



EDITOR'S NOTE: Here are scary accounts of three rack failures, none of which, fortunately, caused injuries or even much kayak damage. Following them is a general review of boat hauling considerations by Jay Gingrich.

GENE LANGLINAIS: I stopped for gas just west of Kansas City on my return trip to Colorado. At the advice of a trucker I checked all my lines and tie downs carefully

as high cross winds were predicted on west I-70. All was secure, and I was comfortable that the slalom boat and squirt boats were tied down well enough in their J racks to survive the trip.

The wind was incredible, and worsened as I approached Salina, Kansas. I was passing a tractor trailer at about 70mph, and as I cleared the truck a burst of wind rocked the van pretty severely. I heard two successive loud pops and saw the shadow of the boats lifting off the van. I looked in the rear view mirror just in time to see them, still attached to the entire rack system, tumbling through the air behind me.

The high cross wind actually blew everything off the road surface, and luckily there was no one close behind me. The boats, still attached to racks, came to rest right side up in the grassy median.

The majority of damage was to the rails on the van because the Thule towers were ripped out of the rails; two of the towers were destroyed. There was also a good-sized dent to the roof from the squirt boat, crossbars, J rack screws, one of the tie-downs used under the hood, and minor damage to both boats.

GARY CAGE: Anne Fiore and I were returning from the Niobrara River in Nebraska, driving south on I-76 in eastern Colorado at about 70mph with a thunderstorm brewing to the west generating 20 to 30mph crosswinds; the truck was being pushed around in the wind a bit. I looked in the side view mirror and saw our two sea kayaks flying through the air and landing in the median. That was a pretty good flight since we were in the right lane: the boats sailed over the left lane and shoulder and ten feet into the median.

I pulled off and we hustled back up the road to get the pieces. The tracks for the rack had come off the cap on the pickup, and the tracks, towers, crossbars' stacker bars (upright bars) and kayaks had all sailed off in one piece.

Canoe Club members who had been on the Niobrara trip with us came by as we were picking things up and lent us a hand. We decided to load our boats on their van to get them back to Lyons. We had to work fast as the storm was coming. We didn't quite get loaded before it started to rain. It was a buckets-of-water rain storm that thunder storms produce so we spent twenty minutes hiding in the vehicles until it passed. We got the boats loaded and limped to a freeway exit that put us on a two lane highway home at low speed.

The plastic that Prijon used is tough stuff. Damage to the kayaks consisted of only a bent part on the metal rudder assembly and an abraded perimeter line on Anne's boat. The force when the boats hit the ground caused the 1" iron pipe the was the stacker to embed itself in the ground and break off where it screwed into a 1" pipe tee.

WHAT CAUSED OUR FLYING BOATS:

- TOO FEW SCREWS AND NO WASHERS: I had installed the tracks myself using the hardware provided by the manufacturer. They only provided screws for every other hole in the tracks and no washers were provided for the screws. The ends of the rails had a special plastic piece that provided a smooth end to the extruded aluminum tracks. Those pieces had cracked with time so there was a little slack between the end screws and the tracks. The screw heads had pulled through the aluminum tracks. So the screws were still attached to the cap but they were just holding nothing.

When the tracks were replaced I build special hold-down parts for the ends of the tracks that held the track from the very top and the bottom. I also used an extra large washer on the holes closest to the end of the tracks. I used a screw for each hole in the tracks and I added a washer to each screw. This doubled the number of screws holding down the tracks.



- NO END LINES WERE BEING USED: I believe this allowed the kayaks to rock up and down increasing the strain at the ends of the tracks. Now end lines are used. I have also added a crossbar to the cap so that the length of the boat that extends past the cross bars is decreased. The lesson is to have the crossbars as far apart as possible to minimize the lever arm length between the end of the kayak and the crossbar thus reduce rocking forces, and to use end lines front and rear.
- THE KAYAKS WERE STACKED ON THEIR SIDES: I did not have cradles for the kayaks, they just sat on the cross bars. Stacking the boats on their side prevented the hull from oil canning (getting a dent in the boat) where they rested on the cross bar but it presented more kayak area to a side wind. Now I have cradles and the boats sit upright on their bottoms. This reduces the side loading from a cross wind.



