POSSIBILITIES OF FRAME TECHNOLOGICAL PROCESSES APPLICATION IN VARIANT CAPP SYSTEMS

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Abstract: *This elaboration characterizes frame process flows shortly. It presents their use in the course of project planning of manufacturing process realized classically or with computer technique usage. There is particularly convexed the capability of their usage in variant systems CAPP.*
Keywords: *processes planning, frame technological processes, CAPP, variant planning.*

1. INTRODUCTION

As a rule, the man acquiring knowledge and experiences, desires to hand it down to his successors. This process goes on miscellaneously, sometimes in verbal form, sometimes in written or in any other form. This principle is realized since start of civilization evolution. It is used also in hard domain of sience that technology is. In this case, expert technologists work out different data, directions, guidebooks, manners of proceed in definite situations. This way, content knowledge is taken advantage by less - experienced people for correct manufacturing process designing.
In the same order there is also frame manufacturing processes elaborated, which are simplified versions of earlier worked out machining processes of definited parts. Properly genaralized, they serve as fundamental plan of fabrication. They usually include only basic data concerning next manufactiring operations. Very often atere is lack of detailed description of objects clamping manner, contents of procedures, actions and neither parameters of processing. Frame manufacturing processes emerge on base of experiences, works and tried out technologies for proper parts classes. Most often, there are used during designing of machining of new part, in spite of it they play significant role in other domains of life. Most important manners of using frame manufacturing processes have been presented on figure 1.

2. COMPUTER AIDED PROCESS PLANNING

CAPP systems ensure significant reduction of time needed for fabrication of manufacturing processes plan. It is possible to divide applicable methods in CAPP systems on basic three groups:

- Generation method - plan of manufacturing process is created by usage of very complicated methodology. Description of part and knowledge base are irrevocable during generating the manufacturing plans. This way, basing on characteristic features of parts follows construction of machining process plan from the beginning. It is

generated for each new product - it generates automatically the process from start point. Deaription of part (CAD), databases of producers, logical taking a decision and algorithms are the main components of generating CAPP systems.

- Variant method - uses encoding and classification, according to which, there is already elaborated manufacturing process searched out. This process can be a base for elaboration of new technological documentation. Manufacturing process is manually modified properly to shape and dimension of part. This manner uses high probability, that the parts close to themselves by definied characteristic features, will have very similar machining plans;
- Hybrid method (variant - generating) - methods of fabrication the manufacturing processes, that use elements of variant and generating methods.

Figure 2 presents segmentation of methods of manufacturing processes planning.

