HSSMI

SUCCESS STORY:

USING SIMULATION TO PLAN NEW PRODUCT INTRODUCTION

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, and necessitated an analysis of potential changes in part flows, as LEVC wanted to make sure that the integration of the VN5 to its production lines would be as seamless as possible.

HSSMI were brought in to use simulation tools to model the body assembly area. By doing so, the flow parts could be developed and optimised, without the need to disrupt the line and the ongoing production of the TX5 (Taxi). Many vital decisions needed to be made for the area, such as what investment is needed, where stations should be placed, and when and how parts should feed into the system. HSSMI included these factors into the simulated model to provide clarity to LEVC decision makers before any choices were made.

THE CHALLENGE

The production of the VN5 is highly complex. Its body assembly area involves five adhesive lines that automate the application of the adhesive, which holds the lightweight aluminium frame together. These five lines feed the parts to sub-assemblies before the vehicle comes together on the assembly line.

To alleviate the complexity, a new system for part routing needed to be designed and implemented before the start of production later in 2020. The challenge was to design an efficient movement of parts, allowing for full traceability, clear visibility, and balanced timings to avoid bottlenecks.

It was also anticipated that, as sales of the TX rise alongside the addition of a new product, the increased demand would mean that the cycle times for different areas need to improve, ideally without increasing buffers or losing any efficiency.

Through simulation, HSSMI was able to provide clarity on all these issues and enable more robust decision-making at LEVC.

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

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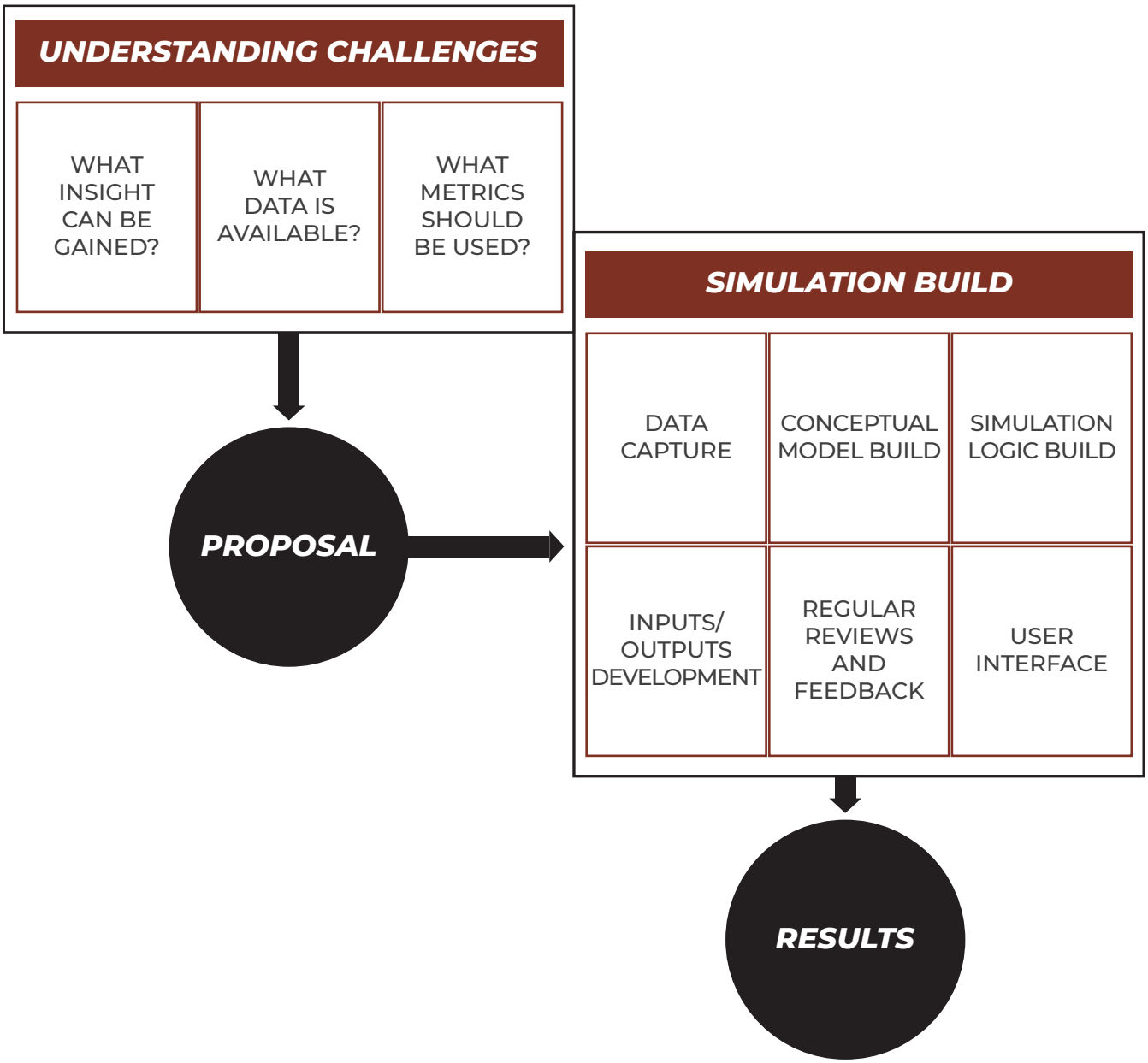
THE APPROACH

