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The method development determynyrovannыh mathematical models, kotorые opysыvayut yntensyfykatsyyu process otdelenie impurities from heap korneplodov kombynyrovannыmy workers by transport and of technological systems adaptyrovannoy korneuborochnoy machine.

Woroch korneplodov, of technological process, flow, Input Massa, The components heap, dyfferentsyalnoe equation.

The method of development of determined mathematical models which describe intensification of process of separation of admixtures from lots of root crops combined workings organs of transport-technological systems of the adapted root-harvesting machine is pointed.

Beet-root tops, technological process, stream, entrance mass, components of lots, differential equalization.

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METOde flaw FOR DAMAGE DETECTION operational in detail and structural MOBILE AGRICULTURAL MACHINES

OV Voinalovych, Ph.D.

To detect defects in parts of machines and structural widely adopted and ultrasonic flaw detection methods vyhorostrumovi. The most important parameters that determine the effectiveness of a method of detection is the sensitivity and accuracy of the method, the ability to detect defects without preparation controllable surface, complexity and cost control, productivity.

Non-destructive testing, flaw detection method, Eddy current method farming.

Asktion problems. Non-destructive testing of parts and structural elements makes it possible to assess their technical condition, determine the possibility of further operation of the system unit or machine without rejection or replace the damaged elements (components). Given the fact that for many parts and components farm machinery through defectoscopic poor manufacturability (difficulty of access to the workpiece surface) subcritical size of defects is difficult, it is necessary to decide which method of detection can be used to control components and structural elements of mobile agricultural machinery with the greatest efficiency.

Rubibno understand that the effectiveness of control often determines not minimality parameters (size) defects and duration of control, reliability and accuracy of detection of cracks, repeatability of results under the same conditions
research, training costs and other controllable surface.

AnaLiz recent research. Neitherno regulations flaw mobile units and parts of agricultural machinery (tractors,
combayniv et al.) provide most of their visual inspection
(detection of visible damage and cracks zaboyin), the definition changes the configuration and size of parts (a ruler or measuring
shtanhentsyrkulem size operation, vyhnutosti, skruchenosti, beats, warping, neperpendykulyarnosti and other violations of mutual accommodation and axes of surfaces) [1].

Difm so important in practice maintenance and repair of agricultural machinery introduce modern
defectoscopic devices to find hidden defects (cracks, sinks unboiled space, etc.) that can lead to sudden failure equipment and emergency situations that lead
dof accidents [2-4].

Metand dperssurvey findings.

Proanabution possibilityyvosti suchamennyh flaw detection methods for operational

poshkotion of structural elements and details of mobile agricultural machinery.

Rezultaty research. Modern IUthendi flaw in aboutAgain NDT divided into the following main types - optical, capillary, acoustic, magnetic, Eddy current, electric, radio wave, thermal, radiation [5]. Most of these methods are varieties designed for specific research and control. Thus, the capillary methods for detecting defects include: color, brightness, luminescent, fluorescent-color, kapilyarno-electrostatic, capillary-elektroinduktyvnyy, kapilyarno- Magnetic, capillary-radiation.

Among the types of acoustic method in the laboratory and in practice widely used following types: informal, dzerkalno-tinovyy, velosymetrychnyy, echo method, the delta method and others. Electrical methods to flaw also includes methods: thlektrychnoho potential distortion registration electromagnetic fields, electrostatic powder, spark, electrical resistance. Choosing the most appropriate and effective method of detection, it is necessary to focus on the type of defect that necessary to identify in detail and elements of design. The table indicates that the method of detection prefer to find cracks that formed as a result of different processes of manufacturing parts and heavy conditions of use.

The list of methods flaw shows that universal method cracks exist, each with specific hardware tMetrology and benefits as well as limitations on how location defects, and the form and material details.

DTo find defects using a fairly simple techniques, and rather difficult to use (for example, scan or penetration of radioactive gases - as in radiation techniques) that potrebuyuting expensive equipment and defense experts who conduct control of harmful environmental factors.

DA visual, radiographic, capillary, magnetopowder, Eddy current methods and some other flaw introduced national standards NDT [2-4] that should be strictly followed.

