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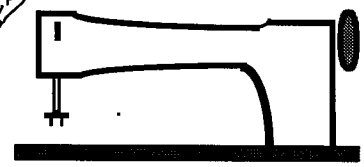
Dedicated to the Sport Balloon Home-Builder



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THE BALLOON BUILDERS' JOURNAL

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In This Issue

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Design Considerations for a Small Rattan Basket: Part 1

By Bob LeDoux, Editor,

2895 Brandi Lane, Jefferson, OR 97352 CompuServe 73474,76

Construction of a simple rattan basket is within the means of a careful builder. Here are some ideas on approaching that first weaving project.

This is an article about the design and construction of a small rattan balloon basket. But first a story.

Introduction

I learned to fly sailplanes while a graduate student at Penn State. Then, as a glider owner, I whiled away many summer weekends at our local Oregon soaring site. That changed when I met my first and current wife Marianne. Along with the marriage came certain 'family responsibilities'. Many of these duties were not being performed while I was away flying my glider for weekends at a time. As a solution, we decided that I would take up balloon flying and reduce the amount of glider flying, leaving some weekend afternoons for work around the house.

Figure 1. Marianne LeDoux takes off in *Castaway*.

This plan worked well while Mari was my crew chief. But one summer she decided to try her hand at flying, and was badly bitten by the flying bug. As a pilot she was a natural. She became very effective at begging her way into the basket, leaving me on the ground as crew chief. It became very clear that a second balloon had to be added to our stable or I would remain grounded.

Due to limited finances we decided to build a single place balloon. That system, called *Castaway* consisted of a 38,000 cubic foot envelope with a small homebuilt rattan basket for a carriage.

This article is about designing and building that little basket. This is not a set of plans, but rather a compilation of ideas about the design and building process. The *Castaway* basket was a prototype and like all prototypes it is not perfect. In the following I will discuss some of the things I would do differently if I were re-building it today. I'll also describe a few of the mistakes I made. Hopefully, you will avoid repeating my errors.

A Caution

While all balloon components should be carefully designed and constructed, I feel good basket design and construction is particularly important. A basket translates the loads from a very large envelope into a very small area. Failure of, or damage to, basket components can be very hazardous to health. Additionally, a basket is subject to unusual loads, like those experienced in high wind landings. Some of these stresses are difficult to calculate. So a conservative approach to basket design and construction is warranted.

An Overview

Castaway has flown over 200 hours and the basket has protected its one occupant (generally me) through some very hairy landings. The system works. Also note it was my first attempt at basket weaving. As the photos show, my first efforts were reasonably successful, though not perfect.

The basket is fairly small, with a base of about 32 inches to each side. Two Worthington ten gallon fuel tanks are strapped to the basket interior. The basket was made to be as small as possible while still allowing the pilot to take a crouched position during rough landings.

The design is modeled after the old flat-top *Raven Rally* basket. The flat top and square

sides made for easy construction, a benefit to a first time basket builder. While the Raven design transfers basket-to-envelope loads using aluminum uprights, I chose to use steel cables which run from a steel plate in the basket bottom up basket sides to the burner support ring.

The basket floor is of traditional plywood with hardwood skids. As typical of most baskets, the skids act both as load bearing beams and abrasion resisters. The basket sides are constructed from stripped rattan, which is commonly called 'reed'.

The top of the basket sides is covered with lightweight, low cost refrigeration pipe insulation foam, over which a simple fabric cover is laced in place.

I prefer my burner to be positively supported, so I incorporated burner supports in the basket. Each support consists of a $^{7}/_{8}$ inch diameter stripped rattan pole woven into each corner of the basket. Slipped over the top of each pole, and even with the top of the basket, is an aluminum tube. A burner support pole, also of stripped rattan, drops into the aluminum tube. The burner support ring then mounts onto the top of these poles. The photo on this page makes this assembly clear.

The most difficult part of the whole basket was designing the burner support ring. The current ring is my third attempt and still leaves a bit to be desired. This ring is welded up from thin wall aircraft steel tubing. It weighs about 6.5 pounds. If you would prefer to use a flexible upright system for your balloon, it should be a simple matter to utilize a burner ring constructed from a bicycle rim, like that used on Brian Boland products. Doing so would eliminate all welding in the basket.

