While the planning and construction of road network infrastructure is vital, there are other approaches that governments can take to improve capacity and travel times. These include incident management, work zone management, weather management, special events management, freeway and corridor management and better traveller information.

Traffic flow and congestion can also be improved by reducing total demand for the road, or by curbing demand at peak times. Encouraging more people into each vehicle, flexible working hours, telecommuting, living closer to work and expanding public transport each has an important role to play.

The Federal and State Governments' announcement this year they will provide $132 million to undertake a series of studies into projects which have the potential to reduce congestion is a welcome first step.

With more than 1,100 new vehicles added to the road network each day and with petrol prices climbing and climate change looming, it is more important than ever that Governments tackle congestion to counter these issues and provide a solution.

Anti-lock Braking Systems (ABS)

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Introduction

Vehicle safety features, such as anti-lock brakes, are sometimes promoted as the next 'silver-bullet' for road safety improvements. Research with thousands of drivers around the world, suggests that many of them are dangerously ignorant of what ABS actually does.

What is ABS?

ABS is an abbreviation for Anti-lock Braking System. ABS allows steering while maximizing braking. ABS was developed to reduce skidding and maintain steering control when brakes are used in an emergency situation. When used properly, an antilock braking system (ABS) allows the driver to maintain directional stability and control over steering during EMERGENCY BRAKING SITUATIONS, particularly on wet and slippery road surfaces.

Unfortunately, safety experts have found that many drivers don't benefit from ABS because the correct techniques for using them are almost the opposite of everything that most of us have been taught about emergency braking in cars. To gain any safety advantage from ABS, drivers must learn how to operate it correctly. ABS is designed to help the driver maintain control during emergency-braking by preventing the vehicle's wheels from locking. This allows drivers to maintain steering control under heavy braking and to hit the brakes fully with less fear of skidding or loss of control. It does this by either preventing the wheels from locking, or if they do lock, by releasing and then reapplying the brakes once more.

In effect, ABS is a mechanical way of cadence braking (or pumping the brakes). There are two advantages for the typical driver. One is that the ABS system is able to "pump" the brakes on and off much quicker than the driver's leg, and the other is that it requires no skill or experience - the car does all of that for you.

ABS was originally used in aerospace applications - specifically, to reduce wear and tear on aircraft tyres after landing. The first car (worldwide) to have ABS fitted as standard across the entire range was the Ford Granada Mk 3 (of 1985). BMW made the technology standard on all vehicles in 1986. Since it came into widespread use in production cars, ABS has made considerable progress. Recent versions not only handle the ABS function itself (i.e. preventing wheel locking) but also traction control, brake assist, and electronic stability control, amongst others. The technology now much lighter and more efficient.

A typical ABS is composed of a central electronic unit, four speed sensors (one for each wheel), and two or more hydraulic valves on the brake circuit. When the system senses that any of the wheels are rotating considerably slower than the others (a condition that will bring it to lock) it moves the valves to decrease/increase the pressure on the braking circuit, effectively reducing/increasing the braking force on that wheel. This process is repeated continuously, causing a pulsing feel through the brake pedal.

In vehicles not equipped with ABS, the driver must manually pump the brakes to prevent wheel lockup, maintain steering control and avoid hazards. In vehicles equipped with ABS, the driver's foot remains firmly on the brake pedal, allowing the system to automatically pump the brakes. This makes ABS particularly useful for steering through skids, reducing both the likelihood and severity of collisions.

What is the downside to ABS?

In Australia, The Royal Automobile Club of Victoria (RACV) was concerned about overseas research on ABS safety and commissioned Monash University Accident Research Centre (MUARC) to examine the Australian experience. MUARC analysed the crash records for a number of models that came equipped both with and without ABS, and compared their actual crash involvement.

The results were mixed, and rather disturbing. For multi-vehicle crashes, ABS-equipped vehicles were less likely to be involved (by about 18%) compared with the same model without ABS. However, for single-vehicle run-off-road crashes, e.g. leaving the road on a bend, ABS vehicles were over-involved by about 35% compared with the equivalent model without ABS. This increased involvement of ABS-equipped vehicles in run-off-road crashes is particularly concerning. Similar data is available for the US, which suggests that vehicles with ABS are 39% more likely to be involved in roll-over incidents.

You should be aware of the following disadvantages of ABS:

