How To: ID and Repair Shift Linkage Play

This “How To” covers mostly the 3 speed manual transmission equipped 1st and 2nd gen VCVs. The shift lever and related parts we have can take a lot of abuse over a 50+ year period and many areas can cause excessive looseness and more difficult shifting. I’ll start with the lever and move down towards to the transmission. The first checks are done with the engine off and in gear. I advise reading the entire article before starting any disassembly.

Check for broken parts

On 1st gen vans, the upper shift shaft retainer (or whatever you call it) will crack and cause looseness. This is the piece that mounts on the steering column tube and holds the upper part of the shift shaft in place. Excessive force (and weak design) causes these to crack. These pieces fail at that ridge line near the top. This failure is obvious when seated in the van. If you have to remove one of these, it’s some work. You usually have to remove the steering wheel, column, rubber floor boot and other items. It can be a lot of work and the subject of a different “How To”. Currently we have no replacement for these upper shifter pieces and believe me, we have tried. Unfortunately, the cost to repop these was just way too expensive so if anyone has a spare, it’s worth keeping. I’ve seen hose clamps wrapped around the steering column to try and hold these together. If you have one that’s too far gone, one alternative is a Lokar cable type shifter and an automatic transmission. Not exactly a quick or inexpensive fix. Every now and then, I run into a spare. Contact me if you can’t find one anywhere else. My advice is to not force the shift lever, too many hard to find or hard to install parts can break. Fix the hard shifting and play before it becomes a catastrophic failure like these

Below is one in good shape.

Check for looseness at the shift lever pivot point by first carefully pulling back the rubber boot at the base of the shift lever. Be sure not to catch the boot on the pin during removal. Warm up the boot with a hair dryer if it's cold out or it seems like it's wanting to rip. Once the boot is pulled back, you'll see the pin that holds the lever in place. Grip the lever pin like so. Your thumb should be on the top of the pin and your first finger should be on the lower part of the pin and socket.

Now grip the other end of the lever like the picture below and give it a gentle twist back and forth.

There should be only minor movement at the lever while twisting. You should feel no movement at the pin. The pin should not be loose at all or rocking in the mounting hole.

This pin is loose and backing out. The bottom part of the pin no longer contacts the lower part of the lever mount. Since the rubber boot will tend to keep the pin from backing out all the way, the pin rides partially backed out. This wears away the upper mounting hole over time. This then makes for even more play. It happens over time and slowly gets worse.

There are several ways to try and fix this. The first thing you can try is to pull the pin and wrap some shim stock or aluminum foil around the pin splines located near the top of the pin. The splines on the pin are the only thing holding the pin in place. The lower part holds the pin steady but I don't think

there's much on the bottom part of the pin that holds it in place. If you do use something like foil, try to use just a single wrap around the splines. If more than one layer is required, then try the heavy-duty foil which is a little thicker. I haven't found any replacement splined pins for this yet, has anybody? The local hardware store had some tapered pins and also some cylindrical pins that were the same size but if the hole is enlarged, it's still going to be a problem.

Other fixes I've seen are to install a small bolt and self-locking nut. This works but then the rubber boot doesn't fit over it anymore. I've thought of tapping the holes and installing a stainless pan head screw. With the correct bolt, the boot would probably fit again. I'm open to hearing ideas on how to make durable repairs that don't involve too much modification.

Next, using only one finger, lift up and down on the lever in line with the steering column. Apply only light force. There should be less than 1" of free play at the end of the lever. If there's more than that, it's likely the other end of the lever has broken off.

What follows here is how to remove the pin and inspect the lever. I advise checking for more "looseness spots" before taking things apart.

How to remove shift lever pin.

This is how I prepare to hammer the pin out.

