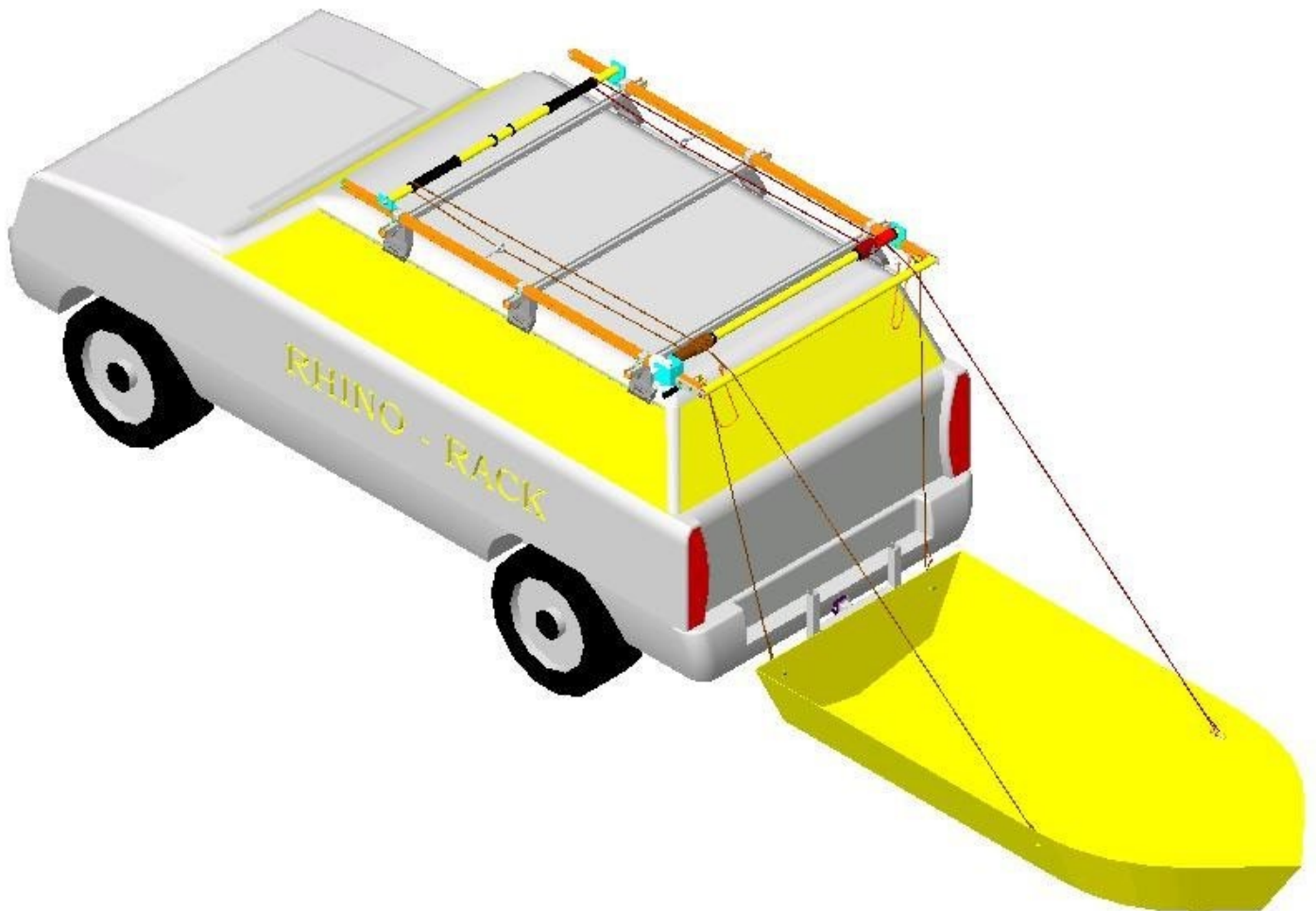




RHINO-RACK

AERODYNAMIC & HEAVY DUTY ROOF RACK SYSTEMS

THE BOAT LOADER FITTING INSTRUCTION.



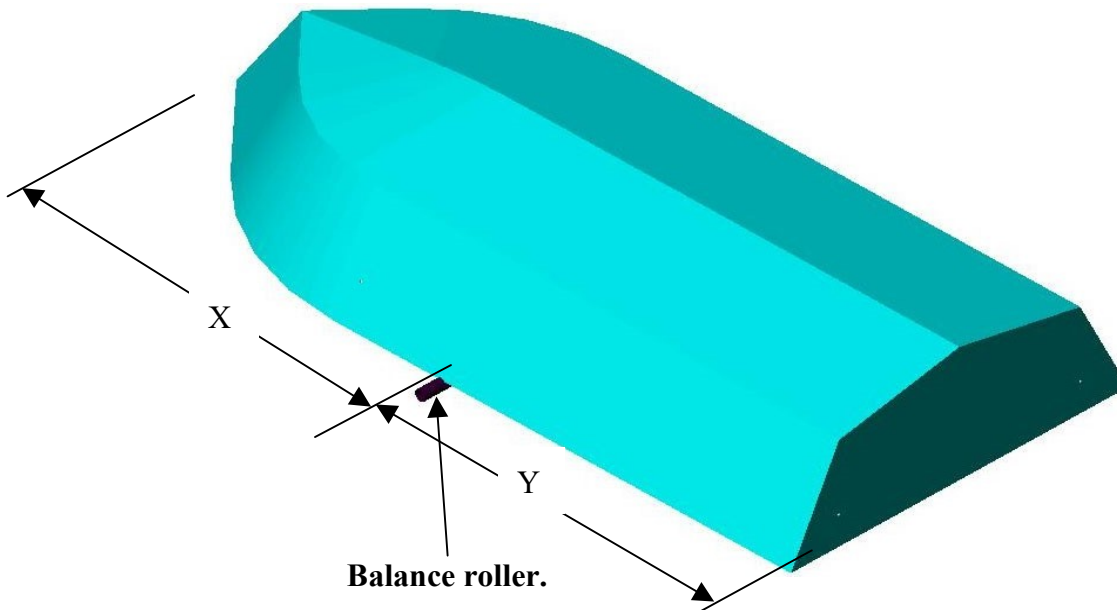


RHINO-RACK

AERODYNAMIC & HEAVY DUTY ROOF RACK SYSTEMS

Preparing the boat for the eye nuts. Balance point

Turn the boat over on to the gunnels, place a roller under the gunnels and parallel to the transom, roll the boat on the roller until the boat is balanced across the roller. Mark the balance point on the side of the boat adjacent to the roller (BP).



Front eye nuts position

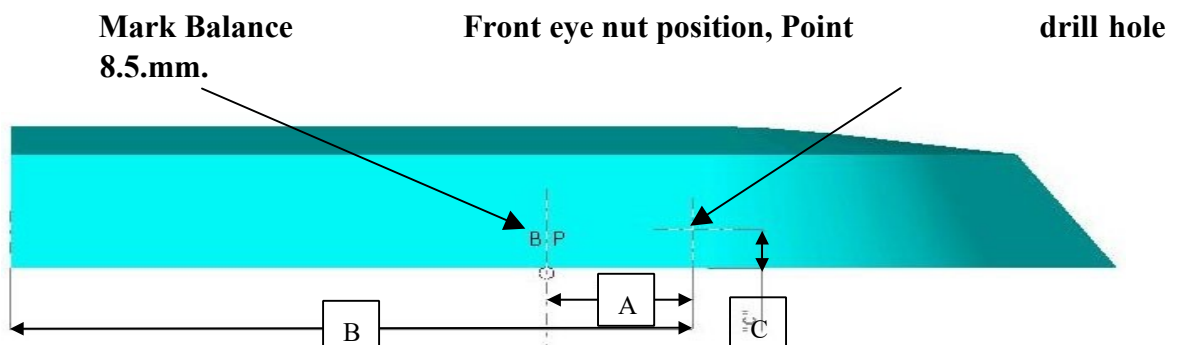
Measure from the balance point to the transom, (Y) dimension.

Measure from the balance point to the bow, (X) dimension.

Front eye nut position

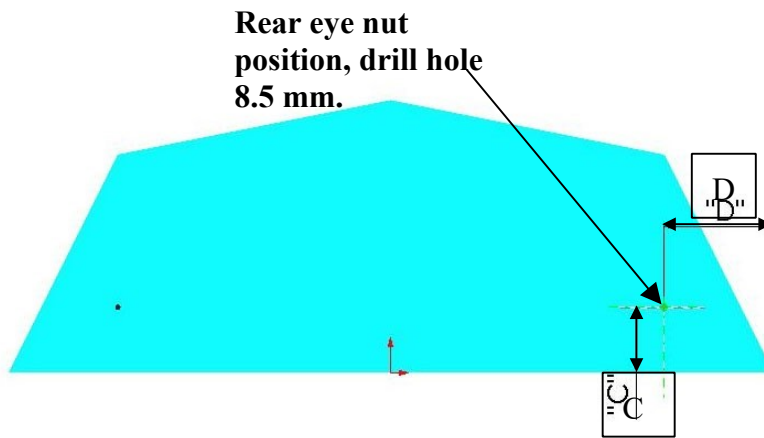
The distance between the rear pivot roller and the front roller = $X + 50\text{mm}$, the position of the front eye nut from the transom "B" must be equal to $X + 50\text{mm}$. Distance "A" (eye bolt to the balance point) if "A" is less than 450mm, make the position 450mm ($Y + 450\text{mm}$).

Mark the distance "C" 120mm from the gunnels to the front eyebolt. Drill the intersect of "B" and "C", 8.5 mm hole.



Transom eye nut position.

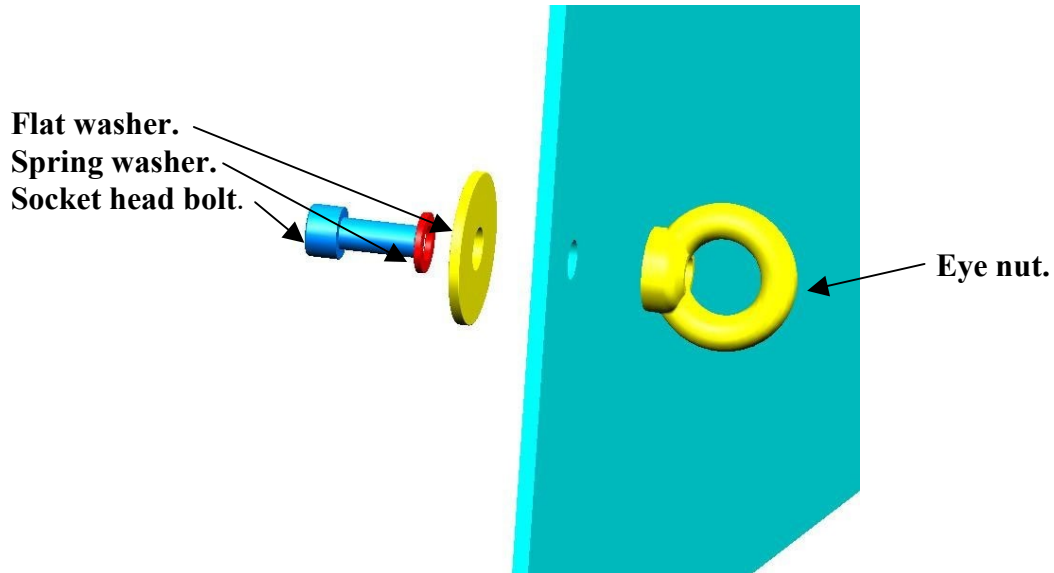
Transom eye nut positions “D” and “C” generally the position of the transom eye nut: “C” = 120 mm and “D” = 150.0. Drill intersects of, “D” and “C” using a 8.5mm drill.



Fitting the eye nuts.

Before fitting the eye nuts, deburr the holes and coat the holes with Duralac sealing compound to stop corrosion between the

eye nut and boat. Assemble the eye nut, washers and bolt. The transom eye nuts are on the outside of the boat, the front eye nuts are on the inside of the boat.



Note: Duralac is purchased from a specialist marine outlet or ship chandlers and is not supplied due to transport regulations for flammable substances.



RHINO-RACK
AERODYNAMIC & HEAVY DUTY ROOF RACK SYSTEMS

Setting up the frame

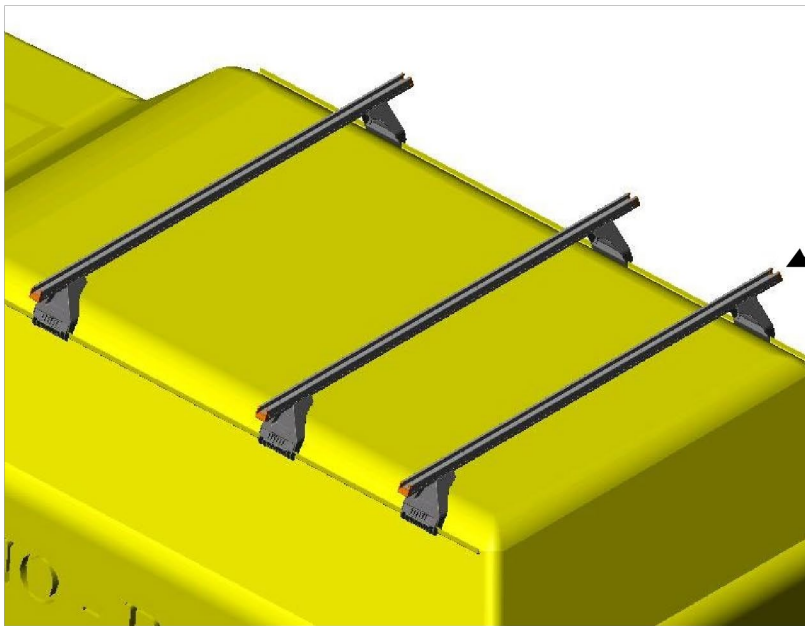
Roof racks and longitudinal bars

Note: The Crossbar width must be 24cm greater than the beam of the boat.

