

# eCanoe BR-60 Battery Rail Installation Guide

## Tools Required:

Layout tools: Tape measure, yardstick(s), pencil.

1/4" (6.5 mm) Twist Drill (a hand drill works well for composites).

7/16" (11 mm) Socket Wrench or Nut Driver (or a small adjustable wrench).

(Optional: Small triangle file, hacksaw).

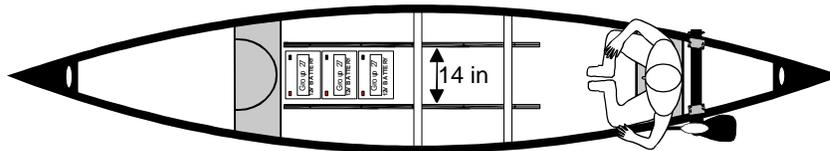
## Step One: Decide where to mount the rails on the hull.

Rails are usually mounted parallel on either side of the hull midline. Rail spacing depends on the size of the batteries you are using, limited by the increasing hull curvature near the sides.

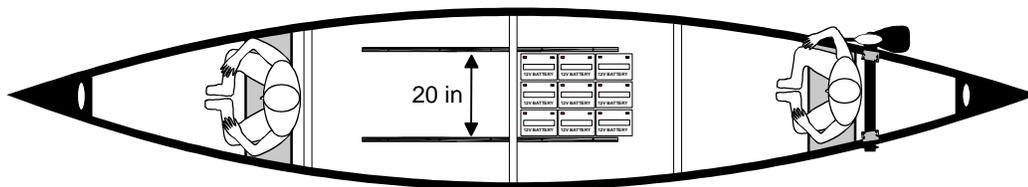
To cruise solo, place the rails more forward so the batteries can keep the nose of the boat down.

### Examples:

16-Ft Canoe using 12V Motor system. Batteries forward for balance when solo:



20-Ft Canoe using a 36V Motor. Batteries aft keep bow high with 2 people in boat:

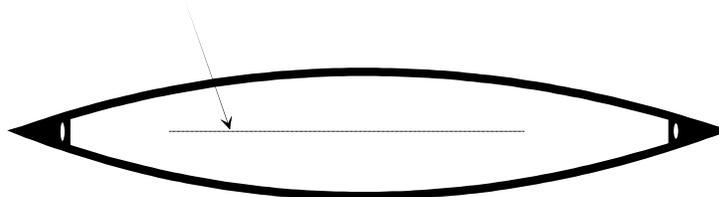


## Step Two: Find the Midline of the boat.

The quickest way to mark the midline anywhere along the hull is shown in the picture. Work with the boat upright on a flat, level surface if there is no keel, otherwise do this step with the boat in the water.

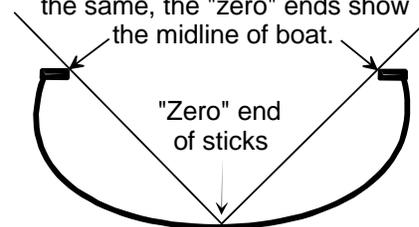
Two yardsticks (or metersticks) are placed across the hull with their "zero" ends together. They are moved across the bottom of the boat until they both show the same measurement at the points where they contact the gunwales. When those distances are the same, the "zero" ends are on the midline of the hull. Mark the point with a pencil.

Repeat this procedure every 2 to 3 ft along the boat, then a pencil line can be drawn along the hull midline using the marks and one of the yardsticks.



### The Two-Yardstick Method to find the midline of a small boat:

When these two read the same, the "zero" ends show the midline of boat.

