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Review of Product Lifecycle Management Tools Used in Manufacturing Industry

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Abstract. Nowadays, the growing complex business environment and complexity of the product,large number of product typescompanies are beginning to focus more and more on the three individual productivity application, productivity and IT productivity these three factors must be balanced and optimized at moderate cost.This is particularly challenging for small medium and large size companies. This study provides an overview of the most important PLM technology concepts and demonstrates concepts by explaining the design and implementation of industry-developed PLM tools and dynamic PLM service is the solution to that demand manufacturing companies. The purpose of this study is to improve the industrial production process through the PLM tools.
Keywords: Product Lifecycle Management (PLM), Manufacturing Execution Systems (MES), Manufacturing Process Planner, T4S, Active Workplace Client (AWC).

1. Introduction

Short product life cycles, growing product complexity and the need for a large number of product types have made Product Life Cycle Management (PLM) very important for many manufacturing companies. Product lifecycle management is the business activity of managing, in the most effective way, a company's products and the entire lifecycle of a product from its conception, through design, manufacture, to service, and ultimate disposal. PLM integrates people, data, processes, and business systems and provides a product information backbone for companies and their extended enterprise. PLM is the management system for a company's products. Using PLM tools can map business process of company. This study provides an overview of the most important PLM technology concepts and demonstrates concepts by explaining the design and implementation of industry-developed PLM tools. The purpose of this study is to improve the industrial production process through the PLM tools. [4, 5, 6]

2. Product Lifecycle Management (PLM)

Product lifecycle management (PLM) is the process of managing the entire lifecycle of a product from inception, through engineering design and manufacture, to service and disposal of manufactured products. PLM integrates people, data, processes, and business systems and provides a product information backbone for companies and their extended enterprise. [8]

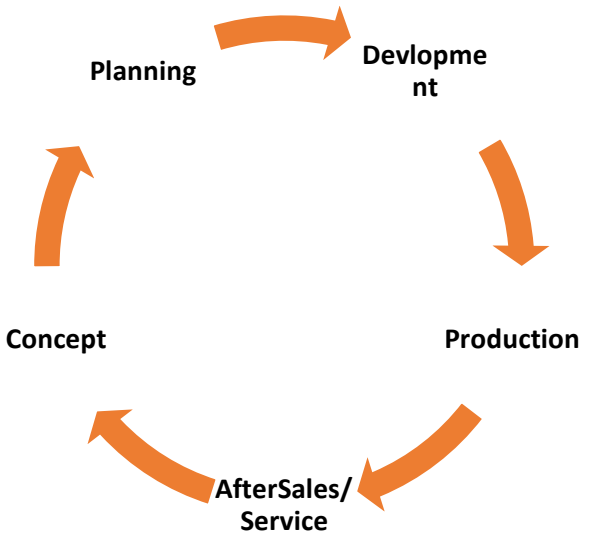

FIGURE 1. Plm Phases

Team center: Team center is a PLM application to manage the engineering data and process such as pat BOM, document, and drawing and change history of product, engineering change and process of review, approval and release.

3. Engineering Change Process

The Engineering change process is the process of requesting, determining, planning, implementing, and evaluating of changes to a system. Its main goals are to support the processing and traceability of changes to an interconnected set of factors

- ✓ **ECR: Engineering change request** can be raise by any user whenever there is need to either introduce new part /material/process or modify the exiting part/material7process in Product.
- ✓ **ECC: Engineering Change object** which carries the solution to implement the change request if change request is accepted for change
- ✓ **ECN: Engineering change notification** which is the notification send to the plant for implement the EC solution in the product

Engineering change process Phases: Identify issue or need. Someone identifies a problem or issue and determines whether it requires a change request then require feasibility study and solution and the appropriate person creates Implement change.

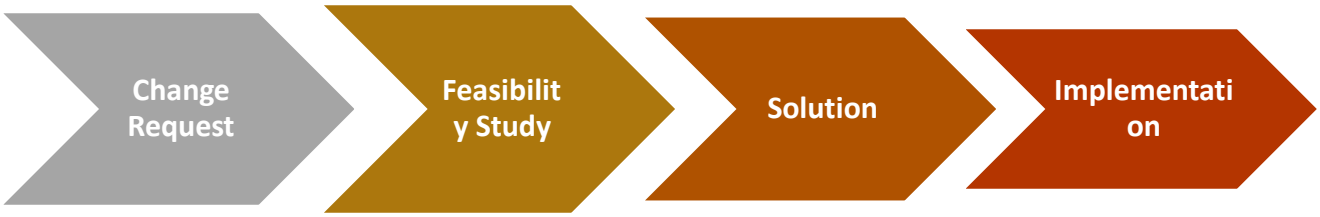

FIGURE 2. Phases in engineering change process

4. Manufacturing Process Planner

Team center Manufacturing Process Planner is aspect of product lifecycle management (PLM) that helps to engineers and allow manufacturers to create and manage manufacturing information while collaborating to align manufacturing plans with product design. These applications provide a close collaboration between engineering, manufacturing, and performance by improving Team center's workflow, change management, Manufacturers can use Team center Manufacturing Process Planner and Easy Plan solutions to measure and re-integrate blending processes across multiple plants, capture store floor work instructions, perform detailed time analysis, production lines, and much more.[Faith PLM]

