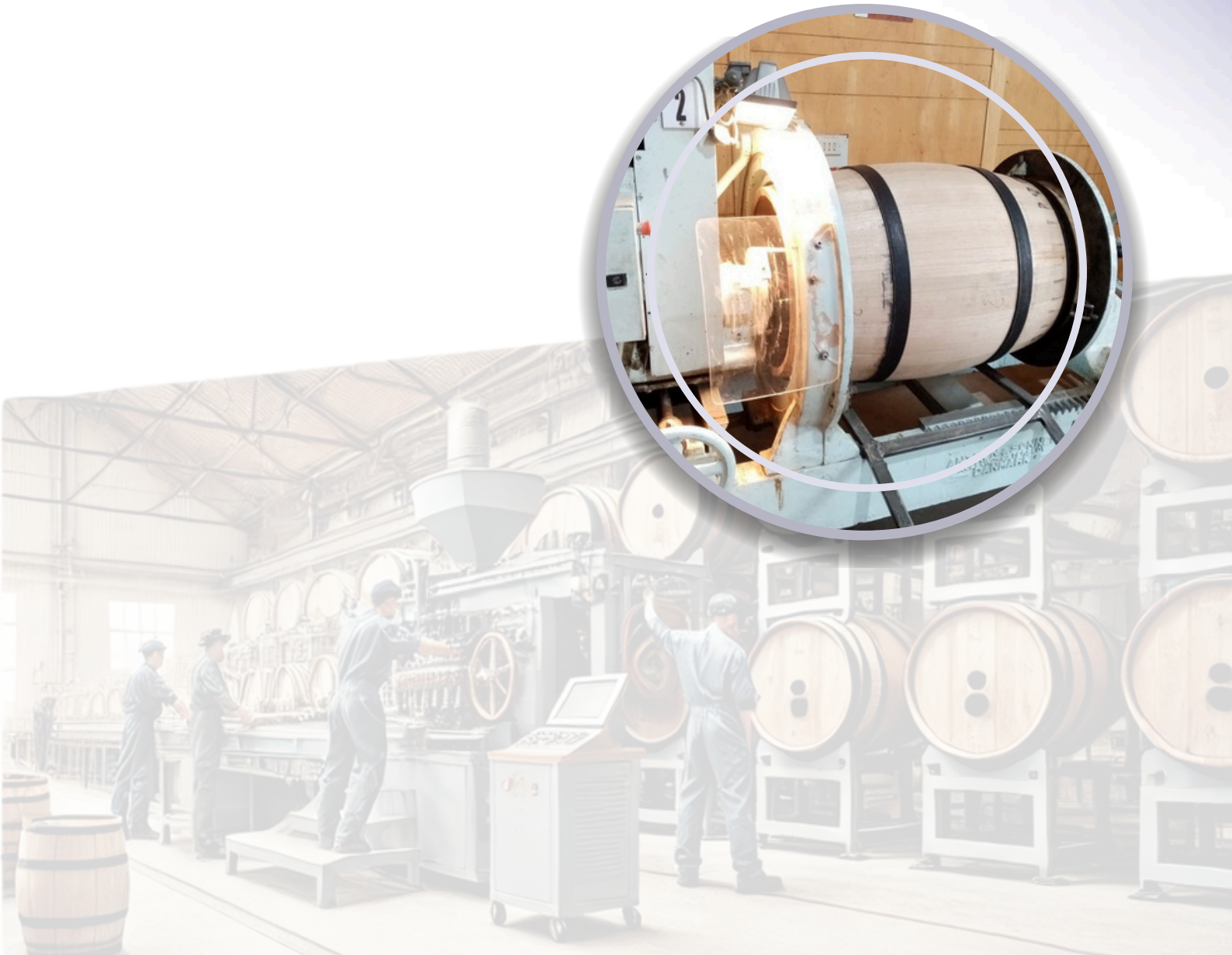
The Single Crozer

MARIAUD CONSULTING



Our PROGRAM

The single crozer

01 Description

Role of the machine

The crozer is an essential machine in the manufacturing of the cask. It rotates the barrel around an axis while a set of tools successively machines:

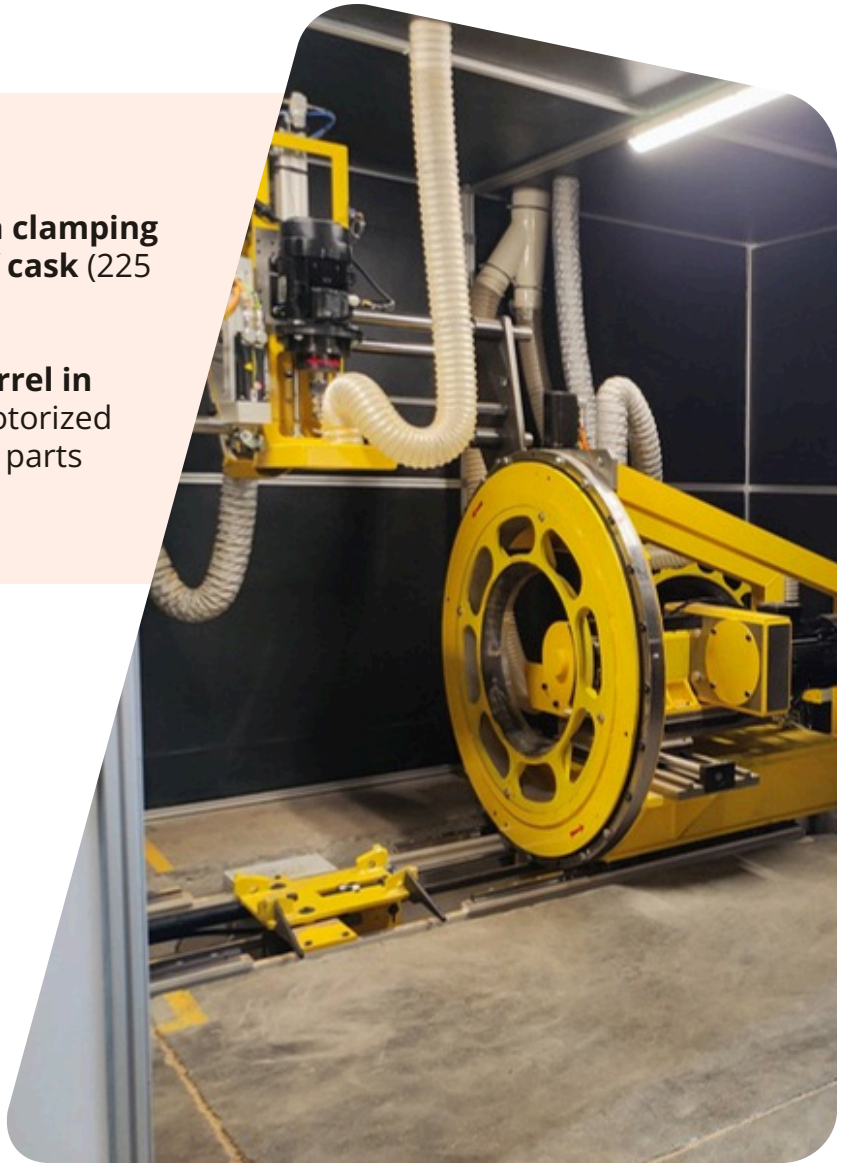
- the **chime** (a slanted bevel to facilitate assembly and prevent splintering),
- the **howel** (pas d'asse) (a slightly rounded transition zone),
- the **croze** (the deep groove where the barrel head is fitted).

