Enterprise Product Data Management Research

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Abstract. Enterprise-level product data management (EPDM) system should be implemented and applied in modern manufacturing industry. This paper studies the enterprise product data management, and points out the difference of enterprise level PDM and department level PDM is the integration between PDM and ERP(Enterprise Resource Plan). According to the actual development of enterprise level PDM, we puts forward the unified PDM framework system structure. There is a characteristic that the system structure is based on the unified enterprise information resources. In order to realize the integration of PDM and ERP, we puts forward the integrated EBOM and PBOM to integrated two systems. The realization method is adopted in PDM system. The automatic conversion from EBOM to PBOM is realized with the retrieval methods development converter, and the basis for the development of enterprise level PDM is provided.

Introduction

Concurrent Engineering is based on CIMS information integration ,process integration as the core ,emphasizing the work ,the advanced management ideas and advanced automation technologies combine to achieve the integration of the product development process and parallel , simultaneous analysis of the organizational model of concurrent engineering has change and process reengineering ,product life-cycle information model defined ,integrated product development environment set up and so on. It is because of these characteristics, in the implementation process, concurrent engineering of enterprise product information to define, describe, manage and exchange of information made more challenging requirements. As on the analysis of the characteristics of concurrent engineering noted, the implementation of the concurrent engineering must be based on integrated product development environment [1]. The integrated product development environment should have the following characteristics [2, 3] : (1) Support product development organization mode of IPT ;(2) support the product development process definition, realize the reconstruction of the product development process;(3) support product development resources sharing, the team members in the scope can get the relevant data; (4) support the development team members in time between the exchange of information, to ensure that the correct time to correct the information as to the right way to transfer to the right people or machines.

The appearance of the product data management technology, for establishing the integrated product development environment provides technical means. Product data management technology is put forward in recent years that it has a new manufacturing mode concept, it products and relevant data together with the process integration in unified management, for engineering technicians to provide a collaborative work environment, guarantee product data in its life cycle, the latest and consistent security, become the concurrent engineering can make tools [4,5]. As the information integration PDM framework, it can product design, analysis, manufacture, process planning and quality management information integrated unified management, enterprise information integration in the role of a bridge. Through the above analysis, establish a business information system is to realize the enterprise the basis of PDM system; this paper puts forward the enterprises information coding system in order to realize the unity of the enterprise information resources for the development of an enterprise PDM provide premise.

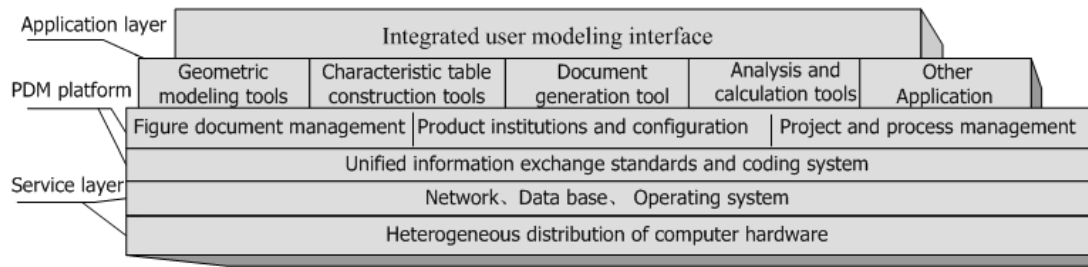## Enterprise level PDM system structure design

Fig.1 PDM system structure model

Based on the PDM integrated system is characterized by network technology, database technology for support framework of the form, the system of the hierarchical structure model building as shown in figure 1 shows, that from the graph, the system structure model has three layers: (1) Application level to the different applications , different tasks (such as CAX, DFX , etc.) , this layer is a data generator and receiver , it is packaged or integrated through the interface to the PDM platform, data exchange between the two is mutual; (2) PDM platform is the core of the system; it is the application of the tool integration framework and object management framework, using the Object Browser (objectBrowser) to achieve a variety of models (such as process models, product structure model, personnel, resources, etc.) of the uniform management; (3) Services mainly for the above two layers of support, database mainly to the Meta-Data for the management, and network for the main frame of the B/S or C/S structure provide support.

