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Моделювання напружень у термопластичних клейових з'єднань деревини

Наведено моделювання напружень у термопластичних клейових з'єднаннях деревини. За результатами моделювання тепломасоперенесення встановлено розподіл нормальних та тангентальних напружень та виявлено їх вплив на довговічність термопластичних клейових з'єднань деревини.

Ключові слова: клейове з'єднання, вологість, теплоперенесення, пружно-деформаційний стан, деформаційні та релаксаційні процеси, компоненти напружень.

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THE INFLUENCE OF HARDWARE RELIABILITY ON TECHNOLOGICAL INDEXES OF EFFICIENCY

Influence is studied of reliability of hardwares on the technological indexes of efficiency of functioning of automated control the system by technological processes. The modern methods of determination of reliability are examined for the decision of tasks of increase efficiency of functioning of the automated production systems on the enterprises of industrial forestry complex. Refuses in technological lines influence on reliability through casual character of sizes and certain descriptions of purveyances, parameters of machine-tools and their knots, instruments. Reliability of equipment considerably influences on the actual productivity of the automated production systems. The decline of reliability predetermines the considerable decline of the actual productivity of the automated production systems and decline of stability of technological operations. To promote reliability of the automated pro-

duction systems expediently by development of charts of arrangement of equipment, structurally self-reactance optimization, structural backuping and imitation design.

Keywords: reliability of hardwares, technological indexes of efficiency, control the system by technological processes, imitation design, structurally self-reactance optimization, backuping is automated.

Substantially influences on efficiency of functioning of automated control the system by technological processes in industry of woodworking reliability of hardwares, production equipment, management facilities. Unreliability of technique, failings in organization of labour, the factors of external influence draw the losses of time of functioning of technological equipment. Influence of reliability of hardwares on the technological indexes of efficiency shows up in that the consequences of refuses of hardwares are represented on the conduct of management object (Fig.1). Efficiency of the automated production systems is determined by technological, organizational and by economic indicators.

The technological indexes of efficiency are determined in technological units and represent such sides of functioning of the automated technological complex: amount of the manufactured products; quality of the manufactured products; amount of the consumed raw material, materials, energy, fuel; use of technological equipment. **The organizational indexes** of efficiency represent the labour costs of personnel of the automated technological complex on the production of goods and determined in units of labour costs (m/hrs), that is determined in times of calendar.

