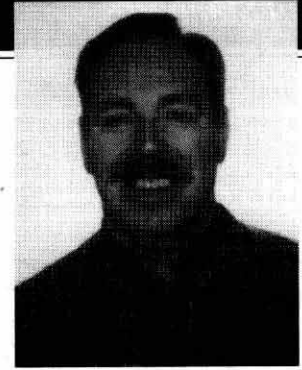


How To Be A Clutch Hitter In The Big Leagues



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At least twice a day we get a weary trans rebuilder on the phone, calling with a hydraulic clutch problem. "I've changed everything and done all I know how to do, but the pedal still goes to the floor." Hydraulic clutch problems will be

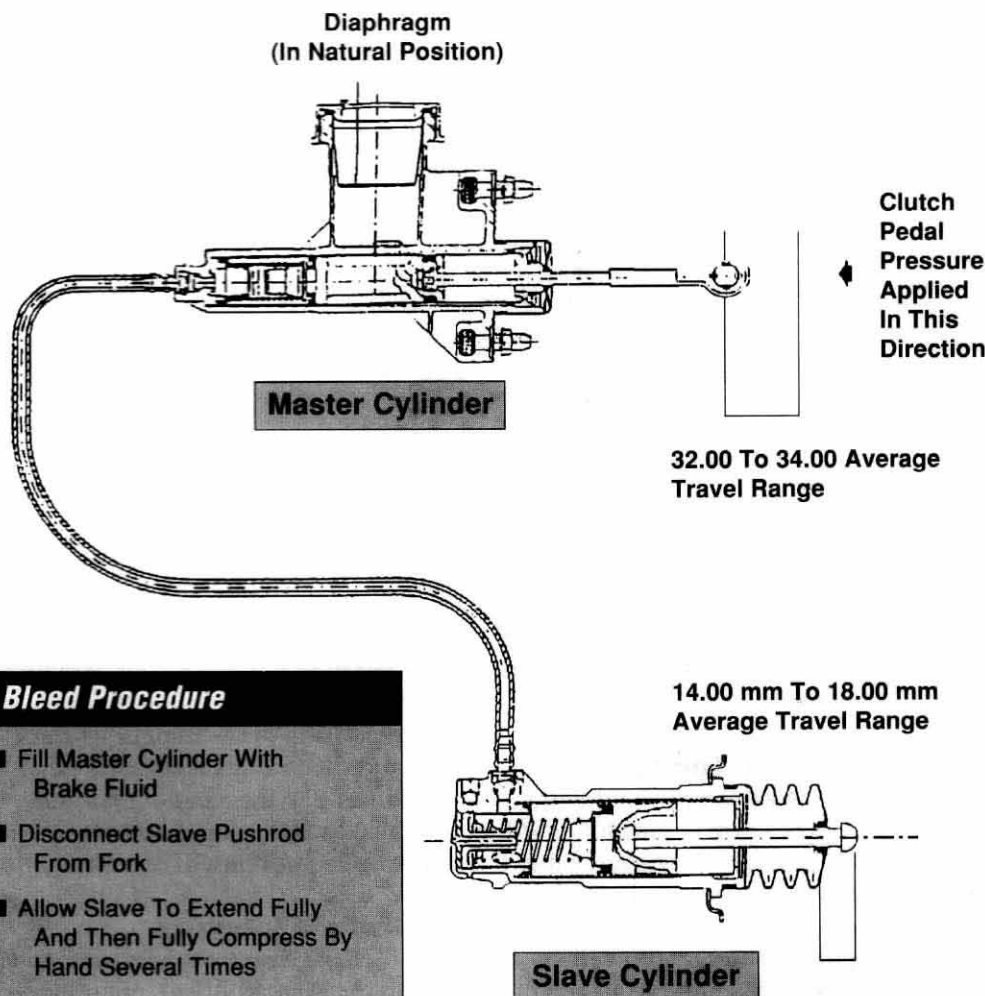
the subject of our discussion. Vehicles with standard shift transmissions have increased in numbers in the last 10 years. Hydraulic clutch release systems have replaced most cable type or mechanical linkages. A master cylinder

connected to a slave cylinder by a hydraulic line is cheaper and more efficient for the manufacturer, but requires a different approach by the service sector.