JUD HURD: Back when I was a novice paddler I didn't tie down the bow and stern of my kayak while traveling. Gail and I were driving across eastern Colorado coming back from Oklahoma when one of those big wind storms hit us. I had my Prijon *Touryak* and my Current Designs *Kestrel* large volume on the rack with no bow or stern tie downs; the *Kestrel* was on its side with its huge cockpit turned outward. A large gust of wind hit that cockpit and lifted the whole assembly off the car.

I looked in the rear view mirror and saw this large, mango ball tumbling down I -70 behind me. While that upset and embarrassed me, what really scared me was the thought of what would have happened if a car has been behind us at that time. I probably would have caused an accident and injury, or perhaps even killed someone. Let me tell you folks, that is a sobering thought. So, don't make my novice mistake. Firmly tie down that bow and stern to your car. Let the ropes take the stress of holding your kayak on your car during high winds. I guarantee it is worth the extra few minutes it takes to do this.

**STRAP CONFIGURATIONS
SEEN AROUND...what do
you think?**



No Flying Boats

By Jay Gingrich

In many ways the trip to the put-in is likely the most hazardous thing we do in boating. Lots can go wrong, especially as vehicle speed or wind speed increases. As some have learned first hand, the increasing force on components can be surprising and devastating. Here is a bit of science and some additional boat hauling safety thoughts:

It's been a while since physics class, but the professor noted that everything is measured *with respect to* (WRT) something. For example, going down the interstate at 75mph in calm conditions the wind with respect to your kayak is +75 MPH. However at 75mph with a 30mph headwind, the wind WRT your kayak is +105mph!

Now the scary part: To obtain the pressure, we use roughly the mass of air x the effective area/shape of an object x the velocity². That means that if we go twice as fast, the pressure doesn't double, it increases exponentially. Even worse, there can be other turbulence such as cross winds and the buffeting from passing trucks which are unpredictable on kayaks in different kinds of racks. Although your engine can push the car at 80mph, your rack and supports may not be up to the task; slowing down may help you get to the put-in safely.

I've been lucky and haven't lost a white water or sea kayak while traveling all over the West and in Baja and mainland Mexico on 4wd roads for the last thirty years. Most of my experience has been with kayaks on trucks, but I have three decades of general ideas in addition to the admonition to watch out for the wind.

- **Always use bow and stern lines** to secure a boat. A triangular (wider at the bottom) tie-down with two lines is more secure than just one line, especially for vehicles with a short spacing between the cradles. A snappy quote from one of the web threads about flying boats says: "Straps hold boats to the roof rack; bow and stern tie-down ropes to the vehicle frame hold the rack to the vehicle." Maybe that's going too far, but bow and stern lines could buy you enough time to pull over in case of a rack failure.

[Brian suggests 3/16" Amsteel Blue Dyneema AS-78 Single Braid line from West Marine. It has a 5400 pound break strength and costs \$1.08 a foot.]



Inverted V Bow lines

- **Straps should loop under the load bar** between the cradles, so you do not rely solely on cradle-to-bar attachments. Some people even loop one of the straps under the longitudinal bars that come with the car. Clove hitches can attach straps to bars or rails for more security.



- **Use load-rated straps with friction buckles** meant for securing boating gear, or ropes and knots. It is best to avoid cheap ratchet straps with hooks; the ratchet binders can put too much force on a boat's hull if over-tightened, and the hooks can come loose. (Old School boaters never used straps. They use stout ropes with knots, such as clove hitches and the trucker hitch. Ropes do not vibrate in the wind like straps, although a twist in a flat strap may prevent that drumming. Noisy or not, straps spread pressure better on a boat hull.)



- **Watch for the cutting of lines or straps over sharp edges** with vibration from wind or bumpy roads. A pad or sleeve can reduce the cutting effect on straps under tension. Many vehicles have stamped tie-down attachments or tow eye bolts that have rough inner edges. If so, they should have a rounded locking carabineer or lock ring attached before the bow or stern lines are fastened.



- **Sea kayaks need a longer support base** due to their length. This can be a problem on a short pickup shell, so a second load bar can be put on the truck cab. On pickup cabs without rain gutters I drill through roof members and the interior steel structure and attach artificial rain gutter mounts with stainless steel bolts and locking nuts inside the roof, using marine sealant and the supplied rubber pad under the gutter. (This requires dropping the headliner for access, and is best handled by a mechanic.) Then I drill a small stainless steel screw through the slot at each end of the gutter piece to keep the gutter feet from sliding fore and aft. Gutter mounts can also be put on pickup shells if the shell is designed to carry a load.



