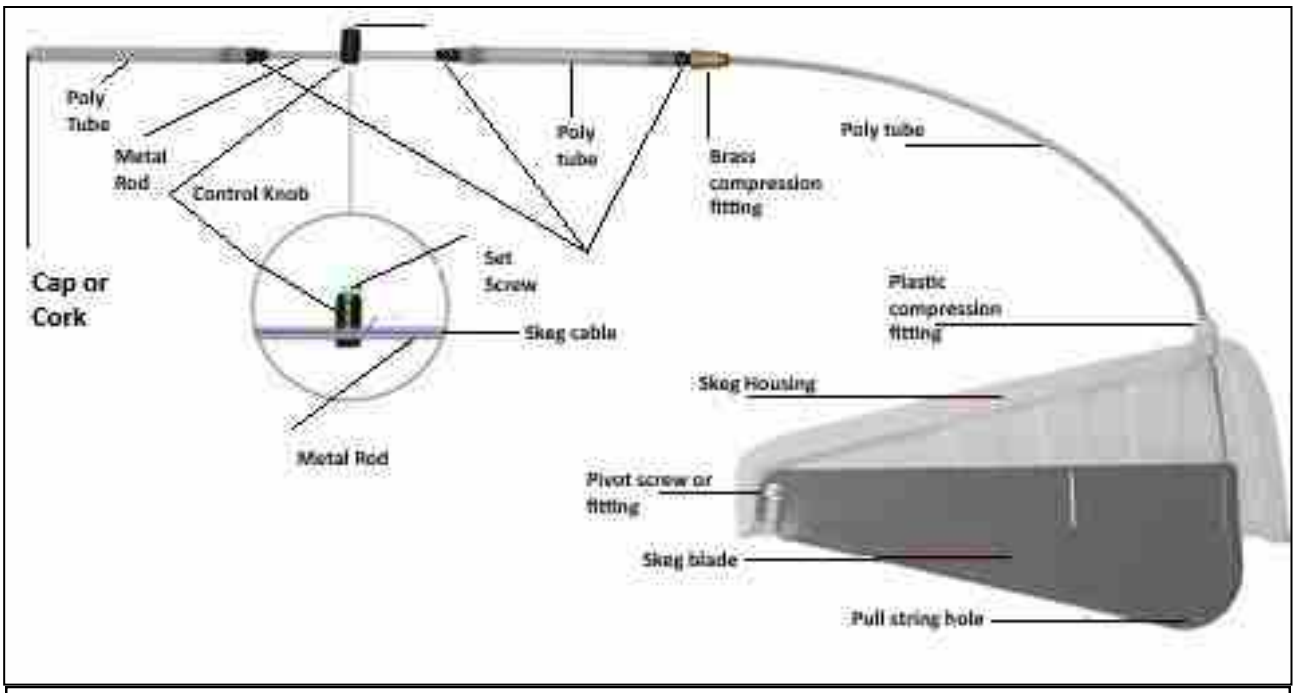
Repairing Skegs and Rudders

By Ralph Heimlich

One of the most frequent calls for repairs at our annual Boat and Paddle workshops are repairs to skegs and rudders. For an excellent discussion of exactly what are and how to use skegs and rudders, see Paula Hubbard's column in the January-February issue of ***The Chesapeake Paddler*** (p. 2). Dave Isbell from Annapolis Canoe and Kayak says "We used to get two skegs a month for repair when we had a repair guy. Most if not all due to operator error. We would get at most, one rudder a year, usually because it was backed into a tree while on top of a vehicle".
[Disclaimer: I have not had a lot of experience with either skeg or rudder repairs myself, partly because I gave up on rudder boats a while ago and partly because I heed the cautions to be exercised when using skegs (more later). These notes on repairs are mostly drawn from other articles online, duly referenced.]

Skegs—The most common ailment for skegs seems to be jamming or kinking the wire control cable. This has two primary causes: Running up on a beach or obstacle and jamming the skeg back up into the skeg box and; Getting the skeg opening jammed with sand or pebbles when beaching and then forcing the skeg control too hard to try and release the skeg, thus jamming or kinking the cable. Either way, jamming the skeg may possibly be remedied, but a kinked cable will never be made right and the cable needs to be replaced.



Components of a typical skeg system (Source: Eddyline Kayaks)

The diagram above shows the main parts of a typical skeg assembly.

- The skeg cable is a stainless steel cable running from the control knob situated near the cockpit to the top edge of the skeg blade. Because this cable is relatively stiff, it can be used both to push the skeg down and to retract it.