Hold a big ball peen hammer or similar weight on the top of the shift lever shaft while holding a pointed punch on the bottom of the pin. This keeps the upper shift lever shaft from taking too much punishment while removing the pin. Before using a hammer on the punch, wrap the ball peen hammer

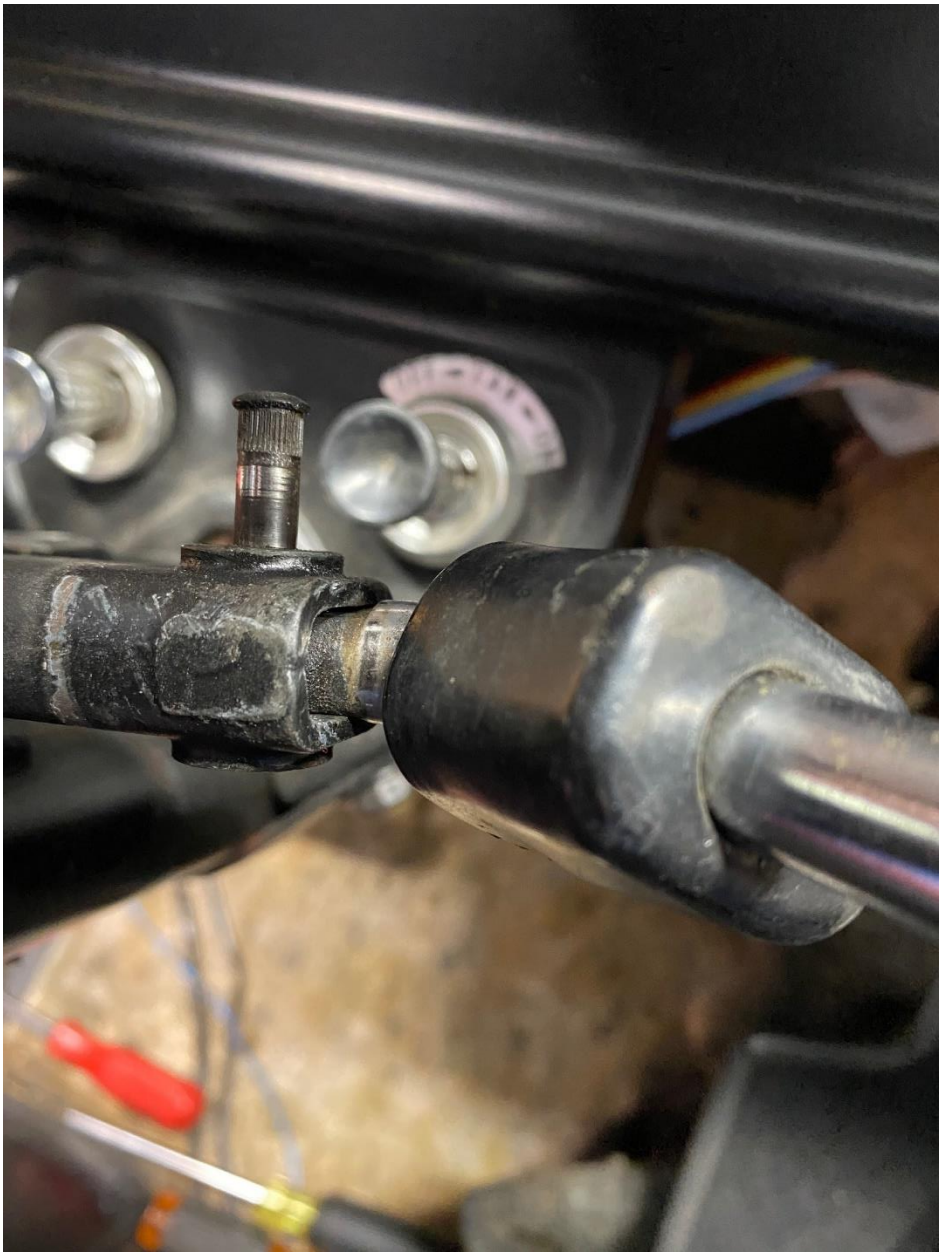
in a cloth to protect the shift lever shaft. This pic was used to show the proper positioning of the tools and how to hold them.