- If you are really worried about the **rack attachment to the vehicle**, you might try something like running one or more NRS straps under the inside of the roof and over the rack or roof rails with the doors open, then suck up the straps and close the doors, making sure they latch securely.
- **Rack screws can be secured** with blue (removable) Loctite (R) to prevent loosening.
- **I'm skeptical of:**
 - * The **rack feet** that clip on with a thin hooked piece of metal on cars that no longer have real meaty rain gutters welded into the body structure.
 - * In the same vein, some vehicles have longitudinal **roof rails that seem more decorative** than strong, and can come loose from the body. Factory cross bars (often of plastic) can be flimsy also. Cross bars should be steel load-rated bars. Remember, while the vehicle manufacturer may give a weight rating for the roof rails, it probably doesn't consider the leverage that wind may have with long sea kayaks, especially boats carried on the beam in J cradles.
 - * Be observant of **plastic parts** which can weaken and break from vibration and UV exposure.
 - * Similarly, **some bars are not galvanized under the plastic wrap**, especially round Yakima bars, and will rust and weaken with water and salt trapped under that black plastic outer wrap. This is seen as a bulge in the plastic covering.
 - * I think these **Thule extruded aluminum units are stronger** than the Yakima stamped units:
http://www.thule.com/en-us/us/products/carriers-and-racks/roof-racks/load-accessories/thule-artificial-raingutters-542-_-1036
- **Some additional, maybe obvious considerations:**
 - * Replace straps when they get shabby from wind vibration.
 - * Make the bow and stern lines just long enough to tie under the vehicle, but no longer. If a vehicle is moved with a line untied at the lower end, the loose end could be run over by a tire and pull the kayak down with an ugly snap. [There was a graphic account of this in *Sea Kayaker* about a decade ago.]

▪ **Additional considerations, continued:**

- * Use a cockpit cover. In addition to keeping rain from adding many pounds of water to a kayak in a rainstorm maybe the cockpit cover helps reduce wind drag . Be sure to clip the cockpit cover to a cross-bow line, or you will leave it in Wyoming like Sue Hughes did.
- * Know your overhead clearance before driving under canopies or garages. (Ask Gary McIntosh about this point.) I find it helpful to loop a bright piece of flagging tape over the rearview mirror when carrying boats to remind you of the roof load.
- * Also, before backing up, a spotter should be used to direct the driver.

▪ **In summary,** we can take some tips from commercial and military truck driving:

- * They require a pre-trip circle of the vehicle with a checklist. Follow their example on this, and on the road: if you are on I -80 driving across Wyoming on a wind alert day, and you see truckers hiding behind underpasses it is definitely time to check your load, slow down or even stop.
- * Windy or not, stop and check if you hear unusual noise or creaking.
- * On longer trips, or on rough roads, stop during the trip to walk around and inspect the entire carrying system for weak points. Look for fraying of straps and lines, and shake the boats and rack to check for fatigue or loosening of rack parts.



Hauling a heavy 21' double and a WW boat from the coast of Sinaloa via the back way to the Copper Canyon over a hundred miles of 4wd roads

▪ **Brian Hunter agrees:**

- * Safety in the wind is a serious issue. Most roof racks I have seen are only rated to 150-200 pounds, and modern cars and suvs have racks that are much too short. Also many modern cars and suvs do not have places to tie off bow and stern lines.
- * Bow and stern lines will take lots of shear force pressure off of the roof rack and most likely will keep the roof rack from being ripped off of the vehicle in high winds. It is also important to have an inverted "V" shaped line as Jay mentioned.
- * J Cradles definitely increase the area a kayak presented to wind. For car roof racks, saddles are much better than J cradles.
- * Open bed pickup trucks with substantial bed racks offer the best use of J cradles because many of them are rated for 1000+ pounds. Toppers on pickup beds can make installing a rack system more difficult and may require a steel frame under the topper.
- * For long trips I have started turning my kayak upside down because I've noticed while driving across Kansas and Missouri, where the beams winds are fierce, that the kayak rides better and seems to offer less resistance to the wind that way.



Tie-downs bolted to the frame of the car

▪ **Gary McIntosh reinforced** the rack on his truck before the instructors hauled their boats to lessons in California. Check with him for the particulars.



The instructors in Santa Cruz, 2010