THE USE OF AUTOMATIC GEARBOXES

Automatic gearboxes and modern derivatives are becoming more common but some drivers are uncertain as how to make the best use of them. These notes, outlining the expectations of the examiner, are designed to assist you get the most from your vehicle as you prepare for the advanced test. A reasonable understanding of the general principles of the automatic gearbox will enable you to make appropriate decisions based on the prevailing circumstances and the performance of your vehicle.

The modern automatic boxes can contain anything from three to six different ratios and may also be enhanced with 'Economy' or Sport' modes. They also have different names such as tiptronic, selectomatic, steptronic and multitronic. The change mechanism can be mounted on the floor or within the steering wheel/column. Manufacturers have invested heavily in these gear change systems and you should first refer to the owner's manual for advice.

Let us consider, briefly, the make-up of the automatic transmission. In the majority of cases this consists of a torque converter and a set of gears called planetary or epicyclical gear train. These are fitted to the car in place of a conventional clutch and gearbox.

The torque converter, as the name implies, converts the torque or turning effort of the engine power through the gear ratios to the drive wheels. Basically, the torque converter consists mainly of an impeller, which is driven by the engine and a turbine that drives the gearbox. Each is bowl shaped and contains a number of partitions or vanes. They are mounted face-to-face in the oil filled gearbox but there is no physical contact between them. Put simply, when you press the accelerator you increase the speed of the impeller, which forces the gearbox oil through the vanes of the turbine, making it rotate. An increase or decrease in torque has the same effect as changing to a higher or lower gear

This almost fluid connection between the engine, through the gearbox, to the drive wheels means that leaving the gear lever in 'D' when negotiating a hazard is not the same as leaving a manual gearbox in top gear.

The majority of gear selector positions are marked:

P **PARK** must never be engaged whilst the vehicle is in motion as it locks the transmission and prevents the car from moving.

R **REVERSE**

N **NEUTRAL**

D **AUTOMATIC DRIVE USING ALL FORWARD GEARS and a configuration of 1, 2, 3 and 4 for manual selection, or a symbol such as a plus or minus sign for upward or downward manual changes. For normal driving the lever can remain in 'D' and allow the transmission to make automatic adjustments according to road speed, engine loading and accelerator position.**

Many drivers of automatics leave the gear selector in D and never consider other options built into the gearbox even though there are times when this might be clearly desirable to optimise flexibility and control of the vehicle. In many cases this is due to ignorance of the potential benefits of using the full range of the gearbox.

If it is necessary to manually change down and limit the range of gear ratios the gear lever or change mechanism should be moved to the required position. The owner's manual will describe the most appropriate method. Selecting the ratio is done within the system of car control when the desired speed has been reached and that speed is within the range of the ratio chosen. Most modern systems will over-ride the lever selection and prevent a change to a lower gear if the engine revs or the road speed are too high.

Manually selecting a set of ratios may be in response a particular hazard where there is a need for more control through use of the accelerator. This will prevent the gear changing up automatically, which may result in the vehicle 'running on' and increasing speed when this is not required. Manually locking a ratio also provides the flexibility to control speed during and after an overtaking manoeuvre, as an alternative to a 'kick-down' or when approaching an area of uncertainty. However, when the specific or general need for flexibility has passed the 'D' (Drive) option should be reconsidered.

Candidates may also choose to retain a lower ratio, for instance within a built-up area, to improve control through the accelerator. However, the upper ratio selected should be appropriate to the circumstances. Selecting 3 in a 5 speed automatic box may be suitable for urban driving but 4 may be the better and more flexible choice for winding rural roads. Leaving the gearbox in 'D' may be appropriate for open bends where the flexibility of a lower ratio is not considered necessary.

Candidates should remember that, as with a manual gearbox, selecting a specific ratio on an automatic box should take place when the correct speed for the hazard has been attained. As with a manual gearbox secondary braking should be avoided.

Some police forces advocate a more direct manual use of the automatic box, particularly in 'pursuit' or 'response' situations. However, for the purposes of the RoSPA test, where that degree of flexibility and maximum performance is neither required nor necessary, the manual over-ride facility must not be used excessively.

When immediate maximum acceleration is required the 'kickdown' facility may be beneficial. This is engaged by pushing the accelerator pedal to the full throttle position, overcoming the built-in resistance. This causes an immediate down shift into the gear for maximum acceleration. When the accelerator pedal is released the gearbox will automatically change up.

When stationary in traffic, even for many minutes, it is not necessary to move the gear lever into neutral because the torque converter absorbs the engine's propulsion force but does not transmit it all to the gearbox. No wear is taking place. In fact, more wear will take place if you engage neutral then engage a drive gear when it is possible to move off. Most gearboxes will automatically select first gear when the vehicle becomes stationary.

While guidance may be given regarding the correct actions in certain circumstances, not all eventualities can be covered. The following is intended as general guidance in some common sets of circumstances.

You should cover the footbrake when moving the gear lever when the vehicle is stationary. You may wish to set the parking brake as many vehicles will 'creep' and some vehicles may have a tendency to lurch, particularly if fitted with an automatic choke.

Stops in traffic, at junctions and at traffic lights leave the selector in D. There is no need to move into neutral, as no damage will result. You may wish to set the parking brake if the pause becomes a wait but your decision will depend on the circumstances.

AT ROUNDABOUTS: Leave in D unless a lower set of ratios has already been selected, in which case it may be appropriate to leave it in that ratio.

ON BENDS: Single bends can normally be negotiated in D. For a series of bends consider locking the vehicle into a suitable ratio prior to the first bend, and on exit from that bend, when the accelerator is eased to set the vehicle up for the next bend, the vehicle will not automatically change up and the driver will have the benefit of engine braking which will give better control.

OVERTAKING: Depending on the circumstances, use either a planned, predetermined lower ratio lock or the 'kickdown'.

If acceleration is needed followed by deceleration to fit into a gap, manually selecting a lower gear or 'locking' the ratio before the start of the manoeuvre may be beneficial.

STEEP HILLS: When descending steep hills in DRIVE, the vehicle will tend to drop into its highest ratio. This will result in excessive use of the brakes. Although brakes on automatics are larger than on their manual counterparts, 'brake fade' can still create a problem but manually locking a low ratio provides compression braking to enhance flexibility and braking control, particularly when towing a trailer/caravan. Conversely, when ascending a steep hill, manually locking a ratio may also provide better control and improve smoothness if the vehicle is hunting between two ratios.

GENERAL

In unusual circumstances when the gearbox is continually changing up and down between two gears, manually selecting an appropriate ratio may prevent undue wear of the gearbox components.

A 'Sport mode merely programs the vehicle to hold a lower ratio until a higher engine speed is reached. On twisting roads 'Sport' mode will often hold a gear sufficiently thus reducing the need for a manual over-ride. 'Economy' mode merely optimises the fuel efficiency of the engine.

It is not necessary to either kickdown or change down manually for a hazard simply because one would change down if driving a car with a manual gearbox when negotiating that same hazard. The modern automatic gearbox is designed to select the correct ratio for the speed and throttle setting, and it does so very well. A manual intervention should be a considered option and planned to give a specific advantage or benefit according to the circumstances encountered. It should not be undertaken solely to demonstrate to the examiner that you know how to do it.

As with all aspects of driving, this technique is not carved in tablets of stone. There may well other occasions when you judge it necessary to manually over-ride the gearbox and, if that is the case, then do

it. But do not make excessive use of the manual holds and return to ‘D’ when the need has passed.