Bebark of the known methods allow only flaw in laboratory conditions to detect defects whose dimensions are much less critical, leading to the destruction of machine parts and construktsiy. But their use for the production conditions leads to significant difficulties in placing defectoscopic equipment, reliability of data on the location and size

defects. Value is also the possibility of defectoscopic control for an array of details in a short time with minimal perelashtuvannyam equipment.

Ryokodations for the use of methods for flaw detection of cracks arose during certain processes [5].

Num	Totehnolohichnoh of welding	YouDr cracks	MeToda flaw
1.	Melting and Casting		Akustychne radiation (through or modbyvne), Eddy current, scintillation, electric
2.	Treatment of Pressure	IntExternal utrishni	Akustychne radiation (through or reflective), flux-gate, induction Akustychne radiation (through or reflective), Eddy current, magnetic powder, flux-gate, induction
3.	Thermal treatment	Thermal Voevery thing upon	Akustychne radiation (through or reflective), Eddy current, magnetic powder, flux-gate Youhorostrumovyy, mahnitohrafichnyy, flux-gate Youhorostrumovyy, magnetic powder,
4.	Mehanichne treatment	BiDr. machining processing	Youhorostrumovyy, magnetic powder
5.	Z'yeConnect metals	BiDr. grinding	Acoustic radiation reflective
6.	Ekspluatatsiy impact	cracks NAClep u	Akustychne reflective radiation akUstica-emission, magnetic powder, Eddy current, ferozondiv, holographic, electric Akustychne reflective radiation Eddy current, holographic
		fatigue	
		Corrosive	

In parts and designs mobile agricultural machinery operating mostly cracks arising from fatigue [6]. Their centers are often visually invisible defects microstructure zones of different granularity, areas with a high concentration gradient and residual mechanical stresses caused by the production technology details. Areas of slow and rapid development of cracks can also be related to corrosion fatigue process for operating agricultural units. To predict their residual

resourceand in life extension is important to identify defects in the early stages of the emergence and spread of cracks [7].

In the structural elements of tractors and agricultural machines mobile fatigue cracks also arise
of holes, rivets and other stress concentrators. The width of the crack opening on the workpiece surface substantially greater than the depth [8]. The method of detection hardest to detect defects parallel to the workpiece surface. Corrosion defects are localized in certain areas, and then may spread to the entire surface
detail [9].

To sendat the location in the details and structural elements distinguish surface and internal defects (cracks). By surface defects are operational risk, zaboyiny, cracks and malotsyklovoyi bahatotsyklovoyi fatigue, creep crack
tcorrosion and so on. About 90% of all zaboyin generated by shocks foreign objects have a depth of 0.5 mm. Together with
youof such superficial defects create local stress concentrations and lower limit of endurance detail [5].

SelIP flaw detection method depends on the location of defects, their length and depth below the surface of the metal.
Bazhlyvym is the presence or absence of a protective cover (paint, oil, scale, rust, etc.) on the surface of controlled items. Further analysis of instrumental methods of flaw detection capabilities to detect cracks in structural elements and details of mobile agricultural machinery.

Akuosculantdeffectskopiya dLakewill controlyuvaty Categoriesayaness
Mayischyn in detail relatively simple form. Identify flat, three-dimensional, linear spots and defects, as well as those caused by corrosion [10].

The largestw common method of detecting defects in acoustic flaw is the pulse echo method, the principle of which is to
linand short ultrasonic pulses and their reflection on the surface of the defect, and the back side detail or element design [6]. With flaw, which sold luna- method can detect defects larger than 1 mm2 (sinks, separation, etc.) Located at a greater depth under the surface of the metal.

The main disadvantages echo method and the method of sound shadow when defectoscopic control of parts of mobile agricultural machinery are: inability to detect cracks in
parts with complex shapes; high sensitivity to surface roughness details, and therefore there is a need careful (labor-intensive) training

onupper limiting mass control; the difficulty of determining the parameters of surface and cross defects.

DTo identify stratification in structural elements (corrosive or between layers of different materials) used
Rezonansnyy, velosymetrychnyy and impedance methods, and the method of free oscillations [11]. But these methods are difficult to apply in manufacturing (repair shops in the agricultural sector), given the large range of mobile parts of tractors and agricultural machines to be
defectoscopic control and the need for frequent perelashtuvannya defectoscopic equipment.

In the electromagnetic-acoustic method of ultrasonic vibrations resulting from the interaction of AC and DC magnetic fields of metal controlled object [12]. This method was also
of decisionand affordable for the general control of parts of tractors and mobile agricultural machinery, for which production
use of steel and alloys of varying permeability.

