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NEW GUIDELINES IN CREATING PLM AND PDM SOFTWARE

Nedžad Repčić
Faculty of Mechanical Engineering
Sarajevo
Bosnia and Herzegovina

Vahid Avdić
Faculty of Mechanical Engineering
Sarajevo
Bosnia and Herzegovina

Nedim Pervan
Faculty of Mechanical Engineering
Sarajevo
Bosnia and Herzegovina

ABSTRACT
Operational experience in development of new products, over the past ten years have shown a increased need for new PLM (Product Lifecycle Management) and PDM (Product Data Management) software. New product design and steadily growing structure complexity in industrial environment (especially in automotive and aerospace industry) lead to new requirements in basic PDM architecture. Regard to constantly new product requirements, the PDM architecture is constantly changing to achieve optimum outcomes in the product design process.
In this paper we expose our approach to give some specific guidelines in creating a own PDM software database for some cases in the automotive industry. On the other hand whilst major CAD companys have perceived the permanently need for new PDM software we try to give a cutaway of the instantaneous market situation for PDM software (Windchill PDMLink, Enovia Solutions, Streamline etc.). Simultaneous solution (basic sketch) for solving the needs of constantly changing design requirements is given with a own developed software which combines the general PDM modules with the specific requests of a product. In this case a brake disc was choosen, represented in the CATIA V5 software followed by a PLM analyse trough the own developed (basic sketch) PDM software.
Keywords: Product Lifecycle Management, Product Database Management, software, CATIA

1. INTRODUCTION

Past two decades of general product development in the industry sector have shown an increased need for a overlooking data management system. To match this requirement a concept was launched under the acronym PLM (*Product Lifecycle Management*) which includes the entire lifecycle of a product from its initial concept, trough design and manufacture, to exploitation and disposal. The main task of a PLM system would be to create a central system for managing all information around the product and technologies used to create it. However, till today PLM systems are more a philosophy of economical business but a excact information system. The software technology is not so important as business strategy is. In order to approximately achieve PLM requirements at the engineering department level a network is created, allowing access to a wide range of users that participate in the design, production, exploitation or disposal of a product, called PDM (*Product Data Management*). Most contemporary PLM software solutions are still at the PDM level but with everyday improvement they are approaching the initial idea of a PLM system. This paper should give some new routes how the future PDM architecture will look like, using a own developed, basic sketch, open source software.

The attempt is to reflect modern requirements, expose contemporary software solutions and propose new suggestions in creating PDM software.

2. PHASES OF PRODUCT LIFECYCLE AND CORRESPONDING TECHNOLOGIES

If there is a capability to basicly describe what PLM is, then the authors will use following description: **Conceive – Design – Realize – Service**. With this four terms the product can be fully described, from the initial imagination, planning, innovation trough out the design process of developing, testing, and realization in form of manufacturing to it`s final service enter, maintain and final disposal. All these phases are Product Lifecycle Management. None of the above given phases can be seen isolated one from each other. There must be a data coordination and management, which includes planning project resources, configuration product resources etc. For these tasks graphical, text and metadata such as product bills of materials needs to be managed. The domain of this, at the engineering level, is PDM (Product Data Management). Considering that this paper agitates PLM trough out the engineering sector, the main corresponding technology of a PLM would be CAD (Computer Aided Design). In this paper we were trying to overview this aspect of PLM called PDM which mostly looks at the product from the engineering side of viewpoint.

2.1. Integration of PDM and CAD systems

To acquire fully PDM capabilities, a software solution needs to incorporate integrated CAD sub functions. These subfunctions implicate data integration such as user environment integration. Data integration implys: manual data input, data exchange via file management, specific databases with realtime data input update, database sharing. Simultaneously user environment integration includes that a PDM software is in charge of running a CAD software and connecting CAD files. Meanwhile the user interface has to be totally integrated.

Based on the former exposure PDM systems can be divided into following categories:

Closed – PDM systems have very low integration rate with other applications. There is no data exchange between PDM base and other applications but it is possible to search, run and save CAD files into the PDM base (this type was chosen for the exposed example).

Opposite – PDM system is exchanging data with the CAD system, without user intervention. Thereat the PDM system is integrated into the CAD software.

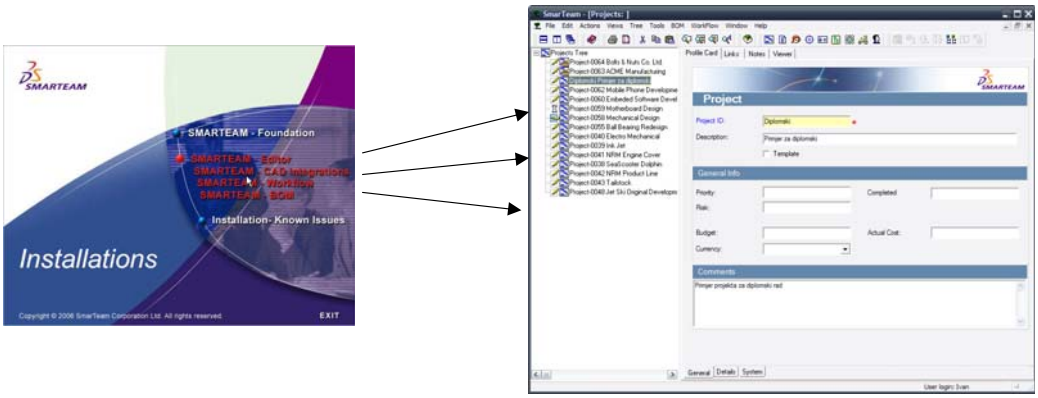

Figure 1. User interface of the SmarTeam (Dassault Systems) editor

Totally **integrated** PDM systems are fully incorporate into the CAD system, meaning that all its procedures and functions are available into the CAD software. **Hybrid** PDM systems incorporate fully into the "own" CAD software, whereat for other CAD systems one of the mentioned solutions is used. Last two mentioned, require a high level of programming skills and are most common in use such as, in 2008 launched, Dassault Systems PDM system called SmarTeam. Figure No. 1 shows a preview of such example.

