

A Review Project study of Product Life Cycle Management With Detail Implementation of modern Techniques Likes Three S's, and CE

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Abstract - In this research work maximum effort has done to present a detail review of PLM (Product Life Cycle Management) to making sustainability of Product Life Cycle Management through different modern techniques or as the steps involved in PLM. For the deep understanding of PLM function and make easier approach to practical implementation of PLM in manufacturing industry a detail step wise study is provide for the different modern techniques which may steps to establish an efficient PLM system, like Product's Use Full Life, Iterative or Repeated process for PLM, Morphology, Three S's, Environmental consideration in PLM, Concurrent engineering, Modular design for PLM, Mass customization, in PLM Design for: Form and Functional, Simplified Process, Evolution, Innovation, Manufacture. This research work guide for better product quality, sales, and durability this project work is being derived, we can get the benefits of reduced time to reaching the market, Increased full price sales Improved product quality and reliability, Reduced prototyping costs, Reduced waste, Seasonal fluctuation management, Improved forecasting to reduce material costs, Maximize supply chain collaboration. Areas of PLM in which the implementation will affect is higher productivity, Enhanced market image, Elimination of defects and waste, reduced costs and better cost management, Higher profitability, after following the suggestion and recommendation of this work it is possible to develop the Improved customer focus from the company or manufacture side and satisfaction to Increase customer loyalty and retention, This work will also be beneficial to increase job security of the employees, and finally present the improved and innovative processes with continuous improvement.'

Keywords— Product lifecycle management (PLM), Three S's, CE, Implementation of modern Techniques, Concurrent engineering, , Mass customization, PLM Design, Improved product quality and reliability.

INTRODUCTION

PLM stands for Product Life cycle management is a broader concept which covers a product hen it start just as a concept end at the disposal of that product. As it making sense from its name, it is a process of managing the complete life cycle of a product from start to end. In actual the life cycle of product is started at very earlier even when the a concept take place in mind generating from a need, and life cycle of a product is consider to be end with the retirement and disposal of the product. PLM is a broader concept than PDM, which takes in the whole lifecycle as well as the tools used for authoring data. PDM remains the foundation of a PLM system, but the term PLM is used to consider the product lifecycle and collaboration aspects regarding product data. (CIMdata 2002). Product Lifecycle Management (PLM) is supported a lot by the information technology (IT) concept whose aim is a more effective and more efficient flow of product definition information through all phases of the product lifecycle. The use of computers, with virtual reality descriptions and simulations, and databases containing information of real products, enables organizations to develop products in ever shorter times, at ever lower costs and of ever increased product quality. As Grieves (2006) puts it, PLM “allows us to capture and represent information as we move along in the product’s life, but also allows us to simulate various actions to the product that would be prohibitively costly, if not destructive, in real life.”

MattiasBokinge 2012, Purpose, aim and research goals the overall aim of the work is to develop new tools and methods that can lead to improved outcomes from PLM implementations in industry. A solid understanding of the characteristics and challenging issues in contemporary PLM implementations, as well as the contexts in which they occur, is needed in order for the likelihood that such new tools and methods can be used to address real issues in future PLM implementations. Hence, the research goals are:

1. Clarify the characteristics of and challenging issues in real contemporary PLM implementations, as well as the contexts in which they occur. Subsequently, the tools and methods need to be proposed, developed and evaluated.
2. Develop and evaluate tools and methods that can be used to improve the outcomes of PLM implementations. The research goals stated above guide the conceptual framework presented in which subsequently leads up to specific research and the corresponding scientific research approach.
3. The research presented in this thesis focuses on the activity of implementing PLM, including the development and deployment of a PLM solution. The initial chartering activity.
4. PLM investment is considered in this thesis. Likewise, the subsequent activities' stabilization, improvement and retirement are also excluded from the scope.
5. Although PLM as a concept concerns products of any combination of all engineering disciplines, the scope of the PLM implementations studied in this research is delimited mainly to the area of mechanical engineering.
6. The research summarizes the results in the result and discussion, conclusion and proposes future work in the area is also presented.

LITERATURE REVIEW

The roots of plm system are in engineering industry jim brown (2003) describes it as the official an enterprise application. however, plm is not just another version of erp (enterprise resource planning) system. the main difference between systems is that plm system takes care of engineering design and innovation side of the product life cycle, while erp is concentrated on production. they are two different systems, and not to pollute erp with design or manufacturing data or plm with material costs it is an appropriate to have both systems. (Brown 2003). PLM is “a strategic business approach that applies a consistent set of business solutions in support of the collaborative creation, management, dissemination, and use of product definition information across the extended enterprise from concept to end of life – integrating people, processes, business systems and information.”(CIMdata 2002). The challenges of integrating PLM systems in mechatronic product development have many dimensions. . It has not yet been shown in industry or research how to successfully integrate mechatronic development in PLM systems. Accordingly (DagBergsjö 2009). (MattiasBokinge 2012) Explained that - Product Lifecycle Management (PLM) is an information technology-based concept bringing several benefits to product development organizations. However, it has been reported that PLM implementations in industry render unsatisfactory results. (Centric Software Oct 2014) - The luxury goods, outdoor gear and sporting goods industries, From large numbers of samples to extensive prototyping and exacting production requirements, material costs loom large for these companies. Obviously, this has a significant impact on a company's bottom line, many companies its advanced product lifecycle management software for apparel, footwear and consumer goods industries (PLM) designed to meet the specific needs of materials-driven product development. PLM has long been recognized for helping companies improve the design, development and production of on-trend products, optimizing lead times and managing sourcing. PLM replaces a chaotic system of multiple spreadsheets, scattered documents and an overwhelming amount of email. And it allows every person involved in a product's design and manufacture—from marketing and product designers to sourcing and international suppliers—to work collaboratively with one set of comprehensive, accurate and up-to-date information.

