KNOX COUNTY RADIO CONTROL

Newsletter

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Make an RC Airplane Stand from PVC

By Brad K. Butzbach

I have too much stuff to carry! So, I look for ideas that can reduce my burden.

A transportation stand that would hold both the fuse and wing together with cheap and inexpensive PVC would save me at least four trips to my truck and back on any given flying day. Hmmm, PVC you say? Let's see what we can make with these plastic tinker toys!

I was first introduced to PVC construction while at a flying field near Seattle WA. The benches were just picnic tables without any form of plane restraint. One of the gentlemen at the field made restraints from PVC that clipped on the table edge and sold them at near cost to the club members. I don't know how many serious injuries were prevented, but that man should have been awarded a medal.

Seeing how practical and inexpensive building from PVC could be, I decided to build a plane stand that would hold both my plane and wing and save me some time while being transported to and from the field. I needed the stand to hold the wing and fuselage and be equipped with carrying handles. Being blessed with an acute lack of ingenuity, I began searching the web for ideas.

I stumbled upon an article in RCUniverse Magazine by Mike Buzzeo, published: February 2010, Here I found almost exactly what I was looking for.

The only thing missing were the carrying handles. I assembled a similar stand for a 60 size P-51 Mustang that had the ability to hold the fuse inverted while I connected what seemed like seventeen miles of servo extensions to the wing. Here's what I came up with. Thanks to Michael Catlin for the CAD drawing. (see illustration 1)

Construction Tips

My planes range in size from small electric foam all the way to Giant Scale. No one transport stand is going to be suitable for all applications. For planes up to 60 size, ½" PVC tubing is sufficient. Cost increases exponentially with the larger sizes of fittings. Elbows, Tee's and Crosses can

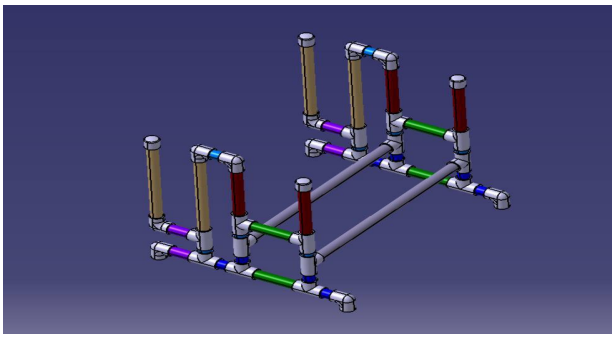


Illustration 1

be combined to make just about anything your imagination can come up with. I make my own joiners out of the scraps of PVC Pipe. 1½" is about perfect with ½" PVC pipe. 2" joiners work better with ¾" or larger PVC.

I do not recommend using PVC Cement. It cures too quickly and it is difficult to get the parts square before the glue sets up. Instead, I use a rubber mallet to square up the structure, then use thin CA glue wicked into each joint. I have used the CA method on stands up to ¾" PVC and have rarely had joints come loose. It is as close to permanent as you can get. In fact, if repairs are needed, you will probably need to cut out the affected structure and rebuild with couplers. One note of caution…NEVER use a PVC stand to run your engine without at least a solid bolt through the joints. I would never trust ANY glue joint against a 12000 rpm Ginsu Knife.

Where to Start

Begin by sketching out your design on a piece of paper. Mark all pieces that will be the same length and assign them a letter. For example, if you have four 20" sections and six 10" sections, label the 20" sections "A", and the 10" sections "B". Continue for each different length of PVC pipe. Count the type and number of each fitting you will need. You can save some Moola by purchasing the "Contractor" bags of Tee's and Elbows if available.

I have built several stands with nothing but a hack saw. But when I purchased a cheap $29 Harbor Freight 8"

chop saw, building PVC stands became child's play. As you cut your PVC pipe sections to length, use a fine black marker on one end to give it it's associated letter. If written within the first ½", it will then be hidden by the fittings. To provide padding, Foam Pipe Insulation available near the water heater section at your hardware store works great! Cut the foam insulation the same length as your PVC sections that require it. You can trim it later.