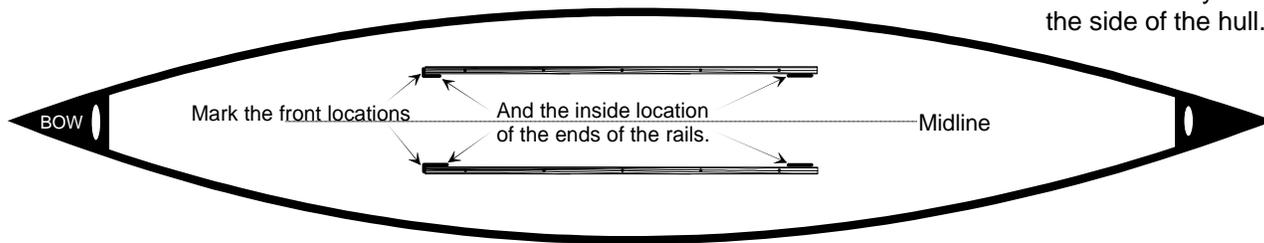


### Step Three: Place the rails and mark the positions.

Adjust the rail positions equal to the midline, spaced as you require. The front locations should be the same distance from the bow.

Note that the Rails are native hardwood, and may have slight curvatures. If so, place these curves so they match the curve of the side of the hull.

Then mark the positions with a pencil as shown.

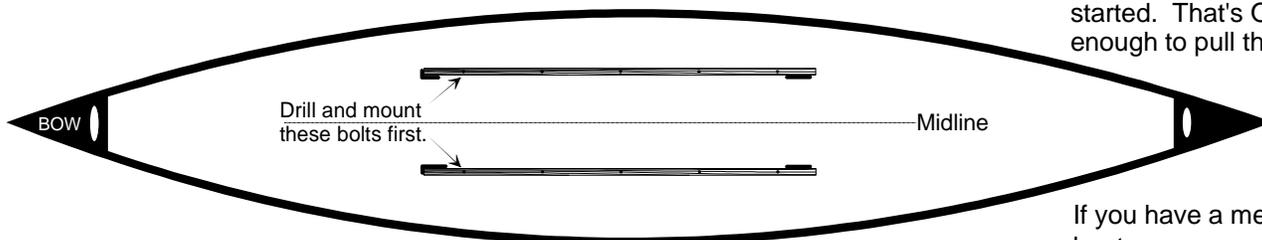


### Step Four: Drill and fasten the front mounting bolts.

Hold one rail firmly in its marked place. Drill down through the front mounting hole and through the hull with the 1/4" drill.

Place a black neoprene gasket over one of the flat-head bolts and push it up through the hole and through the rail. If needed, tap the bolt head with a hammer to seat it in the hull. Hand-tighten a nut on the bolt to fasten the rail.

You might need to leave off the gasket or washer to get the nut started. That's OK. Tighten it enough to pull the bolt up.



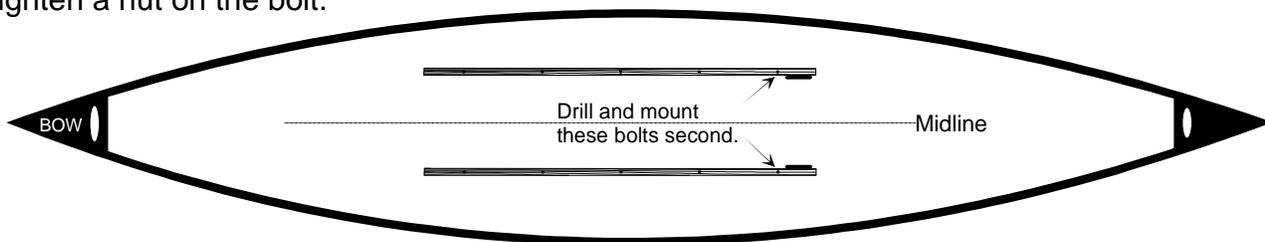
Replace the pieces before final tightening.

If you have a metal or hardwood boat, you may need to file out the holes in the hull to match the square collar of the bolts.

### Step Four: Drill and fasten the rear mounting bolts.

With the front of the rail secured, hold the rear firmly in its marked place. Drill down through the rear mounting hole and through the hull with the 1/4" drill.

Push a bolt with gasket up through the hole and through the rail. Seat it and hand-tighten a nut on the bolt.



