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O. A. SUKHANOVA

ANALYSIS OF THERMAL PROCESSES AND STRESSES DURING FIBER COMPOSITES PRESSING

The technique of fibrous composites formation finite element modeling was proposed. It was obtained the distribution of temperature through the thickness of the billet during the transmission friction lining formation. The analysis of the stress-strain state of the detail under compressive loads was also performed.

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PLM SYSTEMS, THEIR HISTORY AND APPLICATION TODAY IN BUSINESS PROCESS MODELING

The paper deals with product lifecycle management (PLM) systems, their historical development, the first beginnings that were formed easier to databases and archives data, through combining different systems into product data management (PDM) systems to the creation of a comprehensive PLM as we know it in the present form. It also shows on the functioning of PLM systems in currently and discusses some of the providers in the business field in the modeling manufacturing processes. In conclusion, a simple simulation of inter area traffic on automated workplace is shown. This simulation is created using Plant Simulation module from the system set of Tecnomatix products, which is the provider of Siemens PLM Software. This system portfolio and its modules span the completely entire area of PLM and data management in this area.

Introduction. First hints of the need to manage data and information on the product occurred in 80th of the 20 Century, when it CAD systems began deploying. This fact allowed to increase productivity and to reduce costs in production processes. At the same time, but problems arose with the report's data. For this need there were established the so-called PDM systems used for data management. So, the link between the individual components in organizations appeared. And connected the projection sections with the administrative part of the company, which deal with involved in management, information and data. The level of these systems depends on the speed and capacity of firms to introduce new products to market.

Cross-section of the PLM functioning history. The first engineering database for information and data management was created in 80th years of the 20th century. Eventually, it was the fact that the only information management and information technology is not sufficient.

Initial philosophy is extended to support the integration of processes and objectives and created PDM systems. It required an integration platform containing all necessary information about the product development process. This included CAD systems, office programs and instruments NC. The process of data development and the created products design is shown in Figure 1.

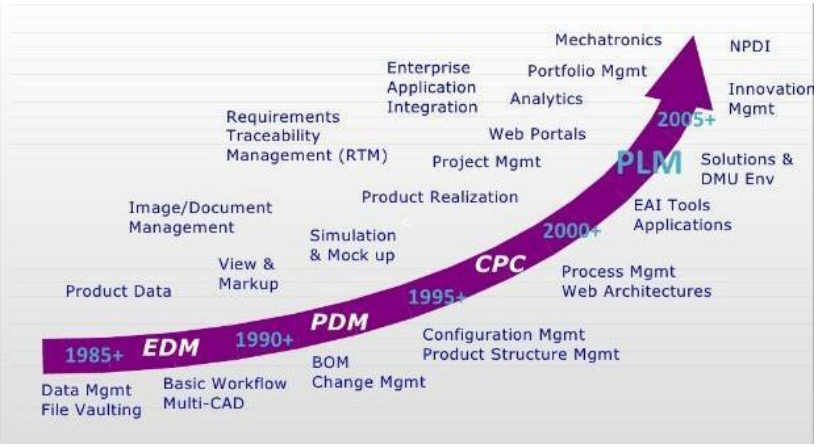

Figure 1 – Historical development PLM system

The next stage in the evolution of these systems is to extend the management of all phases of the product life cycle and the human factor, thus a comprehensive PLM system (Figure 2).

The main objective of PLM is:

– increase revenue,

– reduce costs,

– maximizing the value of the product portfolio,

– maximizing the value of existing and future products to customers and shareholders.

Providers of PLM systems and appropriate products for manufacturing systems modeling. A great number of solution providers for the whole area of PLM is on the market nowadays. Among the most important ones the Dassault Systems should be mentioned due to providing solutions in the form of 3D PLM. This product focuses on the concrete industry, its needs and specifications. The purpose of these products is the implementation of new or innovative products in the shortest possible time, with high quality and low cost.

Figure 2 – The basic components of PLM

The principal products of Dassault Systemes 3D PLM integrated in the industry are:

– DS CATIA: design of 3D virtual prototype, a comprehensive solution for 3D design and product innovation with an integrated environment for modeling parts, creating assemblies and generate drawings, analysis and simulation. It promotes teamwork and communication among all proposal participants.

– DS ENOVIA: data management and product lifecycle management, integrates all the disciplines and participants in 3D definition and implementation of an innovative product.

– DS DELMIA: solutions for digital manufacturing and production which allow producers regardless of industry virtually define, plan, create, monitor and control production processes.

– DS SIMULIA: realistic simulation to ensure the required performance and quality products.

– DS 3DVIA: Cooperation and communication of 3D data for future product.

– DS DraftSight: free, professional product for 2D CAD, based on an open business module.

Another major supplier of PLM solutions is Siemens PLM. This company provides the widest and the most complete product portfolio of solutions for the product information creation and management throughout its lifecycle. Currently, their products are used by most major companies in the automotive, aerospace and general engineering, and the number of users increases. The product of Tecnomatix includes a comprehensive product lifecycle management, which is considered in individual modules of the system (Figure 3).