Once you have your "Kit" cut and labeled, trial fit the structure together with the joiners and make any needed modifications to fit your plane. Some trial and error is to be expected. I try to lay flat sections on a hard surface and use a rubber mallet so all joiners are evenly spaced and squared. Once satisfied, add your padding and wick CA in the joints. For larger PVC pipe, I recommend using #6 sheet-metal screws on joints in addition to the CA. I also use electrical tape to secure the foam padding and keep it from splitting over time.

Variations on a Theme

My latest project was to design a work-stand for building and maintaining almost any size of plane, from a foamy to 27% scale. I had assembled a simple cradle stand for my giant-scale Extra, but I found it took too large a footprint in my small workshop and did not support the smaller models well.

I came up with a simple stand with a triangular truss at each end to support models in excess of 20lbs, but eliminated the rectangular frame that can impede accessibility. 1" PVC was used for this design.

The top cradle halves use 3-way Outlet Elbows attached to a 90-degree elbow. By cross-drilling ¼" holes I

Illustration 2: Showing pins for rotating V

can swing the cradle halves 180 degrees in or out. This gives me three different lengths to choose from depending on the size of the plane. A ¼" hinge pin is used to lock the cradle in place.

In addition, the "V" section can also be rotated 45 degrees from vertical to support working on anything requiring a horizontal workspace.

I leave the top "V" section pieces unsecured so I can swap out different support fixtures as needed. Notice the flattened "V" on the far end of the stand.

A Picture is worth…

Here are a few other ideas that others have thought up. I would be interested in seeing pictures of your own PVC projects.

Feel free to contact me at warhwkbb@yahoo.com.

Happy Building and I'll see you on the flightline!...Brad ■

THIS AND THAT

► L.A. Johnston's ongoing efforts on tuning in the Windlord he bought and modified is a lesson in what it takes to satisfy an old time free flight specialist. Here is the latest;

" Well here goes. I have two current projects, both in the "test and improve" stages. One is the Windlord sailplane, and the other is my latest step in a new direction. (Ed. note;;; I'm saving the second step for later).

Illustration 3: L.A. and the Windlord. A really big wing!

As for the Windlord, it was built by another modeler, and I have modified it into an electric powered sailplane. As built it had no provisions for a motor, and there were no spoilers on the airplane. After looking through my pile of electric motors I found that the only ones I had that would fit in the "narrow" nose of the fuselage were the "Phasor" motors. I ran a computer

program and decided to use the Phasor “303” with a 3s pack, and a 10x6 folding bladed prop. That combination doesn’t have enough power to pull the airplane vertically, but it is enough to pull it into a stalled condition at full power, and the control surfaces don’t have enough

Illustration 4: Phasor motor installation

control authority to over come the nose up tendency at full power, so most of my climb outs have to be done at about ½ power.

On the Windlord the spoilers go on the lower surface of the wing instead of on the top. During the test flights I found that this gave completely different flight characteristics than spoilers on the upper surface of the wing. For one thing they act more like split flaps than spoilers. When deployed, you get no change in pitch, and very little change in speed. I actually think that they improve the thermaling ability of the airplane a little because the airplane seems to be more stable, and a little bit more sensitive to lift.

The last time I flew the airplane I decided to deploy the spoilers while under power just to see what would happen. When deployed, the airplane performed a very tight loop, and down elevator would not counteract the looping tendency! The elevator servos are set up to drive the elevators on the lower surface of the elevator, so the control rod is under compression load for up elevator. After my last flight, I discovered that the pushrods are flexing under compression, so my current mod of the airplane is to replace the pushrods with rods that are stiffer! I am also going to install covers over the servo arms and linkage on the lower surface of the wing. I found that they do make contact with grass and weeds on landing and that might damage the gear train in the servos, although I anticipated this happening, and installed metal geared servos on the elevators. As soon as I get these latest mods made, I will send you pictures of the Windlord....L.A .

SHEAR FLOW IN SPARS.

By Michael Catlin

First let’s start with a classic 3-bar linkage. The loads in the supports are calculated by taking moments. Take moments about the upper left hand support gives 10lbs x 20inches or 200 inch lbs. The lower support being 10 inches away resists the moment by 200 inch lbs / 10 inches or 20 lbs.

