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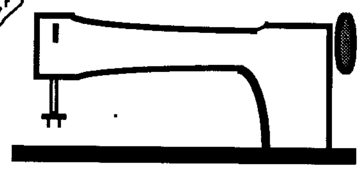
Dedicated to the Sport Balloon Home-Builder



THE BALLOON BUILDERS' JOURNAL

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April-June 1997

In This Issue

Springtime in Vermont

Brian Boland is again offering us his hospitality for the *fourth annual Experimental Balloon and Airship Association* flying weekend in Post Mills, VT., during May 16-18.

Only homebuilt aircraft are invited.

There are numerous motels and guest houses in the region. Camping is free on the airfield.

Brian plans on building a complete envelope during the course of the weekend.

Breakfast will be available each morning, including real maple syrup.

This is one weekend which will bring together people with a common interest in and enthusiasm for building. Don't miss it. I'll be there looking for many of my readers.

Contact Brian for more details. Call him at 802-333-9254 or write to P.O. Box 51, Post Mills, VT 05058.

Renewal time is here for many readers. If your time has come, you will find a form in this issue.

A Warning to Readers: This newsletter is dedicated to an open and free exchange of ideas. Neither editor nor contributors make any claims or warranties as to the appropriate application of these ideas to actual balloon construction. Some ideas contained here may be unproven and highly experimental. The reader must assume all responsibility and liability for the use of ideas contained in this newsletter. Any individual contemplating the construction of a human carrying balloon or other aircraft is strongly encouraged to seek expert assistance. As with all aircraft the operations of balloons involve risk. This risk may be significant involving the potential for serious injury or even death. In the United States balloons are aircraft, subject to the rules and regulations of the Federal Aviation Administration. Readers are reminded that the building and operation of aircraft generally require specific registrations and certifications. Federal rules prohibit the commercial use of amateur-built aircraft.

Revisiting The Gore Pattern Spreadsheet: Part II

By Bob LeDoux, Editor

2895 Brandi Lane, Jefferson, OR 97352

This article proposes new options for envelope gore pattern design using a new curve fit mathematical routine.

Concerns about Shape Errors

I ended the feature article in the last issue of *BBJ* by arguing that we can become too concerned about building to a 'natural shape' design. Some builders are concerned about building to some theoretically correct envelope shape. My position is that these concerns are often exaggerated.

Whether an envelope is a true natural shape is not as important as some other considerations for the amateur builder. The reasons that shape is less important include:

• The stress on the fabric varies at different points on an envelope. Because the fabric stretches according to the level of stress, the cut and/or sewn dimensions will vary from the inflated dimensions of an envelope.

• The fabric used in construction impacts the envelope shape. Nylon fabric, for example, has much more 'stretch' than polyester fabric. This difference in stretch will result in a different inflated shape.

• The type of panel construction will affect the envelope shape. Diagonal construction, like that found in some Balloon Works envelopes, will create a different flying shape than vertically or even horizontally cut panels.

• The envelope shape varies with the payload. A lightly loaded (low temperature) balloon will have a more elongated shape than a heavily load balloon. This difference is easily seen in the photos in *Figure 1* on page 3.

• Different builders have defined 'natural shape' parameters in different ways. The British Colt and Thunder balloons tended to be elongated when compared to Aerostar designs. The Smalley definition of natural shape is different than the half-sphere-on-top-of-a-cone designs used by Brian Boland, and some other builders.

• Envelopes change their shapes during maneuvers. During a rapid ascent or terminal descent, an envelope takes on different shapes than when in level flight. These shape changes can be asymmetrical, suggesting an uneven distribution of forces on the envelope surface.

• Balloon manufacturers continue to modify envelope shapes looking for better efficiency, however efficiency might be defined. Over the past few years, some factory envelopes have tended to get fatter and less elongated to provide higher load carrying capacity. Some of these shape changes are fairly obvious, such as the changes Balloon Works made to their envelopes a few years ago. Other changes are more subtle as have occurred in Aerostar planforms.

(The trend towards more oblate shaped envelopes is consistent with the shape found in the original Smalley shape with $\Sigma=0$. In other words, *The Gore Pattern Spreadsheet*, as printed in *BBJ* Issue 1, has a more oblate shape like that to which some commercial envelope designs are moving.)