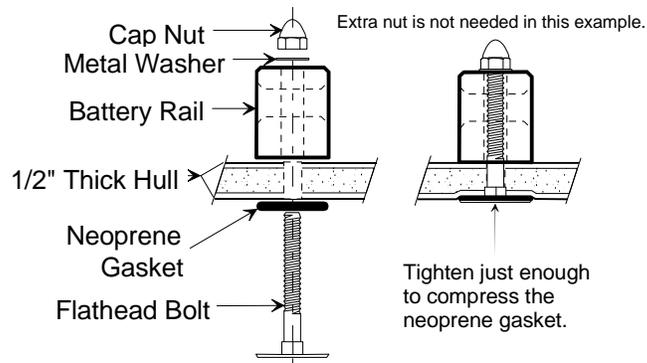
### Step Five: Drill and fasten the remaining mounting bolts.

In similar fashion, drill and hand-fasten the remainder of the mounting bolts.

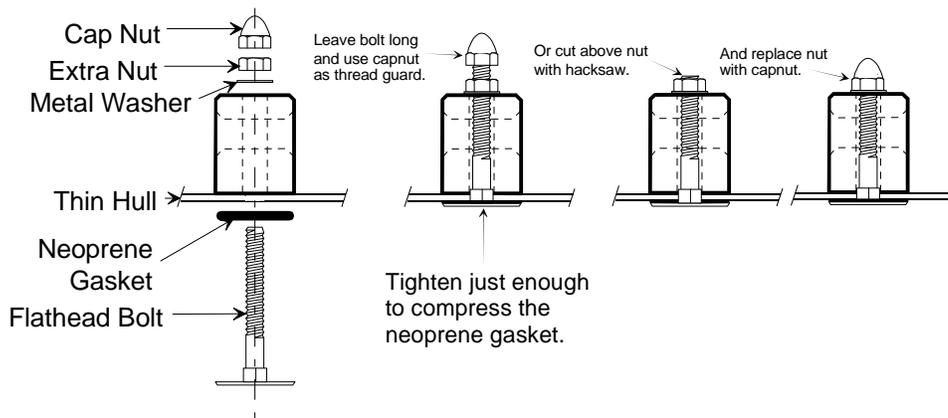
When all bolts are properly inserted and hand-fastened, choose the best example in the bolt diagrams for your needs. Be sure the gasket and washer are in place, then tighten the nut enough to flatten the neoprene gasket under the bolt head. Composite hulls tend to dimple in under the pressure. Tighten enough to bring the bolt heads almost flush with the bottom of the hull. Do not overtighten!

# eCanoe Battery Rail Bolt Diagrams

## For Thick Hulls (Composite or wood):



## For Thin Hulls (polyethylene, fiberglass, metal):



## Step Six: Using the Battery Rails

Generally it is sufficient to place the batteries or other heavy load between the rails without tying them. The rails will keep the load from shifting sideways and making the boat list to one side. Heavy loads almost never shift forwards or backwards. For really rough wave conditions or whitewater, to keep the batteries from shifting it may be necessary to wrap rope around them and through the holes in the rails. Wood or foam shims can be added under the ropes to keep the batteries in place.

**If you tie the batteries down to the rails** so that they cannot be easily jettisoned in the rare possibility you capsize, **be sure you have enough flotation** tied into the boat to float the batteries, otherwise your entire boat may go straight to the bottom! A 39-lb lead-acid battery weighs 25 lb under fresh water, requiring 5 gallons (19 liters) of styrofoam to float one battery.

The rails may also be used to elevate a platform of boards to help keep equipment such as packs and duffels out of the water on the bottom of the boat (this water does not damage the battery cases, so place them on the bottom).

Cut the boards so they extend the full width of the boat. Number or mark the boards if they are of different lengths. Waterproof the wood with paint or Water Seal.

Use cord to tie the boards tightly to the rails. These boards can then be left in place during cartop transport.