The objective is to obtain a perfectly adjusted extremity, guaranteeing the proper fit of the heads and the tightness of the barrel.

Operating principle

The shell (or body) of the barrel is held in **a clamping ring** adapted to the **diameter** and **type of cask** (225 L, 300 L, 500 L barrel, etc.).

Once centered, the machine drives **the barrel in rotation** while the tools, mounted on a motorized axis, simultaneously machine the different parts



Tool composition

- **A circular saw:** for the heading of the barrel extremity.
- **A straight or slightly curved blade: fo**r the chime.
- **A grooving blade:** for the croze.
- **A round blade:** for the howel.

The single crozer

01 Description

Main types of crozers

Regardless of the model, **the operating principl**e of a crozer remains the same: **the barrel is rotated by a drive ring, while a machining tool progressively penetrates the wood** to form **the howel, the croze, and the chime.**

The objective is to obtain **a regular and precise finish on both ends of the cask,** guaranteeing the quality of the head fit and the final tightness.

1. The single-head crozer

This is the simplest model.
It machines only one end of the barrel at a time.
The operator must then manually flip the barrel to process the second side.

➡️ **Advantage:** small footprint, ideal for small cooperages.
➡️ **Disadvantage:** longer cycle time and dependence on the manual precision of repositioning.

2. The vertical crozer

The barrel is **positioned vertically,** and the crozing head moves from top to bottom.
This system is often used for large containers (vats, special casks), as it allows for more stable centering and better control of the cutting pressure.

➡️ **Typical use:** cooperages specializing in large volumes.
➡️ **Advantage:** small footprint, ideal for small cooperages, floor-level suction.

The single crozer

01 Description

3. The double-head crozer

It features two crozing units, working simultaneously on both ends of the cask.

This model exists in manual or digital (CNC) versions:

- The **manual version** requires the operator to adjust the tools and positioning.
- The **digital version** ensures automatic adjustments according to the barrel dimensions and stores several configurations.

➡️ **Advantage**: time-saving and increased precision.
➡️ **Disadvantage**: higher investment cost and more technical maintenance.

4. The crozing and pre-sanding line

This system integrates **several successive operations:**

- automatic centering of the barrel,
- crozing of both heads,
- pre-sanding of the periphery,
- sometimes cauterization of the croze.

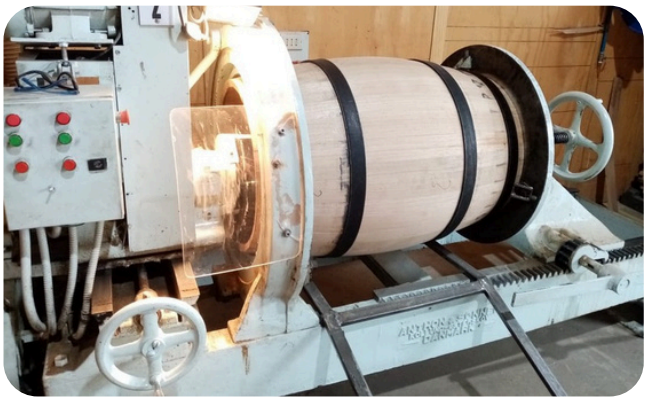
This type of line is typical of **semi-industrial to industrial** cooperages, seeking to standardize the steps while maintaining craftsmanship precision.

