

Instructor's Corner: Brought to You by Your Driving Events Committee

Heel & Toe Downshifting:

Besides giving the Tarheel & Toe driver schools their unique name (Richard John's lasting contribution), heel and toe downshifting is an efficient way of downshifting and braking at the same time while keeping the car perfectly balanced. On the track we are often faced with the need to brake hard for a turn and drop down a gear, or two. Heel and toe downshifting involves using the right foot to brake and "blip" the throttle at the same time. It allows us to match the RPMs for the lower gear before we engage the clutch and avoids that sickening lurch and chirp of the tires as the engine screams to catch up. Done well, heel and toe downshifts are smooth, quick and a lot easier on your car (and your instructor). It's also a lot easier than it sounds. Heel & Toe downshifting is a skill which can (and should) be practiced and perfected on the street in normal driving.

"How can I practice something I don't know how to do?" you ask. Let's take it one step at a time. Begin to pay attention to where the RPM's are when you upshift during acceleration and what it *sounds* like. Downshifting is just like playing that tape backwards when you slow down. Pick a road with no other cars and accelerate up to the

middle of 3rd gear. Let your foot off the gas. As the car slows, push in the clutch, downshift one gear, but before you let out the clutch 'blip' the throttle so that when you let out the clutch there's no lurch forward or back. This takes a little practice. After you blip the throttle the engine revs naturally drop. Try to time when you let out the clutch so that everything engages smoothly. You can practice every time you approach a stop sign or a red light. *Listen* to the sound for the right amount of blip and when to engage the clutch. When you are comfortable with "matching RPMs" as you downshift you are ready for the next step.

Heel and toe technique is a little different for everyone. Mainly, it should be comfortable and natural. For me, the motion is not really heel (on the gas) and toe (on the brake), but rather side to side. I put the ball of my right foot and great toe on the brake pedal and roll the outside of my foot and heel onto the throttle to blip the engine. In most BMW's the pedals are set up for heel and toe downshifting. On some other cars, the pedals are farther apart and require a more extreme twist of the foot. Pedal extensions can help.

Threshold braking on the track slows the car as quickly as possible for the next turn. But, what if we need to downshift from 4th or 5th gear down to 3rd to optimally exit the turn? (Think turn one, VIR). Heel and toe technique makes it possible to do both simultaneously and smoothly. We've learned how to blip and match RPM's. Now let's learn the foot

position required for braking and blipping at the same time.

On an inclined driveway, near the top, stop the car using the ball, toes or top of your right foot on the brake. With the car in neutral, continue to use the ball of your right foot to hold the car still with the brake, now blip the throttle enough to match a lower gear (do it by sound). Don't try to shift, just brake and blip. The trick is to not let the car roll even a smidge, as you blip. When you are good at this try putting the car in gear. With the clutch in and ball of your foot on the brake, blip the throttle. Release the clutch as you come off the brake and onto the throttle. Try to start the car moving without rolling backwards or lurching forward. This is tough at first! But, if you can do this you can easily heel – toe on the track.

Remember, only downshift to a lower gear to obtain optimum acceleration out of the upcoming corner, never to slow the car down. Brake pads cost much less than transmissions. The car should stay balanced during the entire process. Don't be in a hurry. Delay the downshift until the car is traveling at a safe RPM for the lower gear. If you downshift at too high a speed you can over rev your engine or break traction with your rear tires perhaps initiating a spin. So, take your time. When you approach turn one at VIR please don't downshift to 3rd at over 100 mph. No matter how good your heel and toe technique it's going to be expensive and dangerous. *Wait until you are confident that the car is slow*

enough for the new gear, blip the throttle and let out the clutch before the RPMs drop too low for the selected gear..

The process:

1. Threshold braking (this is maintained through all steps).
2. Depress the clutch pedal.
3. Move the gear lever to the lower gear and blip the gas as you are shifting.
4. Release the clutch pedal.

Done properly, the RPMs will exactly match the speed when the clutch pedal is quickly released. Practice makes perfect and it'll take a while to find the right amount to blip and the right rhythm for releasing the clutch. At first if you let the clutch out too soon, or the RPMs are too high, the car will lurch forward under acceleration. If the RPMs are too low, or you declutch too slowly the rear wheels will grab. But when it's right, it's smooth as glass. This is BALANCE, a necessary condition of any well driven, fast paced car. It is requested that you master H&T skills to move on to from B to A group.

When I first began to learn these skills I carried a similar article by my instructor in my pocket and memorized it standing in line at the market. I hope Tarheel students will enjoy this new challenge over the winter and come to VIR in the spring with a new skill to enhance their driving experience.

JoElla John

Next : Proper braking exercise