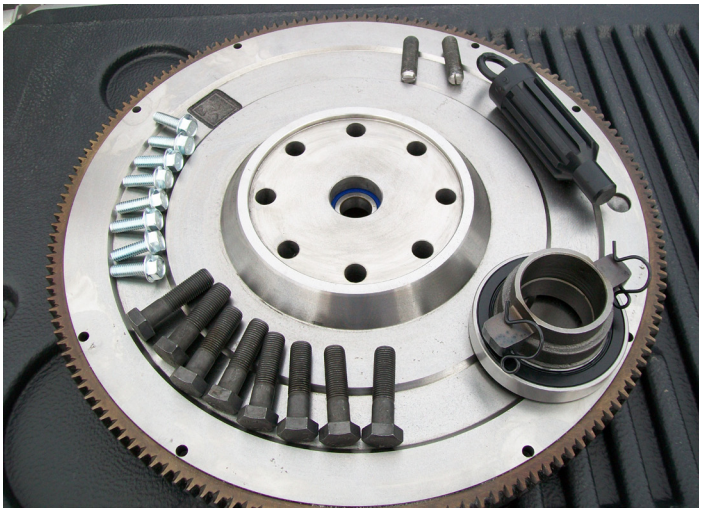
CLUTCHES, DUAL MASS FLYWHEELS, AND THE G56 SIX-SPEED TRANSMISSION

John Holmes mentioned the Mercedes-built G56 transmission and its dual-mass flywheel in Issue 49, page 104. Scott Dalgleish provided excellent coverage of this transmission combination in detail, from the perspectives of new product and engineering advances in Issue 53, page 94. He told us how the Chrysler Noise/Vibration/Harshness engineering group wanted to elevate the customer experience. Scott noted that the G56 shifted easier and smoother and I agree with his assessment. However, I do prefer the ease of reaching reverse with the NV5600 over the G56. Scott noted that overdrive is not as steep (0.79 versus 0.73 for the NV5600) and said he would welcome a higher axle ratio to get a steeper overdrive (lower numerical ratio). In Issue 60, page 48, Scott reported the change to an overdrive ratio of 0.74 in the new version of the G56 for the 2007.5 model year truck and its 6.7-liter engine.

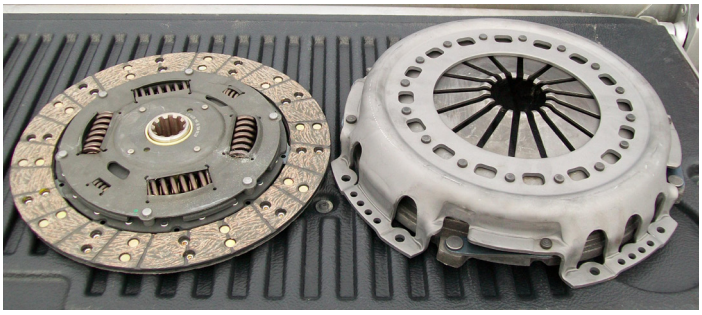
Companion articles included a discussion of G56 features by Harry Brown of Blumenthal's Heavy Duty Transmissions, and a discussion of the clutch with dual mass flywheel by Peter Pyfer of South Bend Clutch. Peter described issues with the Duramax version of Luk's dual mass flywheel, and the scope and limitations of the concept. Specifically, the Luk design experienced some failures and was strengthened, but he felt the Dodge version was similar to the Duramax and "the problem was, and still is, not resolved."

Where are we, about four years later? As a companion to my clutch articles in Issue 66, page 94, and Issue 67, page 78, we will consider the South Bend conversion single-mass flywheel and clutch versus the dual mass Luk OEM for a G56 equipped early-2007 Turbo Diesel. We will also report on how well the G56 has performed, according to Charlie Jetton and Richard Poels of Standard Transmission and Gear in Fort Worth, Texas. We discussed the NV5600 six-speed in Issue 64, page 85, and Issue 67, page 84, and found this transmission to be strong and durable, but with an upgrade recommended for the oiling of the rear mainshaft bearing.