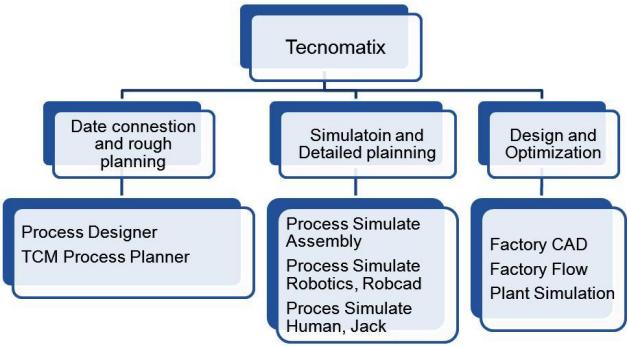

Figure 3 – Tecnomatix modules

These modules help to design the product lifecycle management including components and products, modeling manufactoring procedures and creating complex simulation of manufacturing processes. Figure 4 shows a simple wagon traffic simulation between different objects in the manufacturing process. Wagons move along a specified route between different objects in the production process. Then they stop at roller conveyors, where robots perform loading and unloading in the locations of pallets with cargo, to each machine.

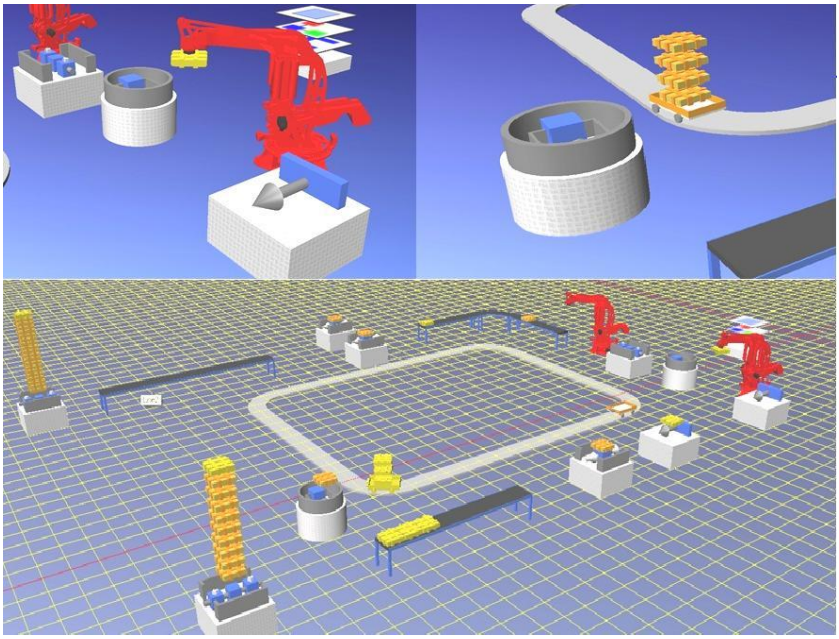

Figure 4 – Right inter area in the manufacturing process

These and many other products of other providers currently manage the life cycle of products in many societies, whether in engineering, aerospace, pharmaceutical, food and many other industries.

Conclusion. PLM systems are now an important element in the management of production and its modeling especially in the development of new and innovative products. From a historical perspective, we see that these systems evolved until today's advanced form. Therefore, nowadays they bring companies to their benefit, increase their productivity and reduce costs. Therefore their application extends the number of sectors in the production of various kinds of products. More and more applications are found, not only for large manufacturing enterprises, but also in smaller companies producing large portfolio of products.

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PLM-СИСТЕМЫ, ИХ ИСТОРИЯ И ПРИМЕНЕНИЕ ДЛЯ МОДЕЛИРОВАНИЯ СОВРЕМЕННЫХ ПРОИЗВОДСТВЕННЫХ ПРОЦЕССОВ

В статье рассматриваются системы управления жизненным циклом изделия (PLM), их историческое развитие, которое началось с формирования баз данных и архивов, через объединение различных подсистем в системы управления данными об изделии (PDM) и далее к созданию комплексных PLM-систем в их нынешнем виде. Показывается, как функционируют PLM-системы в настоящее время и обсуждаются некоторые подходы организации рабочего пространства при моделировании производственных процессов. В заключение показан простой пример моделирования транспортирования на автоматизированном рабочем месте, который выполнен с использованием модуля Plant Simulation программной системы Tecnomatix, производимой фирмой Siemens PLM Software. Названная система и ее модули охватывают всю область PLM и управления данными в этой области.

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МОДЕРНИЗАЦИЯ СЛУЖЕБНОЙ АВТОМОТРИСЫ АС-4

Рассматривается вариант модернизации автомотрисы служебной АС-4, который связан с заменой двигателя ЯМЗ-240Д на обладающий меньшей мощностью ЯМЗ-238-Б14. Выполнен анализ тяговых характеристик модернизированного транспортного средства и предложена конструкция устанавливаемых под двигатель резинометаллических амортизаторов с регулируемыми техническими характеристиками.

На предприятиях железнодорожного транспорта Республики Беларусь находит применение целый ряд пассажирских дрезин (АС-1А, АСГ, АГСП) и служебных автомотрис (АС-4), предназначенных для доставки монтеров пути и инструмента к месту работ механизированных комплексов, работающих по вахтенному методу, а также для поездок при комисионных осмотрах пути и выполнении хозяйственных работ.

Автомотриса служебная АС-4 (рисунок 1) представляет собой двухосную самоходную единицу. Двухкабинный кузов автомотрисы приварен к раме, на которую установлены: силовая установка, ударно-тяговые приборы, ящики для аккумуляторной батареи и сварочного трансформатора, подвешены топливные баки [1]. Многие такие автомотрисы выработали свой срок по-