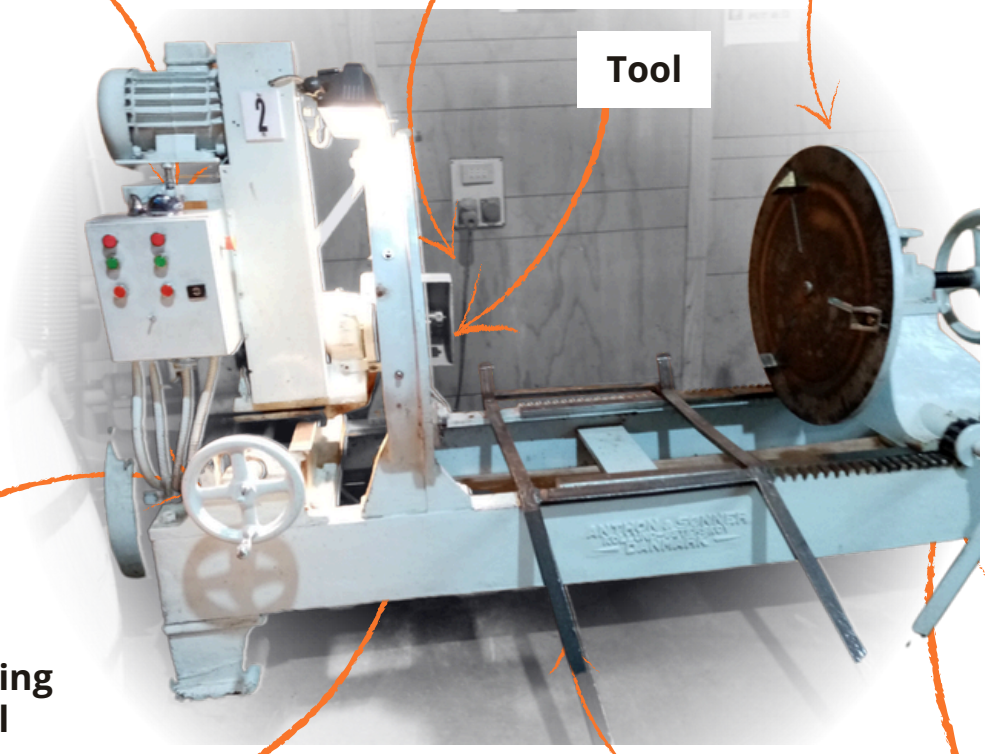
➡️ **Advantage**: consistency, productivity, safety.
➡️ **Disadvantage**: higher investment cost, more technical maintenance, and large footprint.

The single crozer

02 Terminology

Simple Crozer

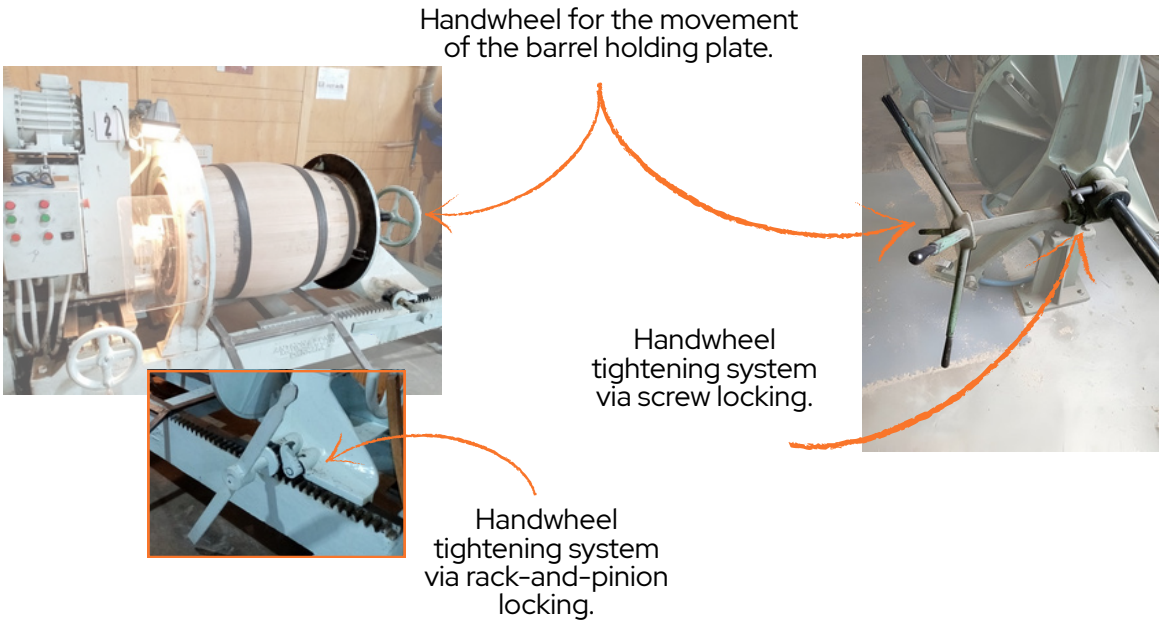


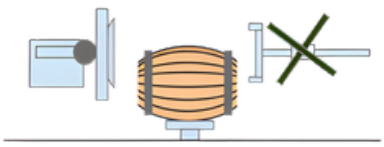


The single crozer

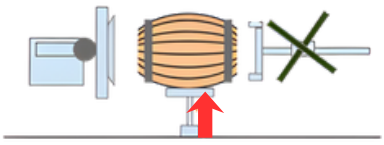
03 Settings

Tightening handwheel and barrel lifter

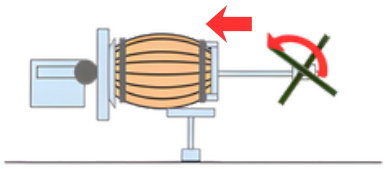




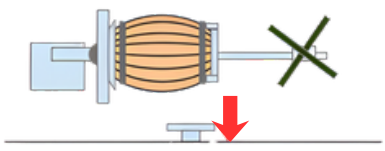
Positioning the barrel
The barrel is positioned on the lifter plate. It must be properly centered to ensure a stable and secure rise towards the crozer ring. Place the dressed side against the plate to serve as a reference surface.



Raising the barrel lifter
Using the control pedal, the cylinder is actuated to progressively raise the barrel to the working height. This step aligns the cask with the axis of the machine.



Advancing the mobile plate
Once the barrel is at the correct height, turn the handwheel to advance the mobile plate located on the right side of the machine. This movement brings the lateral support of the cask toward the drive ring.

