Been There, Dunn That

By Tom Stranko

Free From Marine Duties, a 1916 Two-cylinder Dunn is Ready for a New Life in the Farm Show Circuit

Walter E. Dunn Mfg. Co. built the "Dunn Motor" in Ogdensburg, N.Y. The company was best known for its vertical four-cycle marine engines, which were made in single-cylinder, two-cylinder, three-cylinder and four-cylinder versions. The company was founded in 1900, and was active until about 1922. This engine, a two-cylinder, 4 HP vertical inboard engine was built about 1916.

Restoration

I finished restoring this engine this past summer after about 18 months of work. I came across the engine almost by accident in the course of discussing other engines with a Canadian collector. I acquired the engine in October 2002, and started its restoration the following month. At first the Dunn looked like great restoration material, but then I realized the engine had three pretty serious problems: 1: The base plate (which holds the cylinders away from the crankcase) was cracked and pieces were broken out on one side; 2: The two rear support studs were sheared off at the top; 3: Both bronze connecting rods were bent forward. It seemed to me that a scrapper yanking the engine out of an old boat hull with a chain caused all this damage.

Above: Tom Stranko's 4 HP circa-1916 Dunn in its restored glory. Right: The engine as found.

I took the engine apart and started cleaning everything. I took the base plate with the loose pieces set in place to Lord's Welding Shop in Port Crane, N.Y., who not only welded the pieces back in but smoothed out the weld and marked and re-drilled the standoff and cylinder bolt holes. This saved me a heck of a lot of work by not having to recreate the original cast iron base in steel plate. Plus, I really wanted the engine to be original.

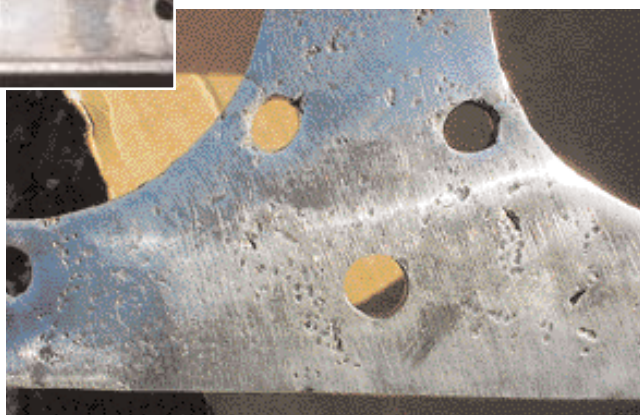
The Dunn was more of a "motor rebuild" job than the last engine I did. That engine, an Emmons but really made by the Stanley Co. of Swampscott, Mass., required a lot of lathe, milling and welding fabrication, plus I did a wet sand and spray enamel finish.

The Dunn needed piston rings, but also bearing refitting and cylinder/base/crankshaft alignment,

along with straightening the connecting rods and readjusting the rod bearings. The six threaded stand-offs that support the cylinders were all broken or bent in some way. I could not buy any Grade 8 stand-offs that were an exact match, so I bought six Grade 8 bolts, cut off the heads and cut threads in the ends.

The Engine has two heads, and each head has an intake valve body screwed into the top of the head. (The intakes are not mechanically operated. Rather, they are "atmospheric" like most hit-and-miss engines). The valve bodies (with a fine thread) were really stuck after almost 90 years in place. I carefully put the head castings in my vise and applied my acetylene torch, mostly to the body itself, to try to break the bonds of time, as it were. I knew from experience that I could break something here if I wasn't careful. Well, one valve body came out fine, but the other one, well …

Above: *Cracked and bent cylinder plate (note bent connecting rod).*
Left: *Badly cracked cylinder plate.*
Below: *Repaired cylinder plate.*



I had an 18-inch pipe wrench on it and I was hitting the wrench with a big piece of oak when the casting cracked. Looking at the remains, I saw that I had placed the wrench above the rim the last time I positioned it and the thin valve body could not take the pounding. I moved the wrench down and the fragment came out. Another job for Lord's Welding.

I clamped the two parts together after grinding a shallow "V" around the break. An intermittent weld was applied and I filled in the rest with epoxy, as I did not want to distort the casting threads if at all possible. The valve bodies came out fine, and after grinding the valves and lapping them into the bodies they both screwed into place with no problems. I put a coat of "neverseize" on the threads just in case anybody ever wants to remove them in the future.