Fit the three roof racks as per the fitting instruction supplied with the roof racks.

The rear roof rack must be fitted no less than 50mm from the end of the gutter. Tighten the rear roof rack.

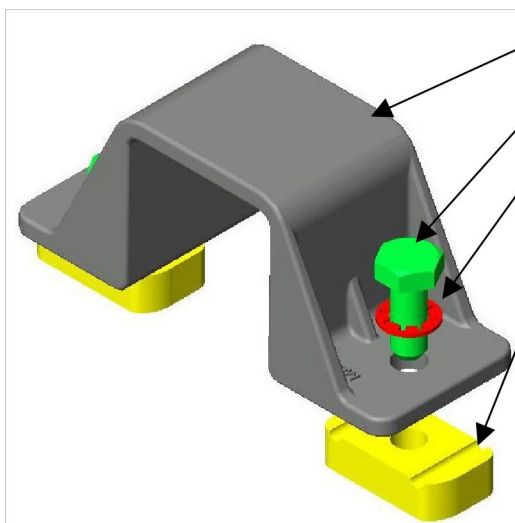
The front and center roof racks can be fitted loose, these may require repositioning later.



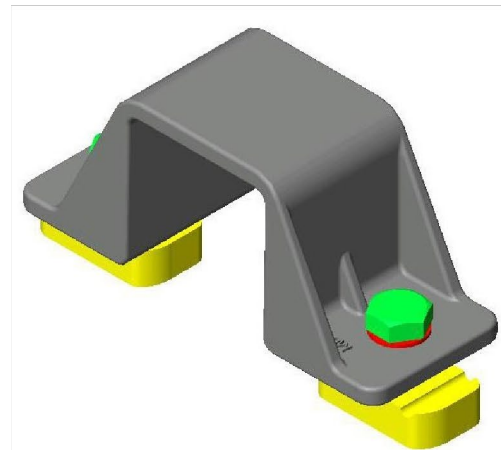
Rear roof rack fitted not less than 50mm from the end of the gutter.

Assemble the six top

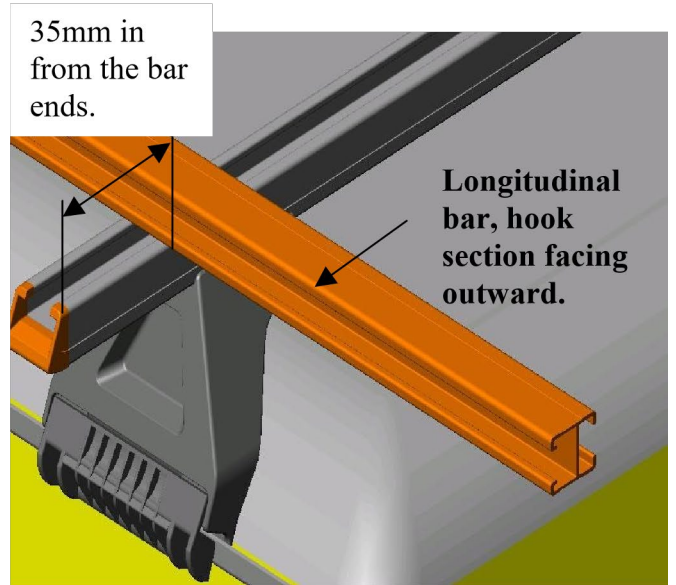
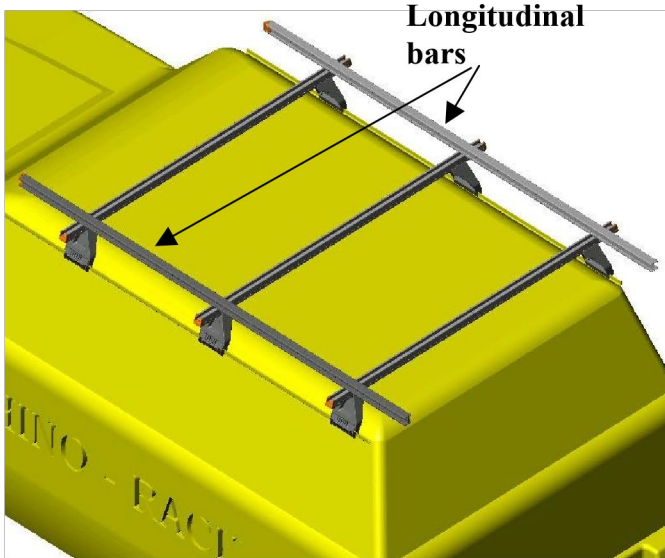
hat brackets as per the diagram.



**Top hat bracket.
M8 x 25 bolts.
M8 Shakeproof washer.
M8 Channel nut.**



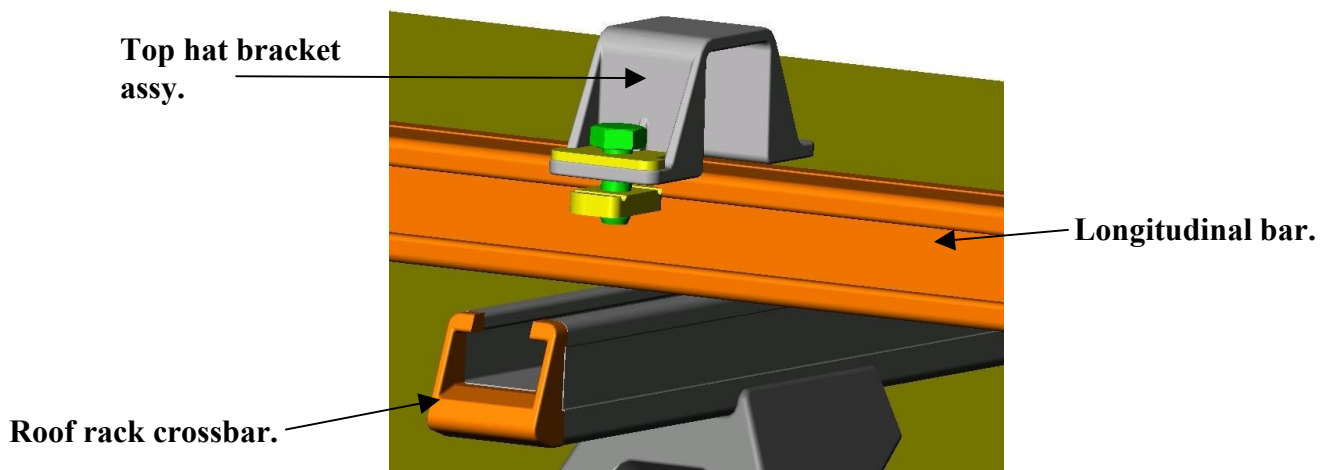
Place the longitudinal bars onto the crossbars with the hooked section of the bars facing outward. (Refer Diagram).



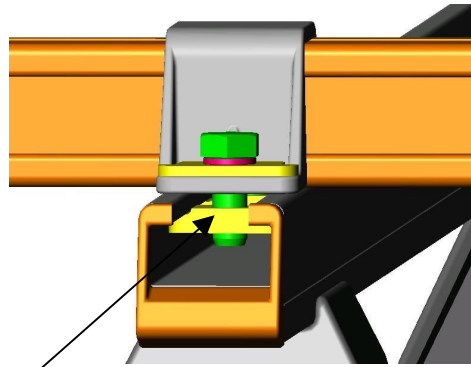
Minimum bar overhang to fit the winch.

Position the passenger and driver longitudinal side bars 35 mm in from the ends of the crossbar and 125 mm from the extreme end of the vehicle to the end of the longitudinal bar, including the spare wheel carrier if fitted. Refer Diagrams.

Place the top hat brackets over the longitudinal bars with the channel nuts down into the crossbars. (Refer Diagram).

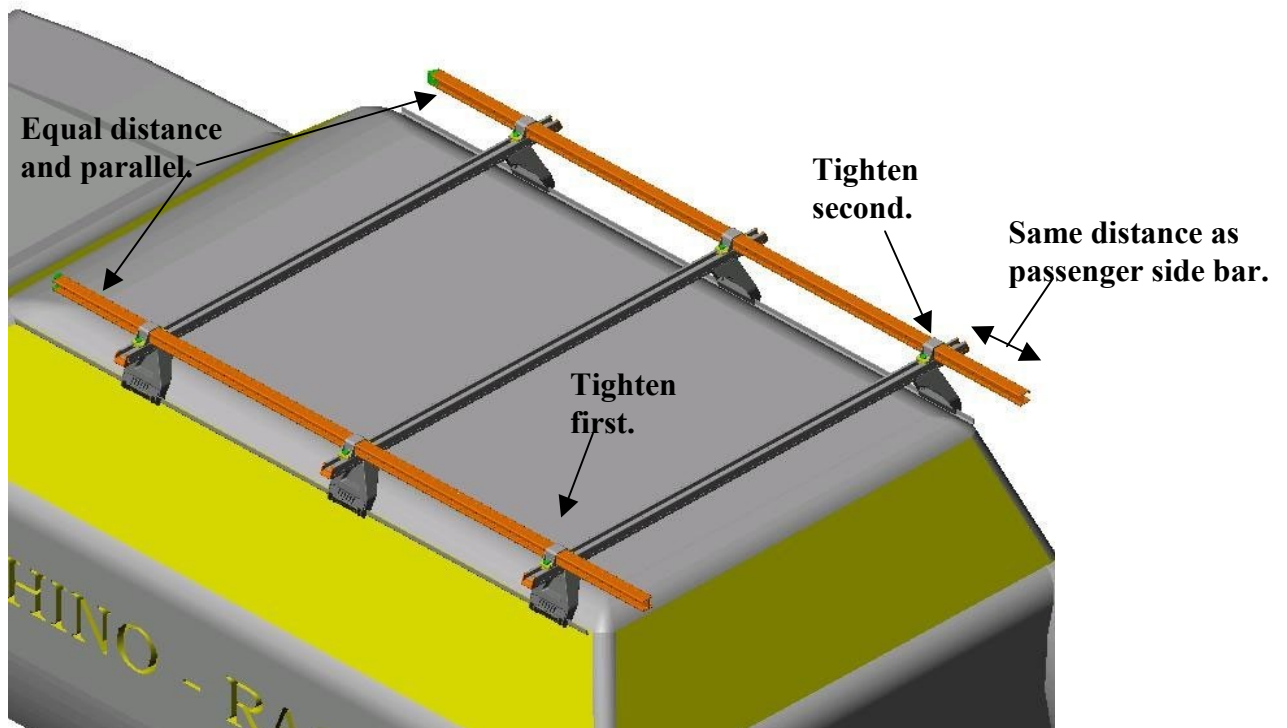


Check that the passenger side bar is still parallel. Tighten only the rear crossbar top hat bracket. **Note: when tightening bolts with channel nuts, ensure that the channel nut is fully located across the crossbar recess when fully tightened.** (Refer Diagram).



Channel nut fully located across the crossbar recess.

Position the driver side longitudinal bar, parallel to the passenger side bar, the end of the bar should be the same distance from the crossbar as the passenger side bar. (Refer Diagram). Tighten the rear crossbar top hat bracket only. (Refer Diagram).



The two front top hat brackets can be tightened to hold the longitudinal bars in place while the rollers are being positioned and cut.



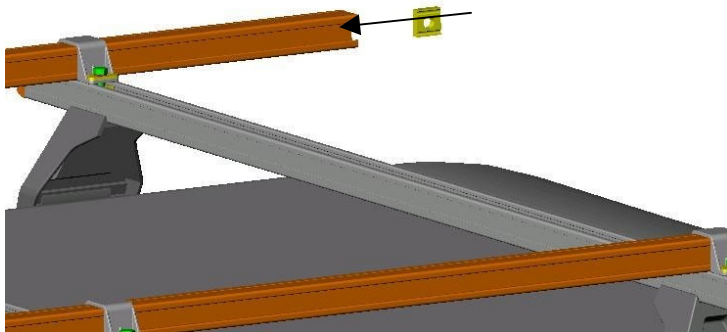
RHINO-RACK

AERODYNAMIC & HEAVY DUTY ROOF RACK SYSTEMS

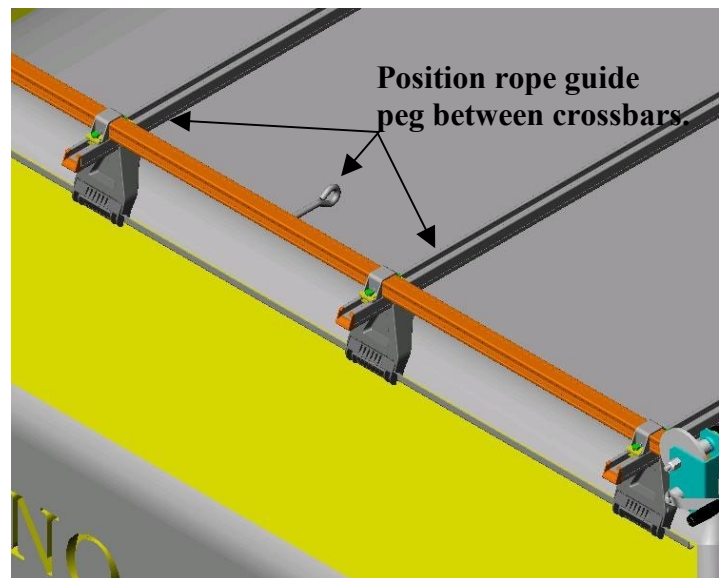
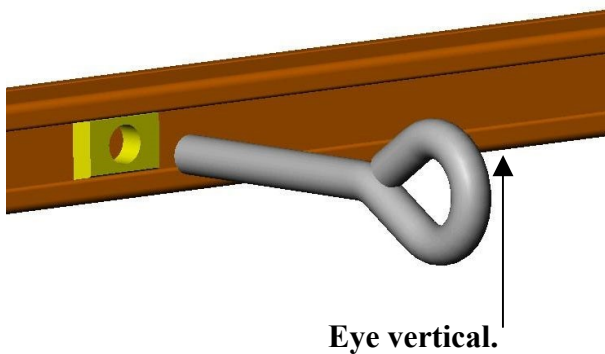
Fitting the rope guide peg to the longitudinal bars.