• The freedom to use other than the 'natural shape' is widely seen in special shape envelopes. As I noted in the last issue, many of these designs would not exist if following a natural shape were so critical to design safety.

Looking at a New Envelope Layout

My intent is not to belabor the issue about variation in natural shape. But establishing the freedom to vary from a narrow definition is important to the following discussion. This is because I am proposing a different definition that can be used to create balloon envelopes.

As noted in the last issue, the natural shape envelope was derived in an effort to reduce the number of ruptures occurring in scientific balloons. Efforts were made to optimize the stress distribution upon the envelope surface, consistent with good flying stability. The best shapes were found to resemble the familiar rounded shape with a fairly flat top. In nature this shape is typified by a water drop hanging from a faucet, just before it breaks free.

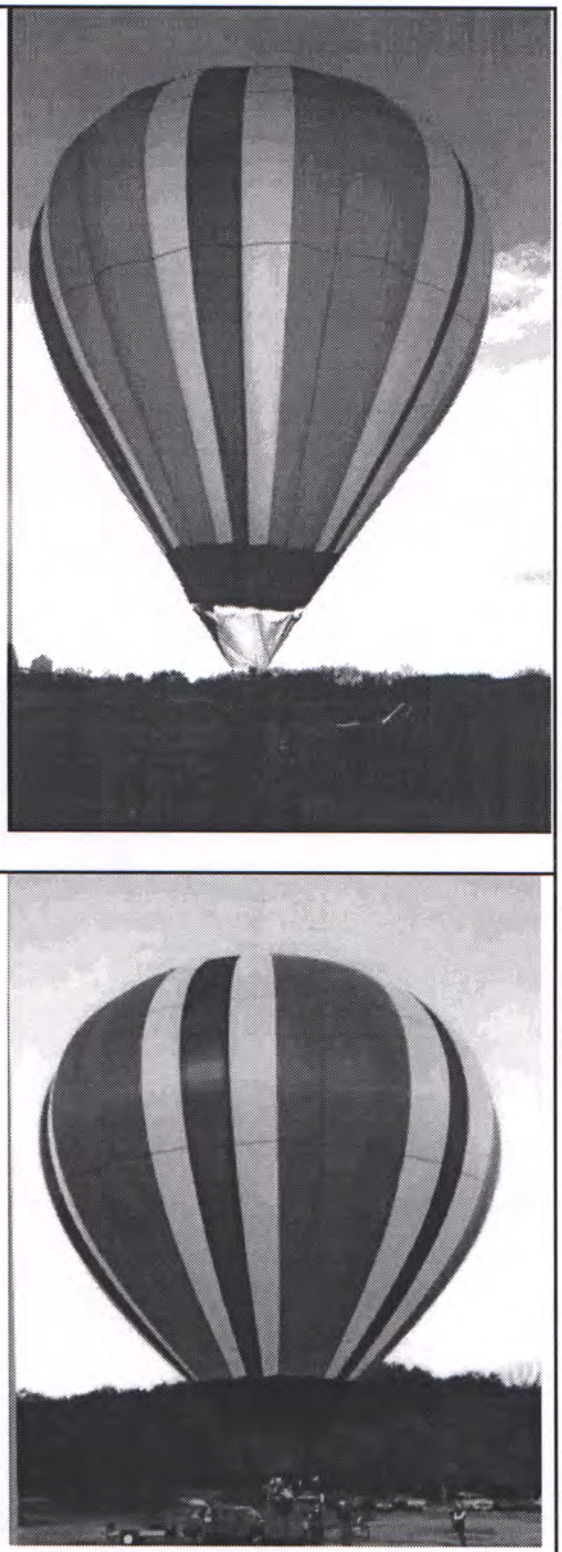


Figure 1: This set of photos, by Phil MacNutt, shows the change in envelope shape due to loading. In the top photo the balloon is loaded to a temperature of 110°F. In the bottom photo the envelope is loaded to maximum gross test load at 248°F.

Looking for a Continuous Function

Because of the way in which the original natural shape calculations were performed, the final envelope shapes were derived as discrete points, and not a continuous curve. But because a balloon has a smooth shape, one would think a mathematical function should exist which closely approximates the envelope shape.

For some time now, I have been looking for a simple way to create such a mathematical function.

A year or so ago, I updated my computer with the new suite of Microsoft Office products. (I spend hours a day working with the Excel™ spreadsheet.) While browsing through the pulldown menus I noticed a new tool. This was an *Insert Trendline* facility.