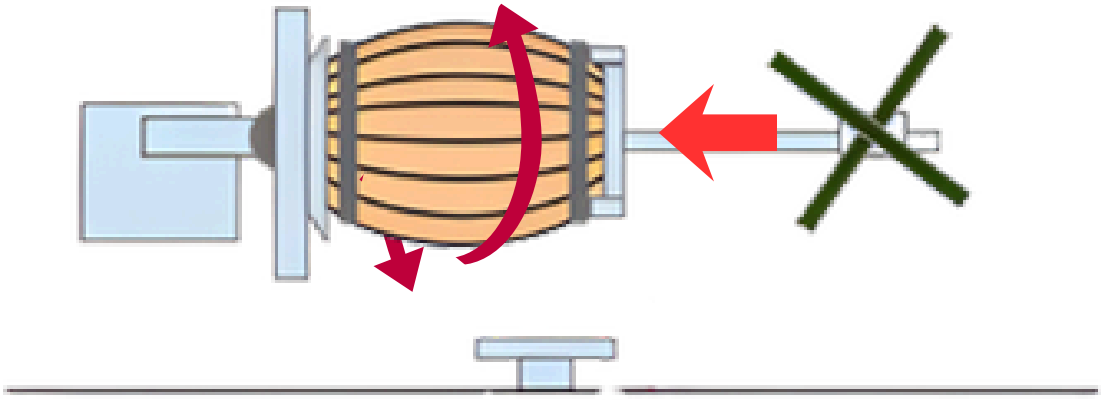


Positioning and locking
The mobile plate gently pushes the barrel until it fits into the ring. Once in place, lock the position to ensure the barrel is held securely during machining, then slightly lower the barrel lifter to release the load.

The single crozer

03 Réglages

Tightening handwheel and barrel lifter.



TIP

Positioning the barrel in the ring.

Once the barrel is inserted into the ring, **a light pressure** must continue **to be exerted** (manually or via a hydraulic system) with the mobile plate.

The **ring** is then set in **rotation**, while maintaining the pressure and tapping on the barrel to create slight vibrations.

These vibrations allow **the barrel to fit completely** into the ring, ensuring optimal **centering** and **hold before crozing**.

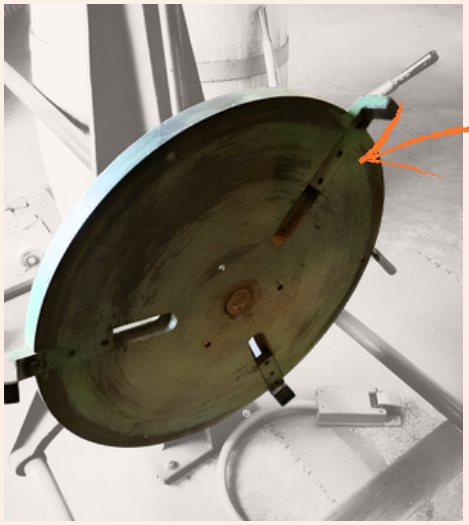
The single crozer

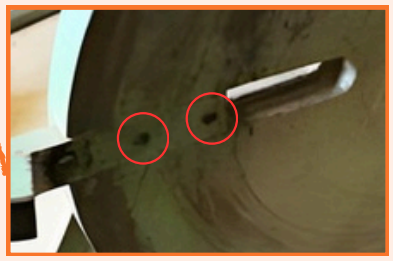
03 Settings

Tightening handwheel and barrel lifter

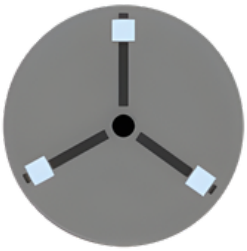
Barrel positioning and holding plate

The plate is used **to position and stabilize** the barrel during its introduction into the machine.
It is **adaptable to different barrel diameters thanks to three adjustable cleats,** allowing for **precise centering** and **secure holding regardless** of the barrel size.



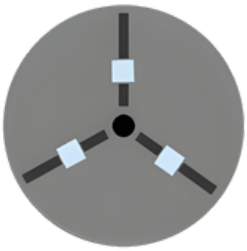


2 screws per cleat



The cleats are spread to the maximum.

It is necessary **to loosen the two screws** of each cleat to allow it **to slide freely on the guide.**



The cleats are brought closer until they correspond to **the diameter of the barrel head.**

Once the cleats are positioned **equidistantly around the center**, **tighten the two screws** to guarantee precise centering and stable holding of the barrel.

The single crozer

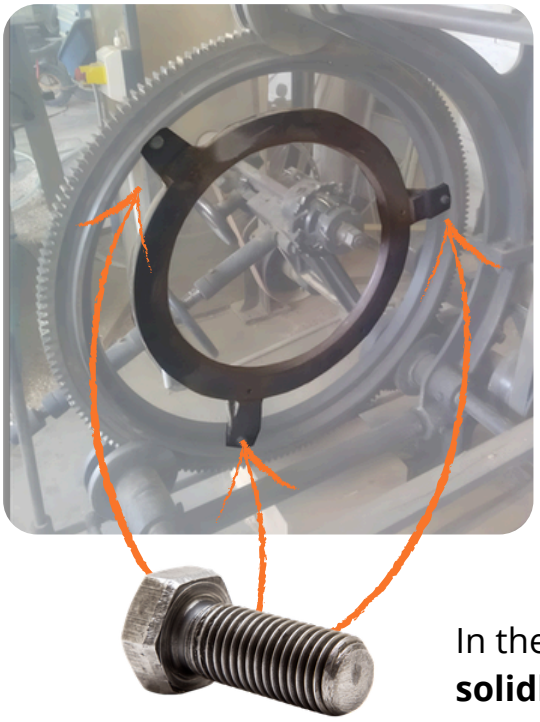
03 Settings

The rings

The drive ring

The drive ring is the main element **that transmits the motor's movement** to the barrel.
It consists of **a circular rack driven by the motor**, on which the operator fixes the ring adapted to the type of cask or the work to be performed.

For safety reasons, this moving part is **generally protected** by a guard (casing) to prevent any risk of accident during rotation.



Each type of cask has a **specific ring** corresponding to its **diameter**.
These rings are interchangeable and are fixed to **the main drive ring** using several bolts, **guaranteeing a solid hold and precise centering** during the barrel's rotation.

In the example above, t**hree bolts are sufficient to solidly fix the ring onto the main drive ring.**

The single crozer

03 Settings

The four operations of the crozing tool

The crozer tool is designed to perform **four successive operations** on the barrel head. Each operation corresponds to a specific part of the tool:

Heading (Dressing)

Performed using a circular saw or an insert tool, it creates **a flat and clean surface at the end of the barrel**

Chiming (The Bevel)

Executed using **straight or slightly curved blades**, it forms an outer bevel that facilitates the fitting of the head and improves tightness.

