

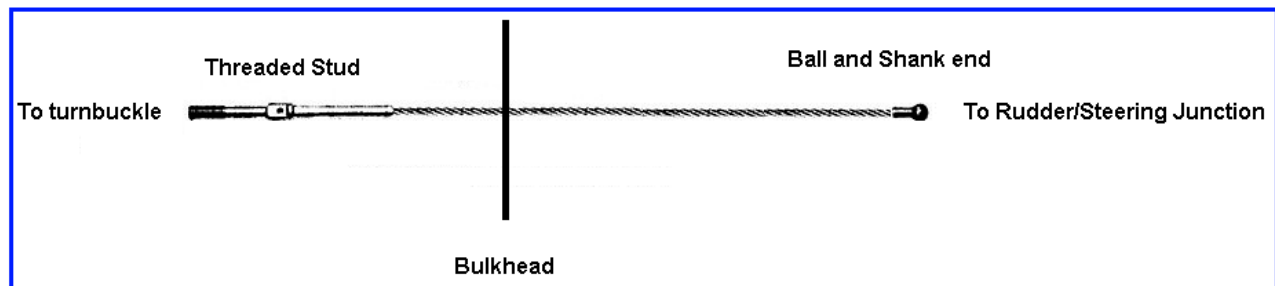
Change Your Water Rudder Cables

I don't know about you but I have to change my Water Rudder Cables every four or five years. They are fraying as they pass through the bulkhead fare-lead just above and forward of the tail wheel. It looks to me like the original phenolic fare-lead material is a little too harsh for the small cables so I use Teflon fare-leads now. Easy to make and VERY slippery. The following procedure is to be used at your own risk as every Seabee is different and this article can't possibly account for every Seabee installation.

Description:

The 1/16" cables are relatively short (approximately 22") and are connected from the Rudder/Tail Wheel steering junctions, if installed, just above the tail wheel actuator. It passes through the bulkhead aft of the tail wheel cylinder and just below the Air Rudder cable fare-lead. It is then attached to a turnbuckle that has a cable eye on one end and a swaged, threaded stud on the other that is swaged (machine crimped) onto the cable. The cable eye is attached to the associated Water Rudder spring that goes to the Water Rudder steering bar. All the adjustments are done with the turnbuckles attached to the springs. The turnbuckles must be safetied after the cables are installed (see AC 43.13).

The cable assembly consists of a threaded stud fitting (normally left hand thread) that is swaged onto the cable, the cable itself and a ball end swaged onto the opposite end of the cable. It looks something like this:



There is one little problem; the ball end cannot be swaged on until the cable is fed through the Rudder/Tail Wheel Steering junction fitting. To do it the way Republic did it you will need to have the ball swaged in position at the airplane unless you want to take all the cables off of the junction and have the shop swage it in-house. A major pain. There is a simple solution however. You can swage it yourself using a cheap swager and a shank ball with a compression sleeve on the end holding the ball in place. This has worked for me for the last 17 years and the assembly showed no signs of falling apart. (See illustration below)



Rudder/Steering Junction
(Shown for clarity only. No need to remove it from the Seabee)

Tools and hardware required: (See photos below)

Tool to remove hand-hole covers (screwdriver, Allen wrench, etc.)
 Cable cutters or a good pair of diagonal cutters
 1/2" socket or wrench
 Nicopress swager (about \$20 bucks at Aircraft Spruce. PN 12-12000)
 Nicopress compression sleeves (copper or stainless steel)
 Ball with shank (MS20664C)
 Threaded Stud, Left hand thread (MS21260-S2LH)
 Cable Eye AN170-16S (if replacement required)
 Turnbuckle AN155-16S (if replacement required)
 Tape or cable marker
 Safety wire (.032")

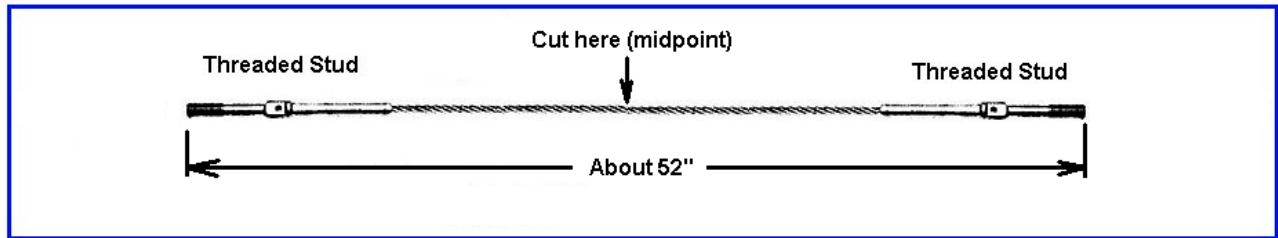
Procedure:

You will need to remove the two hand-hole covers from the water rudder steering bar compartment and the two covers on the sides of the compartment forward of the tail wheel. If you have a hand-hole above the tail wheel actuator you are in luck! This will make your job MUCH easier. If you don't have a hand-hole there consider putting one in. It is fairly simple and will reap benefits for the life of the Seabee. You must get an FAA certified mechanic to help you do that and sign off the logbook and 337 form. [\(There is a previous 337 form from Mr. Bob Gould here\)](#). A drop light inside the compartments will be your best friend with this installation.

