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## **Optimisation and simulation of an e-bike manufacturing system: the case of a small assembly factory**

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**Abstract:** The production possibilities of electric bicycles range from simple assemblies to in-plant production of main components such as the engine or frame. In Mexico, small companies were the first to produce e-bikes; however, this sector faces the lack of theoretical tools for the design and implementation of their manufacturing systems. The purpose of this study was to develop a simulation model of an e-bike manufacturing system that maximises the system productivity. The model was developed using the DES methodology proposed by Jerry Banks and was implemented in Anylogic™ software. The design and analysis of experiments was performed using Minitab® software. The simulation time was defined according to the user, so the working time was 160 hours per month, producing a daily unit. The results indicated that the maximum system productivity was 300 units per year. The best times achieved were: 2.35 units per hour, for the material flow, for welding 1 h, for the turning process 0.58 h and finally for the electrical assembly 0.66 h.

**Keywords:** electric bicycles; sustainable transportation; optimisation via simulation; manufacturing throughput; discrete event-simulation; Anylogic™; decision-making; OpQuest™.

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