

# Modelling using Discrete Event Simulation in Manufacturing

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*By Colin Adams*

## **Situation**

Manufacturing since the dawn of time has been facing challenges. These challenges continue to grow and multiply as if they were on their own production line. Challenges such as:

- Rising material costs versus lower sales price.
- Production and maintenance scheduling.
- Capital Project Assurance with Low Risk

There is an expectation that any cost increase from higher raw material costs will be shared between the manufacturer and customer. This additional cost constraint combined with greater global competition requires further squeezes in order to maintain profits/ dividends to support sustainable growth. The casualties of such conditions have been company's either cutting back on investment or worse still ceasing to trade.

Departmental/ site managers, planners, process/ project engineers are often at the front end of delivering performance improvements to meet the corporate sustainable growth targets. However as time goes by equipment ages but is still required to perform as if it were newly installed. Even the best scheduled maintenance programme still faces the old "spanner in the works" issue from our random foe machine breakdowns.

Those organisations lucky enough to be provided with some capital funds must justify and provide assurances to their stakeholders that:

- All has been considered to reduce the risk of not meeting the key goals to as low as reasonably practical.
- The solution cost is the most efficient cost for the desired performance outcome.

The above issues are by no means the only ones faced by manufacturing today but they do have a significant impact on the organisation moving forward.

## Opportunity

Events such as Brexit, tougher global trading conditions and an increasing global fear for job losses from automation have created an unsettling environment in which to make decisions. A common approach to overcome uncertainty or variability is to wait and see how things will turn out. However, this can actually turn out to be damaging in the long run.

Uncertainty brings with it opportunity to those prepared to take risks and thinking about it, isn't business about taking risks? Variability does bring with it risk, but managed correctly and reducing it to an acceptable level, means it does not have to be the limiting factor. In fact variability can be the catalyst to provide the opportunity to review and develop a corporate strategy for a sustainably stronger and robust business. Manufacture this into something operational could be:

- Capitalise on currency fluctuations to invest in new efficient equipment
- Improve processes to increase production at a lower cost.

## Solution

Discrete Event Simulation (DES) is a computer representation of a physical system operating in time. DES can provide a means to study the causal effects on the system from a large number of both deterministic and random constraints e.g. actual throughput versus machine nameplate rated speeds after taking into account failures and resource availability.

Advantages of using this approach include:

- Process multivariable data inputs in a reasonable time.
- Create production schedules that incorporate variability and provide the level of risk.
- Handle random events such as breakdowns/ unscheduled maintenance.
- Integrate with existing systems though import and export of data.
- Opportunity to challenge the conventional, test new ideas/ approaches and support continuous improvement programmes such as Lean, based on data.
- Support a collaborative environment with input from subject matter experts.
- Evaluate various configurations of equipment optimising price with overall performance.
- Provide a powerful dynamic visualisation to foster greater understanding of the proposed plan.
- Provide a means to perform 'Failure Mode Effect Cause and Analysis on the system then develop mitigation strategies for undesirable outcomes.
- Ability to Stress Test the desired solution.
- A means to assess the impact and re-evaluate once more data becomes available.
- Provide stakeholders with a comfortable feeling when presented with the final plan.

Loxcius provides a service that exploits the power of DES to deliver strategic, tactical and operational improvements through the building of DES models, to training and support.

To have a greater understanding on how DES can support your manufacturing projects, or if there are further questions about simulation, then please email [colin.adams@loxcius.com](mailto:colin.adams@loxcius.com) or alternatively call +44 (0)2392 987984.