POTENTIAL OBSTRUCTION TO COOLANT FLOW IN Y-BLOCK TIMING CHAIN COVER

This article discusses a potential casting protrusion that may slow coolant flow in your Y-Block engine. It appears the volute opening was cast with a thin perimeter and then broken out of the timing chain cover later in the manufacturing process. Unfortunately, some of the breaks were not as clean as intended and resulted in part of the casting protruding into the volute opening. I first observed this when I was sandblasting a timing chain cover to clean it up to serve as a mounting point to show the difference between the original and the A-432 water pump spacers. That first observed protrusion is called out in Figure 1.

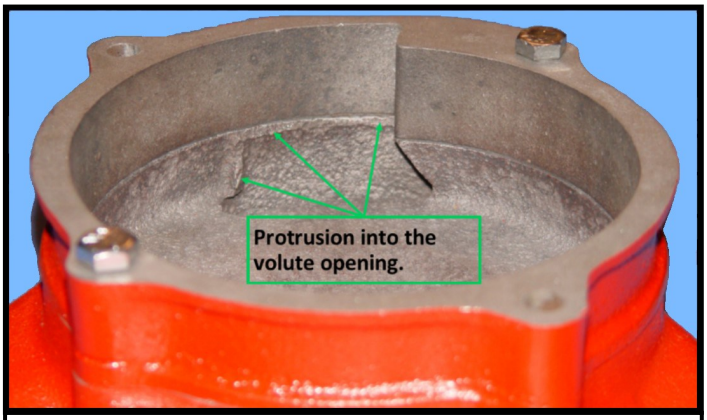

Figure 1.

While this protrusion is visible when photographed with good lighting and from this angle, it is not visible when the timing chain cover is attached to the engine. In fact, during flow testing of the various prototypes of the redesigned water pump spacer, I had removed and reinstalled the water pump spacer several times and never noticed whether or not our timing chain cover had a protrusion.

It was not until after becoming aware of this potential protrusion problem that I realized that I did not know the status of our volute opening. So I removed the water pump spacer to check for a protrusion and found one approximately the size of the one pictured in Figure 1.

The volute opening should be ground flush with the inner surface of the timing chain cover as shown by the green reference lines in figure 2 to minimize obstruction to coolant flow.

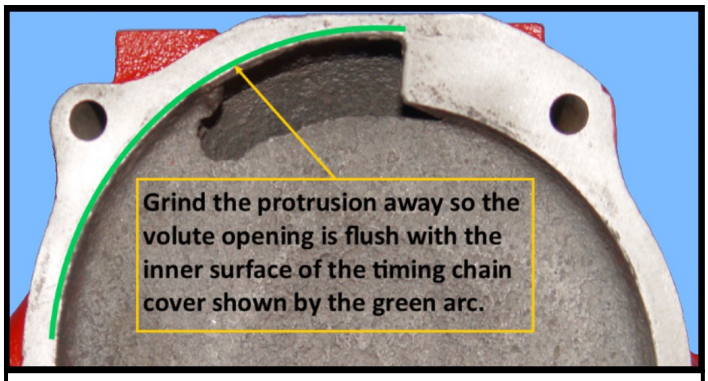

Figure 2.

An angle drill with a 1/2 inch rotary file as shown in Figure 3 is an excellent tool to grind the protrusion away. The one shown is from NAPA, item number 7771619. After the grinding is complete, the water jacket must be thoroughly flushed to remove all grinding debris.

Figure 3.

In Figure 4 the timing chain cover is shown after I ground off the protrusion and smoothed the edges of the volute opening.

Figure 4.

Over

The *Arizona Classic Thunderbird Club* does a Tech Day each year, and at the 2018 session, I showed the redesigned water pump spacer and the example of a protrusion on the timing chain cover shown in Figure 1. After the presentation, one of the first Club Members to install the A-432 said that because this problem was not known when he had his spacer installed, he did not have the timing chain cover checked, and was concerned about the possibility of a protrusion. I offered to help him pull the water pump and spacer to check. A couple of days later, he brought his Thunderbird over, and we removed the water pump spacer and discovered the worst protrusion I have seen to date. And the chunk of casting in the volute opening shown in Figure 5 has gone unnoticed for over 60 years! You are not likely to notice casting protrusion unless you were specifically looking for it.

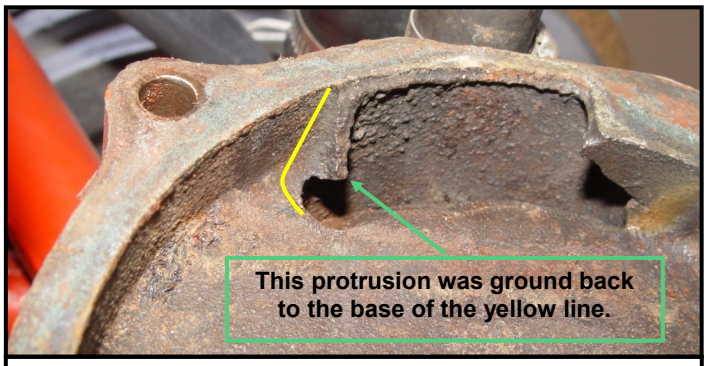

Figure 5.

Because this issue has only recently come to light, most Thunderbird owners have no idea if their volute opening is the result of a clean break or not. If you don't know the condition of yours, I suggest you make a note to check it the next time you remove the water pump. And if you are having your engine rebuilt, do not miss the opportunity to check for and remove any protrusion that exists when the timing chain cover is off the engine.

One final point on this issue is that while the effect is more significant on Thunderbirds because of the spacer installed between the water pump and the timing cover, it applies to all Y-Blocks.

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Revised 4/28/2019