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In Article dan Analytical overview of existing methods uprochnenyya workers organs agricultural machines, rassmotrenы Data typovыh yznosah parts and machine nodes. Shown that most workers эffektyvnым by uprochnenyya surfaces of parts soil-cultivating machines javljaetsja tochechnoe uprochnenye - Arc welding tochechnaya poroshkovoy provolokoy (plavyaschymsya electrode).

Rezhuschye Items yznosostoykost, abrazyvnoe yznashyvanye, tochechnoe uprochnenye, Lemekh plow.

In paper present introduce the present method hardening working tool cultivation machine them advantage and defect Demonstrate what the greatest effective method hardening force surface part cultivation machine have-point hardening point consumable-electrode are welding flux cored electrode.

Cutting elements, wear resistance, abrasive wear, point hardening, blade share.

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Kinematic aspects of WORK threaded connectionAGRICULTURAL MACHINERY

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The basic parameters of movement points lying on the supporting surface of the nut as those that determine the performance of the connection. Implementation of the proposed action in the design, manufacture and use of threaded connections will extend their service life.

Screwed connection technique, kinematics.

Formulation of the problem. Modern farming is not possible without the use of threaded connections, the total cost of which is about 1% of the vehicles, and the cost of parts z'yednuvanyh them - more than 90%. Therefore, the issue of the reliability and durability of threaded connections is extremely important. The vibration causes movement of agricultural machinery elements threaded joint in three mutually perpendicular directions: forward movement along and rotational movement around the coordinate axes. Consequently, in the nut and threaded rod acting acceleration of various kinds are of a technical and scientific interest because of studying the issue of disability threaded connection.

The purpose of research dependency is to change the kinematic parameters point bearing surface of the nuts occasionally. The study used theoretical methods of research, including theoretical mechanics, mathematical analysis, mechanics of materials. Theoretical studies conducted using the medium MatLab R-2007b.

Analysis of recent research. At present, the research of the impact on the reliability of threaded connections of strength, since screwing, manufacturing quality, working conditions and so on.

Analysis of theoretical equations on the basis of performance properties threaded connections allowed to set quality parameters that determine their longevity. [1]

Use during installation of ultrasonic vibrations leads to an increase in the maximum contact pressure in the contact zones and, consequently, increase the strength of the connection.

Detection of imperfections control method screw threaded joint torque and a proposal to improve the accuracy of the task force pressing z'yednuvanyh details are given in [3].

These works do not cover one of the reasons for the weakening of threaded connections agricultural machinery is vibration in three mutually perpendicular directions.

Based on theoretical studies dependence of the relative change in the dynamic value of the time that can be used for planning preventive

measures in each case the vibration load threaded connections are elastic and dissipative parameters derived in non-resonant modes [4].

Analysis of existing methods of monitoring efforts rods screwed connection and use of quality control method of installation is covered in [5].

Kinematic parameters hairpin connections to judge the feasibility of establishing appropriate direction pins spiral thread or the use of a method of locking threaded joint. [6]

Study kinematic aspect weakening threaded connections agricultural machinery is high technology and nature requires theoretical research is also considering increasing quality requirements of modern agricultural machinery.

Results. One reason for the weakening of the threaded connection is mutual angular displacement threaded rod and nuts. This movement will occur provided the vibration corresponding character z'yednuvanyh details. Samorozhvynchuvannya if vibrations directed at an angle of 90º to the axis of the threaded rod will occur as a result of the loss of contact between the parts monolithic connection. This phenomenon will occur when you install threaded rod with a gap junction without unloading z'yednuvanyh details. Observations showed that the latter is the case in the construction of agricultural machinery, helping to complex motion bearing surface of the nut.

Among kinematic reasons are the following weakening threaded joint: a) the occurrence of mutual angular movements around the neutral line threaded rod from twisting vibrations z'yednuvanyh details; b) fluctuations z'yednuvanyh parts (on which rests the head of the bolt and nut to bolting, pin and nut on the screw head to screw) into three mutually perpendicular directions in which the tangential component arise that will return relatively threaded hole threaded rod [6].