Crozing (The Groove)

Performed by **a grooving tool**, it carves the circular groove into which the barrel head will be inserted.

The Howel (Pas d'asse)

Executed with **curved blades**, it creates an inner bearing surface ensuring the proper hold of the head against the shell.

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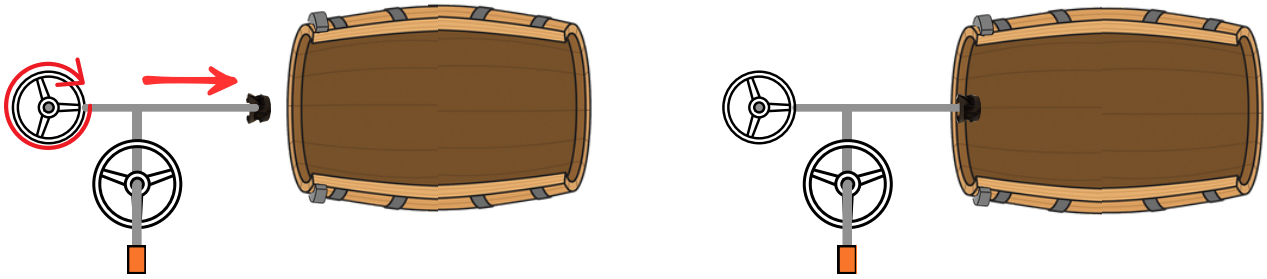
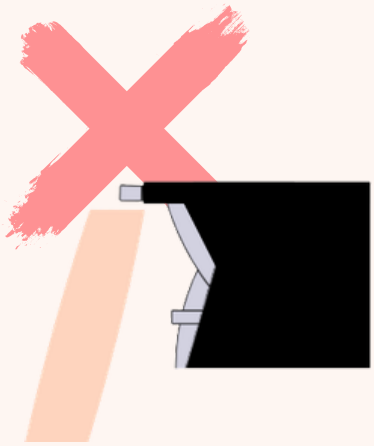
04 Machining Advice

Crozing adjustments

This step consists of **adjusting and guiding the advance of the tool** into the barrel, and then into the wood, to **obtain precise**, **regular** machining **adapted** to the shape of the cask.





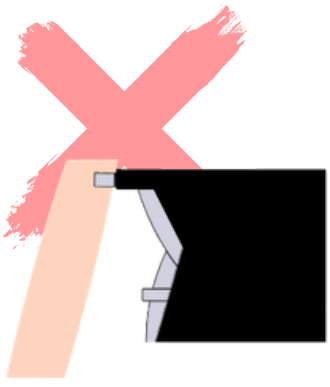
Heading set too high

When **the heading (dressing) is set too high,** the head of the barrel is not **entirely dressed.**

This causes:

- **visible offsets** on the top of the barrel, which are unsightly**,**
- and **poor flatness of the head,** which may indicate that the barrel is **not perfectly straight.**

A good heading adjustment is therefore essential to guarantee the geometry and visual quality of the cask.



Heading set too low

When **the heading (dressing) is set too low,** the tool **removes too much material from** the head of the barrel.

This leads to:

- **a significant loss of wood,**
- **a reduction in the total height of the barrel,**
- and consequently**, a direct decrease in the volume of the cask.**

A well-adjusted heading preserves the material while respecting the nominal volume of the barrel.

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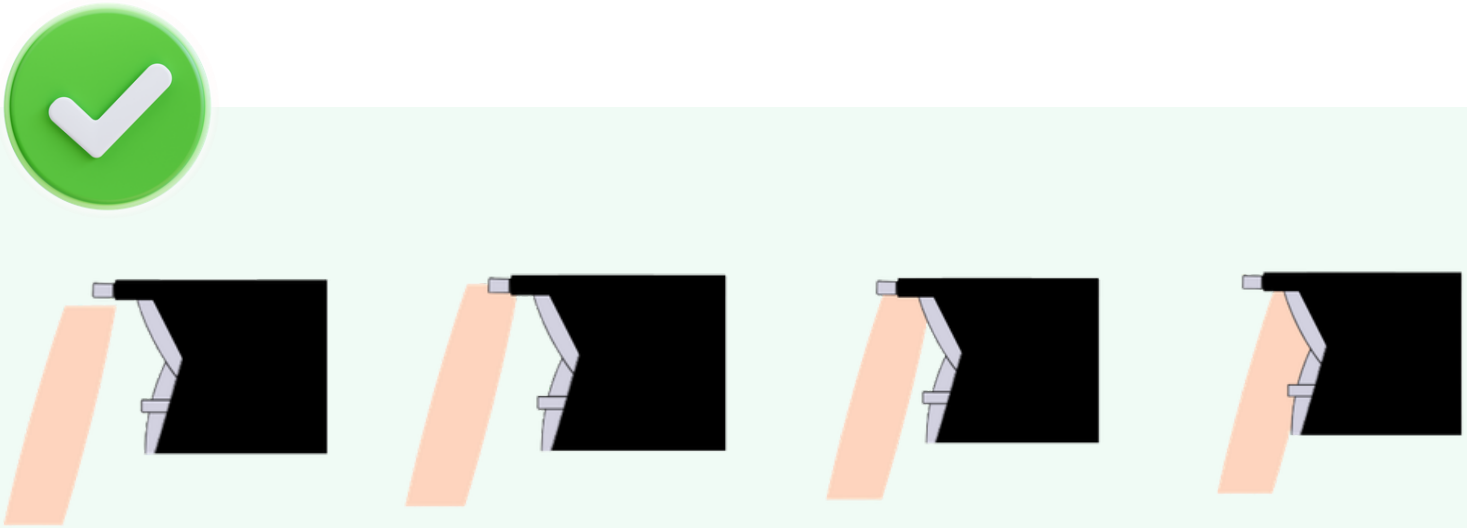
04 Machining Advice



Heading adjustment

Generally, the heading tool is set at the middle of the stave thickness.
In terms of depth, the tool is adjusted **to remove about half an insert of material at each end.**
In other words**, the cutting width corresponds to half of the insert** on the wood**,** ensuring **regular heading without excess material removal.**

