Körber Supply Chain

How to develop a winning warehouse strategy

KÖRBER

Introduction

Supply chains are coming under increased scrutiny as companies seek cost effective solutions to secure the supply of raw material and the delivery of finished goods to the point of consumption in an ever-changing market.

The supply chain director is required to develop a strategy that will reliably meet the anticipated needs of the business ensuring that growth, customer service and market reach can be obtained in a cost effective manner.

Evaluating a supply chain strategy by trial and error experimentation or adopting a strategy based on oversimplification of the problem in a spreadsheet is a risky approach. Simulation takes the risk out of change by accurately taking into account variability, uncertainty and complex interdependencies between processes.

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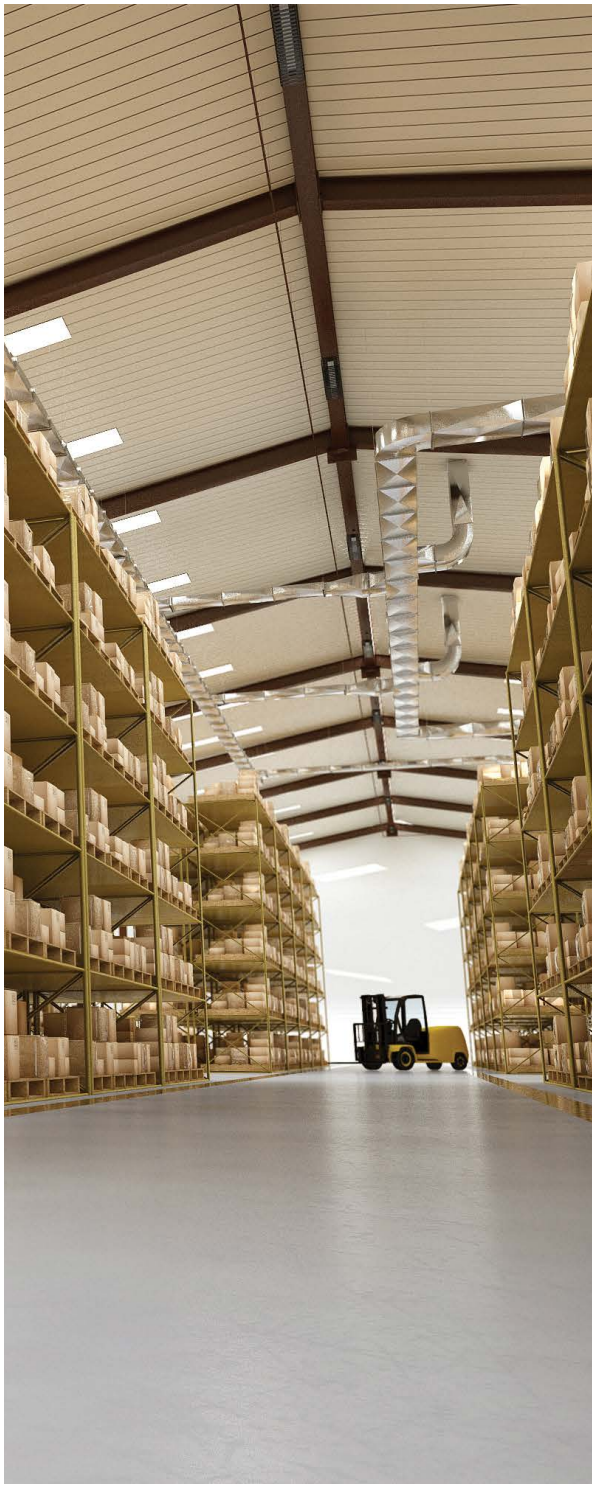
Historical Overview – the evolution of simulation

The history of simulation dates back to the 1940's, and it has evolved with the pace of computing technology, putting it in the hands of the industrial engineering industry in the early 1980s. Simulation was initially applied to improving productivity, planning factories and the flow of work.

However, adoption of this technology has largely been confined to academic use or to large corporations that could invest in the people and skills needed to create, validate and maintain the models.

Today, the advent of ever more powerful personal computers and the development of intuitive user interfaces has resulted in the evolution of a new category of simulation product referred to here as Applied Modelling Algorithms (AMA). Simulation has finally become accessible to everyone.



A new class of products

The next generation simulation applications have simplified the model building process and removed the need for supply chain professionals to have computer programming skills. So, the time for a typical project can be significantly shortened with the associated cost savings and the operations experts are now able to build the simulation.

AMA means that logistics professionals are now empowered with a tool that is as easy to use as a spreadsheet but which offers far greater capability to model reality, visualize the result and see differences in throughput and congestion at different times during the day.

