



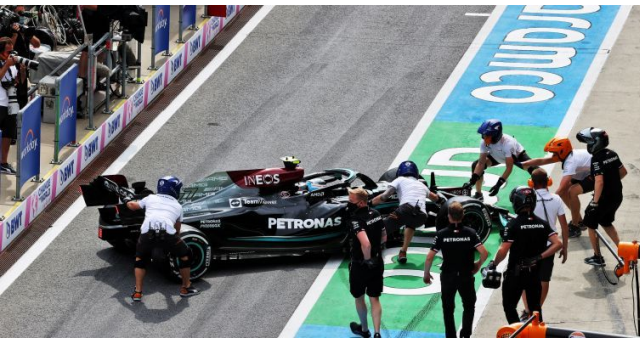
A Critical Review of the 'Halo' Device in Formula One

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Why is the Halo needed? (Plus a little history lesson)



- Ayrton Senna's death has been deemed a turning point in F1.
- Safety has improved throughout the years with the virtual safety car and the way the cars are designed.
- Federation Internationale de l'Automobile (FIA) and teams rely on sponsorship.
- Small incidents improve sponsorship and benefit the sport.
- Large incidents negatively impact sponsorship



So what is the Halo?

- A grade 5 titanium T-shaped hoop which is fixed to the car by three joints for maximum rigidity
- Grade 5 titanium is stronger than grade 2 titanium, and is optimal for the purpose of the Halo.
- The purpose of the Halo is to reduce large objects, such as loose wheels, entering the cockpit, protect the driver from a frontal collision and allowing room for extraction in the scenario that the car is overturned.



The other options to the Halo



Central Line Roll Hoop

- Designed to flex and deflect objects from straight on.
- Caused issues with driver vision and driver access during an emergency.



The Aeroscreen

- The answer to increasing driver visibility
- Made some drivers 'dizzy'

Additional Frontal Protection

- Aimed to deflect a wheel up and over the driver
- Only deflected certain angles and still left the driver susceptible to a head impact.



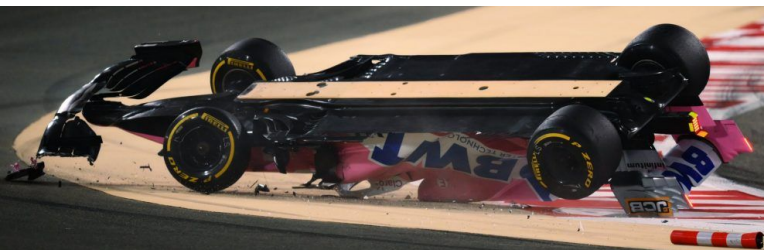
Strengths of the Halo



Three incidents where the Halo saved lives

- Monza 2021 - Verstappen parking his Red Bull on top of Hamilton's Mercedes
- Bahrain 2020 - Romain Grosjean hitting a barrier at 192 kph
- Belgium 2018 - Alonso's McLaren going over the top of Leclerc's Sauber

There is room to escape when the car is overturned.



Weaknesses of the Halo

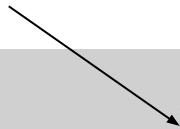


- The Halo is a Standard Supply Component.
- It cannot be modified and is standardised across the F1 teams regardless of budget.
- Limits air into the engine intake and the engine output power is lower

Aerodynamics

- DRS enabled allows for less downforce on the car to increase the speed.
- The Halo disrupts the air hitting the rear wing in a uniformed way - it creates 'dirty air'.
- DRS is now less effective compared to the 2017 season.
- The Halo increases safety, but decreases the speed of the cars

Engine air intake system





So what is next for the Halo?

Despite the mixed reviews, the Halo saves lives and has a place in F1.



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