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An Investigation of deformation processes and razrushenyya drevesnostruzhechnyh plates without kontsentratorov tense and tense with hubs in video kruhlын otverstyy Trejo at a point yzhybe. As a result of conducting tests of mechanical, optical methods s Using, ustanovlenы Changed Features DSP boards deformation field in dependence from velychynы oslablenyya poperechnыh Széchenyi.

Deformation, razrushenye, drevesnostruzhkovaya plate, hub voltage.

Investigation of deformation and destruction processes in flake board with concentrator as round holes at three point bending is carried out. In results of mechanical tests, using digital image correlation, features of deformation fields evolution in flake board depending on magnitude of cross-section reduction are shown.

Deformation, destruction, flake board, Concentrator, pressure.

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CLARIFICATION OF MECHANICAL MODEL elastic WHEELS

SP Pozhidayev, Ph.D.

Elastic wheel can not be regarded as a monolithic hardened body balance equation which make the use of dynamic range. It should be seen as two solids pivotally connected

a - wheel drive and lever angular velocity which is slightly higher than the disc. This model leads to the use of the calculations rolling radius rather than the dynamic range. You can also use the model and elastic wheel as monolithic deformed body with radius equal to the radius of the wheel bearing elastic.

Elastic wheel, dynamic range, rolling radius.

Problem. In [1] it was shown that equation by dynamic radius establishes the relationship between attached to an elastic wheel torque and pulling force is erroneous, because contrary to the law of conservation of energy.

However, this equation should follow from the condition of equilibrium, compiled on the basis of the scheme forces and moments applied to the wheel submitted in the form of a monolithic hardened body, which means that the mechanical model of the elastic wheel as a monolithic body, which interacts with the supporting surface on the shoulders of equal dynamic range is incorrect.

The purpose of research - Clarification of the theory of elastic wheel bearings determine the cause of impropriety by its mechanical model, filed a hardened monolithic body, which interacts with the supporting surface on the shoulder of the dynamic range.

Research results. Consider the simplest case of motion wheels on solid support surface - Fig. 1.

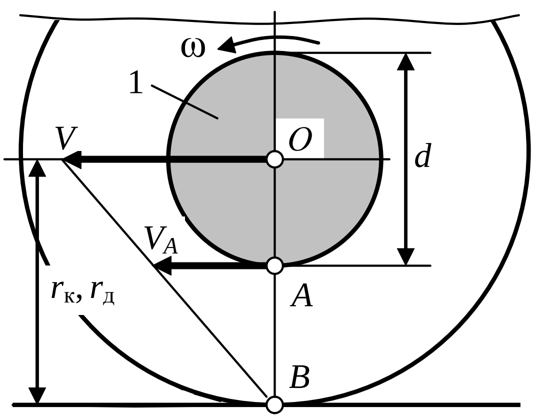

Fig. 1. Diagrams of distribution of linear velocities of points hard wheels in section *JAR.*

Suppose that the elastic wheel has a small normal load at which its normal deformation virtually absent and the wheel can be considered quite tough. Suppose also that the drive wheels 1 driven into motion with angular velocity ω, and slipping or sliding wheels relative to the bearing surface is missing. In this case, vol. *In the* would represent an instantaneous center of rotation of the wheel in its absolute motion, resulting in a linear velocity of points *About* and *And* equal to:

• linear velocity v.*O:*

$$V = \omega \cdot r_к , \qquad (1)$$

where $r_к$ - Wheel rolling radius at which, according to Item 27 standard [1] to mean the longitudinal component of translational wheel speed V its angular velocity ω (Or, equivalently, the ratio of the longitudinal component L path traversed wheel angle to its rotation α**):**

$$r_к = \frac{V}{\omega} \equiv \frac{L}{\alpha}; \tag{2}$$

• linear velocity v. *And* wheel disc diameter d :

$$V_A = V - \omega \cdot 0{,}5d = \omega \cdot (r_к - 0{,}5d)\,. \tag{3}$$

Point *In the* is the instantaneous center of rotation of the wheel, so the linear velocity and the velocity vector of length zero.

Straight lines connecting the end points of the velocity vectors *O, And* and *In the* straight lines, we obtain the distribution of force linear velocity of the wheel hard points in section *JAR*. It is the entire length of a straight line, indicating the uniformity of the angular velocity of rotation of the wheel hard throughout the said section.

Consider the second case, the normal load on Wheels, so that there is substantial deformation normal tires - Fig. 2.

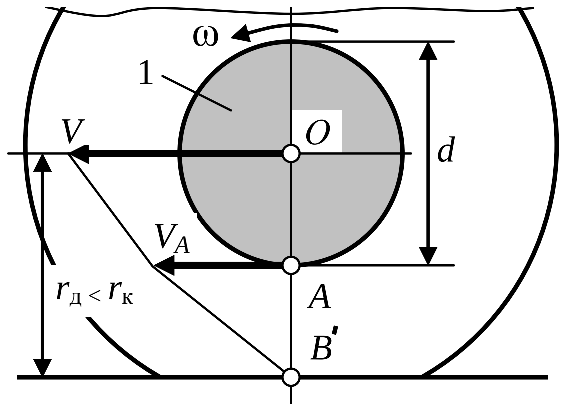

Fig. 2. Diagrams of distribution of linear velocities of elastic wheel points in section *JAR '.*

In this case, please note that brekernyy are modern tire has great elasticity in the radial direction and greater rigidity in the district, resulting in a treadmill "... behave when rolling wheels like a tractor crawler belt" [3, p. 38].

