

## The clutch of the matter

Words: Ron Macdonald

*It would be fair to say that probably 80% + of the cars in the MX-5 Club are manual. Therefore they have a clutch, the operation of which remains a mystery to some owners. For those people, this is a basic article on the hows and whys of your car's clutch.*

### Why have a clutch?

The sole purpose of a clutch is to release the driveline from the engine. If your manual car did not have a clutch, every time you tried to stop you would either crash into something or stall the car. The clutch also makes changing gears easier, while you can do clutchless rev-matched gear changes (as I had to do recently on a 200-odd km return trip from the GOR) ... I am sure Mr Mazda would not recommend this as if it's done incorrectly it can cause mechanical damage.

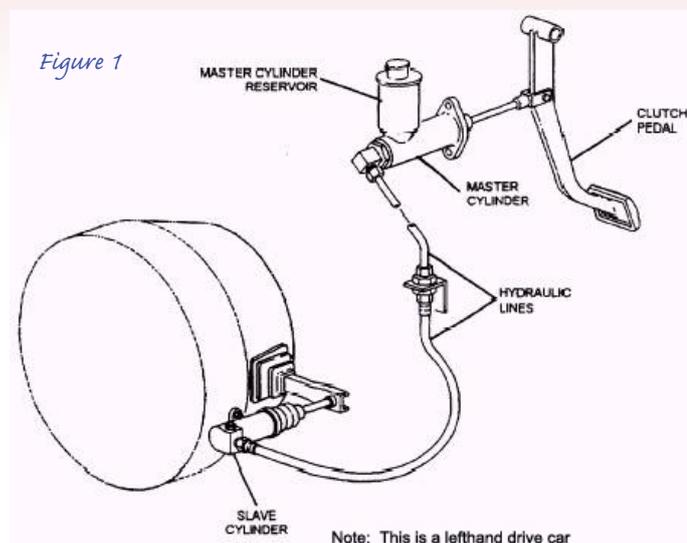
A few things to understand the system better:

- » When you push the clutch pedal to the floor you are not engaging the clutch – you are actually *disengaging* it.
- » The hydraulic side of the clutch system uses brake fluid, most MX-5s would use a DOT4 fluid in their brake system and it is the exact same oil you use to top up your clutch reservoir.
- » While on the subject of brake fluid, please note that this works as a pretty good paint stripper, so if you spill any on your car's paintwork wash it off immediately!
- » Brake fluid is not kind to the human body either. If you get it in your eyes, flush them with a copious amount of clean water; don't rub your face with brake fluid on your hands and most definitely wash your hands well with soap and water before grabbing hold of the wedding tackle when you go to the toilet.

Your clutch system can be broken down into two main parts: the hydraulic side and the mechanical side.

### Hydraulic

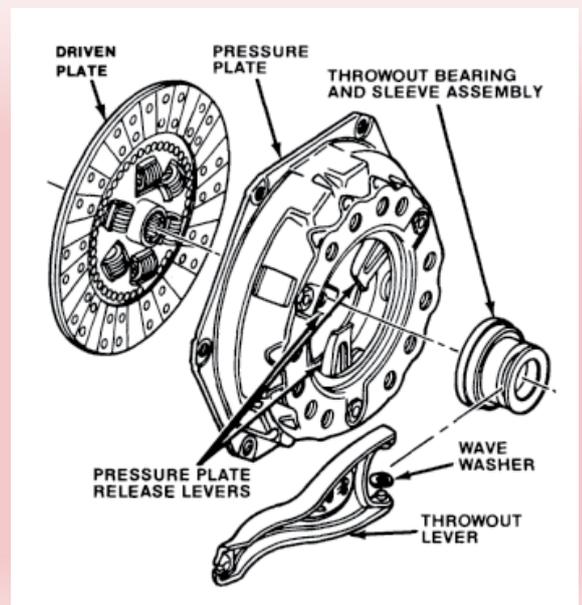
The hydraulic part of your clutch system consists of the master cylinder which is bolted to the firewall in the engine bay, a hydraulic line (connecting the master cylinder to the slave cylinder) and the slave cylinder which is bolted to the driver's side of the gearbox's bell housing (fig. 1).



