DRIVING TECHNIQUE

Although most drivers slow down in bad winter weather, most – as here – fail to increase the all-important following distance; essential for providing time and options should things in front start to go wrong.

PART EIGHT

Be a better driver

Performance driving coach Neil Furber offers some timely advice on how to continue driving safely, whatever the winter weather throws at you

Winter driving is by far the most common cause for concern for many of the drivers I work with. As things stand today, modern cars are such that most drivers avoid accidents or loss of control more often than they realise, due to a combination of high levels of grip and an assortment of safety systems.

Unfortunately, this has led to a high level of complacency during normal driving. However, the majority of confident drivers do have at least some respect for winter conditions and, in some cases, an unnecessary fear of the more extreme scenarios. So my aim with this article is to provide enough information to help improve confidence where appropriate, and reduce complacency where necessary, by explaining the main points that should be considered.

SPEED, DISTANCE AND TIME

We should start by emphasising the relationships between speed, distance and time. You may well remember the old equation 'speed equals distance over time' from school maths lessons. I'm not going to go too deep here but, doubling your speed will double the distance travelled in a given time, or halve the time taken to cover a given distance.

More importantly, reduced grip will increase emergency stopping distances, increase the time taken to do anything (braking to an emergency stop, in particular) and increase risk levels at higher speeds. Understanding and driving to the reduced grip you have in winter is one answer. The other is to consider changing your tyres.

When accidents occur during the winter, drivers typically come out with a string of excuses, and here are a few favourites: 'I was driving around the corner and the car must have hit ice as it just went round.'; 'I turned the wheel and nothing happened. I just skidded off the road because of the ice.'; 'I wouldn't have hit the car in front if it hadn't been icy.'

Perhaps you can identify with one or more of these examples of whinging-winter-woe, or know somebody who can? There's a genuine belief among most motorists that ice causes accidents. Well, I'm here to tell you that it doesn't! The truth is that most motorists don't consider ice properly, and don't adapt their driving to suit changing conditions.

ICE ALERT!

It may sound really obvious but, if it's cold outside when you go to your car in the morning, then there's a real chance that there could be ice somewhere on the roads. On sunnier mornings, most of the road may be fine but, shady areas, cooler zones nestled in dips in the road or sites of frequent flooding are all prime locations for ice.

Even if there isn't any ice, cold conditions make the rubber of normal tyres become harder and less effective. In the UK, the roads tend to be damp in the cold, yet positive, temperatures experienced during winter months. Hard rubber and lubricated surfaces certainly aren't a great mix, so it's always worth building in a little extra margin with reference to your following distances, use of speed and how you use the controls to load the tyres.

Smooth, gentle driver inputs should be the order of the day at this time of year. Referring to the speed equation I mentioned earlier, the more distance that we leave between us and the car in front, the more time we'll have to react and deal with situations. More time allows gentle braking which, in turn, will be less likely to induce a skid. Improved forward vision and less stress can be extra benefits.

If you consider the following space as time rather than car lengths (distance), it will scale up with increased speed. Furthermore, extra time gives you more distance between you and the car in front. A two-second gap provides a nice following distance for normal dry conditions but, you may consider doubling this to four seconds for wet conditions, or even significantly greater than 10 seconds for extreme icy or snowy conditions.

EXTENDED DISTANCES

There's little need to crawl around at walking pace in light snow, but large following distances are essential to give you time and options should things in front start to go wrong. During these circumstances, I tend to witness excessively slow speeds, but very little change in following distances or car spacing. So it's no wonder that many winter collisions end up with multiple cars involved!

Many of you will remember seeing the stopping distance information in the Highway Code. There has been much debate surrounding the accuracy of the data. Surely modern tyres and brakes are more powerful so we stop quicker now than when the data was created; right? Well, this is a valid argument, but it's important to appreciate that stopping distance is determined by two factors – thinking distance and braking distance.