This trending tool allows one to generate 'best fitting lines' through data. A number of curve fitting functions are available including linear regression lines, logarithmic curves, power functions, moving averages and polynomial functions of different powers.

When I first saw these new tools I knew I wanted to take the Smalley natural shape envelope table of values and attempt to make a close fitting continuous function through the data points.

You can see my most successful effort in the graph on page 5. The dotted points represent the 50 values from the Smalley table used in *The Gore Pattern Spreadsheet*, from *BBJ,* Issue #1. The line which is running though the points is my curve fit equation. As you can see the fit between the two sets of values is very close.

The table on the bottom of page 5 shows the fit between the two number sets. In the first column are the station points which represent the length of the envelope. In the next column are the Smalley factors which represent the envelope radius at each of the station points. In the third column are the corresponding computed factors using my curve fit equation. In the fourth column is the percent of error between the Smalley factors and my curve fit factors.

I have defined my error calculations as the percent of difference between the Smalley table computed value and the polynomial curve fit equation computed value. Note that the error is less than 1%, often much less than 1%, over most of the length of the envelope surface. The error is higher in the lower envelope area, especially in the area where builders typically place a mouth. There is also more error in the area near the top of the envelope, where hot air balloons typically have a deflation or venting port.

From a practical viewpoint the higher error on the extremes of the curve do not bother me:

Builders typically develop the cable lengths from the mouth to the basket as an analysis which employs factors independent of the calculated distance found in the Smalley table.

In like manner, the deflation port is typically calculated using its own set of factors. Thus minor errors on the extreme of the curve are of minimal importance.

The final equation is a fifth degree polynomial:

$$\boxed{r = 3.1998s^5 - 5.894s^4 + 2.2326s^3 - 0.3022s^2 + 0.7683s + 0.0006}$$

Where r = the radius and s = the gore length.

The Utility of The New Approach

Let's look at some of the advantages that come from employing a continuous function.

- We can eliminate the table of values. The function will allow us to compute the radius at any desired point on the envelope surface. This allows computations without the need to estimate values between two points in a table of values.

Here is an example: On one of my recent balloon projects I wanted to construct a 6 foot radius mouth. But at the 8% station my computed radius was 5.57 feet. At the 10% station the radius was 6.96 feet. I had to interpolate between the two points to figure out where the 6 foot radius occurred.

Here's another example: In this same envelope, the distance between each station on the Smalley table was 1.3913639 feet. That's a rather awkward number to convert to feet and inches ('1 foot 4 and $^{11}/_{16}$ inches').

Even after this conversion is made its still awkward to use. The Smalley table requires a builder to lay out 50 stations with each station that awkward distance from the next.

With a continuous function it is now a simple matter to choose convenient or even irregular station distances. For example, my stations could have been computed at every 2.00 foot intervals, instead of that irrational number mentioned above. If I wanted to, I could also use 1.00 foot intervals in the sharply curved area around the equator.

Its much simpler to stretch out a 100 foot tape measure and make a mark at every 1 foot or 2 foot intervals.

- Simpler gore pattern displays can be developed. Instead of the table of values, a single equation can be embedded into computer code, even in BASIC, which produces the desired table at time of printing. This eliminates the requirement that readers have access to a computer spreadsheet program to run the gore pattern routine.

- Employing a continuous function allows the use of more advanced mathematical techniques. For example, by deriving an equation for an 'area of a surface of revolution,' using the integral calculus, a general equation can be created. This equation would allow the surface area for any envelope size to be computed. Similar tools may allow the computation of center of gravity and perhaps center of lift. In fact, once a continuous equation is available, all types of advanced analyses are possible.

Summary

This article began by arguing that an envelope which is 'close' to the shape defined by Justin Smalley can be just as safe as one built to his natural shape parameters.

