

Adventures With a Moped

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Summary

This piece describes my adventures with a 1978 Motron Medalist moped, how it came into my life and why I decided to soup up the engine from 49cc to 75cc. A fun project.

Introduction

I always wanted some kind of motorcycle, but always thought them too dangerous. But fun. So while I would not go out and buy one, I kept waiting for one to drop in my lap.

Early last spring, on a Sunday walk through Cape May, NJ, I saw an old moped leaning against a tree, surrounded by piles of detritus from someone cleaning out a garage. I looked at the moped ...and it looked at me. The owner appeared and said, "Take the damn thing, otherwise I have to pay to have it taken to the dump". My wife said, "If you don't take it, I don't want to hear the word 'motorcycle' from you ever again!" So, grateful for serendipity, I hurried the Motron into the trunk of our car for the trip home.

When I did get home and looked it over, I was almost hoping to find it a wreck not worth fixing. I certainly did not want to put hundreds of hours into a rebuild. Nor did I want to tear down the motor. But some things were immediately obvious:

- Most surfaces had no or rather minor rust (it had evidently been kept inside)
- Tires (original, I believe) were in good shape, as was the seat
- Control cables were all rusted and stuck (brakes, throttle, starting clutch), and the chain was very rusty and stiff
- No major parts seemed to be missing, except I could not find a spark coil (was it hiding inside the motor?)
- The engine still had some gasoline in the tank (which I drained and replaced), and the engine still showed oil inside (clean). Spark plug was clean.

Early maintenance and rebuild

So, it looked good to start.

- I began oiling and working the controls, the chain and of course, all other moving parts, taking it easy, starting by making very small movements, then slowly bigger ones. Over a period of a week, everything freed up (moved easily) and seemed to work well.
- I went over the moped looking for clues. The nameplate said it was a 1978 Italian moped, a Medalist Motron. The engine was a 49cc Minarelli V1 and it included a magneto for the ignition, and a 6v magneto generator to operate the lights and horn. Another ID plate said now-defunct "Bob's Sports" in Pennsylvania had sold it.
- I went on the Internet looking for information. I found a surprising scarcity, but what I did find was very valuable. The most important was <http://www.mopedriders.org>, a site with engine manuals for many mopeds and scooters, including the Minarelli V1. I also found a few companies that sell a limited (but useful) range of parts, especially <http://www.1977mopeds.com>. After reading the free PDF manual for my engine, and examining the moped, I ordered a spark coil (\$20) that looked like it might work.

A week or so into the project, with perhaps five hours spent, I had cleaned up the moped, repaired minor items, removed junk (after-market turn signals, etc.), figured out the electrical connections (with the help of the engine manual), and installed a new spark coil (this required making a bracket and minor modifications).

At this point, I still had no instruction manual on this or any vintage moped. I did not understand what the hand-starting clutch did, or the proper process for starting and running the moped. Nor did I know how to stop the engine.

Lift-off!

But even with this limited knowledge, I was ready to go. Instead of a manual for operating the Motron I relied on my many years of experience with engines and mechanical systems.

I put in the gas-oil mixture (40:1), clicked down on the choke (that was obvious), and coasted down my driveway. When the speed got up to perhaps 5mph, I squeezed the starting clutch (the lever on the underside of the left handle), and the engine turned over. And it popped/sputtered!! Hey, that is a great sign. So, back up the driveway for a faster start. Sure enough, in a few seconds, the engine caught and out the driveway I went, returning in triumph to my wife's grin! Looks like we have lift-off!

With a 30-second ride under my belt, it was time to get serious. After more research, I ordered an engine kill switch (worked fine), a replacement horn (didn't work), spare spark plug (didn't need), new speedometer cable (didn't work), and very importantly, a reasonable quality helmet (must have). I continued to oil and clean the moped, even doing a little sanding of rust on the rims and some touch up painting.

