

Modeling and simulation of the EMG30 Geared motor with encoder resorting to SimTwo: The official Robot@Factory Simulator

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This paper describes the EMG30 mechanical and electrical modeling and its simulation resorting to SimTwo (Robot@Factory mobile robot competition official simulator). It is described the developed setup applied to obtain the experimental data that was used to estimate the actuator parameters. It was obtained an electro-mechanical dynamical model that describes the motor, its gear box and the encoder. The motivation to model and simulate the EMG30 is the fact that it is an actuator worldwide popular in the mobile robotics domain, being a low cost 12v motor equipped with encoders and a 30:1 reduction gearbox. The Goal of this work is to provide more realism and new features to the Robot@Factory official simulator, allowing participating teams to produce and validate different robot prototypes and its software, reducing considerably the development time.

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Concept of the System for Optimization of Manufacturing Processes

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This paper deals with the optimization of manufacturing and logistics processes with the support of progressive computer simulation approaches. It briefly discusses systems and tools developed at the University of Zilina, from the Laboratory of Intelligent Systems ZIMS, through the use of emulation and software as a service, to own computer applications based on Genetic Algorithms (GASoS, GASoS2), scheduling of custom production (SSEM) and metamodeling (SAGME). The alignment of developed tools is represented in the system OSMAP.

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FMEA as Applied to Electronic Manufacturing: A Revised Approach to Develop a more Robust and Optimised Solution

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Failure Mode and Effect Analysis (FMEA) is a proactive tool used to identify, evaluate and prioritise potential weakness or failure modes in a given system. As with any methodology, familiarity leads to scrutiny. The more a particular method is utilised, the more questions are asked and inevitably the more weaknesses are found. The FMEA is no different. From its early stages of development with NASA, the FMEA has evolved into an industry accepted methodology used across varied fields from pharmaceutical, to military to automotive. It is this widespread use which has exposed the FMEA to various questions and critics. This paper will discuss a body of research which aims to dissect the FMEA process with particular focus on the perceived weaknesses documented in the available literature. Following a full and detailed literature review, the next phase of this research work will be to identify an optimum FMEA solution for use in the Electronics Manufacturing industry. All findings, recommendations and modifications will be trialed and proven in a high volume automotive electronic manufacturing environment across a number of global manufacturing sites.

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Solid Wood Panel Manufacturing Using Low Quality Materials

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Low-value hardwoods are not used to its full potential because they possess a challenging economic proposition to entrepreneurs in search of profit. In particular, high extraction and processing costs for low-value and underutilized hardwoods are not offset by products that carry a high enough value to customers to assure favourable economics. Thus, the low-value biomass is not used sufficiently in U.S. forests to support sustainable quality forest management practices. Furthermore, economic opportunities are lost for rural economies and forest landowners. The main purpose of the project described is to design the manufacture of a high value product from low-value hardwood timber achieving positive economics, thereby assuring the efficient and effective use of the resource. In particular, the project assesses the markets and the technical potential for manufacturing solid, finger-jointed edge-glued hardwood panels from low-value hardwoods. In fact, the technical feasibility of manufacturing edge-glued panels has been proven and is a major product of wood components manufacturers in the U.S. However, the use of low-value hardwoods for this purpose has not received much attention. This study intends to fill this gap by conducting an exhaustive analysis of secondary sources to assess raw material availability for such panels from low-value hardwoods. Also, appropriate processing routes to achieve competitive target prices while assuring positive economics are investigated.

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