Bottom End

Both connecting rods were bent, and the piston wrist pins needed to be removed to separate the pistons and rods so I could straighten the rods and remove the old, wide piston rings. The wrist pins were locked in place with bolts screwed half into the pin and half into the piston, and I had to use drill extractors to get them out. In an old 1918 auto manual there was a section with detailed instructions on how to straighten and align bent rods. It was a godsend. Straightening was done in two steps: First I put the rods in a vise with a three-point support and forced them back to straightness "by eye." Then I took the rods and set them in the test jig and measured which side of the bearing was not parallel. I then used a big machine clamp to put a bend (a bit at a time) on until there was no measurable error in parallelism. When I assembled the pistons/rods into the engine there were no tight spots or noises etc.

The connecting rod bearings were a little oval shaped. It was not too much (about 0.010") so I opted to shave down the rod caps with a fly cutter in my lathe, which worked fine. There was a 0.050" shim under one cap and a 0.080" shim under the other.

The new rings came from Paul Weaver and they

Left: *The Dunn, partially stripped and cleaned.*

Right: *The bedplate cleaned up with crank and camshaft fitted. Note the captive rollers riding on the cam. Neat stuff.*

are half the width of the originals, so there are now two rings per ring groove. (The compression is so good it's hard for me to pull it over.) I checked the end gap in the bores and used pieces of an old hacksaw blade to bridge them across the ring grooves.

In order to assemble the engine I needed the wood base unit, or skid. I made this from some large pieces of mahogany I had. I cut the mahogany to shape, and after varnishing the wood I bolted or screwed the pieces together. I then painted the crankcase with green engine enamel (1929-1931 Ford dark green engine paint) and mounted it on the skid. At this point I began aligning and placing the various pieces of the engine on the crankcase. I did the fitting over the fall of 2003 through about May of 2004.

Above: *Intake valve body removed from head, valve in place.*
Right: *Vertical timer shaft and new offset bearing.*
Below: *First fire, July 2004.*

This engine has a vertical timer geared to the camshaft. The timer shaft was really crudely installed, such that there was an oval-shaped hole cut in the base plate to allow the shaft to fit. Instead, I machined a brass off-set bearing base to enable me to move the timer shaft forward and align it 90 degrees to the bevel gears on the camshaft. I also made a "fill in" interim bearing to block off the oval hole and steady the shaft.

The timer on my engine is the same style as the 1914 rear-mounted units. I suspect Dunn moved the timer up front and high for ease of adjustment – and to keep it away from water. I had to take a light truing cut on the pot metal timer base to get a stable area for the phenolic body. Aligning the two contact points after putting new hardened contact balls in place was a trial-and-error job. I finally used a caliper to set them both at equal points.

The Dunn's lubrication was a subject of much discussion by the crowd at oldmarineengine.com, a great place for information on old marine engines. There are no other operating open crankcase Dunn engines, but we figured splash from the crank and the continuous dripping of oil from the drip oilers down past the cylinder walls and into the crank wells would do the job. This is exactly what happens. It is a very dirty, oil-flinging engine! Even so, it has run about eight hours all up so far, and the inside is completely slick with oil. (I used mirrors and lights to look up into the wrist pin and small end area.)

The engine's first outing was at the Southern Tier Antique Gas and Steam Engine Assn. 30th Annual Show, Aug. 27-29, 2004, which is our local show. The Dunn ran steadily at the show for about six hours, requiring only for me to keep the drip oilers full and the gas tank topped off.

The Dunn will be on display at the 31st Annual Southern Tier show, Aug. 26-28, 2005, Maine, N.Y. For more information, call: (607) 642-8554. Contact engine enthusiast Tom Stranko at: Tom.Stranko@hp.com

At A Glance: 4 HP Dunn

- Built by: Walter E. Dunn Mfg. Co., Ogdensburg, N.Y.
- Year manufactured: Circa 1916
- Type: Water-cooled four-stroke, vertical two-cylinder
- Horsepower: 4 at 600 rpm
- Bore and stroke: 3-3/4-by-4 inches
- Ignition: Battery and coil with timer
- Weight: ~145 pounds