

Psycho-Physiological Properties of the Driver

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Abstract: This article discusses the influence of psycho-physiological characteristics of the driver through the sense organs of information about the vehicle simultaneously with physical and mental processes in the body.

Keywords: driver, physical, information, vehicle, continuous, experience, speed, load, control.

The psycho-physiological characteristics of a person are determined by the physical and mental processes in his body. Such traits include acceptance, attention, thinking, memory, and feeling, will, and personality traits.

The driver has to perform various tasks: he takes the car from a partner, prepares for departure, draws up the necessary documents, refuels, drives the vehicle, transports passengers or cargo, monitors the loading and unloading of cargo, (in some cases they are involved in this work)) transfer the car to a partner at the end of work, etc.

But the most important thing for a driver is to drive a car.

The process of driving a vehicle forms a whole system that connects the driver with the road and the environment.

All components of this system are interconnected. The driver constantly monitors the objects on the road (car, pedestrian, traffic lights, road signs) and the state of the environment (temperature, humidity, lighting).

Based on the nature of the work performed by the driver, he determines the order of movement (speed, direction), taking into account the capabilities of himself and the vehicle. It also controls its own behavior and corrects it if the driving mode deviates from the intended goal.

The main link in the road system is the driver. During the movement, the driver's work processes are similar to other operators of complex vehicles (a pilot on duty at a single power system control panel).

Basically, these are the processes of processing, generalizing, managing and controlling the information received. But driver performance management methods are fundamentally different from other types of operators.

If other operators receive information from the instrument manual, the driver will directly monitor the traffic situation.

The information he receives from the instruments is secondary to it. The nature and amount of information a driver receives changes frequently.

A large flow of information or its rapid change (for example, during heavy traffic) can prevent him from receiving, processing and drawing the right conclusions in a timely manner.

Signs prohibiting continuous movement, road signs, are violated as a result of the actions of road users.

There are so many control actions that the driver can perform that some actions may not be performed correctly.

In conditions of heavy traffic in cities, a bus or taxi driver on the route performs about 5-6 thousand control operations per work shift (7-8 hours).

About 20% of them are errors (due to lack of time to receive and process information). Especially in the case of a sudden dangerous situation, the driver will be in a critical situation due to lack of time, and delay can lead to a traffic accident.

The driver makes erroneous actions in a difficult traffic situation several times in each turn.

An emergency situation is possible about once a month, on average once every six years.

The complexity of the situation is that the information received by the driver becomes unknown in advance.

With the development of the situation on the road, he never knows in advance the behavior of other drivers. Based on such vague information, he must come to a very important conclusion.

The driver works in isolation from his work team, where he does not have the opportunity to discuss the constantly changing situation.

It should be borne in mind that freight or passenger transport is responsible for the life of a pedestrian and was operated in a variety of conditions.

The driver is affected by various negative factors: exhaust gases in the cabin, cold in winter, heat in summer, noise and vibration, unsatisfactory road conditions, rain, fog, snow and others.

All this complicates the work of the driver, quickly tires, and leads to errors in difficult road conditions.

All of these factors make the driver's job one of the most difficult human activities. The driver's professional activities is assessed according to two interrelated requirements.

First of all, the driver must work efficiently, that is, to maximize the capabilities of the vehicle and quickly perform transport operations. Secondly, it must not violate traffic safety requirements, i.e. it must work reliably.

Most drivers know how to work safely and efficiently in normal road conditions without obstacles on the road.

In difficult road conditions, reliable drivers can work efficiently.

Driver information function

Information about objects on the road, the state of the road, the vehicle affects the driver through the senses and reflects the specific type of surrounding objects in the human mind.

It is subdivided into sensation, sight, hearing, musculoskeletal system, vibration, sensation, smell and heat.

Visual perception is the most important part of the driver's job. Inspecting, the driver sees the condition of the car on the road, objects, their appearance, color, size, instrumentation.

The driver receives sound signals from the noise of the car's aggregates through a hearing aid.

The work of individual parts of the car receives a description of the unevenness of the road surface through vibrations. The gases used in the air in the cabin are perceived by the sensation of a mixture of fuel vapors, and the change in temperature in the workplace by the sensation of heat.

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Sensitivity varies from person to person. It depends on the natural characteristics of a person, age, experience, skills, profession, education and other qualities.

An experienced driver will feel the noise characteristic of a malfunctioning car faster than an inexperienced one in areas with limited road lighting. Sensory abilities vary depending on a person's experience and health status.

About 85% of the information needed to drive a car comes from the eyes. Inspection can assess objects of sufficient width and the distance between them.

The width that can be perceived without changing the pupil is called the field of view.

When one eye sees a white object, the field of view is 90° out, 65° in, 75° down, and 65° up. When you see colored objects, the field of view is slightly smaller, meaning it is reduced by 15% when you see green and 50% when you see blue.

The field of view with both eyes is 120-130°, which in practice allows you to fully see the front of the car.

Human Field of View:

- ✓ border of two eyes;
- ✓ border of the field of view of the left eye;
- ✓ border of the field of view of the right eye;
- ✓ edge view area;
- ✓ central observation deck;
- ✓ Satisfactory line of sight.

The field of view will not be constant. It can expand and contract. As the driver's field of vision narrows, he or she may miss important things in a traffic situation, such as a serious pedestrian error.

