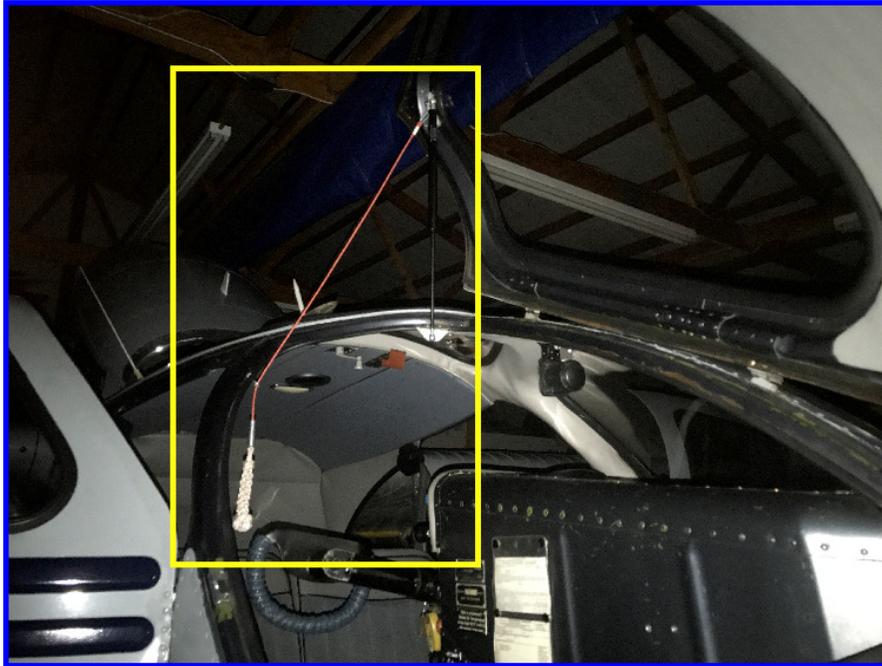


BOW DOOR HOLD OPEN ROD



Bow Door open full extension

After numerous inadvertent Bow Door closings, mainly on my head, I decided to take care of the situation once and for all. This installation is a simple and foolproof way of keeping the Bow Door open and get it closed safely all from the left seat. My DAR has assured me this installation is merely a logbook entry and since the total parts weigh less than a pound, no new Weight and Balance is required. Cost? About \$25. You probably have most of the parts required in your shop.

My hero, Jim Poel, used to open the bow door after every landing regardless of conditions. Not a bad idea and the open bow door helps tremendously on those crosswind taxi conditions especially on the water. This Hold-Open option works well up to about 25 knots of wind. It starts to close with wind from the left above that. Wind from the right doesn't seem to have a limit. I figure it this way, if the wind is 25 knots I'm not going to fly anyway. I hope you like it.

Description:

The Bow Door Rod is a Gas Spring rated at 50 pounds. This will allow the door to open at a slow rate and can be closed easily by pulling on a lanyard attached at the Bow Door Rod fitting. There is very little, if any, strain on the door itself as the lanyard is pulled directly from the top Gas Spring fitting. Once the door is closed it can be latched from the left seat very easily. MAKE SURE YOUR BOW DOOR IS LATCHED, NOT LOCKED, BEFORE TAKEOFF!

The Gas Spring is McMaster-Carr part number 4138T58, at a cost of \$17.51 at this writing. There are other options, stainless steel, etc. It has 50-pounds of pressure and seems to be just enough to keep the door open and is strong enough to open the door without assistance. Total retracted distance of the Gas Spring is about 11.85" so the studs on the Gas Springs must be approximately 12" apart so that the Gas Spring will not bottom out. The extended length of the Gas Spring is 20.12" and is long enough to keep the Bow Door opening wide enough to get out the front if you have to. All the hardware and support lines are out of the way so egress is done unencumbered.

The upper and lower brackets are 1/8" x 1" x 1" aluminum angle cut to shape. Standard hardware is used to attach the brackets and there is a Connecting Link at the end of a lanyard that attaches to the upper Bow Door fitting. The lanyard is then routed down the right doorpost via eyelets to a clip on the sidewall of the cabin (see photos below).