- The polyethylene tubes carry the cable from the control knob back through the hull to the skeg housing or box and are generally attached to the top of the deck. There are nylon, plastic or brass fittings at various places along the tube that also compress and guide the cable. When the cable is forced, if the tube and fittings give too much play to the cable, jams and kinks can occur and they are NEVER easy to get to.

- The cable control knob is usually a plastic piece with a set screw (or grub screw) that may (or may not) be attached to an aluminum rod through which the cable passes. The set screw "pinches" the cable and lets you adjust the length of the cable so the skeg is raised or lowered

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the correct amount. Disassembling the control knob allows you to free the end of the cable, allowing you to get at the cable connection to the top of the skeg. You may be able to lower the skeg enough to pull it off of the pivot point or bar and pull the entire cable out. If you have to disconnect the cable at the skeg, you can then draw the damaged or jammed cable out of the tube for replacement, but will also have to reconnect the cable to the skeg once the new cable is in place.

While this is a "typical" skeg assembly, there are dozens of variations created by particular manufacturer's designs. Your mileage may vary!!!

Below are a set of tips gleaned from the various articles I reviewed on skeg maintenance and repair:

- The best thing is to AVOID jamming or kinking your skeg cable. Do this by ALWAYS retracting the skeg as you approach a beach, and NEVER horsing the cable control knob to try to free a stuck skeg.

- If you have managed to get sand and pebbles stuck up in the skeg opening and jamming it, you can use a skeg pull-down line, attached to the skeg blade by drilling a small hole in the skeg and attaching a short length of sturdy cord. The cord should be knotted up close to the skeg and have two hanging ends, rather than a loop which can hang up on branches, sticks, or other stuff if you paddle over it. A helper can come to the stern of your kayak, reach under and pull on the cord to unstuck your stuck skeg.

- Another useful tool is a butter knife (yes Virginia…A BUTTER KNIFE) that you carry in your repair kit to gently work out the sand and pebbles from your jammed skeg to unjam it. Do NOT beach the kayak and turn it over when using the butter knife, it only works the sand and pebbles deeper into the skeg box. Instead, keep the kayak afloat and work the knife from the bottom up. Gravity and the water will assist in clearing the jam.

- If you must replace a jammed or kinked skeg cable, choose a stiffer cable rather than a more flexible one. Stiffer cables allow you to push against them more without kinking them. Stiffness and flexibility are described by two numbers (eg., 7x19 vs. 7x1) that describe the number of individual wires making up the plys of the cable. A 7x19 cable has 7 plies, each made up of 19 wires, hence it is very flexible, while a 7x1 cable has 7 plies, each made up of one rather thick wire, hence very stiff. (see here or here). Annapolis Canoe and Kayak recommends 1x19 cable, which is very stiff. So, don't just buy the first cable you come across on Amazon when you need a replacement.

- You must also get a long enough replacement cable to reach all the way from the skeg to the control knob, plus a little. There is no way to easily join two shorter pieces of cable together. In addition, the size of the cable and size of the tube must be matched to avoid kinks. If your cable is very hard to extract from the tubing (lots of resistance when you pull it out), you may want to consider a smaller diameter of cable that will run more easily. However, if the tube is too large relative to the diameter of the cable, kinks will occur. Nobody said this would be easy!

- The design of your control knob is also important. If you have a knob that attaches directly to the cable, you risk pulling the knob out away from the kayak rather than sliding it. This leads to kinks and jams. The other design has an aluminum rod in which the cable runs and this forces you to slide the knob back and forth rather than pull on it. Also, the end of the cable that protrudes forward into the cockpit may be completely open or may have a cap or cork in the tube. If this can be removed, it is easier to adjust the length of the control wire and to flush out the tube to remove any sand or sediment that is making it hard to slide the cable. Be sure to replace the cap or cork to keep gunk from getting into the tube.

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- In order to keep the end of the cable from fraying and creating a problem in running it through the tubing, before you start, dip the end of the cable in epoxy and let it dry, then sand it lightly to remove any drips.

- It is also recommended that you coat the cable's entire length in beeswax furniture polish or dry silicone to enhance the "slipperiness" of the cable when you run it into the tube.

- Junctions in the cable tubing can be a point of friction for the cable, causing kinks. If there appears to be junction in the tube creating an edge, you can cut out that section or reinforce it to minimize bending and catching.

