Advanced Circuit Driving Techniques

Article 2: Slow Corners & Hairpins

With the advent of affordable, focused training aids based on Video and GPS, driver training has enjoyed a surge in popularity.

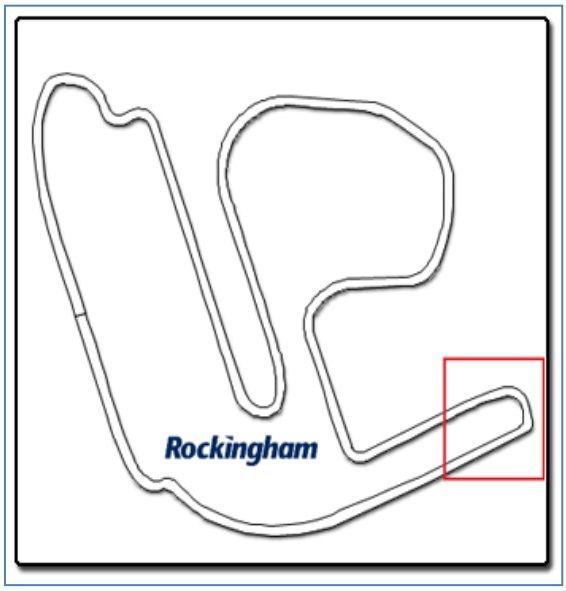
In the second of a series of articles, we will be discussing Slow Corners and Hairpins with accomplished race driver and personal coach Nigel Greensall, to try to help you extract every last ounce of performance from yourself as well as your car.

Nigel Greensall – "You spend more time in slow corners than in fast corners, so you can often gain most lap-time by concentrating on these areas.

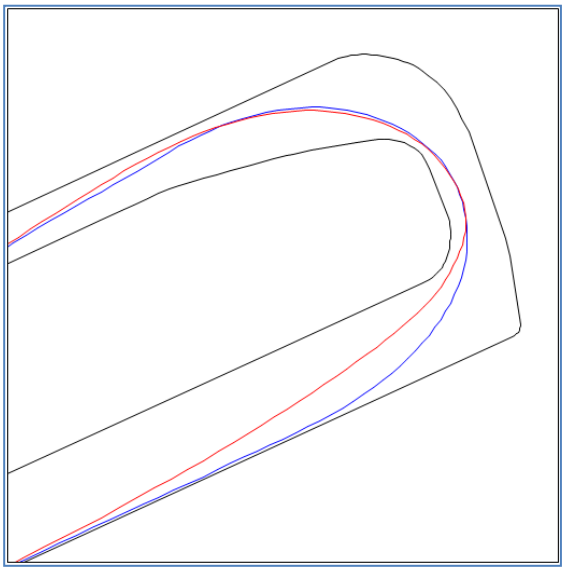
"Exit speed is important, but equally as important is minimising the time spent in the corner.

You often see drivers taking a big wide entry into hairpins to gain a fast exit speed, but due to the slow speeds involved, this sacrifices huge amounts of lap-time, in order to gain a few tenths down the straight.'

The hairpin at Rockingham is a great example. Take the two lines taken in the same car at the same race meeting (right).



The blue line was taken by my team-mate taking a wide entry, and the red line is my preferred approach, which is braking at a diagonal towards the first apex.



The red line is 14m shorter than the blue line, meaning I spend 0.45s less time in the corner.

The blue line does gain 2mph down the straight, but this is only worth 0.15s. Therefore the gain from the shorter line is 0.3s."

"Looking at screenshots from the in-car video (I'm driving the radical in the screenshot on the left) you can see I'm entering the corner much tighter than my team mate.

This means I need to go slower into the corner, but I am gaining time by travelling less distance. This compensates for the slight speed disadvantage onto the straight."

