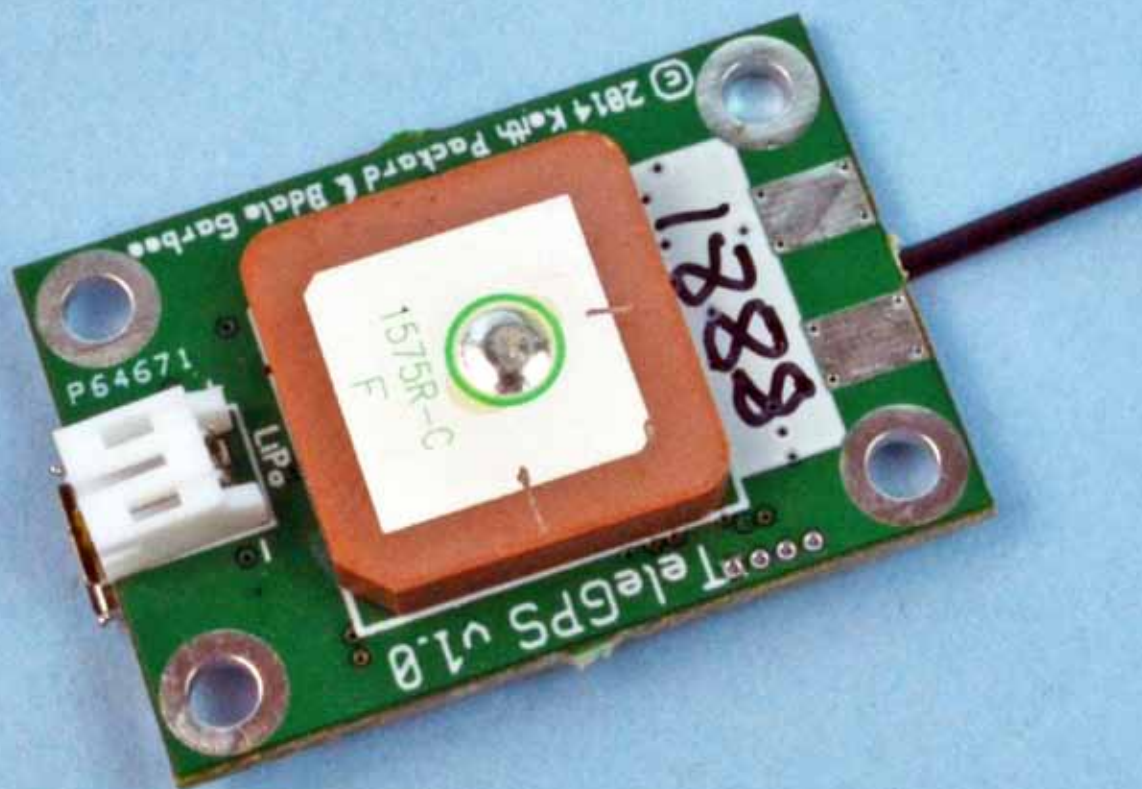


PEAK OF FLIGHT

N E W S L E T T E R

In This Issue

Preventing Tangled Shroud Lines



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Preventing Tangled Shroud Lines

By Hans (Chris) Michielssen

Here's a typical post from an online rocketry forum:

"I'm running into a problem where after we launch and recover the rocket, our parachute lines and shock cord are all twisted up amongst each other, which kinda makes it a bear to relaunch on the same day. I was wondering if anyone had any pointers to keep them from tangling up."

Parachute shroud lines can be tied without tangles. More importantly, with no tangles after a flight! The trick is - Don't make or tie on a parachute as shown in the instructions.

First lets back up and talk about:

Making the Parachutes



Picture 1: Use a knife to cut out the parachute

Don't use scissors to cut out a thin plastic parachute sheet!

