ANNALS of Faculty Engineering Hunedoara – International Journal of Engineering

Tome XII [2014] – Fascicule 1 [February]
ISSN: 1584–2665 [print]; ISSN: 1584–2673 [online]
a free–access multidisciplinary publication of the Faculty of Engineering Hunedoara

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THE USE OF SIMULATION PROCEDURES FOR THE MANAGEMENT EFFECTIVENESS OF INTEGRATED PRODUCTION

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Abstract: Supporting of integrated production by information technology is represented by great amount of autonomous software products (except custom information systems) now. Information technologies cover all means, used by collecting, saving, processing, presenting and information transfer. Paper is dedicated to implementation of new software modules to standard systems that so have properties of "great" integrated software products. So products make able to solve more and more complex problems in all production (design, production and manufacturing management, financial management and decision).
Keywords: simulation, automation production, CAD, information technologies

1. INTRODUCTION

The increase economic effectiveness is an important goal of each production plant. In conditions of the highly automated manufacturing (CIM) is requested to place the module of economic effectiveness into this system. The placement of the module into the structure atones find out and to compare economic complexity different solutions in period computer aided design CAD.

Proposed software module should as an effective tool in hands of designer to simplify his decision making for certain variant in right time without wide either economic or technological knowledge as fare as without knowledge from area planning and controlling of production. Implementation of module for economic effectiveness evaluation into system structure is showed on Figure 1.

2. SIMULATION AS TOOL OF ECONOMIC EFFECTIVENESS EVALUATION

The task of simulation of manufacturing system is to give to designer the tool for selection of optimal manufacturing variant.

It means that designer has influence on production time and on production cost by design influences. For user is available following possibilities to influence simulation:

1. The choice of criteria for calculation of the simulation.
2. The purpose showing the details of chosen variants.
3. Showing the production planning in real time and in particular condition of operations.

3. UTILISATION OF SIMULATION IN PRODUCTION SYSTEMS

The base simulation inputs are a calculation of volume spoon from machining material per operation time. The output parameters are:

- Machining material with defined mach inability, Figure 2.
- Cutting tool with coefficient regarding cutting conditions k_n =1, (for example; for turning by tool from high cutting speed steel, Figure 3.
- Accurate production of part, for example if turning roughness of surface R_a=6.3 is a coefficient regarding roughness of surface k_{Ra} = 1, Figure 4.

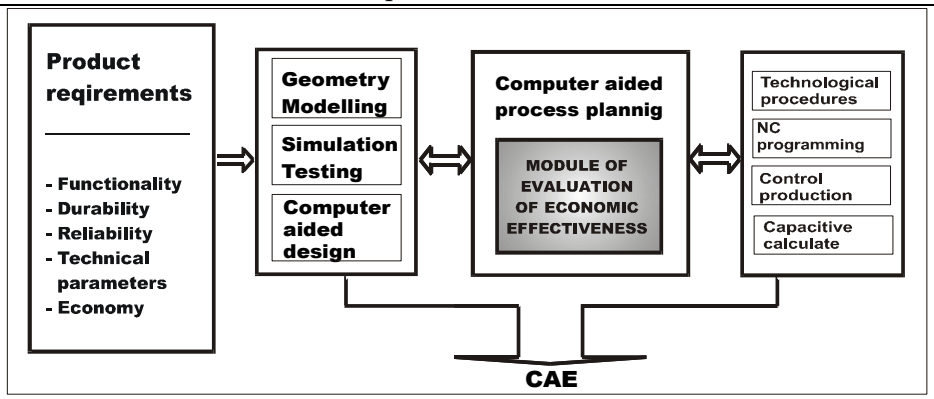

Figure 1: Interconnection – module of evaluation of economic effectiveness with integrated manufacturing