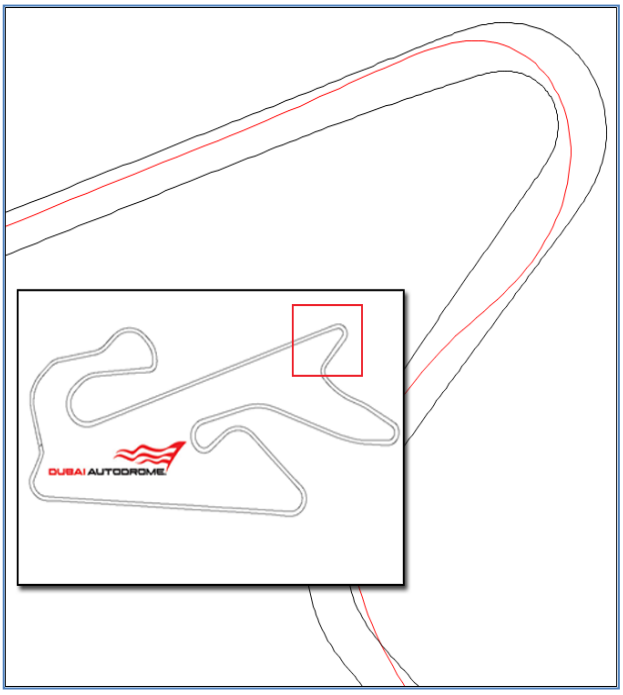
Dubai Autodrome

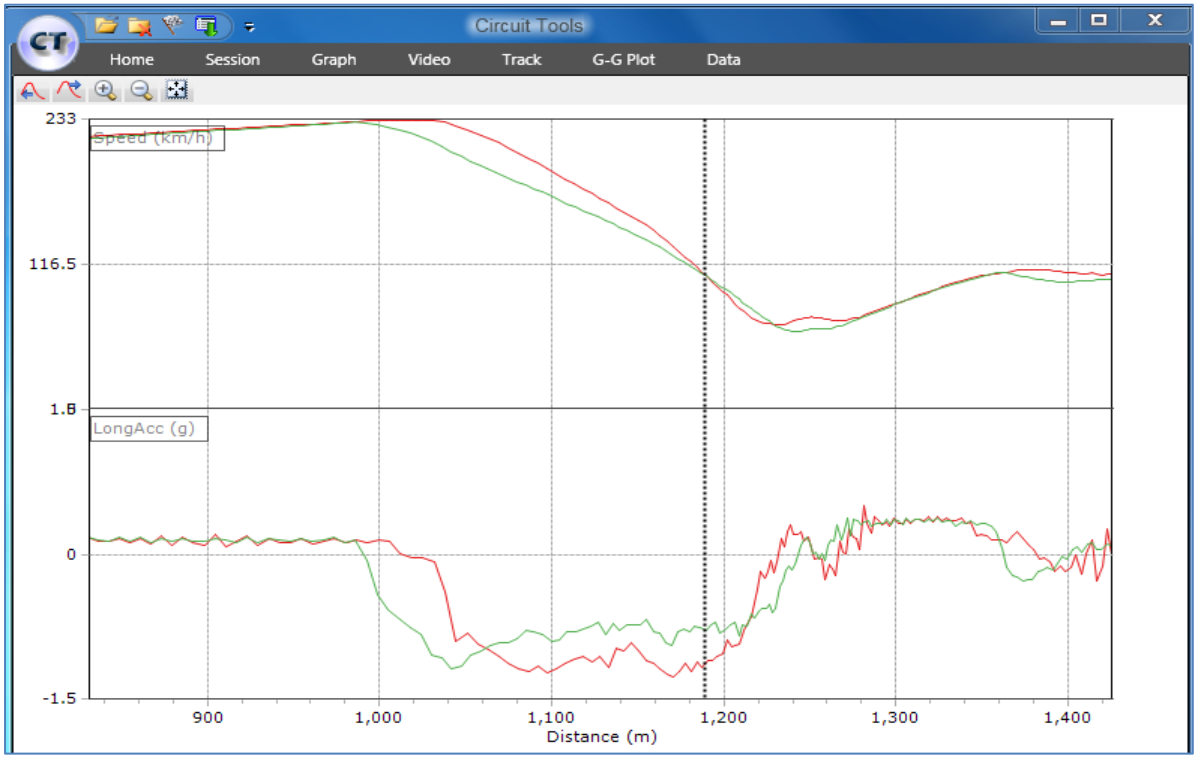
"The next example of a slow corner / hairpin is at the Dubai Autodrome (right).