The biggest burden on z'yednuvanyh contact details appear in resonant modes, resulting in weakened fittings. Within this work these issues are not addressed. Consider fluctuations threaded connection. The source of vibrations z'yednuvanyh contact details are summarized fluctuation received by each of the parts is the result of natural oscillations and forced oscillations details on mobile working bodies. The movement of point O relative to one characteristic details as to bolting when the consideration of the difference is taken vibrations measured on the supporting surface of the head of the bolt and nut bearing surface. Buildable screws perform movement within the elastic deformation that is characteristic of the non-resonant zone.

Vibration threaded joint characterized by amplitude, frequency and initial phase and often is a superposition of oscillation in each direction (x, y, z). Measured fluctuations in agricultural machine threaded

connectionthe points O1 and O2 (Fig. 1) can be reduced to a simple parametric form:

$$(1)\begin{cases} x_1 = a_{1.1}cos(\omega_{1.1}t + f_{1.1}) \\ y_1 = a_{1.2}cos(\omega_{1.2}t + f_{1.2}) \\ z_1 = a_{1.3}cos(\omega_{1.3}t + f_{1.3}) \end{cases} \begin{cases} x_2 = a_{2.1}cos(\omega_{2.1}t + f_{2.1}) \\ y_2 = a_{2.2}cos(\omega_{2.2}t + f_{2.2}) \\ z_2 = a_{2.3}cos(\omega_{2.3}t + f_{2.3}) \end{cases}$$

One of the functions is to provide a threaded joint stability components and pressing z'yednuvanyh set in the dominant direction of the load along the axis. In the construction and agricultural machinery pursuing this principle. However, the analysis shows the presence of axial oscillation components of vibration loads in combination with the cross. This creates favorable conditions for easing the contact details and z'yednuvanyh rotating threaded aperture relative threaded rod. These circumstances determine the necessary pressing force.

The first condition density z'yednuvanyh contact details will be zero displacement difference:

$$(2)a_{1.3}\cos(\omega_{1.3}t + f_{1.3})z_1 - a_{2.3}\cos(\omega_{2.3}t + f_{2.3}) = 0.$$

where, given the phase difference as f, in general, the dependence of the initial phase:

$$. (3)\varphi = \arccos\left[\left(\frac{a_{1.3}}{a_{2.3}}\cos(\omega_{1.3}t)\right)\right] - \omega_{2.3}t$$

Fig. 1. Measuring vibration threaded connection technology.

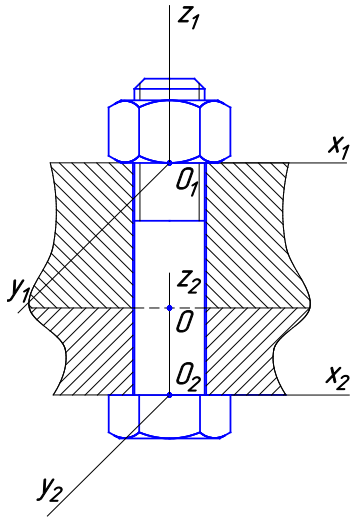

Fig. 2. Scheme threaded connection.

The amplitude of the relative oscillation along the threaded joint axes O1z1 and O2z2 (axis z1 and z2 match) at the same frequencies in these areas will depend on the difference between the initial phase of oscillation: amplitude increases from 0 to the sum of the amplitudes az = A1.3 + a2.3 difference by increasing the initial phase from 0 to 2π (Fig. 3).

Particular case occurs when the amplitude at the head of the bolt and nut equal in magnitude (Fig. 4):

