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GAMES DIAGNOSIS OF VEHICLE STEERING SYSTEM

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Abstract: this paper is part of the research study and maintenance in auto transport. This paper presents practical direction finding games in the joints of a vehicle. Further experimentation are defects that may occur if the steering system have elements that are not functioning optimally.

Kay Words: sliding platforms, spindle, steering system, games of direction.

1. GENERAL CONCEPTS

Technical condition of the steering is particularly important for road safety. It contributes decisively to ensure performance handling and stability of the car and tire wear influence intensity.

Problems with steering, suspension, tires and wheels involve multiple systems. All systems must be considered when the diagnosis behavior. Some problems, such as abnormal and excessive tire wear may be the result of an aggressive driving style. Always did a road test of the car before starting the repair process.

2. DESTINATION STEERING

The steering serves to change the direction of travel of the vehicle. Changing the direction of movement is obtained by changing the plan (steering) wheel relative to the longitudinal direction of the vehicle.

The steering system must provide good road holding (their ability to maintain the direction of travel in a straight line), stabilize the rectilinear movement (steering wheels after the turn was made, it tends to return to the driving position straight line).

It is intended that the steering system to have the following characteristics:

• the operation is as low direction;

• efficiency be as high;

• irregularities shocks from the runway, to be submitted as driving mitigated;

• to allow easy adjustment and maintenance;

• not show excessive wear that can lead to large shocks and decrease safety management;

• have a simple construction and provide as much durability.

2.1 Classification of components and steering

Steering systems are classified according to several criteria:

• After ordering at the drive direction:

- Right steering systems;
- Left steering systems.

• After the drive type:

- Gear ratio, which can be constant or variable;
- The type of gear, meeting mechanism screw, screw, crank and gear;
- Order type can be: manual, mechanical with servo (hydraulic, pneumatic or electric) and Hydraulic.

3. VERIFICATION THE GAMES OF DIRECTION IN JOINTS

The main method to check the games auto steering is play detectors plates in Figure 1.

Fig. 1. Sliding plates

These platforms must allow a minimum of four sliding linear movement or two linear and two circular motion movements (for vehicles over 3.5 tones). Stroke is 25 mm plates for vehicles by 3.5 tons and 3.5 tons for the race is 50mm.

Figure 2. Vehicle positioned on sliding platforms

Work mode: The car is brought with steering wheels on the two plates of the stand. Maintain pressed the brake pedal went straight position. The plates are driven by a hydraulic system (Figure 2), which slides horizontally in both the longitudinal direction and in the transverse direction at this time inspector visually locate the area of games of all the joints of the steering system.

The effort required depends on the friction wheel rotation joints in the steering gears and bearings, and the deformation of a lever or the steering wrong location on the chassis.

Fig. 3. Hydraulic actuation of the sliding plates

To measure the force to operate the steering wheel, place the vehicle on a flat, dry concrete or asphalt parking brake is actuated. Fasten hook a dynamometer outer extremity of the steering wheel spokes (Figure 4) and spins the wheel to the end position.

Maximum allowable force varies wheel drive system construction, ranging generally between 3 and 8 daN, for a mechanism and in good condition. Measured at the end of stroke steering effort is 1.5-2 times higher than that measured with the steering wheel in the straight driving position. This operation is observed in Figure 4.

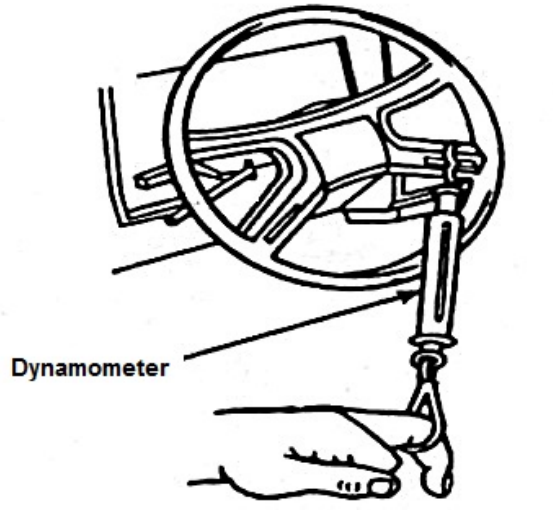

Fig. 4. Measuring the force of actuation of the steering wheel dynamometer

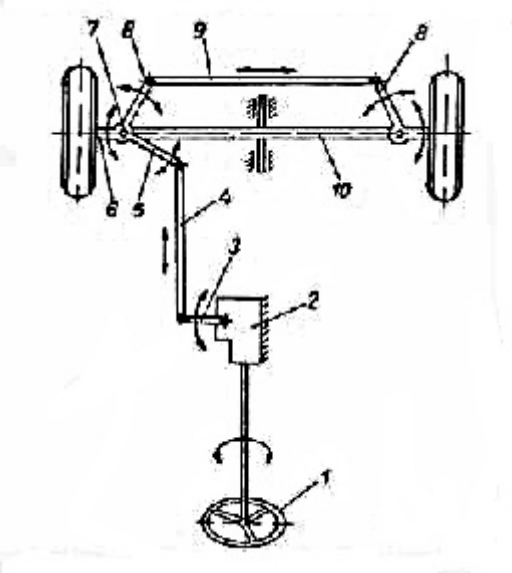

Fig. 5. The general scheme of a steering.
1 wheel, 2 steering (steering box) 3-lever box, 4-bar longitudinal direction; 5 lever spindle, 6 spindle, 7-pin, 8-lever, 9th cross bar, 10 -beam front axle.

