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Implementation Of The Halo In F1 Academic Skills ACHA4005

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1 Introduction

At the heart of Formula 1 (F1) there is continuous developments that spans across multiple domains. The major areas consist of; Reliability, Powertrain, Aerodynamics and Chassis but most fanatics tend to completely disregard and inadvertently overlook how the safety of the sport has evolved over its dynamic history, but a controversy highlighted by many fans, drivers and employees alike was the implementation of the Halo onto the modern F1 car.

The reason I chose to write this report is due to substantial impacts such as how the Halo has saved numerous lives in multiple different ways and the massive controversy that was ignited when it was announced.

1.1 Aims

I aim to be able to give a detailed description of the introduction of the Halo and why it was originally introduced. Whilst also addressing the major controversy it caused affecting the teams and especially the drivers.

1.2 Objectives

To be able to achieve my aims I will use academic resources and credible documents and articles to be able to gain the information needed to reinforce the points that will be made. I will also make use of figures such as tables and/or graphs to show a more understandable view to be able to reinforce statements made but also to evaluate and discuss arguments.

2 Background

In the 1950's Safety was not a huge concern for Formula 1 teams and drivers. Most drivers were seen driving without helmets or seatbelts going with the saying of Stirling Moss "better to be thrown out (of the car) than to be burnt" (Stuart, 2023), so the fact that 18 drivers died between 1950-60 is not a huge surprise. Although as the years go on crashes that would have been death for a driver would now be more of a minor injury.



Figure 2-1 An image of the Halo as it was introduced (F1,2018)

The Halo was introduced into Formula 1 in 2018 after being testing began in 2016. Due to crashes in recent years in F1 and IndyCar from Jules Bianchi and Justin Wilson the FIA had decided they needed to increase driver safety. Jules Bianchi died during a F1 race while being led by a safety car, as his car sped off the track in the rain nose first into heavy machinery that was moving another crashed car. Justin Wilson on the other hand was hit by a piece of flying debris from a crashing car during a race in IndyCar and died on impact from the debris (Le Poidevin, 2022). Formula 1 and IndyCar are known to share some safety developments such as Red Bulls engineered windshield onto an F1 car, but IndyCar used it after F1 used the Halo instead (Keeshin,2016). The Halo was engineered and developed by Mercedes with Mercedes' own James Allison saying, "We had to strengthen the design of the chassis so it would be able to take roughly the weight of a London double decker bus sitting on top of the Halo." The Halo was then tested by the FIA in a realistic scenario, a Pirelli F1 tire was

shot/propelled at the Halo at high speed upon an F1 car to simulate how it would work. It passed all its tests and was then introduced to the modern F1 car. (Dielhenn, 2023)

Figure 2-2 Deaths by Decade in Formula 1

Decade	Deaths
1950s	15
1960s	14
1970s	12
1980s	4
1990s	2
2000s	2
2010s	3

3 Analysis & Discussion

Initially being controversial to bring in the halo due to a vision impediment which according to studies show that it can lead to an increase in brain fatigue (Rosalie & Malone, 2018) many drivers were not happy with the new Halo design until it proceeded to save many lives such as the lives of 7-time world champion Lewis Hamilton, Zhou and Grosjean. (Sunday Times Driving, 2022)

But before any lives had been saved by the new safety development multiple time F1 world champion Niki Lauda had said that the introduction of the Halo is the “wrong” move for the direction of the sport. Niki Lauda being severely burned in a crash during his career was looked up to for his opinion around safety as he was subject to racing conditions that were not so ‘safe’ for the driver. His main reason for stating this opinion was due to how he believes this move will “destroy” the good work F1 has done to introduce and development faster more dramatic cars. Other leading figures such as Damon Hill publicly agree with Lauda’s opinion on the matter. (Benson, 2017)

Regardless of others’ opinions no matter how much of a ‘big figure’ they are/were in the sport the facts do not lie, especially when it comes to Zhou’s crash which was at the famous Silverstone circuit in 2022. Zhou’s Alfa Romeo was flipped upside down and slid across the track after his car collided with another which then sent his C42 the barriers. Without the Halo his head would have been exposed to the track and he would have almost definitely died. (Dielhenn, 2023)

Hamilton’s crash came at Monza in 2021 where Verstappen’s Red Bull had been lifted atop of Hamilton’s Mercedes and Max’s wheel had rolled onto the Halo but was stopped going any further down stopping the contact of the wheel and Lewis’ helmet. This for certain saved Lewis’ life. (Dielhenn, 2023)

Grosjean’s crash was the most controversial on this list. After crashing into the barriers with a force of 67G his car had become lodged into the barrier making it difficult to escape but what added to the complication was his Haas had blown up into a fire. After 28 seconds in the fire, he had escaped with a few burns (Benson, 2021). The Halo had saved him from contact with the barrier as it kept, another life saved (Duxbury, 2021).