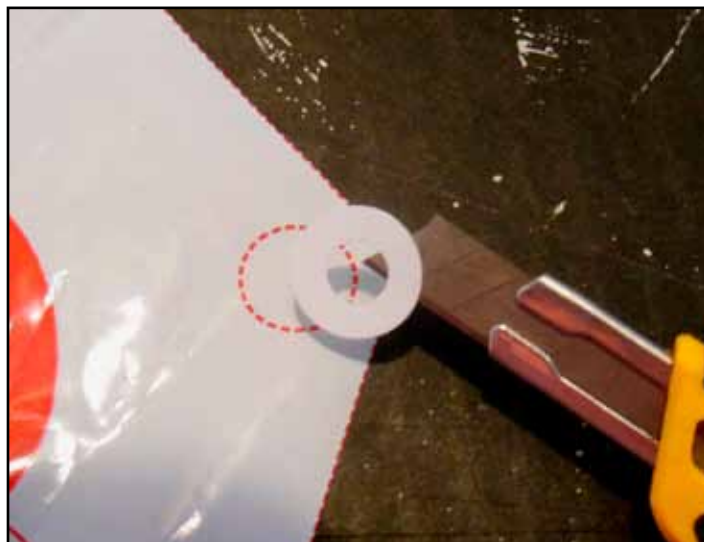
Every kit instruction sheet shows an illustration of scissors cutting out the chute. The chute plastic is too thin and flexible to be cut clean with scissors.

Instead, use a straight edge and sharp knife blade.

In Picture 1, notice the straight edge (ruler) is turned over with the raised cork backing facing up. That cork backing doesn't go all the way to the edge of the ruler back.

Even that open and raised 1/16" space can allow the thin chute to flex and move giving you a ragged cut line.

TIP: Flip over the straight edge and you will have full contact with the plastic sheet right up to your knife blade.



Picture 2: Use a knife to transfer the tape rings

TIP: Don't use your fingers to apply the round reinforcement disks.

Lift and apply the disk using the tip of your knife blade.

Your fingertips can be oily. The oils can be transferred onto the sticky disk and diminish the bond on the chute.

You'll also get a more accurate placement of the disk on the parachute locations without your fingertips in the way.

TIP: If your kit includes paper reinforcement disks (which are the old Estes style tape dots), they will tear!

Therefore, if all you have are paper disks, use one on both sides of the parachute.

Plastic disks are the way to go. You can tell the difference by holding the disks up to a bright light. Plastic disks are shiny, while paper disks have a matte, flat surface.

TIP: Don't punch and tear through the plastic sheet

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Picture 3: Use a rotary punch to make small holes in the middle of the rings through the plastic canopy.

with a sharp pencil! You are actually starting a small tear in the plastic chute, especially a concern on shiny Mylar chutes.



Instead use a rotary punch set on the smallest hole.

Picture 4: Tie the knot using long tweezers

Lay a piece of scrap cardstock under the parachute material to get a clean, round hole.

TIP: To tie on the shroud line use long tweezers.

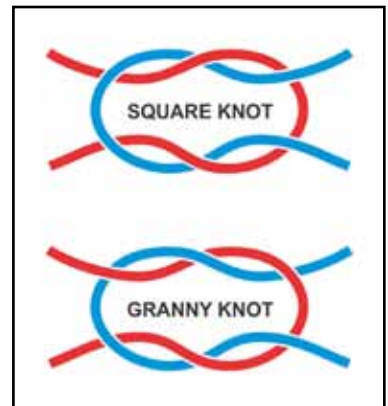
Tying that tiny knot goes so much easier without your fingers getting in the way.

Use a Square Knot:

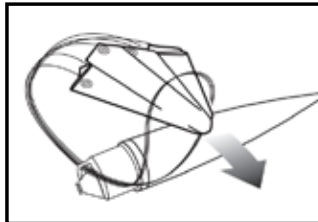
Don't use a "Granny"

Granny knots almost look like a Square Knot. They are not secure and can slip! Note in the Square Knot the red ends and blue ends are together - not crossed!

<http://www.animated-knots.com/reef/index.php>



Attaching the Parachute



Picture 5: The standard way to attach the parachute.

This is how most kit instructions have you attach the parachute.