Persons whose field of vision is reduced by more than 20% are prohibited from driving.

The ability of the eye to clearly see objects at different distances is due to the adaptation of the eye.

The ability of the eyes to distinguish the shape of objects at a greater distance is called visual acuity.

This is determined by the fact that the eye perceives the distance between two points or lines separately.

The most acute vision of the eye is 3-4°, the best vision is in the central angular cone of 7-8°, the most satisfactory vision is in the cone of 12-14°.

Parts and colors of objects that are usually outside 14° do not look good.

Peripheral visual acuity is four times less than the central visual acuity. With normal visual acuity, the driver clearly feels the shape of road signs and objects.

A short-sighted (short-sighted) driver loves the instrument indicator and the road; a far-sighted (far-sighted) driver, on the contrary, loves the road and the instrument indicator.

Perception is a mental (psychological) process of obtaining information. The driver perceives the state and nature of things through perception.

A more complex mental process - perception - is formed on the basis of the perception of things moving or not moving along the road, their shape, size, color.

Through perception, the interconnection of things manifests itself in consciousness in the form of a holistic image.

For example, as a result of a complex of sensations (vision, hearing, vibration, musculoskeletal), the driver feels the car and notices a slight change in the direction or speed of the car.

Rapidly changing road conditions force the driver to receive large amounts of information from sound, vision and other influences.

Therefore, its adoption must be complete, prompt and clear. The quality of reception may depend on the knowledge and experience of the driver and may be characterized by attentional features.

Despite the fact that the mind is concentrated in one place, abstracted from other things, the driver seeks to get as much information as possible from those who may interfere with the movement of the car.

Attention is characterized by a number of features. The ability of a driver to evaluate several objects at the same time is called attention span. Typically, a driver can receive up to five items at a time.

The amount of attention depends on driving conditions, the mood and experience of the driver. When visibility is limited, one or two objects can be taken at the same time in one second.

With a large number of vehicles at complex intersections, some drivers do not pay attention to receiving all the information that ensures traffic safety. The driver recognizes a new situation at a glance.

At the same time, he uses central and peripheral vision, changing the direction of his gaze by turning his head.

But it is difficult to get complete information about all the objects in the field of view with a cursory glance. To study the properties of objects, the driver looks at them in a certain order.

Of all the accepted objects, interactive and dangerous in motion are distinguished. Such objects will be pedestrians, sidewalks and oncoming vehicles.

It takes about half the time to follow them down the narrow roads.

It takes 5-25% of the time to receive objects for traffic assessment on the roadway.

If there are pedestrians in the driver's field of vision, he watches them for a long time. The driver following the vehicle in front spends a lot of time waiting for his direction of travel or braking.

The driver must be able to redistribute attention in order to move from one action to another if necessary.

An experienced driver focuses all his attention on the traffic situation, ignoring the movements of the arms and legs. Early focus prevents a difficult situation from occurring or mitigates a dangerous outcome.

The driver must be prepared to focus his attention on unexpectedly appearing objects.

To accept a situation in another situation may require a different intensity of attention. For example, in dangerous situations, the greater the intensity, the more complete the reception.

But such cases can occur several times per shift. Especially when driving for a long time in heavy traffic, in difficult weather conditions, at night. Therefore, the ability to intensively focus on the driver must be distinguished by its stability.

In addition to the dangerous object, 3 more objects can be considered.

For example, the driver pays attention to oncoming and one-way vehicles, as well as to the roadway when there are pedestrians on the road. These objects are assumed to be at an angle of 2° in the center view from the main focus object and up to 20° in the peripheral view.

When the subject is moved more than the center view, other subjects whose attention intensity is high or not sharp enough may not be visible. An experienced driver can focus his eyes 3 times per second, in some cases up to five times.

This means that the minimum time spent on obtaining an object should be 0.2-0.3 seconds.

The peculiarity of the distribution of attention lies mainly in the ability to slowly study the speed of the car, traffic intensity and the state of objects. High speeds require more intensive attention from the driver, reducing the recording time of some objects.

Increasing the driving speed from 40 km/h to 80 km/h reduces the gaze recording time from an average of 1.0 seconds to 0.6 seconds.

The various objects in the zone that attract the driver's attention most of the time are called the attention zone.

The shape of this area usually depends on the driver's perception of the appearance of the road. If a part of the road is blocked by objects on the carriageway, the shape of the field will change accordingly.

The driver's gaze stops at the field boundary with the greatest intensity. Because this is where you can expect new objects to appear.

As the speed of the car increases, the driver sees more and more distances on the road, and the focus area decreases. The bottom of the field is raised and the surrounding area is compressed.

List of used literature:

1. A.A. Akilov, Sh.Sh. Rizaev. Comments on pictures and tests on traffic rules. T: 2014. - 80 p.
2. P. Gromov. Rules of the road. M.: 2022. - 100 p.
3. E. Nuriddin. Responsibilities of the driver in a traffic accident. T.: 2015. - 80 p.
4. A.Sh. Nasriddinov. SDA.N. 2019. - 180 p.
5. Z. Nishonov. Road lines and their characteristics. T.: 2015 - 100 p.
6. K.M. Usmonov. Certificate from traffic rules for drivers of military vehicles. T.: 2022. - 120 p.