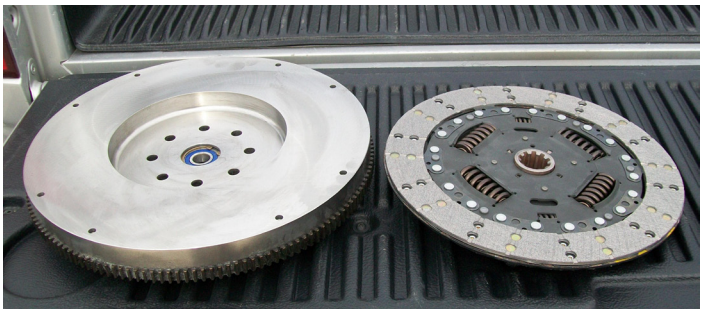
Peter Pyfer of South Bend Clutch has a complete conversion system to install a custom-built single mass flywheel, a South Bend clutch of the same type used in other Dodge Turbo Diesel applications, and a special hydraulic clutch release system similar to the one he makes for the NV5600 equipped trucks (see Issue 66, page 100). The flywheel has a stepped area so it spaces the clutch farther away from the crankshaft than for the NV5600. This conversion kit is complete; South Bend includes the flywheel and pressure plate mounting bolts, a release (throwout) bearing, and an alignment tool. Since this flywheel is heavy—about 70 pounds—I made up two threaded rods that go into two crankshaft flywheel bolt holes, pictured at the top of the following photo, so it could be put into place more easily.



Specially-built flywheel from South Bend Clutch to eliminate the dual-mass flywheel. The kit includes a flywheel with pressure plate mounting bolts, a release bearing, and an alignment tool which are on the flywheel. At the top, there are two threaded rods that I made up to help in positioning the flywheel on the crank.



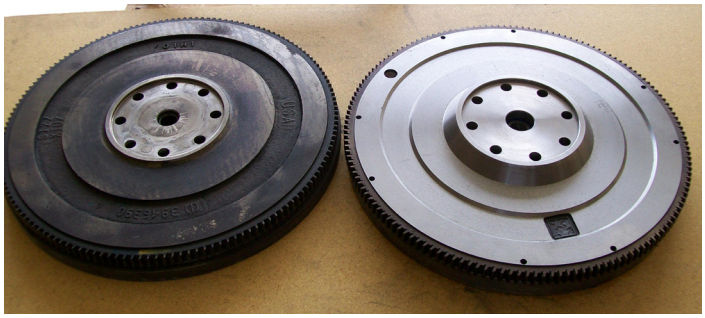
South Bend Con-OFe disk and pressure plate.
The organic faced side of the disk mates to the pressure plate.



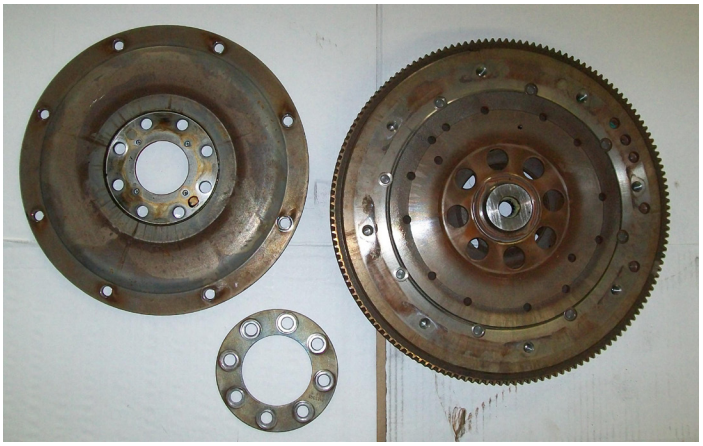
South Bend conversion flywheel and the flywheel side of the disk with ceramic facing.

The clutch is a Con-OFe to hold increased power with near-stock smoothness. The old clutch and dual mass flywheel caused substantial vibration at idle, and some slipping at torque peak rpm. After removing the old pressure plate and disk, heat discoloration and warping were evident on the dual mass flywheel. This situation is to be expected, since the iron plate for the clutch disk is a lot thinner than the solid 1.5" thick conventional flywheel. [photo A] The basic components of the dual mass wheel are the "flex" plate that bolts to the crank, a spacer, and the very heavy cast iron dual

