Enhanced Digital Capability through the use of Simulation in Footwear Product Creation

BUSINESS PROBLEM

Digital capabilities have been identified as a key growth opportunity for footwear companies. The goal is to increase speed to market by reducing the average product creation timeline, in large part through an end-to-end digital strategy. A Product Creation Center serves as a nexus of collaboration, creation, and education in footwear, and may be seeking to evolve its capabilities by investing in performance-focused digital tools. Specifically, this project investigated Finite Element Analysis (FEA) simulation programs and other design-aiding software as tools for improving design process flows while generating cost and time savings.

DATA SOURCES

Information about digital capabilities was obtained through a state-of-the-art literature review, speaking with simulation experts, exploring existing internal knowledge through stakeholder interviews at the host site, observing internal processes, and shadowing work in a product creation center.

Data Types and Format

Qualitative data obtained through stakeholder interviews, CAD models, physical test data from 3D-printed models, and outputs from FEA software programs (stress, strain, and displacement data)

APPROACH

Information was gathered by interviewing key stakeholders and researching state-of-the-art simulation tools in product creation. Potential areas of analysis related to digital simulation capabilities were identified, and one example was detailed through a technical case study on the performance of soccer cleats. A cost-benefit analysis of the investment requirement for this example was developed.

Author: Zoe Hinton
Enhanced digital capabilities have the potential to enable better decision making in the product development process at footwear companies. While there are no regulations or standards to be met as is usually the case in other industries that utilize tools like FEA, simulation is still valuable in footwear creation when comparing relative design features and models. One benefit of FEA is the potential to increase communication between designers, engineers, and manufacturing partners. Teams can test and iterate on multiple designs without making a physical sample while being able to visually communicate product behavior to designers. Design teams can have increased confidence in their products earlier in the design process as opposed to waiting for physical testing. FEA can also help save critical time and cost. FEA saves some cost by eliminating the machining of tooling needed for additional physical sampling rounds. But most importantly, teams can avoid waiting longer lead times to receive samples. Enhanced digital capabilities can also contribute to a company’s sustainability goals by reducing materials and tooling used for physical sampling.