Functions of manufacturing process planner: The MMP tool helps producers to measure and reuse integration planning across all plants and production lines. Providing close collaboration between engineering and manufacturing, the production process planning software utilizes PLM workflow, management modification, and the power to stop creating and administering a Production Product and process for each product.

Shop floor work instructions**:** Engineers can write electronic work instructions about working under the BOP. Production process editing software integrates text instructions with reference parts, resources, and visual aids, including 3D imagery, to provide store floor staff with precise and clear guidance.

Manage Process Plans: **T**eam center Software's Manufacturing Process Planner and Easy Plan applications provide production engineers with the means to create and maintain a process (BOP) policy. Users can easily create processes and functions within the BOP to represent a sequence of steps in their meeting plans. They can assign appropriate sections and major meetings from MBOM to specific activities, as well as the necessary tools and resources from the Resource Bill (BOE) or through a separate resource library. Changes from product engineering can be easily organized into BOP using self-assessment tools, ensuring that engineering and production are kept consistent.

5. Manufacturing Execution Systems (MES)

Manufacturing Execution Systems (MES) is your system for coordinating and managing and organizing your production operations at plant level. Additional MES information (via pBOM) includes task instructions, routes and other process descriptions required in the implementation phase of the process. Industrial groups such as MESA (Manufacturing Enterprise Solutions Association) International, created in the 1990s, have defined a method that determines the scope of the MES. The most recent model developed in 2008 demonstrates the relationship between business strategy, business, and store floor functionality and job shop scheduling. The last products produced will have different attributes related to the production process. This requires a productive manufacturing (PBOM) bill. PBOM tracks the last thing produced. In all mBOMs, one or more pBOMs can be used to be based on plant, country, production line, work center, or any combination of these. Asset

consumption occurs in MES, and each item used may be different from them, providing details for the digital twin building.[7,13]

6. T4S

The SAP Business Suite (T4S) Team center Gateway supports seamless processes in the fields of Engineering, Production and Production and Portfolio Planning (PPM) by integrating the transfer of business assets into the user's daily business processes. The T4S functional areas SAP material management, document management, BOM management Change management, equipment management, functional location management, routing management, network management, vendor management, purchase info record management.[8,9,10]

7. PL4X Architecture

PL4X integration enables bidirectional data integration and integration process between Team center and SAP The features of the Team center X: Search, find and reuse product information, Open and build a bill of materials (BOM), Initiate and participate in change processes, Manage product-related information, including designs and documents, used in your MCAD or ECAD design tool, using NX

8. Active Workspace client

Today, most users are looking for a web-based solution that can help easily access data, assist in data identification and CAD integration. Active workplace client is integrated with many features to help you access all your data easily and quickly, allowing for smooth interaction The Active Workspace client is the perfect solution as industrial requirement. It is a web-based client. Can get a clear UI for all products and processes with a few clicks and can customize software according to needs. It can be accessed on all computer devices such as computers, laptops, and even smart phones.[12]

Benefits

- ✓ Increase productivity by finding the right information, in the context of the task at hand, faster and easier than ever before
- ✓ Avoid costly mistakes and make smarter decisions by seeing the big picture in greater clarity
- ✓ Reach your extended enterprise users and harness their knowledge by providing simple and intuitive access to PLM anytime, anywhere, on any modern computing device [13]

9. Business Process Re-Engineering

Business Process Redesign involves robust redesign of key business processes to achieve dramatic improvements in productivity, cycle times and quality. In Business Process Reengineering, companies start with a blank sheet of paper and reconsider existing procedures to bring more value to the customer.[1,2]

10. Conclusion

Product lifecycle management (PLM) as a process encompasses the idea generation for a product, its conception, and its production, as well as its operating phase. Numerous tools and data models are used throughout this process. In recent growing complexity of the product PLM service is design to enable individuals to do more work in less time by providing user with the product and process knowledge they need to succeed in their business cost efficiently. The contributions of this paper can be summarized.

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