



THE STRATEGY OF MODULARITY AND RECONFIGURABLE PRODUCTION MACHINERY

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Abstract: The paper presents the base of knowledge from the field of architecture and evolution of modularity/reconfigurable machine system of producing and operating technique, including their formation to specific machine system in the accordance with strategy of evolution. The heart of paper makes new approaches solutions, which results in the technical new conceptions of automatic structures, which are able to work in specific place.

Keywords: Producing technical, operating technical, dynamic module, integrated kinematics.

Introduction

Evolution and application machine system (production and operating technology) opens new themes, what he brings advanced technical and economic effects. Determining factor evolution machine system are demands technological process, specialization level their manufacture and unceasing stress on the cost reduction and beating up ratios between loads and utility value. Answer this too orientation producers on innovation change policy's and rescheduling firms' programs regarding marketer adaptability, effectiveness production and service activity.

In the sphere of productions and application machine system innovation direct to motional module, control and creation integrated configuration contiguous with its employ in wide - spectrum technical difficult operation with visual system and accurate positioner. Rises share of such technology into final and service activities.

Current Requirements

Nowadays, more and more industrial enterprises constantly face challenges connected with a coordinated increase in production capacity, the value of assets and quality of production. One approach to solve this problem is the development of new solutions with greater and higher effect. In case of machine manufacturing practice is a support in the following areas:

- comprehensiveness of coordinated development of production capacity, value-level production base and product quality with regard to the assumption that its importance in the industry will continue to rise,
- multi-tier solutions to the problems of coordinated development of specific sectors and markets (i.e. flexibility, adaptability, modularity, agile technology and material flow technology transformations),
- coordinated development of economy management for users of technologies and services (industrial enterprises experienced a trend of increased investment in capacity well-coordinated development).

Handle different ideas and needs for coordinated development from the perspective of various sectors and industries (e.g. automotive, aerospace, machinery and equipment, production of components) and social (cultural) differences and economic links of individual countries (e.g. Germany, France, Great Britain, Italy, Japan and USA) ask to apply logistic approach.

The Strategy Of Modularity And Reconfigurable



In the development of machine system with integrated and reconfigurations effects are based on the requirements of applied fields and the technical capabilities of the components that are abstracted into a model-Fig.1. It could clarify the influencing factors and functional ties.

The analysis focused on the purpose of handling / confirms the role of technology influencing machine system, in particular the mechanical, physical and topological nature, weight, accuracy and stability of position control method and sorting and object exchange rate of production.

Analysis of the nature and terms of application environment confirms influence machine system, in particular the work area (location, shape, size, input), technological dislocation axis (location, access, function), an interactive relationship systems (function, identifying, blocking, movement forward - backward), energy (distribution, transformation, branching flow), mechanical (unification, separation, variability) and realized the nature of technology / process handling (processing / handling tools, process parameters-load, accuracy, stability and performance time modes).

Analysis of the production system confirms the influence of particular machine based on its technical parameters (power-productivity, positioning accuracy, kinematics and dynamic properties), design parameters (baseline layout for the premises, the building interface), connecting mechanism, the program and energy treatment of cross-links (energy and information interface), and integrated technology-related activities (handling, transport, storage and ancillary).

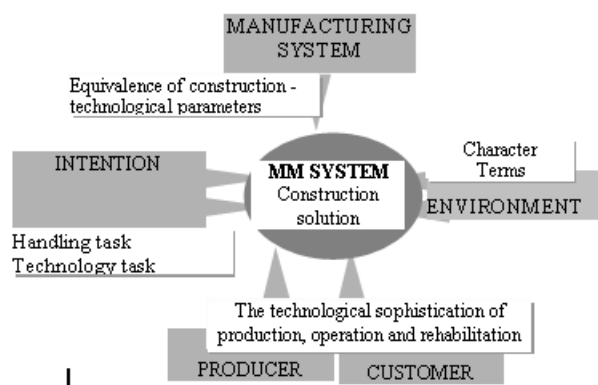


Fig. 1 Factors affecting the structure of the machine system

Analysis of the impact of the manufacturer and the user confirms the influence of particular machine based on the technological possibilities of production, guaranteeing fixed service and maintenance activities, the level of servicing and maintenance, the maintenance of operational capability.

Methodology Procedure

The starting solution is the analysis of stimuli showing the need for greater synergy of elements, nodes and complete and wider application of mechatronics principles. Linked to this is to identify characteristics that affect the composition of the machinery of the system and its impact on the achievement of the objectives of application. The result is a logic machine song patterns between the system and the area of application in the form of the model. The model represents a starting base profiling machine systems, which represents our logistics development. The aim is to develop logistics ongoing, linked sequences of individual



machine modules (reference, connection, motion), as well as construction machinery reconfiguration availability defined systems and performance parameters.

