# A CASE for PROCESS SIMULATION

## A Case for Simulation

Companies practicing Lean Six Sigma without process modeling and simulation techniques need to consider what these practices can provide in terms of risk-analysis and decision-making (such as cost estimating, scheduling, resource allocation, engineering design, etc.) by modeling the probabilistic behavior of a system, process or service.

## Specifically, process modeling and simulation can accomplish the following:

• Predict performance of current processes against effectiveness, readiness and cost to determine areas of significant improvement potential

• Enable rapid analysis in situations with either extensive data or no data

• Provide an understanding of why key factors have the highest impact on results and where to focus efforts

• Meet quality objectives by determining optimal specifications and tolerances

• Communicate findings in a simple, highly visual manner

## Why companies don't practice Process Modeling:

The most common reasons companies restrict the use of process modeling and simulations involve cost, timing, safety concerns, lack of simulation/modeling experienced resources, and/or unavailable or lack of skills in using modeling and simulation tools.

One of the greatest complaints we hear from senior managers is “projects are successfully completed, but I’m not seeing a significant change to the bottom line.” That’s because in the Define stage of (DMAIC), Lean Six Sigma experts don’t have enough information to quantify the benefits. They are predicting a bottom line financial benefit without truly understanding how the process behaves, let alone how it would behave after the change. Without seeing the big picture you may complete a successful Lean Six Sigma project and see no impact in dollars for your organization. There is a better way. With process modeling you create a simple simulated model of the process. You will visually see which projects will affect the total output, and which will sub-optimize the system.

## Why Practice Process Modeling?:

Process modeling and simulation can be invaluable in situations where the construction of a real world model is infeasible. Process modeling helps to visualize a proposed system, facility layout, or other process change. It can help answer "what if" questions and scenarios within a given confidence level. Process Modeling and simulation can often demonstrate the effectiveness (or lack of) of a new design or process through the exploring the implications of operational changes and the investigation of the impact of changes in the marketplace.

## Key advantages of integrating Lean Six Sigma phases (DMAIC) with process modeling:

***Overall interdependencies in process***. The standard Lean Six Sigma toolbox has no way of showing the interdependencies between one area of the process and another. In complex change initiatives where there are interdependencies between processes, when incidents happen that cause delays, bottlenecks, variability, etc., if you can’t show the interdependencies, understanding the system and resolving issues is very difficult. If you can’t understand the system and pinpoint the waste and bottlenecks, changing the system could be risky and typically does not provide the desired results. A simulated model shows those interdependencies, which allows for the uncovering of changes that will affect the overall system.

***Risk free experimentation***. It is proven that real-time experiments are costly and can have an enormous negative impact on the system. If you are experimenting with a simulated model of the system, the only cost is setting up the experiment and



e-mail: info@SherTrack.com www.SherTrack.com

©2008, SNAPPS and SherTrack are trademarks of SherTrack LLC; other product or service names mentioned herein are the trademarks of their respective owners.

reviewing the results. There are no negative impacts to system output or to the morale of the workforce in trying new process experiments. You can change the parameters, run various scenarios and if the desired outcome is not achieved, you can pinpoint the root causes, all the while gathering more information about system behavior – without any disruption to the real system.

***Reduced experimentation time***. You can run hundreds of experiments a day rather than hundreds of days per experiment. Many processes have a cycle time of weeks or even months. Running enough replications of an experiment to validate the results can be overwhelming. With a simulated model, you can run as many computer simulations as you want and develop plans based upon the review of results.

***Impact of change on the existing process***. Processes that achieve the goal of Lean Six Sigma (or a high sigma quality level) fall out of specification if the volumes change. For example, a 50% change to incoming calls to a call center may cripple a customer-oriented sales process. Planning for change in your system by using a simulated model to understand the effects of volume change, product stream substitution, staffing policy or other changes can significantly reduce project risks and the associated costs.

## Examples of Process Modeling Successes:

Fine-grain process understanding (such as pharmaceutical companies analyzing molecular properties of a new drug)

Analyzing process with multiple/mixed levels of process instance/class granularity (such as call centers providing application support)

Analyzing patterns of interaction and workflow among software developers/agents (such as online auctioning or gaming Web sites)

Analyzing processes whose structure and control flow are dynamic (process dynamism) (Such as complex supply chains, military or government supply chain processes)

Process modeling and simulation is well-suited for studying processes that repeat with large number of process instances (such as financial transactions at banks)

Easy to observe process bottlenecks or optimization opportunities (such as airports, transportation systems, process manufacturing facilities and hospital emergency rooms)

***About the author:***

Steven Bonacorsi is a Senior Master Black Belt instructor and coach. Steven Bonacorsi has trained hundreds of Master Black Belts, Black Belts, Green Belts, and Project Sponsors and Executive Leaders in Lean Six Sigma DMAIC and Design for Lean Six Sigma process improvement methodologies.

The AIT Group, Inc.
Steven Bonacorsi, Solution Provider
Lean Six Sigma Master Black Belt
3135 South Price Road, Suite 115
Chandler, AZ 85248-3549
Phone: +(1) 888.826.2484
E-mail: sbonacorsi@theaitgroup.com

Web: http://www.theaitgroup.com

***About SherTrack LLC:***

**SherTrack's** new demand-driven predictive manufacturing solution, **SNAPPS PM**, virtually eliminates the operational impact of forecast error and provides rapid, bottom-line results through Process Modeling & Discrete-event Simulation for complex manufacturers.


©2008, SNAPPS and SherTrack are trademarks of SherTrack LLC, other product or service names mentioned herein are the trademarks of their respective owners.