(see figure 1)

Since horizontal loads must equal 0 lbs then the upper support must see a 20 lb load but in an opposite direction as the lower support. The diagonal rod transfers the loads and makes a stable structural triangle.

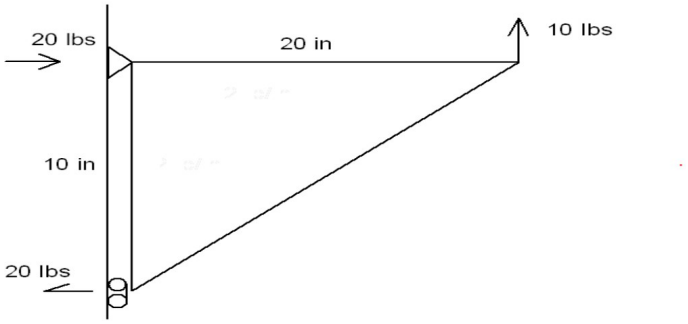
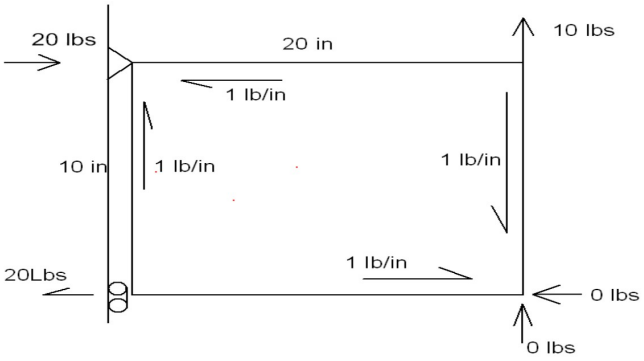


Figure 1

If we replace the diagonal rod by 2 additional rods the structure is now unstable and additional support must be added. In this case a ‘shear web

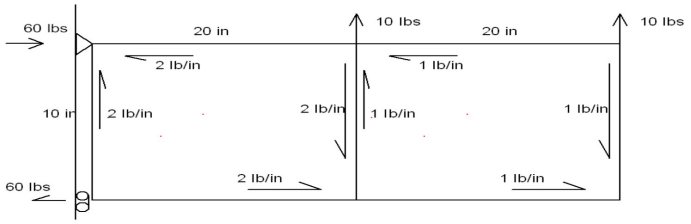


The support loads must be the same but in order for the pin joint in the lower right hand corner to have zero horizontal and vertical load the shear web must reduce the load in the right hand vertical member to 0 over its length. Or, 10 lbs / 10 inches equaling 1 lb/inch. This shear load flow is the same along all 4

sides of the panel but in the directions shown. Along the upper and lower members 1 lb/inch x 20 inches yields 20 lbs at the support.

What happens if we add an additional panel and an an additional 10 lb load? Taking the moment about the upper left corner gives 10 lbs x 40 inches equaling 400 inch lbs plus 10 lbs x 20 inches equaling 200 inch lbs for a total of 600 inch lbs. Dividing this by the 10 inch height gives 60 lbs support load.

Along the far right hand side the results are identical to the single panel but when we reach the middle structural rod notice what is happening. The 10 lbs must be reduced to 0 over the 10 inch height but the shear flow to the left is 20 lbs / inch. But notice the shear flow direction to the right of the structural rod, its direction is opposite and thus subtracting 10 lbs / inch.



In this simple example the vertical loads represent the air loads on the wing ribs and the horizontal rods represent the spar upper and lower caps. The membranes carrying the shear loads are the shear webs and the left hand supports represent the center of the wing with the opposing loads coming from the opposite hand wing panel.

What can we learn from this simple example? The shear loads increase as we move from the wing tip toward the wing root. At the wing tip a piece of paper may be adequate as a shear web and at the root a piece of ply may be needed. The attachment to the ribs is as important to the structure as is the attachment to the upper and lower spar caps. And not clearly shown but also true is that there is tension between the lower left hand and upper right hand corners so for a 'grainy' material such as balsa the grain should be oriented running from lower left to upper right for loading shown. Using a 'non-grainy' material such as plywood would be a better choice when load reversal is expected....Michael

FROM THE PRESIDENT

First, I want to thank outgoing President Ralph Holder, and all the 2016 KCRC Officers and Board Members for doing such an excellent job. Since Ralph was first elected President in 2015, we have seen substantial improvements in KCRC facilities (Safety Fences, Helipad, flightline shed improvements including guttering, decorative gravel, and the list goes on and on...). Of course, I'd be remiss if I didn't mention the contributions, in terms of both time and money, of many of our members which helped make all the improvements possible. In particular, John Basalone, Bill Dodge, Eddie Smith, Steve Jones and others have all gone above and beyond the call of duty to make our club facilities exceptional, all while not breaking the bank. Thanks Guys!

