniture tends to be chunkier than hardwood furniture as bulkier sections are required in order to achieve the same structural strength.
- Tends to expand and contract, “move”, twist and warp - more readily than hardwood.

**Hardwood vs Softwood**

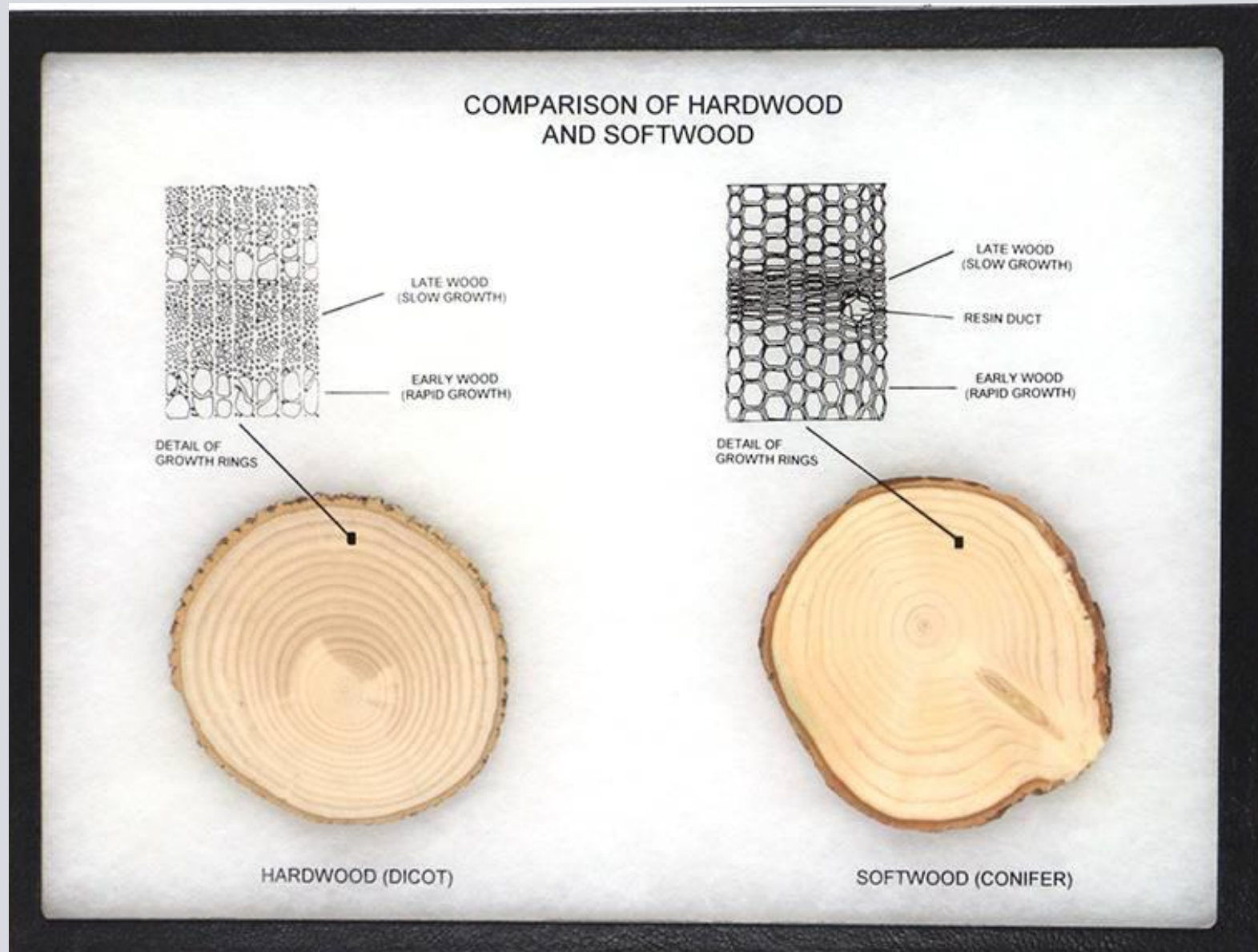


**Hardwood (Teak)**



**Softwood (Pine)**

# HARDWOODS AND SOFTWOODS





# TYPES OF WOOD



# CHECKLIST BEFORE USING THE WOOD LAB MACHINERY

Before starting a job, ask yourself the following questions:

1

**Is this machine the right tool for my project?**

Or would it be easier to cut it with a hand saw, CNC milling machine, or hand router?

2

**Is the material suitable for the machine?**

Hardwood, softwood, manufactured wood, and acrylic have all been approved to be used on these machines. Please check with staff before using any other materials.