The work involved detailed reviews of plans and data at LEVC, then several model iterations both for accuracy and later for optimisation. The model was developed with variable timings for each station, and a user interface to adjust various settings that might be considered. For example, the option of new investment was added in scenarios where the purchase of new facilities was being considered. Then they could be tested in different scenarios to assess their impact. It was also important to choose the correct metrics for reviewing the scenarios. These were focused on utilisation of several stations, waiting times in key areas, and total production volumes.

HSSMI also modelled the changeover between the two vehicles (the TX and the VN5) to see what impact this would have. This was a key consideration for LEVC, as it needed to be done smoothly, with minimal disruption. Modelling the changeover gave the option to try out different methods and gain a better understanding of when to load parts. This helped assess the importance of having faster or automated changeover in key areas and weighing the benefits up against the investment required.

Regular reviews were carried out together with LEVC to discuss results as the model developed and ensure accuracy. The simulation was based on a layout provided by LEVC to ensure accurate distances and help quickly explain results with a view that is familiar to the workers.



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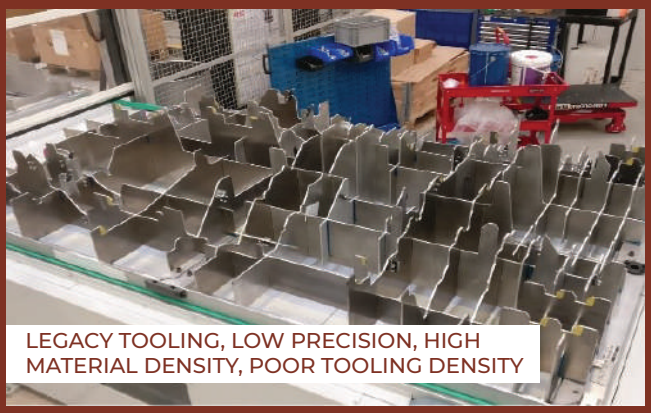
THE RESULTS

- Extensive scenario testing and increased data to aid decisions on investments, production planning, and changes to the lines
- Downtime during product changeover has been reduced by 75% from original estimates
- The number of buffers between stations has been reduced by 33%
- A new parts loading system was tested in the simulation and is now being implemented by LEVC's IT team. The ability to simulate complex areas gave LEVC the confidence to purchase equipment and push ahead with implementation for production, having virtually validated the system.
- The simulation can now be used as a demonstrator/training tool for operators on the line. Given its 2D and 3D view, the simulation can be used to explain part flows and provide an understanding of what needs to be done for production.



LEGACY TOOLING, LOW PRECISION, HIGH MATERIAL DENSITY, POOR TOOLING DENSITY

LIGHTWEIGHT TOOLING, HIGH PRECISION EXECUTION, REDUCED COST

"The simulation designed by HSSMI helped to factually navigate our approach and ensure that the project could be effectively executed within both the time and financial constraints. This simulated approach also delivered several optimised conditions for some TX legacy processes and systems, hence a win-win. The collaborative approach taken resulted in an improved definition of our processing principles, significant cost avoidance and decreased lead time for all new bespoke equipment and tooling. It has also enabled us to better communicate all envisioned changes and their benefits to the internal customers of LEVC."

Lee Boyce, LEVC Manufacturing Engineering Manager

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