

# Bergen School of Architecture

Workshop course.

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## Intellect, body, materials and tools.

Woodworking is a collaboration between the intellect, the body, the materials and the tools. This way of working is particularly closely linked to the practitioner as a person. Strive to treat all aspects of your craft with pride.

The course qualifies the students for independent use of the workshop and machinery.

The course will primarily teach you how to use the stationary machinery in the BAS workshop. The course addresses essential safety aspects when using the machinery, and we will look at various work operations involving the most common machines.



## Machinery:

The best safety precaution is to make yourself familiar with the machinery and to take your time. Stress and haste are our worst enemies in the workshop. If you feel stressed, annoyed or very tired, please stop and think.



## Dust extraction



The stationary machines in the workshop are connected to a central dust extraction system. Dust from wood and other building materials poses a risk to health, and it is therefore important to ensure that the extraction system is working properly when using the machinery. Dust from softwoods such as spruce and pine can trigger allergies and respiratory complaints; dust from hardwoods such as oak, ash etc. can be carcinogenic.

The extraction system is set to switch on automatically when the machine starts. The dampers will also open. If the extraction system fails to start or does not work as it should, you must stop working until the problem has been rectified.

The system has dust containers which must be emptied when they fill up. It is important to keep an eye on the containers. Clearing up and cleaning the system is a time-consuming job if they are left to overflow. A window on the dust container allows you to monitor the dust level. The containers will fill up quickly when using the planer and thicknesser. They will fill up in a matter of minutes during intensive use of the thicknesser. Remember to wear a dust mask when emptying the containers.

Wood shavings and dust are highly flammable. A room saturated with such dust is at risk of dust explosions.

The dust extraction system does in itself pose a fire hazard. Nails or other metallic objects in the woodwork can create sparks and are a common cause of fires. You must therefore be very vigilant when using reclaimed materials or agricultural timber etc. which may have staples or other objects embedded in them. The caretaker has a metal detector if you are unsure.

The dust extraction system has an automated fire suppression system which will be triggered in the event of a fire in the dust chamber. A fire in the workshop will result in the closure of the workshop for at least two days in order to clean the extraction system.

## Sliding table saw



This is a highly versatile, effective and accurate saw for fine carpentry. The saw can be used on both timber and timber-based sheet materials. You can use it for both cross-cutting and ripping. The blade has an electric tilt, and the angle can be read digitally. The cross-cut fence can also be set to fixed or variable angles. The height of the saw blade is adjusted electronically to allow you to create rebates etc. On the cross-cut fence there are two guides with micro-adjustment for setting the length.

This saw is not constructed for coarse, heavy, dirty or wet materials. Such materials should always be processed on a contractor table saw [Gjerdessagen].

All metals etc. must be processed in alternative ways.

Trying to describe all the possible uses of this saw is beyond the scope of this text. Spend some time getting to know the saw and its functions. It will add to your skill set and open up new opportunities.

### **Hazards when using the saw.**

Noise and risk of splinters: Wear hearing protection and goggles!

Dust, especially when working with sheet materials. Ensure that the extraction is working properly, and consider wearing a dust mask during extended use.

Respect the saw. The blade is very powerful and fast-moving. Incorrect use poses a serious hazard. The most obvious risk aspect is cuts from the blade but also kickback. This can cause materials to recoil back towards the user with great force or a misplaced hand to be pulled in by the blade. As with all rotating tools, do not wear loose-fitting clothing or loose, long hair. The velocity of such rotating tools exceeds human reaction speeds many times over.

The key rule for preventing cuts is: *keep your fingers away from the blade!* There are accessories to help you not get too close, so-called push sticks. Very small workpieces should not be placed on this saw. Use a handsaw or bandsaw instead. Never set the blade much higher than the piece you will be working on; 5–10 mm excess height is ideal. Ensure that you have a push stick to hand



when you start sawing, and position the blade guard close to the workpiece (approx. 5 mm above it).

Ensure that the workpiece is resting firmly against the table and the guide.

As with all circular saws, the riving knife is important in preventing kickback. The riving knife does two things: firstly, it stops the workpiece from being grabbed by the blade. Secondly, it protects the rear of the blade and stops it from throwing the wood forward. The blade guard also helps prevent a kickback from throwing the workpiece into the air. One common cause of kickback is when the user cuts workpieces that are wider than they are long and supporting them on the rip fence on the right-hand side of the saw. The workpiece will often twist itself around the blade and be thrown out backwards. The right-side rip fence is only used when ripping wood lengthways. For cross-cutting, use the cross-cut fence on the left in combination with the roller table.