The functions of the system of PDM were classified into the following four modules:(1) Unified enterprise information code system: to achieve an enterprise PDM necessary to build in a unified the enterprises above a resource, and to realize the effective management of the resource pool, a face of complete information enterprise code system is essential; (2) Figure document management; (3) The product structure and configuration management; (4) Project and process management.

Enterprise unified information coding system design

Enterprise have their own characteristic in the production scale, product characteristic, production type, etcs, therefore, the enterprise information code design that is to consider the enterprise of the present situation of the development of the enterprise and to attend to the needs of the information code, but the design and build the enterprises information the principle of coding system is consistent, it includes the following aspects:(1) The enterprise according to the whole determine the encoding rules. Each of the production of the enterprise business all have their own characteristics, in making the encoding rules of the enterprise, the enterprise from the actual conditions of, make sure the enterprise coding rules. (2) The enterprises information code should be the same code structure, so as to realize the form of coding is unified. (3) Involves multiple production information, must use the same coding rules to ensure that information coding meaning no two righteousness. (4) Code design should give full consideration to the country, industry and international standard, in order to improve the standardization level.

Enterprise unified information coding system design. Enterprise, most of the information resources, including: products, components and parts, equipment, tooling, standard, raw materials, technical documents etc can all the classification, and can work out unified classification standards to achieve the same types of classification, realize the same resources of the classification has subordinate relationship, which constitute the classification tree structure, this kind of structure is the advantage of large information content can be inclusive. For the same information resources, through the classified according to the combination of subordinate relations of the generation of code called classification code, classification code only reflect the kind of object, to mark a particular object, consider the classification code behind plus a yard called identification code, to identify specific object. Logo design of code two options: (1) Mark the uniqueness of the same classification code only under the code, that is, mark code has subordinate relations; (2) Identification code in the information resources in the code is the only.
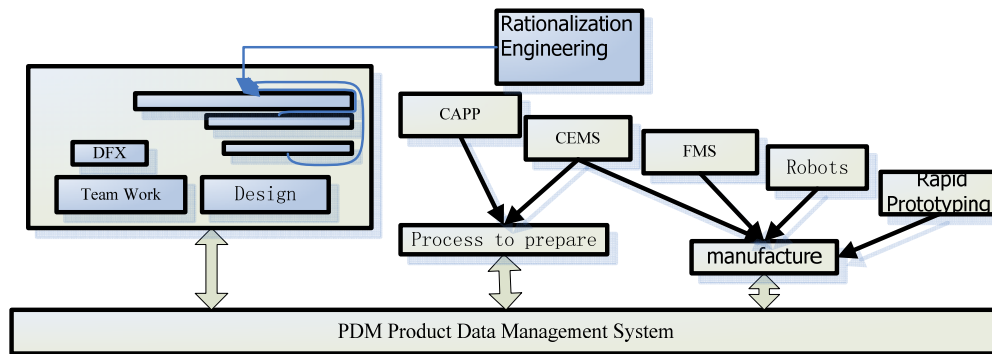
Fig.2 PDM and concurrent engineering

PDM and ERP integration

The enterprise to the division of PDM system can be roughly divided into two classes: departmental PDM and enterprise PDM. Data suggest that this division are fuzzy no clear standards, is according to the application of PDM system in the enterprise range division, at present the enterprise in concurrent engineering application also often limited to design field, so the integration of concurrent engineering support the use of PDM framework mostly on the limited to design or technology department, and with the requirements of the market for the improvement of the enterprise, the implementation of the concurrent engineering range from design field will extend to the manufacturing process, so as to support the concurrent engineering integration framework PDM system will also cover the whole of the product development process. As shown in Fig.2. In the manufacturing sector, ERP system played a role in the management of the production resources, PDM to support the product development process, must information communication with ERP.

