

The Modern Formula One Circuits

Part 2 - Circuit Gilles-Villeneuve, Montréal, Quebec, Canada

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While his death may not have been greeted with the same measure of shock and horror as the deaths of Ayrton Senna and Jim Clark, Gilles Villeneuve's death was probably more epic in scope than any in the history of the sport. His is a tale of broken trust, ruthless competitiveness, and ultimately a violent and sudden death that came far too soon for one of the sport's most popular drivers. A background of the track that bears his name does not permit an examination of the story of Gilles Villeneuve's life and untimely death, but it is unquestioned that Gilles' impact on the sport belies the length of his career.

It is worthwhile noting that it was in part the rise of Gilles through the ranks of Formula One and ultimately into the prestigious cockpit of a Ferrari that inspired the construction of the circuit that bears his name. Situated on a man-made island in the Saint Lawrence River a few minutes from downtown Montreal, the track is located on the site where the rowing basin for the 1976 Summer Olympics were held (the basin is still there, although now encircled by asphalt and screaming V10s once every year). The first Grand Prix of Canada was held there on October 8th, 1978. Villeneuve went on to win the race (the first of his career) after the current race leader, Jean Pierre Jarier, retired his Lotus with mechanical problems, to the ecstatic delight of the Canadian fans (Gilles was a native of Quebec).

With this storybook debut, the track then known as the Circuit Ile Notre-Dame became the permanent and much loved home of the Canadian Grand Prix. It was shortly after the tragic death of Villeneuve during qualifying at Zolder in 1982, only a few weeks before the Canadian Grand Prix, that the track was renamed in honor of the first and favorite son of Canadian motorsports.

Track Setup and Team Reports

While stating that any Grand Prix is hard on brakes is fast becoming a borderline tautology, it really is true at Montréal. Montréal has only one very fast corner (the sweeping right-hand run down to the chicane at Pont de la Concorde). The remaining corners chicanes are all very slow and tight. This means that most braking is done from high speed down to very slow corner entry speed, resulting in relatively long periods of maximum effort braking and high braking temperatures overall. Brake duct sizes are almost always larger at Montréal, even despite the long fast sections that would usually call for as much aerodynamic efficiency as possible.

Of course, having an efficient overall aerodynamic package and a powerful engine can negate the extra drag induced when using high downforce or the parasite drag associated with larger brake ducts. This is why Ferrari can make compromises that other teams simply cannot make—and there is no reason to expect Montréal to be any different. Oh yes, and did I mention that Michael Schumacher has won on this circuit a record six times? Ultimately, however, because of the slow corners at Gilles Villeneuve, downforce is not quite as important as mechanical grip. Teams with a well-sorted chassis should have a good chance of sticking with the red cars at Montréal. Right now, this means the Lucky Strike BAR Honda and Renault should be in the best position — even more so BAR Honda with their powerful Honda engines (that is assuming Sato's car doesn't start belching white smoke like one of the Blue Angels).

Coming into Montréal, it is clear that the resurgent BAR Honda team is in fine position for yet another step toward mounting a legitimate challenge to Ferrari's dominance. They have the power, they have the aerodynamics, and they appear to have the driving talent. While Sato's "all or nothing" pass attempt on Barrichello at the Nurburgring two weeks ago may have drawn the dreaded "amateur" accusation from Rubens (Sato shot back that perhaps Rubens will

be more inclined to check his mirrors when Sato is behind him from now on), Sato clearly has the speed. His P2 at Nurburgring behind Schumacher was a stunning lap, and he has displayed the necessary skills, raw though they may be, to match that speed with the requisite amount of aggressiveness (to be fair, perhaps a bit too much at times, as yet).

This is not to say the Renault team doesn't have similar designs on becoming a title contender, but since the much promised power boost is still pending — unless the new spec engine planned for Montreal proves to be the real thing — the lithe blue and yellow cars will probably still lack the necessary steam down the circuit's long straights to gun for the top spot on the box.

It is a sad statement about Williams BMW and West McLaren Mercedes that a discussion of their chances is relegated to the "as for the remaining teams" portion of the text. The "B" spec McLaren chassis is now slated for a Magny Cours debut, so it will be another weekend of desperately trying to stave off the engine demons that have all but eliminated Kimi Raikkonen's much vaunted hopes for his first Formula One title. As for Williams, they too await a new chassis, but of far greater detriment to the team's success is the ongoing soap opera within the team itself — a sordid tale that will likely end only when the happy couple of Juan and Ralf finally go their separate ways.

Nonetheless, race reliability will continue to be a crucial storyline at Montreal, especially given that the circuit often finds a large number of cars falling victim to mechanical demons. In 2003, several of Michelin's tires delaminated during the course of the weekend, and there was notable glow coming from the rotors of Juan Pablo Montoya's Williams BMW, which might not otherwise be worth discussion had it not been for the fact that the rotors glowed orange even when not in use. A test is certainly in store for several teams — teams like Williams and McLaren that appear to have come to Montreal looking very much "the worse for wear."