Modern vehicles can certainly achieve improved braking distances compared to those from many years previously. Unfortunately, though, recent research has shown that modern drivers are actually displaying degraded thinking distances. This is the bit where cars travel more distance in any given time – they are at their highest speed. The rise in general stress levels, traffic density and in-car features – not to mention smartphones – has meant that the average driver may struggle to stop within the distances shown in the Highway Code. Even with all the benefits of a modern car to help them!

TYPES OF SKID

Most BMW owners are aware that front-engined, rear-wheel-drive cars may oversteer (loss of grip at the rear) during cornering, but this isn't the only type of skid they may encounter. In fact, it isn't as common as is generally expected. Yes, if a driver accelerates too hard or too quickly in low-grip situations, then the rear may move if the safety systems don't block or control it. However, during winter driving, the most common type of skid for most drivers is actually a braking skid. Additionally, entering a corner a little too fast for the conditions often leads to the car driving straight on, rather than spinning. This is known as 'understeer'.

Braking skids aren't always due to a full emergency stop, but can be induced because there's simply less grip than expected, resulting in the wheels trying to lock-up under braking. The ABS (anti-lock braking system) will trigger under such circumstances, and the driver will feel a pulsing, 'gravelly' sensation underfoot. The ABS will be working to control the skid by releasing and reapplying brake pressure at the brakes, to prevent a complete locking of the wheels.

Most drivers think ABS reduces stopping distance, but the truth is that it tends not to – in snow it can actually increase it. But ABS will enable a driver to retain some steering control during a braking skid, to help with obstacle avoidance. If you feel ABS activate during a stop, keep the pressure on and steer smoothly, as required.

WINTER RUBBER

So, winter tyres are just for snow, right? Wrong! In fact, winter tyres out-perform normal (summer) tyres from around 7°C and below. Yes, they make an almost unbelievable difference in shallow, snowy conditions, but much of their value is in the cold, wet stuff typical of almost every commuter journey during UK winters. Michelin UK has kindly provided some illustrative data for this article, from which you'll see that from around 50mph (80

ASK NEIL...

In future issues, there will be a regular readers' column available for questions on driving. If you have any specific questions, or would like more information on topics covered in this series, please don't hesitate to write in. Please email me using neil@drive7tenths.com and I'll endeavour to provide you with answers. You never know, there may even be a prize for a good letter!

DRIVING TECHNIQUE

Winter driving is by far the most common cause for concern for many of the drivers I work with

Fitting the right tyres is one of the keys to maintaining maximum control under difficult, cold weather driving conditions.

DISPELLING WINTER DRIVING MYTHS

- Winter tyres are not just for snow!
- Stability control systems are not magic and can't solve all problems.
- ABS doesn't make a car stop faster.
- Ice isn't the cause of accidents on winter mornings!
- Rear-wheel-drive cars don't always oversteer (spin) if they skid in icy conditions.

km/h), a conventional (summer) tyre will have a stopping distance a whole 4m greater than a winter tyre during wet conditions at 5°C. That's nearly the length of a 3 Series, on top of your thinking distance and physical braking distance! In snowy conditions, conventional (summer) tyres can require a further 30m to stop from around 30mph (50 km/h) than a winter tyre. That's more than six 3 Series models nose-to-tail!

From personal experience, it's actually a little more complex because the specific temperatures of the air, road and snow further affect performance. A short climb and descent testing winter tyres in the French Alps last winter, yielded three distinct types of snow and associated levels of braking performance in less than a kilometre, due to quickly changing temperature gradients. Loose snow 'beads' on a layer of hard-packed icy snow, followed by softer, sticky snow (the type that makes nice snowballs) and, finally, wet, slushy snow yielded three different sensations and demanded an ever-changing margin for error.

TREAD AND COMPOUND

So, what's the difference between conventional tyres (now known as summer tyres) and winter tyres (often called snow tyres)? Well, there are two main factors to consider – compound and tread. The winter compound uses a softer rubber, which will be overly-soft for much of the warmer, summer conditions (so could wear very quickly). However, it becomes much more suitable as the temperature drops.

