Design research on information coding system under the concept of agile manufacturing

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Abstract: Agile manufacturing can achieve the characteristics of high quality, low cost, short production cycle to meet the increasingly fierce market competition. Information coding system in agile manufacturing environment is particularly important, which directly determines the quality of information exchange in enterprise dynamic alliance of agile manufacturing. This paper analyzes the requirements of information coding system under agile manufacturing concept, and gives the design points of each module, providing some references for relevant researchers.

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1. Concept and Features of agile manufacturing

1.1 Concept
Agile manufacturing is a manufacturing paradigm that enterprises adapt to and respond to market changes through efficient response in an unpredictable competitive environment. The key technologies of agile manufacturing are concurrent engineering and virtual enterprise alliance. The advantages of agile manufacturing can gather cross-regional resources, form a certain enterprise alliance, and respond to market demand quickly. Since the concept of agile manufacturing has been put forward, it has been supported and recognized by all sectors of society. The advantage of meeting the market demand makes agile manufacturing become one of the manufacturing modes which have been paid close attention in the century. The core of agile manufacturing is agility, which requires enterprises to respond quickly and enhance their competitive advantages in a complex competitive environment. It is a kind of strategic competitiveness. Agile organizational form is to form an agile enterprise alliance, which takes the core competitiveness of the enterprise as the basis, uses a quick way to quickly seek the same core competitiveness of resources nationwide and even globally, organizes these resources quickly, forms a certain scale of production and manufacturing chain, from the design of products. The origin of operation mode of agile manufacturing is market demand. The market opportunities and challenges are analyzed. The operation model of agile manufacturing is shown as follows.
1.2 Features
Agile manufacturing is one of the most competitive production modes in this century. Under the background of economic globalization, agile manufacturing can respond quickly and flexibly. It can get the maximum profit with the shortest delivery time and win the market and customers. Agile manufacturing resources can be flexibly organized to form a rapid response to the market. Because the organization of agile manufacturing is flat, the decision-making under this manufacturing mode is rapid and flexible. For external resources, it can be linked together with effective information technology, make full use of network resources for rapid and effective transmission of information, can speed up the dynamic change of resource cooperation. Quality control is only controlled by advanced technology to ensure the high quality of vehicles. Agile manufacturing needs to combine excellent resources from all over the world to cooperate in production and manufacturing. Therefore, the production information exchange and production and operation between cooperative enterprises need to have a certain relationship. Therefore, the enterprise must be a development structure, which can allow more excellent resources to join.

2. Principles and process of information coding system design

2.1 Principles
Scientific information classification coding is becoming more and more important in all walks of life. With the emergence of agile manufacturing, enterprises are no longer confined to internal integration, but must be integrated with external to achieve information sharing. Under the new manufacturing mode, the product is developed in the environment of remote design and manufacturing. Therefore, the design of enterprise information classification and coding system should start from each link of code application in the enterprise, considering both the current situation of the enterprise and the development of the enterprise. Because the classification and coding of information is a difficult, complex and long-term work, it may take years or even longer to establish a scientific and perfect coding system. Therefore, the top-level planning should be done well before the implementation of information classification and coding system, and the formulation of standards should be organized from a global and long-term perspective. The main reason for the distortion of information is that the definition and expression of information are not standardized and inaccurate. Therefore, it is necessary to standardize all kinds of basic data and information in various original documents, reports and other information carriers from the system and process, and formulate enterprise standards, and publish and implement them in enterprises. Standardize the application process of the coding system by supporting the software. We should design a coding system that is compatible with the characteristics of enterprises, and do not copy the coding schemes of other enterprises.

2.2 Process
It is necessary for the relevant personnel of the design, manufacture, procurement and even the cooperative manufacturer to exchange information with each other in a timely manner. At the same time,
in the concurrent engineering environment of mold development, it is also necessary to share information and data and resources among the various departments of design and manufacture to overcome various problems caused by geographical and organizational factors. The analysis and design of enterprise information classification and coding system can be carried out according to the following steps by tracking and implementing the information classification and coding system projects of many enterprises.

3. Requirement analysis of information coding system design under the concept of agile manufacturing

The information coding system based on agile manufacturing should not only adhere to the basic design principles of information code such as uniqueness, stability, extensibility, applicability and operability, but also have the following characteristics: high flexibility of the system. Coding rules are set entirely by the user-defined, and according to different circumstances, the total number of three-element code segments, each bit, each code value can be modified to form a complete, hierarchical clear rule structure to face the changing products and processes. The structural reconfigurability of the system. In the process of system operation, the system function modules can be expanded and redeveloped according to the changes of environment and the needs of customers, and the system structure can be changed rapidly by constantly updating and adding new information. The system should be designed based on modular principle, and only modular design can meet the requirements of rapid reconfiguration of the system. Agile enterprises are dynamic alliances based on market conditions and their respective advantages. Agile enterprises are the integration of people, processes and technologies in different regions. Agile manufacturing emphasizes a flexible mode of production organization. Information coding system is required to operate across regions to ensure the overall operation of the enterprise.

4. Design of information coding system in agile manufacturing environment

4.1 Code generation module

Code generation includes auxiliary encoding and auditing code. This module encodes the specific information object according to the defined coding rules and initialization contents. During the coding process, the system will judge whether the information object is coded repeatedly, and automatically
generate the code according to the coding rules. At the same time, it can strictly guarantee the uniqueness of the code. In addition, the generated code can also be audited to ensure the generation. The correctness of the code can be corrected by error code. According to the change of information object state in agile manufacturing process, information code can be frozen and thawed. Applying for encoding is a process of generating unique encoding according to the rules of the defined encoding object and the user’s choice. Application coding function is the most basic function and core function of the whole system.

4.2 Code query module
Code generation includes auxiliary encoding and auditing code. This module encodes the specific information object according to the defined coding rules and initialization contents. During the coding process, the system will judge whether the information object is coded repeatedly, and automatically generate the code according to the coding rules. At the same time, it can strictly guarantee the uniqueness of the code. In addition, the generated code can also be audited to ensure the generation. The correctness of the code can be corrected by error code. According to the change of information object state in agile manufacturing process, information code can be frozen and thawed. Applying for encoding is a process of generating unique encoding according to the rules of the defined encoding object and the user's choice.

4.3 User management module
User management module is mainly used to manage users of the system, including adding users, deleting users, modifying passwords, resetting passwords and mapping roles for users. In this system, the mapping relationship between users and roles is many-to-one relationship. The role management module is mainly used to manage system roles, including adding, deleting and modifying roles, and assigning permissions to roles. The privilege management module is mainly used to grant roles to access and operation privileges to the system.

5. Conclusion
The main conclusions are as follows: (1) The process of information coding system design include identification of system goals, investigation of company, identification of coded objects, formulation of coding rules, verification, compilation of standard documents and release and implementation. (2) The information coding system in agile manufacturing environment must adhere to the basic design principles and should have the highly flexible function, powerful communication function and remote maintenance function. (3) Design of information coding system in agile manufacturing environment the code generation module, the code query module and the user management module.

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