Driveshaft Rebuild Made Simple

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A slight vibration or maybe even worse, a terrible racket from beneath your truck has caused you to crawl under to check things out. After eliminating several items from your possibilities list, you think that you have isolated the trouble to the driveshaft, in particular, the double-cardan joint seems to have an awful lot of slop and movement. If a brand new driveshaft for about $250 or a rebuilt unit from one of the Bronco houses for $189 just doesn't seem feasible to your already depleted Bronco budget, maybe you could rebuild the double-cardan driveshaft with its constant velocity joint. With your mechanically-challenged skills and the lack of a heated garage, can you do this task? YES, you can! And here's how!

Spicer offers these tidbits of information about the double-cardan design (http://www.spicerdriveshaft.com/cardan/products-cardan.html), stating that their new designs offer "higher operating angles — instantaneous of 25 degrees and maximum continuous of 12 degrees — with low noise, vibration and harshness disturbance." So it is worth your time to rebuild your own driveshaft! The double-cardan design consists of five parts (images 1 & 2): two u-joints, a CV collar, a CV ball joint, and a special tip assembly welded accurately and true to the driveshaft tube.

I recently took the time to sort through my trail spares box and discovered that the spare front driveshaft had too much slack in the double-cardan joint. I decided to enjoy the post-deer hunting time of mid-January in front of a warm, propane fire and tear into the driveshaft (images 1 to 4). I set up a small worktable in front of the satellite TV and watched the bevy of Saturday morning shows in the SpikeTV lineup, being particularly attentive to Stacey David's TrucksTV, of course!

Jim Creel, owner of Wild Horses, provides an easy way to determine which driveshaft you have: "From 1966-70, the Bronco came with a Borg Warner driveshaft and, from 71-77, they used a Spicer. Both of these styles used constant velocity joints. If you're not sure, don't go by the year because many of the old ones have been updated already. An easy way to tell which you have is to see if your driveshaft uses external snap rings (Spicer). If you can see the snap rings on the outside of the bearing cap, it's a Spicer." (http://www.wildhorses4x4.com/09.asp) Mine was a Spicer!

I began by removing the external snap rings. They were caked in mud and grease and some rust, but a few swipes with the wire brush and a couple of taps with a punch and a hammer loosened them right up. They were then easily removed with a pair of needle nosed pliers and laid aside for later use (remember to recycle!). By pressing down on the CV ball joint, I was able to remove the two caps off the end of the top u-joint. I used a 4" shop vise to hold the other end steady, but this rebuild project can be accomplished without a vise if you don't have one. (Or maybe it's part of the "investment in tools" that you can convince "The Boss" is crucial to the rebuild process.) With one end of the driveshaft held securely by the vise, place the other end of the driveshaft on a big block of wood, to absorb the hammer blows, in such a way that the u-joint cap has room to exit the CV collar.


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A 3/4" socket from my 1/2" ratchet placed on the top u-joint cap was used to persuade the opposite u-joint cap to come out of the collar. Place the socket so that the more solid side is towards the u-joint cap. You may want to take precautions to avoid damaging the socket by using an old bolt inside the socket (image 5) or a block of 2x4 hardwood on top of the socket. Go slowly so that you do not break the grease zerk, or better yet, remove the zerk to provide more clearance. When the opposite u-joint cap is about ready to pop out, take a pair of vise-grip type pliers and see if the cap will come loose, if not, tap some more. Carefully remove the cap and check the roller bearings. If this is your daily driver rig and it is your rear driveshaft, do yourself a favor and splurge for the higher quality, name-brand Spicer u-joints that will run about $20-$25 each! But if it is not that crucial to your operation, clean the parts you acquire during this rebuild for possible reuse. Since this was a spare front driveshaft for my trail rig, I recycled!

Now that one cap is out, the other cap may be persuaded with a little encouragement to come on out in the direction it was initially going. But if not, simply flip the driveshaft over, being careful to maintain the integrity of the contact with the u-joint end and its cap so that the roller bearings do not fall down into the cap. Gently tap the end of the u-joint with a wooden dowel. (OK, for you really cheap so-n-sos out there, cut about 6"-8" off of the end of an old broom or mop, which is what I did.)

Now that all four caps have been removed from the first u-joint, it should

come out fairly easily. But, be attentive to the CV ball joint! Carefully press down on the CV ball joint to remove the u-joint and lay it on a clean towel, rag, or newspaper while maintaining some slight pressure on the CV ball joint. Flip the driveshaft up on its end so that the CV ball joint is on the workbench/table/floor and allow the CV ball joint to come apart from the rest of the double-cardan joint. Carefully inspect the CV ball joint. It consists of a CV flange (images 6 & 7) with four fine threaded holes and a round, hollow, circulating ball in the center. Inside the ball is a spring, if not found look in the end of the driveshaft to see if the spring remained there, and many small roller bearings. Upon inspection of my CV ball joint, I discovered that not only were both of the u-joints of the double-cardan joint worn out, but also that the CV ball joint ball had worn out and the roller bearings were dry and loose inside the ball. Time to rebuild the double-cardan/CV joint!

Wild Horses (http://www.wildhorses4x4.com/09.asp) lists item #8584 as a "Driveshaft Rebuild Kit" consisting of "3 u-joints and a constant velocity joint." James Duff (http://www.jamesduff.com/eb/warn.html) has item #3810, a "Driveshaft Repair Kit", for 70-77, of "2 crosses and 1 CV ball joint". Jeff's Bronco Graveyard (http://broncograveyard.com/products/cat/13/32/12462) offers a "Dana/Spicer Driveshaft Repair Kit", item #12462, containing "everything that is able to be replaced on a driveshaft: 3 Dana/Spicer U-joints and 1 CV head".