Lowering temperatures cause summer rubber to become progressively harder, with the generally accepted cross-over point for performance being around 7°C. So already, winter rubber suits much of our UK winter. Tyre tread patterns vary enormously, even among summer tyres, but winter tyres tend to feature more of a 'vee' pattern than a blocks-and-ribs design. However, the biggest difference in tread concerns the many little features cut into each section of tread, known as 'sipes'.

Now, while these small cuts may be simple enough, the tuning of their specific geometry, depth and angle is quite complex. In wet conditions, the sipes suck in and then eject water, which helps clear the area under the tread in the contact patch (the area of tread in contact with the road at any one time).

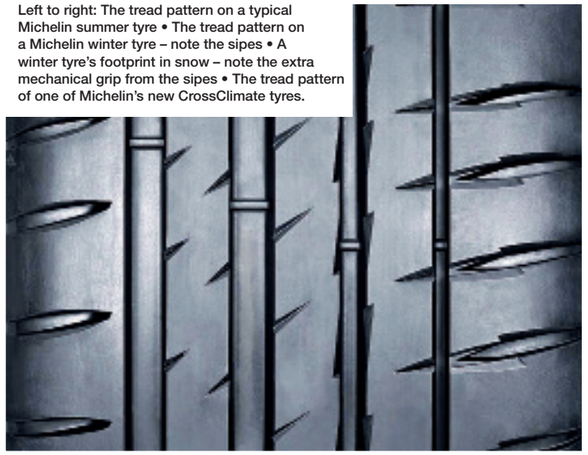
In snowy conditions, the sipes can harness snow which, in the case of a sticky, snow-ball-ready snow, can give extra mechanical grip. They can also allow the tread to operate with multiple gripping edges to each block – much like spreading your toes on the wet surfaces around the edges of a swimming pool.

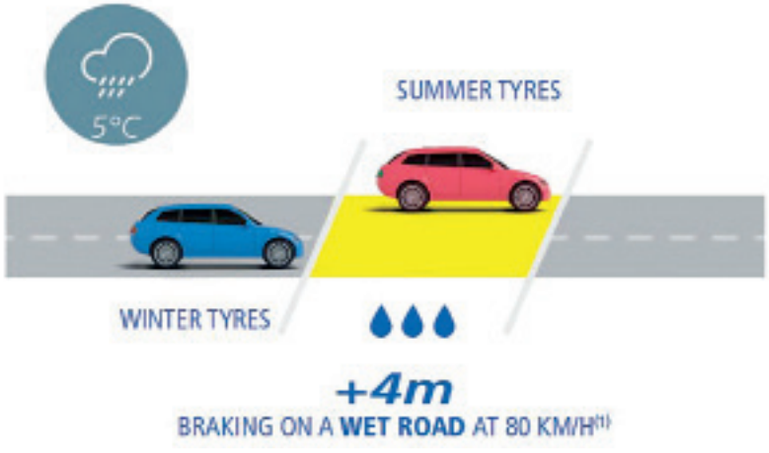
ELECTRONIC WIZARDRY

Modern cars have many systems operating in the background, aimed at improving driving safety. Some of these can be proactive, but many are reactive. Although traction control will limit excess wheel-spin, and many skids will often be nipped in the bud before engine power can cause problems, some skids will need the stability control system. But it's always best to regard these as a crutch, rather than a full safety net.

Stability control system are designed to provide additional support, but rely

Left to right: The tread pattern on a typical Michelin summer tyre • The tread pattern on a Michelin winter tyre – note the sipes • A winter tyre's footprint in snow – note the extra mechanical grip from the sipes • The tread pattern of one of Michelin's new CrossClimate tyres.





