

500 Horsepower Olds 455c.i.d. build

Technical Article part 1

The project we will feature in this multi-part article is the design and build of a 455 motor to be used primarily on the street in club member Art Whitney's 1950 Olds street rod. We will review all the components being employed and the reasons for these decisions, some being for durability, some for horsepower, some specific to the application, and some for cost effective purposes.

This project actually starts with the 400c.i.d. engine that was in Art's Olds which started having oil pressure problems shortly after being put into service a few months back. This engine was built originally by Mondello Performance Products in Paso Robles Ca. for Art, using a core 400 early block and internals provided by Mondello and adding Edelbrock aluminum heads, Engle cam, forged pistons, and other performance upgrades. Unfortunately for Art, this vendor sold Art a bill of goods, not providing some of the key components Art had asked for such as a roller hydraulic cam, full roller rockers, lower compression to deal with today's pump gas, and a couple of other build parameters Art had asked for. When this engine was brought to me, upon teardown I discovered a flat tappet hydraulic cam, roller tip rockers, flat top high compression pistons, incorrect length pushrods, incorrect rocker arm studs in the heads, improper bearing clearances which ultimately contributed to the oil pressure issues as the bearings were all into the copper, an extremely poor valve job done on the heads with none of the valves fully seating, and a number of other assembly errors.

Now I am not one to go around bashing other vendors and engine builders but in this case, as I have seen before, using this particular vendor for ANY Olds parts or machine work is not recommended and should be avoided at all cost! This company is not run, owned, supervised, or sanctioned by anyone with the Mondello name and hasn't been for at least 10 years now. If you are shopping for engine related parts or service, search some of the internet Olds forums or give myself or a fellow Olds Club member a call for some good advice on which vendors to trust your hard earned money to. There are several good and honest vendors and builders out there but you need to do your due diligence in finding them as not all "Olds Experts" are created equal.

So upon teardown of Art's 400 motor, rods 6,7,and 8 all had experienced severe bearing and crank journal failure (self clearanced)with all the bearings into the copper and near being spun. This was simply caused by using too tight of tolerances on the bearing clearances along with improper torque on the rod bolts. The block itself had not been bored and honed with a torque plate thus already showing signs of improper ring sealing. The forged pistons were of a good brand (Arias) but were clearanced too tight in the bore and would have contributed to overheating and galling over time. The block itself was possibly the biggest problem of all with all eight cylinders sleeved! One or two sleeves in a block that are not adjoining cylinders is fine in most builds but with all eight cylinders sleeved, the block is too weak to

keep the bores true and round under any reasonable load, thus the improper ring sealing and changing piston clearances. Going to the Edelbrock heads, it appears they were purchased as bare castings and then machined for the valve job and installed parts by an outside entity. This work was done completely wrong with none of the valves properly seated, incorrect rocker arm studs installed, incorrect valve springs for the cam application, and even employing the incorrect head gaskets in the assembly of the engine. As I noted before, the pushrods were the wrong length (too long) which was causing the rocker arm tips to ride off center of the valves which pushes the valve down through the bronze guides at an angle causing abnormal and premature wear of the valve and the guide. Another assembly error was that none of the high quality fasteners employed (ARP bolts / studs) for the rods and main caps were lubricated with the recommended moly lube provided by ARP thus all the torque values for these critical fasteners were all over the place with none of them being correct.

So faced with all these issues, it became apparent we needed an entire new foundation to build a replacement motor for Art's 50 Olds so we decided to go with the tried and true 455 platform as all the mounting points, external physical dimensions, and accessory attachments are the same as the 400 so it was a natural fit. The block being employed is a 1968 version, with a nodular iron crank and factory forged rods. The Edelbrock heads from Art's other engine will be rebuilt, new lower compression forged pistons will be fitted to this motor, and a true hydraulic roller cam with true roller rockers will be used to make this new torque monster breathe. Throw in a hi-volume oiling system, the double roller timing chain from the original build, a new single four barrel Edelbrock RPM Air Gap intake and a few other details and viola, you have 500hp on regular unleaded pump gas, enough power to get any gear head enthusiast's attention.

The team that will be working to build this 455 for Art will be Bernard Mondello Racing Engines in Corona Ca. who will be taking care of the head rebuilding and supplying some of the engine parts, Dougans Racing Engines in Riverside Ca. who will be handling the machine work on the block, rods, and crankshaft, and Warner Enterprises in Perris Ca. who will be overseeing the design parameters and doing the final assembly. Oh, and I almost forgot Art who will be overseeing the entire project and of course, spending the money.

In next month's article, we will go over all the specific components that will be used in this 455 build and discuss why these particular parts were chosen, what modifications / machining will be performed on them and the block, and go over all the necessary prep procedures prior to engine assembly.

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