

I'm human





A look back at the UK's Midlands region reveals a pioneering spirit in suspension design. In 1955, Citroën introduced the DS with a novel torsion system departed from the norm. The British Motor Corporation responded by developing hydroplastic, which debuted on their ADO16 model. This innovative system replaced traditional springs and dampers with fluid-filled spheres connected from front to back but not side to side. Hydroplastic's design allowed for distinct roll stiffness and pitch stiffness, offering a smoother ride while resisting body roll. The system's compliance also enabled the car to absorb uneven road surfaces. Later, BMC refined Hydroplastic into Hydragas, which was used in various models including the Austin Allegro, Princess, Ambassador, and Metro. The concept even appeared in the MGF before being discontinued in 2002. While Citroën's oleopneumatic suspension garnered more attention, Hydroplastic's success lay in its ability to provide a balanced ride without drawing attention away from the road. In hindsight, this unassuming approach may have contributed to its demise as the public became less interested in advanced suspension technology, and conventional systems continued to evolve. Hydragas Suspension: A Pioneering System That Never Received Its Due The introduction of alternative suspension systems to traditional liquid-gas suspension raised questions about their reliability and cost-effectiveness. Public perception shifted as the smooth ride became less desirable, with harsher rides associated with sportiness and performance. This shift in market image has been detrimental for many manufacturers. In 1984, the Austin Montego featured Hydragas suspension, a system pioneered by British Leyland but largely overlooked. The pioneering work of Dr. Alex Moulton on Hydroplastic suspension began in the late 1950s and was showcased in the Mini in 1959. However, production constraints prevented its widespread adoption. The Austin Allegro's introduction of Hydragas suspension marked a turning point for British Leyland. Despite initial drawbacks, the system proved effective after fine-tuning. In principle, it worked similarly to Hydroplastic, but with displacers partially filled with nitrogen and separated by a rubber membrane. This setup provided a unique "cushion of gas" for ride comfort. The connection between Hydragas cars was based on simple logic: when a wheel hit a bump, the suspension compressed, pushing fluid through interconnected systems. The interconnecting pipe in early Allegros didn't quite work as intended. When hitting bumps, the front wheel would lift while the rear wheel sank, making for an uneven ride. Although improvements were made, customers remained unconvinced by the time the Princess launched in 1975. BL's financial struggles led to a redesign of the Allegro/Maxi replacement, which would ditch Hydragas and adopt VW Golf-inspired suspension. This resulted in the Maestro. However, BL still needed a supermini and didn't have funds for a new car, so they combined bits of Mini and Allegro to create the Metro. King kept the Allegro's system but dropped interconnection to reduce costs and complexity. The Metro's ride was compromised compared to its rivals, earning it ridicule in the Eighties. Years later, Alex Moulton resurrected the Hydragas system by adding interconnects to his homemade Metro. CAR magazine tested the car and discovered its impressive handling and ride quality. Rover took notice and borrowed the car, leading them to revive the Hydragas system for a new Metro model. The result was a "new" car with a 1990 engine in an original 1980 bodyshell. The MGF roadster was created by MG Rover in the mid-90s as a response to the Mazda MX-5. The design was heavily influenced by the Metro engine and front subframe, which were swapped around to create a mid-engined layout. This resulted in one of the most successful roadsters of the 1990s. The MGF's innovative suspension system, Hydragas, was initially successful but eventually phased out due to its complexity and high cost. The system consisted of displacers that worked in conjunction with hydraulic fluid to absorb bumps and provide a smooth ride. Hydragas was first introduced in the Austin Allegro in 1973, which was later converted to use the more developed Hydragas system. The Maxi, introduced in 1978, also used Hydragas but was eventually overshadowed by the Princess, which featured an improved version of the system. The Austin Metro and Rover Metro/100 both used revised versions of the Hydragas suspension system, with significant improvements made to interconnection and valving. However, despite its potential, the system ultimately failed due to financial constraints and was replaced by conventional springs in the MGF's successor, the TF. Today, the legacy of Hydragas lives on as a testament to British innovation in automotive design and engineering. The author of this article has an affinity for 'conditionally challenged' motors and embarks on perilous adventures across Europe. The text delves into the history of BMC Australia's Mini.Matic, a vehicle featuring innovative Hydroplastic Suspension technology from 1968. The phrase "It floats on fluid" was used to describe the mechanics behind this system. According to the explanation, the suspension consists of interconnected rubber balloons filled with a solution containing alcohol, water, corrosion inhibitor, and green dye. When encountering bumps, fluid is displaced between balloons, maintaining the car's level balance. This alternative to traditional suspensions with metal springs and dampers offers advantages such as reduced maintenance requirements due to its reliability and durability. The article references an external source for further information on related topics like automatic transmissions, carburetors, and suspension systems. It is worth noting that the provided text could benefit from additional citations to support its claims, as mentioned in a warning at the end of the article. When a rear wheel hits a bump, the effect is especially noticeable in small cars due to their shorter wheelbases being more prone to pitching. However, the key advantage of this suspension system over traditional ones is that it allows the vehicle to be stiffer when rolling than when pitching, making it possible to design a compliant suspension for a comfortable ride without excessive roll when cornering. In roll, there's no fluid transfer between displacers, so internal pressure increases, and the only flexibility comes from the rubber springs' natural stiffness. In pitch, fluid moves front to rear, keeping system pressure relatively constant, resulting in a more compliant suspension. The displacer units' design and mounting cause them to deform as the suspension compresses, presenting a larger area to the mounting plates and increasing the pressure's effect. This gives the suspension a sharply rising rate, even in pitch, creating a strong tendency to return to equilibrium. Nevertheless, cars with this suspension tend to squat under acceleration and dive under braking, requiring clever component design to minimize these forces. The hydropneumatic suspension of the Citroën DS is believed to have inspired Issigonis and Moulton, who were working on a similar system at the time, to develop a simpler alternative. Hydragas, an evolution of the previous system, was first introduced in 1973 and attempts to address the ride-handling compromise without the complexity of Citroën's system, using pressurized displacer units as its core component. The Hydragas system features gas-filled displacers that substitute conventional steel springs in standard suspension designs. The pressurization process involves pre-pressurizing hydraulic fluid, then linking the displacer to its adjacent unit on the opposite axle, distinct from Citroën's setup where continuous fluid pressurisation is maintained via an engine-driven pump and a central pressure vessel. Hydragas systems are smaller, more compact versions of the dampers used in Hydroplastic-equipped cars. These miniaturized components feature a rubber cone spring with an internal fluid chamber to absorb shocks and provide stability. A website called The Hydragas Register helps owners find qualified mechanics for maintenance and repair services, particularly for pump-up services, in their local area.