$$f = (\omega_{1.3} - \omega_{2.3})t.$$

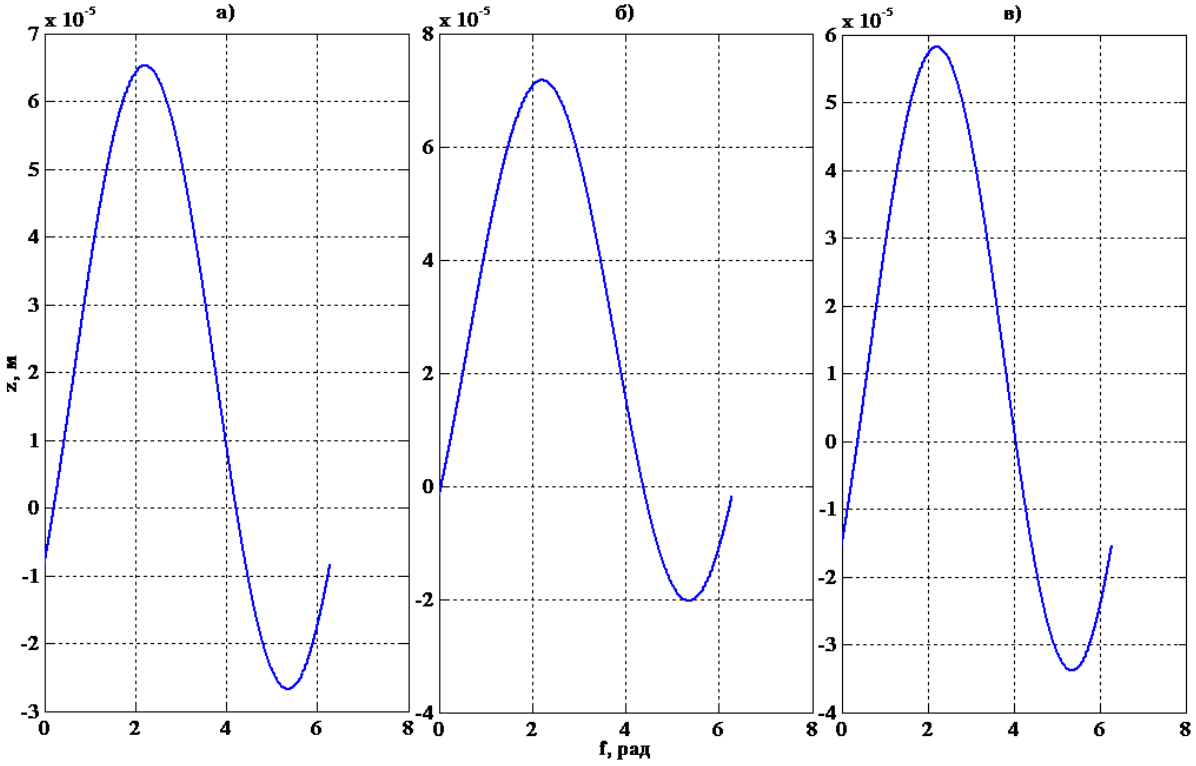

Fig. 3. Graph of changes in relative displacement amplitude of the difference with respect to the angular frequency longitudinal oscillations: a) ω2.3 / ω1.3 = 0,5; b) ω2.3 / ω1.3 = 1,0; a) ω2.3 / ω1.3 = 2,0.

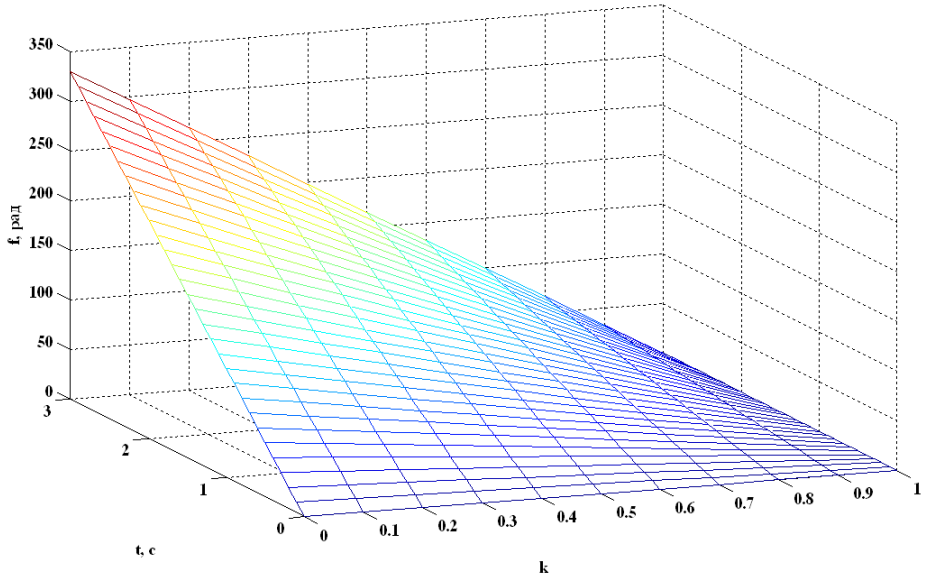

Fig. 4. A plot of the difference changes the initial phases of time t f and frequency ratio k.