Slide the square channel nut into the end of the longitudinal bars to a position in between the front and middle crossbars As per the diagrams.

Slide in channel nut.



Screw in the rope guide peg. Position the rope guide peg between the front and middle crossbars. Tighten the rope guide peg with the eye vertical.





RHINO-RACK

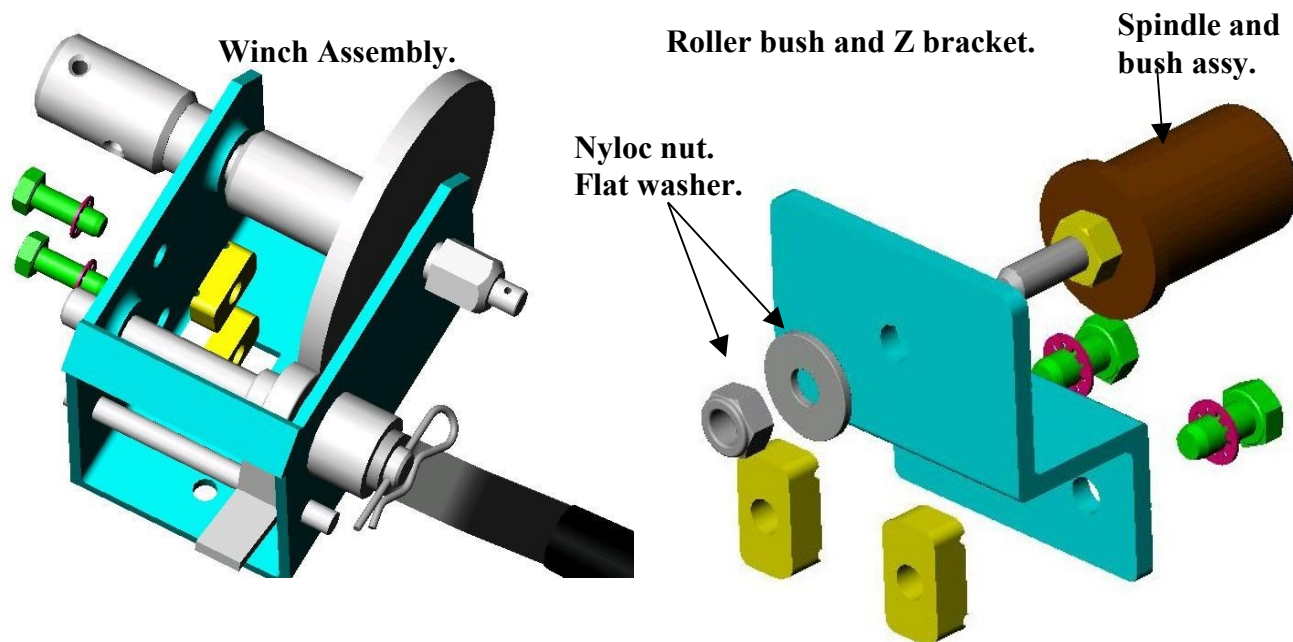
AERODYNAMIC & HEAVY DUTY ROOF RACK SYSTEMS

Fitting the Winch and Power roller to the longitudinal bars.

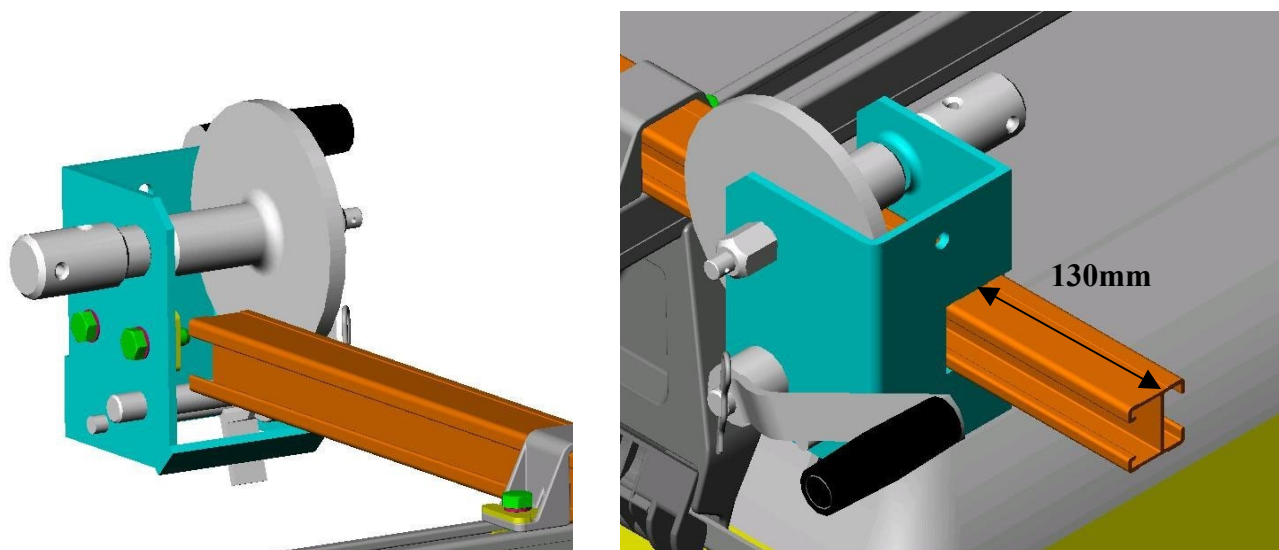
Winch

Assemble the M10 x 20mm bolts, channel nut and washers onto the winch and Z bracket as per the diagrams, ensure that the channel nuts are loose. **Z Bracket**

Assemble the bush and spindle onto the Z bracket, fit the flat washer, screw on the Nyloc nut and tighten. Assemble the M10 x 20mm bolts, shake proof washer and channel nuts as per the diagram, and ensure that the channel nuts are loose.

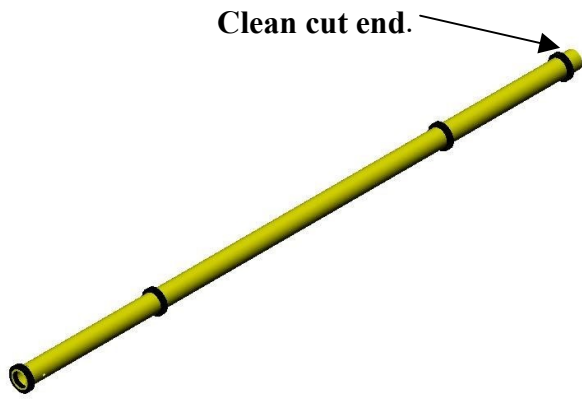


Slide the winch onto the passenger side longitudinal bar with the winch handle facing outwards, as per the diagram. Position the winch 130mm from the end of the bar. Tighten the attachment bolts, **check that the channel nuts are fully located across the bar.**



Check the channel nut is fully across the bar.

Slide the power roller Z bracket onto the driver side longitudinal bar with the roller bush inwards and inline with the winch power roller shaft. Tighten the M10 x 20mm bolts ensuring that the channel nut is fully located across the bar.

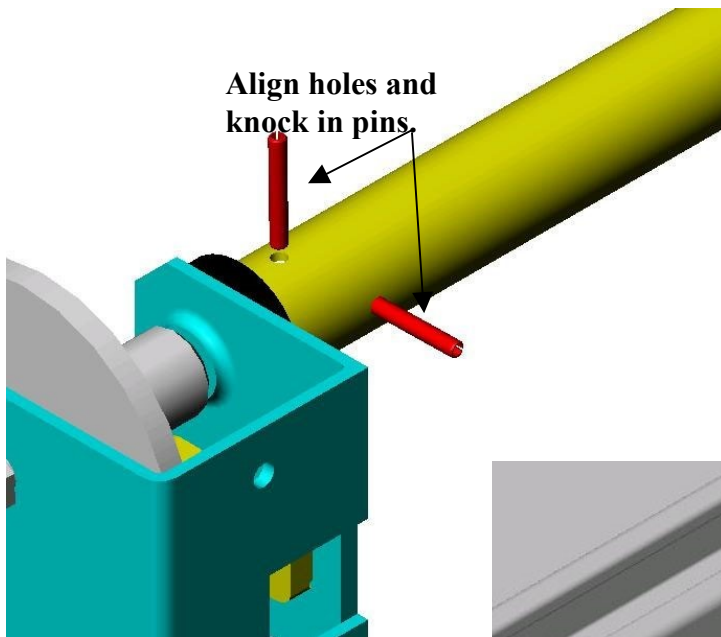


Remove burrs and clean the cut end of the power roller, slide the rubber rings onto the roller in any position. Place the rings in hot water, this will aid the rings to slide onto the roller.

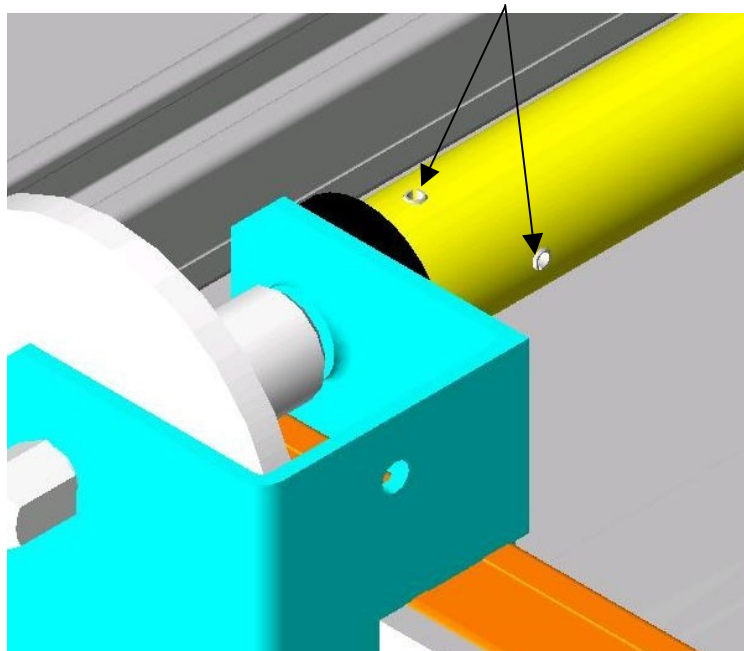
Remove the Z bracket, insert the drilled end of the power roller onto the winch power roller shaft, insert the Z bracket power roller bush into the roller, insert the Z bracket onto the longitudinal bar, adjust the roller to be parallel to the rear crossbar. Tighten the bolts as previous described and check that the channel nuts are

fully located across the bar.

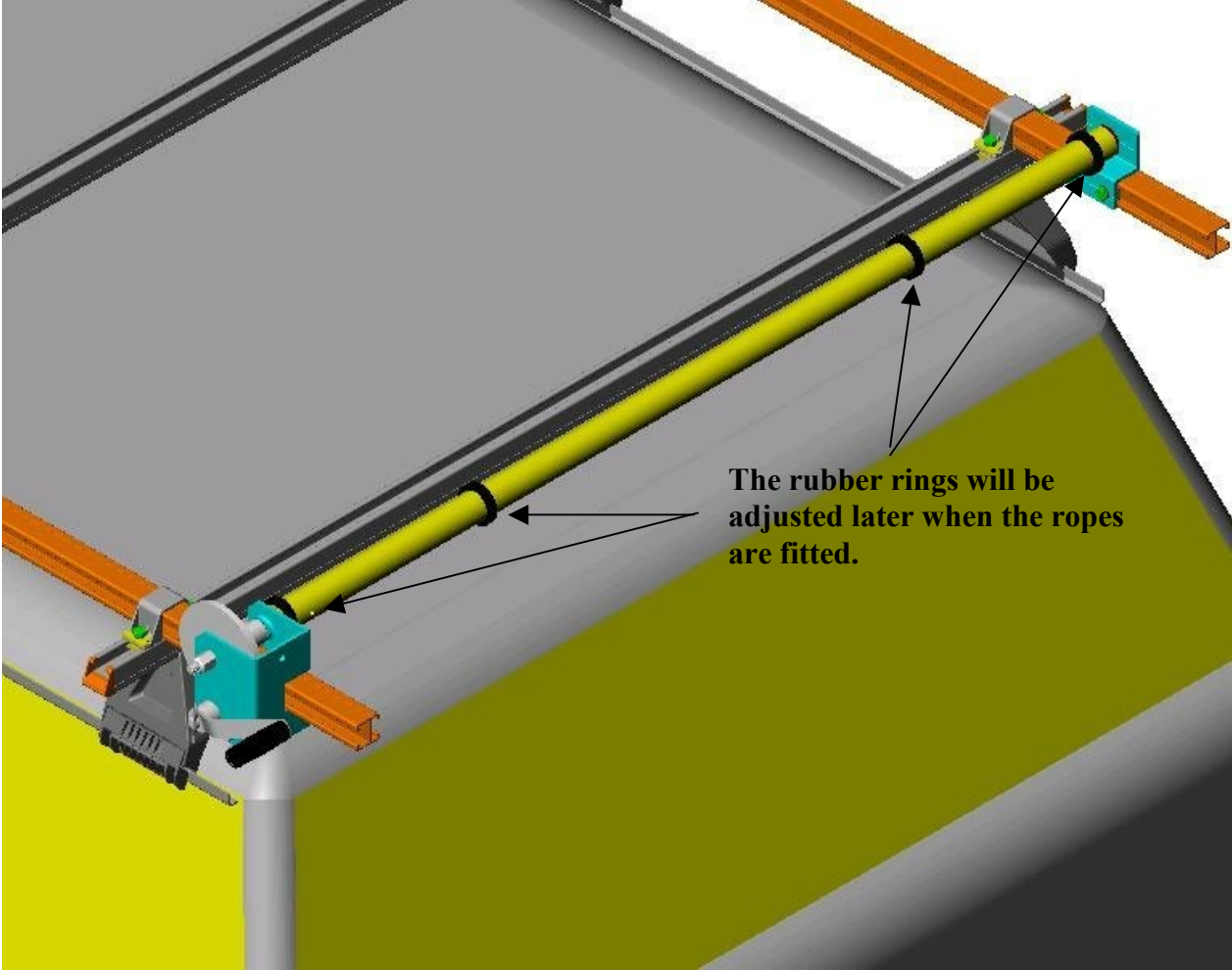
Align the holes in the roller with the winch shaft, knock in the power roller drive pin until it is flush with the roller.