Fluorescent color and flaw detection method [13] using the phenomenon of capillary penetration of liquids with high wetting characteristics in cracks, pores and other surface heterogeneity. These methods are not effective for control of parts of the rough rough surface and inapplicable to verify porous materials. The disadvantages are the need for removal of protective covers and lengthy process control (several hours), low probability of defects in materials with significant compressive residual stresses. This imposes significant restrictions on the use of capillary methods to repair
Sectionidrozdilah farms.

Princesn the action of magnetic flaw detection methods based on the detection of magnetic stray fields occurring around defects. Applied magnetic powder, mahnitohrafichnyy,
ferozondiv and inductive methods galvanomagnetic and other ways to display stray fields.

Elektromahnitnyy method used to determine the physical and mechanical properties of the components of magnetic materials, as well as registration of fatigue cracks [14]. Magnetic methods flaw found predominant use in laboratory and
fixed factory [15, 16].

Using magnetic powder flaw detect surface defects and defects to a depth of 2 mm below
ontop. Its sensitivity strongly depends on the quality of the applied powder orientation of the magnetic field,
confihuratsiyi controlled product, so it is difficult to

usesconditions for cotton farms repair units.

Fromand using induction flaw detect cracks and lack of penetration in welded joints, bars and ropes applying
in lifting devices [17]. However, the main branch of the application of these devices are stationary plant and laboratory conditions. In the method of heat (infrared radiation) using the wave length 0,8-10 mm. Infrared react to small temperature differences on the surface of parts (a few tenths
gamedusa) [18]. Control of parts of mobile agricultural machinery using thermal methods without proper surface preparation and coatings removal on them (degreasing, grinding rust, paint) ineffective.

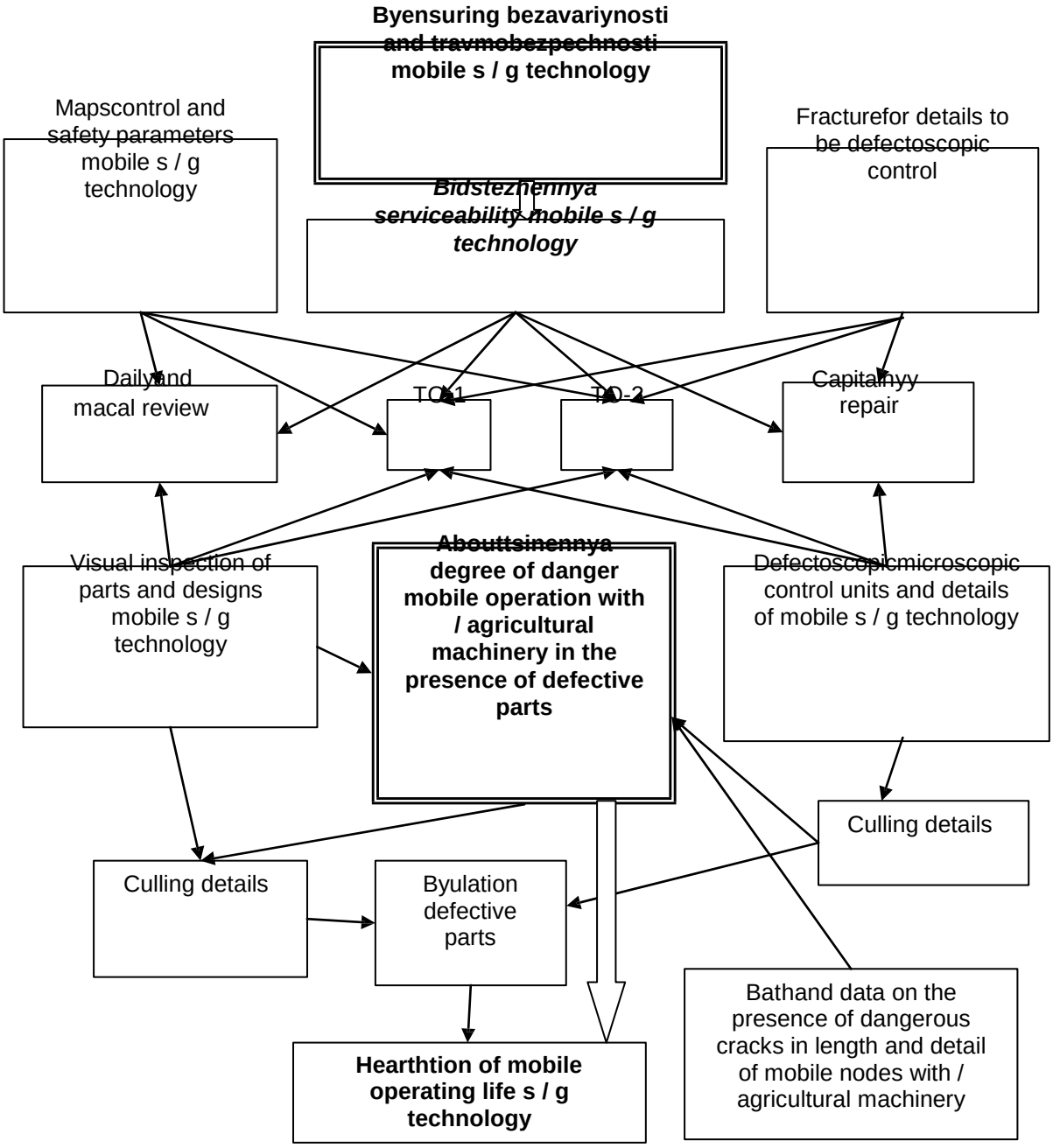
Noised elektrychnohabout potentialin there is
Some of suchm from The easiestx and
netrudomistkyx flaw detection methods that can measure the depth of the curved surface cracks is to investigate the kinetics of crack shape. Its drawback - the relatively low sensitivity.