3

**Do I know how to use the machine?**

If you are uncertain, you can consult the operating manual as linked with each machine. Don't hesitate to ask for support from our staff if you need it.

4

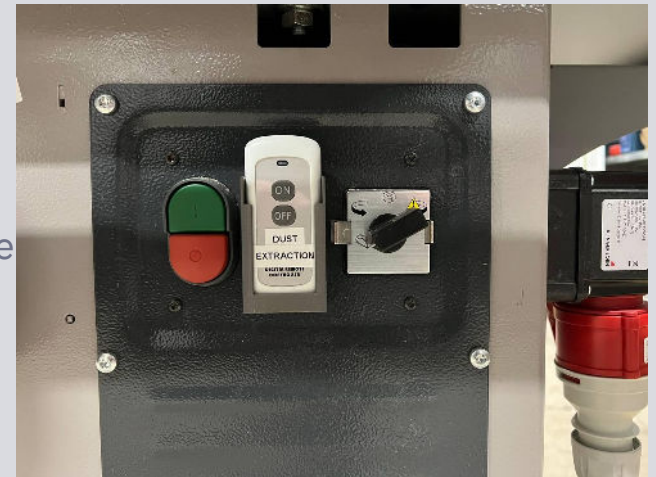
**Can I manage my job alone?**

When working with larger material on such high-powered machines, always enlist a buddy to give you a hand. It's always safer as a beginner to work in twos.

# USING THE WOOD LAB MACHINERY STEP-BY-STEP INSTRUCTIONS

## TURN ON AND PREPARE THE MACHINE

- 1 Checking that dust extraction is connected.
- 2 Ensure that blast gates are closed on other machines to optimize suction on the machine you plan to work on.
- 3 Remember, the golden rule in carpentry:  
**MEASURE TWICE, CUT ONCE.**
- 4 Make sure your material is set correctly in the machine.
- 5 Set your blade or guard height.
- 6 Check that the working area is clear and your material is free from any foreign objects. Watch out! Repurposed wood may have hidden nails, screws or staples that **MUST** be removed first.





# USING THE WOOD LAB MACHINERY STEP-BY-STEP INSTRUCTIONS

## TURN ON AND PREPARE THE MACHINE

7

Inspect the machine and make sure it is free from debris or dust.

8

Safety first - your push stick is your best friend! It should be ready and on hand before you start your project.

9

Unlock the machine's switch on the wall

10

You're ready to go! Turn the on the dust extraction and then the machine.



# CLEANING AFTER FINISHING

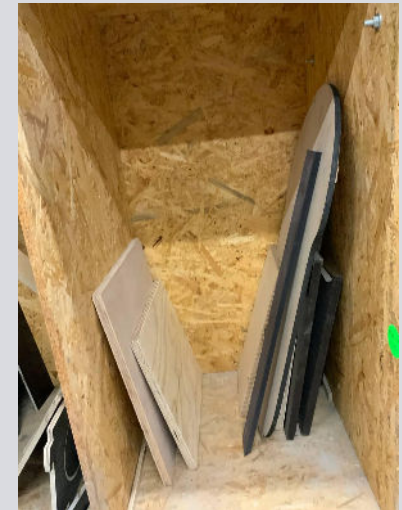
## 1 Throw the trash / remaining material in the appropriate container

Make sure you use the black bin for wood, red for other trash.



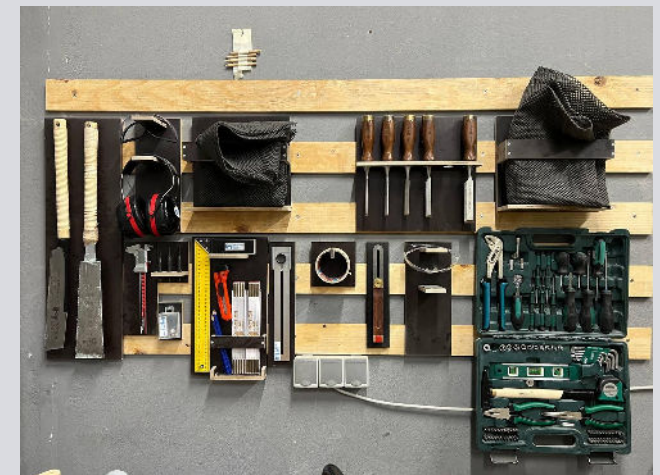
## 2 Store / give away your material

- Make sure you label your material as follows:
  - Last name, first name / Date
- To store material, either place neatly below the workbench or for larger projects, please check with staff about storage.
- If you want to share leftover material, leave it in the designated shelf.
- **Remember!** Only store safe to cut material



## 3 Return the tools to the right place

Do not take any tools outside of the lab, and leave them in their place on the tool board in the workshop.