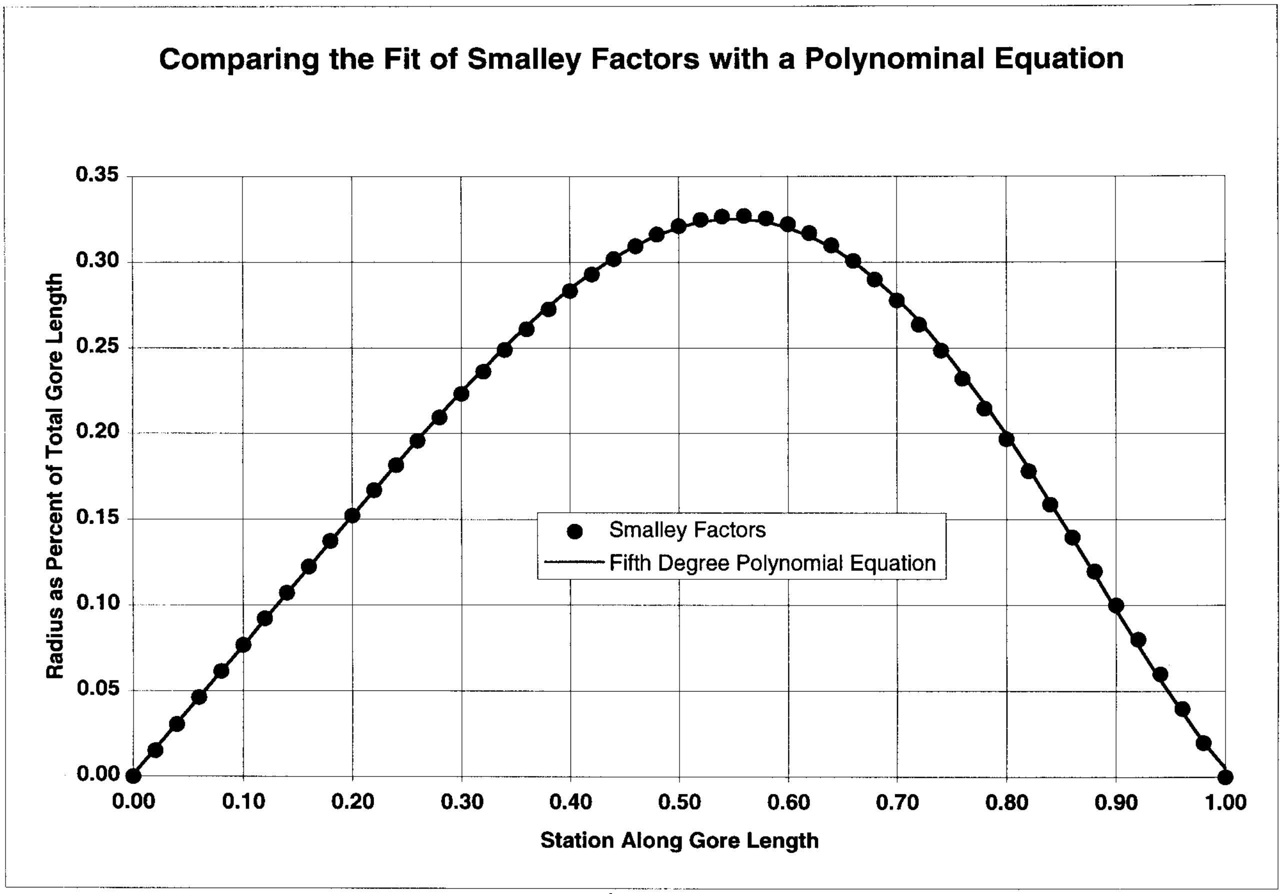
A close fitting polynomial equation was defined which closely fits the Smalley natural shape definition.

This continuous function opens the door for powerful mathematical tools which can improve and simplify the calculations made by amateur builders.

Future Goals

As this article is a work in process, I have yet to generate some of these tools. I invite our more adept readers to take up the challenge. If you are interested in pursuing some of these challenges, contact me for additional help.

I am particularly interested in developing either an interpreted (perhaps BASIC) or compiled micro computer program which could be used by readers to generate their own gore pattern layouts.



