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COLLECTING AND USING QUALITY INFORMATION FOR PLANNING IN CAQ

Summary. In this paper some problems connected with data collecting and using information in quality assurance system has been discussed. The conception of computer aided creating of two-levels quality inspection plans has been presented.

1. Introduction

Transformation of enterprise management is associated with creating of modern quality assurance systems (QA). In these systems particular significance has the way of data collection, processing, using and data acquisition which are connected with different aspects of quality. There is here situated the gravity point of up-to-dated quality system. Considering the great number and variety of these information the future of quality assurance systems is closely connected with computer systems, particularly with integration of QA into CIM scheme. Structure of quality information has to be conformed to the standards held in CIM - and in connection with the extent of this system - has to be formed according to needs of individual areas of the enterprise [1]. This concerns all areas of the enterprise which take part in manufacturing process of product, from the beginning of design project and to the end of storage and distribution activity.

2. Quality information in the enterprise

Quality information existing in the enterprise can be divided into two groups. The first group contains information which function traditionally within the limits of the firm and are dispersed in its organizational structures (for example: Marketing Department - recognition of customers requirements function, Quality Inspection Department - delivery inspection accomplishment function, Technological Department - technological and inspection planning process). The second group includes information created specially for demands of modern quality assurance system (for example: creating production and inspection "history", information from steering units in SPC schemes [2], analysis of appearing faults with regards to reasons and places of their appearance). The most information mentioned in the first group "rotates" in enterprise extents, but they are not

availed efficiently. Ordering information circulation in CAQ (Computer Aided Quality Assurance) scheme is a chance for a better use of information mentioned above for decision-making in management sphere. Also ISO 9004 standard talks about it, pointing necessity of creating information feedbacks relating product quality by analysis, comparison, interpretation and communication in accordance with defined procedures.

The main extents of the enterprise, in which the quality information come to existence and where they are transferred into are particularly: leading marketing activity, modifying construction design, planning of process and inspection technology, and also supervising of process conformance with requirements. Properly ordering of information derived from these areas allows to separate the functions regarded to quality management from among generally understood management functions. As the element of integrity in the whole becoming CAQ system a planning quality unit can be treated [3]. Quality planning is understood here very widely and means designating of quality features of the product and creating quality inspection plans, and also supervision of control course during process proceeding.

3. Information in computer aided quality system

A lot of information applied for quality planning and creating inspection plans are contented in ordinary technological documents of the enterprise. It often causes considerable problems to find and modify these information. A great advantage can be the application of computer aid, particularly at the stage of generating plans and management of them.

Further in this paper the conception of creating quality inspection plan for computer aided quality assurance system is described.

With regard to variety of productive and organizational conditions in the enterprise (different assortment of production, different phases of elements machining, various types of used technology, etc.) the conception of two-levels creating quality inspection plans was taken. At the first level frame inspection plans concerned to the chosen group of similar parts (with connection to construction, technology, organization of process) are created. During creating of these plans information originated from different sub-systems of enterprise are used - it shows figure 1. Particular meaning has quality information originated from exploitation phase of similar products which are already existing. These information are collected by marketing service. On this base a characteristic of the product is created, which includes among other: usefulness, safety, availability, reliability, maintainability, economics and environment aspects, productive features, quality level and modernity of product, service instructions, production conception, special requirements and others. Above elements determinate entrance point for constructor, who at the last phase of designing "explains" it into characteristic of individual components. If order accepted in marketing department concerns catalogue product, or the product is new - the way of proceeding is shown in figure 1.