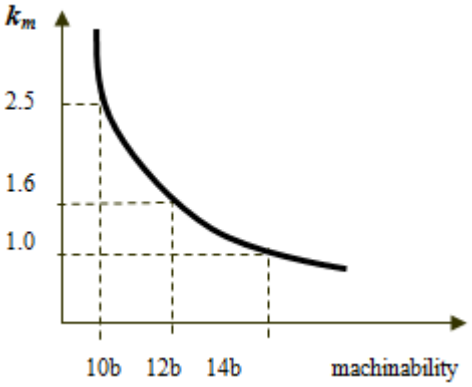

Figure 2: Coefficient k_m regarding machinability of material

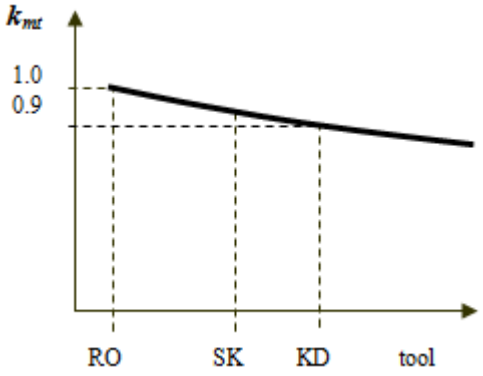

Figure 3: Dependance of the machine time coefficient k_{mt} based used tool

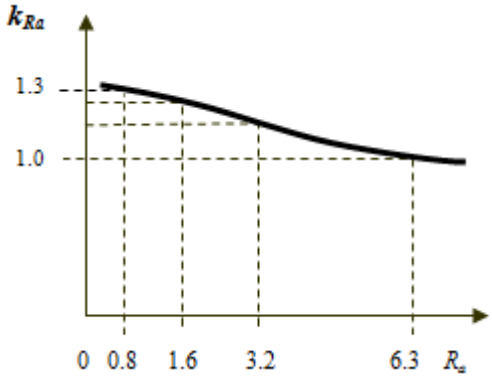

Figure 4: Coefficient k_{Ra} regarding turning roughnesss of surface R_a

4. SIMULATION PROCEDURE POTENTIAL IN THE PRODUCTION SYSTEM

The simulation of discreet activities makes a very strong position in an actual integrated system. Without simulation so to say don't exist an adequate executive and flexible possibility as to support decision of manufacturing alignment control process.

Simulation finds application possibilities for the solution main complete dynamic work of application field, analyses and optimisation production system. The effectively processing simulation project is so a necessary phase for design of production system, which directly influence to the economic production parameters.

Increasing of the simulation influence is calling by following features support by the computing simulation:

- Ability of various alternative ready test solution for concrete task
- Minimisation of risk for incorrect decision
- Elimination intuitive decision, which have disputable effect
- Computing support simulation makes it possible in built of a great rate parameters into the process, which eliminate any favourite human factor
- Human factor input is easy to implementation by define of input conditions such as starting conditions, limit conditions, priority, directive decisions etc.
- Possibility to prompt and flexible response of any change of conditions.

5. THE SOFTWARE APPLICATION

Next is describes as example the application software aniseed at Department of environmental studies and control process under leading of the paper authors. Includes result of theoretic

research in this field of science and verification same processes and procedures. The software is dedicated as tool for designer to facilitate his variant decision without wide economic or technologic knowledge, as soon as without big knowledge from the field of controlling and planning processes. Software module provide:

- Impact assessment material usage of row product, cutting tools and needs from of surface roughness depends on the long time of operation and production costs,
- Impact implantation of the concrete technological equipment in the production operation according to batch size, batch priority for purpose of concrete product in real time and operation state to produce.

On the Figure 5 is the base algorithm of software module function according to run process of simulation.

Figure 6 shows dialog panel „setting of base input parameters". The panel is designed to definition of base input simulation parameters.

On the Figure 7 is displayed the panel „Production equipment", which is helpfully to define of detail input parameters for separate technological equipment in here in the production plants.