PROPOSED METHODOLOGY

The proposed methodology provides the techniques and already proved process to make a strong. The methodology suggest following steps in detail to develop a PLM system which satisfy the customer and also increase the sale and performance of product. Following steps are given in detail

1. Prepare a Simplified design procedure
2. Always effort to Extend the Product's Use Full Life
3. Use Morphology of design for improvement in PLM
4. Design should be Environmental friendly
5. Product Development Processes and Methods should be environment friendly
6. Information Modeling should be standardized.
7. Efficient Information Management must be adopted
8. Think for Configuration Management

9. Engineering Change Management as when required.

Achieve following guidelines:

1. Minimize Total Number of Parts - Eliminating the parts tends to less maintenance during the product services. parts reduction should not go beyond limit that it adds cost because the remaining parts become too heavy or too complex.
2. Standardize Components - Use and manufacture commercially available standard components, it will help to increase in quality with minimum cost and are easier to be inventory.
3. In a Production Line maximum Common Parts should be try to use- Same material, geometrical shape, size and weight leads less cost per unit and also simplifies the process control.
4. Multifunctional Parts Design - Such parts tends to reduce the number of parts, Ease of Fabrication, save from machining processes which are generally costly and give the nearest to the desired shape.
5. Avoid too Tight Tolerances - Too tight tolerances requires extra precision into the tooling, longer operating cycles and more skilled workers.
6. Design should aim for minimum weight to strength ratio.
7. Try to perform task with general purpose tooling rather than special dies wherever possible

RESULT & DISCUSSION

Where cost-reductions, time-to-market reduction, increased design re-use, and increased design for customer and environment the main factors leading to product life cycle management are globalization of business, company fusions, growing competition, tightening budgets, industry and quality regulations as well as, shortening deliver. This pressure of continual changes requires competence to change own processes and to operate more efficiently and this methodology support for these all. The most important benefit of PLM systems is development of an internal and external communication. It improves as well transfer of different types of file formats, which brings quality, effectiveness and speed up the operations management. However, it's important to remember that PLM is only a tool which removes distances and improve effectiveness only when implemented and used properly. Usually PML implementation demands changes of current data management, and in the beginning may cause more work for the users but it gives valuable advantages. As immediate advantages time saving for example in terms of faster product structure because of easier information utilization, improve quality control.

Expected Out comes after implementing the methodology: It guide for step by step procedure and reduce the probability of creating the mistake, systematic decision making process. Guide for the innovative work. It is an iterative process. Designs are prepared in the limit of found as per actual condition. The work is tested on mathematical model which reduce the probability of failure after production. The reliability of Product among the customer increased. As the work suggest to prepare design a life cycle of product which can be remanufacture at the end of life and for the disposal purpose such design will save the natural resources and also provide the resell value to the last consumer. It provides a chance at every step to make changes in design on the basis of simultaneously out come. It gives very comfort condition to work with the accuracy and in the way of desire objective. With minimum probability of mistake such a work can give the great results in the field of product life cycle management. By implementing the Morphology a better concept design will help to develop the better products and also it will increase the production speed. And the product developed on as per customer requirement will satisfy the customer it will be the first step to increase the level of PLM. Advantages of simplification in respect to PLM save a lot of storage space, As we know that with simplified design less components used, as no complex structure is used. Also simplified design gives the ability to work even with less materials and finished products. So in case of simplified design inventory also reduce. Low investment -.Simplify, planning, and production methods give the support to simplified plant and equipment and inspection and control. In this manner plant running cost also decreases. Standardization founds to be useful in Global acceptance of product – As the standardization Limit the variation in physical dimension and tolerances of components so for same purpose same size product can be used and interchange as per requirement.

Result from CE implementation in PLM: In traditional design approach product design it takes a long time and pass it to the process engineering and operational personals. The process design and ramp up of product generally take again a long time, Concurrent design reduces this development time in two ways. First the process design and testing being soon after product design begins. And process design may begin 1 month later rather after completing the process design long period. After the starting of product design testing and modification are easier. Concurrent engineering Improved the PLM - Concurrent engineering is an advance method of production and differ from the traditional used methods of production. The concurrent engineering provides the opportunity to check the product

design is meeting with the requirements of high quality production and production process. It provides the base to design and test the production process when the product is being design.