I'll take the fastest qualifying lap of both myself and my teammate, and examine the hairpin at the end of the long straight.

As you can see by the graph over the page, our approach speeds are within 1mph.

However I brake 45m later, and harder. This gains me 0.3s, and we both arrive at the corner with very similar speeds.





A screenshot from Circuit Tools, the new software from Racelogic that comes free with every Video VBOX GPS data logger. The software can show side-by- side video for comparison, automatically finds the fastest lap, and displays easy to use graphs to show where time was lost or gained.

Nigel Greensall – "The graphs above show how it's possible to shave off time on the hairpin at the Dubai Autodrome.

The red line shows my car, whilst the green line is my team mate's car.

The upper graph shows speed through the corner, whilst the lower graph shows acceleration (g-force).

As you can see from the two graphs, we both come in at about the same speed, but I brake later and harder.

You can see the difference in braking from the speed trace, and also from the acceleration trace.

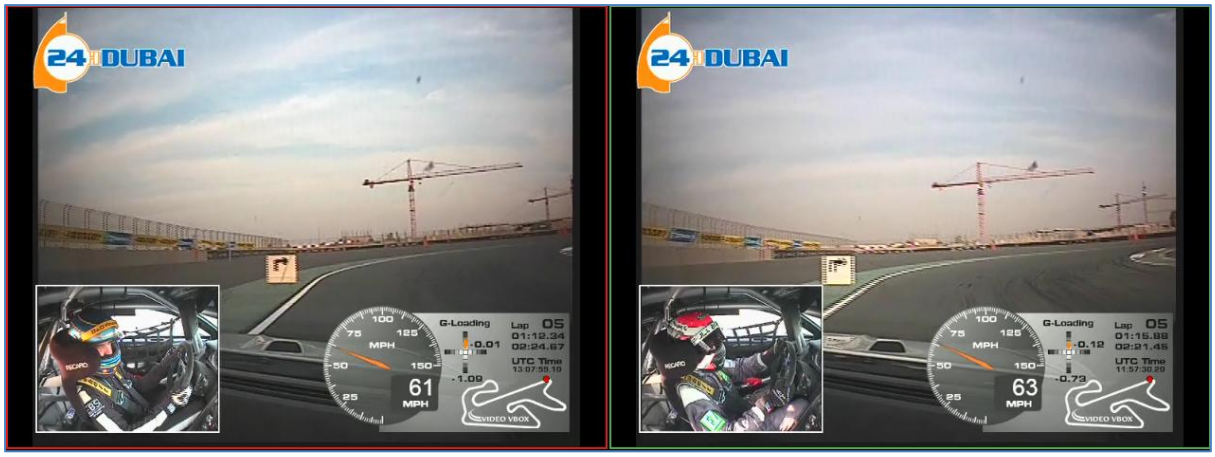
My team mate starts braking about as hard as me, but comes off the brake pedal as he slows down, whereas I maintain the braking force throughout the braking zone.

Onto the hairpin, and exit speed here is key.

This is because you don't brake for another 600m after this point, so I find it best to sacrifice some entry speed into the hairpin in order to turn the car quickly and spend as little time in the corner as possible.

