

INFLUENCE OF TRACTOR TIRES LOAD-CARRYING CAPACITY ON PERFORMANCE QUALITY

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**Annotation:** This article highlights information on determining the quality of processing in cases related to the pressure exerted on the soil by wheeled tractors during plowing, and the metrological dimensions of tires.

**Key words:** Tractor, wheel, tire, egate, size, metrological, load, radial, deformation, contact, diagram, empirical.

The load-carrying characteristics of tractor tires during cotton processing are determined by the values of the area  $F$ - contact trace; average pressure -  $p_{\text{yp}}$  and the maximum pressure at this point. Tire under normal (radial) load  $Q$  - base point with the field  $F$ - is formed. The radial strain diagram, contact trace shape, and principal pressure diagram are shown in Figure 1.

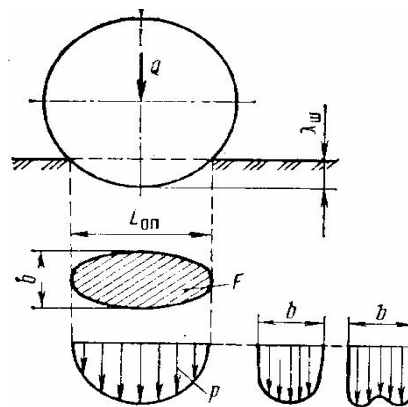


Figure 1. Radial deformation and loading scheme of the tractor wheel

Usually, the value of the pressure in the field –  $F$  of the contact surface is determined by the largest radial deformation of the tire -  $\lambda_{u\text{max}}$ , is called the normal (radial) deformation of the tire. To estimate field values – tires and normal deformation -  $\lambda_{u\text{max}}$  of the support of the tires  $F$ , Several empirical formulas are used. The main ones take the same position.

$$u = \gamma_{\lambda} \cdot c \cdot Q / (P_c); \tag{1}$$

$$F = u \cdot b = Q \cdot c \cdot \gamma_{\lambda} / p_c . \tag{2}$$

if  $\lambda_{\lambda}$ - coefficient that takes into account the stiffness of the base on which the tires rest. Usually  $0,7 < \gamma_{\lambda} < 1$ ;  $c$  - the coefficient is directly proportional to the width -  $b$  контактли жойи, босим  $p_c$  шиналардаги ҳаво ва юкга тескари пропорционал -  $Q$ ;  $D$  - the free diameter of the tire.

The value at the point of collision -  $F$  контакти биринчи навбатда ғилдиракдаги нормал юкга, шиналар кенглигига, ундаги ҳаво босимига ва ёнининг мустаҳкамлигига боғлиқ, бундай ҳолда, контакт изидаги босим нотекис тақсимланади. Одатда, трактор шиналари умумий контакт майдонининг 30 % дан кўп бўлмаган айланиш майдонига эга.

The value of the footprint left by the tire tread on the soil depends on the pressure force acting on the soil and the profile of the tire (Figure 2).

A ratio to describe the main characteristics of a tire -  $Q/\lambda_{ш}$  is used and is called the radial stiffness of the tire.

Formula (2), as shown, gives the relationship between the main characteristics and the load on the tire. A more reliable formula for pneumatic wheels of agricultural machines V.V. Smilsky is based on the processing of experimental data using the methods of similarity and measure theory:

$$Q = (p_c + p_э) z^{0,5} (D \cdot b_d / B_{ш}) \lambda_{ш} \lambda_{ш} / H,$$

If  $p_c$  - tire air pressure, кПа;  $p_э$  - pressure equivalent to the hardness of the tread layer at different deformations of the tire, кПа for tractor tires, in the calculation ( $p_э \approx 110$  кПа) can be obtained;  $z$  - the number of cord layers in the tire;  $D, b_d, B_{ш}, H$  - respectively, the free diameter, disc width and height of the pneumatic tire profile, м;  $\lambda_{ш}$  - tire radial deformation, м.

The size of the load carrying capacity of the tire is the maximum permissible value of the normal load -  $Q_{к\ddot{y}ш}$ , for the case where radial deformation is not taken into account -  $\lambda_{ш}$ , the specified service life of the tire is provided at a certain value of the air pressure in it.