### Mechanical

The mechanical parts of your clutch system consist of the throwout lever, thrust bearing, pressure plate and the clutch (or driven) plate (fig 2). The clutch plate is sandwiched between the engine's flywheel and the pressure plate and is coated on both faces with a friction material not dissimilar to what is used on brake pads. When the clutch is engaged, the friction material on the clutch plate grips both the flywheel and pressure plate, giving you a mechanical connection between the engine and gearbox. When the clutch is disengaged both the engine and gearbox can move independently.

Figure 2



### How does it all work?

The best way to understand how things work is to go through the "bang to bang" (as we used to say in my *Gunnery* days). In normal circumstances the clutch plate is engaged with both the flywheel and pressure plate allowing the engine to rotate the gearbox and in turn the drive shaft, differential, axles and finally the rear wheels.

When you push the clutch pedal to the floor, a rod connected to the pedal pushes on a piston in the master cylinder, which draws brake fluid from the master cylinder's reservoir and sends it (under pressure) down the hydraulic line to the slave cylinder.

The pressurised fluid activates a piston in the slave cylinder which in turn pushes on the throwout lever, the inner end of which is connected to the throwout bearing (or thrust race). The throwout bearing is forced forward into the pressure plate release levers (or fingers), which then separate the pressure plate from the driven plate. Your clutch is now disengaged.

When you release the clutch pedal the whole procedure is reversed and the clutch is again engaged (fig 3).



## 'CW' update ...

■ Words & photos: John Waldock, Southern Tasmania Chapter

*In February 2011 John reported that he and his best mate – fellow Southern Tassie Chapter member Allan Pryer – had “gone halves” in a Sprite in need of a complete restoration. They’ve been updating us on their journey together ...*

*It’s a little embarrassing to be writing this update.*

Looking back at all my photos, I realised it has been two years since Allan and I purchased **CW**, our 1962 Mk 2A Austin Healey Sprite (named after Allan’s father), and about 18 months since we had the engine out and rebuilt.

The going has been slow; we have had fellow MX5-er Mike Williams welding some patches in the floor pan. The engine bay has been ripple coated and finished off in sparking Monza Red. We have cleaned the underneath of **CW** (that took three attempts – trying to strip back 50 years worth of oil, muck and road grit!) and ripple sprayed the underneath surfaces.



We are awaiting the re-conditioned gear box, which hopefully will arrive soon. We can then drop the motor back in (*such a relaxed description of a pretty big job*) and get **CW** back on the road.

The intention is to then strip back the exterior paint and have that sprayed by another friend of a friend in a spray booth.

**Estimated time of completion:** who knows! We are hoping **CW** might be driving in early 2013, but I have long given up predicting when things will get done as Allan and I are trying to save money by doing as much of the work ourselves as we can.

So, watch this space. Hopefully I won’t be writing too many more updates. ■

◀ *half way there ... still lots to do.*

Engaged

Disengaged

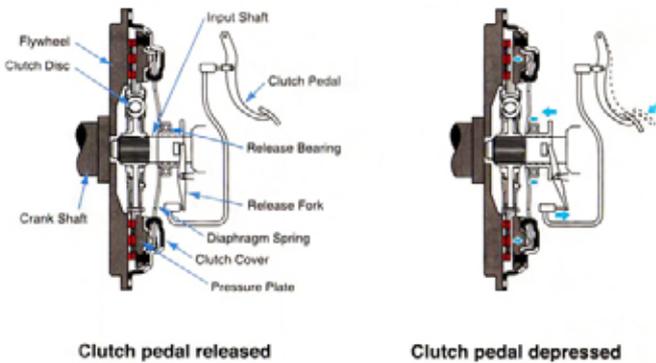


Figure 3

**Knowing how the clutch system works** can be very handy for diagnosing clutch issues. Basically if you have drive at the rear wheels but you cannot disengage the clutch, it will most likely be a *hydraulic issue*. If on the other hand your clutch can be disengaged but you have no drive or the clutch slips under load, it is most likely a *mechanical issue*.

Clutch plates (like brake pads) do wear, however to gain the maximum life from your clutch plate is it important that you always remove your foot from the pedal (and put it back on the foot rest) between *every* gear change. Even the slightest pressure on the pedal can slightly disengage the clutch and cause it to slip, creating unnecessary wear to the friction material.

**There you have it, while not a comprehensive study of the clutch system of a manual MX-5, hopefully it might remove the mystery for some. ■**

**Next month:**

**Replacing the flexible clutch hose on an NB MX-5.**

*Preparing the engine bay for painting, seemed to take forever. ▶*