List of Materials: (numbers like this, [3], correspond to photo numbers)

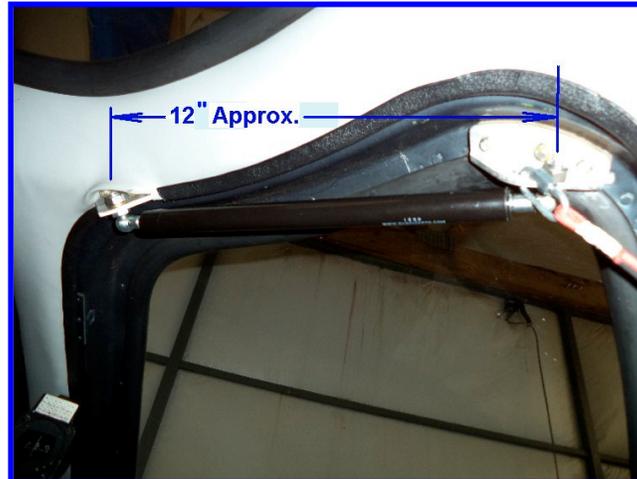
- | | |
|--|--------------|
| 1 – 50-pound Gas Spring | (not shown) |
| 8" – 1/8" x 1" x 1" Aluminum Angle (only 6" required) | [5 and 7] |
| 1 – 1/4" x 2" x 3" Phenolic spacer or equivalent | [9] |
| 1 – 10-32 x 1" Screw with washer and nylon locking nut | [8] |
| 1 – 10-32 x 3/4" Screw with washer and nylon lock nut | [8] |
| 1 – 8-32 x 3/4" Screw with washer and nylon lock nut | [6 and 8] |
| 2 – 6-32 x 3/4" Screw with washer and lock nut | [8] |
| 3" – 1/2" Aluminum tubing. Flared at both ends. | [1] |
| 1 – 6" x 3/4" x .032" Aluminum strap or equivalent clip for tubing | [2] |
| 6' – Parachute cord with Connecting Link, various colors (1/8") | [4] |
| 1 – Bellrope end; handle at the end of the Parachute cord | (not shown). |



Photo of Bow Door Rod Parts

Procedure:

First, determine the location of the Gas Spring when it is fully retracted on the upper part of the doorframe. The lower, airframe fitting should be very close to the hinge line; within 2" or 3". (see left photo below). The total length of the rod is 11.85" but space the brackets a little further apart (12") to prevent the Gas Spring from reaching its retracted limit. See photo below:



Gas Spring in closed and retracted position

Once the location is set, drill out the rivets as shown in the photo below. Rivets will be drilled out of the upper doorframe and the door itself to accommodate both fittings with hardware; we are replacing rivets with screws. Once the rivets are drilled out, clamp the fittings and spacer in place and drill the boltholes through the doorframe and the bow doorframe. There is a 1/4" Phenolic spacer (or equivalent) under the Upper fitting to prevent the Gas Spring from rubbing on the Bow Door. This spacer should be drilled at the same time as the fitting holes. As you know, every Seabee is different so the rivet/bolt spacing will most likely be different on each Seabee.



Bow Door Lower Fitting



Bow Door Upper Fitting

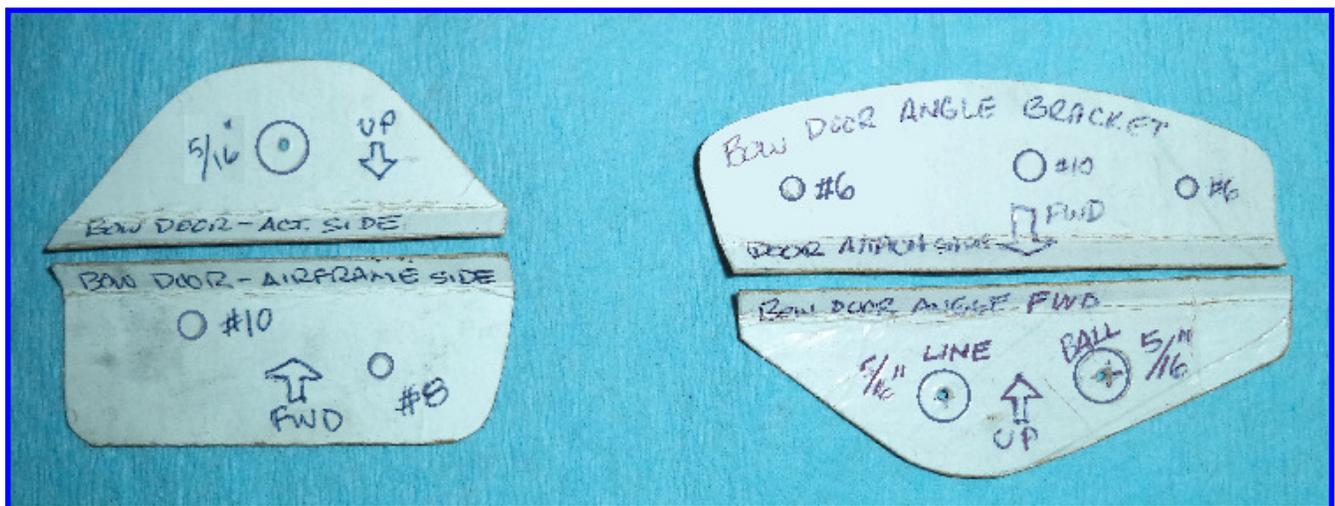


Lower Bow Door Fitting, ball end installed

The Bow Door fitting is aluminum angle cut and shaped to the contour of the Bow Doorframe. The Phenolic spacer is cut to the same contour. The Airframe fitting is the same size aluminum angle (Templates are illustrated below). Keep in mind that your hole pattern may be different than shown.