Gore Station	Smalley Factors	Curve Fit Equation	Percent of Error
1.00	0.0000	0.0051	
0.98	0.0200	0.0205	2.60%
0.96	0.0400	0.0379	-5.53%
0.94	0.0600	0.0568	-5.71%
0.92	0.0800	0.0767	-4.32%
0.90	0.0999	0.0972	-2.71%
0.88	0.1197	0.1182	-1.33%
0.86	0.1394	0.1391	-0.25%
0.84	0.1589	0.1598	0.53%
0.82	0.1781	0.1799	1.02%
0.80	0.1967	0.1993	1.27%
0.78	0.2148	0.2177	1.32%
0.76	0.2321	0.2350	1.22%
0.74	0.2484	0.2510	1.02%
0.72	0.2636	0.2656	0.75%
0.70	0.2775	0.2788	0.45%
0.68	0.2899	0.2903	0.15%
0.66	0.3006	0.3003	-0.13%
0.64	0.3096	0.3085	-0.36%
0.62	0.3168	0.3151	-0.53%
0.60	0.3220	0.3200	-0.64%
0.58	0.3254	0.3232	-0.68%
0.56	0.3269	0.3247	-0.67%
0.54	0.3266	0.3247	-0.60%
0.52	0.3246	0.3230	-0.49%

Gore Station	Smalley Factors	Curve Fit Equation	Percent of Error
0.50	0.3210	0.3199	-0.35%
0.48	0.3159	0.3153	-0.19%
0.46	0.3095	0.3094	-0.02%
0.44	0.3018	0.3022	0.14%
0.42	0.2930	0.2938	0.29%
0.40	0.2832	0.2843	0.41%
0.38	0.2725	0.2739	0.50%
0.36	0.2611	0.2625	0.55%
0.34	0.2490	0.2504	0.56%
0.32	0.2363	0.2376	0.54%
0.30	0.2232	0.2242	0.46%
0.28	0.2096	0.2103	0.35%
0.26	0.1956	0.1960	0.20%
0.24	0.1814	0.1814	0.03%
0.22	0.1669	0.1666	-0.17%
0.20	0.1522	0.1516	-0.37%
0.18	0.1373	0.1365	-0.56%
0.16	0.1223	0.1214	-0.72%
0.14	0.1072	0.1063	-0.83%
0.12	0.0920	0.0912	-0.87%
0.10	0.0767	0.0761	-0.80%
0.08	0.0614	0.0610	-0.55%
0.06	0.0461	0.0460	-0.07%
0.04	0.0307	0.0310	0.86%
0.02	0.0154	0.0159	3.23%

Letters to the Editor and Other Bits of Information

Dan Helmboldt built this really classy envelope modeled after 'Tweetie Bird.'

Tweetie Bird Special Shape Balloon

March 3, 1997
Dear Bob,

Enclosed is a photo of my recently completed "Tweetie Bird." It is a 77,500 cubic foot homebuilt completed and inflated for the first time 2-22-97. This is my third homebuilt balloon envelope...

Eyes are 20 feet tall and $9^1/_2$ feet wide. Top notch is 4 $^1/_2$ feet tall.

Checks–ah yes...the cheeks. Major pattern problems. I talked to a calculus instructor at our local community college to have him work out the cheek on a parabola versus a sphere. Actually, they came out quite well.

Total construction time: 132 hours. Twenty hours less than the time for either of the first two balloons–even with the face. I must be getting better on the sewing machine!

Dan Helmboldt
3144 20th Ave. Ct.
Greeley, CO 80631-8703

The Tweetie Bird is remarkable in that it has definite eye appeal while representing a basic enhancement to a standard envelope shape. Dan has offered to provide more details about building 'his bird.' BBJ will run a feature article later this summer.