Pins to be flush with roller.



When fitment of the power roller is complete, rotate the winch and check that the winch and roller rotates freely.



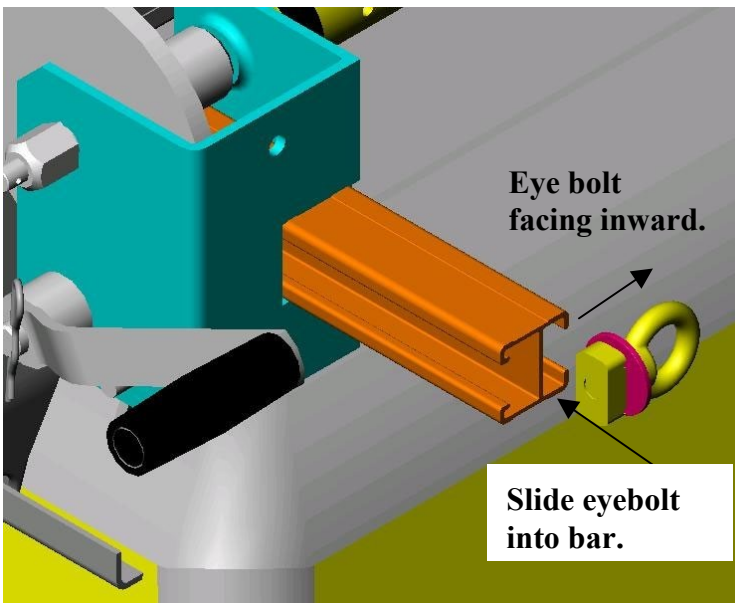


RHINO-RACK

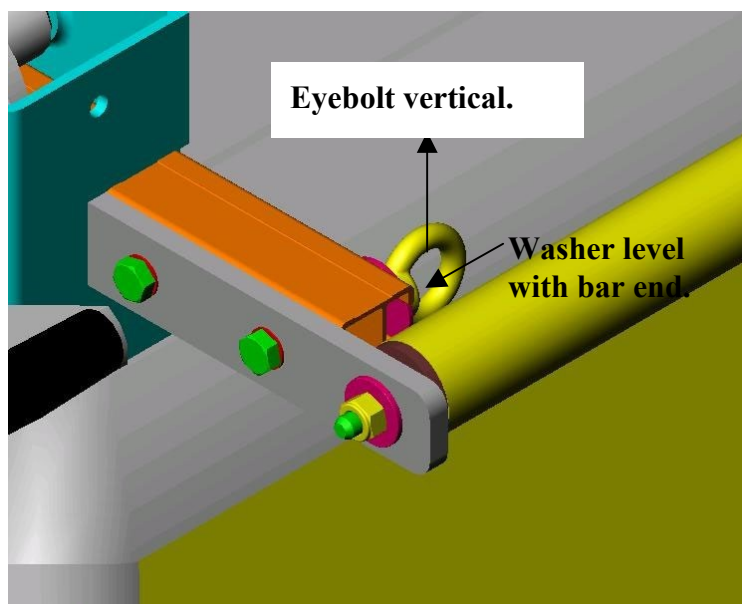
AERODYNAMIC & HEAVY DUTY ROOF RACK SYSTEMS

Fitting the Eye bolts to the longitudinal bars.

Prior to fitting the pivot roller slide the eyebolts into the longitudinal bars with the eyebolt facing inward and the channel nut fully located across the bar.



Position the eyebolt washer level with the end of the longitudinal bars. Tighten the eyebolt and check that the channel nut is fully located across the bar. When tightened, the eyebolt must be vertical.





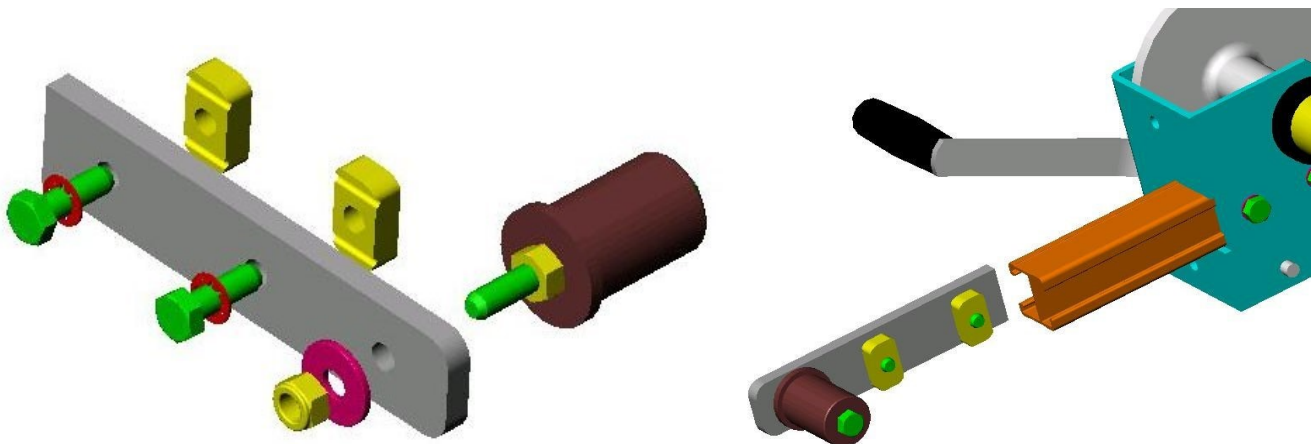
RHINO-RACK

AERODYNAMIC & HEAVY DUTY ROOF RACK SYSTEMS

Fitting the pivot roller to the longitudinal bars.

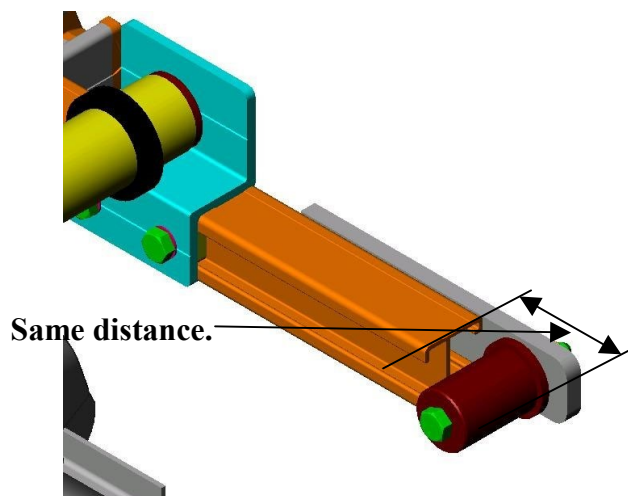
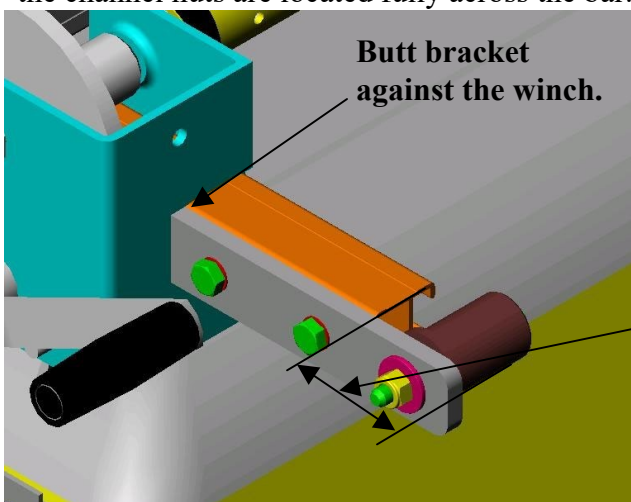
Pivot roller brackets.

Assemble the bush and spindle onto the bracket, fit the flat washer and screw on the Nyloc nut and tighten. Assemble the M10 x 20mm bolts, shake proof washer and channel nut as per the diagram, and ensure that the channel nuts are loose.



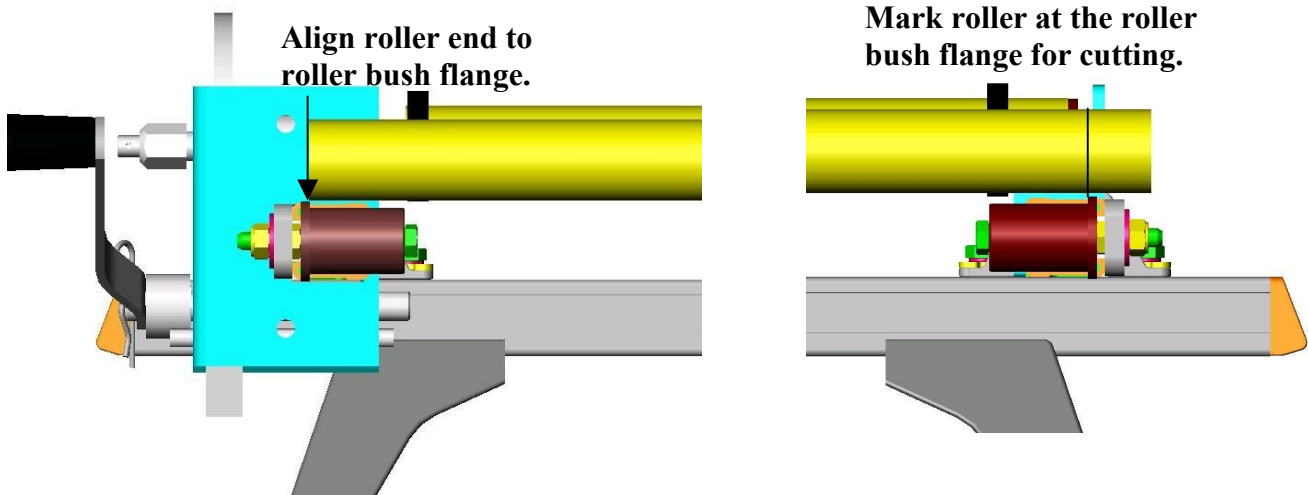
Slide the winch side pivot roller bracket into the longitudinal bar so that the end of the bracket is against the winch with the roller bush facing inwards. Tighten the attachment bolts; **check that the channel nuts are located fully across the bar.**

Slide the driver side pivot roller bracket into the longitudinal bar. Position the bracket the same distance from the end of the longitudinal bar as the winch side bracket. Tighten the attachment bolts ensuring that the channel nuts are located fully across the bar.



Marking and Cutting the roller.

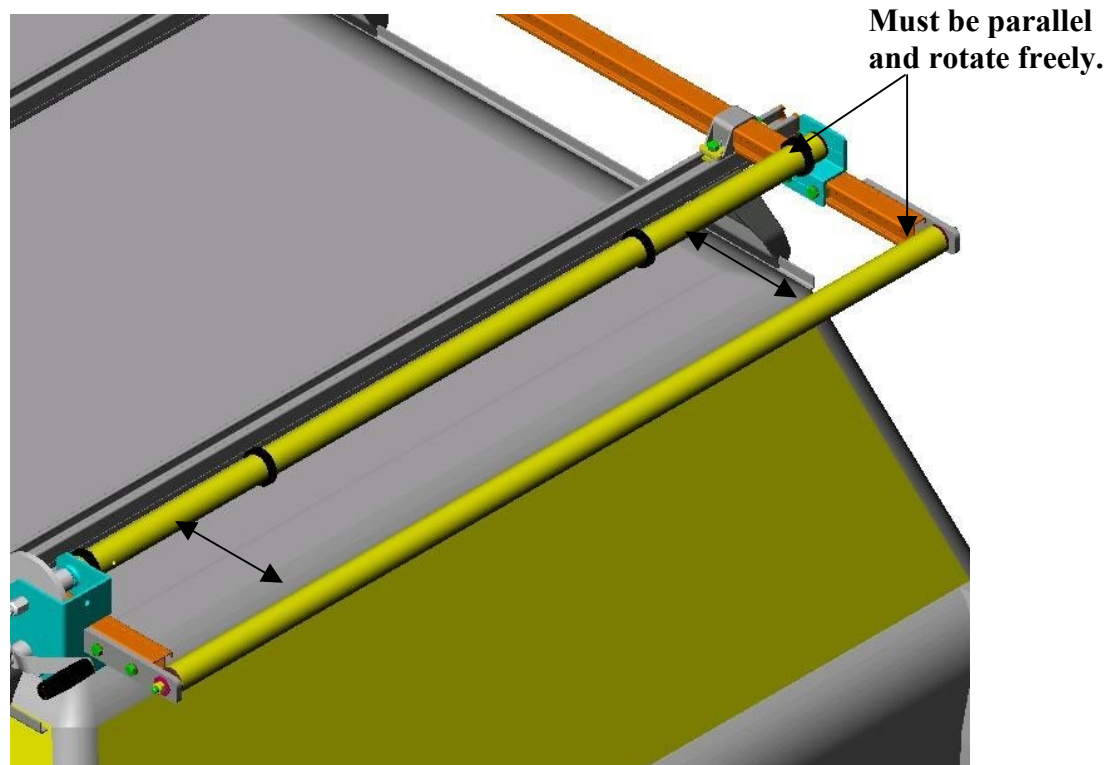
Align one end of the roller with the inside edge of the roller bush flange. Mark the other end of the roller adjacent to the inside edge of the driver side roller bush flange as per the diagrams.



