



The Brazil GP according to Brembo

An in-depth look at Formula 1 brake use at the Autódromo José Carlos Pace

The Autódromo José Carlos Pace will host the 20th race of the 2016 Formula 1 World Championship from 11 to 13 November.

Located some fifteen kilometres from Sao Paulo, the circuit was formerly known as the Autódromo de Interlagos. In 1985 it was named after Brazilian driver José Carlos Pace, who won a single Formula 1 GP on the Interlagos track; he died in a plane crash in 1977.

The nearly 5 miles (8 kilometre) long track used in the '70s was first reduced to 2,68 miles (4,325 metres), then 2,66 miles (4,292 metres) and finally, in the year 2000, to its current 2,67 miles (4,309 metres). The track sees a lot of driving and features large high-speed curves that only require mild braking: single-seaters face Curva do Sol at about 155,34 mph (250 km/h), Subida dos Boxes at 170,87 mph (275 km/h) and Arquibancadas at over 186,41 mph (300 km/h).

According to the Brembo technicians who ranked the 21 World Cup tracks on a scale of 1 to 10 the Autódromo José Carlos Pace is the least demanding for the brakes. The track was given a difficulty index of 3, which puts in on par with the [Silverstone](#) track.

As with the British circuit, the main challenge for the brakes is the possibility of rain and dropping temperatures: at the 2012 Brazilian GP air temperatures never rose above 66,2 degrees Fahrenheit (19 degrees Celsius).

Brake use during the GP

Though the track features 15 curves, braking is only necessary 7 times for each lap: Silverstone, on the other hand, forces drivers to brake 9 times with its 17 curves.

Still, brakes are used for 16% of the overall duration of the race: which is a considerable amount of time compared to 10% for Silverstone and 12% for [Suzuka](#). On the other hand, the Autódromo José Carlos Pace stands out from the other two tracks for its 3 sharp turns, which must be faced at less than 62,13 mph (100 km/h).

Average deceleration is 3.8 g, the same as for Barcelona. The energy dissipated while braking amounts to 122 kWh, less than half the amount measured in Mexico City. Those 122 kWh are equivalent to the daily consumption of 18 Brazilian citizens.

From the start of the race to the finish line each driver exerts a total load of 57 tonnes on the brake pedal, equivalent to over 300 times the weight of all the medals handed out at the Rio 2016 Olympics and Paralympics.

The most challenging stops

Of the 7 braking sections for the Autódromo José Carlos Pace, 3 were ranked by Brembo technicians as challenging for the brakes, 2 were ranked medium and 2 light.

The most difficult section is at curve 1, just before the S do Senna: the single-seaters arrive at 213,13 mph (343 km/h) and brake for 1.42 seconds as they drop to 60,89 mph (98 km/h). Drivers are subjected to a violent deceleration, 5.5 g, as the cars travel 449,4 ft. (137 metres), or just over the height of the Martinelli Building, the first skyscraper built in Brazil.

The braking section at curve 4 has two features in common with this section: deceleration is 5.4 g and the load on the brake pedal is 361,5 lb (164 kg) (just 2,2 lb [1 kg] less than curve 1). However, the braking section doesn't last as long, both the time and distance are shorter: 1.25 seconds and 397 ft (121 metres), as the car slows from 211,2 mph (340 km/h) to 82,6mph (133 km/h).

The slowest curves on the circuit are curves 8 and 10, faced at a mere 56.5 mph (91 km/h): a 295 ft (90 metre) braking section is needed for the first, the second section spans 305 ft (93 metres). That's practically twice the length of the braking section required for curve 9: 150,9 ft (46 metres) to go from 90,7 mph (146 km/h) to 62,7 mph (101 km/h) in 80 hundredths of a second.

Brembo Victories

Single-seaters equipped with Brembo brakes have won 21 of the 41 editions of the Brazilian GP they participated in. The driver with the most victories is Michael Schumacher with 4 triumphs. Ferrari is the dominant team with 10 victories, but the last win dates to 2008.