

A SURE WAY TO EMPTY YOUR WALLET

ACQUIRING THE MACHINING, COMPONENT REBUILDING SERVICES
& REPLACEMENT PARTS NEEDED FOR THE RESTORATION OF
A 1932 PACKARD STANDARD EIGHT ENGINE

by Dick Profio & Paul Grant with major contributions from John Haydon

Welcome to the fourth installment in our series of articles about the restoration of a 1932 Packard Standard 8 engine, salvaged from a parts car by Paul's grandfather some fifty years ago.

In the previous three articles we provided an overview of the Packard Standard 8 engine, described disassembly and left off with a discussion of the critical phase of evaluating the major engine components.

As noted in the last article, all major engine components (i.e. block, head, crankcase, crankshaft, camshaft, connecting rods, etc.) passed close visual inspection. This provided a green light to proceed to the next phase in the process; machining, component rebuilding and acquisition of replacement parts, discussed in this article.

Machining

Extensive services were performed mostly by a local engine machine shop as described below.

Block: To start, the block was hot tanked to clean out rust, carbon, etc. Next magna-flux testing was performed to ensure the block was free of cracks. Thankfully, there were no unpleasant surprises and the block underwent the following machining:

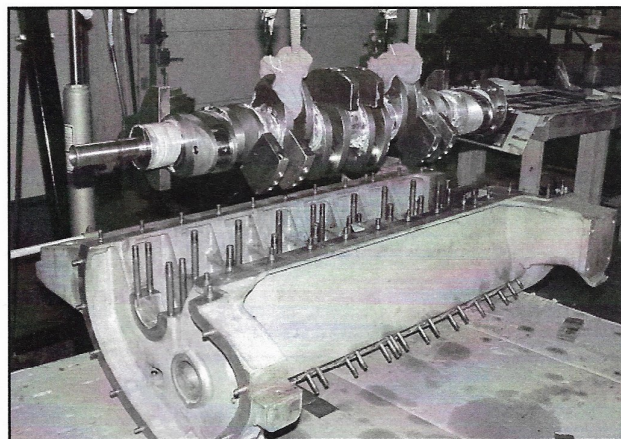
- Following careful measurement of taper and concentricity, the cylinder walls, which were found to be well within tolerances, were bored out. Consequently, the signs of mild scoring and

years of wear were transformed to smooth and true surfaces.

- New valve guides and hardened exhaust valve seat inserts were installed.
- Helicoils thread repair inserts and stitch pins were installed in a couple of instances where exhaust manifold stud threads were damaged.
- The top, bottom, water jacket and intake/exhaust manifold gasket areas were resurfaced.

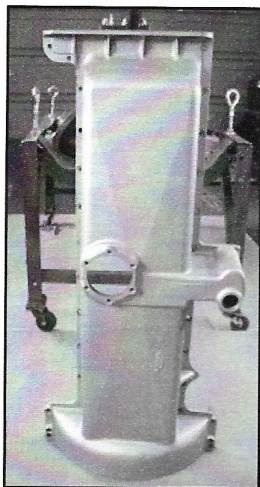
Head:

This component was also hot tanked and then magna-flux tested for potential cracks and then resurfaced to ensure uniform contact with the head-to-block gasket.



Crankcase: Because this component is made of cast aluminum, magna-flux testing couldn't be performed. Due to the softness of aluminum, the crankcase was soda blasted with non-abrasive ground walnut shell media. While the blasting did the job of cleaning the crankcase, mild discoloration that occurred over several

decades of exposure to grease, grime and oil remained.



All main bearing caps and saddles were in fantastic shape. It was determined through using Plastigauge that clearances between the bearing surfaces and the crankshaft journals were well within Packard specifications.

The cast aluminum oil pan was also soda blasted.

Crankshaft: This heavy forged steel component makes one appreciate the high level of quality Packard incorporated into its engines of this era. However, the connecting rod journals showing signs of wear were ground to first undersize (.020). The main journals required only polishing.

Unfortunately, once the crankshaft was installed, we encountered undue resistance when rotating it with a hand crank. A number of theories came to mind as the cause for this condition, such as issues with one or more of the main bearings, a warped crankcase, or perhaps the crankshaft was bent.