If only son circular oscillation frequency efficiency by threaded connection is equality initial phases.$\omega_{1.3} = \omega_{2.3} f = 0$

The second condition is the lack of contact density torque fluctuations at the time of junction for assistance in detecting the first condition. For practice important to dissolve these two phenomena in time, which is complicated by the presence of a periodic component of these processes. Resolving this issue is possible in two ways: 1 - minimizing the twisting effect in the plane transverse to the axis of the threaded rod; 2 - Use rationally oriented towards carving a pair or thread.

The second way to date when the construction machinery is to set the threaded rod backwards. This is often not possible because of technological movement of material at the site planned to establish a core, creating impossible maintenance (maintenance) due to lack of access or complicated connections. The direction of the thread reduces interoperability and unification of parts, which affects the cost of maintenance and repair.

Minimizing the twisting effect in the transverse plane is different. Ideally, it is possible for zeroing or minimizing fluctuations in the transverse direction, which is impossible because of technical capabilities. So minimization.During the period of normal screws perform relative movement within the elastic deformation that is characteristic of the non-resonant zone.In general, the oscillating system bolting point *O1*

and O2 execute the movement in the XY plane by dependencies y1 (x1) and y2 (x2), respectively (Fig. 5).

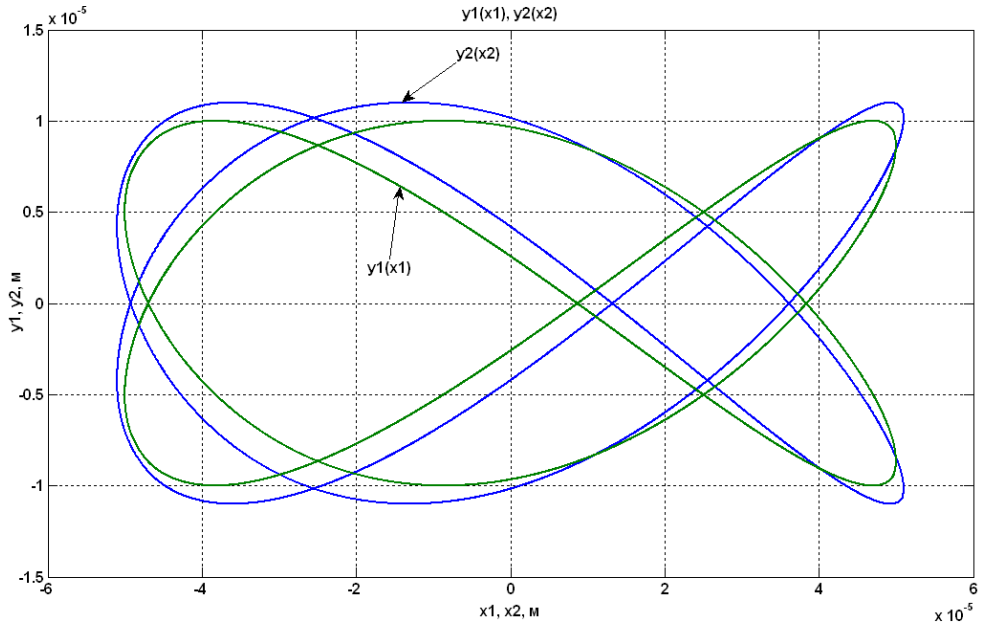

Fig. 5. The graph of changes in movement points *O1* and O2.

Different frequencies, amplitudes and initial phases will ask angular deviation threaded rod and nut relative equilibrium. This phenomenon will weaken until the threaded connection. Reducing the amplitude and frequency of vibration agricultural machines lay on the stage of design and production and limited achievements in modern engineering.

Reducing the influence of transverse vibration in x and y direction on the supporting surface of the head bolts and nuts without reducing the amplitude and frequency of vibrations possible change in the initial phase.