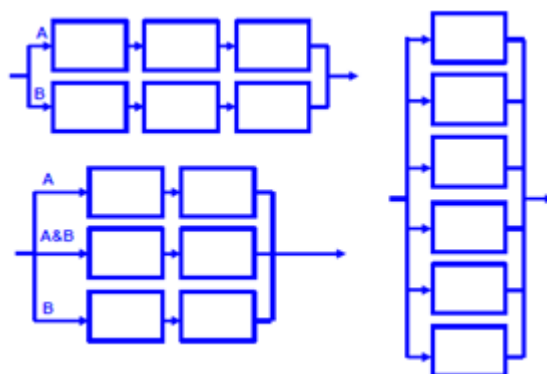


Fig. 2 Example of three configurations of production machines created from six modules

Based on the above methods and to develop modular analysis of individual machine modules comprising reconfigurable machine system, a case may vary (Fig. 2). To improve the user properties are used to address kinematics structure of anomalous elements and their mutual relations, thus creating space for new concepts of plant and equipment of modular organization. Furthermore, the specificities of these concepts is that they can change the spectrum of tasks, again spread over different modules and used to address new challenges. Moreover, can integrate additional features, e.g.: adding motion to change individual modules and operating system machine work opportunities. Combining machine modules can generate cash machine systems ready for use according to user specification.

Identification Of The Elements, Modules And Logistics Buildings Machine System

The entire Board of the work concentrated on production and assembly is based on the relative relationship between the working tool and work object. The basis for the realization relationship is system architecture for machine-Fig.3, which comprises a set of active and passive modules linked to the base structure of the machine [5]. Its technical appearance is based on mechanical systems implementing the transmission of movements and forces, with the ultimate effect of location and clamping (object, instrument), keeping the working member (tool) for the direct or transposed implementation of manufacturing operations, changes in position (location, location, orientation) course in During manufacturing operations, and addressing the subject, respectively. Exchange Facility for other manufacturing operations.

Model presented in Fig. 3. is built on the idea modularity, and its essence is the variability in the way of grouping the construction of modules into a basic or advanced machinery chain to the reference base for the implementation of the requirements of manufacturing operations. Thus the concept of providing set of learned functions and activities, either differentially within individual working parts (tooling, subject) or concentrated machine system through an integrated structure.

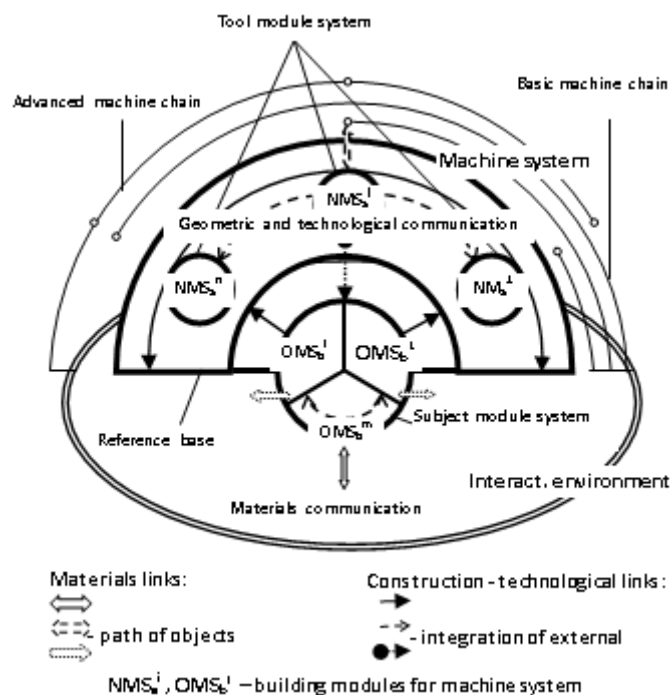


Fig.3 The integrated model system for machine

Conclusion

The present contribution provides information on creating a modular reconfigurable machine system based on more variants of design and technology links. These links allow us to implement the required functions concentrated in the lean and open assembly machinery system that can easily complement and change the role and easily ridden. Results solutions are the basis not only for creating new concepts of machine systems to the complex concatenation of production activities, but also on how to expand or modernize its manufacturing base and broad impact on production machinery based applications support systems based on new positioning elements in machining, welding and assembly.

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