2025

The Capstan Knot

MARIAUD CONSULTING

Our PROGRAM

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01 Presentation

📌 The Capstan Knot applied to Barrel Bending

In coopering, **the capstan knot** is used for bending staves during barrel assembly.

It allows for securely fastening **a cable clamp** around the base of the barrel, ensuring **a progressive and balanced tension** between the winch and a fixed point.

🧬 A Reliable Knot for Bending

The capstan knot allows for:

✅ **Creating a solid loop** around the barrel.
✅ **Distributing the tension** of the winch on both sides of the cable.
✅ **Bending the staves** uniformly, without slipping.
✅ **Providing a simple solution to untie once** the heating is finished.

🔸 The cable is **wrapped around the base of the barrel**, at the level of the final hoop.
🔸 **A capstan knot** is then formed to create a stable loop around the wood.
🔸 The cable then pulls:
- on one side towards **a winch,** which provides the traction,
- on the other side towards **a fixed point** (wall, ground, support).

🔹 When the winch is activated, **the tension is distributed on both sides,** and the capstan knot **does not slip under traction.**

🧩 This system allows for **a symmetrical closure of the staves**, while preserving the necessary flexibility for heating.

🛠️ How the Knot Works

🔹 Formed with two inverted loops.
🔹 It tightens automatically when tension is applied.
🔹 Easy to untie after use, even after a strong effort.

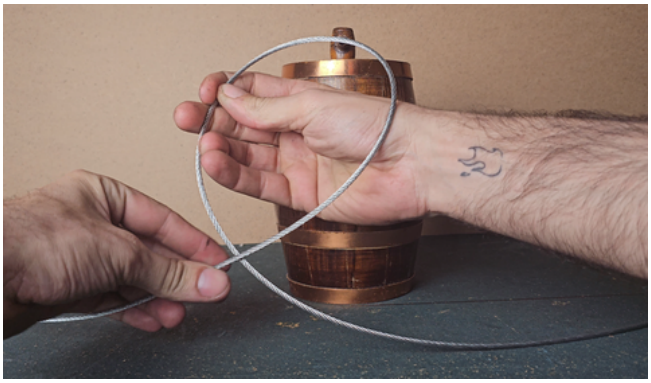
The Capstan Knot

02 Methodology

1

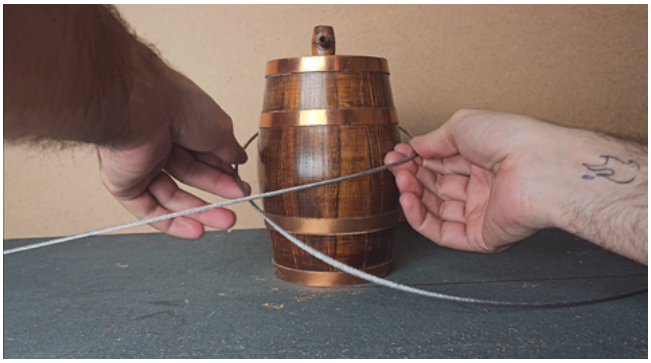
Position the barrel so that the cable passes in front of it.

2



Make a loop so that the winch cable passes behind the fixed cable.

3



Pass this loop around the barrel.

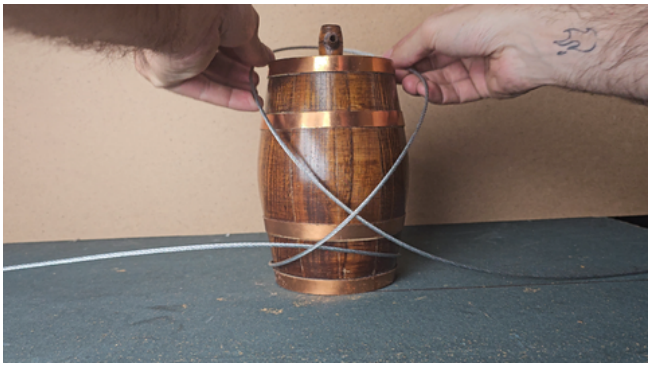
4

Tighten the cable, straight, at about the height from the bottom of the future head hoop.

5

Take the cable between the first knot and the winch while keeping the knot taut, and make a second loop identical to the first.

6

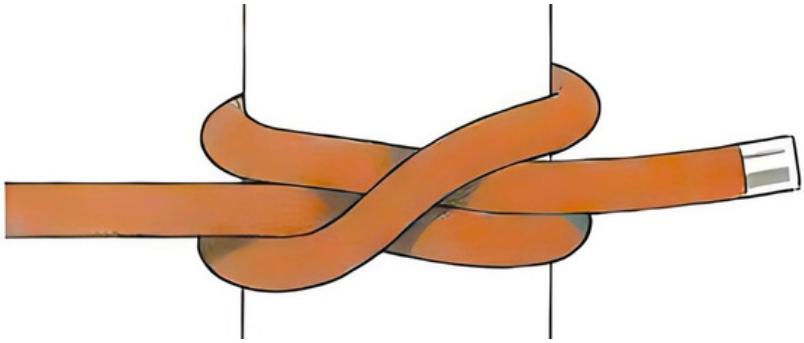


Pass this second loop around the barrel.