Stop the saw immediately if something seems out of place during sawing, e.g. the workpiece starts vibrating excessively, you struggle to move the workpiece forward, unusual noises etc.

When you have finished using the saw, return it to its default position, i.e. with both fences and the blade guard in the right places. The saw is not a storage space or workbench.

Always keep your distance, and do not disturb people working on the saw. Ensure that the space around the machine is tidy before you start and when you leave. Never leave the machine running when not in use.



## Planer (jointer)



A planer (also known as a jointer) is used for planing materials, most commonly a surface and a perpendicular edge. These are the reference sides for further processing with a panel saw or thicknesser. The thicknesser is used to achieve uniform thickness based on the reference sides created with the planer. **The planer planes, the thicknesser trims.** The setting on the feed rollers determines how much material the planer should trim off. We recommend not trimming more than 3 mm in a single pass.

A planer is a precision tool. You should only use it on clean and dry wood. The top (table) of the planer must be kept clean in order to reduce friction. It is advisable to use a lubricant. There should always be both detergents and lubricants in the workshop. Treat the planer as you would your own dining table: don't sit on it, don't store objects on it, especially not wet or dirty items. The knives on the thicknesser must be sharp in order to produce a good result and reduce risk during use. Materials which have been stored for a while must be brushed down before trimming in order to remove sand etc. Every single grain of sand from sandpaper etc. will damage the knives. The rule of thumb is therefore never to step on materials.

### Hazards when using a planer (jointer).

Noise and risk of splinters: Wear hearing protection and goggles!

Most people are filled with respect when they see and hear a planer in use for the first time. Make sure you maintain that respect.

The tool is not dangerous when used correctly, but once you start to get creative with it, the risk increases. Get to know the planer before you use it. For example, it has two emergency cut-off switches. There is a fence/guide and a blade guard above the blade.

As with all rotating equipment, keep clothing and hair away from the knives. Do not wear gloves. There are various types of push sticks available for use with planers. Personally I feel safer without them but am happy to discuss and try out the different models available in the market.



Small and thin workpieces should not be used on the machine without taking certain precautions. Taking a trial and error approach is not advisable.

You will receive training in the safe use of the planer in the workshop. If you are unsure about something, just ask us to go over it again. **Don't experiment!**

Always keep your distance, and do not disturb people working on the planer. Ensure that the space around the machine is tidy before you start and when you leave. Never leave the machine running when not in use.

### **What is the difference between a planer (jointer) and a thicknesser?**

Matt Estlea

Are you confused about the difference between a Jointer and a Thickness Planer? In this video, I explain why each tool is unique, why it's important to use the correct one for a certain job, and the consequences of choosing the wrong machine to dimension your timber.

<https://youtu.be/53yKtkP0yFE>

### **How to use a planer (jointer) safely and effectively.**

Matt Estlea

In this video, I show you how to use a jointer safely by covering the placement of guards, how to setup and operate the machine, and what to watch out for. I also show how to use it properly by showing you common mistakes people make while machining timber and how to avoid this.

<https://youtu.be/IUCb-J8zP8U>



## Thicknesser



The thicknesser is used to achieve uniform thickness based on the reference sides created with the planer. **The planer planes, the thicknesser trims.** The final dimensions of the workpiece are programmed and displayed both on a digital display and on a scale on the side of the table. We recommend not trimming more than 3 mm in a single pass. The thicknesser feeds the workpiece through by itself. The feeding can be adjusted with the rotary switch. Feed too fast, and it can cause problems with the dust extraction. The quality of the surface may also be compromised. This depends on the type of wood and the dimensions. If you are trimming away large amounts of material, it can be a good idea to first use the panel saw or bandsaw before making the final adjustment in the thicknesser. This saves time and reduces the amount of shavings in the dust containers.

A thicknesser is a precision tool. You should only use it on clean and dry wood. The table on the thicknesser must be kept clean to reduce friction. It is also a good idea to use lubricant on the table. There should always be both detergents and lubricants in the workshop. The knives on the thicknesser must be sharp in order to produce a good result and prevent burn marks etc. on the wood. Materials which have been stored for a while should be brushed down to remove sand etc. Every single grain of sand from sandpaper etc. causes damage to the knives. The rule of thumb is therefore never to step on materials.