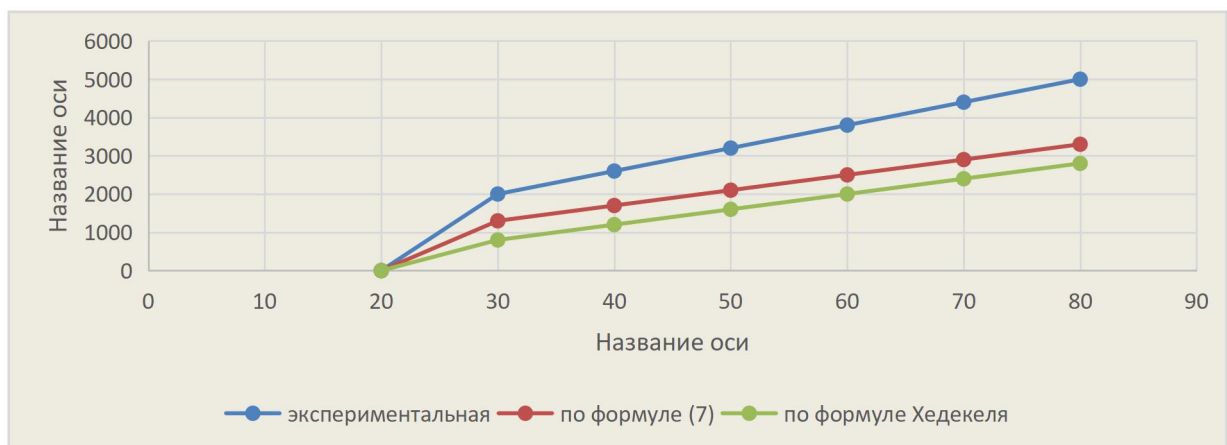


Figure 2. Load capacity of pneumatic tires::

- 1). Theoretical calculation; 2). 9,5-42 Я-183 experimental;
- 3). 13,6 R38 ЯР-318; 4). 15,5-38 Я-166; 5). 18,4/15-30 R-319.

Thus, the total loss of resistance of our analyzes is the speed of the tractor, the distance traveled  $S \approx 1,5 \alpha$  ( $\alpha$  - base area), Shows rolling resistance according to tire types, tire air pressure, deformation values, impact force, tread thickness, etc.

As a result of maintaining the condition of the tractor wheel, we have achieved the quality of the cotton processing processes. To fully understand the interaction of the cotton bush with the leading wheel, we determined the cross-sectional profile of the cotton bush (Figure 3). Row spacing during normal cultivation of cotton 0,6 and 0,9 м was carried out. To carry out the measurements, a uniformly developing plot of cotton was selected and measurements were taken from five places of the plot.

Measurements per 0,1 м height was carried out and the data obtained were recorded and processed in the observation log.

Row spacing 0,6 and 0,9 м was carried out using the method of studying the effect of stem size on the damage level of cotton..

In order to study the effect of plant size on the damage rate of cotton, the following cultivation background 3 and 4 0,6 м between rows, 9,5-42 Я-183 and 13,6 R38 ЯР-318, 15,5-38 Я-166 between rows 0,9 м. If, 3 and 4 in the background of cultivation, 9,5-42 Я-183 model; 13,6 R38 ЯР-318 model; 15,5-38 Я-166; 18,4/15-30 R-319 model. In order to exclude the influence of the leading wheel and the physiological state of the cotton, the experiments were carried out on tractors equipped with a device for protecting the cotton bush from the wheel (obtekatel).

Field characteristics were studied before the experiments. In the section selected along the length, 3 sections with a length of 10 m each were selected. In the registration plots in the rows where the tractor's leading wheels should pass, the number of pods in the hub and the number of pods were counted before each tractor pass. Invalid (damaged) branches were removed from the stem. All experiments were repeated three times.

The study was carried out in cultivation backgrounds 3 and 4 at 1.33 and 1.80 m/s, respectively. The results of the research were recorded in the observation journal, and based on the results of the processing, the correct selection of the tensioner (power) and tires in terms of metrological dimensions in the processing of cotton allows to increase the quality of work.

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