Through the above analysis, this article from the point of view of global information integration enterprise, and puts forward the sign of an enterprise PDM; Enterprise sign of PDM and manufacturing performance in ERP system integrators, through with ERP integration, PDM system can very good management from product design to manufacturing the entire process, become true enterprise-level PDM. Examine the main output information PDM system is one of EBOM (Engineering BOM), its reflection in the design of the product structure is. Through the above analysis is not difficult to find, PDM system output information and ERP system input information in the form of thought, but they reflect a common object a product structure. PDM and ERP information transmission relationships see Fig. 3, PDM system output information EBOM through into PBOM become ERP system information source, therefore, based on the PDM system and the integration of the ERP system, the author put forward through to the core of the product, the product structure realize the integration of the two systems.
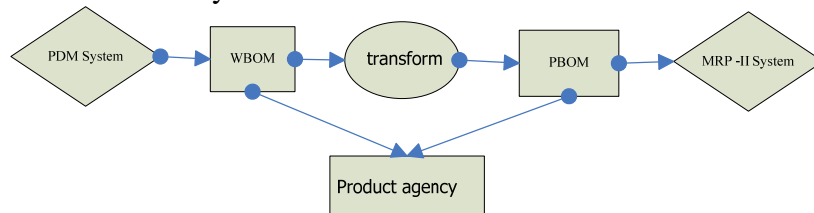

Fig.3 PDM and ERP information transmission relationships

The integrated method has the following characteristics: (1) caught PDM system and ERP system common core part of our--product structure; (2) between the two systems to simplify the integration of difficulty, to an enterprise PDM development may bring. Different enterprise product BOM content although each different, but they are in the expression on roughly the same; all is the small regulating the use of the great tree structure. EBOM investigation and PBOM content have a lot in common, but because the two BOM from different departments, and application scope is different also, EBOM complete reflects the structure of products, specific to each parts products. PBOM used in production department, it's more of the assembly structure reflects products. Due to production way should not easily, such as self-control, outsourcing, outsourcing, EBOM in some of the

components in the PBOM may not appear, and along with the change of production, PBOM content often occur accordingly, as time passes, both hard to realize communication. In this paper, we consider two BOM in form no significant rules; put forward a kind of retrieval model transformation method, as shown in Fig.4.
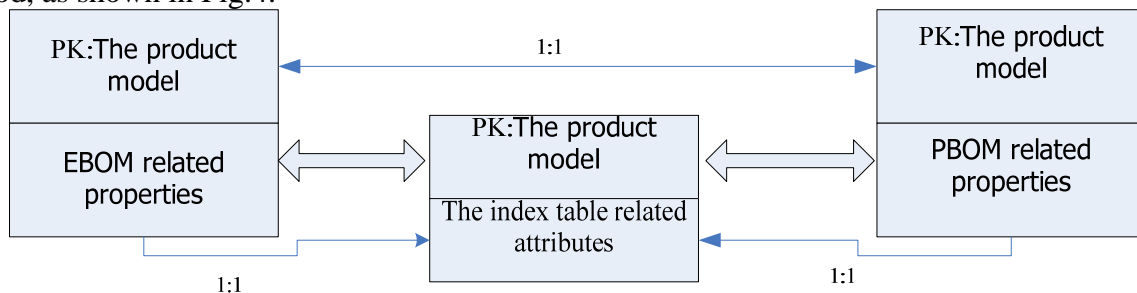

Fig.4 EBOM, PBOM and index of the relationship between the tables

The above transformation relationship in the operating characteristics have the following two points: (1) EBOM through the index table can automatic generate PBOM, and also ran; (2) EBOM and PBOM changes in the index will do in the table relevant record.

The survey found, the enterprise to EBOM to PBOM transformation most used artificial way, and not making changes recorded retained. With the increasing of the number PBOM change, the relationship between the two BOM readings very difficult, the serious influence between the enterprise information communications. In this paper, the design of the transformation of the retrieval model method not only solved the above problems, and simple, reliable, not only in PDM and ERP on the integration of made the crucial step, and has a good application value.

Summaries

This paper discusses the requirements of product data management as integration framework in the concurrent engineering implementing and puts forward the difference of enterprise level PDM and department level PDM is the integration between PDM and ERP. According to the actual development of enterprise level PDM, it puts forward the unified PDM framework system structure. There is a characteristic that the system structure is based on the unified enterprise information resources. The combining way by using classification code and identification code sets up enterprise unified information coding system. The coding system has advantages such as it has more information and convenient query, etc. In order to realize the integration of PDM and ERP, it puts forward the integrated EBOM and PBOM to integrated two systems. The realization method is adopted in PDM system. Through the retrieval methods development converter has realized automatic conversion from EBOM to PBOM, so as to provide the basis for the development of enterprise-wide PDM.

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