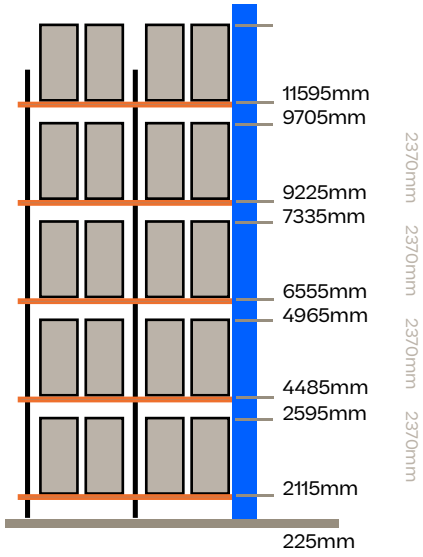
What are the key considerations when selecting a software tool for Warehouse Simulation?

The AMA category of products are developed for ease of use and clear visual representation of results. The key attributes to look for are:

1. A product that is designed specifically for warehouse modelling. A generic package will invariably require more effort and computer programming expertise to configure, and is more likely to introduce errors into the model.

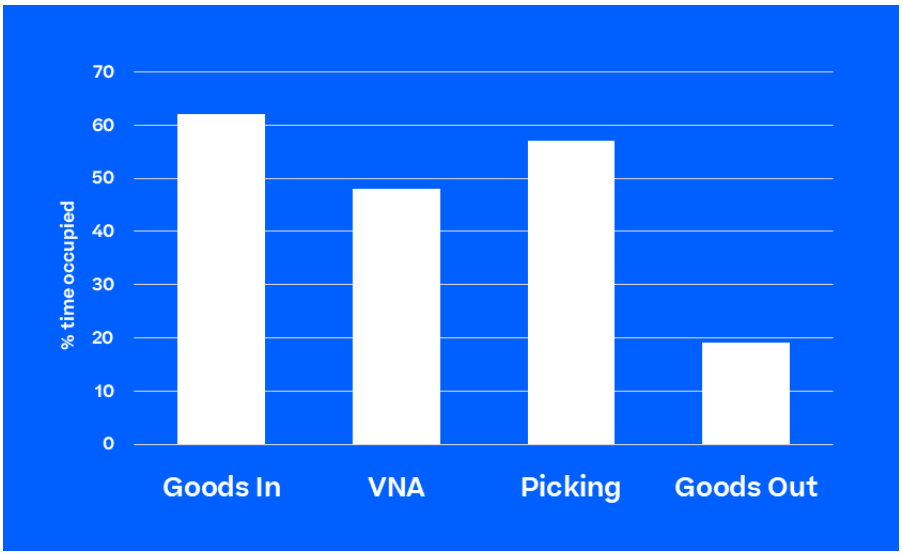
2. The product needs the breadth of functionality to enable a virtual representation of all the potential processes the warehouse can use.

3. Enables the easy modelling of resources. For example if you will be using a forklift truck ensure that the model can accurately represent a truck movement ie a truck accelerates, travels at a safe speed, truck slows to a halt, forks are lifted etc.



“Applications that are spatially aware vastly reduce the configuration time.”

Shift usage summary



4. Allows the easy modelling of the facility. For example you will need a set of drawing tools that are capable of drawing the warehouse. You do not want to be constructing the racking bays, for example, line by line, so ensure there is a library of warehouse components e.g. rack types which can be positioned and sized on the design layout, and then quickly and easily changed to test alternative scenarios.

5. A product that is spatially aware. One of the most important contributors to simplifying the building of a warehouse model is to ensure the product understands the distance between objects e.g. the length of an aisle, the travel distance to go from a goods in bay to a storage location, the height to which a pallet has to be lifted. If the application is not spatially aware the user will need to configure all the relevant distance matrices between all points, a very time consuming job.

6. Once the warehouse has been drawn it needs to be tested in a way that is representative of how it will be used. As most warehouses are operated using a Warehouse Management System (WMS), the warehouse model needs to be able to simulate all the operating rules that the WMS will use to run the warehouse.

7. The model simulation will include setting up vehicle deliveries and dispatches, so the model must allow the accurate representation of a delivery and dispatch profile and associated service levels.

8. The warehouse itself is not the entire consideration, the physical space in the warehouse yard also needs to be modelled to ensure vehicles can enter through the gatehouse, without queuing onto a public road, park up, unload and leave site safely without causing congestion.

9. The prime reason for modelling is to get a result that is easy to understand and highlights any weakness in the warehouse design. Look for applications in which you can see the warehouse in operation, i.e. have an animation capacity, preferably 2D and 3D. Very importantly, also look for applications that offer a wide range of detailed, drill-down graphical KPI reports that are warehouse specific. For example, warehouse capacity, staffing utilization across the day, vehicle departure times, MHE distances travelled, time lost to congestion and task completion rates.

10. In order to visualize the finished warehouse and present the finished design back to the business, 3D visuals combined with a movie creation capability is a great feature for communicating your design to stakeholders and users alike.

