COACHING SAFETY SERIES

Our pinned Boat

No.4... Get the ADVANTAGE

In the fourth part of the Paddler safety series we will be looking at recovering pinned boats from the river. If there was one recommendation that I could make that would help you to avoid having to deal with this situation at all in the first place, it would be airbags! Get yourself some bow and stern airbags and make sure they are inflated before you set off.

By Chris Brain

It is important to remember that there is no substitute for professional training in this area and this must be combined with experience in order to effectively use the ideas and techniques contained in this series. This article is not intended to replace formal training.

Our previous articles have focused on preparation, simple rescues, working together on the river and above all avoiding incidents happening in the first place. The techniques covered in this article assume that you have read the previous chapters.

Self-team-victim-kit

It is essential to remember that our boats are not as important are we are. This means that we shouldn't put ourselves in any unnecessary danger to rescue them and we shouldn't prioritise them over our own safety. Too often I see paddlers getting straight in the river (on foot or even swimming) to try and rescue their kayak or canoe, ultimately putting themselves at risk.

However, in some situations a stuck boat could range from simply being a mild inconvenience to being your only way to get to safety out of a steep gorge. Therefore, having some straightforward techniques which can help you recover your boat can be very helpful.

Stop and think (make a proper plan)

If I am safe, my team is safe and the swimmer is safe, my first thoughts are to stop and think. On many occasions I have seen boats magically free themselves after a few minutes when they initially appeared to be completed stuck. Give the boat a little bit of time and get yourself fully ready for whatever you are about to do, often boats will only need just a bit of physical effort to get them free and the hardest part is probably clipping the line to it initially.

How is the boat pinned?

Take time to consider how the boat is actually pinned and which end of the boat it might be preferable to clip to (if you have a choice). When we are unpinning a boat we rarely have to physically move it very far, it is usually just a matter of dislodging it from whatever it is caught on and allowing the water to do the rest of the work

Clipping

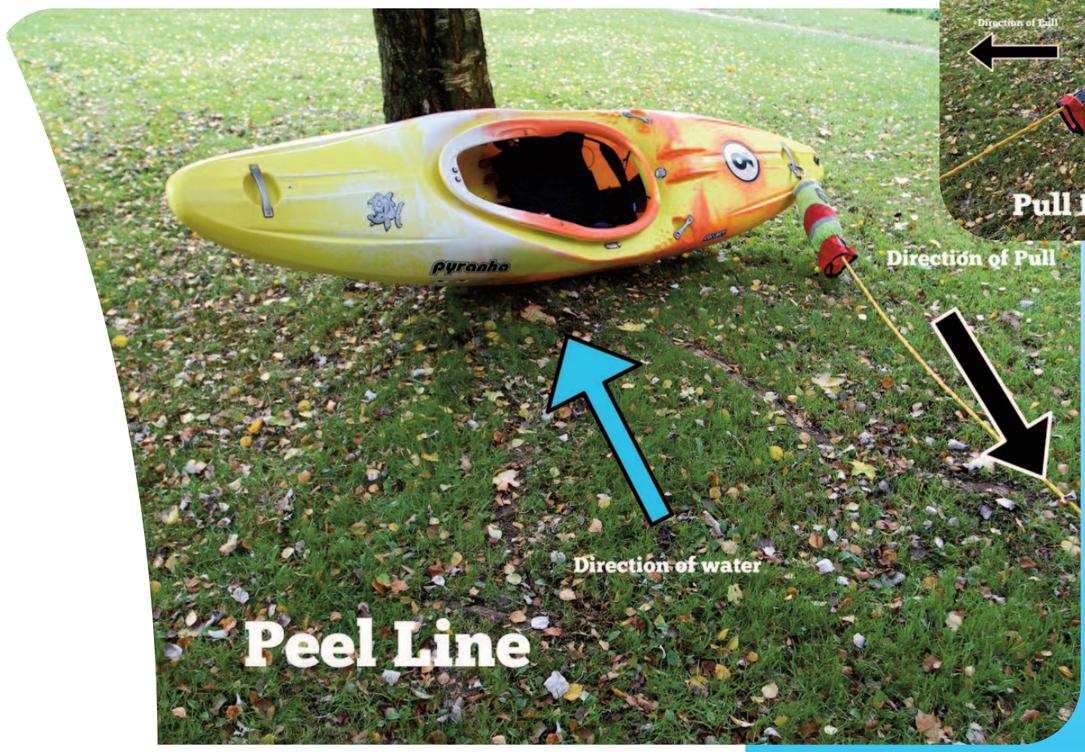
Our hardest job is usually attaching a line to the boat, this is also the part where paddlers tend to put themselves at an unnecessary level of risk by rushing in too soon.