The envelope is attached to the burner ring using aircraft cables which terminate in aircraft grade cable shackles. This generates a suspension system which is reasonably simple and light in weight. Marianne greatly dislikes the little safety pins used to assemble this system. She would much prefer a carabiner system, like that used in Cameron balloons.

Rattan, a Basic Introduction.

To learn more about rattan, check out a book on its use from your local library. Also read the article on rattan in the December 1995 issue of *Balloon Life* magazine. You might also take a basic basket weaving course at your local college. Expect your fellow students to be at least amused if you show up at the first class with a balloon basket as your first project.

Rattan comes from a vine commonly found in tropical regions. These vines, which can grow hundreds of feet in length, range from a very small size up to, occasionally, over three inches in diameter. The material is prepared by cutting the vine into usable lengths. allowing it to dry, and stripping off the bark. The result is what we generally know as rattan. Rattan's outer surface is high in silicone which provides protection from moisture and dirt. Most balloon baskets are constructed from rattan.

A second material, commonly called "reed", or "cane" in Europe, is made from rattan. Reed is produced by running the rattan through dies which strip the outer layer off to produce a material of consistent diameter. Most Balloon Works baskets I have seen are constructed from reed.

Reed is more flexible than rattan of an equivalent diameter. Because the cover has been removed it absorbs water quickly, which

Figure 2: Looking into the basket, we see two Worthington ten gallon tanks and the instrument package. This photo was taken as part of the original airworthiness application. The burner is a Raven HP I, vintage 1978. This burner support ring was replaced after the second flight due to shortcomings described in the text.

makes reed a more convenient material for basket weaving. A basket constructed from reed will be more flexible than a similar basket constructed from rattan. In order to restore protection from moisture and dirt, the completed basket should be sprayed with a finish. A varnish coat will serve this purpose.

In constructing the *Castaway* basket I utilized a couple of simple weaving techniques. In order to simplify construction I chose to use a plywood floor instead of a woven (Cameron style) floor. Weaving a basket on a wooden base is a very common process which is discussed in most beginner's textbooks.

The basket floor is cut from a sheet of plywood. Holes are drilled through the floor around the outside edge. Vertical reeds, called 'spokes' or 'stakes' are threaded through these holes. The basket surface is formed by weaving reed between the stakes in the horizontal direction. These horizontal reeds are called 'weavers'. Weavers are typically of a smaller diameter than the stakes.

Most of the basket is woven using a 'single weaver' sometimes called 'randing'. That is, one length of reed at a time is woven through the stakes. Above and below each of the tank strap holes I wanted more detail, and a stiffer weave. So I wove in three weavers at a time, a weave which is sometimes called 'wailing'. The top of the basket is finished by bending over the excess length of the vertical stakes and weaving them into each other. This is a common process called a 'three rod border'. All these basket construction techniques are considered as 'beginners' skills. A balloon basket is just larger version of a typical weaving class project.

Weaving reed requires a bit of finger strength. Expect rough and sore fingers. The reed has a rough, almost abrasive surface. Because it is woven wet, the dampness will soften the fingers which then get sore. This discomfort can be reduced by weaving for short periods at a time. I was not successful in finding gloves which could be used while weaving.

Design Considerations.

Construction of the basket took about 100 hours. Of this time 58 hours were spent in working the reed. A total of 26 pounds of small diameter reed were used in the basket. Six pounds of reed were purchased for the vertical stakes. These stakes were constructed of #11 reed which is $^{11}/_{32}$ inch in diameter. The weavers consisted of 17 pounds of #9 reed which is $^{1}/_{4}$ inch in diameter. Two pounds of very thin reed ($^{1}/_{8}$ inch diameter) were used to weave the areas between the tanks strap holes. Two pounds of $^{5}/_{8}$ inch reed (#17) were used as vertical reinforcements around the tank strap holes. In 1988, when this basket was constructed, premium reed cost $5.50 per pound in orders of 25 pounds or more. Today, this reed costs about $6.50 per pound.

As already mentioned, the basket was designed to be the minimum size which would carry myself along with two internal fuel tanks. I determined this size by placing two tanks together. Then assuming a crouched (high wind landing) position beside the tanks I put up cardboard panels around me. I adjusted the cardboard panels until I derived the desired basket size. From this model I determined the current dimension of a 32 inch square basket base. After weaving, the basket interior was actually about 28 inches square. Having flown this basket for several years, its clear that I could have made it even smaller. A 30 inch square base would still give me adequate room inside the basket.

