

LET'S REBUILD SOME MUSTANG ENGINES!

By Mike Guymon

In these times of uncertainty, we live vicariously through our dreams, watch others, and save for the right moment.

When I was 24 years old and again at 39, I took on the tasks of restoring and rebuilding my two 1972 Ford Mustang Grande coupes and their Cleveland 351 CID 2V engines. I purchased a master builder set for the engine, tore it down, and I had the cylinders bored to .30 over. I wanted to run regular gasoline, so I did not use high compression pistons or stroke them. BSA and Steve's Machine Shops in Santa Monica and Venice, California completely cleaned and hot-tanked my engine block, intake manifold, and heads before they rebuilt, machined, and installed Stellite hardened valve seats so that my cars could run unleaded gasoline. I had to use an original NOS metal valley pan and racing gaskets to seal the intake manifold to the heads, a necessary job to seal the manifold and keep vacuum leaks at bay. I wanted everything to be TRW with a Teflon coating for a long life. Then, I purchased a brand new Holley 650-CFM carburetor so that each engine would breathe easy. My FMX transmission was rebuilt and upgraded with a shift kit by my kids' godfather Mark Bealieu at AAMCO in Newhall, California.

Leaping forward to today at 59 years old, my love for vintage Mustangs and my career as a pilot have happily converged while I indirectly help restore P-51 Mustang airplanes and Merlin engines. What does it take to restore a P-51 and overhaul its engine, might you ask?

I would like to introduce you to Ms. KT Budde-Jones at Stallion 51, who helps keep these beautiful P-51 Mustang Airplanes operating:

MUSTANG PRESERVATION AND RESTORATION BY KT BUDDE-JONES

Preserving the legacy of the Mustang is not an easy task. Of the thousands of P-51 Mustangs built there are approximately 160 left that are airworthy. Those that have survived through the decades of neglect have found a rebirth at the hands of skilled mechanics that not only restore them to the sky but have restored the history that they have guarded within.

More than mechanics, the men and women who bring these magnificent examples of the period's aviation know-how back to life are more akin to museum conservators, following the more intricate details and drawings to restore the aircraft to new condition and sometimes better than new. North American Aviation, who designed and made the Mustang, created cutting edge technology. They also had the ability to mass-produce Mustangs and all its specialty parts and components thousands of times to perfection.

The abundance of these parts makes it possible to keep the surviving Mustangs flying. Wings, fittings, skins, casting, components, engines and accessories are still available in various states of use ready to rebuild, restore and reuse on a P-51. A Mustang's restoration is never complete; it is a progressive project needing to be worked on continuously. Mustangs were built in WWII with a short life expectancy; assuming they would be shot down or shot up before they wore out.

Today, we restore and repair them for the long haul. That takes time and effort to continually work on them; possibly like a Formula racer versus an everyday driver. Though the Mustang is sturdy and dependable; she is a well-bred race horse that needs TLC on a continuous basis. Not much different than restoring a car; systems are replaced or rebuilt and then maintained but unlike a car they are restored and repaired by FAA licensed

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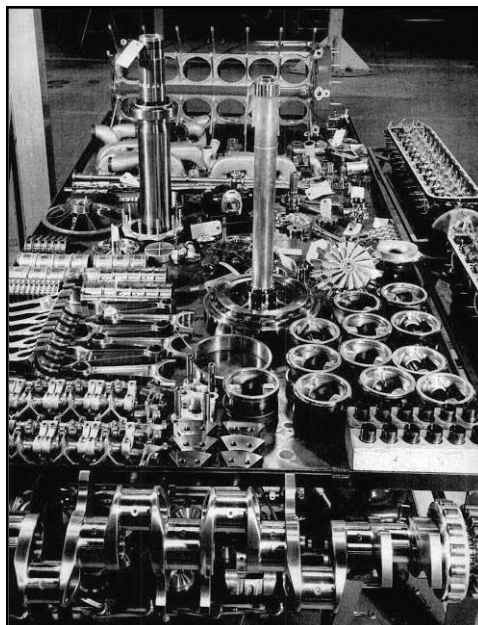
technicians that learn their craft from those who came before them. It's an art as much as much as it's a vocation. Some would say a calling.

Thank you KT!

Let's look back for a moment, and remember that the P-51 Mustang was built for the punishments of war and originally had a life expectancy of roughly 200 hours. With Axis fighters shooting at you and flak thick in the air, all you could think about was, "Will that armor save me, and will my engine operate well enough to get me home?"

