SIMUL8 CORPORATION

Keep your 3 Legged Stool Upright!

Leading Successful Manufacturing Projects

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About the Author

Brian Harrington is a Six Sigma Black Belt with 20 years operations research and simulation experience at Ford Motor Company. He designs and implements manufacturing process improvements which incorporate many conflicting objectives such as robust, flexible, and Lean systems.

Now running his own discrete event simulation specialists firm, he continues to deliver high quality complex models for a wide range of manufacturing, healthcare, and business process improvements. He also acts as a technical ambassador for SIMUL8 Corporation assisting in teaching, mentoring, marketing, and consulting projects.

Keep your 3 Legged Stool Upright!

Simulation expert Brian Harrington discusses how simulation can play a key part in the successful completion of a manufacturing project when the conflicting objectives of cost, quality and time all need to be delivered on.

Today, managers are faced with many conflicting objectives when attempting to deliver a new product to market. There is significant pressure to launch the product within budget, at a high quality and on time. The "3-Legged Project Management Stool" is an excellent way to describe the balancing act that is required. If one of these important facets falls short of their respective target the stool falls over; moreover the project fails.

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Shorter Development Time

Most project teams find themselves working within shortened development timing. For example a company may have historically been taking 18 months to launch their new product, but it now needs to be delivered within a year. Competition, coupled with advanced technology are some of the outside forces that are driving shorten development cycles.

Assurance

Beating your competition to market can make the difference in assuring maintaining targeted market share. Manufacturing managers must assure that the facility is capable of producing the new product. This may include the introduction of new equipment or a new green-field site.

Success with Simulation

Most successful companies are using some form of simulation within their development cycle. The best time is usually early within their development plan. Discrete event simulation can put your "AutoCad" layouts into action. More importantly these simulation studies can provide "data-backed" solutions to balancing your "Project Management" with respect to: Cost, Quality, and Time.

How does simulation address cost factors?

Construction and the introduction of new equipment are the most costly factors when implementing a new facility design. There will be new lines, new material handling systems, and many configurations of the new process. Another large consideration will include resources; such as line operators; fork lift drivers, and skilled maintenance trades. Successful managers will have a simulation team involved with their manufacturing engineers. The simulation team will be responsible for developing simulation scenarios of all proposed layouts. Therefore, the team can compare scenarios against each other, and make data-backed decisions. More importantly, the team will have insight into where bottlenecks and constraints are within each respective layout. Therefore, they can allocate the budget to where it's needed most within the proposed layout.

When simulations are conducted ahead of implementation there are often several areas of "Cost Avoidance" that will be discovered. This is key to spending money where it is needed most! Putting in an "Automated Guided Vehicle" system might seem like a good idea after seeing a promotion video from a vendor. But… until you see it in action within your facility. How do you know it's worth the cost? There might be something within the facility that is blocking the achieved gain of an AGV system. This is where simulations can provide answers to these types of questions; reducing the risk of purchasing new technology.

How does simulation address quality?

When we look at quality within the manufacturing process it usually comes in the form of the following: quality tests, repair spurs, and process design. The overall process design is key to assuring that quality can be maintained and controlled. An example could be assuring that there is a large enough exit buffer after an oven operation. Simulations can easily determine the optimal buffer size to assure no defects due to over baking within an oven.

Some other common quality decisions are about where to place vision detection equipment. These could include vision assets that read the quality of a welding operation. Therefore, when a weld fault occurs, the line will stop until the quality issue is resolved. This can avoid redundant quality defects in piece to piece work flow, as each product would have the same defect. This could cause overflow within downstream repair areas and costly scraps rates to occur.

If the quality is not up to target, it will cause your time and cost factors to go over budget! Furthermore, the product launch will be delayed, causing potential market share loss. Simulation can provide great insight into the best practices for assuring that quality stays on target.

How does simulation address time?

When it comes to the time factor, this is what discrete event simulation does best. After all discrete event simulation is all about events taking place at some discrete time. These simulation studies are all about time- from regularly occurring cycle times to the stochastic nature of predicting failure rates. Furthermore, the simulation will predict the capability of the facility. What can it produce per hour, per shift, per month, per year, etc.

As for project management the simulation analysis will reduce the overall development time, it will keep the focus on the critical steps. Allowing managers to make decisions, accept implementation bids, and keep the program moving forward. Within manufacturing plants it is too time consuming and costly to build manufacturing prototypes of lines. The simulation analysis becomes the virtual prototype of the facility. It provides a testing bed; to answer critical questions as the program team advances through their project timing. For example simulating 3 unique proposals for line side sub-components (Fork Lifts & Racks, Power & Free Conveyor, and Electric Monorail Conveyor). The simulation team presents the benefits of each system when it is nested within the entire facility. Therefore, management can make informative decisions on whether an advanced material handling system is necessary.

Keep your 3-Legged Stool Upright and ensure a successful project

Your company will need to take on projects to increase business or inject a much-needed change into your workplace. Projects will require you to grow and add to your skill set to accomplish the project goals, but in order to ensure it doesn't become too time-consuming, too expensive, or too substandard, you need to understand how every area of your project will run.

The project itself is the seat of the "Three-Legged Stool" and Cost, Quality, and Schedule are the legs. To have an efficient and effective project, you need to have all legs of the stool be equal so there's no wobbling!

Discrete event simulation is one of the best tools that lends itself to all three of these facets, and that is why most large manufacturing companies are using discrete event simulation to reduce risk and keep up with the competition.