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Use of a requirement that all LMP1 cars must be closed-cockpit, some changes to the hybrid system, and the introduction of the slow zone system.[36] Porsche returned to Le Mans in 2014 with a new factory LMP1 program, and Nissan returned to an LMP1 program in 2015. Audi withdrew from racing at the 24 Hours of Le Mans in 2015, but only on a temporary basis in 2015. Porsche won the race in 2015, 2016 and 2017 with its hybrid L1 and remained the most successful manufacturer at Le Mans, with 19 overall victories, including seven straight Le Mans from 1981 to 1974. In 2017, changes were made to the LMP2 regulations on cockpit and chassis, meaning all prototype cars must be closed-cockpit. In 2018, Toyota won their first Le Mans with Fernando Alonso, Sébastien Buemi and Kazuki Nakajima driving. Toyota won the race again in 2019, 2020, 2021, and 2022. 2020 also saw the race held behind closed doors for the first time due to the COVID-19 pandemic. 2021 onwards 2021 saw the introduction of the Hypercar class, a class which allows for Le Mans Hypercars and from 2023 onwards also LMDh cars to participate. 2021 saw the race once again being postponed, this time to August. For 2021 and 2022, non-hybrid LMP1 cars were allowed to participate as "grandfathered" LMP1 cars, although only Alpine would make use of this.[37] Other entries in the hypercar class were Toyota and privatier team Glickenhaus. The new Hypercar regulations allowed manufacturers more freedom with the design, leading to cars such as the wingless Peugeot 9X8 which will enter in 2022. The LMP2 regulations were extended to 2024 with the next generation LMP2 cars, which are also used as chassis for the LMDh cars, is said to be introduced in 2025. 2025 will likely also see the introduction of hydrogen powered prototypes which will race for the overall victory.[38] Innovations Le Mans has seen many innovations in automotive design to counteract the circuit's difficulties. These have either been dictated by rules or have been attempts by manufacturers to outwit the competition. Some innovations were incorporated into the everyday automobile. Aerodynamics A 1969 Porsche 908 Langheck The 1950s Cadillac Le Monstre One of the keys to Le Mans is top speed due to the long straights that dominate the circuit. This has meant cars have attempted to achieve the maximum speeds possible instead of relying on downforce for the turns. While early competitors' cars were street cars with their bodywork removed to reduce weight, innovators like Bugatti developed cars that saw the beginnings of aerodynamics. Nicknamed tanks due to their similarity to military tanks in World War I, these cars used simple curves to cover all the car's mechanical elements and increase top speed. Once Le Mans returned after World War I, most manufacturers would adopt closed bodies streamlined for better aerodynamics. A notable example of the changes brought about by aerodynamics are the 1950 entries by Briggs Cunningham. Cunningham entered two 1950 Cadillac Coupe de Ville, one nearly stock and the other completely embodied in a streamlined aluminum shape developed by Grumman Aircraft Engineering Corporation that looked so unusual that it was nicknamed "Le Monstre" by the French press. The smoothing of body shapes and fairing-in of various parts of the machine brought about by the continual search for reduction of aerodynamic drag led to a separation from Grand Prix cars, which rarely had large bodywork. As the years went on, bodywork became all-enveloping, while at the same time lighter. The larger bodywork with spoilers was able to provide more downforce for the turns without increasing the drag, allowing cars to maintain high speeds. Extended bodywork would usually concentrate on the car's rear, usually being termed long tail. The bodywork also began to cover the cockpit for less drag. However, open cockpits would come and go over the years as rules varied. Aerodynamics reached its peak in 1989 before the Mulsanne Straight was modified. During the 1988 race, the crew of a Peugeot-powered WM prototype typed over the engine openings, allowing Roger Dorchty to set a recorded speed of 405 km/h (252 mph) down the Mulsanne in a publicity stunt. 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Graham Hill is the only driver to win the so-called Triple Crown of Motorsport, winning the Indianapolis 500 (1966), Monaco Grand Prix (1963, 1964, 1965, 1968, 1969), and the 24 Hours of Le Mans (1972).[48][49] Accidents See also: List of 24 Hours of Le Mans fatal accidents Le Mans has seen many fatal accidents due partly to the very high-speed nature of all variants of the track throughout history. The largest one was in 1955 when 83 spectators and driver Pierre Levegh were killed. In the wake of the disaster, many races were cancelled, including the Grand Prix races in Germany, Spain, and Switzerland (the latter as a part of a blanket ban on motorsport round-track races that was maintained until 2018).