3. BASIC SKETCH MODEL

In order to better understand basic PDM requirements a own basic sketch model software called BPDM (Basic PDM) was developed. BPDM is a closed type of PDM system which means there is no information flow between the PDM database and other CAD systems but it is possible to search, save and run CAD files into the PDM kernel. For experimental purposes a product from the automotive industry (brake disk) was designed in the CATIA V5 software, afterwards all available product information were distributed depending to the information tree algorithm (Figure No.2).

This algorithm provides all relevant product information which refer to the product, in this case the brake disc. The homepage is divided into three main sections intended for the customer, manufacturer and associates. The comprehensive administrator for the system would be the customer who has access to all relevant data product documentation. Right beneath the customer is the manufacturer who can see only those data which relate to him as the manufacturer, while the associates have the permission to see just a little part of the whole product docu in which he is interested. At the same time, an internal link connects the system with the web to make it more look like a "open" type of PDM system.

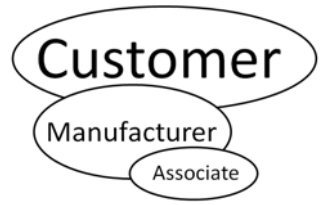

Figure 2. Information tree Algorithm

3.1. Graphical description

To ensure a higher operative functionality of the system an attempt was made to connect parts of the documents with extern files that describe the product more complete. In order to expand this concept of connecting with extern files to a higher level, an internal link was added which connects the system to the web if a connection is possible.

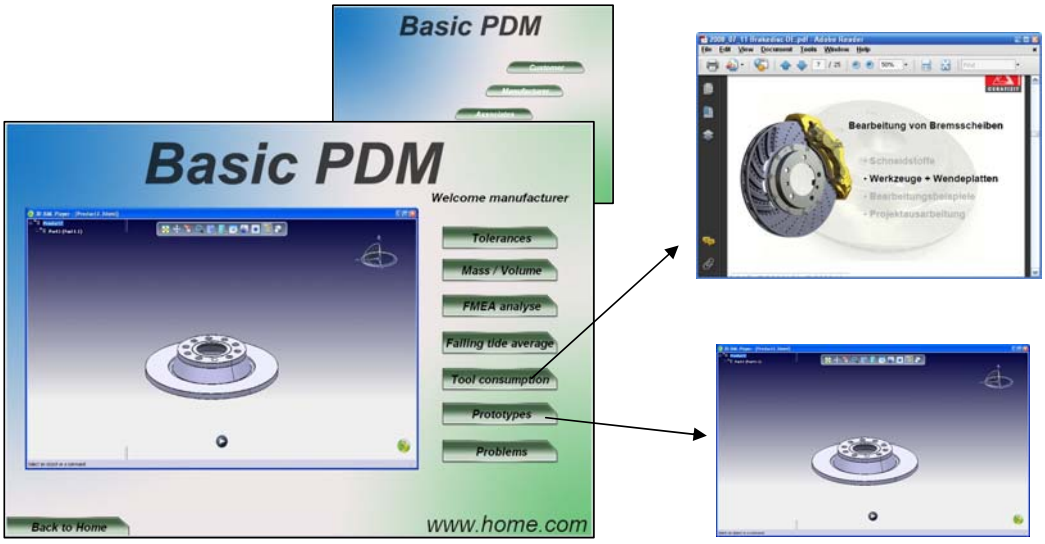

Figure 3. BPDM initial user interface Outlook

According to the access licence the user is able to view a wide range of product data which directly refers to the product at engineering level. Special modules are anticipated such prototypes, tolerances, mass / volume, FMEA analyses, tool consumption that was made in order to manufacture the part and more. These are just a few options, if needed the algorithm tree can be expanded but this operation isn`t predicted for the enduser.

4. DISCUSSION AND CONCLUSION

The main objective of this paper was to give a main direction in which PLM software development will go, point out the prime guidance, and give a example with a own basic sketch software model. Yet the developed program is at a very low level of integration rate with other applications, data exchange and generally on a low programming level, it indicates all future PLM tasks. The main focus was, to make it a web based application. Following the in 2008 launched new PLM concept by Dassault Systemes, known as PLM 2.0 the main objectives of a future PLM system would be:

- It should be *web - based*
- It should focus on a web communication between different user. That means, a kind of internet community would be established
- It expands out of the range of the company which uses them
- It should be able to run system procedures over the internet

According to this new concept, PLM systems as a business philosophy are approaching to the initial idea of PLM. Future PLM solutions should not be seen as a single software product but a collection of software tools and working methods integrated together to address either single stages of the lifecycle or connect different tasks or manage the whole process. It is to believe that other leading manufacturers of PLM systems such as PTC, Siemens PLM software, Agile Software Corporation will follow this guide. However, at this stage of development there is no PLM/PDM software which is able to fully cover all areas that PLM assume.

6. REFERENCES

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