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INFLUENCE OF VERTICAL COMPONENT OF AIR RESISTANCE TO BRAKING VEHICLE STABILITY

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The paper evaluates the influence of the body shape to longitudinal stability of braking vehicle. This influence was considered using coefficient of vertical component of air resistance (C_z). The criterion for evaluation of the braking vehicle stability is unit tangential braking (j/g) at the wheel lock limit on the front and rear axle. This was shown on diagram as a function of vehicle velocity (v) for different values of the coefficient of vertical component of air resistance (C_z).

Significance of spoilers' installation and their influence on the vertical ground reaction value were shown, especially for light vehicles. Numerical results for a domestic passenger vehicle were presented in case when the brake load compensator was installed, with its characteristics being given, and in case of the same pressures in both the front and rear brake line.

For the maximum unit braking, at the adhesion limit level ($j/g = \varphi$), the vehicle braking distance was given for certain cases evaluated under the stable driving conditions, which was used for connecting the aspects of the body shape and spoiler installation influence with vehicle braking safety, i.e. with the vehicle braking distance length.

Key words: braking, stability, air resistance, uplifting force, braking distance.

UTICAJ VERTIKALNE KOMPONENTE OTPORA VAZDUHA NA STABILNOST KOČENOG VOZILA

U radu je analiziran uticaj oblika karoserije na podužnu stabilnost kočenog vozila. Ovaj uticaj je uzet u obzir preko koeficijenta vertikalne komponente otpora vazduha (C_z). Kriterijum za ocenu stabilnosti kočenog vozila je jedinično tangencijalno kočenje (j/g) na granici blokiranja točkova na prednjoj, tj. zadnjoj osovini. Ono je predstavljeno dijagramski u funkciji brzine vozila (v), a za različite vrednosti koeficijenta vertikalne komponente otpora vazduha (C_z).

Pokazan je značaj postavljanja spojlera i njihov uticaj na veličinu vertikalne reakcije tla, naročito kod lakih vozila. Prezentirani su numerički rezultati za putničko vozilo iz domaćeg proizvodnog programa i to u slučaju kada je ugrađen korektor kočenja, čija je karakteristika data, i u slučaju istih pritisaka u prednjem i zadnjem vodu kočne instalacije.

Za maksimalno jedinično kočenje, na granici prijanjanja ($j/g = \varphi$), dat je i zaustavni put vozila za neke analizirane slučajeve u stabilnom režimu kretanja, čime je problem uticaja oblika karoserije i postavljanja spojlera povezan sa bezbednošću vozila pri kočenju, tj. sa dužinom zaustavnog puta vozila.

Ključne reči: kočenje, stabilnost, otpor vazduha, sila uzgona, zaustavni put.