When attaching 3 looped shroud lines to the nose cone this way you have already tangled up the lines!

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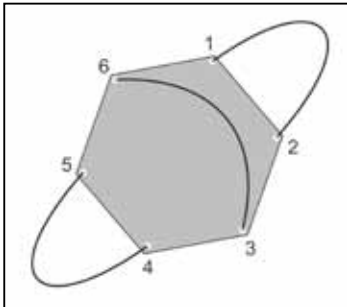
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Preventing Tangled Shroud Lines

While this is easiest for the beginner, you can tie it right the first time without tangles.



Picture 6: Loop one set of lines across the canopy to keep from twisting the set.

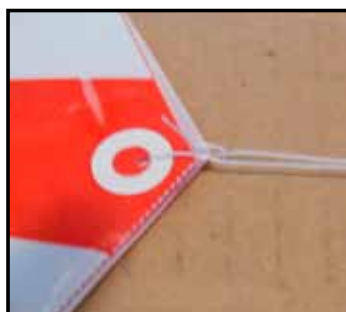
Notice the lines are attached (reading clockwise) at the 1 & 2, 3 & 6 and 4 & 5 locations. This drawing represents the underside or un-printed side of a parachute.

The outside lines (1&2, 4&5) are side by side but the middle line (3&6) goes across and over the middle the parachute.

Tying the lines this way will allow you to set the paired lines side by side when attaching to the snap

If you are making your own parachute from a chute kit, start tying on the shroud lines as shown in Picture 6. This is the first step to no tangle shroud lines.

(I was surprised to see the pre-assembled Estes parachutes are now tied this way.)



Picture 7: Prior to folding, match all the corners together.

swivel.

To tie at the middle of the shroud line length, find and mark the middle point of the three loops.

"Spike" the parachute so the apex is at the point. Then match up the tape disks (corners) as shown in Picture 7.



Picture 8: Mark the center of each set of shroud lines with a felt-tip marker.

pen. This is the center point of the shroud line loop.

Continue and mark the middle line at the 3 & 6 location and finally the line at the 4 & 5 location.

At this point, all three lines have been pulled straight and the centers are marked.

Tie a very small

Take two adjacent lines, for this example positions 1 & 2.

Pull the loop line straight out to the right and fold the end to a "V" point.

Mark the tip of the "V" with a felt-tipped permanent



Picture 9: Tie an overhand knot in each of the three lines.

Continued on page 5



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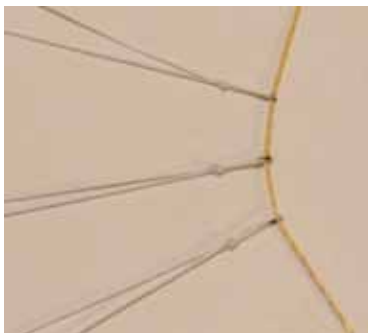
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Preventing Tangled Shroud Lines

overhand loop knot at the marked center of each line loop. This will take a few tries to get right. Don't tighten the knot until the loop is small and centered. The black center mark should be at the outside end of the loop.



Picture 10: Thread a strong cord through the loops.

Cut off about 6" of heavy thread, shroud line string or thin Kevlar.

Feed the 6" line through the loops.

In Picture 10 the top line is the 1 & 2 loop. The middle line is the 3 & 6 loop and below that, the 4 & 5 loop.

Notice all three lines will be tied so they are side by side.

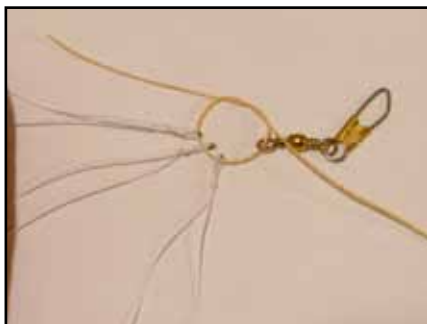
Normally, getting six lines through the small eye of a snap swivel is difficult.

But here, simply take the 6" line and tie it onto the eye of the swivel with a square knot as shown in Picture 11. Cut off the excess line ends.