Ken Kennedy's Projects

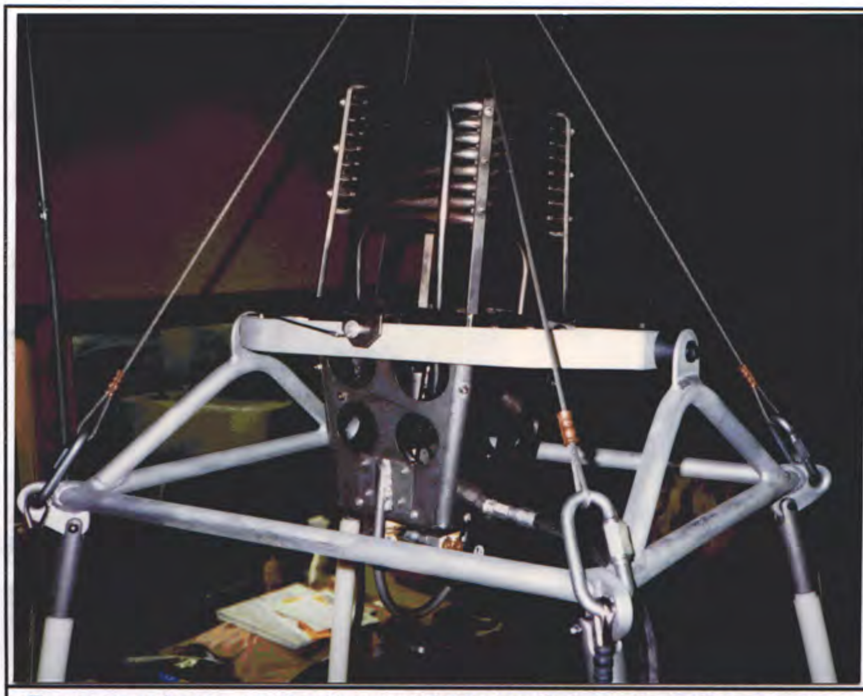
December 13, 1996
Bob,

I've been trying to get this written to you for months and months. I wished I could have seen you in Albuquerque. I was making the off-the-field dawn patrol flights and we didn't get a chance to cross paths.

I built this balloon about a year ago. Volume is 77,500 cubic feet and the envelope weighs in at 135 pounds. The top is 18 feet in diameter. It is constructed from lightweight silicone coated fabric, primarily of blue color with a bit of yellow and wine color near the bottom.

I am currently building a couple of 90,000 cubic foot envelopes. They are also constructed from the lightweight fabric. The top has a 20 foot diameter in these larger size envelopes. Each envelope has 300 panels with each panel fully tailored at the top and bottom as well as on the sides. With my

Looking at Ken Kennedy's 77,500 cubic foot envelope with an 18 foot parachute top. The envelope weight is 135 pounds. It was built from lightweight silicone coated fabric.



The burner frame on Ken Kennedy's Raven Rally basket. The aluminum upright system has been replaced with cables *a la* Cameron. The Rally burner is in a fully gimbaled mount and has a new stainless steel handle attached to the bottom. The cables are arranged in this manner for a load test. Ken tested the assembly to 2,000 pounds which is well above the original factory gross limit of 1,480 pounds.

cutting technique I have very little fabric waste, no more than a small grocery sack.

Making two envelopes at one time has saved me a considerable amount of time. On the top, for example, it used to take me 24 hours to complete one top. By doing two I average 16 hours for each top.

I have also included a photo of a burner load ring I recently constructed for my Raven Rally basket. The frame is constructed from aluminum tubing and based on the Cameron suspension system, employing a flexi-rigid cable suspension. The cable arrangement shown here was for a test of the suspension system. It worked out quite well. The basket was loaded to 2,000 pounds for testing and everything held together.

The burner is a modified Aerostar HP Rally burner. The burner is rotated 90° from the original setup. With this arrangement it is fully gimbaled. I further modified the burner by mounting a stainless steel handle on the bottom which can be seen in the photo. The liquid feed lines goes out one side of the burner and the vapor pilot line goes out the other side.

I still have a preference for traditional wicker baskets over the lightweight materials some builders are now using. My own experiences continue to support staying with the higher weight basket systems.

Sometime back I was flying an ammonia rally in McCook, Nebraska. We were flying in some challenging conditions. Some of us had some pretty fast landings and bumps and bruises were pretty common. I came in for a landing with 30 pounds of ballast in sand bags on board. During the landing I thought I might want to 'bail out' of the basket as the balloon ran into a fence. But as the basket laid over, the sand bags trapped my leg. I hit the fence with only minor scratches to the wicker, and no injury to me. I'm glad I wasn't flying one of the lightweight systems for this landing.

The recent *BBJ* temperature gauge article was very interesting. I have been experimenting with the UEI digital pocket thermometer. It covers a temperature range of -40°F to 300°F. The model number is DT-10K and it is produced by UEI in Beaverton, OR. I purchased mine from Johnstone. Their part number is H25-001. Retail cost is about $49. [Johnstone is a wholesale supply house, but will often sell to individuals who have a business card.]

I also found that silicone marking sticks are good for marking lightweight silicone coated fabric. I purchased mine at a local welding supply shop.

I know of several people who are currently ballooning because of the amateur built balloons. As the costs of commercial balloons continue to climb building your own remains an important opportunity which allows some pilots to fly who otherwise wouldn't have the financial resources.