Under such conditions the way L Passed wheel when you turn it on one turn (α = 2π), will be the same as in the previous case.

This means that the radius of the wheel bearings (according to the expression (2)) and the linear velocity v. *About* (According to the expression (1)) are the same as in the previous case. Fig. 2 reflected vector V velocity of t. *About* the same length as in Fig. 1.

According to expression (3) linear velocity v. *And* also did not change.

Connecting the end points of the velocity vectors *Oh, And* and *In '* straight lines, we obtain the distribution of force linear elastic wheel velocity points in section *JAR.* It is a broken line, indicating the existence of two different angular velocities in the above section. The area *OA* section angular velocity remains the same as before, equal ω. But on the site *AB '* section angular velocity ω' slightly higher, because the less than rigid wheels, shoulder *AB '* (Equal $r_д - 0{,}5d$) It gives a same linear velocity V_A That of the hard tires:

$$V_A = \omega \cdot (r_к - 0{,}5d) = \omega' \cdot (r_д - 0{,}5d).$$

It follows that the angular velocity plot *AB '* section elastic wheels is:

$$\omega' = \omega \cdot \frac{(r_к - 0{,}5d)}{(r_д - 0{,}5d)}. \quad (4)$$

Consequently, the elastic wheel can not be regarded as a monolithic body hardened.

Applying the principle of curing, flexible wheel should represent as two solids pivotally interconnected - wheel disk rim diameter of 1 *d*Rotating with angular velocity *ω*And attached to the arm length 2 *AB '* $= r_ä - 0{,}5d$ (Fig. 3), whose angular velocity (ω') Is slightly higher than ω And is defined by the expression (4).

Only in this case, the mechanical model of the wheel, which is based on the dynamic range will provide true value of the translational velocity of t.*About*:

$$V = (r_ä - 0{,}5d) \cdot \omega' + 0{,}5d \cdot \omega = r_ê \cdot \omega. \quad (5)$$

The forces acting in such a mechanical system, can not be determined using the equation of equilibrium.

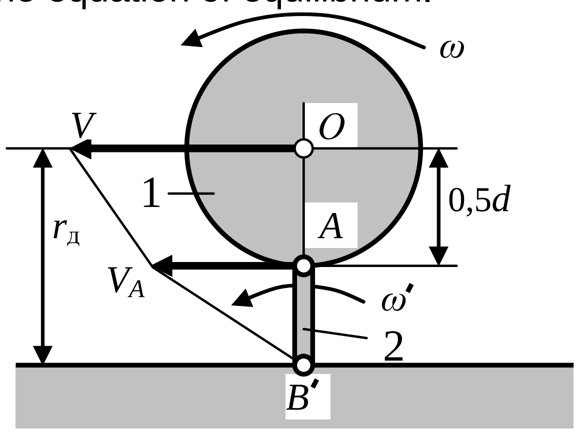

Fig. 3. Submission of an elastic wheel in two solids.

This can be done by using the virtual work equation δA Which confirms the elastic force interaction with wheels supporting surface on the shoulder, rolling radius equal $r_к$ Rather than the dynamic range $r_д$. On the other hand, equation (5) indicates the feasibility and simple elastic model wheels - in the form of a monolithic deformed body with radius equal to the radius of the wheel bearing elastic.

As for all other aspects of elastic wheels - slipping, forming its rolling resistance forces, these were unaffected except that in all cases should be taken into account only the rolling radius rather than the dynamic range.

Conclusions

The reason fallacy equation using dynamic range establishes the relationship between attached to an elastic wheel torque and pulling force is misconception that the elastic wheel can be seen as monolithic hardened body that interacts with the supporting surface on the shoulder of the dynamic range .

Actually flexible wheel should be considered as a mechanical system of two solids pivotally interconnected - wheel disc diameter *d* and attached to the arm length $r_д - 0{,}5d$, Angular velocity at which $(r_к - 0{,}5d)/(r_д - 0{,}5d)$ times greater than the angular velocity of the disk. The use of such a model wheels inevitably leads to the use of rolling radius, not the dynamic range.

You can use the wheel and model in the form of a monolithic deformed solid with radius equal to the radius of the wheel bearing elastic.

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Эlastychnoe wheel impossible rassmatryvat a video monolytnoho zatverdevsheho PE Interaction with kotorogo opornoy poverhnostyu happening on the shoulder, anyway Dynamic radius. His sleduet rassmatryvat a video of two of solid bodies, articulated soedynennыh Between you - trailers and rыchaha drive, Whatnot rotation velocity kotorogo neskolko more, something disc. This model lead for use in calculating rolling radius rather than Dynamic radius. Also you can polzovatsya and modelyu эlastychnoho wheel monolytnoho video

nedeformyruemoho PE with RADIUS, RADIUS ravnыm эlastychnoho rolling wheels.

Эlastychnoe wheel, Dynamic radius, radius rolling.

The elastic wheel can not be considered as a hardened monolithic body equilibrium equations of which are made with the use of the loaded radius. It should be presented in the form of two solids pivotally interconnected - a web of wheel and a lever angular, velocity of which is slightly larger than the same of the web of wheel.

This model leads to use in the calculation of rolling radius rather than the loaded radius. You can also use a model where the elastic wheel is as a monolithic undeformed body with a radius equal to the rolling radius of the elastic wheel.

Elastic wheel, loaded radius, rolling radius.