

Comparative study of Conventional Molding and Virtual Molding Process

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Abstract – The virtual manufacturing in modern era it is the manufacturing of the system with the help of computer which gives exact process and avoiding complexity of the process. The more complete answer is that virtual manufacturing is the process of conducting the various experiments with this model which gives appropriate results regarding the manufacturing of the system for the purpose of understanding the behavior of the system. **In today's manufacturing** system which not give the appropriate results which lead to give loss in the product so before implicating this virtual manufacturing gives expected results with the help of VM software for simulating individual manufacturing processes and the total manufacturing system. By driving compatibility between the product design and the assembly plant process, these virtual tools enable the early optimization of cost, quality, and time to help achieve integrated products, process and resource design, and affordability.

Key Words: virtual, experiments, manufacturing, implementation.

1. INTRODUCTION

“Moving to a conventional modeling from the computer base simulation” The Virtual Manufacturing the main thrust area is to analyze the whole process and overall enterprise performance it is a user friendly system. This capability gives the decision making which lead to process development. The main thing is to minimize the time required for the production and increase the production cost so this system are more beneficial for the overall development regarding the process, production.

Virtual manufacturing (VM) is a main thing which adopted by the commercial and defense sectors of U.S. industry, including the DOE Weapons Complex this sector supports the affordable, lean, and flexible manufacturing system. The term virtual manufacturing simply describe as the manufacturing with the help of computer to enhance the productivity. The virtual manufacturing broadly used in the modeling of the manufacturing system with the help of simulates or design alternatives for an actual manufacturing environment, mainly use of computers. It is a prediction

before the actual manufacturing process which type of problem actually occurs in the production process and gives exact relationship before real manufacturing starts. This virtual manufacturing gives the exact difference between conventional manufacturing and computer base manufacturing. This gives increase in productivity of overall environment. It is an realistic part so no doubt how much product will produced and how much product in scrap. Virtual manufacturing is a new kind of manufacturing process but it is no real it's totally depends on computer and network system related with software. Virtual manufacturing deals with production and manufacturing with respect to computer base environment. It consists of digital software rather than physical reality raw material. Virtual manufacturing products are digital in nature rather than the conventional product but the results are in conventional model of computer base software product which is a virtual product and is a real product in a virtual environment. Therefore conventional product is based on virtual product and gives real product.

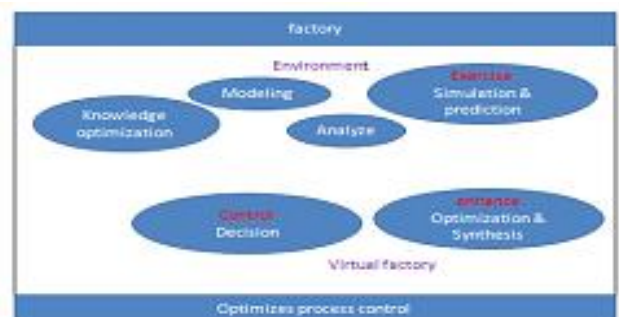


Figure1: Virtual manufacturing

2. OBJECTIVES

The objective of the Virtual Manufacturing in the private industry to provide void range in the simulation and modeling base environment. The main objective of this is to implement of the computer base manufacturing process rather than the conventional molding.

- Develop user friendly computer base simulation tools which compatible with existing conventional platform.

- It is the platform of increase the overall knowledge of engineering workforce and sharing with the industry and government organization.
- It is the process of affordability of new design which stands in global market and strategies given to the various industrial approaches.
- Developed new design of the product with the help of VM and stand that system in global market.
- Provide training to the users and give overall knowledge regarding modeling and simulation tools.

3. BENEFITS OF VIRTUAL MANUFACTURING

Visualize the material flow through the manufacturing system.

- Provide computer base environment rather than conventional molding.
- Specific task give true utilization of manpower.
- Virtual environment gives faster equipment used rather than conventional molding.
- Identify the bottlenecks of the system.
- Predict exact process while manufacturing.
- No more scrap is observed during manufacturing process.
- Identify the on job damages.
- Cost analysis gives more specific in this case.
- Optimize the system by virtually adding resources (equipment/manpower) to observe performance responses.
- Planning and assembly of product before the manufacturing.
- Process simulation.

Virtual manufacturing has also been successfully implemented in the following areas:

- Airport operations.
- Urban traffic study and development.
- Maintenance operations.
- National economy study.
- Waging military battles.
- Material and warehouse distribution systems.