- Cutting cable can be an issue. Standard wire cutters do poor job of cutting the cable, often causing it to fray. Some solutions include cut-off discs on a Dremel tool (be sure to cut in the direction of the twist in the cable to minimize fraying). Another solution is to drill a hole exactly the diameter of the cable in a scrap hardwood block. Push the cable into the hole and create a "mini" miter saw by cutting down through using a hacksaw. You can use this mini-mitre block over and over again.

- Most cables are secured to the skeg blade by means of a small hole drilled into the top of the blade and a larger hole in the body of the blade with a lead crimp or an epoxy plug (see below). It is possible to fit the skeg attachment with a (very) small electrical wire fitting that will allow you to reconnect the wire in the field if necessary (see Toby Speight "Repairing a Skeg - installing a field-replaceable wire").

Figure 1 Source: Mike Buckley https://www.ukseakayakguidebook.co.uk/skeg_repair/

Rather than provide any step-by-step repair info myself, I am linking here to two good descriptions already online:
Repairing a Skeg Mike Buckley - May 2009 at **https://www.ukseakayakguidebook.co.uk/skeg_repair/art_skeg_repair.htm**

and

Repairing the Skeg System on a Northshore or Valley kayak by Sea Kayak Oban, December 2022 at **https://www.ukseakayakguidebook.co.uk/skeg_repair/art_skeg_repair.htm**

For a very extensive list of links for repairing many models of skegs for common kayaks, see I**ndex of Skeg Repair Links and Videos**, by Tom Holtey, Copyright TopKayaker GeoOdyssey 2019 https://topkayaker.blogspot.com/2019/11/skeg-repair-links-and-information.html

Skeg Noise—One final word on skegs concerns excessive noise from the skeg banging around inside the skeg box. This usually results because the skeg blade is aluminum vs. plastic, and because the skeg opening is larger than needed (probably to help avoid sand and pebbles from jamming the blade). First, check that the attachment of the skeg blade on the pivot is not too loose. If it is, you can cut a rubber hose washer and put it on both sides of the picot limit the movement of the skeg blade at the pivot point. You can also attach some stick-on foam insulation

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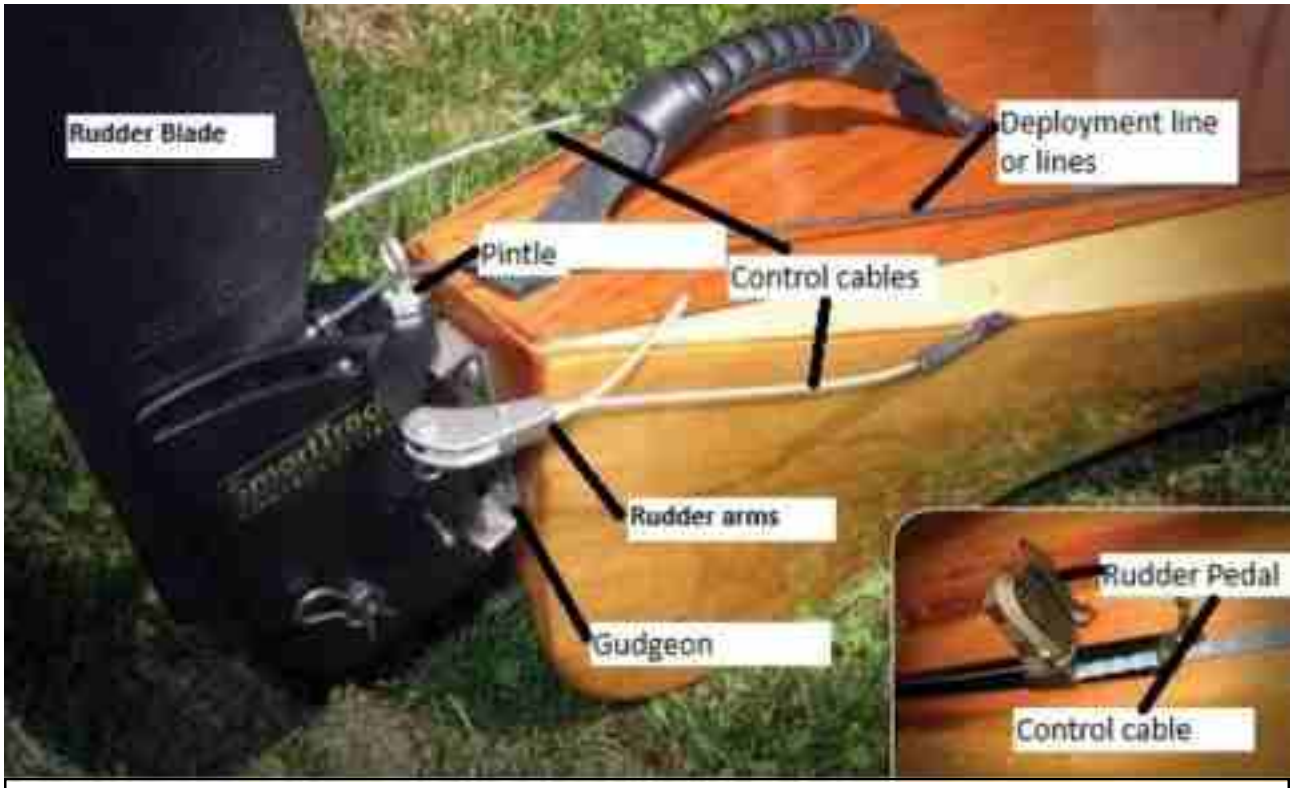
or Velcro to either the blade or the inside of the skeg box to dampen the noise from the blade banging on the sides of the skeg box. Keep it thin enough that it does not impair the up and down movement of the blade. This solution may need to be renewed every so often as the adhesive gives up and the insulation comes loose.