Un-safety the turnbuckles and unscrew them leaving the turnbuckle barrel on the cable eye attached to the springs. (The cable eye end should be right-hand thread) Just a couple of turns will hold it. CAREFULLY cut the Water Rudder cables at a convenient location and thread the cable forward through the fare-lead and

out of the Rudder/Steering Junction. Save both pieces of the cable and keep them together for reference later. Keep the left with the left and the right with the right. Measure the length of the two pieces of cable you cut in half and write it down. The left and right cables may be different lengths so measure both of them.

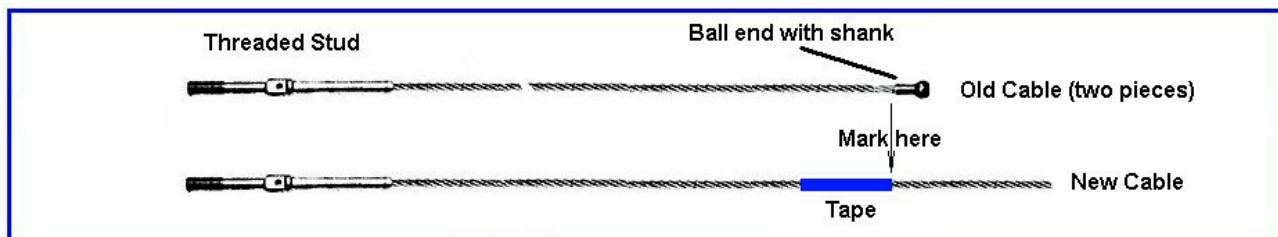
I have ordered a cable assembly from Aircraft Spruce with the threaded stud end on both ends of the cable and then cut it half to make a left and right cable when you get them they will look like this:



Assembly as received from Aircraft Spruce

(I'm sure a local machine shop can make the cable assembly as well but I mention Aircraft Spruce because it's convenient and they were only \$32.00 each. It makes two cables)

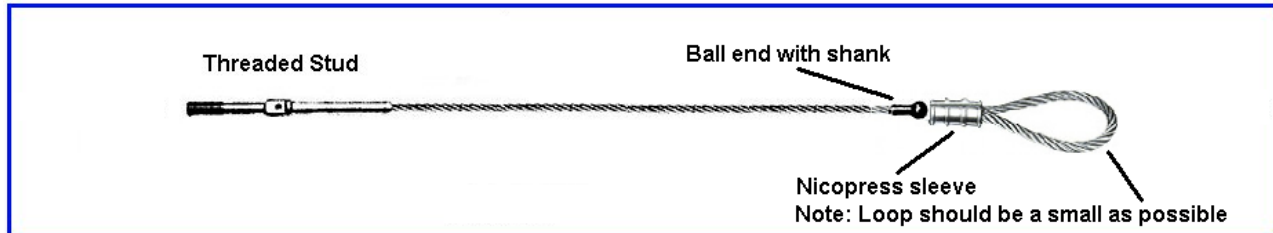
Put the new cable assembly next to the two pieces of the old cable and mark the location of the ball shank. I used masking tape wrapped around the cable to mark it. Just make sure the tape is tight against the cable and doesn't move while you install it. It must fit through the small hole in the Rudder/Steering Junction.



Carefully thread the bare end of the cable through the **aft end** of the Rudder/Steering Junction and pull it forward and straight until the threaded stud hits the junction keeping the tape or mark you made in place as you push it through. (This is where the top hand-hole comes in real handy) Pull the cable end up and out the hand-hole and tape it to the fuselage so it won't go back in the hole. If you don't have a top hand-hole pull the cable out the nearest side hand-hole and tape to the side of the fuselage.

Install the ball fitting with the shank end facing aft (toward the other end of the cable). Install one Nicopress compression fitting over the cable and loop the cable back into the other side of the compression fitting. Making absolutely sure the mark you made on the cable hasn't moved, slide the ball shank down to the

mark. Pull the compression-fitting down to the ball and pull the cable out to make a small loop on the end of the assembly. Install your swager tool and cinch the cable tight. Tighten the 1/2" bolts on the swager ALL THE WAY DOWN! You should now have something like this (Note: Rudder/Steering Fitting is not shown below for clarity):



You will have a small cable end sticking out of the compression fitting which should be cut as close to the fitting as possible. A sharp pair of diagonal cutters works well. Take a small cut at a time to insure you don't nick the good side of the cable.

