

Developing reusable components database system for Special vehicles

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Abstract. The research on the database development of the reusable parts of special vehicles is particularly important for shortening the design cycle and accelerating the development of the product. This paper takes the reuse parts database development as the research background, adopts organization and management platform of PDM, combines product design resources' result process and result information, applies knowledge based management system to reuse the design resource unit in the design resources library organization and management, effectively establishes the mechanism of management of the design resource, and finally maximizes the reuse of design resources, reduces the design cycle and development costs obviously.

1. Introduction

Reuse parts database is mainly used to solve the problem the selection of overall design process, general arrangement, performance simulation calculation stage, and component parts of the second design reference about heavy vehicles to facilitate the overall designer for design calculation [1].

Database system of the reusable parts adopts organization and management platform of PDM, combines product design resources' result process and result information, applies knowledge based management system to reuse the design resource unit in the design resources library organization and management, and ultimately provides services for reuse [2]. Design resources are the design results of the product design process, the decision process and the knowledge about making the decision. The purpose of reusable database system development is to effectively establish the mechanism of management of the design resource, maximize the reuse of design resources, and finally reduce the design cycle and development costs obviously [3].

This paper takes the reusable component database of special vehicles as the research background, and establishes the reusable model of the product design through the research of the reusable mechanism of the product design resources. On the basis of the model, the management technology of the product design resource storehouse is studied, and a reusable design platform is designed and developed.

2. Architecture design of reusable component system

The reusable system is the classification management of existing models, components, parts model, file and the attributes to supply reference to the design personnel in the modification design and the new design.

A summary of the design framework of the reusable component library is described as follows:

(1) The reusable parts can be storage according to classification tree structure and the structure can be modified dynamically, and the designer can browse the reusable parts through the structure tree;

(2) Each reusable piece of data structure can be changed, and parameters items can be increased, expanded and deleted;

(3) provide the function of search function, and information can be searched through various simple conditions and combination conditions [4];

(4) The model and attribute data of reusable parts can be controlled through privilege management mechanism to guarantee the accuracy and the tightness of data;

(5) The reusable component library has data import and export function, and can be used to export the relevant data into Excel or XML format, or import data into these formats [5].

According to the design framework of reusable parts database, this paper can build the reusable pieces management function module and show as Fig.1.

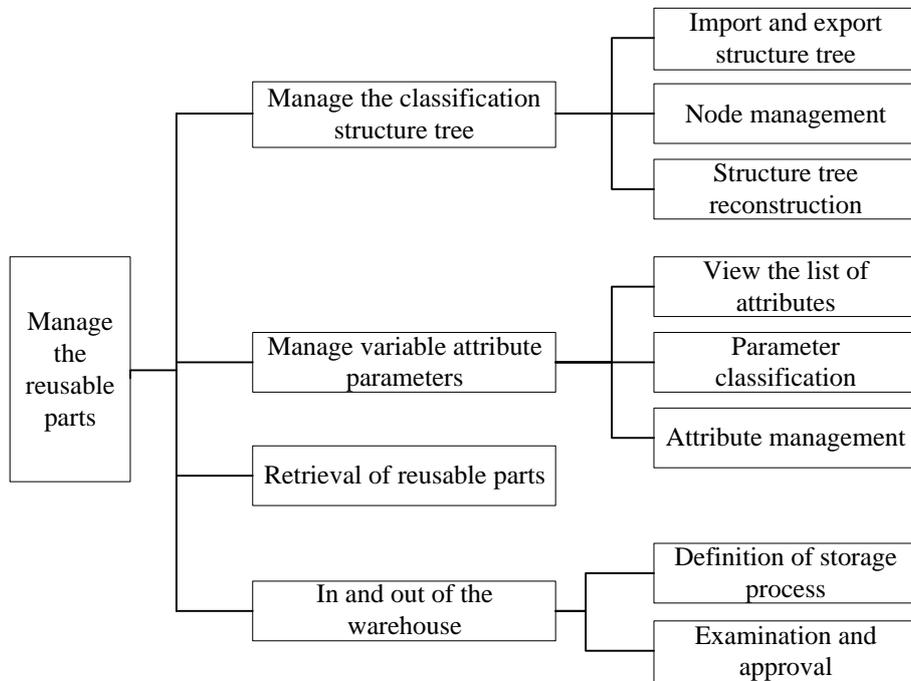


Fig.1 Management function module of reusable component

3. The correctness and security of reusable pieces of data

The correctness of reusable component data in this system is mainly guaranteed by the two process of releasing reusable information, as shown in Fig2.

