

Pneumatic Antenna Line Launcher



About:

There have been a number of variations on the theme of antenna line launchers ... and this is just my concept of how to build one. There's nothing really special about it other than it looks, handles and shoots like a rifle. Sighting down the barrel gives amazingly accurate results. Features include a built in pressure gauge, battery operated release valve, momentary action trigger switch and safety switch. The fishing reel is mounted to a removable coupling that attaches to the front of the barrel. The projectiles are made from a short length of PVC tubing and two pvc caps.

A number of these launchers were built and tested with range/height results shown below. The numbers should be taken only as a rough guide as variations in build precision and component tolerances will have an effect.

Approximate Range/Height vs. Elevation Angle

	45°	50°	60°	70°	80°
25 psi	172/43	168/51	150/65	110/76	58/83
30 psi	207/52	202/61	180/78	132/91	70/100
35 psi	221/55	217/65	192/83	141/97	75/107
40 psi	241/60	236/71	210/90	154/106	82/117
45 psi	247/62	242/73	215/93	158/109	84/120
50 psi	259/65	254/76	225/97	166/114	88/126



Parts list

#	Description
1	3" pvc cap
2	4" length of 3" schedule 40 pvc pipe
3	1.5" x 3" pvc reducing wye
4	3" length of 3" schedule 40 pvc pipe (not visible in photo - hidden by black cable tie)
5	3" x 1-1/2" pvc reducer
6	1-1/2" x 1" pvc bushing
7	1-1/2" length of 1" schedule 40 pvc pipe (not visible in photo)
8	1" pvc male adapter (slip x mpt)
9	Sprinkler valve – Orbit 57461 1" female NPT both ends (Home Depot)
10	Gauge 0-100 psi – 3847K72 (McMaster) or equiv.
11	Schrader valve – Victor 04100-8 or equiv. (Advance Auto Parts)
12	1-1/2" pvc cap
13	6" length 1-1/2" schedule 40 pvc pipe
14	Trigger/safety/battery assembly
15	1" x 1-1/4" pvc reducing male adapter (mpt x slip)
16	2' length 1-1/4" schedule 40 pvc pipe
17	1-1/4" pvc coupling
18	Fishing reel – Zebco 202 or equiv. (Walmart)
19	3/4" pvc cap
20	2-1/2" length of 3/4" schedule 40 pvc pipe
21	3/4" pvc cap

Sourcing parts

PVC pipe and fittings were obtained at Home Depot and/or Lowes but could likely be sourced at most good-sized plumbing supply houses. The sprinkler valve was purchased from Home Depot but can also be bought online. Walmart supplied the fishing reel. The gauge was obtained from McMaster-Carr and the Schrader valve from Advanced Auto.

Building it

The WYE fitting should be drilled and tapped for the air pressure gauge and the 3" x 1-1/2" reducer drilled to accept the metal Schrader valve before assembly. The order of pvc assembly is not particularly critical. I start at the back end of a unit and work forward. The trigger/safety/ battery assembly is the most difficult part of construction. I machined mine out of pvc channel and epoxied it to the handle. Other construction techniques could work equally well. The trigger is an momentary action toggle switch (Mountain 10TC262 from Mouser). Two 9-volt 'square' batteries operate the valve. In series with the toggle switch is a miniature rocker switch, which is used as a safety.

The fishing reel is epoxied to the 1-1/4" coupling. The bottom of the fishing reel mount is contoured to approximately the same radius as the coupling. This can be done with a drum sander or alternatively, a piece of sandpaper wrapped around the coupling.

The pvc projectile has only one end cap cemented to the pipe to allow additional weight to be added inside the projectile (if needed). Two small holes are drilled in the end of the cemented on cap and a cut off paper clip is pushed through the holes and the wires simply bent over inside (it's best to do this before cementing the cap). This forms a 'low profile' loop on the outside of the projectile. The end of the fishing line is fitted with a standard fishing barrel swivel, which attaches to the loop on the projectile.

Use

Estimate the total distance (range) from the launch point to where you would like the projectile to land. Estimate the height (height) of the tree. Use the table provided to determine the appropriate pressure for the desired height and range. Pressurize the storage chamber using a foot pump, bicycle pump, 12 VDC auto tire pump, compressor or portable air tank. At this point a test shot can be made by not connecting the fishing line. The difference in range/height with and without the fishing line in tow is negligible. Make sure the down range is clear. When ready to make the actual shot, press the spinning reel line release button and attach the projectile to the fishing line. Insert the projectile into the barrel with the fishing line connection toward the open end of the barrel. Make sure the down range is clear. . Aim the launcher by sighting down the barrel and operate the trigger. Since the launcher uses 10 lb fishing line it will likely be necessary to pull an intermediate weight line before the final antenna support line. Small diameter nylon 'mason line' or similar material works well in this application. A small amount of compressed air may remain in the pressure reservoir after launch and can be released by activating the trigger.

Safety

The material used in building the antenna launcher is Schedule 40 pressure rated PVC. This material is designed for working pressures well in excess of what we're using here. Some PVC pipe manufacturers recommend against its use with compressed air. If fractured PVC shrapnel may be expelled. Use common sense. Routinely inspect launcher for signs of cracks or other damage. Don't use pressures greater than necessary to get the job done. Do not use in very low or very high ambient temperatures. Low temperatures make the PVC brittle and high temperatures make it soft. Wear safety glasses when using the launcher. Further information on PVC pipe and fittings can be found at <http://www.harvel.com/technical-support-center/product-specifications/pvc-pipe-schedule-40> .

Treat the launcher as you would a firearm and exercise caution. Don't load the projectile or pressurize until ready to use. Once loaded always point the muzzle in a safe direction – preferably up in the air and in a clear direction. Use the Approximate Range/Height vs. Elevation Angle chart to estimate range and height for each launch. Make sure it is clear down range before launching. Keep fingers away from the trigger until ready to fire. Don't store the launcher loaded and/or pressurized. Detach the barrel when not in use and store in a different location for an extra measure of safety. The fill valve is supplied with a metal cover. When not in use it can be snugged slightly beyond finger tight to help prevent unauthorized use. The launcher is not a toy and should be kept away from children. Basic gun safety rules can be found at <http://training.nra.org/nra-gun-safety-rules.aspx> .

Legality

The Bureau of Alcohol, Tobacco and Firearms has determined that pneumatic launchers are not firearms. Some municipalities may have regulations that affect the ownership or use of such devices. While these rules are not common, the ones that do exist usually apply to combustion type launchers and not pneumatics. Check with your local authorities to be sure. A letter from the BATF on this subject can be found at <http://www.spudtech.com/content.asp?id=13>.

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