Remember… Stop… Think… Make a complete plan (including what will happen when the boat comes free)! It is important that the team understands what is about to happen and that the individuals know what role they will take. When it comes to pulling a boat, many hands make lighter work.

If it is a canoe that is being rescued, hopefully the paddler has ended up on the bank with their swim line, meaning that a rope to pull on is already attached to the canoe. If however we do need to attach a line, we need to consider our options.

- Is the boat pinned on something (a rock?) that we can stand on to access the boat?
- Can we paddle out to the boat and get out closer to it?
- Is it realistically safe for someone to wade to the boat? (How do we safeguard this person?)
- Can we create a paddle hook to allow us to reach a few metres further?

A paddle hook is a karabiner that we have attached to our paddle (or a canoe pole or tree branch) that we have taped into an open position with our throwline attached. The throwline is then wrapped around the paddle a couple of times to avoid it dragging in the water and passed back to someone on the bank to hold the rope. The paddle hook can then be used to give an extra few metres of reach to the person clipping the line to the boat. Once the boat is hooked, the line can then be unwound from the paddle and when the paddle is pulled away from the boat, the tape around the karabiner rips allowing the karabiner to snap shut and leaving it attached with the line to the boat. There are certainly a few different ways to attach the karabiner to the paddle, but I have always found that gaffa tape works best. It also means that you don't need to carry any more specialised equipment specifically for this job (because you were carrying gaffa tape already of course)!



If we manage to get someone in position near the boat where they can access the handles to clip lines, it is usually best to leave them in that position throughout the rescue if it is safe to do so. This will mean that they won't be helping to move the boat when the team start to pull, but it does mean that if we need a second line clipped to the boat we already have someone in place to do this job.

When clipping a line on a boat I would avoid swimming out to it and would avoid clipping from a moving boat. Using these methods there is potential for too many complications and we are probably putting ourselves in unnecessary danger.

REMEMBER – It actually may not be possible to access the pinned boat safely, we might need to wait for it to free itself or for the water level to drop. Recovering the boat might require higher level skills, equipment and knowledge than we possess in our team. Be prepared to step back from this situation and say no.

Pull/peel/roll

Once we have our boat clipped and we are back on the bank with our rope, which way to pull is probably our most important question. If the boat is stuck perfectly sideways onto a rock so that the pressure on the boat is fairly even at both ends, we can attempt to pull the boat off the rock from the side. This changes the balance point of the boat and makes the water apply more pressure to one end of the boat causing it to free itself.

Another option is to peel the boat off the rock, simply by changing our angle or where we clip our line to initially, we can give a greater turning effect on our boat. All we are trying to do is change the angle that the water hits the boat, allowing the water to do most of the work.

A clever trick we can use is to actually try and empty some of the water from the boat by attaching a roll line. This can be slightly trickier to set up and in some instances it might not be practical or safe to do it because it involves being a bit more hands on with the boat and isn't as simple as attaching a karabiner quickly to a grab handle. Using our sling we attach it to one of our rescue points (or a thwart if rescuing a canoe) preferably one in the middle of the boat, we then we allow the sling to pass underneath the boat and retrieve it on the other side. Typically, because a sling isn't usually long to make it back to the bank to pull on we then need to attach a throwbag to the other end. We then can pull on the rope which is wrapped around the downstream side of the kayak/canoe which will create a rolling effect, helping it to empty the boat and make it lighter and easier to unpin. (We use the sling in this situation because it doesn't float and may be easier to send under the boat to retrieve on the other side, however a standard throwline could be used.) In my experience of rescuing canoes, it is usually the roll line that makes a huge difference to the rescue.

Apply some force!

This is the stage where I find most rescuers start to tie themselves up in knots (literally) and start looking for the more complicated methods where simple ones would suffice. Once we have the boat clipped, we should just try some simple pulling to start with. If the boat is really stuck we should get a few people to help, if a few people isn't enough we should get the whole team on it! If the whole team can't move it, stop and think…..

- Are we pulling in the right direction?
- Can we change the angle that we are pulling at?
- Could we move further upstream?
- Can we move up a banking or onto rocks to pull it more from above?
- Would a second line pulling from a different part of the boat and in a different direction help?