Ken Kennedy
Rt. 2, Box 73
Broken Bow, NE 68822

Editor's note-The Rally basket Ken is using was originally certified for a gross weight of 1,480 pounds. This is a sturdy system. I am still using one of these baskets, built in 1979, for one of my balloons. My wife just loves it.

I do keep an eye on the uprights. They are aluminum and the load ring is steel. Mating the two together tends to scratch the uprights. My annual inspection takes a close look at these scratches to ensure there is no sign of cracks. While I have not heard of any cases of cracks forming at this point I think this is still a good inspection point.

The 'flat top' Rally basket with an HP-II updated burner is a reliable and low cost bottom end for builders.

According to Aerostar , this basket is classified as 'obsolete' but parts will still be provided for it.

Ken, I'm curious as to how you attached the cable bottoms to the basket? Let us know about the operating loads on that big 20 foot diameter top.

Phil MacNutt's Projects

Phil reports on the process of building his new envelope to fly over a rebuilt Balloon Works basket. This is a series of e-mail letters to the BBJ editor.

January 6, 1997
Hi Bob,

I just finished designing a 43,000 for my friend Dave [Koenig] in Houston. I used Smalley numbers and all the design criteria and specification for my AX-8 on it (scaled down of course). I spent 5 days with him over the holidays teaching him how to sew and helping with the construction.

We made amazing progress: 17 half gores (out of 32) and a complete parachute in 4 days. Thank God my sewing machine was running smooth. He was very frustrated at first trying to learn how to hand fold the seam. A couple of times we were ready to quit and order a seam folder. But I talked to him yesterday, and he has done 9 more gores, and now has no problem folding.

Folding the silicone fabric is tough for experienced people, much less somebody who has never folded anything. In retrospect, I should have started him on bed sheets first. He still has trouble "correcting" the lengths to make the index marks line up. I don't know about you, but with me, the bottom piece of fabric always starts getting shorter, requiring a pull to keep things lining up. I don't see this problem much with non-silicone fabrics. He should be finished by the end of January with the sewing, and then I will make the cables and help with the first inflation.

My AX-8 is coming along quite nicely. I have done 4 inflations to date, and now I have started work on the basket (a Barnes 4.0). I am replacing the floor, skids, scuff leather, steel floor cable, corner panels, and tank straps. The wicker on this basket is in very good shape, so it is well worth the overhaul.

I am having lots of fun on this part of the project. I got the details from Sid [Conn, President of The Balloon Works] at AIBF [Albuquerque International Balloon Festival] on the floor specs and urethane. He specifies "moisture cured urethane", which is *very* difficult to find. I finally found a Sherwin Williams dealer who could order if for me: $70 a gallon!!

The plywood is Baltic birch 9 ply, 12mm thick plywood, NOT marine grade (as some people think). Use 3 coats minimum on the floor.

I hope to get the [FAA] MIDO to come down in about 3 weeks to do the inspection. I do not anticipate any problems.

Phil MacNutt

January 6, 1997
Phil

Regarding sewing of silicone fabric. I find pulling the finished seam out the back of the sewing machine with one hand, and feeding with the other makes it go quite well.

I agree that the sewing machine tends to make one side of the fabric creep more than the other, when sewing folded fell seams. I've also noticed that the direction in which I roll the fold makes a difference. When I fold my seams clockwise I get more creep on the right hand panel. Its less of a problem when folding counter clockwise. My sewing machine has needle feed which should help with this problem. But it remains a problem even with uncoated or heavier urethane coated fabric.

I used stripped reed in my little basket and I sprayed regular exterior Varathane™ on it with my airless sprayer. Application was easy and it has held up well. I don't know why the 'moisture cured' finish is so important, unless its a matter of health safety in a manufacturing environment.

Good luck
Bob [BBJ Editor]

Dave Koenig flies his new 43,000 cubic foot balloon using a 20 gallon laydown tank as his bottom end.

January 27, 1997
Bob,

I have finished my basket overhaul (new floor, scuff leather, skids, corner panels, fasteners, etc.), so I expect a visit from the MIDO within a few weeks. I have finished the envelope and have just built a scoop. Have you ever seen a Cameron/TC style scoop over a Barnes 3-point basket? I have not inflated it yet, and am curious on how it is going to look.

When I called the MIDO a few days ago to talk about setting up the inspection date, the inspector that I have been working with said "Oh yes, you are the one that is trying to use a purchased basket and pass the 51% rule".