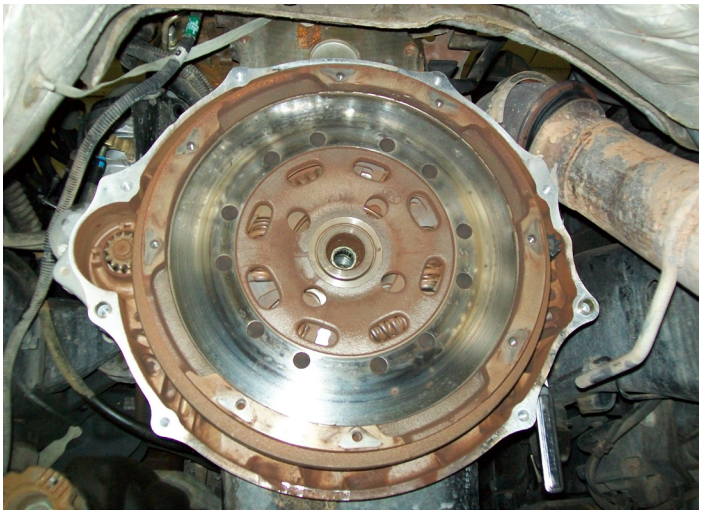
mass wheel itself [photo B]. Wear, loosened springs, and the basic design of the dual mass unit caused the strong vibration at idle in neutral. The disk mounting plate could move over a half inch relative to the flywheel back plate, as shown by the red paint marks [photo D]. The new South Bend flywheel and clutch are installed on the engine, and then the G56 transmission and transfer case can be reinstalled [photos E, F].



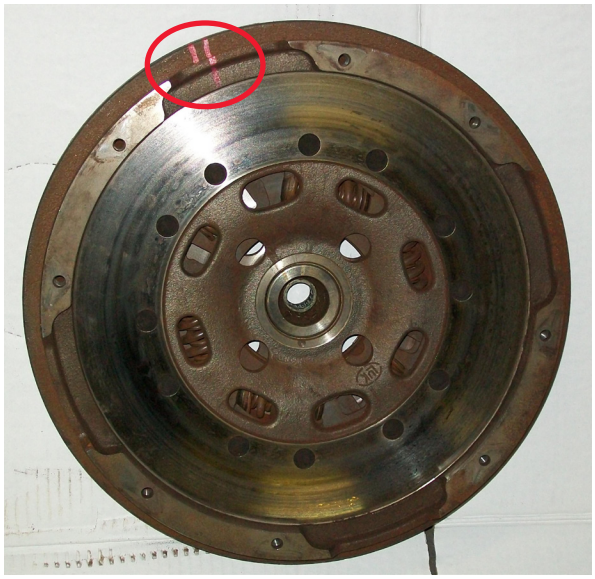
A. The stepped mounting area of the South Bend flywheel on the right is compared to a standard Cummins High Output engine single-mass flywheel. The deep step is needed to replace the extra thick dual mass flywheel and position the pressure plate correctly in the bellhousing.



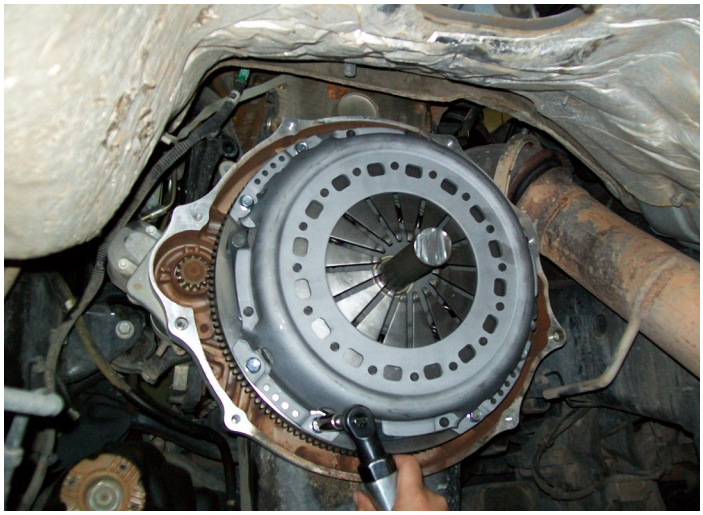
B. Components of the dual mass flywheel: mounting flex plate, spacer ring, and cast iron dual mass wheel with sprung hub inside.



C. At 99,000 miles the dual mass flywheel is warped from excessive heating by a slipping clutch.



D. This close-up view of the dual mass flywheel shows that there is more than a half-inch of rotational free play.



E. The South Bend conversion clutch system has been installed.

F. G56 transmission and transfer case ready for reinstallation.