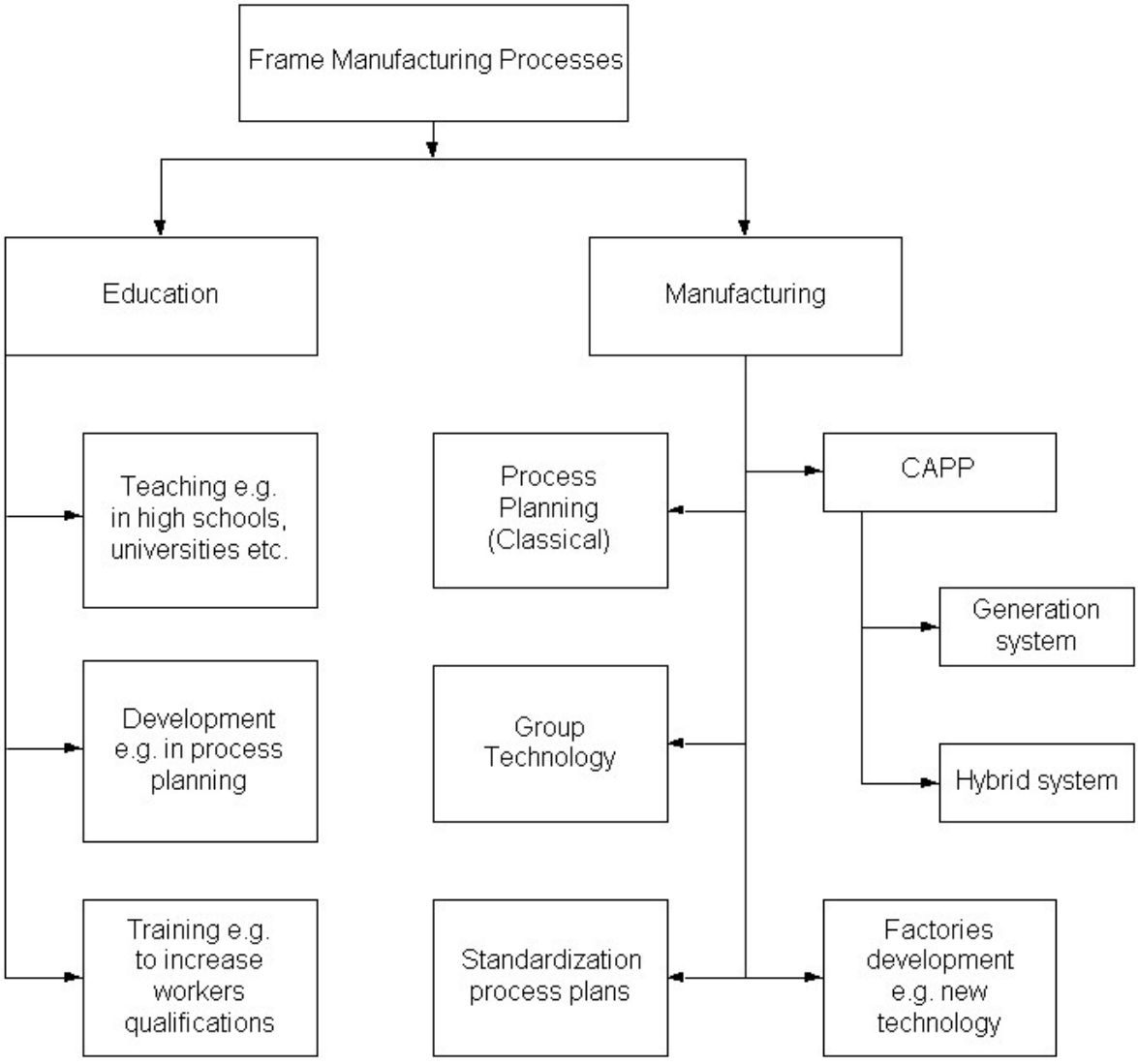

Fig. 1. Most important manners of using frame manufacturing processes

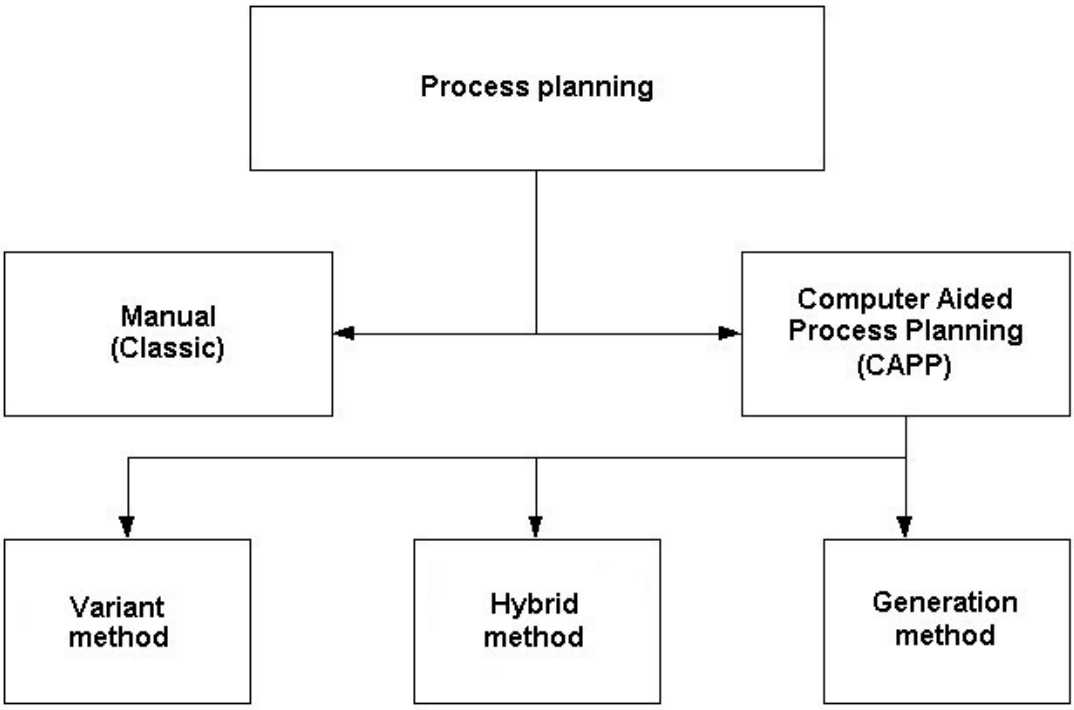

Fig. 2. Segmentation of methods of manufacturing processes planning. [4]

3. POSSIBILITIES OF USAGE OF THE FRAME TECHNOLOGICAL PROCESSES IN VARIANT CAPP SYSTEMS

Frame manufacturing processes are often used in hybrid and generation methods. Also in variant CAPP systems there exists possibility of usage of manufacturing processes diagrams, especially in case of modification or fabricating process design from the start point.
As it was already mentioned, variant CAPP systems use constructional and technological similarity for recovery of parts with similar production course. It bases on already elaborated manufacturing processes. In these systems, classification proceeds in view of constructional and technological similarity. In case of similar process recovery the technologist imports the process, and there, if it needed, he makes the modification. In this case, the frame manufacturing processes can be usefull in improvement or readjust of existing processes to conditions or characteristic features of new part.
They can improve technologists work through included in them information, e.g. information about machining process, heat treatment, sequences of operations, etc. In second case, when technologist cannot find any part with constructional and technological similarity, he has to generate new manufacturing process. Problem emerges in this place, because usually the variant systems do not offer any kind of help and the technologist is obliged to elaborate new project by traditional procedure. It relies on it, that after getting of drawing in the form of sheet of paper, it is necessary on its base, following on own intuition, experience and literature, to create the content and sequence of operations.
Besides, technologist defines manners of processing, clamping, he decides about selection of machines, tools, he calculates time standards, writes programs for NC-machines, etc. It is necessary to note, that such manner of elaborating of technological documentation is very time-consuming, that effects very disadvantageous on firm image (unpunctuality, costs, etc.). The introduced procedure is possible to facilitate, promote and objectify by assistance of properly prepared databases, patterns and usage of frame manufacturing processes.