One Hot Lap

As Formula One tracks go, Montréal is not overly challenging. This does not mean, however, that the drivers dislike its 4.421 kilometers. Most drivers praise the circuit, if not for its layout, for the location of the track, the atmosphere, and the city of Montréal itself. The track is an interesting combination of purpose built road-course and pre-existing street-course. It does, in many places, have the characteristic tightness of a typical street course, including walls occasionally placed very close to the track, but the overall feel of the circuit is that of a permanent track. The circuit is bumpy, however, and again, mechanical grip is at a premium.

A lap starts almost at the end of the main pit straight and is followed by a sharp left into a right-hand hairpin (Virage Senna). The track offers very little assistance in exiting this corner and the greatest challenge here is to avoid the temptation to try and put the power down too soon. There is a short straight before the first chicane of the track, and getting a good drive onto that straight is very much a priority, especially if you have any plans to make a pass into that first chicane.

And a tricky chicane it is. Following a short and sharp right, there is a quick left into a sweeping right-hand corner. This is easily the fastest corner on the circuit and also one of the sections where the walls come closest to the track, offering a very small margin for error. Whatever downforce you have decided on using in your setup will be very much in demand, as lateral G-loading is the highest here of any corner on the track, in excess of 3Gs. But this fast corner ends abruptly in another chicane at the Pont de la Concorde. It is another fairly straightforward left/right complex, and again, a premium is placed on mechanical grip to aid the driver in obtaining that blast of power onto the relatively long back straight.

Upcoming is the next right/left chicane, another relatively straightforward sequence of turns, but an important one, as it leads to a short run down to the Casino Hairpin (or L'Épingle) — the primary passing corner on the circuit. It is probably worth noting at this point the key differences between Formula One braking and typical road or sports car braking. Typically, in most road and sports cars, braking begins with a touch on the pedal to begin the transfer of weight to the front wheels and then a progressive push on the pedal, bringing the wheels to the brink of lock without losing traction. This is called threshold braking.

In a Formula One car, the massive downforce produced at high speeds requires a very different approach. Rather than gently transfer the weight, an F1 driver stomps on the pedal and then gradually reduces pressure as the car slows to avoid lock. The reason for this is because of downforce. As the car slows, the downforce is reduced. Downforce is nothing more than lift: the generation of low pressure on one side of an airfoil. As with airplanes, as the speed increases, the lift increases — only in Formula One, the wing is turned upside down, creating low pressure beneath the car. As speed decreases, so does lift, until at a certain speed, lift disappears altogether as the relative pressure on either side of the wing is equalized (in aviation, this is called a stall).

For an F1 driver, this means that downforce assists traction the most when the car is going its fastest, and therefore the brakes work best, at least initially, at high speeds. As the speed is reduced, and with it the downforce, mechanical grip gradually becomes the sole provider of traction, and wheel lock becomes more likely. Thus, an F1 driver jumps on the brakes hard and early and then modulates the pressure more carefully as downforce slowly is lost.

L'Epingle is one place where the drivers will most certainly be using the car's downforce to full effect in the braking zone. L'Epingle is the best passing area on the track, and this will be the spot where most drivers will make an attempt at a lunge down the inside — especially given that there is plentiful run-off and most of the run-off area is paved asphalt. A major mistake here need not knock a driver out of the race. L'Epingle is also one of the most common areas of the track for a driver to loop the car—not under braking, but again, as with Virage Senna, while attempting to put the power down to get a good drive onto the long Casino Straight. The Casino Straight is the fastest section of the track, with the cars reaching speeds of 210 MPH before braking for the final chicane.

The final right/left chicane before the pit straight, like all final corners, is the most crucial of the track. Often, this chicane is the site of many close encounters with the wall outside the left-hand turn of the chicane as the cars hunt for rear tire grip in the drag to the line. There are often as many moments entering this complex also, as the cars try desperately to run in to the first turn deep and make a last chance pass. Of course, with speeds in excess of 200MPH likely at the braking zone, even a fractional misjudgment of the proper braking point can have the tires locked and the car spinning. Once the car has managed to avoid a close encounter with a retaining wall, all that remains is a short sprint to the line, a wave to the fans, and a quick check with the pit crew to see how many seconds behind Schumacher you have finished.

The times from last year:

Ralf Schumacher (Williams BMW) held the pole with a 1'15"529

Fernando Alonso (Renault) set fastest lap with a 1'16"040

Michael Schumacher (Scuderia Ferrari Marlboro) won the race from Ralf Schumacher and Fernando Alonso.

In closing, I can only add the words used on the inscription placed upon the starting grid for the 1983 Grand Prix of Canada:

"Salut Gilles"