A big thanks goes to the instructors, Phil Cope, Frank Allemand, and Brad Butzbach as well as Jim Scarbrough for his continued production of the newsletter, and Jeff Prosise for developing and maintaining our website. These things generate new interest, new members and a sense of unity which are the lifeblood of our club's continuation.

Also, welcome to the new Officers and Board Members for 2017. Obviously, we have big shoes to fill fellows.

It is truly a humbling honor to serve as President of a club like KCRC. KCRC has a rich, decades old, history of pioneering in RC flight. In 1984, Henry Morse wrote a 75 page history of the club and its predecessors which I'd like to share with the members. Thanks to the work of Jerel Zarestky, who located and PDF'd it, you can view and download this fascinating history by visiting my cloud drive at this link:
: https://drive.google.com/open?id=0B5RGwOO9iSBCdGhHQnd2VC1pS0k

With UAV's becoming ever more popular, KCRC continues to remain in the limelight of cutting edge RC technology. Most of you know that Ed Dumas installed the automated weather station and linked it to the internet and that Ed flies the NOAA owned DJI S-1000 at the KCRC field from time to time for purposes of atmospheric research. But for those who haven't seen it, here's a link to an article,

"Pushing the Boundries" explaining what those flights are accomplishing: https://drive.google.com/file/d/0B5RGwOO9iSBCSzZXdzlLODZmZGM/view?usp=sharing

Additionally, KCRC's field was recently used by Avion Solutions out of Huntsville, AL, to train about 10 ORNL employees in UAV flight. We're pleased that KCRC can be a part of these continuing contributions to RC flight, research and technology.

Margie Hagen, a reporter for the Harden Valley Shopper community newspaper recently happened upon our field and contacted us for permission to do an article on KCRC. The article is tentatively planned for February 22nd publication. Those of you who get that paper may want to watch for that article.

I've said more than enough at this point, but I know we're all looking forward to a new "almost here" flying season and seeing what our fellow members have been working on all winter. See'ya at the field.....Rick Thompson,, President.

KCRC Minutes – February 13, 2017

President Rick Thompson began the meeting at Fellowship Church in Knoxville at 7:00 p.m. Monday February 13. The usual Tuesday meeting was moved up a day to avoid Valentine's Day. There were 20 members and one guest attending. KCRC added one new member, Steven Brant.

Rick introduced new officers and board members and thanked various members for their service, including Michael Catlin (others were recognized in last month's minutes) for KCRC's Facebook site. John Basalone will continue as chair of the field and grounds committee. Randy Philipps is the new safety officer.

There were no corrections to the December minutes, which were approved by unanimous voice vote.

The Treasurer's report by Joel Hebert was approved by unanimous voice vote.

Secretary Roger Kroodsma and safety officer Randy Philipps had nothing to report.

Rick reported the results of his 3-question survey taken at the January banquet. Regarding the number of KCRC sponsored events, 12 members wanted about the same, 10 wanted more, and 1 wanted fewer. Regarding how-to presentations that could be given after meeting adjournment, most members favored this. And regarding the time and location of summertime monthly meetings, about 80% favored Tuesday evening meetings at the field.

Rick and Ed Dumas reported that two instructors from Avion Unmanned Solutions of Huntsville, Alabama used the field during the afternoons part of the last week of January and first week of February to train 10 personnel of Oak Ridge National Laboratory in the use of unmanned aircraft. KCRC may get a report from Avion on this activity. On a separate subject, it is not known whether the planned drone flights have been conducted at the water plant adjacent to the KCRC field.

