



Northeast Side Taildraggers

Northeast Side Taildraggers R/C Aviation Club Geotextile Runway Information

The Northeast Side Taildraggers R/C Aviation Club in Noblesville Indiana has deployed (2) geotextile fabric runways at its flying site. We have had many questions and inquiries regarding this material and the process that we used to install it. This document attempts to answer all of those questions. If you have questions not addressed in this document, please feel free to contact me at jdavid@nest-rc.com. I will be happy to help if I can.

Material:	Woven Geotextile Fabric (Wilacoochee 315W)
Spec Sheet:	http://www.winfabusa.com/uploads/WINFAB_315W_product_data_sheet.pdf
Roll Size:	17.5' x 258' (500 square yards per roll)
Number of rolls:	8 (3 rolls in 2011, 1 roll in 2012, 4 rolls in 2013)
Cost:	2011 - \$321/roll 2013 - \$250/roll \$90/1500 stakes
Vendor:	L&M Supply Company https://www.landmsupplyco.com/



The Decision to Go With Fabric:

We were preparing a flying site on school property, and we knew that our window of opportunity at the site was probably limited to 5 years or less. We didn't like the idea of spending \$1500 to \$2000 and 2 years to develop a "fairway" quality grass runway, only to be forced to leave it behind if and when we had to vacate the property. We found several other clubs around the country that were using this type of fabric as a runway surface with great success, and after a great deal of discussion and planning, the following positives gave us cause to try it:

1. Fabric allows launching and landing ANY wheeled aircraft; micro to ¼ scale.
2. It's portable...it can be rolled up and taken with us if and when we vacate.
3. It's "instant". You can fly off of it as soon as it's staked down.
4. It doesn't require mowing, reseeding, fertilizing or watering.
5. It is long lasting, resilient and easily repaired. There is a club in NM who is on their 9th year with their initial deployment of fabric. They have more extreme weather than we do in both winter & summer.

What Is It?

The fabric is used as an underlayment in road construction; as a porous barrier between gravel and earth. Water filters right through it, but (as long as it is in contact with the ground below) it tends to keep the underlying earth below it from eroding. There are many different varieties, all designed to meet government specifications for either puncture strength, tear strength or porosity. Its main weakness is that it will degrade over time due to UV exposure. Given the NM experience, we expect to get at least 10 years of use out of our fabric runway before needing to consider replacement. It is a petroleum-based material, so pricing varies widely and changes day-to-day.

Site Preparation:

Fortunately, we started with a very flat surface. The school had graded the area just a few years earlier and slice-seeded prairie grasses (which had been overtaken by weeds and thistle). We scalp-mowed and sprayed Roundup™ over the runway area, then waited 2 weeks for it to do its thing. We dragged the area with a grader blade behind a farm tractor for about 4 hours, then a chain drag for about an hour, then a roller for about an hour. Make sure you don't have any "dips". The surface needs to be flat or slightly crowned. The fabric will stretch and "lift" off of any dips in the terrain, and the earth below will be at risk for erosion.

Seams:

Our research of other clubs around the country that had used this material indicated that the “standard” practice for deploying parallel rolls of the fabric was to simply stake down each roll as a separate unit and use Blackjack #57 roofing compound on the seams. Knowing that the probability was high that we would need to relocate the fabric at some point, we were not sure how easy it would be to pull stakes from the glued seams. We decided to sew the long seams with a monofilament nylon thread, then coat the sewn seams with roofing compound to protect the nylon from UV degradation. This decision proved to be wise (as we had to vacate after only 1 flying season), but extremely difficult. None of our wives were excited about the prospect of us taking their sewing machines out to the field to sew over 500 feet of material akin to heavy denim. We ended up buying a cheap sewing machine on Craigslist.com.

Our first phase of deployment consisted of 3 rolls of the fabric (17.5' x 258') arranged side-by-side to yield a 52' total width. We cut 15' off of the end of each roll to use as taxi spurs along the near edge of the runway, so our initial length was about 243'. Each roll weighed in at about 250 lbs. We developed a unique and innovative process for sewing the seams; we unrolled two of the rolls of fabric, placing one roll on top of the other and lining up the edges. We built a platform on the side of a small utility trailer and mounted the sewing machine to it. With the sewing machine running off of a generator, we pulled the machine from one end of the runway to the other behind a ZTR lawn tractor while sewing the seam. It took about 3 hours to find our “groove”, then about 5 more to do both long seams and the 3 seams to connect the taxi spurs. It was two very long days.

