HSSMI

SUCCESS STORY:

ASSESSING WAREHOUSE REQUIREMENTS THROUGH MANUFACTURING SIMULATION TO SUPPORT STRATEGIC DECISION-MAKING

INTRODUCTION

The London Electric Vehicle Company (LEVC) is the leading global manufacturer and retailer of purpose-built commercial electric vehicles. Their iconic black cabs are famous across the world. As part of their commitment to deliver zero-emissions capable technology across a range of electric commercial vehicles, they introduced a new product: the VN5. It is a zero emissions-capable light electric van with a battery range extender.

This presented many opportunities but also several challenges in the manufacturing facility. HSSMI were brought in to use advanced manufacturing simulation tools to model the warehouse area in order to:

- Assess requirements for new equipment and facilities
- Configure and optimise part flows
- Assess warehouse requirements
- Plan for the effects these changes will have across the plant, in areas such as logistics.

THE CHALLENGE

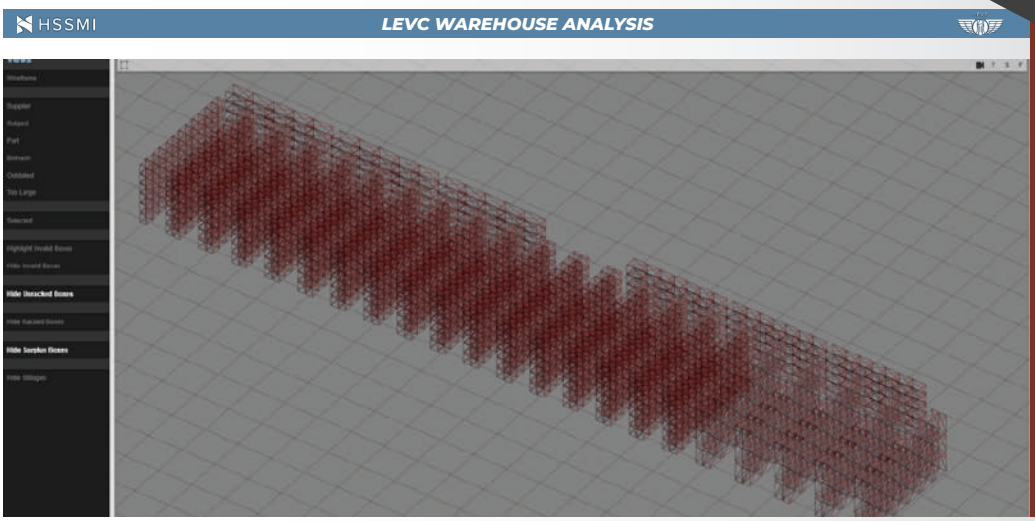
Introducing a new product presented challenges in how the warehouse is managed. The current facility was reaching its capacity limits as production increased and there was concern over whether the facility would cope with higher volumes in the future.

This problem meant seniors at LEVC needed to consider options of improvement, expansion, or moving to just-in-time (JIT) delivery systems for more parts. HSSMI was able to help the decision-making process by undertaking a data analytics study, using bill of materials and warehouse data.

This work was carried out as part of an APC and Innovate UK funded project. Project No. 113071.