CHECKment radiation method is to determine the position and shape defects (using tomography), lack - awkwardness and difficulty of used equipment, which is unacceptable demands on operational control of parts of agricultural machinery. Using X-ray equipment repair defectoscopic control farms requires appropriate training of specialists, their respective registration or contracts for the survey of companies that have a license for this type of non-destructive testing.

Thus, summarizing the findings of the analysis of methods flaw that could be used to detect defects in parts and structures of mobile agricultural machinery, must first be noted that the optical and capillary methods that are widely used in engineering, not to detect internal defects. The most common practice now in maintenance departments farms visual optical control method compared to other parts characterized by low sensitivity, low reliability and accuracy of defects.

MutualGali opportunity to find defects in material or on the sensor side of reach for most parts flaw detection methods are limited, it is used mostly acoustic, vyhorostrumovi and radiation techniques. But radiation techniques, including the most common radiographic, provide

byapplication of X-ray and gamma radiation, and therefore can not always compete with ultrasonic method.



Ric. Algorithm evaluation operability of mobile agricultural machinery.

DFor control of machine parts and structural components of mobile agricultural machinery is most suitable for ultrasonic flaw detection methods and vyhorostrumovi [19].

Andlhorytm evaluation operability of mobile agricultural machinery in Figure.

Conclusion. Effectsness byment SEWtion IUToddin

flaw is the ability to determine not one though

uyutnenky very, veis important, setting, and their complex that ensures safe and reliable operation of machines and structures suitable for the economic costs of defectoscopic control. The most important parameters that determine the ultimate effectiveness of a method of detection is the sensitivity and accuracy of the method, the ability to detect defects without preparation controllable surface, complexity and cost control, productivity.

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For obnaruzhenyya defects in parts of machines and structures elements Broad Application ultrazvukovыe and I send vyhretokovыe defektoskopyy methods. Most vazhnыmy parameters opredelyayuschymy Efficiency of ynoho method defektoskopyy Or, javljaetsja chuvstvytelnost and dostovernost method, Ability obnaruzhyvat without defektы Preparation kontrolyruemoy surface, and trudoemkost The cost control, ego proyzvodytelnost.

Nondestructive control methods defektoskopyy, vyhretokovыy method selskohozyaystvennaya Technology.

To detect defects in machine parts and structural elements widely applied ultrasonic and eddy current flaw detection methods. The most important parameters that determine effectiveness of flaw detection method is sensitivity and reliability of method, ability to detect defects without preparation of test surface, labor and cost control, productivity.

Non-destructive testing, inspection methods, eddy current method, agricultural machinery.

UDC
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Basic theory CALCULATION sectional transporter KONOPLEZHATKY

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