This shows the pin removed, the shift lever end and the two punches that I recommend. The center punch is pointed and is better suited for starting to drive the pin out. The longer pin punch is better for driving the pin the rest of the way out.

Below is a view of the bottom of the pin. Note how a pointed punch will fit nicely in the base.

Once the pin is almost out, it should be removable by hand. Once the pin is out, pull the lever out while cupping your hand below the removed pin area. Sometimes, there was a small wave washer installed on the lower pin area. Check for this washer or pieces of what's left of it.

Sometimes on first gens, a different pin is used. I've seen one like the pic below. These are shorter and have no splines. They are shaped like a smooth cylinder and are much tougher to remove. Once you start banging away on this pin, you'll think you're trying to push it the wrong way. Be sure you have a well-fitting pin punch and are backing up the shift lever with as big a weight as possible. I wish I had a small pin press that fit neatly around the lever. That way I could press these out instead of hammer them out. When I have run into these types of pins, it has taken me a lot more hammering than I wanted to. Luckily, I don't run into these as often.



Once the shift lever is removed, check to see if the ball end is in place. One of the previous pics (with the pin punches) shows the ball on the end is unbroken. If the ball is missing, check the socket to see if the broken ball end is there. These broken ball ends on the shifter are another common source of

looseness. This part breaks when too much force is used on the lever. The fix is to replace the lever or take it to a welder and see if they are willing to try a fix. Below pic shows one I pulled out that was repaired. It's a lot easier to weld material onto the end than it is to reshape the end into a ball. Maybe a ball bearing can be welded on the tip?

The C10 truck levers are usable but the ones I've seen don't have the same bends as our VCVans.

Below pic shows a bunch of shift levers with broken ends.

The next area to check is the lower shift mechanism. Mounted on top of the steering gearbox is where this lower shift mechanism lives. This is serviced from below but you can check for looseness pretty well by looking through the grille openings. Have an assistant go through the gears while you're observing the shift mechanism doing its thing. Note how the two levers control the gear selection. The top lever is for reverse and 1st. The lower lever is for 2nd and 3rd. The ends of these levers are connected with pins and bushings to the two long shift rods going back to the transmission. Also ask an assistant to gently rock the shift lever while in each gear so you can check for looseness at these shift lever bushings. A small amount of play at these lower levers translates to a large amount of play inside at the upper shift lever. If it looks like the bushings have not been replaced, you can just count on replacing them. There's no need to pull them out unless you have a replacement set on already on hand. The original bushings are rubber clad metal. There are two bushings per lever so you'll need 4 on the 3 speeds and 2 on the automatics. It'll take 6 if you have a 4 speed. When ordering, sometimes I've seen solid bronze or brass bushings instead of the rubber clad metal. One former member made a few up for me on his Harbor freight lathe. (Anyone got a lathe at home?) The solid ones will have a noticeably stiffer feel to the shifting and will last longer. The rubber clad metal type will have a smoother feel. Either style will work well to take out some of the shifter train looseness.

Removing the lower shift lever bushings.

Remove the belly pan to access the levers. Pull the retaining clip and remove the pin and bushings for closer inspection. When you pull the retaining clip, the pin and bushings can fall out so be sure they don't get away from you. The 1st gens have a U shaped rod end and the 2nd gens have the pin built into the end of the rods which makes them more difficult to remove.