To pinpoint the cause of the problem, the crankshaft - crankcase assembly was taken to the local engine machine shop, where it was determined the crankshaft had a 0.006 bend. To correct this problem we enlisted the services of an out of state specialty engine machine shop. There, the crankshaft journals were ground by 0.010 to fully cor-

rect the bend. Next, the existing main bearings were line-bored and then machined to accept modern precision bearing inserts. While this remedy came at a higher cost, it is expected to pay off in the long run. As noted in the last article, we will report on the results of bench testing the engine following assembly.

Camshaft: The camshaft was in great shape, requiring only a thorough cleaning.

Connecting Rods: The connecting rods were in very good condition. However, because the crankcase rod journals were ground 0.010, the rods were required to be rebabbited and then balanced.

Valves: All valves were cleaned and re-faced, except for two exhaust valves which were replaced with new ones.

Flywheel: Only balancing was required.

The cost of machining services definitely lightened the wallet and took considerable time to complete. However, all major components were expertly restored and readied for reassembly.

Ancillary Component Rebuilding Services

Following is a list of ancillary components that were sent to various service shops for rebuilding:

- Generator
- Fuel pump
- Carburetor
- Water pump – rebuilding included a replacement stainless steel shaft and machining to accept a modern unified seal in place of conventional packing material.
- Clutch
- Vibration damper

Continued on page 14

There is no question sending these items out to be rebuilt significantly added to the cost. However, it was clear that due to the expertise required to carry out this work, it was best put in the hands of professionals. An added bonus of outsourcing this work is that most of the service shops also finished/painted the rebuilt components consistent with Packard colors of the era.

One exception to our outsourcing strategy for rebuilding services was the distributor, which we rebuilt and converted from dual points to single point system in the process.



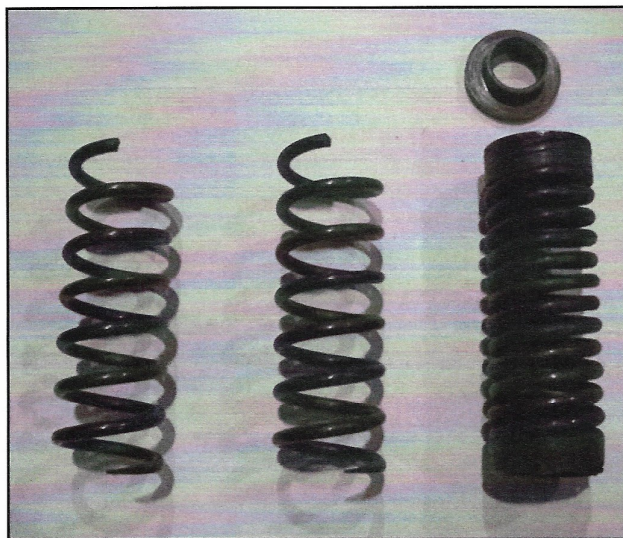
Replacement Parts

The cost of replacement parts for our Classic car engines can also put a real strain on the wallet. However, finding the parts sometimes presents a significant challenge. In the case of the parts needed for this project they were generally readily available. A list of many of the replacement parts purchased is noted below.

- Oversize pistons and rings
- Timing chain
- Distributor points conversion kit
- Rocker lever bearings
- Gaskets - Quite a few gaskets are required for a complete engine restoration. None of the gaskets are inexpensive, but the copper clad head gasket was by far the most expensive.

• Various Hardware Items:

- o Studs - stainless steel versions were purchased but they came at a significantly higher cost.
- o Nuts, bolts and screws, including the 40 stainless steel cap screws used to secure the water jacket cover, as well as the 27 expensive chrome acorn nuts and their thick chrome washer counter parts, were acquired. In addition, four very pricy stainless steel valve cover screws were purchased.
- Valve springs - Only a few of the valve springs tested below specifications so most of the existing springs were used. It is interesting to note that Packard valve springs of this period are designed to have two identical springs intertwined so as to function as a single spring assembly for each valve.



- Water jacket cover - Due to exposure to water, particularly without the benefit of the corrosion inhibitor properties of more modern coolant products in that era, it's not surprising to find that original water jacket covers aren't serviceable.

Please see the related photographs showing a few of the engine components in their finished state. In our next article we will cover the reassembly phase. We hope you tune in. There will be fewer words and more pictures.