There is a minimum and maximum thickness. The minimum length of the workpiece is 50 cm.

There is an emergency cut-off switch on either side of the thicknesser.

### **Hazards when using a thicknesser.**

Noise and risk of splinters: Wear hearing protection and goggles!

The thicknesser is relatively safe to use, but never place your head, arms or legs or anything else you would like to keep intact inside the machine without being absolutely sure that it has been disconnected. Never attempt to trim crooked or twisted materials with this machine. The workpiece must have a flat and straight reference side on the side facing the table. Always keep your distance from people working on the thicknesser. Ensure that the space around the machine is tidy before you start and when you leave. Never leave the machine running when not in use.

## Bandsaw



The bandsaw is a highly versatile tool. It is often the first saw a woodworker will buy for their workshop. You can use it to saw timber-based sheet materials and wood. A large bandsaw can work through thick materials provided the blade is sharp and correctly calibrated. The width of the blade and size of the teeth can be adjusted according to use and type of materials. A good bandsaw can deal with most materials. Its limitations are often down to precision. On the other hand, it can be used to saw curves. The bandsaw blade will immediately become blunted and useless if you use it on materials containing sand etc. It is also advisable to clean the workpiece before use. When using a bandsaw ensure that the side of the workpiece facing the table is straight and flat. If it is warped, the blade will grab the workpiece and could even snap.

As with all saws, it is important not to push the saw. Let it maintain its full pulley speed while you saw. Whether you are using a handsaw or mitre saw, if you force the blade against the workpiece, the saw will not be able to expel enough sawdust from the kerf. It will start to “wander”, and you lose control of the kerf. With its thin blades, bandsaws are especially prone to this.

### Hazards when using a bandsaw.

Noise and risk of splinters: Wear hearing protection and goggles!

The bandsaw has an emergency cut-off switch. Determine where the switch is before you start sawing.

Contains rotating parts: ensure that you are not wearing loose clothing or hair. A tie can look smart, but being pulled into the bandsaw by the neck is not cool.

There is a risk of cut injuries when using this saw. It is less powerful than a panel saw or mitre saw, but even a bandsaw will quickly chop whatever you feed it in terms of body parts. Use push sticks, always stop and think, and always position the upper blade guide approx. 1 cm above the workpiece.

Do not use excessive force when using the saw as it increases the risk of cut injuries and blade breakages. Cylindrical workpieces should be kept well away from the bandsaw as they pose a



major risk of cut injuries etc. without certain precautions and additional tools. Ask the workshop supervisor for advice.

Ensure that the workpiece is resting firmly against the table.

Always keep your distance from people working on the bandsaw. Ensure that the space around the machine is tidy before you start and when you leave. Never leave the machine running when not in use. Never leave the machine until the blade has come to a halt. Ideally, you should also lower the blade guide all the way down to the table before leaving the saw.

Matt Estlea

In this video, I show you how to set up your bandsaw for optimum performance. I'll take you through everything from blade selection to tensioning, tracking, bearing adjustment and fence alignment to get your bandsaw performing as it should do!

<https://youtu.be/ugc85kJmos8>



## Edge sanding machine



An edge sanding machine is used to finish off a workpiece. A sander will always create a slight arc on the workpiece and is not suitable for precision work. The sander produces huge amounts of dust. Use other machines where possible, and do not sand materials that generate dangerous dust such as certain sheet materials. We never use a sander for major work, only for finishing touches and minor shaping operations. Please note that sandpaper will always leave behind abrasives in the workpiece. Sanding must therefore be left until last. Abrasives from sandpaper are very good at causing damage to machines and hand tools. The knives on the planer and thicknesser will quickly become dull when used on workpieces which have been through the edge sanding machine.

### **Hazards when using an edge sanding machine. And other sanders.**

Noise and risk of splinters: Wear hearing protection and goggles!

Large amounts of hazardous microparticles. Consider wearing a dust mask during extended use. Avoid extended use if possible. Ensure that the dust extraction system is working optimally when using this machine. Show consideration for others.

As with all rotating equipment, keep clothes, jewellery and hair away from the machine.

Sanders pose a high risk of fire. Keep metals and other objects that may create sparks well away from the machine.

The workpiece may be expelled by the machine. Ensure that the piece is adequately supported and that no one is standing in the direction of travel.

The machine will promptly shred skin, flesh and nails if touching the belt.