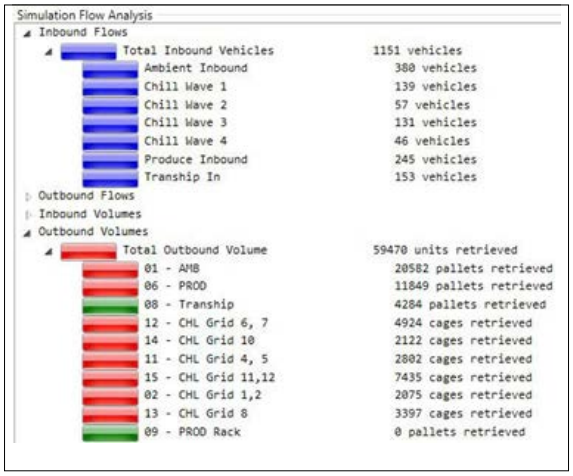
Resources
The shift patterns and working hours need to be set up together with the availability of material handling equipment. Any rules governing these, for example zone restrictions or tasks that need particular equipment e.g. for a narrow aisle, use a narrow aisle truck.

Run the simulation
The model can then be run for a period of "simulation time". The simulated time can be sped up so the model can generate data in a short amount of time that is representative of hours, days or weeks of operating time.

Validating the model
Having run the simulation model the results need to be validated against those gained from the existing operation. These need to be reviewed and the model amended to ensure it is an accurate representation of reality.

Evaluating the result
Having validated that the model is a true representation of reality the order volumes can now be increased by 10%, using a "What-if" wizard to see the effect on resources, congestion etc. The two scenarios can then be compared and resources or layout adjusted if necessary to achieve the required service levels.

Presenting the business case
Having completed the simulation exercise, the graphs and metrics generated can be used to present back to the business any changes required to the warehouse to accommodate the additional volume. The 3D model can also be used to create a virtual tour of the final warehouse design.



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Conclusion

Simulation technology continues to advance and become more accessible to the wider business community. The AMA category of products have a greatly simplified user interface and models can be built using intuitive functions that do not require any complex simulation or programming knowledge. Importantly these models are designed to solve specific problems and have a level of inbuilt intelligence which guides them to find the best result in a much quicker time frame.

Simulation enables both the designing and testing of warehouse strategy in a virtual and therefore risk free environment. It is capable of replicating all the warehouse processes and can test the design as it would really operate without oversimplifying the problem.

Once built, these models provide reliable data for supporting the business case for change and are excellent at communicating your ideas to the board and colleagues alike.

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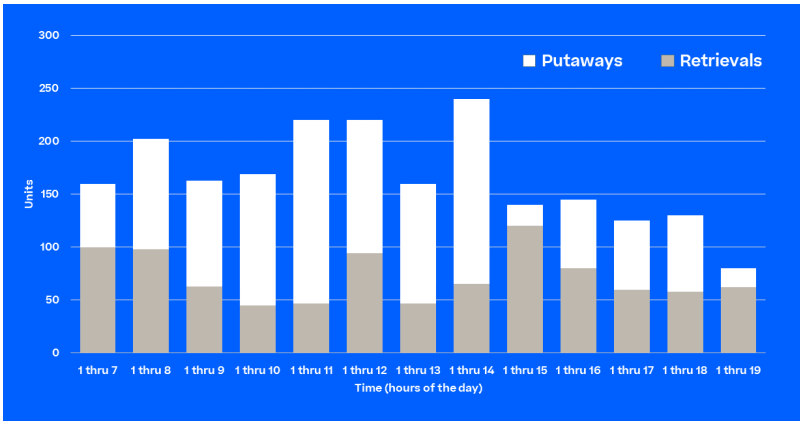
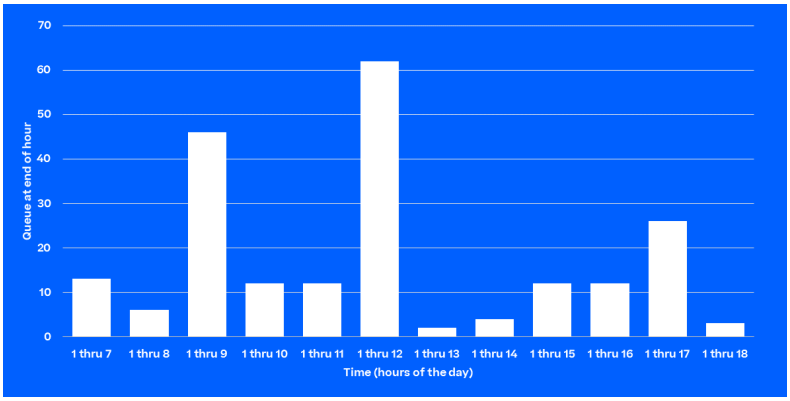
Bulk movement histories all storage areas



Task queue history by work zone (unloading)



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For more information on how Körber's solutions can transform your supply chain please visit: https://www.koerber-supplychain.com/