Phil Spelt recommended that the Senior Pattern Association contest scheduled for the KCRC field October 7 and 8 be moved up a week to September 30 and October 1 so that Warren Oliver can attend. Members voiced no objection. Phil will check with the SPA whether this change is okay.

Phil also reported that the Marines are sending a check for $250.00 to KCRC for last year's Mud Run. The Marine's proposal to have the Mud Run this year on September 16 was approved by unanimous voice vote. The possibility of the Marines participation in driveway maintenance will be further discussed.

Rick reported that Margie Hagan of the Hardin Valley Shopper will be publishing an article on KCRC. To provide history, Jerel Zerestky sent Rick a 75-page history of KCRC prepared in the mid-1980's by the late Henry Morris. This document will be added to the KCRC website.

Allan Valeo reported on the problem with fire ants at the field, where 14 mounds have been counted. Treatments were applied last year. These ants could be a problem for attendees at the Marine Mud Run who park in the big field at KCRC as well as for KCRC members and visitors. John Basalone volunteered to treat those ants on the KCRC field. Phil Spelt volunteered to notify the county Parks and Recreation Department of the fire ant issue and to report this communication next month.

Rick discussed the possibility of having a Cub fest this spring, with outside RC clubs being invited. At least 9 KCRC members have Cubs. Having this event was approved by unanimous voice vote. Randy Philipps, Craig Dieter, and Ed Dumas will organize this event and select a date, which may be May 6 or 13.

Phil Spelt reported that the Harriman RC Club is having a benefit fly-in for Roane County needy school children on September 16, coinciding with the Mud Run at KCRC. KCRC pilots are invited.

Treasurer Joel Hebert submitted a proposed budget totaling $5020, which was approved by unanimous voice vote.

Craig Deiter reported that the Gadgets hobby shop in Harriman has gone out of business.

The award for Model of the Month went to Randy

Philipps who showed a Hangar 9 80-inch Cub with a 4-stroke Saito 72.

Illustration 5: Randy showing his MOM winner.

Rick Thompson and Steve Jones brought models just for display rather than competition for MoM.

No Crash of the Month was reported.

After the meeting was adjourned at 8:00 p.m., Ed Dumas gave a presentation on the Jim Byrnes Disk Sander for a variety of sanding jobs.

Respectfully submitted, Roger Kroodsma, KCRC Secretary…

Roger sent the pictures from the meeting

NOW AND THEN

I was enjoying the monthly AMA magazine we get with our membership and remembering the pleasure I've gotten out of magazines over the years. Especially now that my flying activities are lessened. The AMA magazine has become my favorite now, but when I look back, I guess that RC Modeler was my all time favorite.

The first issue came out in 1963 as I recall, and I think I read every issue from that time until the nineties when it finally gave up. Every issue contained several articles covering the construction and flight setup for every kind of rc model and sometimes reviews of rc radio equipment. One of my all time favorites was an article and construction plans for a vintage looking model called Miss Scarlett. The author was a Georgia boy and the plane was supposedly a scale model of the first ground support plane used by the confederacy in the civil war. A very funny article. I built the plane and it was a good flyer. I especially liked the scale models that appeared in every issue..

The cover almost always featured a sexy looking model with an even sexier looking model. One of the editors of a competing magazine called RC Modeler a skin magazine and I guess that wasn't far wrong because the cover usually showed a fair amount of very good looking skin.

Another magazine I really liked was Model Airplane News. It was an even older and more established magazine that catered a lot to technical aspects of the hobby. In 1968 they published a series of articles detailing the construction of a proportional radio kit called the Man 2-3-4 radio. This meant you could buy the kits and build the different units of the system as the articles came out and you could build the radio as a two, three or four channel radio. A couple of friends and I ordered the kits and we'd get together and build them. I built a four channel and still have it, although it is pretty well greased up now with castor oil. It was a good radio that seldom failed to work well. Unfortunately, the frequency's available were shared by a lot of folks not flying model airplanes and that occasionally caused a problem. .Jim

KCRC Emeritus member Donald Bowman passed away on February 11, 2017. Don was a charter member of KCRC and served as its second president in 1974. Don was very active in the formation of the club in its early days as it transitioned from East Tennessee Radio Control to Knox County Radio Control.