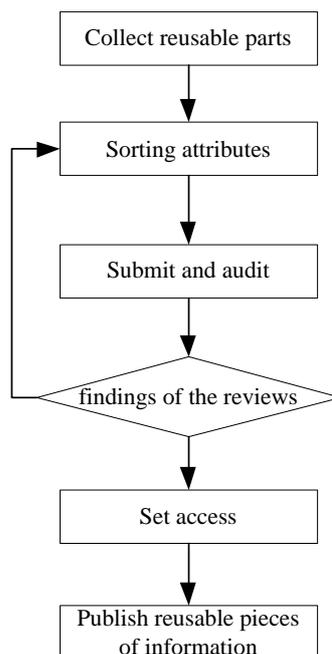


Fig.2 Process of reusable components storage

On one hand, collect already stereotypes type, components, parts and other reusable parts, collate and verify the reusable parts of the model, data, parameters and other information; on the other hand, auditors need to audit the correctness of the data. The security of reusable parts is mainly through the establishment of a privilege control mechanism, and set up the permissions and download permissions of the reusable parts for different persons.

4. Development and implementation of reusable component system

Reusable parts library mainly has five functions, the organization structure, reusable attribute management, reusable pieces management, approval management and reusable search. Designers can not only rebuild a reusable library, but also upload and edit the data in the project

4.1 Implementation of organization structure.

The organization tree can project the structure and the structure of the project so that the structure can be clearly added to the project, as shown in Fig.3.

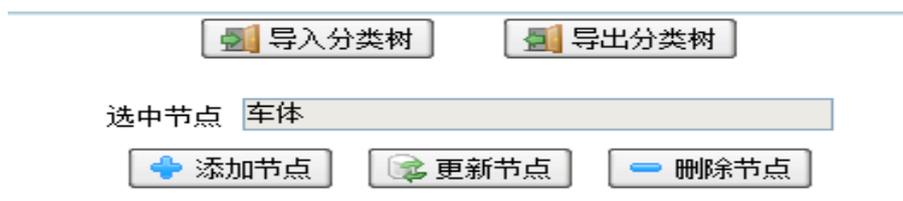


Fig.3

4.2 Implementation of reusable attribute management.

Reusable attribute contains names, classes, units, types, and priorities, and the type includes parameters, text and file of these types, as shown in Fig 4.

名称	<input type="text" value="车宽"/>	类别	<input type="text" value="基本属性"/>
度量单位	<input type="text" value="米"/>	类型	<input type="text" value="参数"/>
优先级	<input type="text" value="1"/>		
<input type="button" value="增加"/>		<input type="button" value="保存"/>	

Fig.4

4.3 Implementation of reusable pieces management.

The reusable management means that the user can import the export data in batches, and edit, view, delete and download the data, as shown in Fig 5.

选中节点 <input type="text" value="车体"/>		<input type="button" value="新增"/>	<input type="button" value="导入"/>	<input type="button" value="导出"/>	
<input type="checkbox"/> 名称	版本	创建日期	创建人	状态	操作
<input type="checkbox"/> 车	3.0	2015-04-15	管理员	待审批	查看 更新
<input type="checkbox"/> 车	2.0	2015-04-15	管理员	待审批	查看 更新

Fig.5

4.4 Implementation of approval management.

People who have the right to approve the data for reusable components, and decide whether the data is scientific, true and valid, as shown in Fig 6.

可重用件入库审批					
待审批 未通过 回收站					
名称	版本	创建日期	创建人	状态	操作
车	4.0	2015-04-15	管理员	待审批	查看
车	3.0	2015-04-15	管理员	待审批	查看
车	2.0	2015-04-15	管理员	待审批	查看
车	1.0	2015-03-21	管理员	待审批	查看

Fig.6

4.5 Implementation of reusable search.

Query of reusable components is a commonly used feature, including direct search results in search, advanced retrieval and export results in four parts, as shown in Fig 7.

可重用件查询					
<input type="text" value="车"/> <input type="button" value="搜索"/> <input type="button" value="结果中搜索"/> <input type="button" value="高级搜索"/> <input type="button" value="导出结果"/>					
名称	版本	创建日期	创建人	操作	
车	5.0	2015-04-15	管理员	查看	

Fig.7

5. The correctness and security of reusable pieces of data

This paper takes the reusable component database of special vehicles as the research background, adopts organization and management platform of PDM, combines product design resources' result process and result information, applies knowledge based management system to reuse the design resource unit in the design resources library organization and management, effectively establishes the mechanism of management of the design resource and ultimately provides services for reuse. Herein we also studies the design platform of reusable parts for special vehicles. Through this platform, designers can effectively establish management of these design resources to assist design, in order to shorten the project period and reduce the development costs of the purpose.

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