Formula One Aerodynamics

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The purpose of this project was to determine which aerodynamic element/s on an F1 car is/are the most important to maximize to achieve the fastest lap possible around the Bahrain International Circuit. All analyses were conducted without the use of wind tunnel data, ensuring that smaller teams can make the most of their resources. Method: An analysis of the track was completed to identify track sections. A full analysis of both car aerodynamic elements was done to identify setup differences. The lap time data was recorded using the aerodynamic performance analyses. Results: The data that was recorded showed that Car A gained lap time compared to Car B on straights by 0,018 seconds, in low-speed corners by 0,171 seconds, in medium-speed corners by 0,122 seconds and in high speed corners by 0,388 seconds. Team A has shown that by minimizing the size of their engine housing and intake areas (roll hoop and sidepods) they could maximize their downforce generating elements to have the best possible setup for the race weekend. Car A is seen to have a much more effective cooling system than Car B, which allowed these elements' sizes to be reduced. This allowed for fast straight-line speed, because of the total decreased surface area, while still being able to generate enough downforce in the high-speed corners. Increased speed in the corners allows for greater exit speed, further increasing straight-line speed. Therefore, these elements prove to be the most important for a car's aerodynamic setup on a high-speed circuit.

Awards Won:

Third Award of $1,000