A team using simple methods that pull in the right direction will have more success than a team with using advanced methods that pull in the wrong direction.

What is mechanical Advantage and do we need it?

For paddlers, mechanical advantage systems allow us to increase the force we are applying to the boat to try and unpin it. When we are simply connected to the boat and pulling directly on it with no system between us and the boat, we have no advantage at all (we call this a 1:1 system). However, if we create some simple systems with our ropes, we can multiply the force that we are exerting on the boat, which might give us the little bit extra that we need to make the boat move.

For these systems try not to get too focused on the physics, the ratios or the numbers, but more on what actually works. It is important to remember that the environment that we will be using these systems in is not a science lab, a combination of imperfect angles, ropes running along the ground creating friction and pretty quickly we can start to lose the theoretical advantage we are trying to create.

What kit do you need?

To apply the techniques shown here you don't need any more kit than you are probably already carrying. Some of the techniques do require more karabiners and rope, but If every member of the team brings a throwbag, two karabiners and a tape then we will have more than enough equipment to use between us. A bit of planning on what kit we are all carrying at the start will go a long way should we ever need to use these techniques.

Prussics? No
Pulleys? No
Extra karabiners? No
Fancy slings? No
Specialised pin kit? No

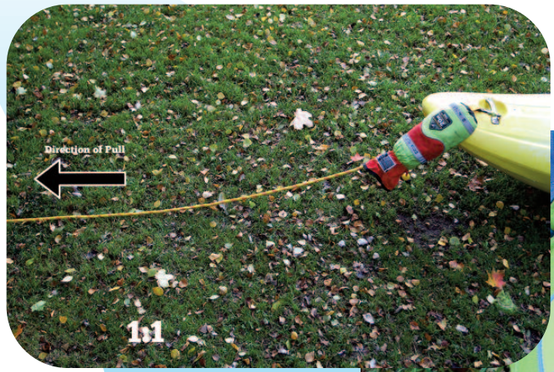
For more advanced environments we might choose to carry some of the above equipment, but I find that for most paddlers it is probably not required.