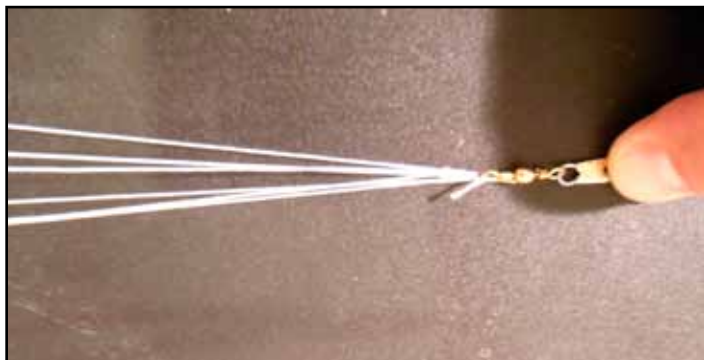
If you are not yet using snap swivels on your models, you should be.

They are inexpensive and necessary to help keep shroud lines clear and untangled.

With your right hand, hold one end



Picture 11: Use a square knot to attach the lines to a snap swivel.



Picture 12: You'll now have a tangle-free set of lines. of the swivel and hold the parachute canopy with your left.

Pull the lines taught. As shown in Picture 12, you should have an untangled group of six shroud lines from the parachute to the small end of the snap swivel.

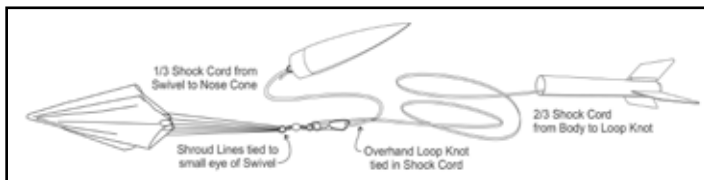
Attaching the Parachute to The Rocket

At ejection the nose cone can swing in and out of shroud lines and cause even more tangles!

You can eliminate the tangling by moving the parachute attachment point away from the nose cone.

If you've ever seen a slow motion video of how violent an ejection charge can be, you understand how the nose cone could get into the shroud lines.

Every low power kit instruction I've seen has you loop the shroud lines through the plastic lug or screw eye.



Picture 13: Attach the parachute to a point on the shock cord, not on the nose cone.

Continued on page 6

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Preventing Tangled Shroud Lines

I'd suggest tying an overhand loop knot in the shock cord, one third the way down and away from the nose cone as shown in Picture 13.

Use a longer Shock Cord!

Most kits pack a length of shock cord that is much too short!

Buy some elastic at a craft store. I'll typically use three times the length of the model, 36" long is the least length I'll use.

Attach the parachute's snap swivel to the loop and you are ready to go!

With the parachute tied on the shock cord 1/3 the way down from the nose cone, your rocket will fall like three separate assemblies, still tethered together by the shock cord.

First to hit the ground is the tail end of the rocket, the nose cone and finally the parachute. This is the same way many mid and high power rockets are built for recovery.

Why not fly and recover your LPR models like the bigger rockets?

If your rocket has a tower or longer payload section, adjust the distance down the shock cord so the longer nose cone won't be banging against the body tube during descent.

Picture 14 shows a good example of a successful, no tangle recovery with two parachutes.

Note how the nose cone is hanging down and away from the shroud lines. The nose cone is also above the body tube and won't collide with it during descent. There are no tangles in either parachute!

Reef That Chute

When you pick up the rocket after a flight, don't run back with the parachute flipping around behind you! That's another opportunity for the nose cone dip in and out of the lines and add tangles!

Stop, pick up your rocket - take a moment and pack the chute. Then, walk back to the launch area.

About the author:

Chris Michielssen is an avid builder and flyer of low power model rockets. He produces Odd'l Rockets and accessories, available from Apogee Rockets.

His building blog: www.modelrocketbuilding.blogspot.com is followed by 950 people each day worldwide.



Picture 14: Two tangle-free parachutes for a picture-perfect descent.



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Penny shown for size comparison

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