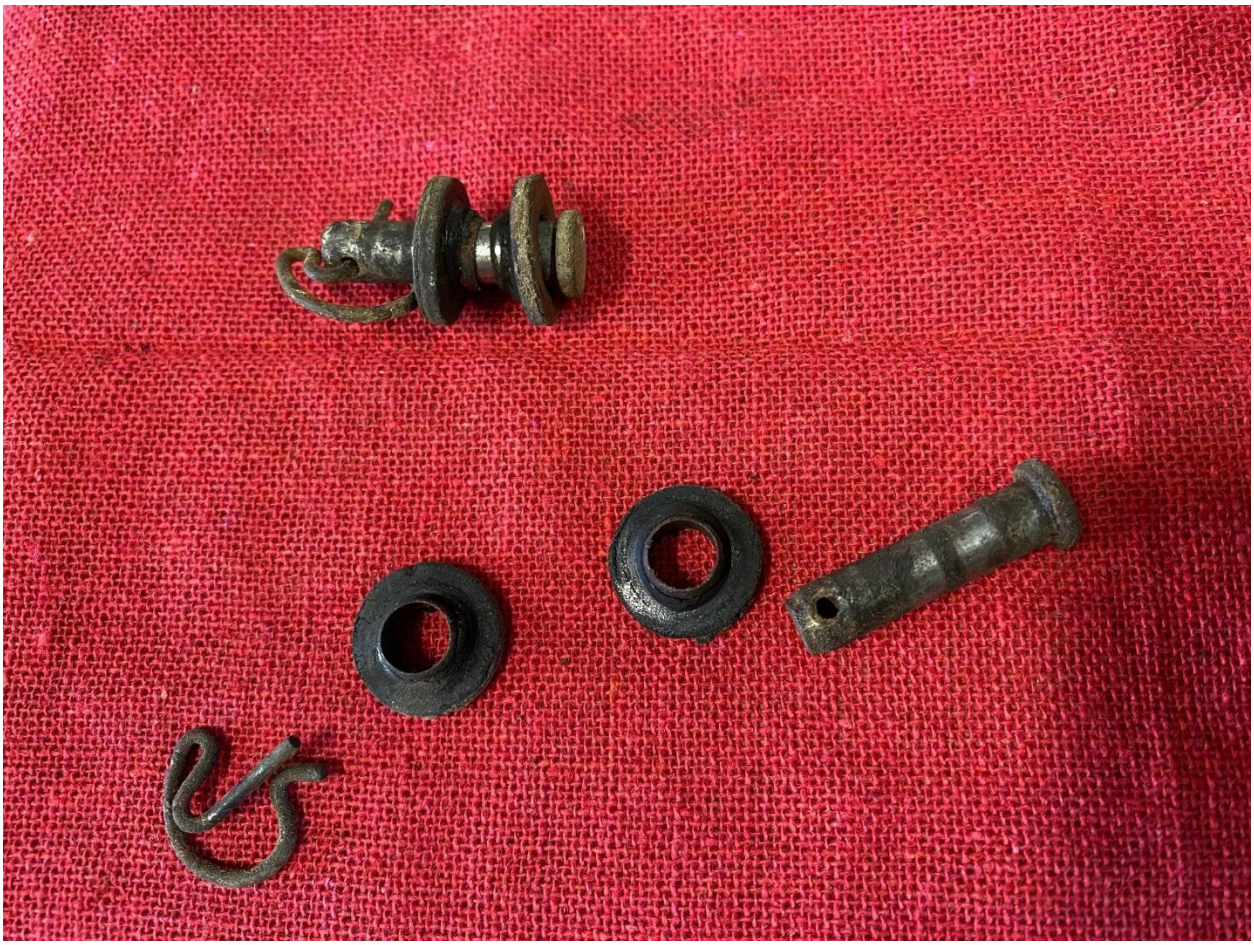
This area right behind the grille gets a lot of exposure to the elements and tends to collect a lot of dirt. The shift mechanism itself can cause play also but pulling that out is more involved and will be covered in another “How To”. This “How To” is intended to address the most common areas of excessive

