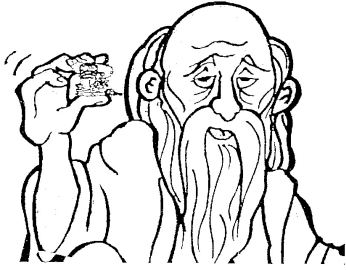


Getting Rid of Old Man Varnish

by Hal Howard

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If your engine has not been running as well as it once did, not holding a needle setting, sagging at full power when you know it is not overly lean, dies on climbout a little after liftoff, yet it has good compression and no air leaks, you may be suffering from an attack of "Old Man Varnish."

This Old Man gets you when the engine is hot because the varnish softens under heat and tends to grab the piston, sort of like a heat-activated glue.

He especially likes to attack small .049 size engines, but can really reduce the performance of larger ones.

Varnish forms due to the heat and agitation in our engines which causes the castor oil in the fuel to break down into varnish which primarily coats the cylinder walls, and to a lesser extend the piston skirts.

Old fuel which has absorbed some water, and flying in damp weather accelerates the process. Please don't take this as a vote against castor as a lube—I think the best of both worlds is castor as 3 to 5% of the total fuel volume with synthetic making up the remainder of the lube content.

However, models engines seem to be a great place for making varnish. I read one article that said the conditions in our engines is very near that used in factories to make varnish: heat, compression, agitation, and spraying through small orifices.

Do I Have It?

- 1) Run engine full throttle on ground. Peak the needle for normal flying full power. Tach soon as it comes to full rpm, then again after it has run for 60 seconds or so. If you have lost more than a couple hundred rpm after the engine is at full temperature, or you hear a noticeable sag in rpm, then you are a likely victim of Old Man Varnish.
- 2) 1/2A engines often just run sick, changing the head/plug, fuel, adding head shims don't help, engine seems to always go lean after a minute of running, and even quits. Look in the cylinder—when it is bad you can see a yellow /brown glazed look to the bore.
- 3) Especially on larger engines, you can be losing 500 rpm and never notice it. So for weekend warriors, clean once a flying season/6mts, for 1/2As, after each quart of fuel, or when it gets sick. Remember old fuel and flying in wet weather makes the problem come on much faster-sometimes in one run for a 1/2A

Quick and Dirty Fix

- 1) Pull head on engine and hold inverted during entire process to keep foreign material out of the crankcase.
- 2) Wrap a blob of #0000 steel wool say twice as large as the cylinder bore (any hardware store, paint section will carry it), around a dowel. Notch the end to grab the "wool".
- 3) Push dowel and steel wool into the cylinder and rotate—you want it to fit tight and be moderately hard to turn. Try for uniform coverage top to bottom with piston at bottom of stroke.
- 4) Pull out after eight-ten turns. If the outer part of the steel wool now has a tan/yellow cast, you have hit pay dirt—that is the varnish!
- 5) Continue to apply until the cylinder is bright and clean. Do not try to remove metal, just do until the initial dull appearance is gone.
- 6) Wipe out the cylinder with paper towels or rags. until no more bits of the steel wool come out.
- 7) Flush/spray out with brake cleaner (any auto parts store) until piston moves freely (do not force piston). Keep cleaner off paint and dope as it will remove it.
- 8) Replace head and enjoy restored power.

Full Treatment

1) Pull engine and take out piston and cylinder/sleeve.

2) Use steel wool as before in the cylinder.

3) Rub sides/skirts of piston with steel wool until it is bright.

If a ringed engine, only remove rings if they are sticking in the ring grooves, and then you would be best off to replace them with new rings after carefully removing the varnish in the grooves with a small dowel and steel wool. Do not round the edge of the ring grooves or scratch their sides.

4) Again, use only until dullness is removed. Be especially careful with an aluminum piston. Some discoloration will remain in the "grain" of cast iron pistons.

5) Wash with detergent and hot water, dry with heat gun, oil, and reinstall.

Do Not:

1). Use any kind of sandpaper or abrasive— you will remove metal and cause premature wear on the engine.

2) Leave steel wool residue in the cylinder or on the parts. Trying to run the engine with these bits of foreign material will damage the piston/cylinder sealing area at the very least

3) Use excessive force, especially on aluminum parts. You only want to remove the varnish, not metal.