Before starting the machining, it is advised **to do a full rotation of the barrel to** check that the tool **touches the entire perimeter.**
This ensures **that the top of the cask will be dressed uniformly.**
Once this check is done, you can advance **to the stop.**

If you notice **the tool does not touch everywhere,** do not hesitate to slightly **lower the tool into the cask** to obtain a complete and regular dressing.
The goal is **to remove the minimum amount of material possible** while ensuring a **regular height across the entire barrel.**

A good adjustment **limits wood loss** and **preserves the raw material** while guaranteeing **a clean, homogeneous heading.**

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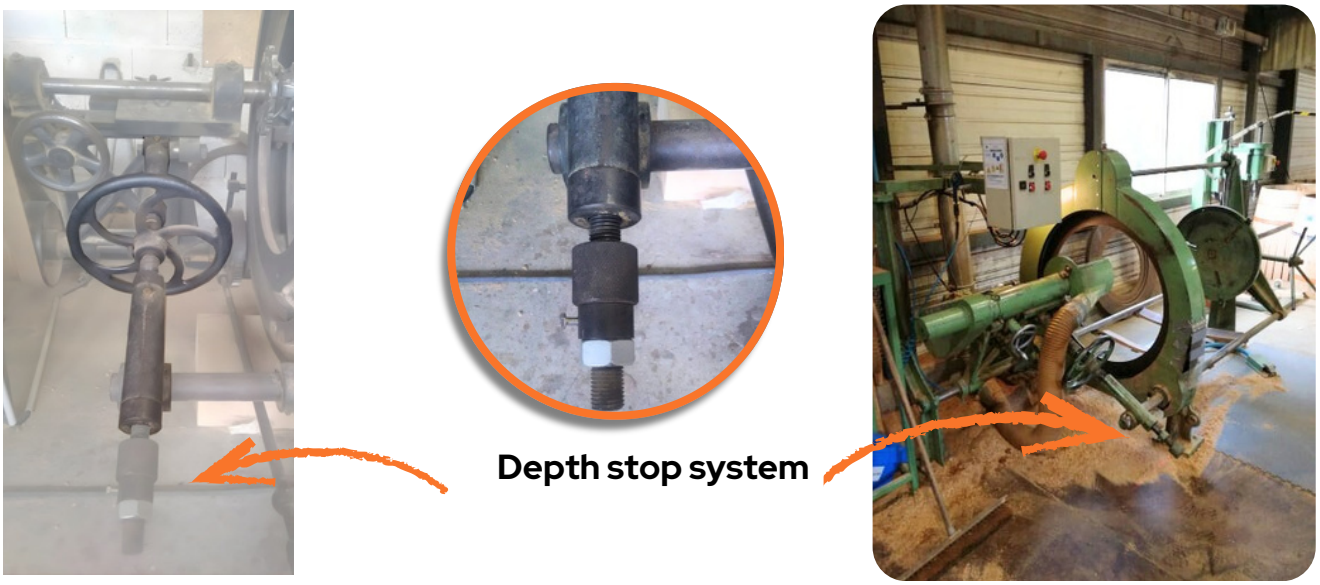
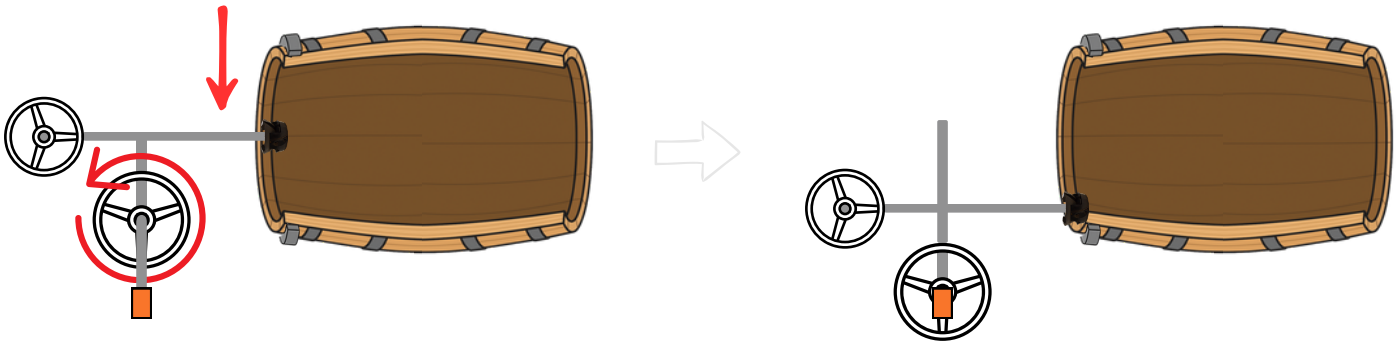
04 Machining Advice

The tool feed crank

This handwheel allows **for the progressive advance of the tool inside the barrel**, in order to adjust the depth and cutting position during machining.





Depending on the machines or work habits:

- You can work using **a depth stop**, represented here by the small orange rectangle, which serves as a fixed reference point to limit the tool's advance.
- In more traditional methods, **the operator refers to the width of the chime (liseré)** to visually evaluate the machining depth.

The single crozer

05 Maintenance

Daily Inspection

Daily maintenance includes:

- **a complete visual** check of the machine,
- **greasing of the moving parts,**
- **checking the play in the bearings,**
- and **verifying the adjustment points.**

Monthly Maintenance

About once a month, it is necessary to:

- **grease the rings, the tool-holder bearings,** and the slide carriage pads,
- disassemble the base rings (type 600 L) **to clean** and **grease the teeth with a brush,**
- **check the oil level** of the hydraulic unit.

