

A301MMA

Reflection Report

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Role of simulation in the product life cycle stages

Production and product life cycle

Simulation has an important role within the product life cycle, for companies “it starts with reducing the cost of innovating, developing, manufacturing and operating their products.” (Ansys, N/A) In the product life cycle, there are 3 stages which simulation has an effect on, product design, production planning and production engineering. In these 3 areas simulation lets designers use tools such as CAD application to simulate a design of a new product without having to create the product and allowing changes to be made and as well as that it also further goes into the engineering stage where CAD/CAM applications come together to simulate have the product will be created, ranging from materials to how it will be on mass production. This saves time and money by allowing for quick simulations to ensure a product can be created with the correct resource, correct technique and if anything is wrong, they can change the simulation and try again which is a major asset as it saves work on the main production line. Simulation also helps production planning in this sense since by simulating the creation and different things on the product a company can plan the major production line by doing things such as 3D printing a prototype during this stage and having a simulation run for the 3D printing beforehand so it can be done correctly before even tested. Overall helping manufacturing and saving a company time and money.

Existing Product and new product introduction

For existing and new product simulation's role in the product life cycle means that new products can be made with better quality and be much better designed and not have to take as much time with production since simulation should allow for the product to be in a much more perfect stage. For existing products simulation can play a role in improving production for the product by finding better ways to do it with different materials and such and perhaps be more resource efficient saving time and money.

The role of simulation in industrial system optimisation

Scheduling and sequencing

Scheduling is where a company will allocate resource to product development, the role that simulation helps play in that it describes a certain process in a time dependent manner. This allows for “Simulation-based scheduling means that simulation is used to determine schedules with a scheduling horizon ranging from several hours to a day.” (Rose, 2006) Which helps to control the assignment of jobs to machine via a simulation engine which helps with optimising automation and with simulation there is less need for interference. With sequencing simulation can similarly allow machines to sequence certain tasks over a day.

Resource utilisation

Simulation can have an important role in resource utilisation, this is because it allows for the simulation of different materials with a product when designing and simulating manufacturing and that allows companies to see which materials would work best when creating it, this means less cost on material resources which results in a higher resource utilisation. Simulation also lets us test the different types of manufacturing that can be used when creating products which stops companies wasting resources by finding out which manufacturing resource works the best for the product. As well as that using simulation models companies can find out how employees are best being used and ensure that they are working the right roles at the right time to improve workflow and better make use of work hours and doing work. This also applies to machines as it allows companies to see how a supply chain can be improved by running different simulations of tasks allowing machines to be used in much better ways.

The impact of simulation in achieving flexible industrial system that could adapted to change in the product mix

Flexible manufacturing systems

The impact of simulation in achieving flexible industrial systems that can be adapted to change in the product mix are how with simulation it is possible to test new products quickly since you can simulate creation and production of a new product, this makes system highly flexible as you don't need to rework a production line to test a new product and when you do create a new product you have correct simulations of the product/creation process making it much quicker to add that product to the production line. As well as that with existing products it helps with customisation since simulation allows for quick changes making it highly flexible to use in an industrial system since an existing product chain can be modified much quicker. This applies to the product mix as it allows for more products to be expanded upon since with simulation, they can easily be adapted into better products by checking for how to improve them with something like a different material etc, and the overall process.

Bibliography

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