There is only one right way to do a clutch job, regardless of what type of system operates it. Replace the clutch disc, pressure plate, release bearing and pilot bearing as an assembly. There is no reason in today's market not to use new parts. All the OEM manufacturers woke up and discovered that there was an after-market (us), and now we can buy new original equipment clutch parts cheaper than rebuilds. Resurface the flywheel by grinding. Starting out with a flat properly finished flywheel will extend clutch life. Check the front bearing retainer for wear, check and lightly lube the input shaft splines, and make sure any oil leaks from the trans or engine are sealed.

continues next page

Figure 1 Clutch Actuator With Clutch Pedal Applied



Bleed Procedure

- Fill Master Cylinder With Brake Fluid
- Disconnect Slave Pushrod From Fork
- Allow Slave To Extend Fully And Then Fully Compress By Hand Several Times

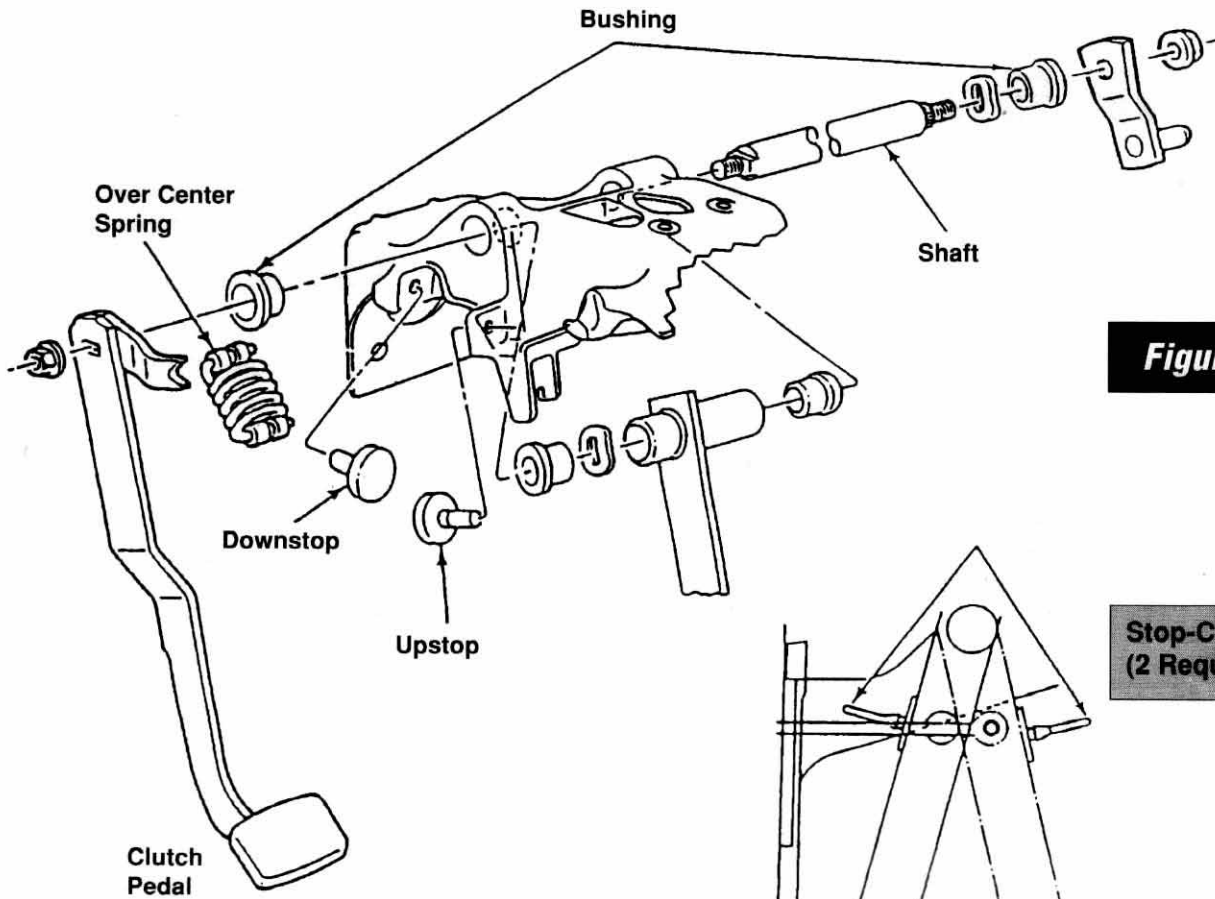
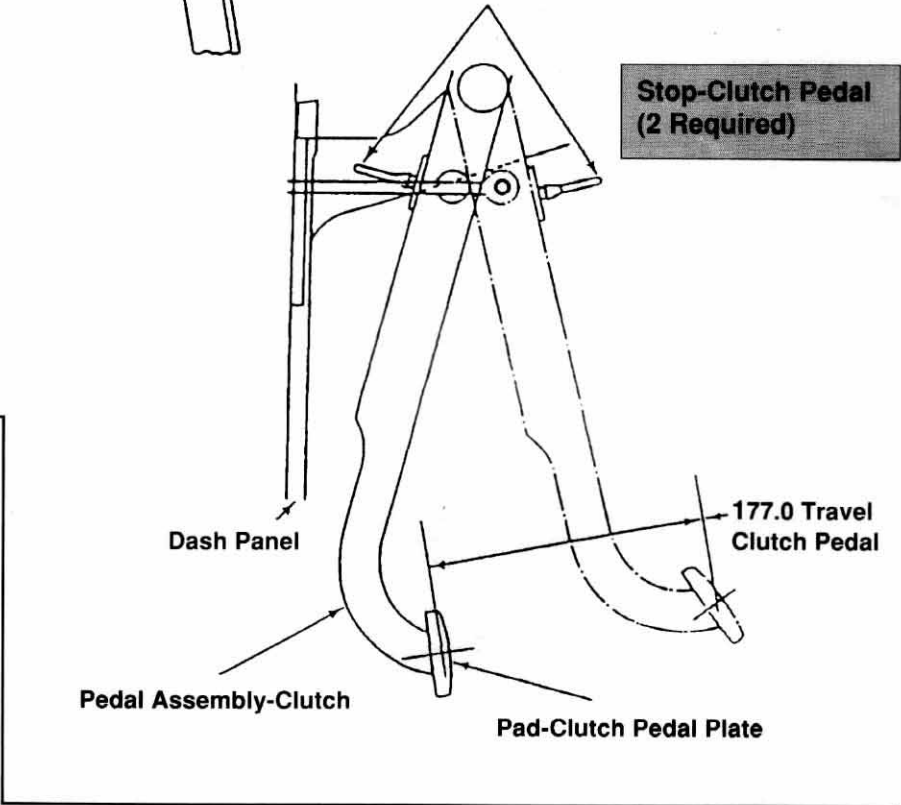