Plywood Floor Considerations.

When weaving reed through a wood floor careful consideration should be given to the grade of plywood used in the floor. The floor is 'trapped' in the basket by the weaving which makes repair or replacement quite difficult. A broken floor may require repair using a patch called a 'scarf patch' which many woodworkers find quite difficult to construct. If the plywood splits or delaminates at its edge, it is very difficult to replace it without major re-weaving of the basket.

I constructed my basket floor from $^{1}/_{2}$ inch thick marine grade Douglas fir plywood, which I happened to have on hand. This plywood is heavier and thicker than required for this size of basket. A $^{3}/_{8}$ inch thick plywood would have been adequate but was difficult to find.

I would always use a plywood which is at least water resistant for my basket floor. Marine or aircraft grade plywood are definitely waterproof. A good exterior grade of A-A or A-B plywood would also be acceptable, providing it had no voids in its interior plys.

Figure 3: This view of the basket bottom shows the steel plate to which the basket support cables are attached. The glue lines clearly show the two wood layers which make up the basket skid assembly. The slot in the near side of the skid plates is to allow a replacement cable to be fitted to the basket without cutting apart the base.

To test plywood, soak a sample for 24 hours in cold water. If it comes apart, or if it can be easily pulled part, it is a poor choice for basket construction. Aircraft plywood, which is typically certified under Mil-P-6070, must withstand boiling water for 3 hours to pass certification. Some builders are making basket floors from an imported Baltic birch plywood. This is a high grade, beautifully made wood panel material. But some of this plywood is glued together with water soluble fish glue. Test Baltic birch plywood to make certain it won't come apart.

The choice of basket skid material depends on the application. Oak is a traditional choice. If landings or inflations are made on hard surfaces then oak may be the appropriate choice. But for the pleasure pilot flying off of grass, even pine may be a proper skid material. My basket skids were constructed from two, 3/4 inch layers of alder, a local hardwood, which is fairly soft and light weight.

My skid plates were constructed and assembled just like those on the Raven Rally basket, except for the steel cable mount plate. Two layers of 3/4 inch thick wood create the skid, with the corner joints overlapped. The skids are glued to the plywood floor and bolts run through the entire structure for added security. Further details of the basket bottom will be given in our next article.

Uprights

As noted previously, I chose to incorporate uprights to support my burner ring. There are several options for upright materials. Aluminum tubing could be used, as is traditional with Aerostar and Avian balloons. Nylon rods could be used like those found in Cameron baskets. I shied away from the nylon both for reasons of cost and weight. My uprights are constructed from large diameter reed and only weigh a total of 2.5 pounds making them much lighter than nylon rods.

I would not use wood doweling for my uprights. Any of the common dowels like oak, birch or beech have a definite lengthwise grain. When these break they tend to splinter leaving long, jagged, spear-type ends with the potential to inflict lethal wounds.

I'm happy with my rattan (reed) uprights. This material does not have the kind of grain found in hardwoods. I have broken a couple of these uprights over the years. These breaks occurred when the basket attempted to 'dog house' or turn over onto its top during a high wind landing. All the rattan fractures have been progressive breaks straight across the diameter of the material. All the breaks have occurred at the top of the aluminum tube into which the uprights drop. Once a fracture begins to occur it becomes very evident as the pole takes on a permanent kink, or 'dog leg' bend which cannot be straightened. I have never had a rattan pole fracture completely through on a single landing.

Some builders may object to my reed uprights in that they aren't nice and straight like doweling or nylon rods. This is a characteristic of rattan products. Efforts to straighten out the uprights always seems to be successful for only short periods of time. If you are unhappy with this characteristic you might want to consider some other material for your burner supports.

Burner Support Ring-Big Mistake

I would like to discuss the load ring configuration in more detail. The photo on page three was prepared as part of my airworthiness certificate application. The load ring in that figure was a complete failure, don't copy it.

Frankly, I'm not completely happy with any of my burner support ring designs. But

my first design was totally unacceptable from a safety viewpoint. My current design is safe though it has some shortcomings.