4. SCOPE OF VIRTUAL MANUFACTURING

The scope of virtual manufacturing gives specific cost of product with the utilization of computer base environment also the investment in the product is valuable. Timing constrain with respect to virtual manufacturing gives exact time for the production and avoiding the unwanted time.

a) Design-centered VM: gives information regarding designing process all the process of designing are conducted here. In this case virtual manufacturing provides all the simulation work to optimize the design work provides manufacturing information to the designer during the design phase. It also provides flexibility in the work. Due to this

design phase all the information regarding your actual manufacturing can be solved.

b) Production-centered VM: After the design center virtual manufacturing this production center virtual manufacturing is done. All the resources given by design is implemented in the production by virtually, simulation gives exact idea of production which gives modern product with less amount of damages..

c) Control-centered VM: It is the main era in the virtual manufacturing which controls the simulations to control models and actual processes allowing for seamless simulation for optimization during the actual production cycle.

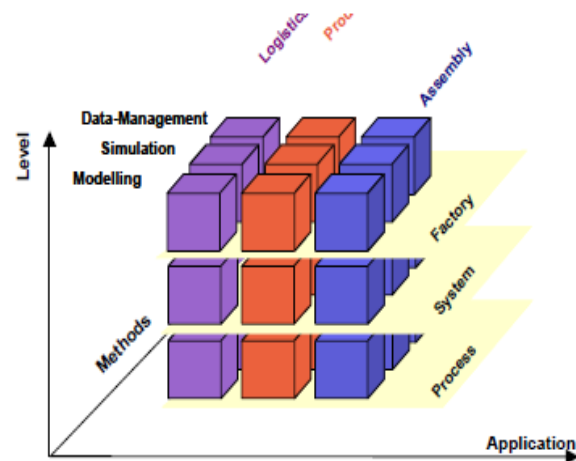


Figure2: Virtual manufacturing objectives, scope and domains

5. COMPARISON TRADITIONAL MOLDING WITH VIRTUAL MANUFACTURING

5.1 Traditional molding

A new 8 cavity mold arrives and now you are responsible to “find” a process that consistently makes good parts

- In this first we have to setup all the information for processing the product.
- After 2 days of processing there is some changes in the product so we have to remold or change that product.
- There is some problem regarding shrinkage, blow hole, ejection distortion etc.
- After all this process eject the mold send it back change all the possibilities modify the process and try again, so lots of time are wastage and not good quality of product are formed.
- The cost required for the production is much higher than the actual production and the material requirement is cross the limit so the production will automatically goes down.

- By the end of more than one trial the actual product formed but lots of time and money are wasted.
- By the end of the third trial, \$9,000 has been lost. If it's still not right, the problem becomes very serious because you're running at 50% scrap and cycle time is more than 30% longer than it should be so you're losing money and the order might be late or some bad parts still get shipped.



Figure3: Traditional molding process

5.2 Virtual molding

This technique is more reliable than the conventional molding, after all trial and error in the conventional molding where both the problems are occurred but due to this technique solution were found before the mould arrived. There is no material wastage, no extra time required, no scrap, no sorting.

- Make a good parts with good quality
- Attempt in more complex parts so that the value of this can credit.
- Make good parts the first trial with a process you already know
- Be able to deliver parts sooner
- Provide parts with consistent quality
- Know your actual time required for the production.
- Value for the good product.
- Communication factor is more reliable. With consumer to customer.
- Attract more repeat business
- Enhance the Quality of product.

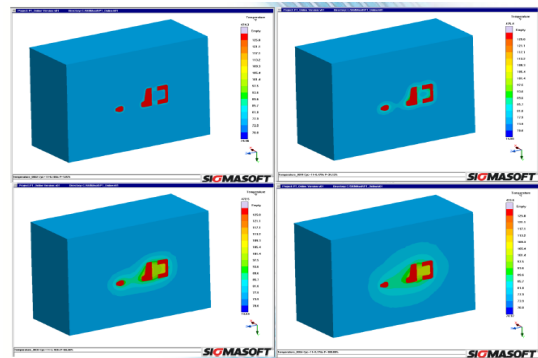


Figure4: Virtual molding process

- The virtual mold is always part of the model.
- Critical for accuracy.
- As mold heats up, cooling slows down.
- Mold material dependent
- CAD not required.

6. CONCLUSIONS

Virtual manufacturing is the great design product for the manufacturing the mold design. So, by this the efficiency of the product is increase. Now day's lots of work have to do so this virtual reality comes true value for that. This is a slandered for the design for the production. The computer technology is widely used and acceptable term in global worlds so this virtual reality goes more importance in any field. The virtual prototype is the key role for the production process. Today's company requirement needs faster technology and time saving for the more accurate solutions. Leading companies are already demonstrating the virtual reality and they implemented successfully. But one thing kept in mind that all the resources have some drawback so keep all things virtually. All global companies have successfully implemented this technique and gives value for money.

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