Innovate UK

ADVANCED PROPULSION CENTRE UK

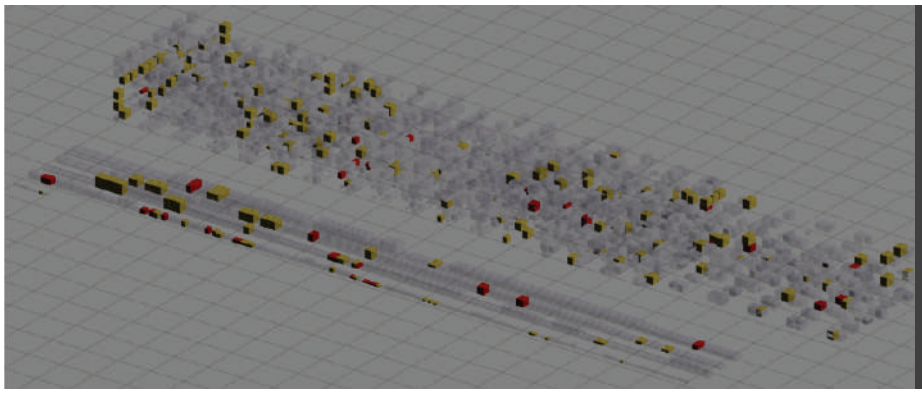


WEB VIEW OF THE DEVELOPED WAREHOUSE SIMULATION TOOL

THE APPROACH

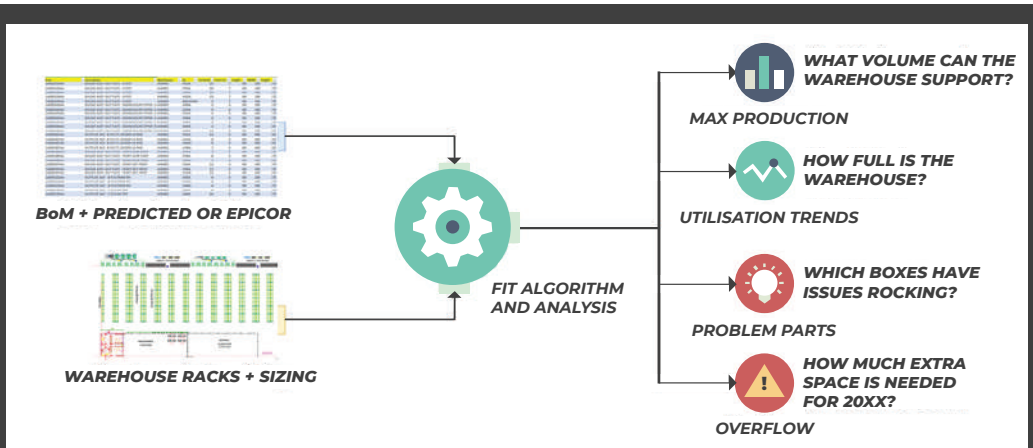
The approach was to analyse how the current warehouse was being filled and determine its maximum capacity based on the current space and the box sizes of the parts coming in. To get an accurate answer, HSSMI created a 3D model of the warehouse, and algorithmically matched the location and box sizes of parts in the facility. This was done by creating a data workflow, developing a dedicated Python program and a d3.js 3D visual in a web browser.

By using a Python workflow, HSSMI could change the configuration in the current warehouse or change and expand the current warehouse to view how parts would fit using the anticipated part flows. Alongside the 3D view, different statistics were also calculated – rack utilisation, how many of the racks were used for each supplier and so on.



HIGHLIGHTING PARTS BASED ON VARIABLES–SUPPLIER, SIZE, REQUIREMENTS ETC.

PROCESS USED FOR THE WAREHOUSE



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THE RESULTS

Once the algorithms were created, it was easy to reconfigure the model for different potential scenarios. HSSMI considered the options of increasing the width of racks, adding new racks, adding new facilities, and what impact moving some of the larger parts to a JIT system would have, based on guidance from LEVC.

The outcome of this study gave LEVC a precise set of data to base their future considerations. This was taken up to the senior levels at LEVC to help drive their decision-making process. The results have helped LEVC redesign their warehouse in a cost-effective manner to optimise use of the space, as well as offering clear guidance on what additional space they will be needing in the coming months and years. This helped LEVC make the correct investment decisions for their business and ensure the logistics department have the correct support they need.

With the tool now developed, LEVC can quickly consider other scenarios in the future too, should the need arise. The tool can also be used to periodically assess the current performance of the warehouse and receive useful feedback, all from a web browser view (including on mobile devices).

"The VN5 adds a further 600+ parts into storage and handling at LEVC and, particularly when combined with business volume growth plans through 2021 & 2022, presented a clear challenge. The modelling undertaken enabled us to develop multiple reconfiguration options that could act as intermediate solutions to part density and volume growth. The analysis led to a more strategic approach, looking at the longer term requirements for the business, particularly in line with an ever evolving global supply chain for components, and avoiding the sinking of non-returnable capital expenditure. The analysis enabled LEVC to correctly formulate its footprint requirements through the growth years of 2021 & 2022, determine facility specification requirements that would complement either capital investment or operational overhead decision-making at an executive level within the business."

Lee Boyce, LEVC Manufacturing Engineering Manager

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