

## TRAACA Tech Day: 1966 Ford Thunderbird Power Steering Pump Replacement By Craig Brown

August 26, 2017 Norm Madsen's Garage

It's not every day the Tallahassee Region of the Antique Automobile Club (TRAACA) gets to work on an official race car, but it does happen. The Great Race National Event (AKA Hemmings Motor News Great Race) is an automotive competition based on precision driving and navigational skills in classic, antique and vintage automobiles. This is a timed, controlled-speed, endurance rally with race vehicles following a prescribed route while attempting to maintain assigned average speeds. Needless to say, performing all of the above in a pre-1972 car will also test problem solving and mechanical skills.

Some of you may not know that the St. John Paul II Catholic High School automotive club fielded a 1966 Ford Thunderbird (race car no.149) in the X-Cup division of the 2017 Great Race. X-Cup Teams are qualified high-school/college/youth-group Teams. The story of how this team of young automobile enthusiast completed the 2017 Great Race is worthy of its own article. But on this day TRAACA members gathered to assist students Seth, Ariana and Sloane repair some of the race wear-and-tear on the Thunderbird.







A rebuilt pump had been purchased, so Bob, Ken, Jack and Seth did a quick check to determine what it would take to remove the old pump.



The Thunderbird has the advantage of the Ford 390 cubic inch monster torque engine, but also has the disadvantage of the fender well to fender well expanse of this big-block power plant. The power steering pump is on the left side up against the left fender well.



Paul and Jack determined the best way to extract the old pump and had it out in record time. Strategic placement of cardboard and a drain pan underneath the Thunderbird caught the Type F transmission fluid that had not already leaked out. This is important because as we all know transmission fluid, much like blood, always looks like more than it actually is when spread over a garage floor.



With the old pump out on the bench, Craig, Vic and Ken went through some of the next steps with Sloane, Seth and Ariana:

1. Check the new part against the old part carefully before installation to make sure it is correct
2. Ensure the rebuilt pump is completely drained of the shipping oil (this oil is to prevent corrosion during storage and shipment, but is not the appropriate fluid)
3. Make sure the correct puller and installation tool for the power steering pump pulley are on hand and will thread properly into the pump shaft (sincere thanks to Neil for loan of the special tools).



Ariana, Seth and Sloane assembled the puller and soon had the pulley off the old pump. This was set aside to be used on the rebuilt pump.



This is the old pump with the pressure hose and pulley removed. When checking the old part against the new, we carefully noted the location and thread pitch of the pressure side outlet and recognized the return line was 180-degrees opposite of the original. The return line pointing upward would actually make the installation easier. What we dismissed was the slight bevel on the back side of the old pump casing shown in the picture above. That missing bevel on the rebuilt pump was significant.

The team had worked up an appetite and needed a short break to refuel on the sandwiches and snacks Kathy and Norm provided. Even the delicious distractions didn't block the ritualistic banter including jokes that begin with "What does Ford stand for?" This of course led to retaliatory Chevy bashing. The seasoned club members had heard all of this before and paid it the minimal attention it deserved. When the brand bashing didn't let up, the saltier members had to be reminded there were impressionable young people present and to please go back to telling stories that involved non-controversial topics such as "when gas was 15-cents a gallon" and "I paid thirty-five dollars for my first car."



When break time and story time ended, Sloane, Ariana and Seth used the pulley installation tool to press the pulley onto the rebuilt pump.



We had measured the clearance between the pulley and the pump casing with calipers to ensure the installation on the rebuilt pump would maintain proper drive belt alignment. In the heat of competition, the Thunderbird didn't need to throw off a belt! Seth, Ariana, Ken, Bill and Craig check the clearance and make the final adjustment above.

With the pressure hose loosely installed, it was time to put the rebuilt pump in the Thunderbird. Remember the slight bevel in old pump casing? The team quickly discovered the reason for the bevel while test fitting the pump. The bevel on the right side of the pump is to clear the mounting bracket and the bevel on the left is to clear the fender well. The new pump could be wedged in place, but it could not be moved enough to take up the slack in the drive belt.

It is not uncommon to have a part that is used in multiple models with slight variations for a particular model. The problem occurs when a replacement part is listed for multiple models and it will function in each model, but the replacement part does not have the variation specific to your application. Sometimes this is a minor inconvenience that makes installation difficult, sometimes it requires modification, and sometimes the part just can't be installed. The team decided this was a "requires minor modification" situation and decided to move forward.



The first alternative was to remove the pump mounting bracket and begin grinding to alleviate some of the clearance issue. Paul and Norm work on the bracket above.



The result of Paul and Norm's fabrication effort can be seen above. The face of the bracket has been reduced and the sleeve has been shortened to allow the bolt head to recede into the bracket. This allows the pump casing to pivot farther without contacting the bolt head and bracket for a greater range of drive belt adjustment.



Norm, Seth and Paul installed the modified bracket and test fit pump. It took more than one test fitting and bracket modification, but patience did pay off.

Then it was time for the obligatory parts run to locate a shorter drive belt. This was necessary to minimize the amount of travel required by the power steering pump. Norm and Seth returned with a new drive belt that was exactly the correct length for the rebuilt pump. The bracket modifications allowed enough movement for proper tension.



The smiles on Lori, Ken, Reuben and Ariana indicate success! After being filled with Type F automatic transmission fluid and cycled a few times to bleed air, the power steering worked well. Now that the windshield wipers had pressurized power steering fluid, they also worked.

Tech. day taught a few valuable lessons:

1. Check EVERY aspect of the old to new part prior to beginning the job. Even the most innocuous looking dimple, bend, casting, etc. may be there for a reason.
2. Check a service manual and pay particular attention to “special tools needed.” There are sometimes substitutes, work-arounds or shortcuts (and we have all used them), but this situation was one that required the proper tools in order to reuse the pulley. Without the proper puller and installer tool, this job could not have been completed.
3. Always chock the wheels (even on level ground) when working on a car with a malfunctioning emergency brake and unreliable transmission parking pawl.

Number 149 Thunderbird is one step closer to being ready for the 2018 Great Race and our club is thrilled to have some younger members. Thanks again to all the members who helped out. Welcome once again to the St. John Paul II Catholic High School automotive club newest member Sloane, and new TRAACA members Zach, Seth, and Ariana.