- ABS fitted vehicles do not have a better safety records than those vehicles not equipped with ABS. Indeed, some have shown their records to be worse. US research, for example, suggests that cars with anti-lock brakes are up to 65% more likely to be in fatal crashes than cars without them. Experts suggest that the problem isn't with the technology, but poor driving habits and lack of driver awareness on how the brakes operate.
- Drivers are traditionally taught to pump the brakes on slippery roads to avoid a skid (cadence braking). Firm and continuous pressure - not pumping - is required to activate ABS.
- The belief that ABS dramatically improves a car's braking performance is very widespread and highly dangerous, because this mistaken idea tends to encourage inadequate following distances and tailgating.
- Technology like ABS places over emphasis on reactive safety, rather than proactive safety and careful driving. You MUST drive carefully at all times to avoid the need for emergency braking. Even better, minimise the need to travel, or use safe modes such as the train.
- Increased braking distances in many circumstances ie they allow you to steer through a skid, but not necessarily to stop more quickly. ABS is designed to help the driver maintain control of the vehicle during emergency braking situations, not make the car stop more quickly.
- ABS is the subject of some widely cited experiments in support of risk compensation theory, which suggests that drivers adapt to the safety benefit of ABS by driving more aggressively. The equipment creates a "false sense of security" among drivers who do not understand the operation and limitations of ABS. Don't become an over-confident driver because you have ABS. Drive prudently as you always should.
- Inexperienced drivers can be put off by the pulsing feel of the ABS and take their foot off the brake pedal – thus reducing its effectiveness. Keep your foot on the pedal!
- ABS is often noisy, a bit like the brakes are grinding against gravel, which can also be off-putting. Keep your foot on the pedal!
- Emergencies are relatively rare and sudden by nature (and of course completely unexpected by unobservant and unaware road users). Most drivers have little or no experience of how to deal with them safely.
- When drivers do encounter an emergency that causes them to brake hard and thus encounter this pulsing for the first time, many are believed to reduce pedal pressure and thus lengthen braking distances, contributing to a higher level of accidents than the superior emergency stopping capabilities of ABS would otherwise promise. Nevertheless, ABS can significantly improve safety and control for drivers in on-road situations if they know not to release the brakes when they feel the pulsing of ABS.
- The availability of ABS should not deter drivers from learning to master threshold or cadence braking skills.
- Despite these limitations, researchers remain confident about the potential for ABS to prevent crashes, and encourage you to choose ABS-equipped vehicles. Drivers, however, should consider the warnings and tips discussed here to make the most of the technology and should practise emergency braking in safety until it becomes second nature. A split-second, life-or-death crisis is no time to learn new skills.

Best practice tips for using ABS

1. Understand whether your car has an antilock brake system:
   - Read your owner's manual.
   - Check your instrument panel for an amber ABS indicator light after you turn on the ignition.
   - When you buy, lease or rent, ask fleet manager, dealer or rental company.
2. Familiarise yourself with the ABS system. Test drive the vehicle at a speed above which the ABS activates (usually above 10mph) in an unobstructed such as a car park and apply the brakes firmly. The antilock system should prevent the wheels from skidding. Pulsation may be felt in the brake pedal and you may hear a clicking sound. Avoid pumping the brake, even if the pedal is pulsating.
3. Always make sure you drive carefully, keep a safe distance behind the vehicle in front of you, and maintain a speed consistent with the road conditions. Don't rely on ABS to allow you to drive closer to the car in front or to drive faster. You should continue to maintain a sensible distance between you and the car in front. You should also always drive at a speed which is sensible for the conditions. Always assume that ABS equipped cars will take the same distance to stop as cars which are not equipped with ABS. The big advantage is that the car remains under control. It won't skid and you can still steer it.

4. In a braking emergency, press the brake pedal as firmly as possible and, where appropriate, steer around obstructions. You should not pump your brakes if you have ABS. Pumping is for standard brakes. It completely robs ABS of its effectiveness. Just hold your foot firmly on the brakes pedal and remember that you can still steer. Remember the ABS system will prevent the wheels from skidding. So "Stomp and steer!" KEEP YOUR FOOT HARD ON THE BRAKE PEDAL for as long as you need to do so in order to avoid the obstacle.
5. When activated, the ABS causes the brake pedal to pulse noticeably - almost as if the brakes are pushing back at you. Also, the valves in the ABS controller may make a noise that sounds like grinding or buzzing. In some cars you may feel a slight vibration--this means the ABS is working. It is important NOT to take your foot off the brake pedal when you hear noise or feel pulsations, but instead continue to apply firm pressure. As most drivers rarely or never brake hard enough to cause brake lockup, and a significant number rarely bother to read the car's manual, this may not be discovered until an emergency. Just KEEP YOUR FOOT HARD ON THE BRAKE PEDAL for as long as you need to do so in order to avoid the obstacle.
6. No matter how hard you brake, ABS does not help you stop quicker under most conditions. It helps you maintain steering control during braking so you can steer around obstacles. Why? Because the wheels don't skid, but continue to rotate. This means that you can brake hard to avoid an obstacle and steer around it at the same time. This really adds to your chances of avoiding injury or death. Remember, just STEER NORMALLY, even when braking hard in cars with ABS. Avoid steering towards oncoming traffic.

Getting more information about ABS

A really detailed review of the research on ABS is provided by:

- Evans L, Traffic Safety (2005), Publisher: Science Serving Society (www.ScienceServingSociety.com), ISBN: 0975487108

More discussion, guidance and tips on ABS are available online:

- en.wikipedia.org/wiki/Anti-lock_braking_system
- www.nhtsa.dot.gov/cars/problems/Equipment/absbrakes.html
- www.dervman.com/abs.htm
- www.csu.edu.au/division/healsafe/webpages/guides/ABS.htm
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- www.intellichoice.com/carBuying101/AntiLockBrakes