In the first case the process engineer chooses typical technological process from a "library" of similar elements including specification of control operations (self - control, inter operation control, final control). Each of technological operation is imputed to separate instruction card. In case that it is an inspection operation, it contains a "reference mark" to

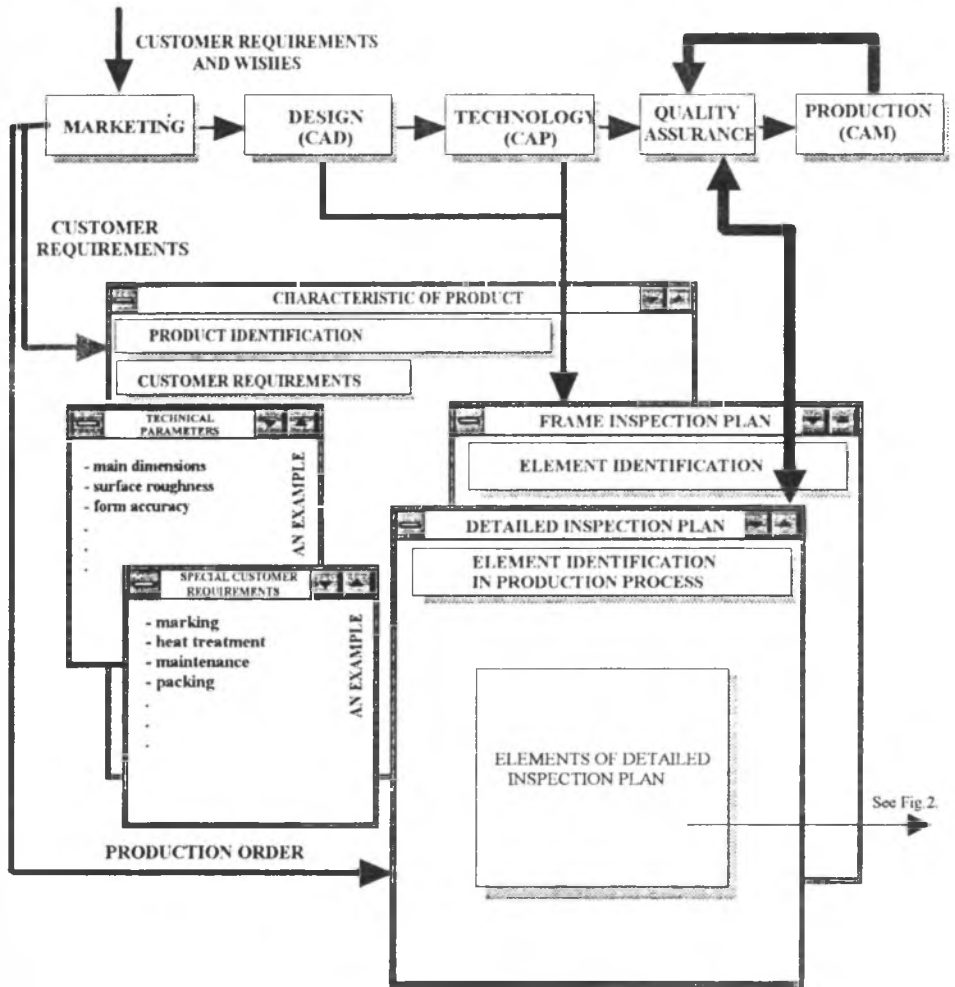


Fig.1. General scheme of quality inspection planning in CAQ

the appropriate frame plan card. Modification of detailed plan card (in this case only number of order is completed) is the second level of creating inspection plans. If the element coming into production is a special one or the customer presented particular requirements, it is necessary (on modified technological process base) to modify current detailed inspection plan. Demands for introduction of changes in frame and detailed plans results also from information feedbacks from production departments during accomplishing each productive order. In this case the using of "production history" in planning quality inspection is possible. Example data contained in selected system units are presented on scheme (figure 2). These units are data basis used for creation of quality inspection plans with full possibilities of accessing to them in order to: review of data, input data, data modification. Among other things the schemes illustrate that origin place of presented quality inspection plans is planner section in quality assurance department in the enterprise.

Modification of quality inspection plan is possible after activating the windows called: "Frame plan card number", "Detailed plan card number" (figure 2). In this case also can be received all identification information about element (window "Identification number of element"), about started order (window "Production order number"), technological process (window "Technological process card number", "Operation card number"). In the case of plan creating option selection, on the computer screen of planner terminal the following frame (detailed) elements of inspection plan appear: specification of controlled features (features symbols, nominal values, dimensions tolerances), ranking of quality features importance, type of control method and its parameters, specification of measuring equipment. There are also chosen: places of control accomplishment, persons responsible for control, way of results registration, specification of used instructions.