The ring displayed in the photo on page three was my attempt to copy the Cameron design. (Also see the detail in the upper left photo on page 7.) It represents my effort to create a solid attachment between the burner support ring and support poles. The vertical steel tubes which slip over the poles were welded solidly to the support ring. My support ring was welded up from 0.035" wall thickness aircraft chrome-moly aircraft steel tubing. I quickly discovered why the Cameron load rings are sooo heavy. They use a very thick wall steel tube to handle the bending loads which occur in the nylon rods and tube corners.

My first inflation with *Castaway* was in a very gentle wind of 1 or 2 knots. As the basket rocked gently back and forth, I could see the vertical tubes in my burner ring bending and flexing. It was only a matter of (very short) time before the tubes cracked from metal fatigue. I quickly constructed a new burner ring which incorporated flexible joints in the corners. A study of the photos on page 7 shows the changes I made in the new burner ring.

Burner Load Ring Mistake #2

My new burner support ring used little metal 'tabs' to attach the envelope and the basket cables. (See right hand photos on page 7.) These little tabs were constructed from .090" thick aircraft steel plate. The top tab has one hole through it to 'shackle' the envelope to the burner ring. The bottom tab has two holes in it. The right hole attaches the cable which carries the basket load to the burner ring. The left hole provides a pivot point for the tube which slips over the burner support pole. My mistake was to construct the left hole too precisely.

As an airplane builder I learned classic aircraft close tolerance construction. When drilling a hole, in metal for a bolt, one does not just drill a hole. That would be too easy. A hole is drilled slightly undersized. Then a tool called a 'straight reamer' is used to enlarge the hole to an exact size. When a bolt is slipped into a properly reamed hole it will make close contact, all around its circumference. In some applications a hole is so precisely sized that some force is required to push the bolt into the hole.

Anyway, I applied these close tolerance techniques when drilling the 'left hand holes'. Imagine my surprise when, during my first annual inspection, I discovered a small crack in the weld of one of these bottom tabs. My tolerances were so tight that the flexing of the basket was actually bending the little tab, causing it to crack in its weld. I rewelded the cracked tab after examining each of the other tabs for cracks under a magnifying glass. I then enlarged these particular holes to give them more 'slop'. I have had no problem with cracks since that time.

Thus I learned one can be too precise when constructing some elements of a balloon basket.

Good aircraft design calls for little tabs, like these, to be reinforced so they are immune to sideways bending. Thus my design falls short. An examination of a Cameron or Thunder & Colt balloon will show how these manufacturers handle this problem. They use multiple tabs and tabs of extremely thick steel.

While it is very unlikely that I could suffer a failure in a weld during flight, I still decided to incorporate a little extra protection. This protection is in the form of a little loop of cable, in each corner, which runs between the cable and basket attachment fittings. (See photo on page 7.) If one of my weldments should ever fail, the basket will still have support in that corner.

Without doubt, the burner support ring is a weak part of my design. I developed it before the Boland-style bicycle rim and carabiner hookup became widely known. I think the Boland style is superior to what I have displayed here. But, I have not engineered a solid burner support system for the bicycle rim burner ring.

Closing Comment and Next Article

For those who are planning an innovative basket design I hope my experiences will be of value. No prototype design is going to be perfect. Any prototype will display unanticipated weaknesses and downright mistakes. Until the design has proven itself, care should be taken to examine the structure after each flight. After a hard landing special care should be taken to look for hidden damage.

In our next issue we will discuss the construction of the *Castaway* basket in further detail.

Above: Looking at one corner of the original burner support ring, which has been retired, the vertical tube, which slides over the rattan upright is solidly welded to the remainder of the burner ring. The flexing in this tube was a major reason for changing this design. **Above, Right:** This is a corner of the new burner load ring. The envelope attaches through the shackle at the top of the picture. The basket support cable is the lower cable. The vertical tube on the left is bolted to the burner ring. This tube slips over the rattan upright. The loop of cable is my 'butt saver', which was incorporated after a welding cracked as discussed in the text. If either of the welded tabs were to give way, a highly unlikely event, this cable loop ensures the basket corner remains attached to the envelope. **Right:** This is the same photo as seen above, right, except the hardware has been removed in this picture. Looking at the bottom metal tab, the left hole has been enlarged to provide additional play, thus eliminating bending in the tab due to flexing of the basket. See details in the text.