But being the cheapskate that I am, and having several cleaned and recycled u-joints from various other driveshaft projects over the past couple of years, I decided to see what my friend, Greg King, manager of King Auto Parts NAPA, might have to replace the worn out CV ball joint. NAPA carries the whole CV ball joint, but they also have a simple rebuild kit (part # 612-NUJ) consisting of the ball and collar, new spring, and the gasket ring for less than $30. Since my CV ball joint was not broken and the four fine threaded holes were in excellent condition, I opted for the NAPA CV rebuild kit. Although it came with no instructions, I was able to finally figure out that the old collar from around the ball had to be removed from my old CV head. After trial-and-error, I finally came upon a very thin, flat screwdriver blade that could chip away at the softer metal of the old ball's collar. A Dremel-type tool with a cut off wheel would probably have worked better, sigh! Once the old collar was out, I took some fine sand paper and polished any of the screwdriver blade marks that might have slipped, doh! The whole unit was thoroughly cleaned using brake cleaner, wiped down with a clean towel/rag, and allowed to air dry. The new ball and collar was a snug fit, but I located just the right sized socket to fit over the ball and make good contact with the collar. Carefully taping on the socket with a rubber mallet, I constantly rotated the unit so that the new collar eased down into the CV head without getting cocked to one side or the other. The new gasket ring then fit on to the CV head without difficulty, using the same socket-n-mallet technique as the collar and ball. I've found it best to leave the red plastic spacer inside the ball until you are ready to install the CV joint as that keeps the small roller bearings in place. Then, when you are ready, pack the ball with grease to ensure that the roller bearings will remain put while you put everything back together (images 6 & 7).


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If need be, the second u-joint can also be removed from the double-cardan joint. Start by removing the four external snap rings. The caps on the CV collar are the first ones that should be removed and set aside for cleaning and inspection. Removal is accomplished in the same manner as above. Then, remove the CV collar, if possible (image 8). Otherwise, proceed with removal of the other two caps. Now the CV collar and the final u-joint will come out. Reinstall in the opposite steps.

Whether you remove the second u-joint of the double-cardan joint or not, be certain to closely examine the tip end of the driveshaft (image 9). What you are looking at is the hollow tip that the CV ball joint's ball rotates upon. If the ball is completely worn out, the hollow tip could be deformed, elongated, or oblonged. If you discover that your driveshaft tip is in poor condition, you will want to consider having it replaced by a competent machine shop. The machine shop can precisely and truly remove the tip end assembly and replace it accurately. At this point, a rebuilt driveshaft from Tom's Bronco Parts may start to look like an attractive deal for you and your truck (http://www.tomsbroncoparts.net/cgi-bin/broncocat/2955.html)

If possible, and if you have a large enough vise, you might be able to press the bearing caps back into the holes (image 10), but I was unsuccessful at this attempted feat. Therefore, I used the tried-n-true method of a small sledge hammer, the proper socket, and a solid work station/big block of wood. If this driveshaft is your spare, take serious steps to ensure that the u-joint caps of the loose end do not come off and get lost. Duct tape, cut to the proper width, and securely wrapped back upon itself has worked well for me. Others have been successful with cable tie wraps and electrical tape. Keeping the caps securely in place on

the free ends of the u-joint ensure that it will remain clean and greased and be ready for action when needed; most likely some off-road locale where a grease gun is not readily available (image 10).

One of the most difficult parts of this rebuild was getting the last u-joint installed while keeping the CV ball joint in place (image 11). Since the CV ball unit was replaced with a freshly rebuilt unit, the CV ball joint was very tight and significant (hand) pressure was needed to get the bare u-joint into place. Once the double-cardan joint is correctly aligned, replace one of the u-joint caps, taking care not to allow the roller bearings to fall down into the cap. I found that packing the cap with grease and using extreme care to center the u-joint end into the cap was successful. If the cap will not go a sufficient distance into the hole so that the external snap ring can seat fully into the groove, then perhaps one or more of the roller bearings has fallen into the cap. Remove, inspect, rebuild, refill with grease and try again. Since my driveshaft rebuild included replacing all three u-joints, the chances that I would mess up one or more of the caps was high. I messed up only once and that was on the last u-joint, the one holding the CV ball joint in place (image 11).





The last item on the rebuild list is to adequately grease the whole contraption! Each of the three u-joints has a zerk, but the two in the CV ball joint are probably needle-point zerks, as is the CV ball joint itself, and require a special adapter for your grease gun. This needle-point applicator (image 12) is much used in u-joints in driveshafts and axles and well-worth the small investment - I've had mine for years. There is also a zerk on the slip yoke. "Adequate grease" is when the grease oozes out between the rubber ring and the cap of the u-joint at several places. Packing the u-joint caps with grease during the rebuild process is simply extra insurance! Perhaps the best way to grease the slip yoke is to loosen the cap and slide the slip yoke down enough to expose most of the splines, then apply the grease liberally to all surfaces and groves. When you put the pieces back together, wipe off the excess grease to prevent it from collecting dust and debris. Grease applied through the zerk on the slip yoke will tend to escape through the small hole at the end of the slip yoke unless care is taken to securely cover this hole with a finger under good pressure.

See, I told you it was simple! I know you can do it, too! And look at how much money you saved by doing it yourself! My total costs were less than $30, a partial, small tube of grease, and a partial can of Wal-Mart gloss black spray paint (image 13). If you decide to use all new parts, such as one of the rebuild kits offered by the Bronco parts houses, expect to pay from $60-75, plus shipping. Read the specifications carefully and select quality, Spicer components.