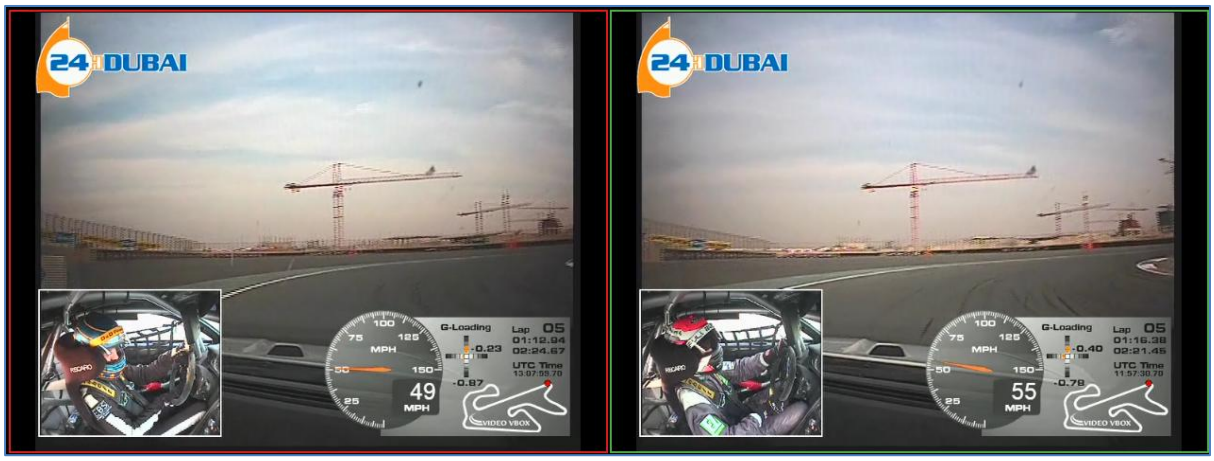
This means I can get on the power early, and carry the extra speed down the next section of track.

Have a look at some side-by-side video screen shots on the next page to show where I position the car to carry the optimum speed around the hairpin."



1: The corner entry (*Nigel's car is in the screenshot on the left*)

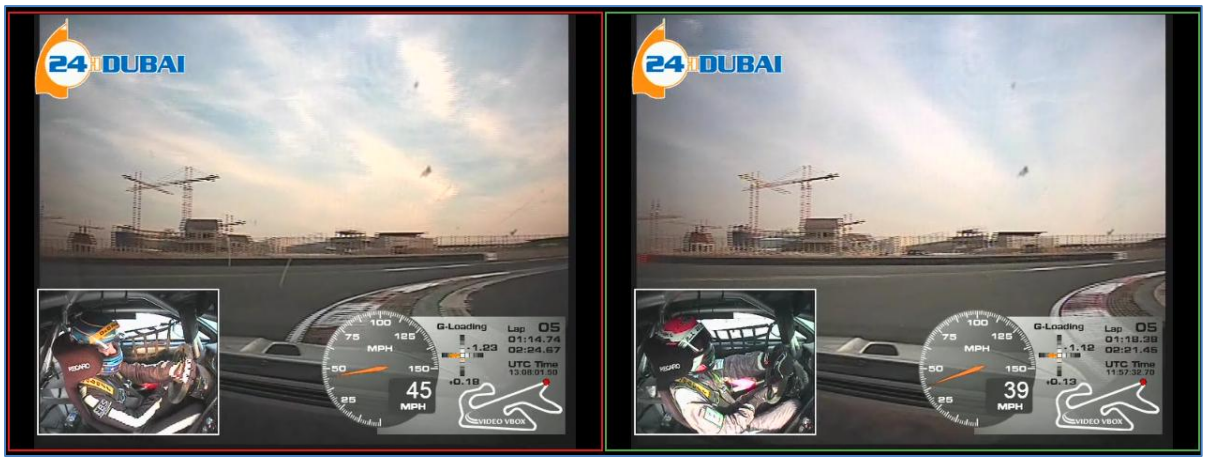
At the end of the braking zone, I am using a slightly wider entry angle, by moving left just before turning in. This widens the corner slightly and allows a little more exit speed