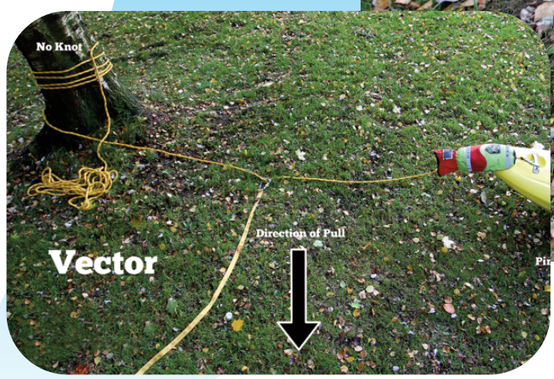
Securing the rope

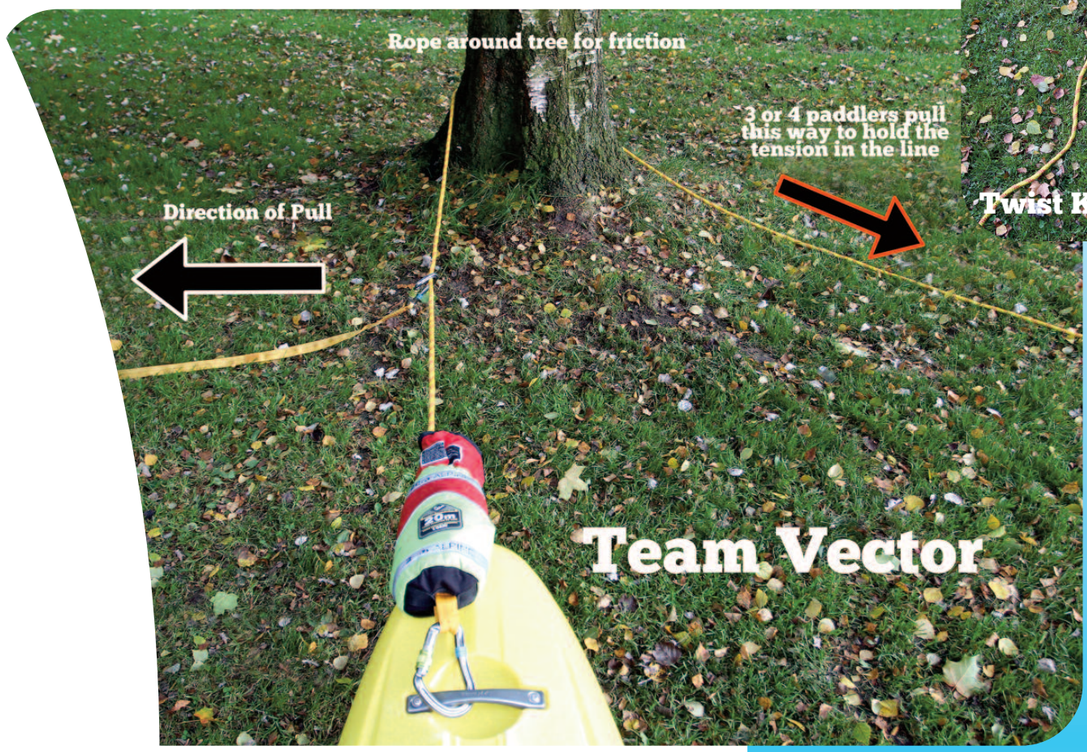
To start applying more force to the boat we need to secure the free end of the rope. We can do this using a no knot. We need to find a large sized tree (or boulder) that will not move when we start to pull as it will have plenty of force applied to it. Starting at the bottom of the tree/boulder we pull our rope tight and wrap it around neatly upwards. The smaller the tree/boulder the more wraps you will require, the bigger the tree the fewer wraps are needed (I would suggest always going round at least three or four times even on a big tree/boulder) The end of the rope is now just kept neatly to one side near the tree/boulder. The no knot works on friction and is releasable even when loaded (which might be useful if you want to lower your swamped boat down to an eddy once it is released.)

Vector

Now we have the boat secured we can attach a sling (or rope) using a karabiner clipped straight onto the line and position ourselves so that the two connected lines form a 'T' shape (90-degree angles) and we can pull directly away from the rope attached to the boat. The physics of what is about to happen is really simple, when you pull on your sling/rope, the rope attached to the boat and the tree will have a strong force exerted on either end trying to pull both ends together. However, because one end is secured with a no knot all of the movement should be at the boat end helping to remove it from its pin. It is important to stand on the upstream side of the line attached to the boat, because if the boat comes free you will have a tensioned rope heading away from you rather than towards you!







Team vector

One of the issues with a standard no knot and vector is that once we have pulled on the line as much as we can, the force we are creating starts to fade, so we need a way of resetting the tension back into the line so we can start again. Instead of having a no knot around the tree, consider having some of the team holding the line which has been taken back around the tree instead to create friction. This means that when the line has had the vector applied to it and the force has faded, the team holding the rope around the back of the tree can pull the rope back in again allowing the system to be reset. You almost certainly need two people holding the tree rope for every 1 person pulling on the vector as the force created is huge.

This system is one of my favourites and doesn't require any complicated setting up.

Join ropes

An issue we might face is a boat extraction situation is that our ropes are not long enough, we might need to join ropes and a simple method that I use is a twisting knot. This works on friction a bit like the no knot does and is as simple as twisting two loops of rope away from each other several times and clipping into the top loops (see diagram). If we are using a thinner rope, more twists are needed. This will give us a strong point that we can attach another throwbag or rope to so that we can extend our system. When you start to pull on the rope after tying the twist knot, it is the norm for the twists to slip a bit before they bind together. It also sometimes looks like a bit of a tangled mess once it has been pulled on, but the great thing is that it holds and can be easily undone after being loaded.

Alternative systems

An alternative system which is also used by paddlers is a 4:1 system (any effort we put in is multiplied by four.) This system can be set up direct to a boat, but is more commonly set up by joining ropes and setting up the system using an extra throwbag or even a tape. To understand how to set this up, it is best to look at the diagram and recreate this in a safe environment before trying to use it for real.

One drawback of this system is that is uses lots of rope and you might feel like you have pulled lots of rope in without the boat moving at all, but the good thing is that the system can be completely reset back to the beginning again as many times as your rope will allow, (have a play with it, you'll soon work it out). This system can even be used to tension a line (and then secure with a no knot) before you pull using a vector to try and unpin your boat. Doing this will create an immense force on the system, watch out for things snapping and breaking at this point!

So which system should I use?