Take off the tape attaching the cable to the side or top of the fuselage. Feed the cable into the hand-hole and pull it straight aft. Feed it through the lower fare-lead and aft to the turnbuckle. Ok, this is tricky; if your hands are small you can get both of them inside the hand-hole access to the water rudder steering bar and reach the turnbuckle barrel. If not, you gotta do it with one hand like I did. Not the easiest thing to do but do-able with patience. Tighten the turnbuckle a few turns and install the other cable in the same manner.

Once both turnbuckles are turned down a few turns, jack the Seabee tail up so the tail wheel is off the ground. Wiggle the air rudder back and forth a few times to "loosen" the cable tensions.

Note

Check that both ends of the cable are securely seated and the cable eye is centered on the spring. Check the full length of the cable to be sure there is no binding and that the cable routing is correct.

Now turn the turnbuckles tight a little at a time until they are snug. They should only be hand tight with no slack in the cables. Check the adjustment by "eyeballing" the alignment of the air rudder with the water rudder. It is easy to see if it's off one way or the other. If adjustment is necessary, loosen one turnbuckle then tighten the other the same amount of turns. Once you are happy with the alignment, safety the turnbuckles. This is a one-handed job and five or six wraps around each end of the turnbuckle should hold it. If you have those turnbuckles with the one-piece safety clips you have it easy!

Your cable and/or hardware may be different than mentioned above but this is what I had to work with. You may adjust your installation to fit your needs but be sure to get the approval of your mechanic. One modification I would make is to increase the cable size to 3/32" and with the addition of Teflon fare-leads they may just last longer.

Get your mechanic to look at your work and sign off your aircraft logbook. Close up all the hand-holes and you are done! It took me about three hours to do this job. Go slow and be careful.

Steve Mestler
For the Seabee Club

Tools and parts required



Compression Fitting



Swaging Tool



Cable Eye



Ball Shank



Turnbuckle Barrel



Threaded Stud (Left Hand Thread)

MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)				Form Approved OMB No. 2120-0020	
US Department of Transportation Federal Aviation Administration				For FAA Use Only	
INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed \$1,000 for each violation (Section 901 of Federal Aviation Act of 1958).					
1. Aircraft	Make	Republic		Model	RC-3 Seabee
	Serial No.	462		Nationality and Registration Mark	N6255K
2. Owner	Name (As shown on registration certificate)			Address (As shown on registration certificate)	
	Robert Allen Gould			44-365 Kaneohe Bay Drive Kaneohe, HI 96744-2664	
3. For FAA Use Only					
The TECHNICAL DATA identified herein has been found to comply with applicable airworthiness requirements and is hereby approved for use only on the above described aircraft, subject to conformity inspection by a person in 14 CFR, Part 43, Section 43.7. <div style="display: flex; justify-content: center; align-items: center;"> <div style="margin-left: 10px;"> Date <u>12/09/05</u> STANLEY C. CRUCK WP-HNL-FSDO </div> </div>					
4. Unit Identification					5. Type
Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	~~~~~ (As described in Item 1 above) ~~~~~			XX	
POWERPLANT					
PROPELLER					
APPLIANCE	Type				
	Manufacturer				
6. Conformity Statement					
A. Agency's Name and Address			B. Kind of Agency		C. Certificate No.
William Wallerbenstein 3628 Waiala Place Honolulu, HI 96822			X	U.S. Certificated Mechanic	A&P575063513
				Foreign Certificated Mechanic	
				Certified Repair Station	
				Manufacturer	
D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.					
Date			Signature of Authorized Individual		
DEC 14 05					
7. Approval for Return To Service					
Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> REJECTED					
BY	FAA Fit. Standards Inspector	Manufacturer	X	Inspection Authorization	Other (Specify)
	FAA Designee	Repair Station		Person Approved by Transport Canada Airworthiness Group	Air Carrier
Date of Approval or Rejection		Certificate or Designation No.		Signature of Authorized Individual	
12-14-2005		575606260			

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

MFG: Republic

Model: RC-3

REG: N6255K

S/N: 462

INSPECTION PANEL ON TOP OF FUSELAGE AT STATION 222

1. Cutout approximately a 4" diameter hole on top of the fuselage at station 222.
2. Installed inspection kit doubler using single row 5/32" rivets pattern same as other size rivets on other inspection panels.
3. Inspection panel secured with one screw.
4. An "O" ring installed between panel and doubler makes it water tight.
5. The above installation accomplished i/a/w AC43.13-1B chap par 4-57b & f and par 4-58f.
6. No change in weight for above repair.

-----END-----

Additional Sheets are Attached



N6255K Drawing #1

New inspection panel