looseness and the repairs that can be done to correct them without as much effort as pulling and repairing the lower shift mechanism. Below is a pic of 1st gen shift mechanism removed. The Chevy casted ones do not have a grease fitting. The GMC casted ones do have a grease fitting. You can just see it near the bolt hole. This is typically overlooked and not greased. If you have looseness, in the shift lever, it's usually not caused by this piece. Issues here will cause increased effort while shifting but not really looseness. If you have a shift mechanism that looks like this then at some point, it needs to be removed, properly cleaned and re-bushed. If you try to push grease into this fitting that looks like this, you may make the shifting worse. The ones I've serviced had a lot of hardened grease in there. If you try to push more wheel bearing type grease in there it can push the hardened grease into the mechanism. If you have high effort shifting and believe it's coming from here, disconnect the shift lever pins before you remove the shift lever, then move the shift lever with the long shift rods disconnected. Then you'll be able to feel the effort required for that portion of shifting. If you aren't going to tackle the removal and cleaning of this mechanism right now then I would only use a light oil or lubricant like WD40. Push the WD40 in through the grease fitting if equipped. This is the best way to lube the mechanism and get a WD40 shower all at the same time. Spray into the mechanism from the top also while an assistant moves the lever through the gears. This lube is only a temporary fix but will help loosen the hardened grease. Unfortunately, it will also attract much more dirt. The cylinder shape on the end is a plastic cover that goes over the spring mounted in the base. If yours is missing, there's a good chance it's sitting in the frame rail. This cover helps keep dirt from getting into the spring area and lower part of the mechanism.

The pic below shows the 2nd Gen VCVs shift mechanism. The 2nd gens have a flat spot on the main body that (I believe) is intended for a grease fitting but I have never seen one installed from the factory. It comes from the factory not even drilled or tapped for a fitting. (WTH!) If you have opportunity to remove one, I advise installing a grease fitting as shown.

Enough about lower shift mechanisms for now.

Below is a view of the pins, bushings and retaining clips once removed. You can see the rubber cladding is worn and cracked.



The pic below shows a new bushing next to an old one. The new bushing is much more squared off and will result in much less looseness. I'm having trouble locating these bushings, any help is appreciated. There was a couple of Hurst Shift Arm Bushing Pit Pack kits available but they didn't fit the 1st gen shift arm I was working on. I'm looking for replacement bushings.

The next area for tighter shifting is the U bushings that help support the long shift rods. These are located below the driver's seat and can be seen from below. From the factory, these were made of a phenolic type material that would crack, break and fall away. In all my years of boneyarding, I've only ever seen one partial piece on a van. From that one partial piece was recreated the 3D printed bushing I have available today. Many thanks to Lucky Chuck for his CAD renderings of this bushing. Much trial and error were involved to produce a usable bushing. The way I figure, I'll never, ever break even on that item but it's just one more crazy way I demonstrate my VCVanatacism. Clearly, an affliction.