The single crozer

05 Maintenance

Insert replacement protocol

1. **Stop** the machine and disconnect the power supply.
2. **Wear** cut-resistant **gloves** and safety glasses.
3. Remove the tool-holder with care.
4. Control wear parts:
    - **Change worn back-irons.**
    - **Replace stripped or damaged screws.**
5. Evaluate the condition of the inserts:
    - In case of normal wear, **replace the entire set of inserts** to maintain perfect balance.
    - In case of localized impact, only replace the affected inserts.
6. If the tool-holder has many inserts, **make a mark with a marker** on the first one replaced to know where to start and finish.
7. **Carefully clean the insert housing and the bearing surfaces.**
8. Loosen and remove the worn inserts.
9. Check the reference and mounting direction of the new inserts.
10. **Tighten uniformly** with the appropriate wrench, without forcing.
11. Reassemble the tool-holder and perform a dry run to ensure balancing and the absence of vibration**.**

Best practices

- **Never remove all inserts** at the same time: remove one old insert, replace it immediately with a new one, then move on to the next**.**

This avoids positioning errors and guarantees mounting consistency.

- **Wear gloves:** inserts are very sharp.
- **Work on a stable and clean surface.**
- Store new inserts in their original box, protected from dust and moisture.
- Never work on a machine while it is powered on.

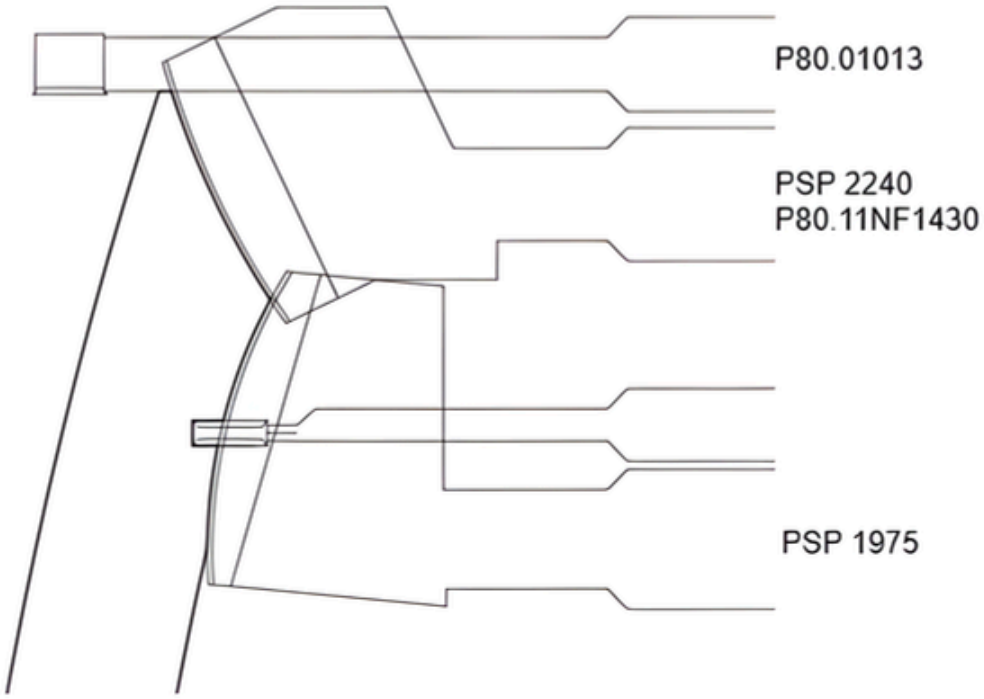
The single crozer

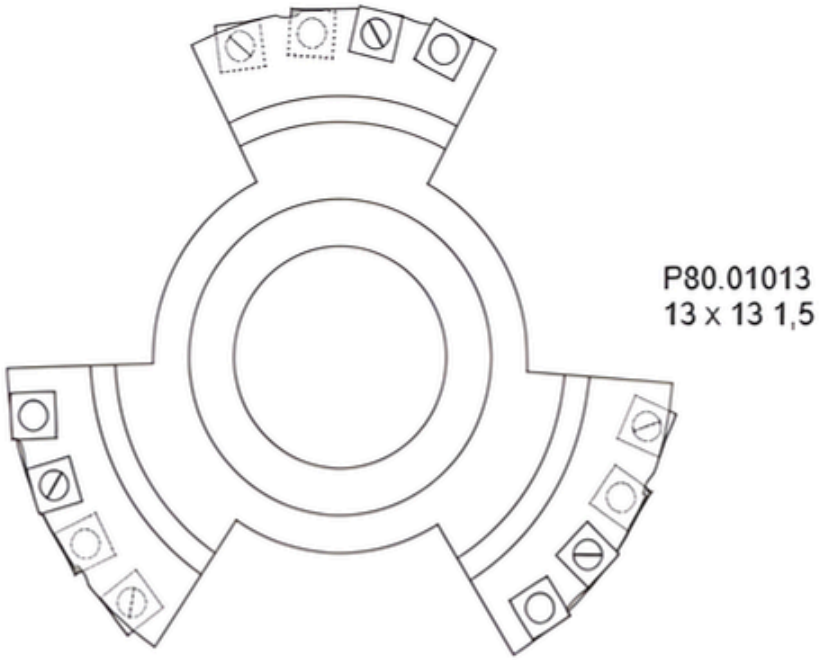
05 Maintenance

This diagram presents an example of a tool plan with the corresponding insert references.

It can be **adapted to your workshop and used as a traceability tool**, by adding **your own references** and the maintenance or replacement dates for the inserts.

This ensures regular maintenance tracking and guarantees the compliance of the tools used on each machine.





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06 Safety

The single-head crozer is part of the early concepts of crozing machines.

Although it is less compliant with current regulations, it remains widely used in traditional workshops.

It is, however, possible to improve its safety through a few simple adaptations, particularly regarding guards, casing, and emergency stop devices.

It is possible to enclose (case) the mechanical parts that present a crushing or cutting risk.

In the example above, **the guard now protects the ring gear area**, thereby eliminating any crushing risk for the operator.