It is funny that this is the only thing he remembered about me. Pretty sad considering that the vertical wicker is the only original part left. When we originally spoke a few months ago, we seemed to have worked this problem out, so I really don't expect much problems when they see the work I have done.

P.S. My friend Dave Koenig in Houston just finished his 43,000. I did the design and some of the sewing. He is using a Raven laydown 20 gallon tank as a bottom end. The pictures he sent me look pretty good.

Phil

Editor's note–Obviously the FAA in Phil's MIDO are less concerned about the technical details and more concerned about the 51% percent rule.

February 7, 1997
Bob,

I did my maximum gross weight test on my new AX-8 last week; 1866 lbs! everything looked good. [*See photos on pages 3 and 10–Editor*] I also rode my small balloon up a tether line and sat on top of the AX-8! You can really learn a lot about parachute fit, spider web tuck, and other such items by being right on the top when the balloon is inflated and loaded.

Funny though, whenever the vent opened on the big balloon, the heated air would rise up inside my small balloon and cause me to start climbing hard. Just the residual heat coming off the envelope skin of the AX-8 kept my small balloon pretty much at equilibrium.

FAA should be up here in a couple of weeks to do the inspection. I also designed a scoop and made a prototype that came out looking pretty good. I've never seen a scoop over a Barnes basket before, so maybe I am one of the first!

Phil

Phil's experience with the heat loss from the lower balloon is telling about the amount of energy we give up, even in a new envelope. Better insulating value in our envelopes could go a long way in reducing fuel consumption. -Editor

February 14, 1997
Bob,

"Roy Bean" is legal!

FAA issued my Airworthiness Certificate on Thursday.

The inspection went very smooth. I attribute this to planning ahead and having everything in order (paperwork). Also, I had all my tools, test specimens, etc. out for inspection.

The first thing the inspector did when he arrived, was to approach the basket and make a comment about the basket being a type certified item (i.e. the 51% rule problem that we have down here). I immediately started showing him all the old stuff I replaced on the basket (floor, scuff leather, corner panels, etc., etc.).

Then I started showing him my tensile strength testers, test specimens, and about 100 pages of engineering notes. I think the amount of engineering and detail I presented took him by surprise. He did not even look at the balloon anymore at that point. He sat down and filled out the paperwork and handed me the airworthiness certificate.

He made the comment that he had never seen that much engineering and testing done before, and that I had essentially done a lot of the same stuff as if I were applying for a full type certificate.

The only thing he looked at on the envelope was the webbing (I quoted the MIL SPEC), the swages (the one thing we share with airplanes) and the N numbers.

If you remember, when I first contacted the MIDO, they were very skeptical about issuing me a certificate because of the factory basket deal. Instead of getting angry, I took the route of "I'll help educate the MIDO about balloons".

Phil MacNutt has his own unique way of checking on the fit of his parachute top. Check it out from 'on-high!'

Other readers that have this problem may need to take the same approach. I am convinced that if I had taken a "you against me" stance, I would have lost.

I actually asked the inspector why they seemed sensitive about this issue. He said they have been having problems with "hired guns" in the fixed wing sector, and this has made them very cautious.

I found the inspector to be courteous, professional, and very easy to work with. When I explained to him why his requirement for 25 hours phase I testing was too high for a balloon, he promptly changed the requirement to 10 hours for me.

My advice for others with this situation would be the following:

1. Replace as much as possible in the basket.

2. Emphasize that the burner, tanks, and hoses are "standard procured items" and do not figure in to the 51% thing.

3. Keep very thorough design notes and drawings.

4. Be patient with the FAA.

Phil MacNutt

In the past BBJ has covered a variety of airworthiness certification stories. Phil's experience with the FAA is a good lesson for us all. Few FAA staff have any experience with amateur built balloons. The builder who takes the educational rather than the confrontive approach should have a 'better go at it.'

Remember also that the requirement to build the 'majority part,' (at least 51%), is a national requirement. Only the interpretation of the rule varies by region. To ensure a positive experience with your local FAA personnel, get a clear understanding of their expectations. Seek help from BBJ and other local builders if problems occur. Solve your problems early.

There are some very nice projects coming to completion. Best of luck to other builders.

We are looking forward to providing more construction details for builders contemplating 'special shape' projects. If you can make a contribution in this area, contact the editor.