Also games in the tie rod ends are turning the steering wheel left and right short and technician noticed games in their joints.

4. STABILIZATION STEERING WHEEL

In order to ensure good road holding of the car, steering wheels stabilizes. By stabilizing the steering wheel understand their ability to maintain direction when going straight and to return to that position after being Brac or diverted under the influence of perturbing forces. To this end, steering wheels and pivots the specific angles relative to the vehicle's longitudinal and transverse. The pivots fuses two angles differ:

4.1 The longitudinal angle β (or camber)

- Is the longitudinal tilt and swivel steering makes the following, steering wheels have the tendency to return to the straight position. The presence of a β angle of the vehicle handling is more difficult, since the steering wheel must defeat the stabilization time.

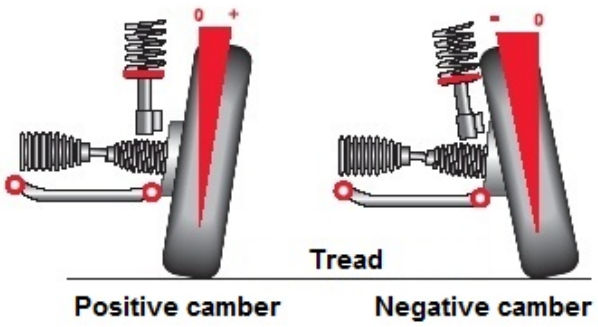

Fig. 6. Tilt angle

Side reactions between the tire and the tread occur more frequently following the action of centrifugal forces on the car; the moment that the stabilization achieved by tilting the longitudinal axis of the pin is proportional to the square of the speed and stabilization time is called speed.

4.2 Heel angle δ (side)

- gives rise to a moment acting on the wheel stabilizer brace.
At the deflection, due to the transverse tilt angle, the wheels tend to move down, but as this is not possible, as the wheel is supported on the road would result in a lifting of the pin, respectively the front axle and the frame. Under the action of the weight taken by the axle of the front wheels tend to return to the position corresponding to driving straight ahead, giving rise to a moment of stabilization.
Cross angle leads to decreasing the distance between the pivot point of the wheel contact with the ground and the point of intersection of the pivot axis tread (distance called repo). In an exaggerated reduction deported when stabilizer reduces steering wheel and vehicle stability. In current vehicles, a transverse pivot angle has values of 4-10 °.
Steering wheels, as well as pins, the two angles:
a) camber or α - is tilting the wheel from the vertical plane. This angle helps to stabilize the steering wheel preventing the tendency to oscillate due to bearing play**.** The wheel tilt

angle α, the weight resting on her, G, will give a component and a horizontal component H G'r that will always push the center bearings, making it behave like free games and reducing demands spindle nut.

b) the angle of convergence or the closing of the front wheels δ

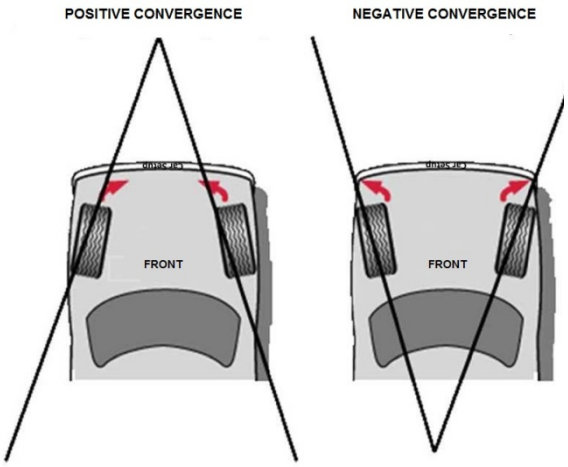

Figure 7. The angle of convergence

- is the angle of the wheels to the longitudinal plane of the vehicle. Convergence angle is contained between 0 º 10 'and 0 ° 30'.

Convergence is required in order to compensate for a tendency of divergence their rolling caused by camber. Convergence is chosen so that, in normal driving conditions, it tends to run straight parallel. If convergence is not appropriate, there is an excessive wear of the tires, by raising the consumption of fuel Convergence is 0-5 mm from cars, trucks and buses reaching up to 8-10 mm.

On vehicles with rear drive axle there is a divergent trend rolling wheels because the pins are placed in the plane of the wheel, but are shifted inwards.

5. CONCLUSIONS

In this paper we have the following conclusions:

- direction without games provide maximum safety while driving the vehicle;;
- correct detection of games steering is particularly important when running repairs to it, not to parts are not worn with it being made in financial savings;
- also leads the way with game uniform tire wear;
- adjusting the direction is correct only if the direction is without game;

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DIAGNOSTICAREA JOCURILOR ÎN SISTEMUL DE DIRECȚIE AL AUTOVEHICULULUI

Rezumat: Această lucrare este parte componentă a studiului şi cercetării mentenanței în transporturile auto. Lucrarea prezintă practic găsirea jocurilor în articulațiile direcției unui autovehicul. De asemnea se găsesc defectele ce pot apărea dacă în sistemul de direcție avem elemente care nu sunt în parametri optimi de funcționare.

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