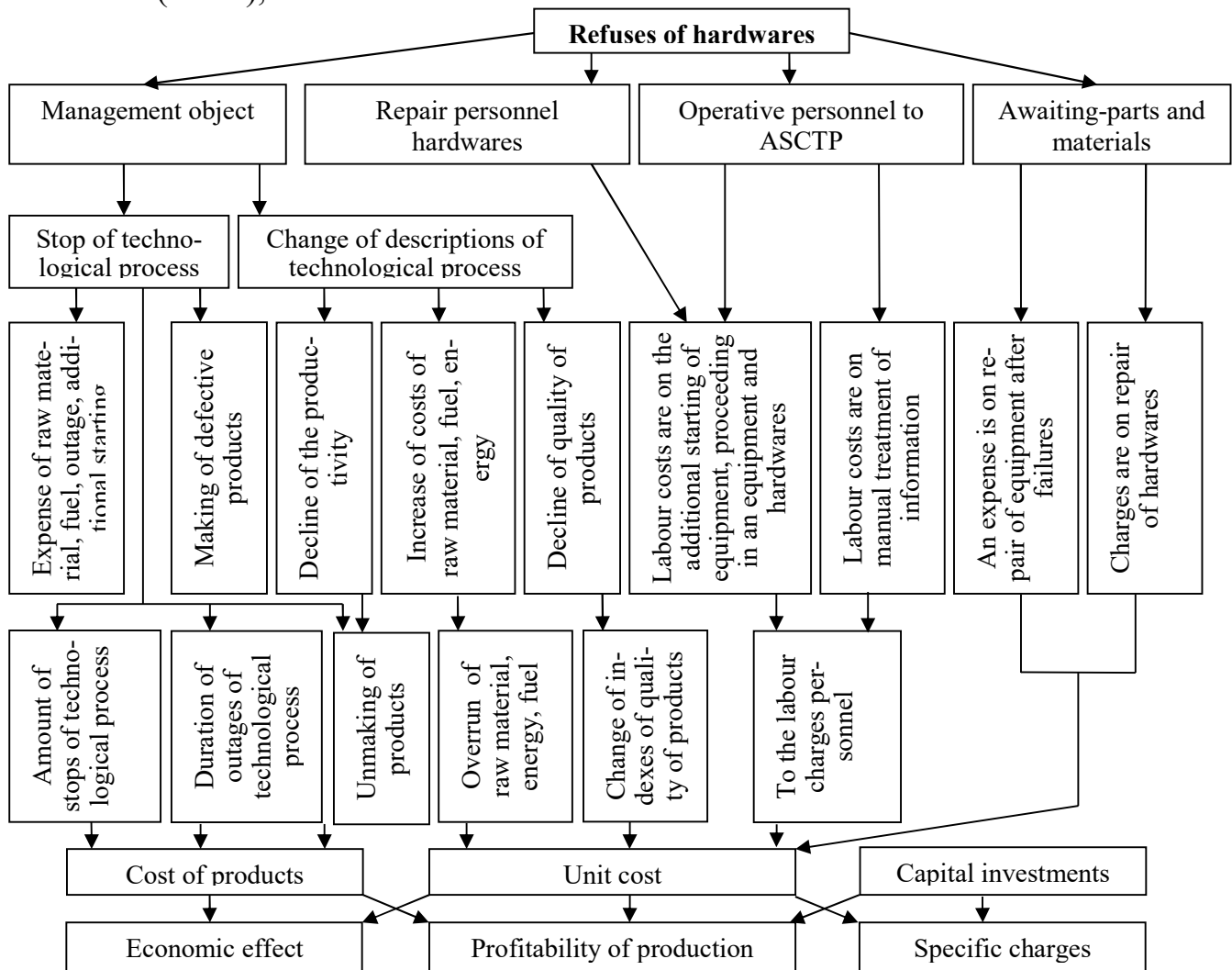


Fig. 1. Influence of failures of hardwares on the indexes of efficiency to the automated system of the control by technological processes

The economic indexes of efficiency represent the economic results of functioning of the automated technological complex and is determined in monetary items or in units which determine the degree of accordance of these results to the costs.

The technological indexes of efficiency, which describe the amount of the manufactured products, can be determined for calendar unit time, for work unit of equipment, for unit of the consumed materials, raw material et cetera for continuously discrete technological processes these indexes can be determined for the cycle of treatment. Indexes which describe quality are often determined as a fate of products, which is made the certain sorts of quality in attitude toward all of products of made for calendar time unit, unit of work of equipment. Indexes which characterize the use of equipment (amount of the forced stops, total duration of outages) belong to calendar time. As a result of emergency failures of hardwares there is a damage of equipment or stopping of technological process, as a result of technological refuses descriptions of technological process are worsened without his stop. The emergency failures of hardwares can influence on: amount of products which is made, as a result of the forced costs of working hours on the outage of equipment and transients of his stop and starting; quality of products is as a result of possible shortage at transitional processes of starting and especially stop; cost of energy, raw material, materials, fuel et cetera in case of stopping, outage and starting of equipment; use of equipment; coefficient of the use of equipment. The technological refuses of hardwares can influence on: to the unmaking products; decline of its quality, issue of defective products; increase of cost of energy, raw material, materials, fuel.

Reliability of hardwares of the automated system of the control by technological processes is determined such constituents: faultlessness, by fitness to repairs, by longevity, by property to keep the set descriptions during the set term. Faultlessness, determined as. Important the factor of violation of the set terms of co-operation between machine-tools, mechanisms in a technological line is cyclic instability of parameters of work which shows up during exploitation of technological line. Therefore ground of reliability of the automated production systems from positions only a wear is insufficient. Failures in technological lines influence on technological reliability through casual character of sizes and certain descriptions of purveyances, parameters of machine-tools and their knots, instruments. For renewal, functioning of the automated production system is required set time. The charges of time are expended in proceeding in normal work of equipment increase duration of intervals of issue and reduce the actual productivity of technological lines [1-12]. These undesirable consequences grow with the increase of power of equipment and rev-up flowing of technological processes.

For the decision of problem of reliability of the automated system of the control by technological processes it is suggested to decide such modern tasks:

1. To develop the methods of forming of the scientifically grounded requirements to reliability of industrial hardwares of different types recognition possibility of their backuping, use of these facilities in different the automated system of the control by technological processes. To develop the methods of optimization of technical maintenance of facilities of the automated system of the control by technological processes and microprocessors, utilize a computer technique, for providing of rational level of centralization of service and warehousing of awaiting-parts, awaiting-parts.

2. To analyze possibilities and wide use of vehicle and programmatic methods of control and diagnostics of good condition of hardwares of the automated system of the control by technological processes. To create scientific and engineering's bases of reliable computer-aided of difficult facilities and control the system design. To execute a supervision and calculations of actual reliability of mechanisms indexes and built on in the conditions of exploitation together with analogical researches of the productivity and stability.

3. To promote reliability of the automated production systems expediently with the use of the structural backuping, development of charts of arrangement of technological lines, structurally self-reactance optimization and imitation design.

Decision of the indicated tasks next to other technical and organizational measures, will enable considerably to improve reliability of the automated system of the control by technological processes on the whole.

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Вплив надійності технічних засобів на технологічні показники ефективності

Вивчено вплив надійності технічних засобів на технологічні показники ефективності функціонування автоматизованих систем керування технологічними процесами. Розглянуто сучасні методи визначення надійності для вирішення завдань підвищення ефективності функціонування автоматизованих виробничих систем на підприємствах лісопромислового комплексу. Встановлено, що відмови у технологічних лініях впливають на надійність через випадковий характер розмірів і певних характеристик заготовок, параметрів верстатів та їх вузлів, інструментів. З'ясовано, що надійність обладнання значно впливає на фактичну продуктивність автоматизованих виробничих систем. Виявлено, що зниження надійності зумовлює значне зниження фактичної продуктивності автоматизованих виробничих систем і зниження стабільності технологічних операцій. Встановлено, що підвищувати надійність автоматизованих виробничих систем доцільно за допомогою розроблення схем компонування обладнання, структурно-параметричної оптимізації, структурного резервування та імітаційного моделювання.

Ключові слова: надійність технічних засобів, технологічні показники ефективності, автоматизовані системи керування технологічними процесами, імітаційне моделювання, структурно-параметрична оптимізація, резервування.