2: Turning in

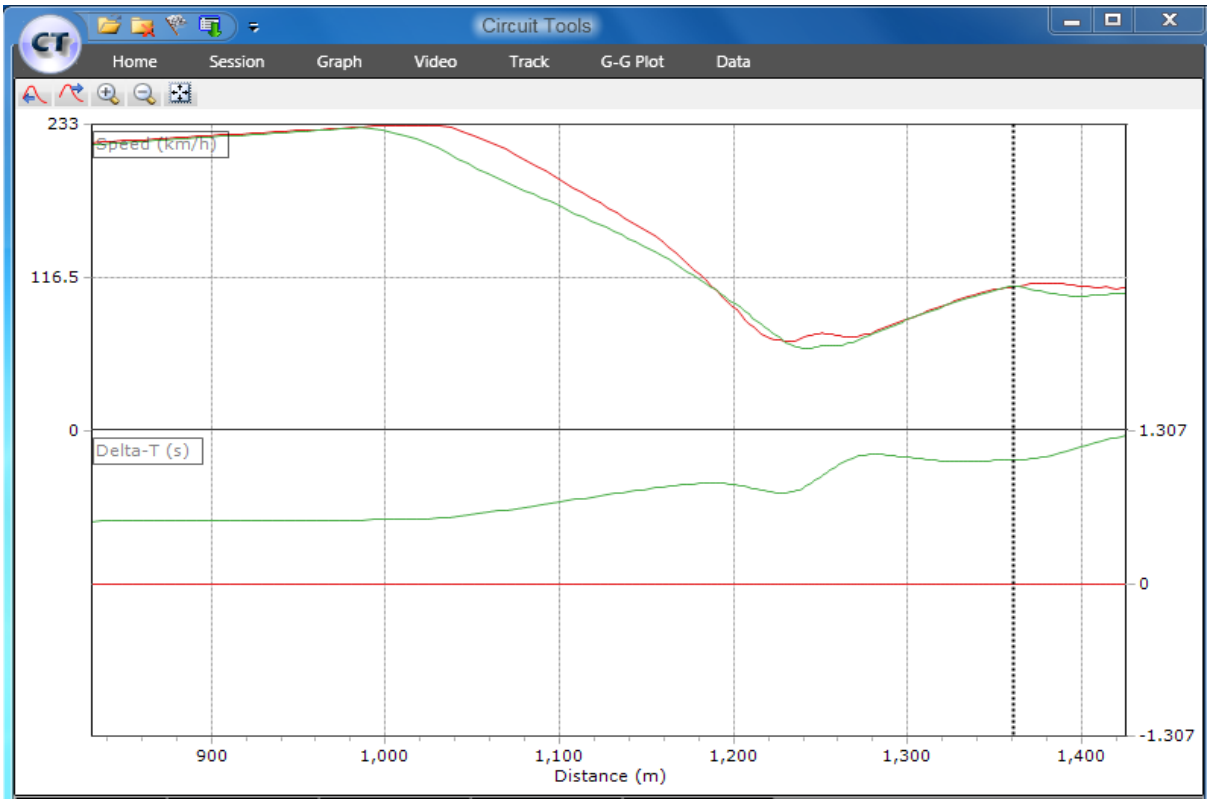
Approaching the apex, you can see that I am now carrying much less speed, allowing me to turn the car more quickly. At this point I have lost a little ground to my teammate, who has carried more speed into the corner. As shown by the graph over the page, the data shows a 0.1s loss at this point.

However, this allows me to get on the throttle much earlier...



3: Hitting the apex

My car is over the apex, which shortens the corner and allows me to travel less distance. I'm also able to get on the throttle much earlier than my team mate. By taking a bit more kerb I manage 6mph higher speed at the apex (45mph as opposed to 39 mph), as shown by the speed on the graphic overlay of the video.



The *Circuit Tools* graphs above illustrate how my car gained 0.25 seconds from corner entry to exit. This is best shown by the 'Delta-T' graph on the bottom, which shows where on the corner my team mate (represented by the green trace) loses time."

See over the page for a link to the side by side video of the Dubai hairpin corner...

Click the image above for a video of the Dubai Autodrome hairpin featured in this article. Nigel Greensall's car is featured in the video on the left.

We hope you've enjoyed reading this article, and that it has provided an interesting insight in to how one racing driver approaches slow corners and hairpin bends. You can add your thoughts to the discussion on the Racelogic forum here.

There are, of course, many ways to tackle a corner, but looking at the video and data quickly shows which are the most effective!

All data and video in this article was recorded with **Video VBOX Lite**.

Video VBOX Lite incorporates a GPS and video data logger with customisable graphic overlay, and is designed and manufactured by Racelogic.

More information and the online shop is available on **www.videovbox.co.uk**