This is a really good question and my statement earlier is still relevant…

A team using simple methods that pull in the right direction will have more success than a team with using advanced methods that pull in the wrong direction.

After the 1:1 the simplest system is the team vector but it requires more people to make it work. The 4:1 system is more complicated to set up and you are less likely to remember it in the heat of the moment (unless you are well practiced), but it can give you a very tensioned line that you can pull on using a vector after the line has been secured.

My experience of using these two systems for real has brought me to the following conclusion

- Four or five people pulling on a 1:1 system is roughly the equivalent of one or two people pulling on a vector
- In use, a vector system seems to create about the same force as the 4:1 system
- Four or five people pulling on a vector on a highly tensioned line (using a 4:1 secured with a no knot?) is one of the strongest pulls we can create using the systems covered.

Be safe

Whenever we set any of these systems up we need to understand the limitations of not only ourselves but also our kit. Where possible we should be using our strongest and newest ropes but even these could break under the kind of forces we are creating here. Ropes running over an edge can also easily become damaged and we should avoid this or pad an edge out with a log or boat.

We also have components in the system of varying strength with the weakest part maybe even being your boat. Be cautious when applying your full force on these systems, if they break you will have parts of your system potentially flying towards you.

Time to practice

It is unrealistic to think that you could read this article and then go out and apply these techniques in a real environment effectively without any practice. The good thing is that these systems can easily be practiced in a garden or on the river bank where you can take your time to set them up and work them out step by step.

I know of a paddler who has these systems set up on a crib card that he keeps with his karabiner in his PFD to use as a memory jogger when he comes to use them for real (you could even print this article!) It's also really important to remember that there is more than one way of doing things and I have only covered a few options here, there is no substitute for proper training.

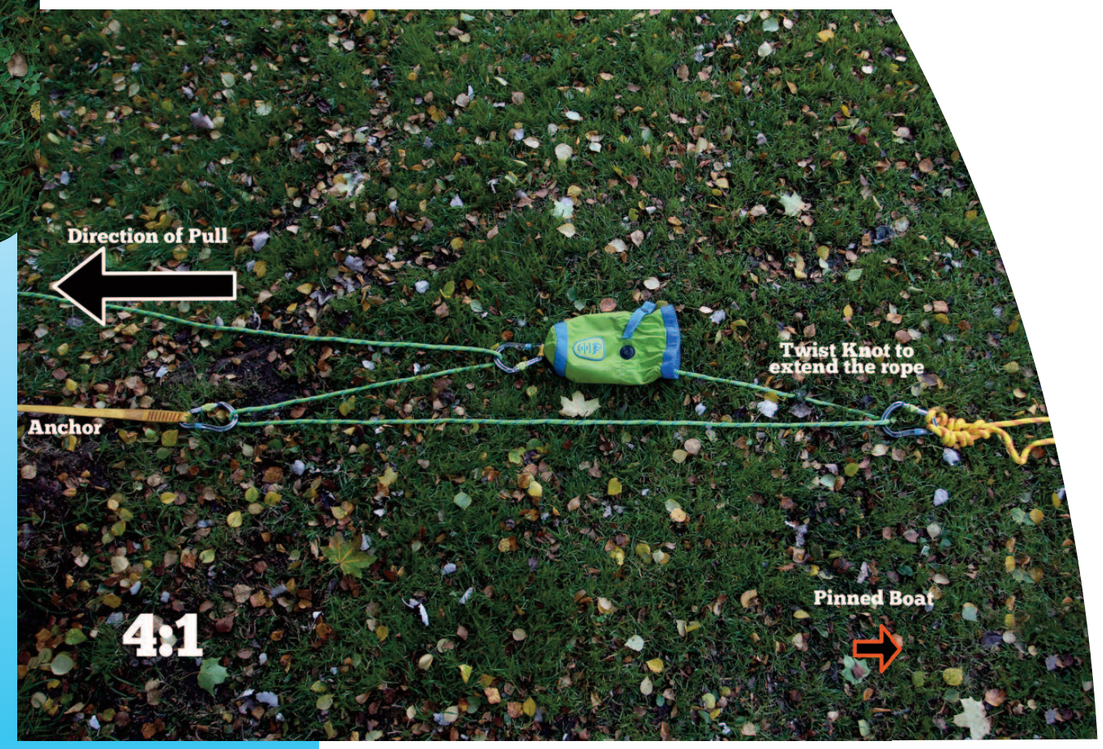


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Photo: Patrick Beavis