AERO 101

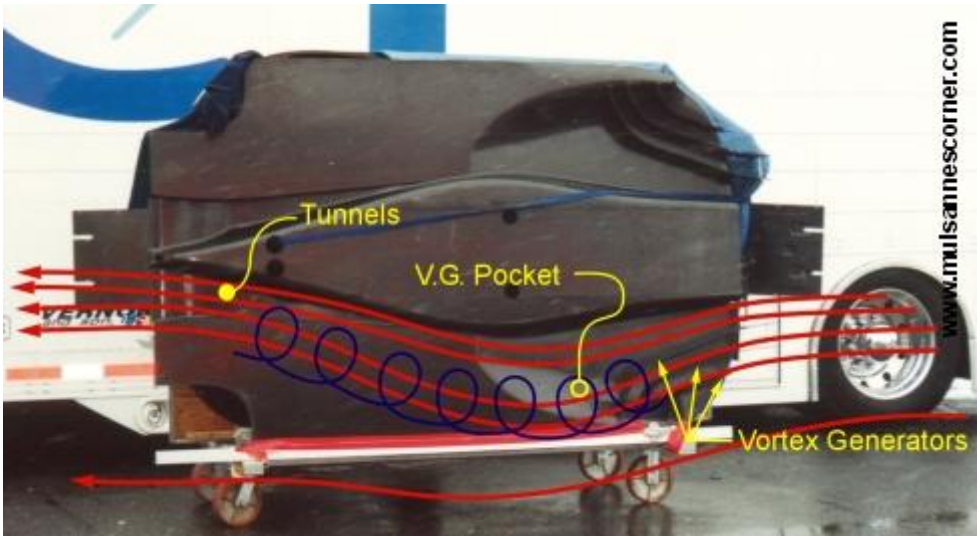
Welcome again! This is the seventh segment of Aero 101. In this segment we will discuss barge boards, sideskirts, and underbodies. All these devices are used to optimize airflow under the car. Many times, they can be used in conjunction with each other to create the perfect package. Both bargeboards and sideskirts keep air from entering the underbody where they can disrupt the airflow. As always, don't be afraid to ask!

Underbodies

There are two types of underbodies: flat floors, and profiled floors. Most stock cars have a lot of imperfections and rough surfaces underneath the car (such as the exhaust) and these cause disturbances to the airflow. By adding a flat floor and smoothing the surfaces out, lower static pressure is developed and downforce increases. Downforce is increased partly due to the added floor, but more so to the reduced lift OVER the body of the car, because of the increase in airflow underneath the car. It is important though that the inlet feeding the underbody section feed enough air for it to work correctly (if your airdam is too low, it will cut off airflow to the underbody). For flat floors, a small 1-2* of rake is actually beneficial because it creates a simple venturi section.

Profiled floors were created to optimize the shape of the packaging of fundamental components of a race car. Profiled floors have a convergent inlet, a throat, which led to a diffuser section. The tunnel shape needs to be well designed to work properly. The roof to wall junctions need to be generously radiused to prevent flow separation. Where the tunnel meets the floor, the corners are left sharp, to encourage vortices to form within the tunnel, which assists in maintaining attached flow and

lowers static pressure.

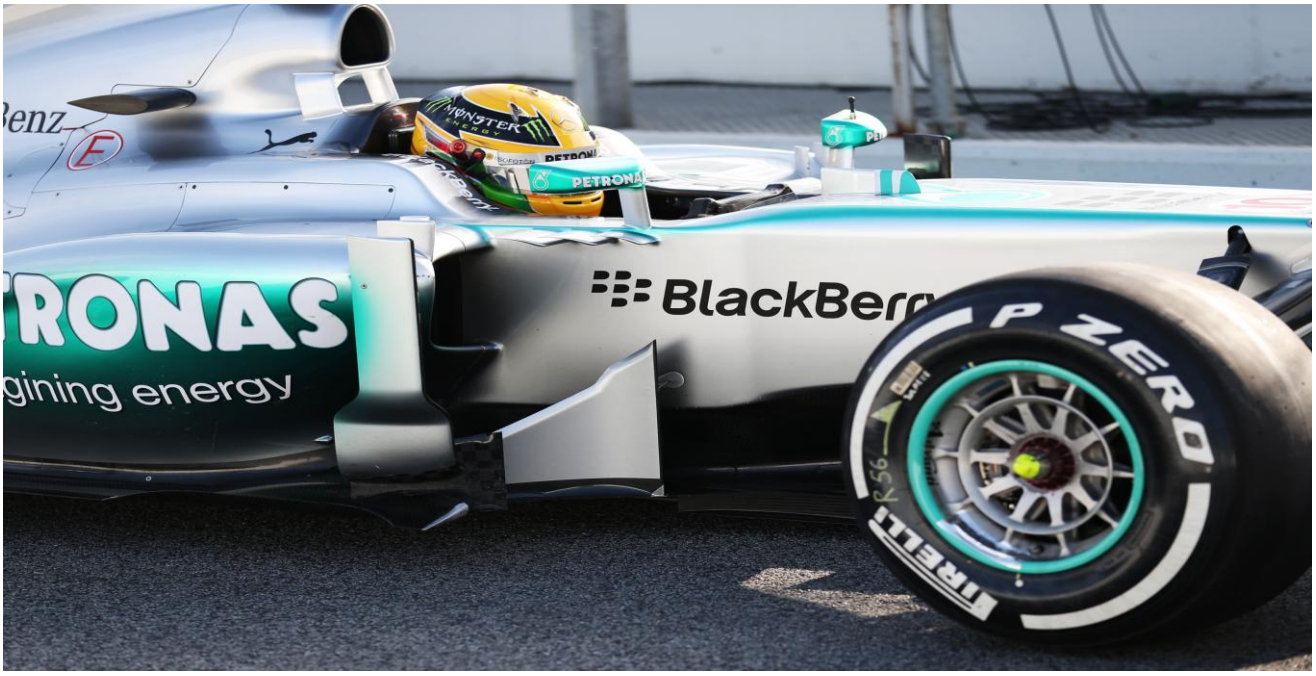


Sideskirts

Sideskirts are flexible or rigid devices mounted to the body of the car, spanning from wheel to wheel. In early Formula racing, the skirts actually slid up and down, to create a vacuum seal with the ground to further increase downforce. However, due to some skirts getting stuck and causing safety issues, sliding skirts were banned. We can use the same principle though and use fixed sideskirts that have a low ground clearance. The purpose of the sideskirt, as mentioned in the introduction, is to keep dirty airflow from flowing underneath the car. Airflow has a tendency to flow into areas of low static pressure, and the sideskirt acts like and endplate in this effect.

Bargeboards

Bargeboards can increase downforce, efficiency, and reduce drag. They reduce the static pressure in the underbody, and create 2 pairs of vortices (1 from the upper surface, and 1 from the lower). The lower vortex travels downstream and is the cause of the drop in static pressure. In F1, bargeboards usually have incorporated turning vanes which help direct air around the sidepods. In amateur racing, turning vanes can be incorporated to direct dirty air from the tire away from the underbody.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