Letters to the Editor and Other Bits of Information

Update from an FAA Airworthiness Inspector on the "Majority Portion"

In our last issue, Lyle Alexander presented his position on the 'majority portion' of hot air balloon construction. He has provided the following, further clarification which may benefit our readers.

01/11/96

Bob

Perhaps I was a bit hasty when I wrote that 'a balloon envelope is the aircraft'. In fact the *aircraft* consists of all the components necessary to operate in flight. In the case of a hot air balloon the *aircraft* would be the following:

- Envelope: flight controls, (vents etc.)-structural components–tapes–cables etc.
- Occupant carrying device: gondola, basket, swing seat, trapeze or other container.
- Burner
- Accessories: fuel tanks, hoses instruments, radios, etc.

In the past the FAA did issue registration and airworthiness certificates to only the envelope and considered it the *aircraft*. In realizing that an envelope is not a "complete" flying machine, the FAA discontinued this incorrect practice.

Refer to FAA Order 8110.39 which, in part states, "Manned free balloons consist of an envelope, burner and basket..." The order also says burners and baskets are usually designed to interchange with different envelopes. Order 8110.39 is directed toward type certified balloons and defines their status as aircraft. In the overall scope of the order, however, there is no doubt the FAA recognizes the envelops as THE MAJOR component of the *aircraft*.

The best definition of "Eligibility" for amateur-built aircraft is in Order 8130.2C, paragraph 125: Its states–The eligibility is determined by "...the amount of work accomplished by individual or group of individuals, [compared against]the total amount of work necessary for the complete project..." (excluding procured items–burners, hoses, fuel tanks, etc.)." Further, paragraph 125 b(2) states "the use of ...major assemblies ...from certified aircraft is permitted."

Order 8130.2c paragraph 125(b3) states "..the FAA should be reasonable in their requests to amateur builders,..." This statement clearly means to give the builder the benefit of doubt on decisions which are subjective!

Scenario: Lets say an FAA inspector was absolutely convinced that the envelope was only 49% of the aircraft and the basket, etc., were 51%. Lets say the Inspector was adamant and denied an amateur built certificate on that basis. What does the FAR say? FAR 21.191(g) states "...the major portion of which has been fabricated and *assembled* by..." The builder gets no credit for fabrication of the basket. The builder does get credit for fabrication of the envelope and gets credit for assembly. Even a stubborn inspector can add:

Fabrication	Envelope	49%
Fabrication	Basket	0%
Assembly	Aircraft	5%
Total Credit		54%

The above is a worst-case scenario. Any FAA inspector that has an inkling of common sense and any knowledge of balloon construction would nearly always credit 70% to 80% for fabrication of the envelope. This call is a no-brainer!!!

All the FAA inspector needs to do is follow the guidance in Order 8130.2c. The problem is that 8130.2c is 'subjective' and many inspectors know little or nothing of balloon construction. Any inspector with common sense, even without knowledge of balloons, should clearly understand that fabrication of an envelope and assembly of the remaining components meets the amateur built eligibility requirement of FAR 21.191(g) and Order 8130.2c.

Sincerely,

Lyle Alexander
Aviation Safety Inspector SLF FSDO
1320 E. Utopia Road
Phoenix, AZ 85024

Dr. Richard Clark Weather Workshop

On two occasions balloon pilots living in the Pacific Northwest have enjoyed the opportunity to hear Dr. Richard Clark conduct seminars on meteorology.

Dr. Clark is a professor at Millersville University in Pennsylvania. In addition to his broad understanding of meteorology he is very skilled in translating complex scientific concepts into terms understandable by the average pilot.

Of particular interest to pilots is his material on boundary layer meteorology. This is the developing field in atmospheric science which seeks to better explain the impact of ground based objects and geographic features on the atmosphere. Dr. Clark's discussion of phenomena occurring within the bottom 2,000 feet of atmosphere is particularly relevant to balloon pilots.

The day and a half long seminar is being conducted at the Oregon Institute of Technology, in Klamath Falls, Oregon, a state college campus which lies near the California border.

Pilots should note that guest speaker for the Saturday night banquet is long time balloon pilot and designer, Don Piccard.