Now, let's return to the actual overhaul. So, how do you even begin to rebuild a Rolls Royce Merlin V-1610 Engine with six-inch bores and 6.5-inch strokes? Well, it will take about \$300,000 for the overhaul itself, then the cost of labor to remove, overhaul, and finally reinstall the engine. Interestingly, the giant V-12 1,610 cubic inch engine is similar to but extremely different from the Cleveland 351 2V engines in my two Grande Mustangs. If you are ever looking for a concours or restomod restoration, you can fly to Stallion 51, Pacific Fighter Restorations, or American Aero Services for a concours or restomod, but let the buyer beware: a full restoration of an entire P-51 Mustang can take upwards of 23,000 man-hours. Your wings can also be overhauled at Odegard with new aluminum skins and fresh rivets. New custom or classic paint can be had at Sky Harbor Refinishers. Roush will even custom-build the pistons for your Mustang car and Merlin engines!

The first steps in rebuilding the Merlin engine is to remove all of the cowlings and then the propeller. The hangar at Stallion 51 has a roof crane and a wheeled propeller cradle. It takes roughly 30 man-hours to remove the propeller and pull the engine from the mounts. There is a lower end that has two detachable banks of six cylinders. The heads are cast, just like the heads on our cars. The banks are sent out for Cermichrome re-sleaving, and then the heads are sent out for machining. The top end has to be rebuilt as needed, and sometimes, an overhaul can be needed in as little as 25 flight hours, costing around \$50,000 dollars. The oil tank holds 12.5 gallons and the system holds 21.2 gallons of 120 grade 60 weight oil in total. Just the oil alone for your oil change will cost you \$600, not even including the filters or labor! How many parts do you think are in a master builder set for the Merlin . . . ?



A MERLIN ENGINE MASTER BUILDER SET

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The supercharger has two stages, and it is rebuilt on an as-needed basis. The radiator is located in the lower fuselage aft of the pilot and also has to be rebuilt on an as-needed basis. It is amazing that there are still NOS radiators out there and that you can buy a custom radiator or just overhaul your own original to spec. You cannot just take this radiator to Valley Radiator in Van Nuys for a rebuild since the FAA has to get their hands on everything. Harrison or Martin Radiators, however, can build your dream radiator! There are two cooling systems on the Mustang: one for the pre-cooler and the other for main engine cooling system. The engine cooling system has to be flushed as needed, and it holds 16.7 gallons, whereas the pre-cooler tank holds 5.2 gallons with a ratio of 50% distilled water to "Stay Clean Glycol."

The gorgeous, "Cuffed Propeller," can be sent out to Hamilton Standard or Mid-Florida Propellers for an overhaul on an as needed basis, but each propeller itself lasts between 2,500-3,500 flight hours. The propeller is geared and turns about half the actual RPM of the engine. You need a crane, slings, and a cradle on which to set the prop after it is removed.

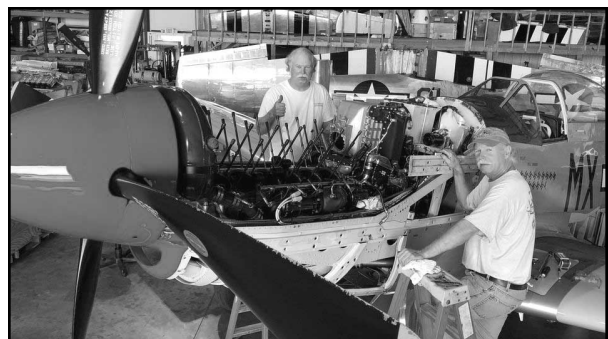
Once rebuilt, the engine is then placed in a test cell and is run between five to seven hours at all power settings with a test propeller. The first oil change comes after 15 hours, then again after 25 and 50 hours. Interestingly enough, however, Rolls Royce did not have oil filters originally, but they did have screens for all of the big parts that failed or were damaged during combat. Under a contract with Rolls Royce, Packard Automotive built the Merlin engine. At first, Packard Automotive could not believe that there were NO OIL FILTERS, so they came up with a wafer oil filter called a, "Cuno Oil Filter." Today, sanity has come to the Merlin world, and spin-on oil filters are now widespread, just like our Fords.

Once the engine is re-hung back in the airplane, and the propeller is installed, the engine must be tested, and the propeller must be run-up to 2,300 RPM. Then, you check the oil, fuel, hydraulics, water temperatures, pressure gauges, supercharger operation, and the electrical outputs. Then, you cycle the propeller from high RPM to low RPM. Once you have done all of these things, you can take the airplane out for some truly invigorating and exciting flying. It is truly amazing what is needed to keep these "National Monuments" running, and if you are anything like me, your heart will race when you hear the hum of the engines and see the airplanes in flight! All we have to do now is win the lottery or make great decisions in the stock market, then we can go fly with Lee Lauderback, and Marco Rusconi in a dual-controlled P-51 Mustang at Stallion 51 in Kissimmee, Florida.

One such fellow loved Mustang airplanes and cars SO MUCH that he purchased a Cobra Mustang in Florida and then had the car wrapped with the colors of the P-51 from Stallion 51. This fellow, Mr. Manny Aranda, will take his story from here and tell you all about his journey of loving both the Mustang Cars and Airplanes!