7

Apply pressure to the whole assembly, making sure that everything aligns correctly and fits into place.

To ensure that the knot is well-made, the parts of the cable that leave the fixed point and the winch should cross at the center of the knot.



Once the barrel is bent, you must lay it on its side, place the final hoop, then give a few sharp taps on the knot to unlock it. It then loosens easily, which allows the cable to be removed effortlessly.

🛡️SAFETY - CABLE CHECK

⚠️PRECAUTIONS

- Always check that the cable is correctly positioned at the bottom of the barrel at about 10cm from the ground.
- Make sure that the knot is correctly formed before applying tension.
- Do not use on slippery materials or on too thin cables such as straps, ropes...
- Add a safety knot or a locking system if necessary.

Before any bending operation, it is essential to check the condition of the cable used:

🔍 Points of quality control:

- **No visible wear:** broken strands, oxidation, twisting or crushing.
- **Verification of the anchor point:** solid, stable, well positioned.
- **No crushed or flattened areas.**
- **No rust,** excessive wear or permanent twists.
- **Length adapted to the operation.**
- **Protected ends** or tips to avoid injury.

🚫 A damaged cable can give way **under tension** and cause accidents. Never use it without a complete visual inspection.

🛠️ Fixed side clamping:

✅ Use **several cable clamps** (at least **2 or 3**) to secure the anchor.
✅ Choose cable clamps adapted to the cable diameter.
✅ Tighten progressively and check that **no play** is present.
✅ Orient the cable clamps all **in the same direction** (nut exit side of the cable).

📏 How to correctly select and position a cable clamp

✅ 1. Choose the right cable clamp diameter

The cable clamp must be **adapted to the diameter of the cable** used.

Simple rule:

➡️ ***Cable clamp = same diameter as the cable***

Cable diameter	Recommended cable clamp
6 mm	Cable clamp 6 mm
8 mm	Cable clamp 8 mm
10 mm	Cable clamp 10mm

📌 A cable clamp that is too small does not tighten correctly.
📌 A cable clamp that is too large slips under tension.

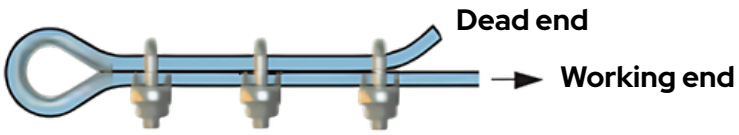
🛠️2. Correct positioning of the cable clamps.

- **Minimum** : 2 cable camps
- **Recommended:** 3 cable clamps, especially for heavy-duty bending

📍Order and spacing:

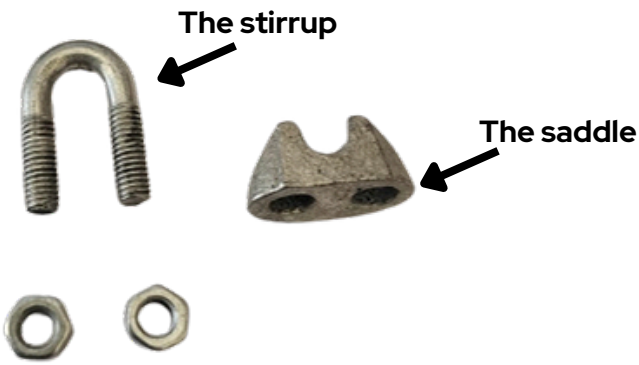
The first cable clamp is placed as close as possible to the loop (loop or cable eye).
The others are spaced 6 to 8 times the cable diameter.

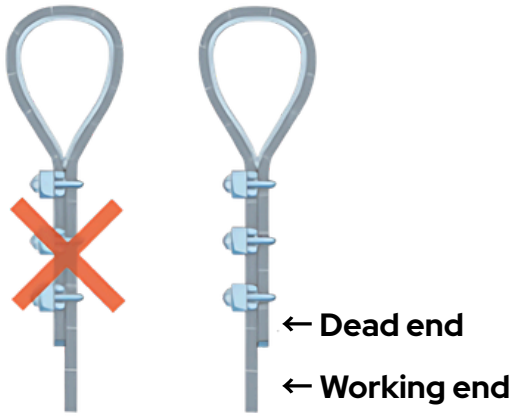
Example: for an 8 mm cable -> spacing of 5 to 6 cm between each cable clamp.



📍Assembly direction:

- **The stirrup (in U)** side is the free cable (return).
- **The saddle (flat part)** side is the main (loaded) cable.





🔧Tightening the nuts

- Tighten **uniformly** both nuts.
- After tensioning the cable, **tighten again** a second time.
- Regularly check the condition and tightness in the workshop.

It's up to you to put your knowledge into practice and perfect your expertise!