The total deviation from equilibrium:

$$r_1 = \sqrt{[a_{1.1}\cos(\omega_{1.1}t + f_{1.1})]^2 + [a_{1.2}\cos(\omega_{1.2}t + f_{1.2})]^2},$$

must be minimized (Fig. 6).

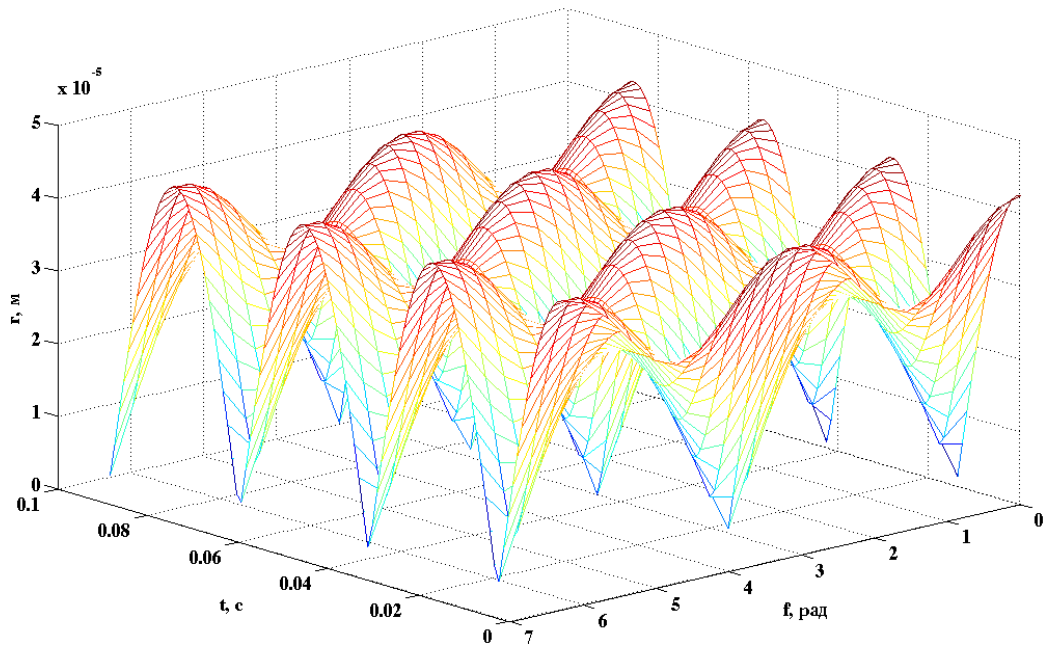

Fig. 6. Schedule Depending on changes in deviation from the equilibrium r initial phases of the difference f and time t.