THE MERLIN ENGINE:
A WORK OF AMERICAN INGENUITY



RICHARD AND PETER LAUDERBACK
REBUILDING THEIR MERLIN ENGINE

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A REBUILT BANK OF CYLINDERS

HEEEERRREE'S MANNY ARANDA WITH HIS 2012 SHELBY COBRA WRAP:

My first encounter with a Mustang as a kid, was in my Dads 1969 coupe. It looked fast like a rocket ship, had growl and threw you back in the seat when my dad hit the gas. That was my introduction to a Mustang, I loved that car and it stuck with me. At age 19 my 1st car was a 1966 Mustang 200 CID coupe, my 2nd was a 1966 coupe 289 V-8 three speed on the floor! I eventually sold those due to expenses which did not cooperate with having a family or two baby car seats in the back. Some years after, the mustang fever however came back to me and I bought a 1995 SN-95 V-6 (3rd) and eventually the kids grew older which in turn led me to buy a 2001 GT Convertible (4th). I was in the Navy and it moved my family to Japan, and I had to place the 2001 GT in storage stateside. It was not one of my fondest memories and I missed it so much, it was like leaving a family member behind. Luck would have it, a fellow Sailor was selling a 1997 SN95 GT (5th) which was slightly modified for Japanese streets, so I bought it. Some Japanese loved it, while others with Nissan Skylines would run side by side on the freeways. After my tour in Japan I sold it and came back to the states to my 2001 GT. I always loved the Shelby's and decided I was going to buy one when I "Grow Up." When I retired from the US Navy in 2012, I started looking into Shelby's and finally bought a 2012 Shelby GT-500 (6th) in 2017 from CarMax for \$49K with only 2,400 miles on it.

As a kid I loved watching war movies such as 12 o'clock High, Black Sheep Squadron, etc. I put together model airplanes, all WWII Bombers, Fighters, however the P-51 was my favorite and I was intrigued it was a Mustang. The Mustang made its way into military aviation and it looked awesome. I loved its bubble canopy and sleekness, it really caught my attention more so than other fighters of the WWII era. One facet of the WWII aircraft was the Nose Art which will play its way into my story. As I started attending car shows around California, such as Ponies on the Pike in Long Beach, I saw some mustangs with P-51 markings. Some were not as detailed as others however it sparked my interest and it dwelled on my mind for quite some time. Out of the Love for Mustangs, I formed a Mustang Club here in my town four years ago and you can find us on Facebook. "Muscle Mustangs of Ridgecrest."

I had done other things with my Cobra like a put a Cobra decal both sides however a club member convinced me to go for what I really wanted, P-51 wrap. I inquired many different places who wrapped cars and many told me if I wanted a chrome wrap it was going to be costly due to the material. This is when I had an epiphany, and went to the local Ford Dealership "Jim Charlon Ford" and talked with the general Manager "Nick Charlon" and

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asked him to sponsor my car with any amount he was comfortable with. He agreed to sponsor my car wrap and I was now one step closer to getting it done.

I started looking up P-51 Mustang owners and wrote to a couple of them asking permission to use their aircraft as a template for my car. Some owners were stand-off-ish and did not reply back after my initial contact so it was a little hard. I saw Crazy Horse from Stallion 51 Flight Operations in Kissimmee, Florida, a school that teaches and certifies pilots to fly in P-51D Mustangs. I was able to talk to the staff and eventually the owner of Crazy Horse. Lee Lauderback (Owner of Crazy Horse) was delighted to give me permission to use his aircraft as a template for my 2012 Shelby Cobra. Just as long as I sent him pictures of my Cobra when done.

Jim Charlton Ford dealership gave me 1,000 dollars towards the cost of the wrap which was \$5,500 plus tax. The shop who did my wrap was RAD Custom Graphics in Ridgecrest, California. The owner Rayan and I sat down and I told him, "listen, this wrap has to be "spot on." This is a P-51D wrap and it will receive lots of criticism if done wrong or with small imperfections. The City of Ridgecrest has a large aviation influence since it's home to China Lake Naval Weapons Station with two Naval F-18 Fighter Weapons Test Squadrons, VX-31 Dust Devils and VX-9 Vampires. Ryan promised it would turn out right and it did.

There is one more item which I will add to keep it with a WWII vibe by adding a Nose Art picture of a Pin-up Girl riding a Cobra (keep it Shelby) throwing a Bomb down below. It's a pleasure and honor to have my cobra wrapped as a P-51D and cruise it (Rough sketch included but not done).

Thank you, Manny Aranda!



STALLION 51's TF-51 AND
MANNY ARANDA'S COBRA MUSTANG

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MANNY'S NOSE ART



CRAIG CUNNINGHAM, MANNY ARANDA,
AND MIKE GUYMON,
ADMIRING MANNY'S MUSTANG



MANNY ARANDA'S
COBRA ENGINE BAY