Staking and Stretching:

We purchased 1500 8” landscaping staples for staking the runway down around the perimeter. The fabric needs to be pulled reasonably tight for staking, but it will shrink some with a few days of good hot sun, so don't overdo it. We initially pulled the fabric as tight as we could by hand and staked it down with a stake about every 10 feet. After we had stakes all of the way around, we started in the middle, and we had 4 or 5 guys line up on the runway in a row and walk toward the near edge of the runway, shuffling their feet to pull the fabric tight. As they approached the edge, we would pull the stakes and reset them. The “shufflers” would then go back to the center and shuffle toward the far edge, this time in a diagonal fashion. Once again, we would pull and reset the stakes. We repeated this procedure all of the way down both ends of the runway until all of the big wrinkles were gone.

We went back and put stakes about every 12”, using the stakes as a lever to pull the fabric as tight as we could before driving the stake home. After about a week of mid-80s and bright sun, the fabric shrinks down and becomes drum-tight.

Redeployment:

Of course, as our luck would have it, we had to vacate the school property after only one flying season. We folded up the fabric in mid-September and stored it on a trailer in my back yard for the winter. Fortunately, we were able to procure a new (and more stable) flying site over the winter, so the following spring we started the site preparation process again. The new site wasn't graded quite as nicely as the school site. This time we had to rent a 3-point tiller and till the runway area about 3 to 4 inches deep, then graded it with a grader box for about 8 hours. We spent about 2 hours hand removing rocks before we felt ready to unfold the fabric. We didn't figure that it would heat-shrink again, so we were pretty aggressive with our stretching technique this time. We were right...it didn't shrink much the second time.

Shortly after staking the fabric down the second time, we purchased another roll of the fabric. We cut the new roll into thirds (86' long) and sewed them together. This time, we left the sewing machine stationary (and we convinced one of our wives to let us use her machine). We fan-folded the fabric into about 20' sections beside the machine. We unfolded the fabric stack and ran it through the machine, then refolded it on the other side of the machine. This system worked MUCH better than our initial attempt. We only sewed the long seams...we didn't sew the butt seam, we staked it and glued it; partly because we didn't want to un stake the existing runway

segment, and partly because we didn't have a good way to pull the machine through the fabric to sew that seam, and partly because we were plum sick of sewing.

Now that the new section has been deployed for awhile, it has shrunk down to drum-tight, even tighter than our "aggressively-stretched" initial segment.

We purchased 4 gallons of cheap "barn paint" and striped and numbered the runway. It is amazing how much that adds to the look of the site.

Usability and Maintenance:

Most of our members like the fabric even better than pavement, as the fabric is more "forgiving" than pavement, especially on foamies. I have a micro Beast biplane with 1/2" wheels. It wouldn't fly off of any grass, not even a golf green. It flies off of the fabric just fine. If anything, it makes it more difficult to fly larger aircraft because you lose the natural braking effect of grass and tend to overshoot the end of the runway. I prefer to think of it as "making you become a better pilot".

As for maintenance, I can't say that we have had a great deal of experience yet. We have had a couple of prop strikes. We have patched those with either Blackjack alone (for very small tears), or a small patch of the fabric glued over the tear with Blackjack. All in all, we are very happy with the resilience of the fabric. We have also had a few out-and-out crashes on the runway with no perceivable damage.



1 – Initial deployment at the school



2 – Finished Runway



3 – Finishing up the stripes

2017 Update:

Since the original writing of this article, we have added a crosswind runway, and we've used the geotextile fabric to cover our pit area and pilot station areas. All in all, I'd say we still like the fabric as a runway surface.



Challenges:

Because our main runway has a sloping grade that runs across the runway, we had some issues after a couple of years with erosion under the fabric. One reason for this is due to the fact that we tilled the soil to remove the large weeds and undergrowth (some of the weeds actually had bark on their trunks). Tilling loosened the soil to the point that the rain caused small ruts that grew larger with each major rainfall. We ended up pulling up the fabric and re-grading the runway, then drum-rolling it to pack it down. This didn't help, as the erosion continued. We installed French drains along the "high" side of the runway and several across the runway in an effort to eliminate the erosion. That didn't help much, either. We pulled up the fabric again, and this time we placed 6-mil plastic sheeting under the runway fabric. That seems to have eliminated the erosion problem.

For the past 2 seasons, we've had wind damage to our main runway. We've stopped using the 8" landscape staples and now we use 18" geo pins. We installed these long pins down the seams of our main runway. This seems to have corrected the wind vulnerabilities.