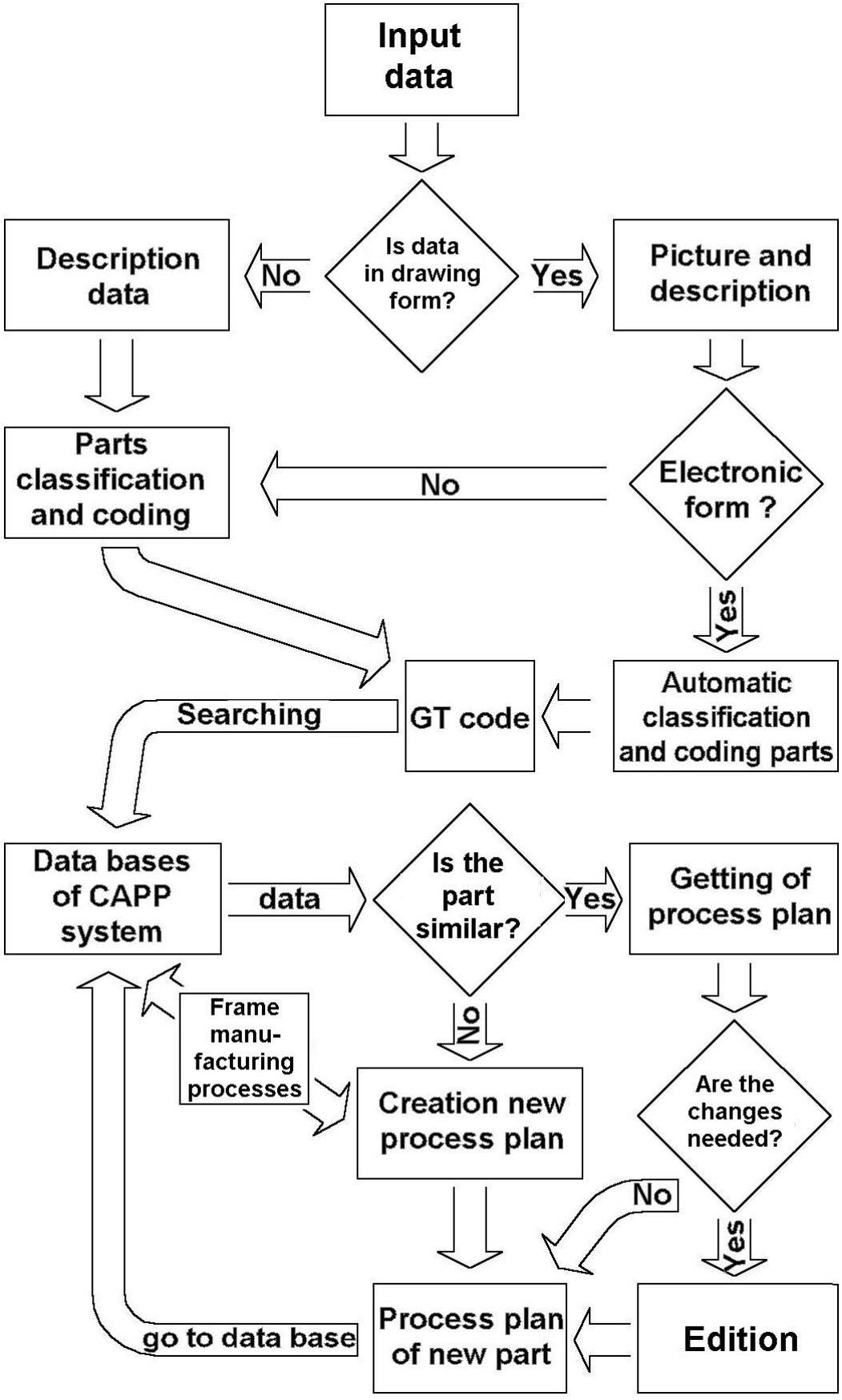

Fig. 3. Algorithm of planning realization by variant method application in CAPP systems [3]

Algorithm of realization of designing by variant method with taking into consideration frame manufacturing processes has been presented on figure 3. During searching database for recovery of part with constructional and technological similarity, it is possible to assign them proper frame manufacturing processes. As it has been already mentioned, in case of finding the similar part it would be usefull as assistance in editing and fitting of already existing machining process. Otherwise, it could prominently accelerate work of technologists, first of all, through giving ready solutions. It would be predifined by amount of details in elaborated frame processes, that exist in worked out database. Depending on it, it is possible to say about general outline of machining, selection of machines, manners of clamping, technological instrumentation, tools, etc. Using this manner is conditioned by earlier works over fitting of general production principles, frame manufacturing processes published in literature (e.g. [1]), modern applicated technology by given production potential. Besides, in frame process, used in such systems as CAPP, there should be taken into consideration informations concerning kind of available machines and instruments, their technical condition and eventually degree of staff professional qualifications. It requires considerable amount of work over creation of proper database, which shall be updated in real time.

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5. CONCLUSIONS

Summing up, it is possible to come to conclusion, that usage of frame manufacturing processes in variant CAPP systems is not only possible, but it becomes even requirement of moment. Especially in case of competition of national industry with other producers from european countries. It belongs to enterprise polish industrial equal in technical considerations, as well as in range of taking possession of newest technology, and also equip them in proper instruments to cope with their competition.
Certainly, the author realizes, that in case of using frame manufacturing processes in variant CAPP systems, it is possible to begin long lasting discussion over correct name of such system. Taking into consideration existing division of methods of manufacturing processes planning (figure 2), such system could not be included stricte to variant systems, but rather hybrid.

In author's opinion, the nomenclature is not important here, but rather concrete requirements and results of application such composite methods. Variant systems, aided with another additional instruments, as if frame processes, have to give desirable results in the form of reduction of manufacture preparation time, reduction of costs, boost of competitiveness of national industrial enterprises, etc.

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