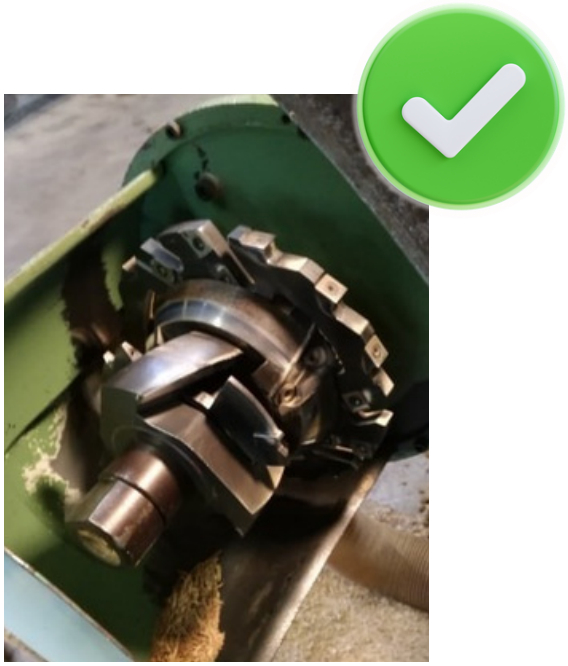
The single crozer

06 Safety

The cutting tool is also protected by a guard, but a **cutting risk persists** if the operator removes the cask before the tool has come to a complete stop.

To prevent this, it would be wise to install a casing or an automated safety cycle:

- as soon as the machine stop is requested,
- a mobile shield automatically descends in front of the tool,
- actuated by a pneumatic cylinder, preventing any contact until the rotation has stopped completely.



In the past, crozers were equipped with massive square-iron tools, which were heavier and more difficult to adjust.

Today, they use insert tool-holders, which are more ergonomic, precise, and faster to maintain, offering better comfort and increased safety for the operator.

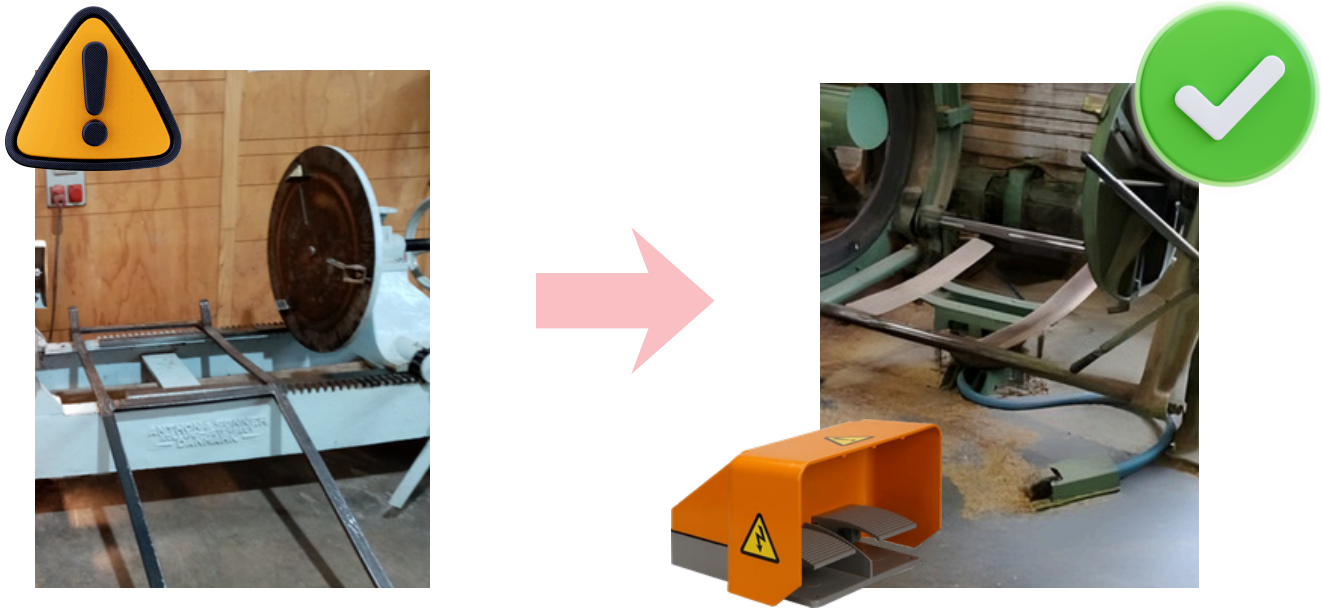
The single crozer

06 Safety

Lifting systems on crozers

Old crozers **do not have a lifting system.**
The operator must lift the barrel by hand, which leads to rapid fatigue and **can cause back pain.**
Today**, a pneumatic or hydraulic barrel lifter can be added.**
This system **lifts the cask effortlessly** and places it directly at the correct height.
It is faster, safer, and more comfortable.

It also reduces the risk of pinching fingers between the plates, the barrel, and the ring.
The hands remain away from the moving parts, making the work more precise and secure.



The barrel lifter also provides more stability during crozing, avoids jolts, and protects the machine and the tools.

Advantages:
- Less fatigue and pain.
- Faster and more stable work.
- Increased safety for the operator.

Disadvantages:
- Requires a pneumatic or hydraulic system.
- Installation cost and maintenance to be considered.

The single crozer

06 Safety

Lifting systems on crozers

The use of a crozer involves mechanical, noise, and wood dust risks. It is therefore **mandatory to wear the appropriate protective equipment** before starting the machine.

PPE to wear:

- 🦺 **Safety shoes:** protect the feet against falling barrels, tools, or heavy parts.
- 🎧 **Noise-canceling headphones or earplugs:** reduce exposure to the significant noise generated by the motor and the tool.
- 😷 **Dust mask:** to be used especially during cleaning or maintenance of the machine to avoid inhaling wood particles.
- 👓 **Safety glasses (recommended):** protect against flying chips or dust.
- 🧤 **Thin cut-resistant gloves (except during machine operation):** useful when changing inserts or for manual cleaning.

💡 Good habit:

Before each use, check that all PPE are in good condition and properly fitted. A well-equipped operator is a safer, more focused, and more efficient operator.




Apply these tips right now and take charge of your machine with confidence and mastery!