Remove burrs and clean the cut end of the roller. Remove the pivot roller bracket from the driver side longitudinal bar, insert the pivot roller into the winch side bush, insert the driver side bracket bush into the roller. Insert the pivot roller bracket into the longitudinal bar, adjust the pivot roller to be parallel to the power roller.

Tighten the attachment bolts as previously described and check that the channel nuts are fully located across the bar.

The pivot roller must rotate freely.





RHINO-RACK

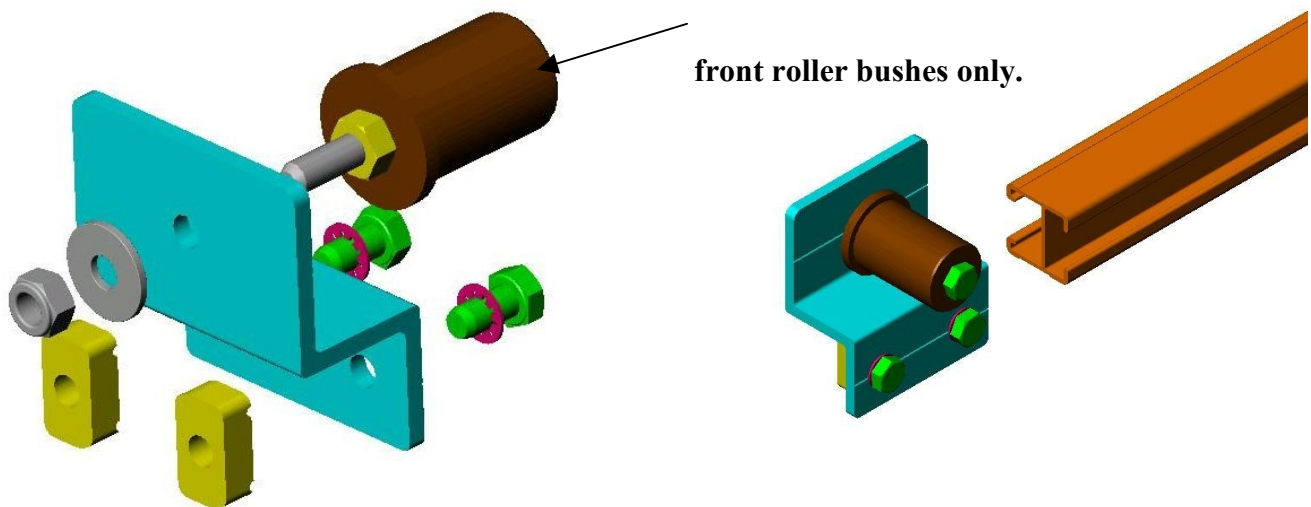
AERODYNAMIC & HEAVY DUTY ROOF RACK SYSTEMS

Fitting the front roller to the longitudinal bars.

Z brackets.

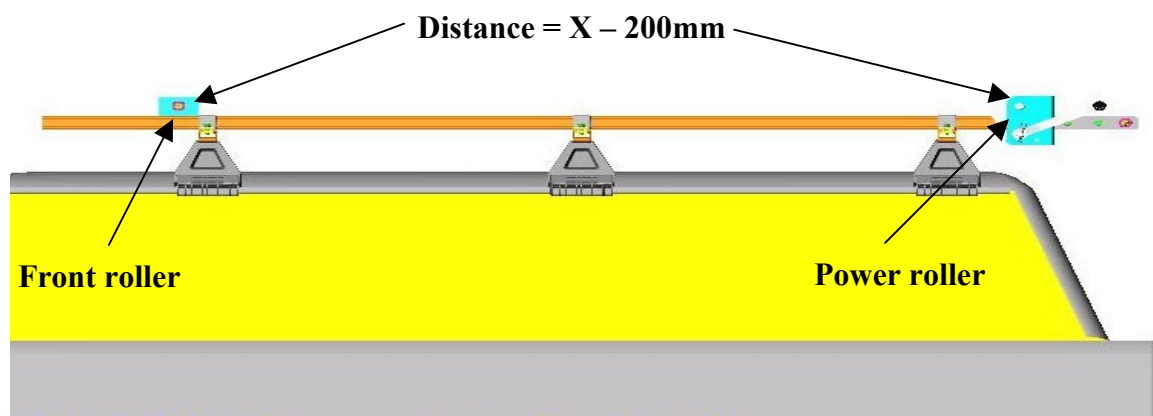
Note: - The bushes for the front roller have a smaller spigot diameter.

Assemble the spindle bolt, bush and bush nut, the bush nut must be positioned to allow the bush to have minimal end float and rotate freely. Assemble the bush and spindle onto the Z bracket, fit the flat washer, screw on the Nyloc nut and tighten. Assemble the M10 x 20mm bolts, shake proof washers and channel nuts as per the diagram, ensure that the channel nuts are loose.



Smaller spigot diameter

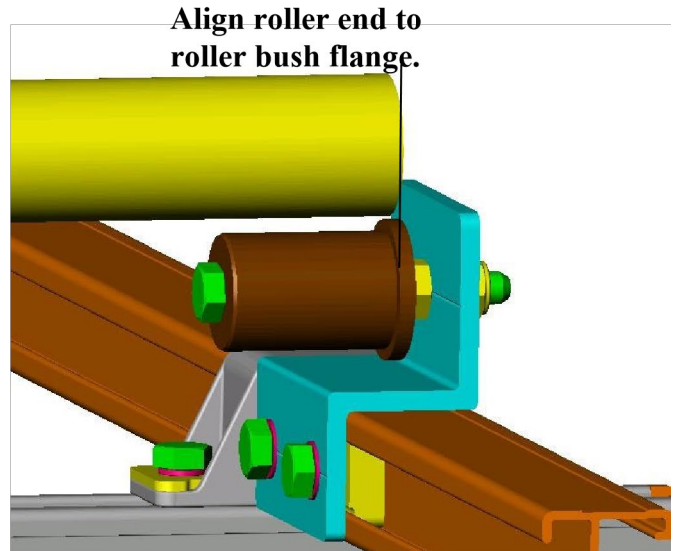
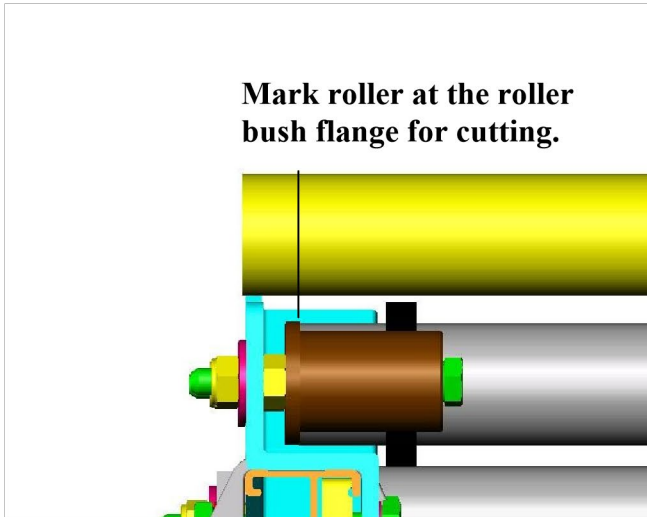
Slide the Z brackets into the longitudinal bars with the roller bush facing inwards. Position one of the Z brackets at $X - 200\text{mm}$ from the power roller. (X = the distance from the bow to the Balance point). Tighten the attachment bolts; **check that the channel nuts are fully located across the bar.** Position the other Z bracket in line with previously attached Z bracket and finger tighten the attachment bolts.



Marking and cutting the roller.

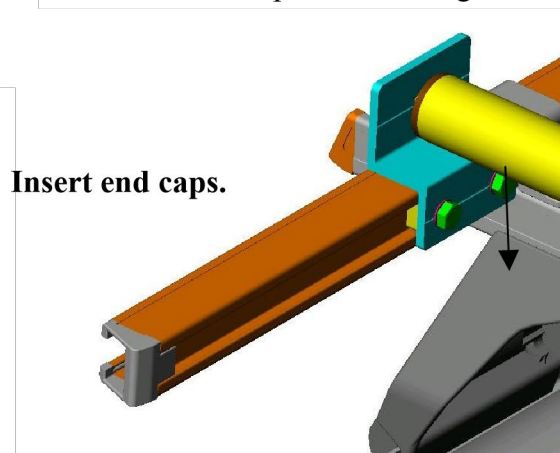
Note: - The front roller has a smaller center bore than the pivot and power rollers.

Align one end of the roller with the inside edge of the Z bracket roller bush flange. Mark the other end of the roller adjacent to the inside edge of the roller bush flange as per the diagrams.



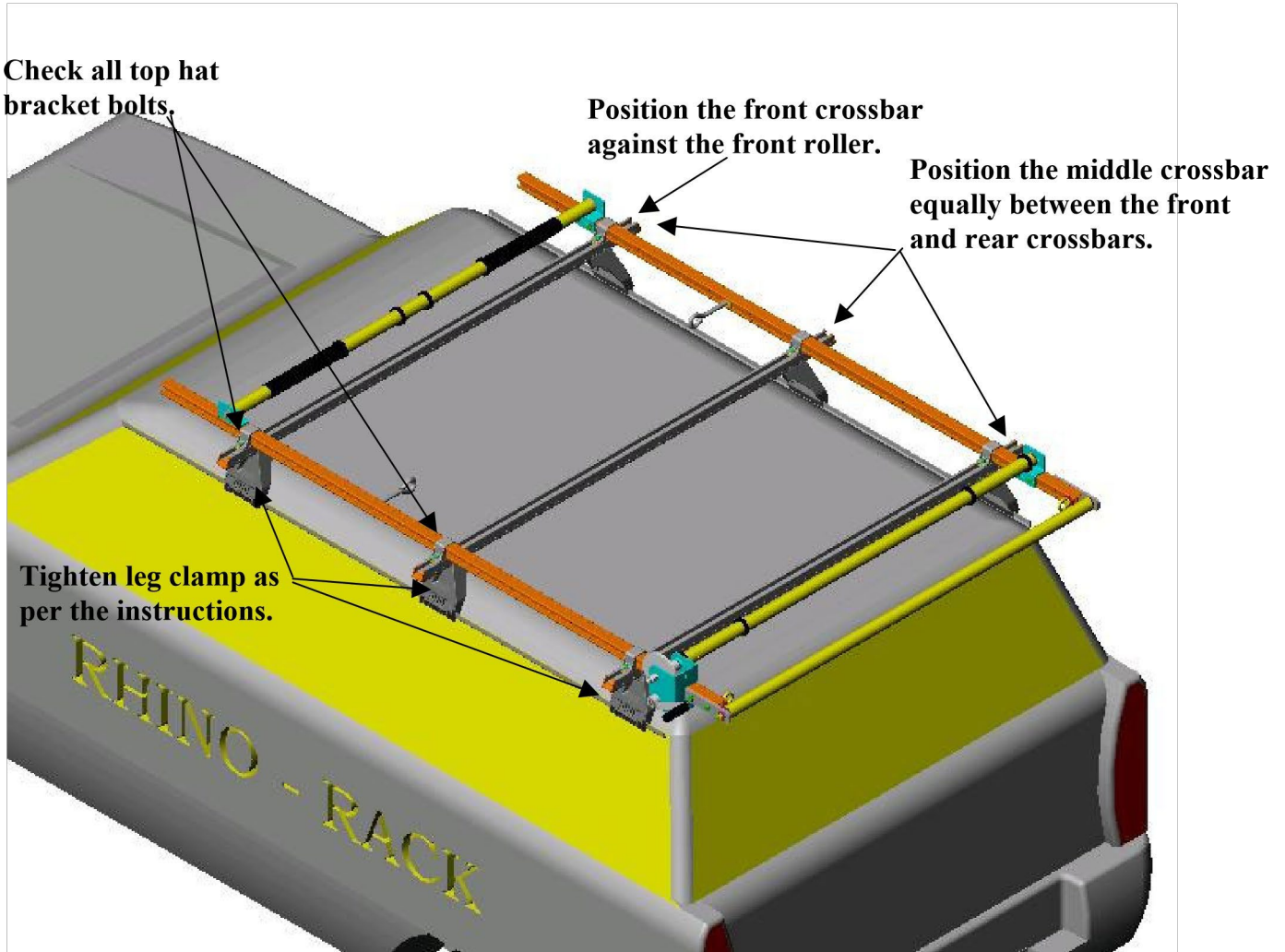
Remove burrs and clean the cut end of the roller. Assemble two sleeves and four rubber rings onto the roller as shown. Remove the un positioned Z bracket, insert the front roller into the fixed Z bracket bush, and insert the other Z bracket bush into the roller. Insert the Z bracket into the longitudinal bar, adjust the front roller parallel to the power roller. Tighten the attachment bolts as previously described and check that the channel nuts are fully located across the bar.

Insert the end caps into the longitudinal bars.



Position front crossbar assembly against the front roller Z brackets check that the crossbar is parallel to the rear crossbar.