4. Summary

Quality assurance system treated also as information system has a very complex configuration. It results from different data sources using in manufacturing process. There is a possibility for distinguish some reasons which particularly motivate the introducing of computer technology in quality assurance system:

- each element is described by different features which give information about its quality during different process phases,
- there is a necessity of creating production and inspection "history",
- there is a duty of quality documentation according to defined procedures (ISO 9000 - 9004 standards),
- there are a lot of routines connected with quality assurance (data collecting and data processing, creating and quality plans managing).

This facts shows propriety and even necessity of computer aiding of activities realized in enterprise in the range of quality assurance. Because of the numerous data sources and different organization cells using these information, hardware and software environment should make possible simultaneous activities of many data users. Looking forward at the development of management production techniques it should be postulate that CAQ software and hardware should give the possibility to include quality assurance system to computer integrated manufacturing system in the enterprise.

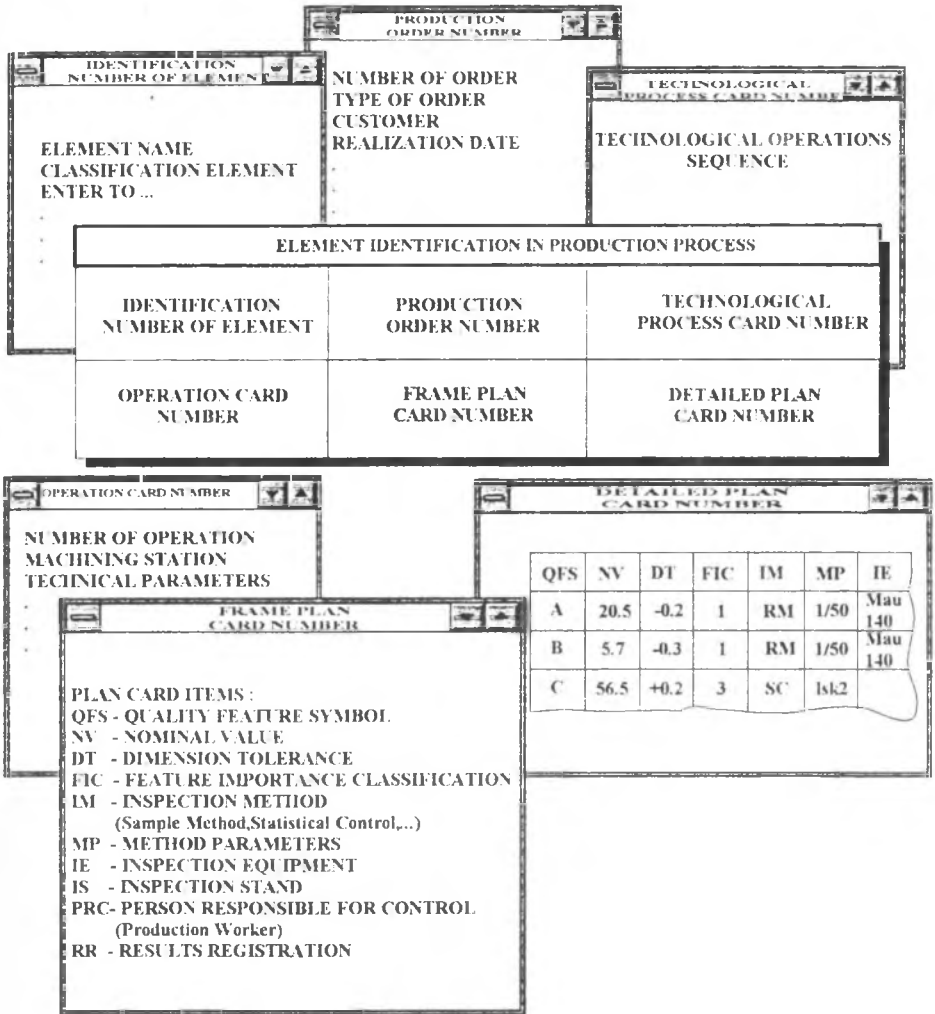


Fig. 2. Elements of detailed and frame inspection plan

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