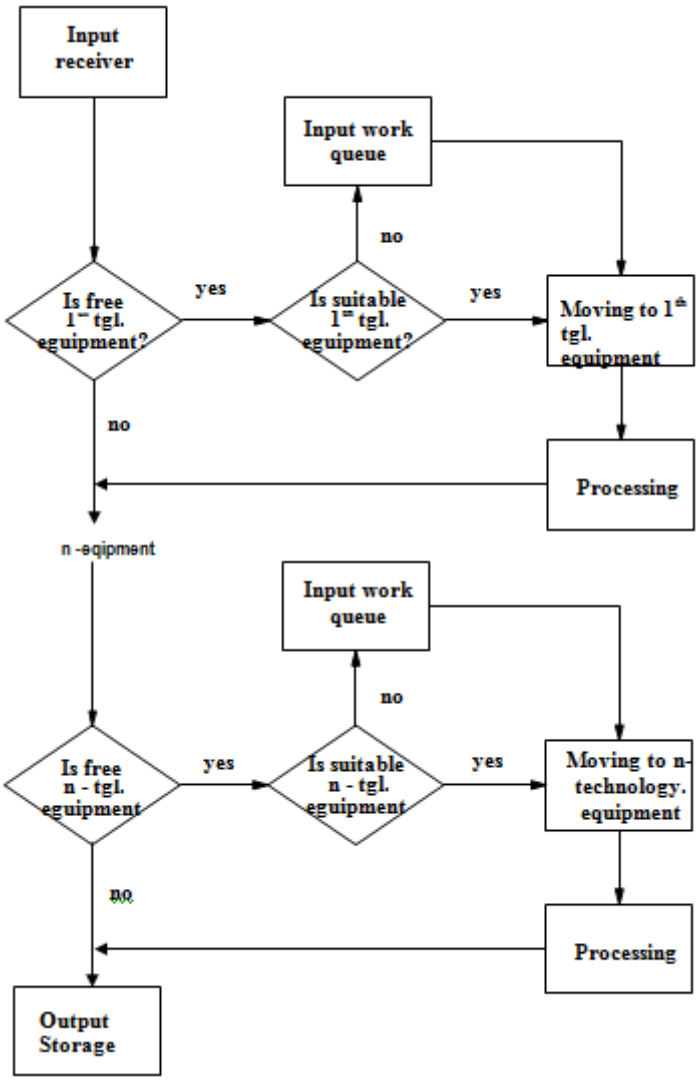

Figure 5: The base algorithm

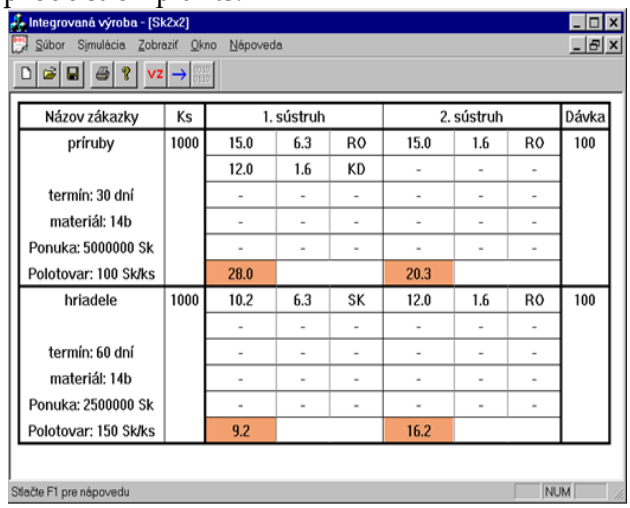

Figure 6: Setting the base input parameters

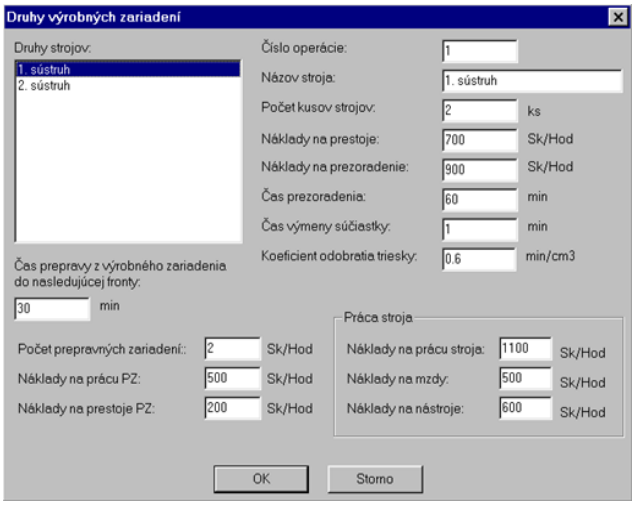

Figure 7: Dialog panel „Production equipment"

6. CONCLUSION

New usage method of data brings new requirements to their structure and quality simultaneously.

This work was supported by project VEGA 1/1216/12 solved at Department of Environmental Studies of Technical University of Košice.

ACKNOWLEDGEMENT

This work was supported by the Slovak Research and Development Agency under the contract No. APVV–0432–12

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