I live in a hilly rural environment and began to take rides of up to 1/2 mile. I quickly found that the moped, from a standing start, would barely get up the hill on which our house sits (a 5% grade), though with a running start it could sustain about 10mph. On level road, it could barely achieve 20-25mph (estimated, since the speedometer was broken). But I continued to gain experience.

Starting and Operating the Moped

Pedals: The pedals on a moped are *almost* worthless, except as a place to put your feet. Like a bike, they engage only when you pedal faster than the moped is going. However, the seat is very low (not adjustable), the pedal diameter is very small, the pedals are geared way down, and the moped is much heavier than a bike. All this means that you can pedal the moped, but not far and not fast, and you will tire very quickly. In fact, I found I could just barely pedal it fast enough to start the engine.

Starting the engine: The easiest way is to coast the moped down a hill, with the choke clicked down. Above about 5mph, you can engage the hand-starting clutch, which engages the engine and chain (rear wheel). This cranks the engine, which hopefully starts. Once started, after a few seconds, you relax the clutch, and gun the engine with the hand throttle to release the click latch on the choke. You then relax the throttle, and let the engine warm up for a few seconds. Whenever the engine is running above idle speed, another internal clutch engages the engine to the drive chain to power the moped.

But what if there is no hill to coast down to start? As stated above, it is possible but very hard to start the engine by pedaling and engaging the starting clutch. However, when parked, the moped sits on its kickstand with the rear wheel off the ground. Thus, you can set the choke (if needed), advance the throttle a bit, move the left pedal to the high position (noon, not just 11 o'clock), and push down fast and hard on it while engaging the hand clutch. The rear wheel will spin (like a flywheel), and the engine will start (might take a couple tries). My experience is that this works fine, but you must use the full pedal travel to be successful and push down very hard and fast (a wimpy leg push will not do the job).

Caution: riding a vintage moped is not trivial. It requires a very substantial and unfamiliar coordination of starting clutch, brakes, throttle (hand grip), balance, and steering. My wife, who is a very capable and coordinated person, found great difficulty in mastering the moped. Furthermore, because the moped weighs relatively little (perhaps 75lb), the moped/person combination has a relatively high center of gravity, compared to a motorcycle, so the handling is very different. In contrast, I have found that new model motor scooters are much easier to operate as compared to this vintage moped. On the other hand, I

didn't pay some \$2-3000 for mine! And the Motron (now nicknamed "Gitmo") has much more snob appeal than a shiny new Vespa!

Advanced Moped and Engine Modification

After more operational experience, I continued to cleanup, then to modify the moped. This included

- Disassembly and repair of the original horn (internal wires were simply broken due to vibration of the internal coil). Note this is an AC horn (the magneto makes nominal 6vAC) so is simply a coil close to a diaphragm. The coil was not mounted firmly so its wires broke. I wedged and epoxied the coil firmly.
- Minor repainting, including the rims.
- Checkout the lights (headlight and taillight both worked fine). I leave them ON while running on the highway.
- Installed the engine kill switch (missing when I got the moped).
- Created a box to go under the seat to hold sunglasses/safety glasses (keeps bugs out of the eyes).
- Created a "Rumble Seat" trunk to carry stuff. The moped had a spring loaded book bracket, which is worthless and dangerous (things get loose). The "luggage rack" is also almost worthless. The new "trunk" I made of fiberglass, with a wood/epoxy lid, is big enough for the helmet, gloves, do-rag, and other essentials.
- Installed a small mirror at the end of the left handle bar -- you really do need to watch for approaching cars. Being startled by a car passing you with two feet to spare is very scary. Note that the engine vibration makes all mirrors hard to use.
- Disassembly of the speedometer. The speedometer did not work, and a little investigating showed the drive cable end at the wheel unit had broken. However, a new cable that supposedly fit this speedometer was substantially different in its fit into the speedometer (top end). So, the lower drive unit and lower end of the cable operated, but the upper end of the cable slipped in the speedometer fitting. After several different attempts, I ended up applying solder to the end of the speedometer cable and carefully filing it to make it fit tightly into the speedometer. You can test the setup with an electric drill on the lower end. It would be easier and cheaper to install a bicycle electronic speedometer unit.