Phenolic Upper Fitting Spacer (Actual size)



Airframe Fitting (Actual Size)

Bow Door Fitting (Actual Size)

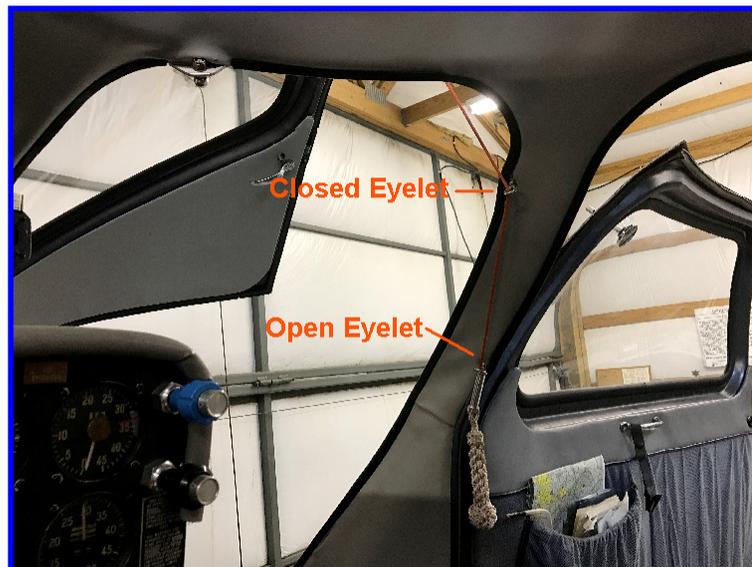
Note that the ball-end stud holes are 5/16" as is the parachute cord attach hole. The parachute cord attach hole (line) is used with the oval shaped connecting link and parachute cord.

NOTE: The Gas Spring ball studs are NC 5/16-18 threads. The nuts required should be the same. These are common in hardware stores and available in stainless steel if you prefer. Aviation nuts will not work, as they are normally a 5/16-24 NF thread.

Bolt the fittings to the Airframe and Bow Door using the screws, nuts and washers shown in the parts list above. Remove the retaining clip on the ball end and install the studs in each of the fittings using nylon 5/16-18 lock nuts. The Gas Spring balls should be facing the Bow Door window, that is, facing down with the Bow Door closed. I put a little grease on the ball ends before the final installation. Open the Bow Door and install the Gas Spring onto each ball end. The wide, cylinder end should go up, as there may be interference installed the other way. Use the clips provided with the Gas Springs and lock the balls in place. You can also use .040" safety wire and safety them in place if you prefer.

Close the Bow Door and be sure there is nothing interfering with the latching ability of the door. Open the door and check that it opens freely and remains open and that the ball ends of the Gas Springs remain in their respective sockets.

Clip the Connecting Link to the free hole in the Bow Door fitting. Attach the lanyard to this link and run it down the right side doorpost. There are two eyelets that guide the lanyard down and away from the controls and allowing the passenger a clear view out the front window. The upper eyelet is "closed" but the lower eyelet is "open", that is it has its eye opened a small amount to allow the lanyard to be stowed there during flight (See photo below).



Lanyard eyelet positions

The eyelets have a 10-32 thread and can be installed at a convenient location with washers and locknuts. Drill out the rivets in the right-hand doorframe to accommodate the eyelets. These should not interfere with the closing of the door. The lanyard is fed through the eyelets and down to a convenient location for the installation of the lanyard-retaining clip. The lanyard is fed through the small aluminum tube and heat shrink tubing and the lanyard is terminated with your favorite "Bellrope" end. The small heat shrink tubing is placed over the lanyard on both ends to contain the safety wire. These "Bellrope" ends can be made by hand and many videos are available on Youtube (just search "Bellrope"). The ends of the lanyard are doubled over and wrapped with .025" safety wire to crimp the parachute cord. The heat shrink tubing is then shrunk over the safety wire to prevent snagging or hurting you or your passenger.

A circular clip is attached to the right sidewall at a location where the aluminum tube (over the lanyard) can be clipped into it for in-flight stowage.



Bellrope end attached to clip on sidewall

Note: The clip above is a plastic clip bolted, with a spacer, to the sidewall. I haven't been able to find these so an aluminum clip, with spacer, made from .040" aluminum will work just fine. See item #2 on page 2.

Sit in the left seat and operate the Bow Door a few times to see how it works. I think you will find that you didn't know how you did it any other way! Best of luck and fly safe.