**Remember to always clean up after yourself!**

# SAFETY MEASURES

When working on or with the machine, the following must be strictly observed:



**Persons with long hair who are not wearing a hairnet are not permitted to work on or with the machine.**



**It is prohibited to wear gloves while working on or with the machine.**

When working on or with the machine, the following must always be worn by personnel:



**Protective gear (overalls, safety goggles, dust mask, hairnet to contain long hair, etc.)**  
Sturdy, tight-fitting clothing (tear-resistant, no wide sleeves, no jewellery (rings, bracelets, necklaces, etc.).



**Protective footwear**  
That protects the feet from heavy falling objects and prevents sliding on slippery floors.



**Ear protection**  
To protect against loss of hearing.



# RISKS AND SAFETY INSTRUCTIONS

The Wood Lab machinery requires 100% attention at all times when in use. There is a high-risk associated with these machines, therefore safety precautions must always be followed.

In order to avoid an accident, please follow these recommendations:

- Keep the **work area orderly and clean**. Components and tools that are not put in their correct place or put away may be the cause of accidents.
- Locate and **familiarise yourself with the safety elements** of the machine and the room: Emergency stop switch, fire extinguishers.
- **Stay with the machine at all times**. Never leave the machines on while unattended.
- As a beginner, **minimum size of working material should be no smaller than 15 cm**. Please speak to staff if you require assistance.
- Always wear suitable **protection - ear defenders** to muffle loud and high-pitched sounds, **goggles** or a **visor** to shield your eyes from flying debris, and a **mask** or **respirator** to protect your lungs from fine dust and toxic fumes.
- **Accumulation of dust** and resin from **oily rags** thrown into the bin before they have a chance to dry can cause a combustion **fire**. Always clean your machines and working area.

## In case of emergency

- Press the emergency stop button.
- In case of fire, use quick fire extinguisher burst to suffocate the flames.
- Immediately report any accident to staff.

## Fire extinguishers



**Both are located next to the shelving unit**

# DO'S AND DON'TS

## DO

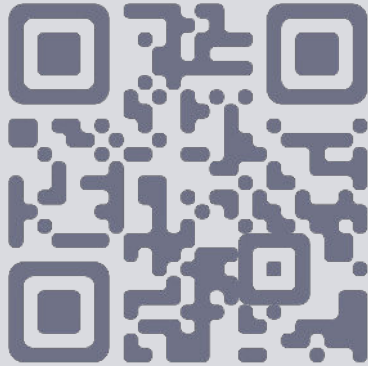
- Pay attention to what you are doing and to the people working around you
- When in doubt, ask our staff. We are happy to help
- Keep the area around the machines clear from obstructions
- Ensure that your material is suitable for the machine
- Keep your safety gear handy, especially your mask. We recommend working in an FFP2 mask.
- Report any faulty or improperly cleaned equipment/area to the staff
- Clean after yourself and keep the lab tidy
- Know the location of the fire protection gear

## DO NOT

- Disassemble or repair the machine, or remove its protective covers
- **Ever leave the machine unattended while in use.**
- Attempt to remove guards or any other safety feature of the machine.
- Do not dispose paint, glue, resin silicone or aerosol in the wood bins.
- Use metal/aluminum with the bench sanders. Foreign material can embed in other people's projects.



# ADDITIONAL ONLINE RESOURCES



**MotionLab.Berlin Slack channel - [#14\\_wood](#)**



Join our wood lab slack channel and the community of experts!

Experience projects from coworkers, ask questions and help others and stay up to date about news and changes at the lab.

Also, let us know what exciting things you developed at the lab. Simply, post it in the slack channel and tag @Lau Bau

- MotionLab.Berlin online [material settings library](#)
- [Booking system](#) for the machines at MotionLab.Berlin
- Inspiring Custom [Woodworking Channel](#)
- MotionLab.Berlin WIFI guest access

Network: Motionlab-Guest

Password: motionlab.guest







# ALMOST THERE!

**NOW, PARTICIPATE FROM  
THE LIVE WORKSHOP AND START  
WORKING ON YOUR PROJECTS!**

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**DID YOU LIKE THE CONTENT OF THIS WORKSHOP  
AND YOU ARE STILL NOT A MEMBER?**

Join our ecosystem and make your ideas come to life!

Reach out to our colleague [Matthew](#)

Or sign up for our [newsletter](#) to learn about the upcoming  
workshops and events.

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**Note:**

This is a living document, which  
may experience changes as our  
labs evolve.

If any of the links don't work,  
please report it to

[info@motionlab.berlin](mailto:info@motionlab.berlin)