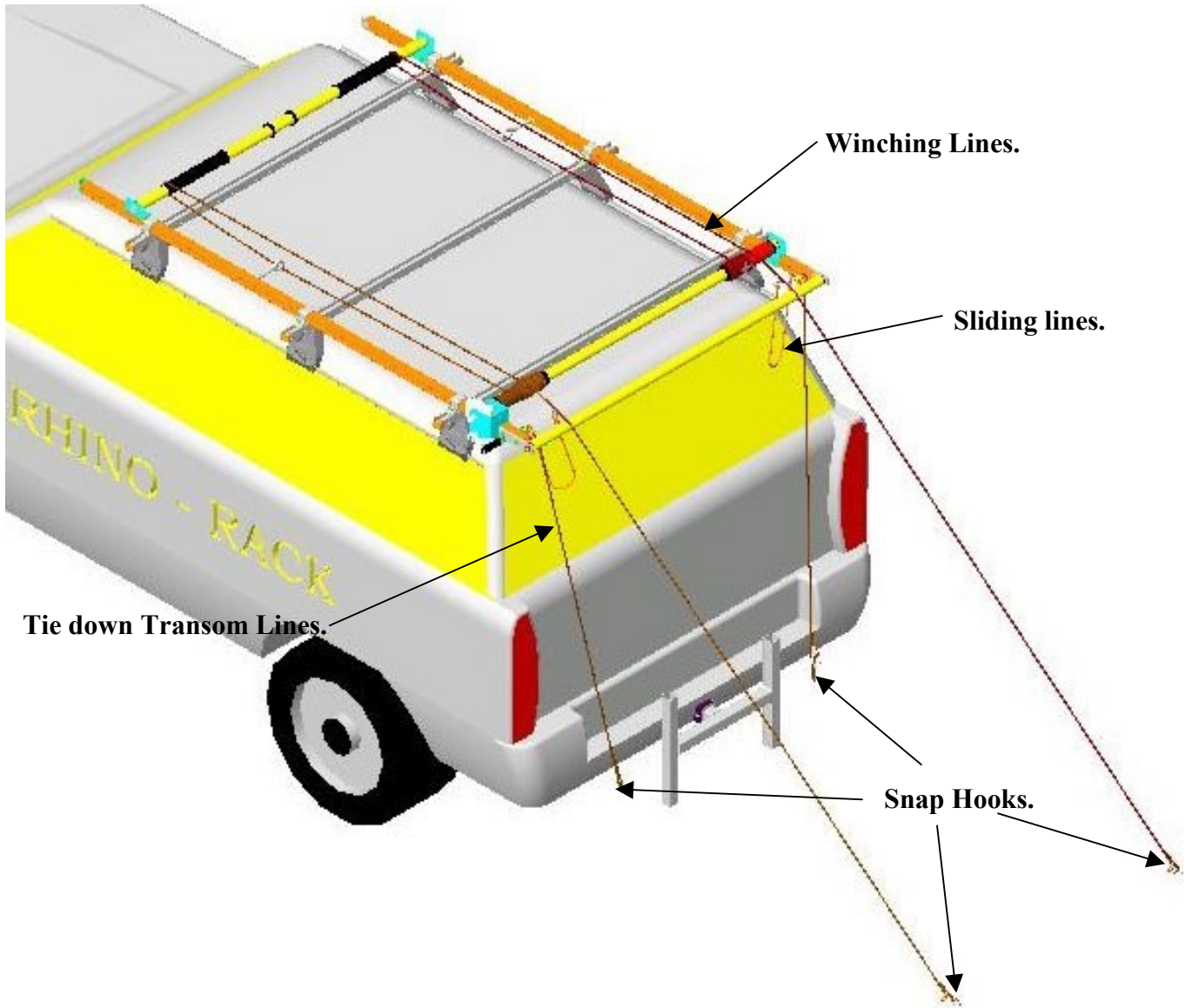
Position the middle crossbar, centre distance between the front and rear crossbars. Tighten the leg clamps as per the Rhino commercial roof rack fitting instruction. Tighten and check all top hat bracket bolts.



RHINO-RACK

AERODYNAMIC & HEAVY DUTY ROOF RACK SYSTEMS

BOAT LOADER LINE LAYOUT.

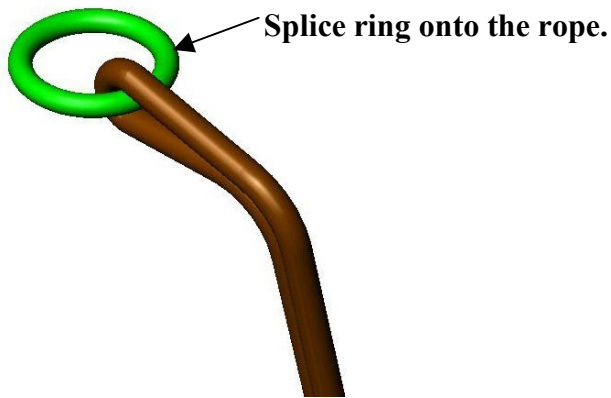


RHINO-RACK

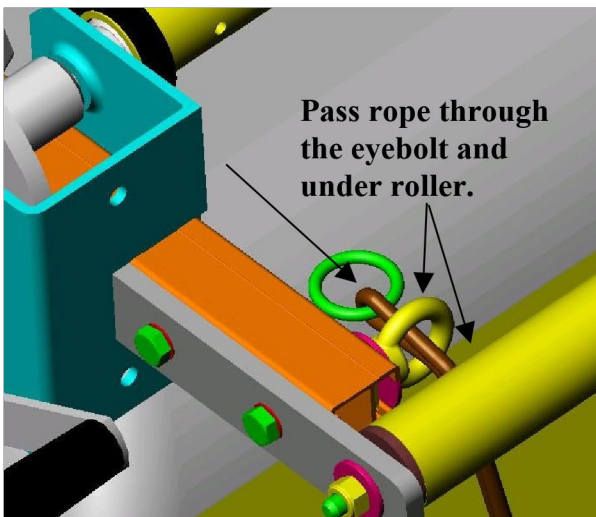
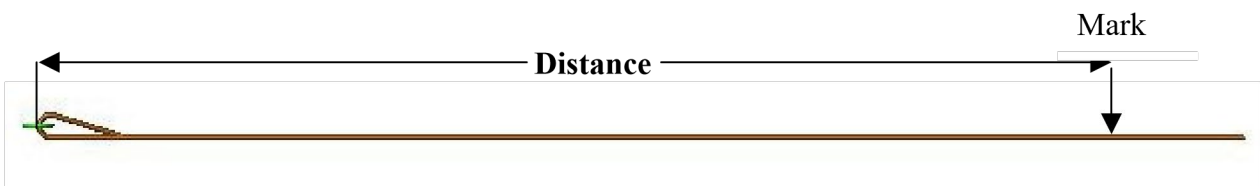
AERODYNAMIC & HEAVY DUTY ROOF RACK SYSTEMS

Fitting the Rear tie down lines (Transom lines).

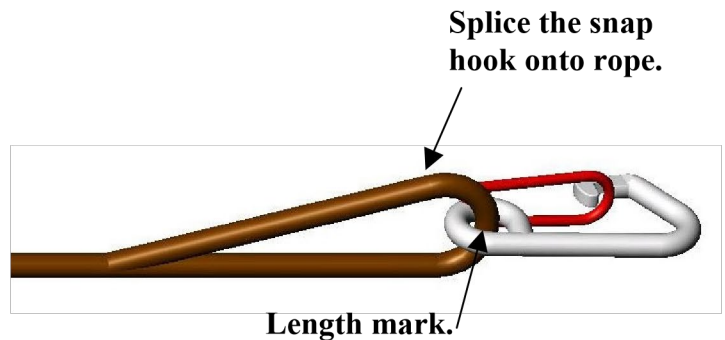
Cut two pieces of the hollow braided polypropylene rope to the length, equal to the distance from the transom to the Balance point plus 1000 mm, at one end splice a ring. (Refer to the spliced sample provided) The spliced length should be approximately 500 mm.



Mark a length from the ring to the free end of the rope equal to the distance from the transom to the balance point, a piece of masking tape around the rope will do to mark the distance.



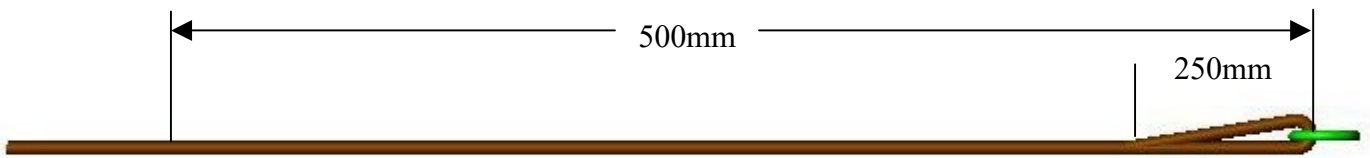
Pass the free end of the rope through the eyebolt and under the pivot roller as per the diagram. Pass the free end through the snap hook eye and position at the previously marked distance. Splice the rope. (Refer to the spliced sample provided). Some adjustment maybe required to the tie down rope at the snap hook end.



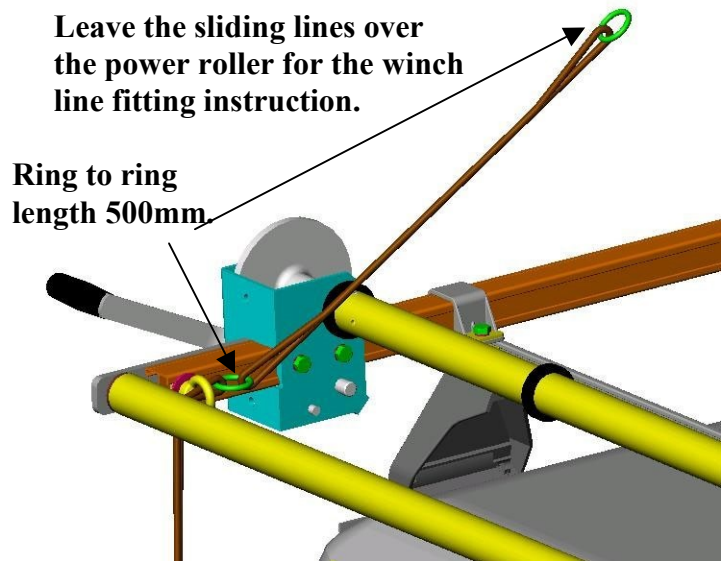
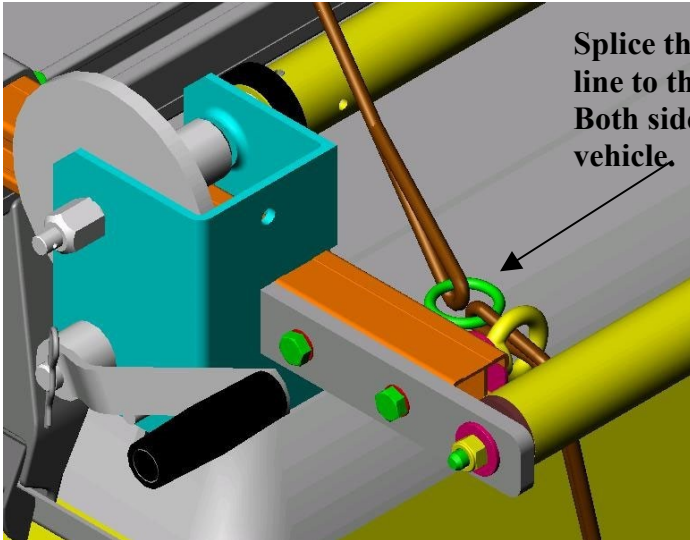
RHINO-RACK
AERODYNAMIC & HEAVY DUTY ROOF RACK SYSTEMS

Fitting the sliding lines to the tie down lines.

Cut two lengths of the hollow braided Polypropylene rope supplied equal to the distance from the balance point to the front eyebolt plus 500mm, splice a ring on one end with a splice length of 250mm. This allows for later adjustments.



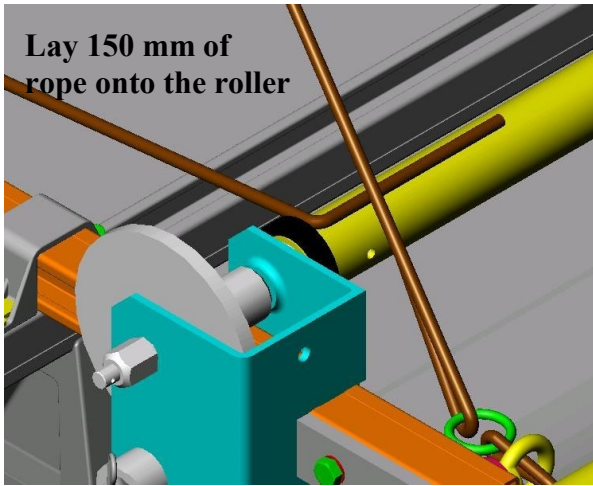
Splice the free end onto the tie down line rings, at a length of 500 mm from the previously attached ring, as per the diagram. Some adjustment may be required to this line during the loading operation.



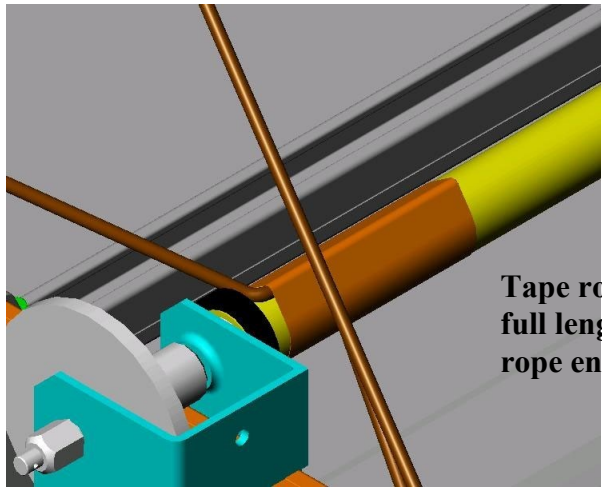
RHINO-RACK
 AERODYNAMIC & HEAVY DUTY ROOF RACK SYSTEMS

Fitting the winch lines to the Power roller.