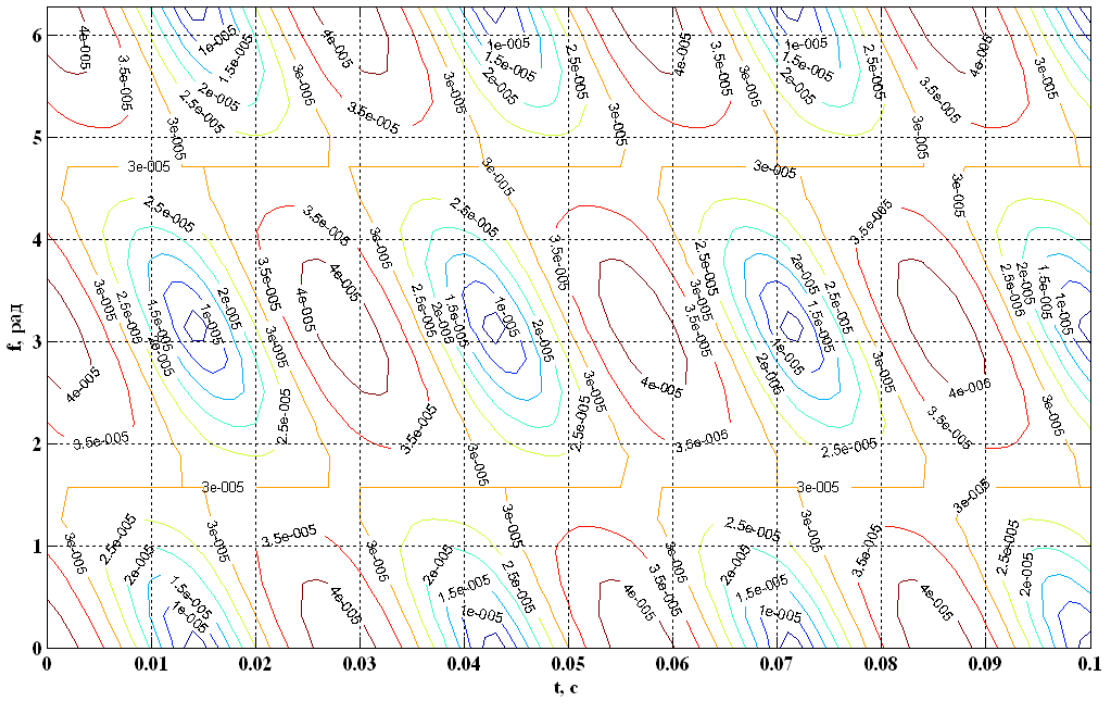

Fig. 7. Schedule lines of dependence r (f, t).

The minimum value is well represented by the lines of the graph (Fig. 7), which clearly shows the point (f, t) by the smallest value of r. The appearance is minimal periodic phenomenon in time and difference frequencies and within this article is not considered.

In the process threaded connections on machines driven technically not possible to change the phase fluctuations. Resolving this issue is possible in cars with electric drive (servo). Information from

vibration sensors supplied to the control unit and gives the command to the motor for phase change by increasing or reducing speed, then the speed is stabilized to ensure quality execution process. This algorithm is relevant for machines with a high number of resonant frequencies in the working mode.

Conclusions

Based on theoretical studies obtained dependence of the initial phase of influential factors that makes it possible to judge the axial vibration load threaded joint and plan preventive measures for a single threaded connection and make recommendations to clarify the geometric dimensions of the connection.

Reducing the difference between the initial phase transverse vibrations will reduce the torque effect of vibration, which is particularly important at the moment a nonzero value of the difference of the initial phases of longitudinal vibrations in the supporting surface of the head bolts and nuts.

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Basic parameters of movement Pryvedenы Point Range, lying on the surface opornoy nuts and bolt heads, kotoryya opredelyayut rabotosposobnost compounds. Execution of action predlozhennыh t TIME designing, Production and Using rezbovыh compounds pozvolyt prodlyt Term s service.

Threaded Connection, technics, kinematics.

The basic parameters of movement of points lying on the supporting surface of the nut and bolt that determine of working ability of connection are shown. Implementation of the proposed action in the

designing, manufacturing and usage of threaded connections will extend their working time.

Threaded connection, machinery, kinematics.

UDC 001.32

Research and development of systems engineering KAFEDRYSILSKOHOSPODARSKYH MACHINES AND Academician PM Vasilenko

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The basic results of science, technology and innovation in the last years of the department.

Science, technology, research, innovation department.

One of the trends of modern agricultural production advanced countries is the introduction of precision farming (TRS) - the practical application of variable standards (doses) introducing technological materials (seeds, pesticides, fertilizers, etc.) according to the unique characteristics of each elementary area of the field. Precision farming allows you to leverage the potential of farmland while significantly reducing anthropogenic impact on the environment.

In line with this progressive trends of modern crop on the chair Problem Laboratory "Precision Agriculture" (PLTZ), whose supervisor is Professor Voytyuk DG and headed scientific school of precision farming technology.

Problem Laboratory conducts, both theoretical and experimental research in the fields of Chernihiv, Cherkasy regions, as well as in the fields of teaching and research farm NUBiP "Velykosnitynske" Fastovsky district of Kiev region. In the formation of the ideological and theoretical level problem laboratories participating members prof. Aniskevych LV, associate Wolanska MS, Smolinskyy SV, OV pit, Brovarets AA, p. Dinner teacher OM, a graduate student Rosamaha YO more.

One of the main areas of research are PLTZ study scientific basis of a field of unmanned machines in the plant information with the development of the theory of building navigation and control complex