If you're interested in attending this conference contact Carol Beech at Millersville University, phone 717-872-3030.

Comment on Gas Balloon

1/14/96
Bob,

I'm finally getting around to writing in response to your request in the Nov.-Dec. 1995 issue of *The Balloon Builders' Journal* for info on homebuilt balloon envelopes certified over factory built baskets. We constructed a 2,000 m[eter^3] gas balloon envelope and had it certified to fly over an old Raven poly bucket.

We modified the gondola by boring 2" diameter holes on all sides (Swiss cheesed so to speak) to lighten the weight. We then installed 2 each. $^1/_4$ inch diameter x 19 foot long encased steel cables following the aluminum uprights down one side, underneath and backup the other side. These cables are then connected together with a load ring that is constructed of $^3/_8$ inch encased steel cable. The only other mods made were the replacement of some wood skids and the installation of $^1/_4$ inch plywood to the bottom on the inside.

Builder	Zia Gas Balloon Club
Address	3232 San Mateo, N.E. #142 Albuquerque, NM 87110
Model	1050CM
Serial No.	001
N No.	601ZG

Certification Issued by - Albuquerque FSDO

There was no question by the local FSDO that fabrication time spent on the envelope far exceeded the time spent on the gondola.

Hope this helps,
Paul Clinton
CompuServe 75373,136

Offer to Compile Basket Article

1/10/96
Bob -

Excellent work on the 'Design Considerations' article [in Issue #16]. I look forward to the full series.

Also, in reading the sidebar to the article, I would like to propose a contribution article. I was amazed by the various 'baskets' mentioned: the plastic garbage cans, kitchen chair, collapsible fiberglass, etc. If various builders would send me information about their nontraditional baskets, I will compile them into one or more articles for the BBJ. The builders may contact me either E-Mail or postal mail.

Also, I am looking for any software (PC compatible) pertaining to ballooning. If someone has a balloon flight simulator, I would be very grateful!

Thank you for all of the work you put into the *BBJ*. It is a fine publication and I look forward to each copy.

Thomas Jones

Email: TCJones@PWINET.UPJ.COM

Postal: 176 Barney Blvd
Battle Creek MI 49017

Peter Asp's Balloon Project

01/23/96
Dear Bob:

My amateur building experience is limited, although my envelope building is not. I've operated CRS [certified repair station] KC5R983CM for the past 11 years and done major envelope work on numerous customers' balloons as well as my own equipment.

Just about a year ago I undertook my first homebuilt envelope. Cutting and sewing entailed about three weeks, followed by testing and certification of about three months.

N81826, PH65-16, Serial 001, consists of a 65,000 cubic foot envelope and old Raven Rally basket and burner that I had sitting around. The envelope is of 16 gore design with 32 vertical panels; 32 vertical and 9 horizontal load tapes. It's shape is based on an Aerostar S52A gore diagram and utilizes Soarcoat™, F-111 and rip-stop nylon fabric from top to bottom for economy and (hopefully) longevity. The large number of load tapes provide a smooth shape and isolate the light fabric into relatively small pieces. Envelope weight is 115 pounds.

Venting/deflation is via a rather large parachute top activated by Cameron vent rope and pulleys. The only mistake I made here is putting the pull line on the wrong side of the basket. The line slack drapes over the instruments!

Mouth size and suspension have been modified from the Aerostar design to provide easier hook-up as well as better manners in windy inflations. The mouth location was moved up 2 feet on the gore patterns to increase size and also result in 'stressing' which holds it open pretty effectively in moderate winds. Suspension is by Kevlar™ cored ropes which attach to a modified basket suspension that looks decidedly "Balloon Works." The basket retains it's aluminum uprights to support the burner, although they've been changed to make them easier to assemble and to raise the burner by about 6 inches. None of the basket changes I've made is "irreversible", in case I ever want to put it back into "standard" service.

Peter Asp's homebuilt envelope based on an Aerostar S-52A gore pattern.

The burner is of obsolete [Raven] HP design which I think is about as good as Raven or Aerostar ever got. (Yeah Zone 5's™ are nice, but they weigh a TON!) I did add a redundant system comprised of [Balloon Works] Fire II™ parts. When combined with the light fabric it makes PH-65-16 a dynamite "glow" balloon.