Always keep your distance from people working on the edge sanding machine. Ensure that the space around the machine is tidy before you start and when you leave. Never leave the machine running when not in use.

## Mitre saw



This saw is used in the workshop and on projects in the field. It is a portable non-handheld machine. A mitre saw is a highly versatile and accurate tool used to cut and adjust wooden materials. The saw can be set to a range of different angles by tilting the blade and/or rotating the turntable. The largest models are capable of cutting very wide and high workpieces. The depth of the kerf can also be adjusted to allow you to cut shoulders or rebates in the workpiece.

### **Hazards when using a mitre saw.**

Noise and risk of splinters: Wear hearing protection and goggles!

Dust. Use the dust extraction system if you are indoors, alternatively a dust mask if you are on a field project and performing extended sawing operations.

Contains rotating parts: ensure that you are not wearing loose clothing or hair.

Cut injuries. Ensure that the saw is steady and that the saw table has been correctly assembled and is working properly. Inspect the saw before use. Does the blade guard work properly?

Tidy the area around the saw before and after use. Make sure that the ground is not slippery or uneven.

Check that the saw blade touches the right point (the line) before starting the blade. Do not adjust the workpiece once the saw is running. Keep your fingers well away from the blade, and do not cut small workpieces. Things happen quickly and forcefully once the blade grabs the workpiece. You will have no time to react if something goes wrong.

Unsuitable items such as cylindrical, crooked, long or heavy workpieces increase the risk. Is there an alternative way of doing it more safely? Handsaw? Circular saw?

Ensure that the workpiece is resting firmly against the table and the guide.

Never walk away from a saw that is unsafe and not in working order. Shut it down and give it to the caretaker or workshop supervisor.



## Contractor table saw 1203 – 1603 – 2003 (Gjerdesagen)



The largest models are often stationary machines. The smallest (1203) is portable, as is the 1603 despite being very heavy.

This saw is the house-builder's working horse. It is not primarily used for woodworking like the panel saw. It does pretty much the same thing as a panel saw, but it is built to cope with heavier timbers (the larger models) and to effectively cut large quantities of structural timber. It is less accurate than a panel saw, and it is difficult to make fine cuts with it as you do on a mitre saw. It can be used to process both timber-based sheet materials and timber. The blade can be tilted and set to different angles, and you can use it for both ripping and cross-cutting. The blade can also be set at a fixed height, and you can make cuts with the roller table unlocked.

A contractor table saw lends itself to a vast array of uses once you get to know it. Spend some time familiarising yourself with it, and many opportunities will reveal themselves.

### Hazards when using the saw.

Noise and risk of splinters: Wear hearing protection and goggles!

Dust. Sheet materials in particular generate large amounts of hazardous dust. Use the dust extraction system or wear a dust mask.

This saw must be respected. The blade is very powerful and fast-moving. Incorrect use poses a serious hazard. The most obvious risk aspect is cuts from the blade but also kickback. This can cause materials to recoil back towards the user with great force or a misplaced hand to be pulled in by the blade.

As with all rotating tools, do not wear loose-fitting clothing or loose, long hair.

The key rule for preventing cuts is *keep your fingers away from the blade*. There are accessories to help you not get too close, so-called push sticks. Very small workpieces should not be placed on this saw. Use a handsaw or bandsaw instead. Never set the blade much higher than the piece you will be working on; 5–10 mm excess height is ideal. Ensure that you have push sticks to hand before you start to saw. The contractor table saw comes with two push sticks which should always be in working order and stored in their permanent place on the saw. Position the blade guard some 5 mm above the workpiece.

Ensure that the workpiece is resting firmly against the table and the guide.

As with all circular saws, the riving knife is important in preventing kickback. The riving knife does two things: firstly, it stops the workpiece from being grabbed by the blade. Secondly, it protects the rear of the blade and stops it from throwing the wood forward. The blade guard also helps prevent a kickback from throwing the workpiece into the air.

Stop the saw immediately if something seems out of place during sawing, e.g. the workpiece starts vibrating excessively, you struggle to move the workpiece forward, unusual noises etc. The saw has an emergency cut-off switch. Make sure you know where it is.

When you have finished using the saw, return it to its default position, i.e. with the fences in the right place and not touching the blade and the blade guard above the blade where it should be. The saw is not a storage space or workbench.

Always keep your distance, and do not disturb people working on the saw. Ensure that the space around the machine is tidy before you start and when you leave. Never leave the machine running when not in use. Lower the blade before leaving the machine.