



NTSB ***SAFETY ALERT***

National Transportation Safety Board

★ **Towline Failure is the Leading Cause of Injury and Death in Parasailing Accidents** ★

Tying knots in the towline may significantly weaken it

The problem

Towline failure is the leading cause of injury and death in parasailing accidents.¹ The NTSB recently studied several parasailing accidents and verified that the knot most commonly used by parasailing operators to fasten their towlines is a bowline knot (www.nts.gov/doclib/reports/2014/SIR1402.pdf). In subsequent laboratory testing, the NTSB confirmed that this knot (and any knot in general) can reduce towline strength by as much as 70 percent, even on brand-new, otherwise-strong ropes.²

When the testing also factored in sun and saltwater exposure, sudden “shocks” by wind gusts or other overloads, and general wear-and-tear, the ropes weakened further.

Although most parasailing operators may be aware that tying knots in the towline reduces rope strength, they may have no idea just how drastic the weakening really can be. This lack of awareness can potentially be deadly.



A bowline knot, the knot most commonly used by parasailing operators in their towlines. This type of knot can weaken a brand-new rope by as much as 70 percent.

¹ Coast Guard safety alerts “Know Your ROPES,” 2011 and 2013.

² The NTSB tested three types of rope commonly used by parasailing operators: 3/8”- and 7/16”-diameter double-braid polyester, and 5/16”-diameter single-braid polyethylene.

What can parasailing operators do?

- Recognize that although a particular rope may be rated at 10,000 pounds, the moment you tie a knot in it, the rope strength can drop by half or more. This is *before* factoring in the rope's age, use, etc.
- Frequently and carefully inspect your ropes to ensure that they are in good overall condition with no sign of external abrasion or other damage, and that they are suitable for the intended operation.
- At the parasailing location, use an anemometer or other device to measure wind speeds to ensure that those speeds fall within the parasail canopy manufacturer's recommendations.
- Use steady and consistent speed and force on the winch when deploying and recovering the canopy towline.
- Maintain logs about rope usage and examinations. These should include information on the type of ropes you're using, their time in service, and details of every examination. A usage log is a great way to determine if excessive tension or shock-loading has occurred and weakened the ropes.
- Store your ropes in a clean and dry location out of direct sunlight.
- Trim back the working ends of the ropes as needed, and replace your ropes frequently. For more specifics, consult a recognized source of information such as the Cordage Institute on the selection, care, and disposition of ropes. In addition, refer to the standards for parasailing equipment, currently being developed by ASTM International.