Regarding Grosjean’s crash there are many more safety features that came before the Halo that all have an impact on protecting the driver too. The oldest safety feature on display is in fact the marshals that came to his aid, they were implemented into a few races in 1950 and their presence over the years kept increasing where they are now a normal sight in modern day motorsport. The second oldest being the helmets, after 2 years of F1 they became mandatory in 1952 and then being

upgraded to highly fire-resistant helmets in 2001 made from mostly carbon fibre. In 1975 fire resistant overalls were made mandatory after making normal race overalls mandatory in 1963, before that drivers would commonly wear t shirts or whatever made them feel most comfortable. The new overalls are made to withstand heat of 600-800 degrees for more than 11 seconds. The survival cell, treated as an entity since 1981, made from strong composites of carbon fibre and a layer of Kevlar which then absorbs huge amounts of energy during crashes, they are now also fitted with a fire suppression system (Duxbury, 2021).

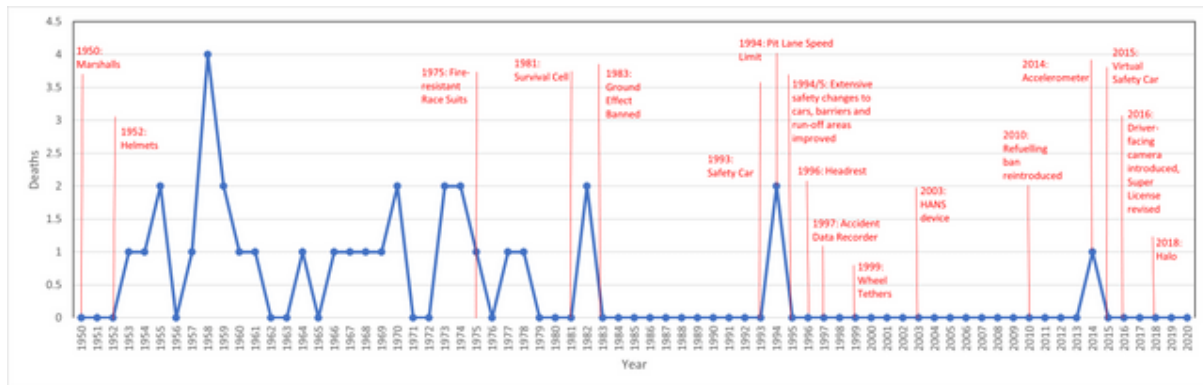


Figure 3--3-1 A graph indicating deaths over the years with safety features implemented (Calvins, 2020)

This graph gives a direct indication to how safety has grown its presence in the sport since its birth and graph solidifies how these safety features are working as the death rates are dropping. There are still outliers as in 2014 Jules Bianchi passed away in a high-speed crash. This leads to the immediate thought of how no matter how much safety has developed the sport is still dangerous and that drivers risk their lives every time their car leaves the pitlane. With this in account it ends on the point that motorsports are dangerous, predominantly at the highest level, no matter how many safety developments are brought in we could still see life changing injuries and death, but the Halo has significantly decreased that risk.

4 Conclusion

In conclusion, after reviewing all the evidence collected the Halo's controversy had every right to exist with the sight impediment it created and the negative impact it could have had on performance and aerodynamics. However, after reviewing what it has done for the drivers of this sport, by saving their lives on numerous occasions, it has every right to exist and continue being used across the category of racing. With the Halo then being adapted to the lower categories (f2, f3, etc) being a very smart decision to follow on from the evidence shown over this report exasperates how the FIA are giving their uttermost best efforts to ensure ultimate safety for the drivers of the world while also not impeding on the raw racing that is being produced from the drivers. This does not affect how drivers are constantly at risk every time they race as situations evolve high intellect is needed to adapt to ongoing events throughout their race but with the added safety the drivers can focus more on their driving rather than not dying. Overall, the aim of finding controversy about the Halo was met as well as uncovering the reasons behind this controversy while also explaining how the Halo works and how it has saved lives and determining if it was a good development.

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