Cut the remaining rope in half. Lay, 150 mm length of rope along the top surface and inline with the power roller. Tape around the roller and rope with the heavy duty tape supplied, overlap each turn of the tape, as per the diagrams. Repeat operation on the other side of the power roller.



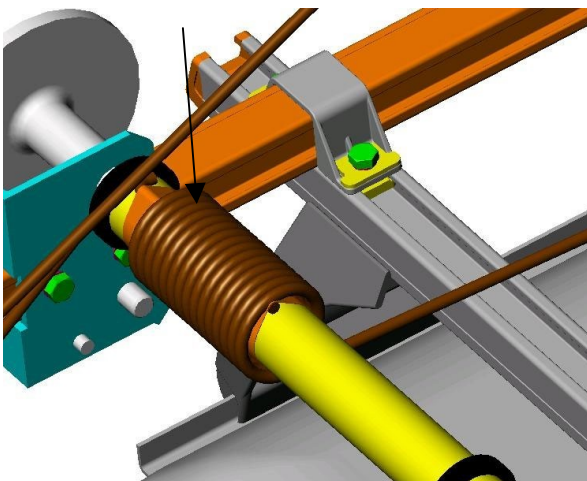
Lay 150 mm of rope onto the roller



Tape roller full length of rope end.

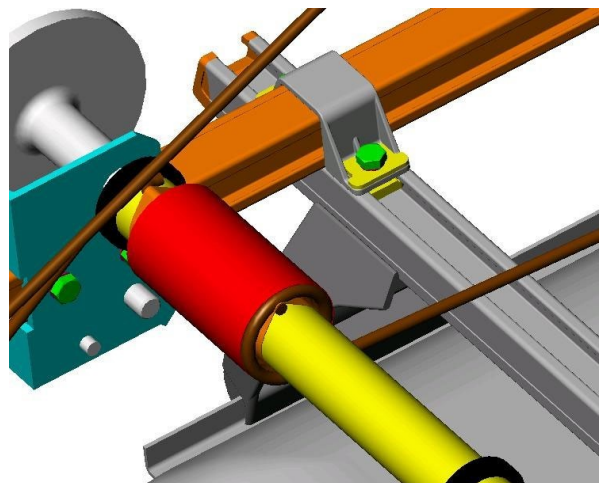
Turn the winch handle clockwise, winding the rope coils inward and over the taped rope end covering the full length of the tape, ensure there is tension on the ropes and the rope coils are tight and together. Tape over and around the rope coils for the full length of the coils ensuring overlapping of the tape, put three layers of tape over the coils, as per the diagrams.

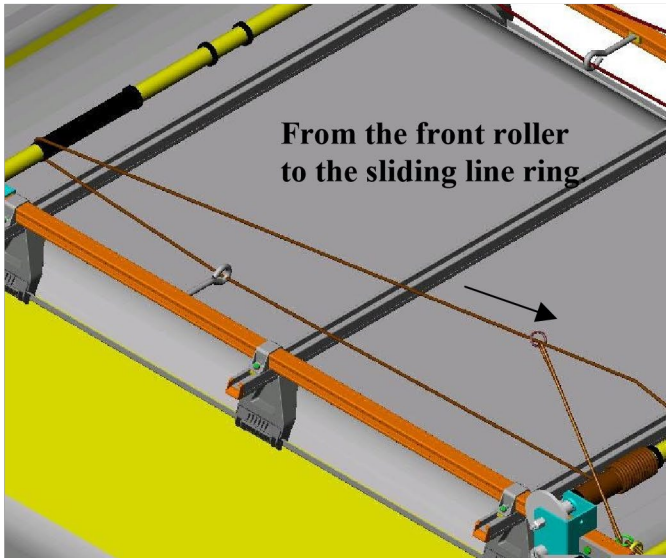
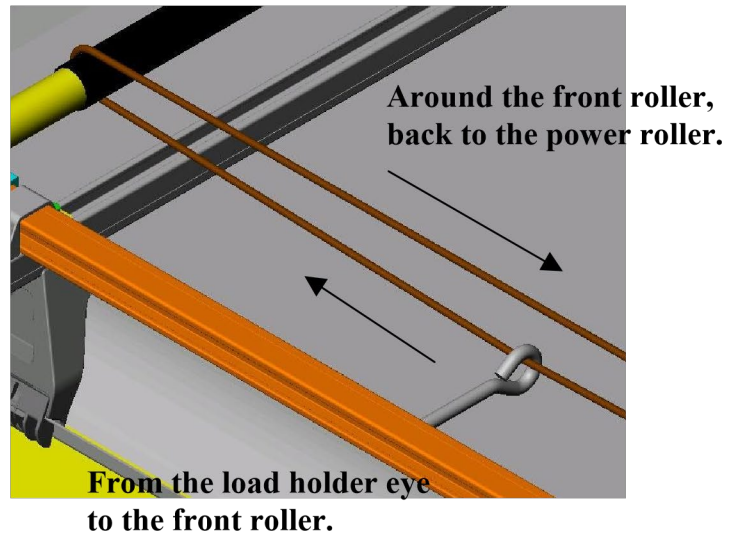
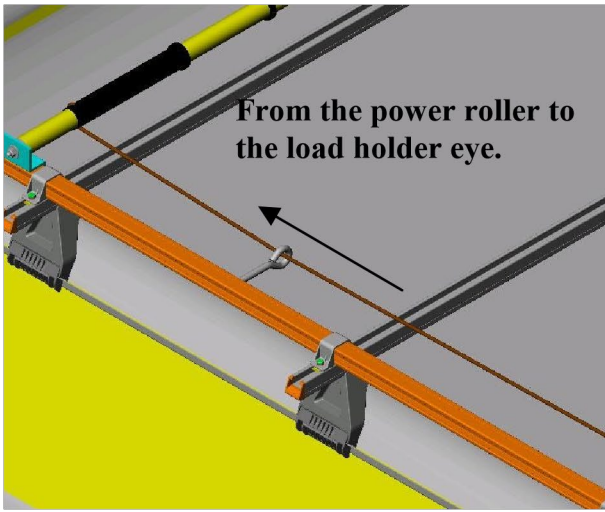
Wind the rope inward and over the tape. Tape the full length of the coils with three layers of tape.



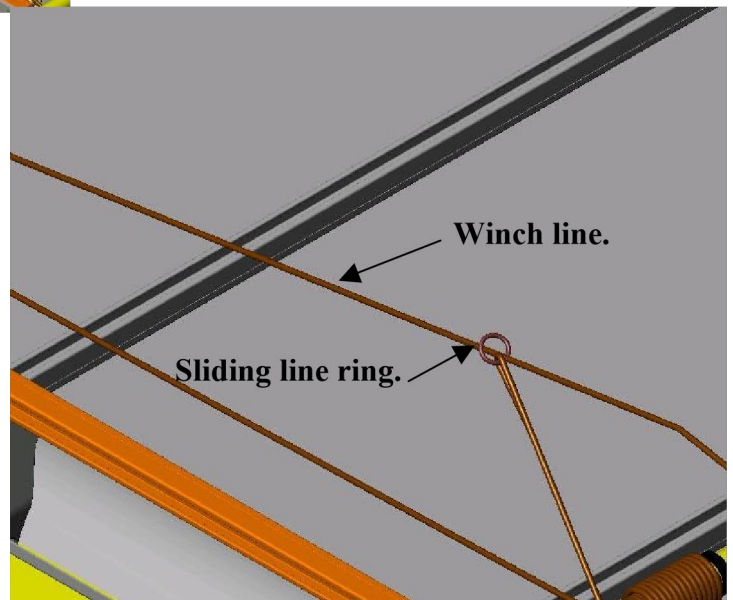
Routing the winch lines.

Thread the free end of the rope over the rear and middle crossbars, through the load holder eye, over the front crossbar, under and around the front roller. Adjust the front roller sleeves so that the rope is around the sleeve, as per the diagrams.

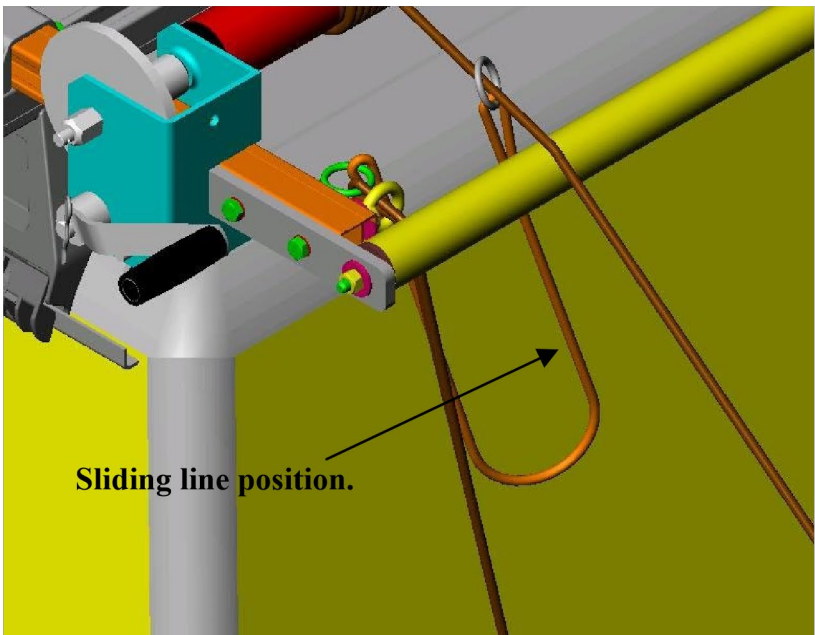
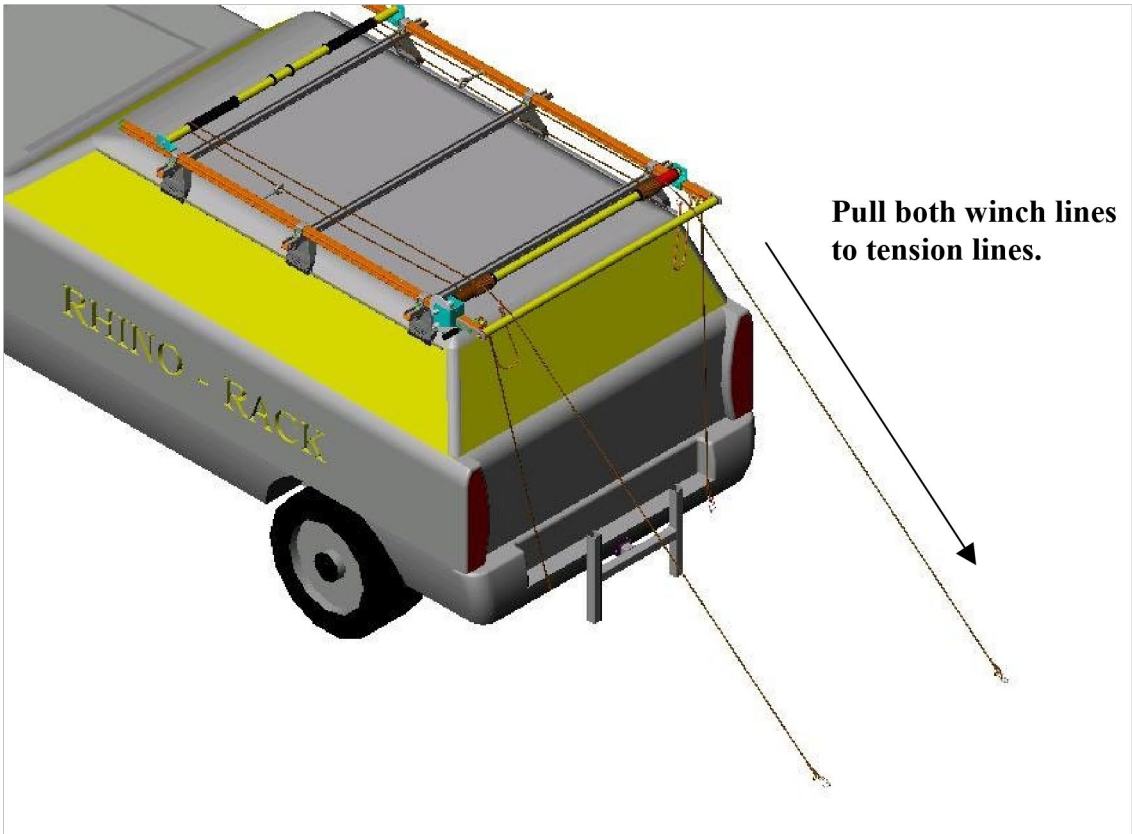




Thread the winch lines through the sliding line rings (as per the diagrams), then over the power roller and pivot roller.



Take both ends of the winch lines and pull to tension the lines. With tension on the lines turn the winch clockwise 5 turns, the lines will coil inwards.



The position of the sliding lines should be between the pivot roller and power roller, as per the diagram.