Rudders—Kayak rudders have four components that can cause problems: 1) Foot pedals that are either the slide or the gas pedal type; 2) Control cables that attach to the foot pedals and to the arms of the rudder; 3) The deployment line or lines that raise and lower the rudder, which are usually line or rope; and 4) the rudder assembly itself, consisting of the gudgeon and pintle, the rudder arms, and the rudder blade. See the diagram below.
This illustration has a single deployment line and gas pedal rudder controls. Before you start replacing any of your rudder components, take a number of close-up pictures of the current setup for reference in reassembling it.



Typical Rudder assembly and rudder pedals (gas pedal type)

Taking the components in order, here are issues that could arise with each:

- Foot pedals—These can be either the slide or the gas pedal type. Slide pedals are not fixed to the rails and slide forward and back to move the rudder, and are pretty simple, but don't let you brace completely against the rudder pedals. Many rudder control breakages have occurred when the paddler has pushed too hard on the sliding foot pegs, breaking the cable, the connection or the rudder arm itself. You can't horse it! Gas pedal-type controls are fixed to the rails and give good bracing (at least on the bottom part of the pedal) and hinge to let you move your toes forward and back to control the rudder. They are little more complicated and harder to adjust correctly, mostly caused by how far forward or back they should be to "center" the rudder while keeping the position of each pedal about the same on each side.

- Control cables attach to the foot pedals and to the arms of the rudder. They can be stainless steel, sheathed high-strength line like Spectra or Dynema, or simply braided high-strength line. Both steel and synthetic lines must have NO stretch. Attachments can vary from nut, bolt and washer, to crimped loops, to crimped on connectors like electrical connectors, and these

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can vary at both the pedal and the rudder end of the cable. The attachments must be tight enough to not come loose when operated, but if they are too tight, particularly at the rudder arm end, they cause the cable to bend excessively and eventually break. The connections must be loose enough to swivel to avoid this. The trickiest parts of reinstalling cables are adjusting the length of the cable to properly center the rudder and the pedals, running the cable through any tubing or fittings in the bulkheads and hull (especially through the hull to the water to avoid leakage), and securing the fittings to the pedals and rudder arms securely in a way that will not cause damage to the hull and will not wear quickly.

- The deployment line or lines that raise and lower the rudder are usually line or rope. Depending on the rudder design, there may be one line that does both (perhaps with a spring or bungee that pulls the rudder in the "other" direction), and they may form a continuous loop or have clam shell jams to secure the rudder in the up or down position. Problems with deployment are usually caused by lines not being the right length, or being wound around the rudder spools incorrectly to achieve deployment.

- The rudder assembly consists of the gudgeon and pintle, the rudder arms, and the rudder blade. The gudgeon is the "hole" or bracket that receives the rudder an on which it pivots right and left. The pintle is the pin that goes into the gudgeon and attaches the arms and blade to the kayak. The rudder arms extend to the left and right a few inches to provide a lever for the control lines to work against to turn the rudder. The rudder blade is the part that extends down into the water providing a surface to direct the flow of the water and steer the kayak. Problems with the rudder assembly include a loose gudgeon which is not firmly attached to the kayak, a pintle that is loose, broken or not secured at the bottom so the rudder rides up or "floats" out of the gudgeon, rudder arms that are loose or broken, a deployment mechanism that is too tight to easily raise and lower the rudder blade (this can be because of damaged or missing spacers, washers, or sleeves, sand or other debris causing friction, or a rudder bolt that is too tight), and a rudder blade that is broken, bent or so nicked up that it catches on weed, sand or other debris. Rudder assemblies can be made of metal or plastic, or both.

