

## **MECHATRONIC SYSTEMS IN THE AUTOMOTIVE INDUSTRY**

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Mechatronics emerged as a group fusion from connecting separate parts of mechanics and microelectronics. One of the most popular options for determining mechatronics is this: Mechatronics is a scientific and technological branch that works to build and maintain computer-controlled machines. All mechatronic systems of vehicles for active purposes are divided into 3 main groups: engine control systems; box and frame control systems; internal equipment and body control systems. The engine control system is a set of devices responsible for the formation of an air-fuel mixture and the supply of a spark at the right time.

As for the box and frame control system, it can be divided into two parts:

a) the undercarriage which is directly responsible for the movement, the adherence of the wheels to the road and their operation. The wheels are driven by the action of torque transmitted by the motor. This process is also called transmission. Visually, the running system consists of a frame, suspension, and wheels as they are. The processes of movement are controlled by the steering wheel (steering system) and the brake mechanism. Another definition of undercarriage: undercarriage is a set of mechanisms that ensure that the vehicle moves smoothly on roads and turns. The suspension is responsible for driving without shock and vibration—a complex of car elements located under the body of the car, which includes guides and damping components [1].

b) the gearbox which is a device with a mechanism that provides changes in torque gears, including the speed of rotation, reverse movement. The gearbox can be found in two basic variants: 1) manual transmission: to operate it, the driver must press the clutch pedal himself. The driving speed, the current gear, the engine load are all controlled by the

driver. Despite this, the design of the mechanism itself is quite simple and intuitive; 2) automatic transmission: the mechanism of the automatic transmission is more complicated than the manual transmission; it is larger and more expensive. There is no clutch pedal, and the load on the engine and the choice of the appropriate speed determines the unit itself. This is convenient for drivers who just sat behind the wheel and are not completely confident in their capabilities [2].

New technologies have introduced intelligent programs into the movement of the car that optimize driving by creating a number of additional parameters that are very important in our case. Among them, longitudinal acceleration, transverse acceleration, speed of movement, speed of movement of the brake pedal, fuel supply can be distinguished. This development makes it possible to optimize the movement of the car both for driving in the necessary road conditions and for driving in your own style.

Next, we will describe the most comfortable mechatronic systems of the car-the control system of internal and body equipment (the former has become the most relevant nowadays). Control systems of interior and body equipment are designed to increase the comfort and customer value of the car. Depending on the class of the vehicle, electronically controlled devices such as the air conditioner, dashboard, Cathode Ray Tube (CRT) – based multifunction information system, compass, headlights, intermittent wiper, burned-out lamp indicator, reverse obstacle detection device, anti-theft devices, communication equipment, central locking of door locks, power windows, variable position seats, seat belts, etc.

Thus, it can be concluded that mechatronics covers not only such wide areas as mechanics and electronics, but also makes an invaluable contribution to the development of such an industry as the automotive industry.

## References

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2. Butylin V.G., Ivanov V.G., Lepeshko I.I. et al. Analysis and development prospects of mechatronic control systems for wheel braking // *Mechatronics. Mechanics. Automation. Electronics. Computer science.* – 2000. – No. 2. – P. 33 – 38.