Now everything seemed stable and useful, but it was still really marginal getting up our hill. In an effort to improve the power, I tried a variety of steps, including cleaning the carburetor (which was already clean), checking the timing (right on), new spark plug (no difference), adding cloth into the air cleaner to experiment with a richer mixture (made things worse), and removing the exhaust pipe/muffler (no change).

I also experimented with different carburetor jet sizes. With a screwdriver, one can easily remove the carburetor, remove the fuel bowl, and unscrew the brass jet. Using a set of miniature drill bits (#60-80, \$5), I measured the jet opening to be #74=0.020. I opened it up two sizes to about 0.024, a 40% increase, and the engine ran poorly (and wouldn't get up the hill). I filled the jet with solder, and then re-drilled it to 0.020, which restored the function. It looks like this performance is what I get with a 49cc engine!

Back to the Internet, where I found a kit (\$150) to increase the displacement from 49cc to 75cc. Wow, a 50% increase should do wonders (I won't tell the cops if you won't....) I could find nothing on the Internet either about how well this kit works, or what it does to the life of the engine. I received the kit (naturally without instructions) so with only a little thought and a few assembly missteps, which I did over, completed the installation. This did NOT require motor disassembly (a major job I still avoid). It simply required removal of the four nuts holding the cylinder head and cylinder onto the block, replacement of the piston with a new one, and reassembly with a new cylinder and the old head. Be sure to use a torque wrench or measurement scale when reassembling -- it is very hard to know how hard to tighten these small 6mm nuts on the cylinder head. While doing the installation, I found that the interior of the thick walled air intake pipe from the carburetor was way undersized (this is how the manufacturer restricts air/fuel flow to limit the top speed). Using a mill drill and a Dermal, I opened the entire passage from approximately 3/8-in. dia to 1/2-in., thus almost doubling the area. The whole job was just a little tricky, but it took less than two hours.

All back together -- but then the engine wouldn't start! Silly me, I had forgotten to turn the gas valve back on. It started fine and I ran it gently for the first several trips, immediately finding a vast improvement in performance. It can easily start up the hill and climb at over 25mph, and feels much, much better. It can now operate easily on level road at over 30mph. I find the driving unstable over 30-35mph and have never tried for full speed with the upgraded engine. The upgrade did not adversely affect the ability to start or operate. At the time of this writing, I have put approximately 100 miles on the modified engine.

The modified moped did show an increase in a type of missing or lugging when decelerating, which would even make the moped buck several times per second when slowing down. This behavior was present before the upgrade, but much worse after. I again experimented with several different jet openings (remember, the engine now has 50% more displacement!) and found that the next size open (#73=0.021) produces smoother operation (indeed, smoother than the original). Enlarging the jet with the next size drill (#72) made the engine very much rougher, so back to #73. These tiny drills are only about .001-.002 different in successive sizes, so you might be surprised to see such differences in operation with such small changes; however, the flow and hence the mixture is very significant at the 10-20% level. Note that refilling the brass jet screw with a little solder makes it very easy to experiment with larger and smaller size openings.

Conclusion

I now often drive up to about 5-8 miles each way on trips, and usually average 30mph on country roads, both up and down. It is a lot of fun, but is definitely dangerous. The worst factor is the competing automobiles and drivers who are unskilled in dealing with a moped (I am faster than a bicycle, but still slower than a motorcycle or car). An impatient person behind the wheel of a car is unpredictable, I've found. The second worst factor is road hazards: bumps and holes, overhanging vegetation, objects on the roadway. Constant care is needed, and great caution. I do all the right things: watch ahead, constantly check the mirror, wear bright clothing and helmet, and operate with headlight and taillight on.

So far, so good. And as I said, Gitmo rides are fun!