For summer use, I carry 30 gallons of propane in aluminum tanks. For winter, I got a little creative, throwing out one tank and replacing it with an on-board nitrogen system regulated to 100 PSI. I've been a nitrogen fan for years, but never have been real happy with having to "spike" the fuel up to 200 or so PSI so there would be enough pressure at the end of the flight. This burner has a vapor pilot light, and while I've tried nitrogen in the number one [pilot light powered] tank with good results in the past, I didn't want to chance it here. I changed the pilot system so it now operates off a small propane torch cylinder. In testing, this was good for about three hours of operation, but I'm carrying a spare with me, just in case.

Anyway, Bob, that's my story. I'll be looking forward to your next issue.

Best Regards,

Pete Asp
W1341 Highway B
Sullivan, WI 53178

Our readers would probably like to see more details on the redundant burner system and your onboard nitrogen system. -Editor.

Letter From Brian Boland on Project Documentation

02/09/96
Bob,

Just back from a super month of balloon building, flying and airship flying in Europe.

I received and read your January-February issue and I really looked forward to it.

Please revamp my classified ad [*see back page, editor*].

Here is an invite to the Third Experimental meet on May 17-19. I hope you can make it.

Regarding your *Letter to the Editor and Other Bits:* good job on the *Builders' Checklist.* [See last issue of *Balloon Builders Journal.*] Lately I've heard of some builders having trouble getting their Repairman's Certificate after they filled out the one page FAA application form. I'd highly recommend that every builder keep a very concise diary of the whole project and a photo-snapshot album of all phases of construction with photos actually showing the builder doing the work. Keep a simple flash camera loaded with film in the building room so any passing friend can be asked to click off a shot of you working.

A camera with a self timer and a tripod will also get the job done. I'd recommend that the construction checklist for balloons also be used as a photo checklist. There are 57 items on your checklist. I'd suggest taking two or three different photos of each item to be build at different stages and angles. Four or five 36 exposure rolls of film should be used up exclusively documenting the entire project.

With photo flubs you should still have enough readable photos left to show you really building the whole thing.

I built my first balloon 25 years ago and only have two or three photos of the construction. I was too busy, no one was around, and I just never thought to take pictures. Those three photos, though, are treasures at this point in my balloon building life.

Mule Furgeson documented his balloon building project with a video which he edited down to a good fifteen minutes, another great proof and archival historical remembrance....

Brian Boland

Third Experimental Balloon Meet

Reiterating Brian's comments above, the 3rd Annual Experimental Balloon and Airship Meet is scheduled Friday, May 17th through Sunday May 19th, at the Post Mills Airport, Post Mills, VT.

Historically the weather is excellent during this time in May. Temperatures might range from a low of 52° at night to 78° during the day.

Camping on the airport is free, and a list of motels is available. Propane is available for $1 per gallon.

There are no scheduled races or competition. The idea is to fun fly and share ideas and stories. Pilot briefing will be on a personal basis for those pilots requiring them. Pertinent information will be posted.

A pancake breakfast will be provided for a small fee.

May 17th is the 25th. anniversary of Brian's first balloon "The Phoenix" and it may be inflated.

Contact Brian for more information. His address and phone are listed in the *classifieds* on page 12.

FAA Employee Petitions FAA on Behalf on Balloon Pilots

Lyle Alexander, balloon pilot and FAA employee at the Scottsdale. AZ, FSDO, has petitioned the FAA on two matters:

In one petition he seeks relief from the minimum safe altitudes requirement (FAR 91.119). He asks that balloons be allowed to operate below minimum altitudes when the operation is conducted without hazard to persons or property on the ground

This issue is not new to the ballooning community, but Lyle has stated the issue in a manner which may be effective in reopening consideration.

A second petition requests changes to the night lighting requirements for balloons (FAR 91.209). Under his proposal, night lights would not be required after takeoff and prior to landing when the pilot in command determines it necessary to maintain safe clearance from objects on the ground. He argues the lights represent a hazard which can snag on objects like trees and power lines. This petition would also effectively eliminate lights for most tether operations.

You can contact Lyle Alexander, at

1320 E. Utopia Road
Phoenix, AZ 85024.

His work phone number is 602-640-2230, ext. 263.