



F1 Safety – Helmets and Clothing

Hello and welcome to Sidepodcast, this is a new mini series called F1 Safety. We'll be taking a closer look at all the things that minimise the risks of driving at 300km/h. We'll be covering various topics over the next seven shows, and today our attention turns to helmets and clothing.

Every Formula 1 ticket across the globe heralds the warning: "Motorsport is dangerous." And it is. No one could argue that driving at enormous speed around a narrow circuit would be anything but. However, F1 has taken great strides forward in safety since its early days, and now even the smallest details are covered with precise requirements.

The driver's helmet is a perfect example. For a driver, his head, neck, and arms are the most exposed areas during a race. The rest of his body is tucked away behind sheets of carbon fibre, but his head takes the full brunt of any oncoming forces. Putting aside what could happen in an accident, every single corner taken by a driver can be a strain on the head.

It is no surprise, therefore, that every driver wears a helmet. They can weigh anywhere between 1250 grams and 1800 grams, and not only are they designed for safety, but also try to blend well with a car's aerodynamic profile. Made out of layers and layers of carbon fibre for strength, the helmet is lightweight, virtually indestructible, with fireproof materials forming the cushioning on the inside.

There are a few main helmet suppliers, including Bell and Schuberth, and all are subjected to strict crash test procedures by the FIA. Each helmet is fully customised for the driver and most include holes for breathing, ventilation and drinking straws. The ventilation does include some filters to keep out elements of carbon, brake dust, oil and fuel vapours. The helmets also block out a lot of the surrounding noise, which allows for drivers to be in radio communication with their engineers in the pits.

As well as being able to hear, it also helps if a driver can see, obviously. The visor is about 3mm thick, and fireproof, with variable tinted shades depending on the time of the session, the state of the weather, and the track. At Singapore, many of the drivers had lighter visors to help visibility, whilst we know Felipe Baby wanted a lighter visor during the bad rain in Malaysia. Technology also exists to allow the tinting to adjust, as some sunglasses do. In the tunnel at Monaco, it can be slightly brighter, whilst at the exit it can darken again.

Underneath the helmet, the driver wears a balaclava made of Nomex, and this is a name you'll hear a lot when it comes to safety clothing. Nomex is supremely flame retardant material, in that it can be subjected to open flames of about 300 to 400 degrees C temperature without igniting. It's used for the drivers balaclava, as we've already mentioned, plus overalls – with elastic cuffs on the wrist and ankles – for drivers and the pit crew, gloves, socks and underwear.

The overalls also have zips that are designed to be flame retardant and more importantly, not to transfer heat onto the drivers skin, as regular metal zip would. Racing shoes continue the fireproof trend, but are also lightweight, with thin soles and plenty of grip to allow maximum control in the car.

Once the driver is kitted out and ready to race, he needs just one more piece of equipment – the HANS device. This Head and Neck Support device is a way of tethering the helmet so that a drivers head won't flail around in case of an accident. The system consists of a so-called shoulder corset, made of carbon fibre, which is then connected to the helmet by small straps, and to the safety belts as well. The device is designed to allow the natural movement of



racing, but it should restrict the impact of an accident. That kind of force could increase the weight of a helmet to as much as 560kg, which can be absorbed by HANS.

The FIA commissioned the development of the design from Dr Robert Hubbard of the University of Michigan in the mid-1990s, but HANS didn't become mandatory until 2003.

There is so much technology involved in these helmets and clothing elements already, but developments are happening all the time. Recently, some drivers have tested out heated visors to try and help with the problem of fogging up in humid conditions. There's plenty more innovation still to come.

That's all for this first episode of F1 Safety. Tomorrow we'll take a look at another element of safety within Formula 1 and until then, your comments and feedback are always welcome. You can email me Christine@sidepodcast.com.

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