[50] The accident led to safety regulations in all motorsports for both driver and spectator protection. Almost all decades in which Le Mans has been run have seen their fair share of horrific accidents, such as in 1972 when Jo Bonnier was catapulted into a forest surrounding the circuit after hitting a tree, or in 1983 when a Ferrari near the Indianapolis section. Bonnier was killed instantly. The 1990s was a decade where some of the worst-ever accidents occurred. Although Armco barriers had been installed by Briggs Cunningham, Cunningham entered two 1950 Cadillac Coupe de Ville, one nearly stock and the other completely embodied in a streamlined aluminum shape developed by Grumman Aircraft Engineering Corporation that looked so unusual that it was nicknamed "Le Monstre" by the French press. The smoothing of body shapes and fairing-in of various parts of the machine brought about by the continual search for reduction of aerodynamic drag led to a separation from Grand Prix cars, which rarely had large bodywork. As the years went on, bodywork became all-enveloping, while at the same time lighter. The larger bodywork with spoilers was able to provide more downforce for the turns without increasing the drag, allowing cars to maintain high speeds. Extended bodywork would usually concentrate on the car's rear, usually being termed long tail. The bodywork also began to cover the cockpit for less drag. However, open cockpits would come and go over the years as rules varied. Aerodynamics reached its peak in 1989 before the Mulsanne Straight was modified. During the 1988 race, the crew of a Peugeot-powered WM prototype typed over the engine openings, allowing Roger Dorchty to set a recorded speed of 405 km/h (252 mph) down the Mulsanne in a publicity stunt. However, the car was almost undrivable elsewhere on the circuit. The engine was soon destroyed from a lack of cooling.[citation needed] However, for the 1989 event, the Mercedes-Benz C9 reached 400 km/h (249 mph) under qualifying conditions.[39] Engines A 1929 supercharged Bentley 1991 Mazda 787B, the only Le Mans winner with Wankel engine A wide variety of engines have competed at Le Mans in attempts to achieve greater speed and have better fuel economy and spend less time in the pits. Engine sizes have also varied greatly, with the smallest engines being a mere 369 cc (Sigma Cinq) and the largest uprated versions of 8,000 cc (SRT Viper GTS-R). Supercharging was an early innovation for increasing output, first being raced in 1929, while turbocharging would not appear until 1974. The first car to enter without an engine run by pistons would be in 1963, when Rover partnered with British Racing Motors to run a gas turbine with mixed success, repeating in 1965. The American Downcorp would attempt to rerun a turbine in 1968 with even less success. Although the engines offered great power, they were hot and not fuel-efficient. Another non-piston engine that would appear would be a Wankel engine, otherwise known as the rotary engine. Run entirely by Mazda since its introduction in 1970, the compact engine would also suffer from fuel economy problems like the turbine had, yet would see the success that the turbine lacked. After many years of development, Mazda finally succeeded in being the only winner of the race not to have a piston-powered engine, taking the 1991 event with the 787B. Alternative fuel sources would also play a part in more normal engine designs, with the first non-gasoline car appearing in 1949. The Deltezzt Special would be powered by a diesel engine. In contrast, a second diesel would appear in the form of the M.A.P. the following year. Although diesel would appear at other times over the race existence, it would not be until 2006 when a prominent manufacturer, Audi, would invest in diesel and finally succeed, with the R10 TDI. Ethanol fuel appeared in 1980 in a modified Porsche 911, leading to a class win. Alternative biological fuel sources returned again in 2004 with Team Nasamax's DM139. Judd.[40] In 2008, biofuels (10% ethanol for petrol engines and biodiesel for diesel engines) were allowed. Audi was the first to use next-generation 10% BTL biodiesel developed by Shell and manufactured from biomass.[41] Beginning in 2009, new regulations allowed hybrid vehicles with either KERS or TERS (Kinetic/Energy Recovery System) setups. However, only electrical (i.e., batteries) energy storage was allowed, ruling out flywheel-based energy recovery.[42] Cars with KERS were allowed to race in 2009 under specific classification rules. Since 2010, they have competed for points and the championship. 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