Figure 2

Stop-Clutch Pedal (2 Required)



Now to the tricky part, hydraulic release systems. Most problems encountered with hydraulics come down to misunderstanding how the system works. Misunderstanding creates superstition. One common answer to release problems is not to cut the flywheel but rather to replace it with a new one. A new flywheel won't hurt anything, but in almost all cases is a needless expense. The only time to replace a flywheel is if it is so badly damaged that it cannot be resurfaced, or cut so many times before that it is now too thin to be safe. The normal resurface cut is usually 10 to 40/1000 of an inch. This is not enough to create a release problem. Most release problems are caused by air in the system. The problems are so common that Ford Motor Co. has released an 18 page tech bulletin which is a thorough discussion of

hydraulics and clutches and is a must read for any serious trans technician.

Bleeding The System

A worthy addition to your shop tools is a power bleeder. It will pay for itself in a very short time. There are many cars out there that you will never get a proper pedal response without a power bleed. The trick is to get all the air out of the

system. In some cases it will be necessary to remove the slave cylinder from its mount and let the rod extend fully to the limit of its travel and then return it by hand 10 or 20 times. Tip the slave so that the bleed valve is up in order to permit trapped bubbles to reach an exit.

System Integrity

Make sure that there are no leaks in the system. A leak not only per-

mits fluid to leave but allows air to enter. Many of these components have changed from steel to plastic. Heat causes plastic to warp and stretch and to leak internally, past the plunger seals. Check the fluid reservoir for dirt and contamination. Foreign matter in the fluid will kill the seals and groove the bores. These systems operate on brake fluid, which is extremely hydroscopic. This means that it will absorb water from the atmosphere. In braking systems this is dangerous due to the high levels of heat generated at the brake mechanism—enough slave cylinders are mounted next to hot exhaust systems to create some problems. A good supply of fresh, new brake fluid will go along way to ending

this type of headache. Caution: Brake fluid loves to eat car paint, customers like to eat mechanics who destroy their car paint.

External Malfunctions

Check every mechanical component of the system carefully. Wear on the clutch fork, pivot ball, pedal linkages, bushings, master cylinder rods, slave cylinder rods, etc, will cause improper clutch release stroke and result in grinding or release problems. Make sure that all mounting points for the master and slave are solid. I have seen many firewall and under-dash mounting points flex when the pedal is pushed. If the master is moving away from the pedal, it is impossible to get a complete stroke. Many

manufacturers have released adjustable master cylinders so that the stroke is adjusted to match any wear on the pedal components. Ensure that all pedal stops are adjusted properly and measure for correct pedal travel. These measurements are available in most OEM service manuals. Check and measure the rod travel on the slave cylinder to make sure it is in spec.

There is no black magic to cure hydraulic release problems. A good understanding of how the system works, the correct specs, and attention to detail will cut out a lot of wasted time and effort, and bring your frustration level back to normal. ■

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