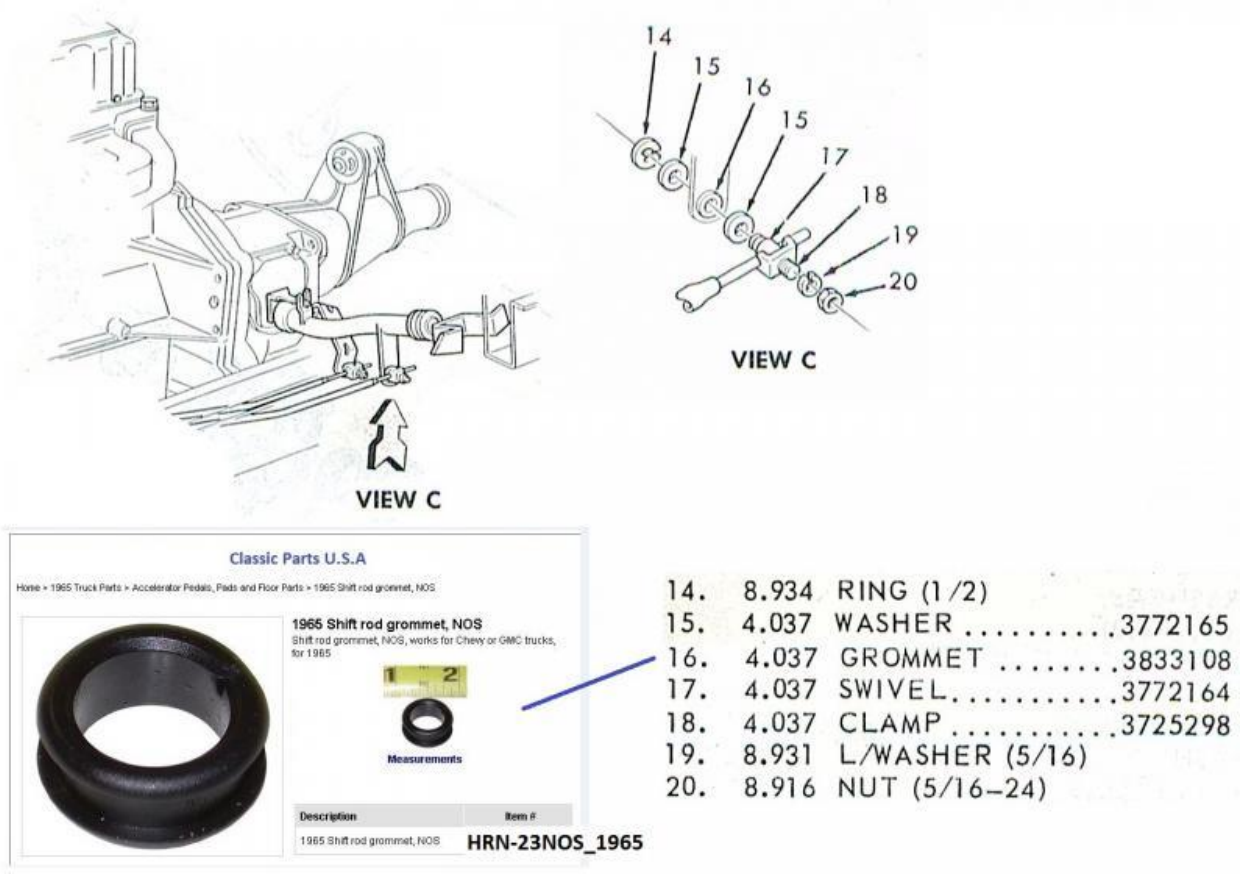
Below shows the U-shaped bushing installed. These long shift rods are hollow and move around if there's no bushing installed. I have installed several sets and have not had to disconnect the linkage at either end. There's some effort involved but they can snap in place without having to remove the rods. Use good judgement in you think you're putting too much force on the rods and disconnect the linkage if you must.

The next area to check for looseness is at the transmission linkage and Z bar.

Have an assistant operate the lever and clutch pedal. Observe all points for excessive play. Inspect the clutch "Z bar" where the bracket mounts to the bell housing. This bracket has a ball stud that rides inside the Z bar. It's slightly different than the illustration on the 2nd gens Sometimes the ball end comes loose from the bracket at the engine and less commonly at the frame end. The pic below shows the ball end bracket and how the ball is swedged into the bracket. This one is coming loose.

Once the ball end gets this loose, the clutch play increases quite a bit. If left unrepaired, it will break off and the ball may drop onto the road. Good luck finding that again. One indication of this failure is that clutch pedal play increases to maximum. (You've just lost your ball, stud.) The fix here is to remove the bracket (before it breaks), clean it up and weld that ball onto the bracket. It would be a good time to clean the Z bar and components at this time also. Once repaired, it should then be good to go for at least another 50 years.

The illustration below shows the transmission grommet that likes to wear. Over time, these bushings wear and sometimes just "go away" to the great broken parts graveyard on the side of the road. Other times, they fall out when replacing a clutch and are not reinstalled.



Most of the parts that you'll need to fix the shift linkage looseness on our beloved VCVs are available. Some are hard to find, but are out there. First you can check for looseness, then locate the parts and after that you can tighten her up by throwing some overdue mechanical lovin on the ole gal.

VCVan on!