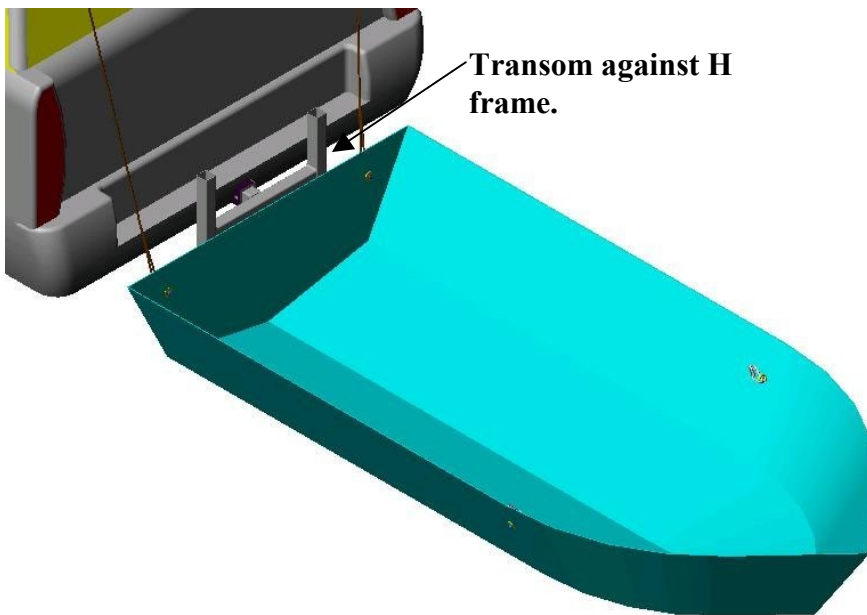
RHINO-RACK

AERODYNAMIC & HEAVY DUTY ROOF RACK SYSTEMS

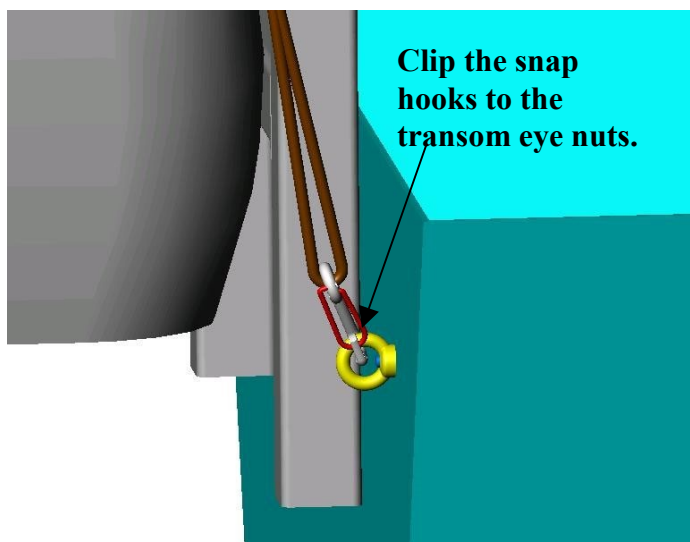
Setting

up the boat and lines.

Position the transom against the H frame and the boat inline with the vehicle.



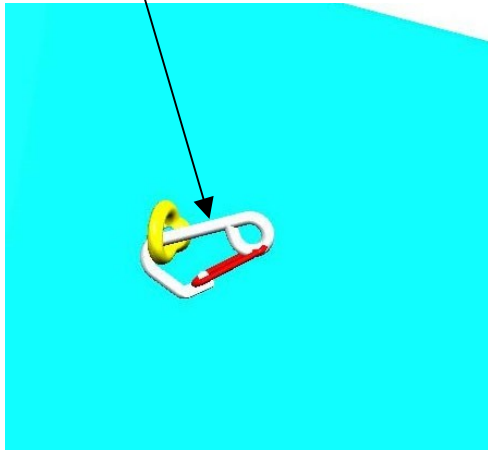
Clip both tie down line snap hooks onto the transom eye nuts. The bottom of the boat may be required to be lifted off the ground to attach the hooks, do one side at a time.



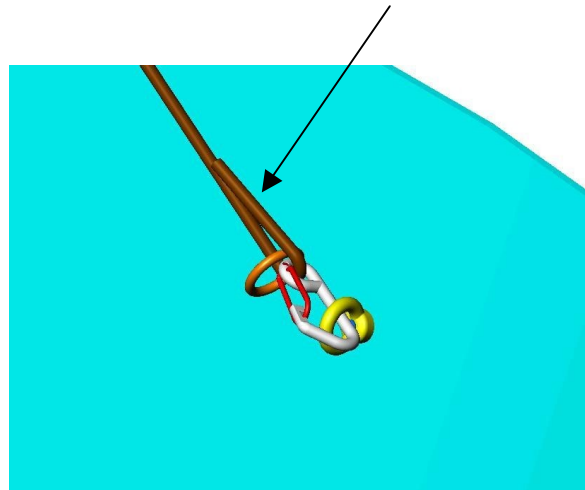
Winch line set-up.

Clip the un-spliced snap hooks onto the eye nuts at the front of the boat. Thread the winch lines through the front snap hook eyes and ring, pull the winch lines with even tension and splice the snap hook and ring onto the winch lines, ensure that the winch lines are of equal length. The splice length should be 500mm, cut off the excess length.

to front eye nuts.



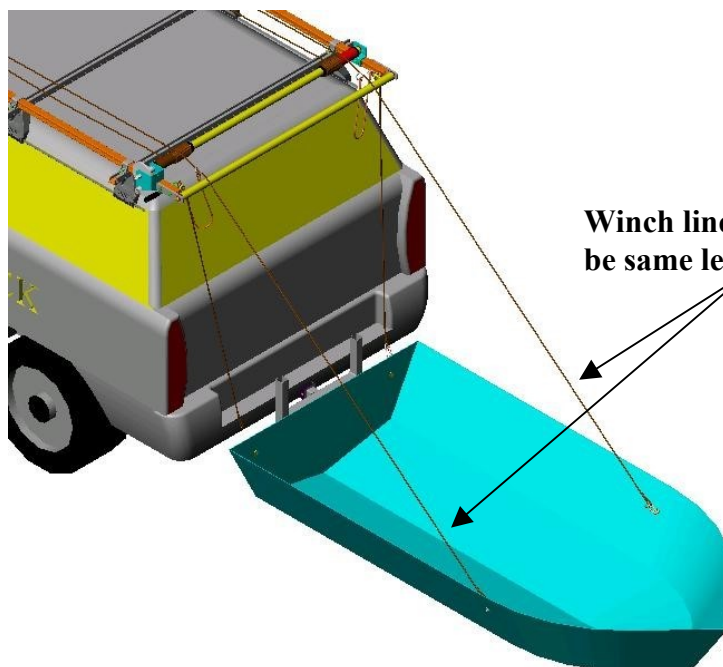
Clip the snap hooks



Splice the

snap hook and ring onto the winch lines.

With all snap hooks connected to the eye nuts the boat should be balanced on the keel. If the winch lines are of unequal length, the boat, when in the vertical position will be leaning and will skew on the rollers.

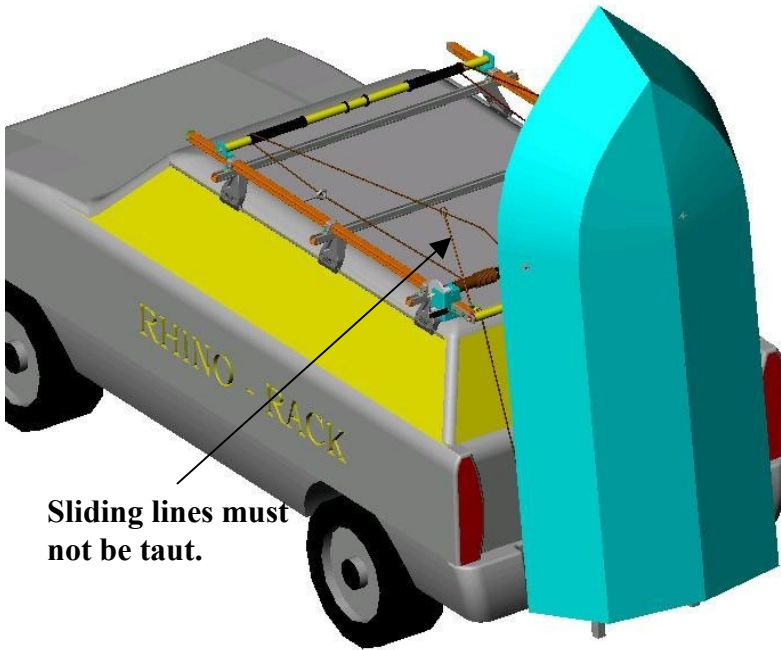


Winch lines must be same length.

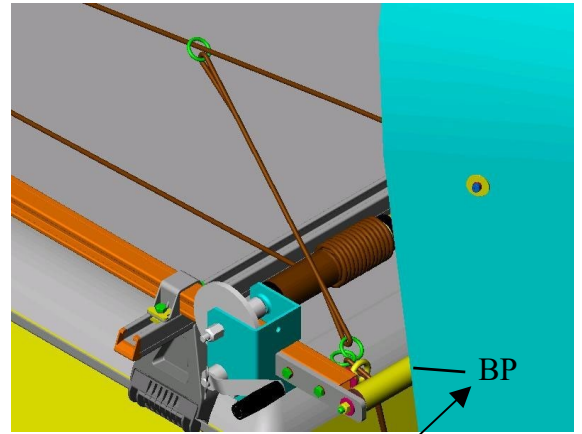
Winching the boat up and line adjustments.

Turn the winch handle clockwise. The winch lines will tension and raise the front of the boat, as the front of the boat raises the tie down lines will tension and support the boat, continue winching until the boat is

vertical and the gunnels are against the pivot roller. Check that the balance point marked on the boat is inline with the pivot roller to a maximum of 50mm below the roller, if the position is incorrect lower the boat and adjust the tie down lines by un-splicing, move the snap hook and splice. Recheck the balance point to pivot roller before winching further.



Sliding lines must not be taut.



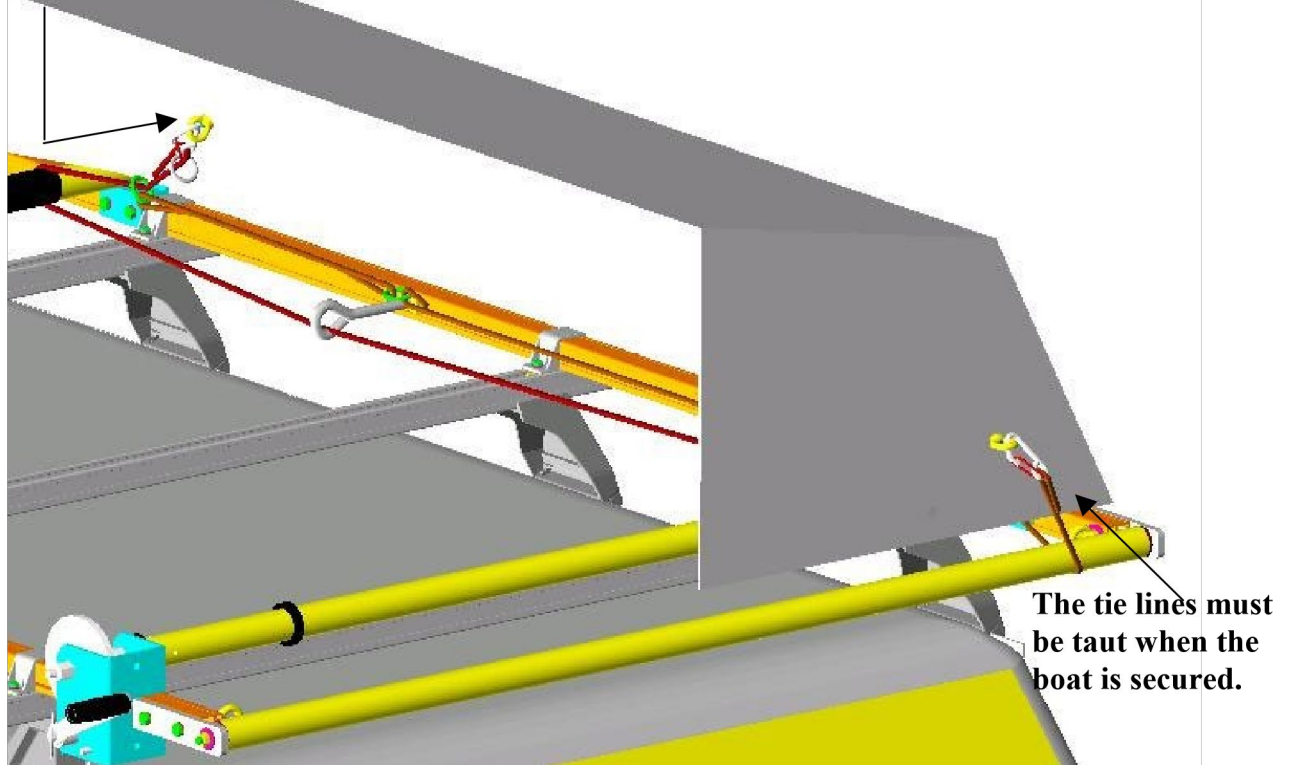
The (BP) balance point must be at the pivot roller to maximum of 50mm below the pivot roller.

If the balance point is correct, check the sliding lines, these must not be taut, if taut, un-splice the line re-adjust then splice. Continue winching slowly, the boat will move upward and start to pivot around the pivot roller, at this point the boat is above the balance point and bow will start to move downward and forward until the gunnels contact the power roller. Continue winching slowly, the bow will move downward and contact the front roller. Continue winching until the sliding line ring is near the front eye nut and the boat is approximately 150mm from the front roller. Check the sliding line length, this can be adjusted to a length, equal to the distance from the balance point to the front eye nut + 50mm.

Continue winching until the sliding line pulls the winch line down, the tie down lines will pull the transom down onto the power roller. All lines must be taut and the boat cannot be lifted off the front and power

rollers as per the diagram.

The front eye nut must be behind the front roller when the boat is secured on the loader.



Unloading the boat.

Hold the winch handle and disengage the winch ratchet, turn the winch anti-clockwise, the power roller being in contact with the gunnels drives the boat backwards off the loader. When the balance point of the boat is at the power roller, the boats bow will start to lift, the boat will move downwards to contact the power roller and the tie down lines will be taut.

Continue winching, the boat will move down and pivot around the pivot roller, this will continue until the boat is vertical and supported on the tie down lines, continue winching, the boat will move away from the pivot roller and onto the ground. Disconnect the snap hooks from the eye nuts.

To stow the lines on the vehicle when the boat is not loaded, snap the winch line hook to the tie down line snap hook and wind in the winch until the lines are taut. **Remove the H frame.**

For extra safety, strap the boat to the roof rack using two Ratchet straps.

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