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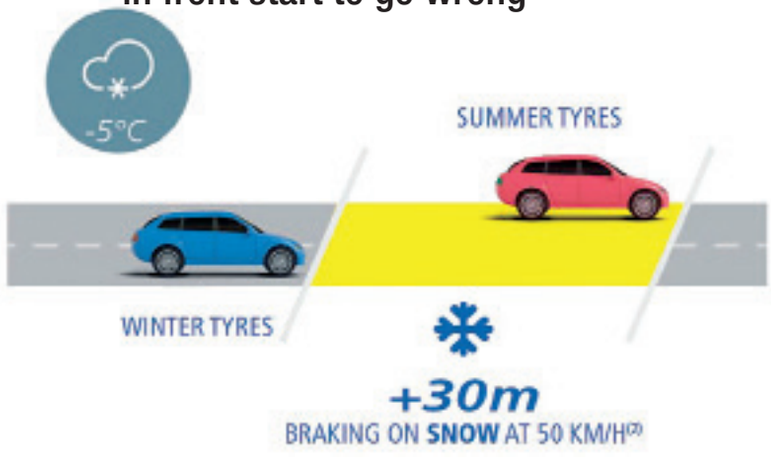

on grip to function effectively. Ironically then, they are most effective in warm, dry conditions, and have reduced performance in the cold, slippery stuff that's most likely to trigger an unexpected skid. These systems use the brakes to slow and steer a vehicle, and the brakes rely on the grip between tyre and road surface to function properly. The more grip, the harder and longer the brakes can be applied during each pulse.

So, surprise, surprise, we're back to tyres! It may now be clear that most safety systems will be more effective – and less likely to trigger – if winter tyres are fitted during the colder months. And this brings me to my final point which, I hope, will provide useful advice.

ALL-SEASON TYRES

In regions with the most extreme changes in temperature, it makes sense to have specific summer and winter tyres. After all, your car will only be wearing one set at a time, so two alternating sets will last twice as long as a single, summer set. In fact, many European countries mandate the use of winter tyres for certain areas or time periods, and others insist upon greater minimum tread depth limits for these tyres (eg 4mm instead of 1.6mm).

In the UK, our temperate climate makes severe, long-lasting snow something of a rarity, even though recent winters are perhaps showing a change. So a suitable, middle-ground for UK drivers may be the all-season tyre. This is typically a winter-style tyre that's been made from slightly harder compounds, and features less siping of the tread.

As such, all-season tyres don't perform quite as well as winter tyres in winter conditions, nor as well as summer tyres in summer conditions. However, they will provide a suitable amount of performance for all but the most extreme use or conditions. For example, I wouldn't run an all-season tyre on an M3 used for the occasional track day, but may consider it for a standard, road-going 3 Series that's used for commuting all year round.

Since Michelin kindly helped with technical information for this article, I should give a special mention to its latest technology – CrossClimate tyres. These may be of interest to some readers, and I have positive, personal experience of these used on BMW models in both winter and summer conditions. Michelin claims that the CrossClimate 'is a summer tyre with winter capability'.

SAFE AND DURABLE

It's new technology that utilises a summer rubber compound derived from extensive motorsport development which copes with a very wide temperature range, yet without excessive wear in any conditions. Anecdotal evidence suggests between 20% and 40% increase in life over conventional summer or winter tyres, but I can't state this as fact.

According to Michelin, the German magazine, *Auto Bild,* ran extensive independent testing of this tyre against the competition and at various states of wear. Interestingly, the testing revealed that the CrossClimate tyre, with just 2mm of tread remaining, outperformed others during wet braking tests, even when those had 4mm left!

So, although a CrossClimate tyre will not offer 100% of the performance of a full winter tyre in extreme conditions, I believe that it represents a very interesting, all-year-round proposition for BMW drivers – many of whom will want good summer performance, but may be concerned about getting stuck when rear-wheel-drive meets snow. I certainly struggled to get a summer-tyre-shod 135i onto my drive during an unexpected snow storm some years ago!

Unofficially, I've heard there's an engine-performance ceiling to the CrossClimate tyre due to the interaction of tread blocks under full acceleration, yet it appears all but the most powerful-engined variants should see no issues, as we're talking somewhere over 300 horsepower. ●

DRIVER TRAINING OPTIONS

If you'd like to learn more about safe winter driving techniques, or develop your skid control, you can get in touch with Neil through the DRIVE 7TENTHS website – **drive7tenths.com**

SPECIAL THANKS

Special thanks to Michelin UK for some of the images and technical data provided for this feature. You can find out more by visiting: **michelin.co.uk**