CONCLUSION

This research work provides the conclusion that although PLM generates benefits, the expectations were even higher. PLM system argues that the value gained from investments made in PLM can and should be questioned, and claims have been made that many failures are due to inabilities in implementation. Reporting from industry, Baker states that “nobody could have foreseen how big, messy, and tough this project would turn out to be.” A well-developed PLM is one of the vital organs for the business development. It reduces the dependencies and uncertainties regarding the product. Hence the focus in this thesis that PLM can generate benefits, the expectations were even higher. It has been argued that the value gained from investments made in PLM can and should be questioned, and claims have been made that many failures are due to inabilities in implementation. Reporting from industry. In an attempt to describe the complexity of PLM implementation, implementation in detail steps provides a complete guide to implement the PLM system in different industry. To conclude, the area of PLM implementation has potential for improvement and is, hence, the focus in this work. This proposed methodology can give a big step by simplified design procedure, as the step by step procedure provided and also it reduce the probability of mistakes during the work. The established and simplified design procedure also helps for decision making process. It is first step for iterative development.

The work is support full to extended Product's Use Full Life as the implementation process provide the advantage of extended Life cycle of a product, most important advantage to all over the environment and that is it helps to reduce the consumption rate of natural resources ultimately which save our requirement. The reliability of Product among the customer increased. The durability of product will be increased and the faith of customer on the product will also be increased. The adaptable design of product will provide the flexibility for required change at the different stage of product life cycle. A design which can be repairable will be the money saving point at the situation of any damage or maintenance problem in the product. As the work suggest to prepare design a life cycle of product which can be remanufacture at the end of life and for the disposal purpose such design will save the natural resources and also provide the resell value to the last consumer. The products which can be reuse enhance the probability of resell of the product, and can also be use for another similar purpose. An easily disassembled in minimum cost after completing the life cycle of product give the edges to recover all or some material used in product. A disposal product design will give the independency to the last customer at the end of life cycle of the product to dispose it easily without any extra effort, expenditure or any type of legal formalities like government permission or anything as. A continues improving PLM system make effect on loyalty of customer and for a brand it will be increased customer loyalty and reduce the customer jumping behavior to other brands. The suggested Iterative nature of design provide the edge of work, it provides a chance at every step to make changes in design on the basis of simultaneously out come. It gives very comfort condition to work with the accuracy and in the way of desire objectives. With minimum probability of mistake such a work can give the great results in the field of product life cycle management. The work also suggest for the Morphology of design in PLM and better concept design will help to develop the better products and also it will increase the production speed. And the product developed on as per customer requirement will satisfy the customer it will be the first step to increase the level of PLM.

The configuration and parametric design for parts and components for any product also increase the accuracy level and decreases the chance of error. These techniques are very help full to establish a better PLM system. Also this suggested system will develop a working methodology where before taking the final decision of a product design and will effect on the PLM it will be must to check the dimensions, tolerance, material name, quantity and manufacturing process. It will very supportive for actual optimization of a product Life Cycle. In such a prepared PLM system Distribution Plan will be improve continuously, a well planned application for the use of consumer will developed a greater level and long life for product life. At the last of product life cycle, retirement plan will be available which is very important and supportive for the end users, when at the last stage of any product proper disposal is suggested in the manual provided by manufacture it will give the satisfaction to the customer also at the Last stage of product. and such life cycle which care for the customer from requirement and need to use and application and at the last also for the disposal after completing the retirement of the product such a PLM will provide the complete satisfaction to the customer. As we know that with simplified design less components used, as no complex structure is used. Also simplified design gives the ability to work even with less materials and finished products. So in case of simplified design inventory also reduce and less space occupied for storage. It minimizes investment cost, reduction in sales price, Shorten or eliminates order queues. Standardization in PLM gives the product global acceptance of product, required similar methods and equipments for testing - As the products are in same standard size and characteristics so the product testing and methods becomes similar, minimum precaution, waste reduction, Increase simplification and specialization,

inventory Reduction, give freedom that no high level skill required Reduction in price, reduction in maintenance and service costs. **The environmental considered design PLM save the environment.** Eco-friendly products saving the environment and protecting the planet, *It ensure that our future is secure. It gives the feel that we completing our responsibility and tends to provide an environment which is safe for upcoming generation.* The environmental considered PLM system supports the reuse; recycle of product and this tendency to control the consumption of natural resources. In traditional design approach product design it takes a long time and pass it to the process engineering and operational personals. The process design and ramp up of product generally take again a long time, Concurrent design reduces this development time in two ways. First the process design and testing being soon after product design begins. The modular design technique can be advantageous in ways, the product do not have to be specially designed for each version of-the module and the assembly process for different models and benefit of modularity is that combing several functions into a single module simplifies the testing. Mass customization aims to provide goods and services that meet particular customer requirements. Mass customization appreciate to give the consumers the product as per customer choice and at the time when, where and how they want it also at a price they can happily afford. The mass customization works as a tool to focus the customers. It provides the variety to the customer at low cost.

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