The typical rudder shown above deploys by pivoting around to raise onto the back deck or down to drag in the water. There are also designs where the rudder blade is pulled through a sleeve to be raised on deck, and designs where the rudder is integrated into the back of the hull and deploys somewhat like a skeg. The rudder arms for these are contained within the hull at the stern. There are even rudders (or scudders) that function as a skeg until they are lowered completely, then pivot on a ball joint partly recessed into the kayak bottom.

Because of the wide variety of rudder designs, it is not possible to give step-by-step directions for maintaining and replacing all rudder components. Instead, I've gathered links to some internet resources on rudder maintenance and replacement below.

For a typical pivoting rudder with two deployment lines:
How to Repair a Kayak Rudder - Maintenance and Re-Lining of a Prijon Rudder https://www.google.com/search?q=reparing+kayak+rudders&rlz=1C1CHBF_enUS962US962&oq=reparing+kayak+rudders&gs_lcrp=EgZjaHJvbWUyBggAEEUYOTIJCAEQIRgKGKABMgcIAhAhGI8CMgcIAxAhGI8C0gEINTg5NWowajmoAgCwAgE&sourceid=chrome&ie=UTF-8#fpstate=ive&vld=cid:5fbe3a09,vid:c-UYLKq0I8E,st:0

For an integral rudder needing tube replacement: **EP17 Epic Kayak - Rudder Line Repair** https://www.google.com/search?q=reparing+kayak+rudders&rlz=1C1CHBF_enUS962US962&oq=reparing+kayak+rudders&gs_lcrp=EgZjaHJvbWUyBggAEEUYOTIJCAEQIRgKGKABMgcIAhAhGI8CMgcIAxAhGI8C0gEINTg5NWowajmoAgCwAgE&sourceid=chrome&ie=UTF-8#fpstate=ive&vld=cid:f9698dc4,vid:YatbW0u40fQ,st:0

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This one focuses on rudder control cable issues and replacement: **Rudder Cord – Inspection and Replacement** https://kayakhq.co.nz/rudder-cord-inspection-and-replacement/?srsltid=AfmBOoqP0zYoLnmeIdn9EQv2uhtlDNRMEb6vuqxX5LIHOWG4v3b-eDiD

This example is for a fishing kayak, but discusses benefits of replacing steel cable with high-strength line and has some tips on managing the rewiring process: **Wire Rudder Cable | DIY | Vibe Kayaks** https://www.youtube.com/watch?v=Xe3Vjx7M0aw

This one replaces old, frayed steel cable connections with a neater, crimped electrical-type connection hardware: **Kraken Rudder Repair** https://hub.jacksonkayak.com/2018/03/kraken-rudder-repair/

This discusses various kinds of cable connection devices that can be used: **Kayak Rudder Cable Connection Options by Tom Holtey** https://topkayaker.com/PDF/KayakRudderCable.pdf

Finally, this article provides links to replacement parts and kits for many common types of kayak rudder assemblies: **Replacement of Classic Kayak Rudders by Tom Holtey 2019** https://topkayaker.blogspot.com/2019/03/replacement-of-classic-kayak-rudders.html

Just as you can prepare for skeg issues by creating a skeg pull-down line, you can also prepare for issues with rudder control cables on the water by using this trick for a fast rudder work-around: **Kayak Rudder Repair WITHOUT GOING TO SHORE** https://www.google.com/search?q=reparing+kayak+rudders&rlz=1C1CHBF_enUS962US962&oq=reparing+kayak+rudders&gs_lcrp=EgZjaHJvbWUyBggAEEUYOTIJCAEQIRgKGKABMgcIAhAhGI8CMgcIAxAhGI8C0gEINTg5NWowajmoAgCwAgE&sourceid=chrome&ie=UTF-8#fpstate=ive&vld=cid:3fc9f425,vid:3vWImLSYPHU,st:0

I hope this article has provided a variety of resources to help you maintain and repair your skeg or rudder system. Please provide any feedback to the author for future updates.