

Modelling electrical energy consumption in automotive paint shop

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ABSTRACT

Industry players are seeking ways to reduce operational cost to sustain in a challenging economic trend. One key aspect is an energy cost reduction. However, implementing energy reduction strategy often struggle with obstructions, which slow down their realization and implementation. Discrete event simulation method is an approach actively discussed in current research trend to overcome such obstructions because of its flexibility and comprehensiveness. Meanwhile, in automotive industry, paint shop is considered the most energy consumer area which is reported consuming about 50%-70% of overall automotive plant consumption. Hence, this project aims at providing a tool to model and simulate energy consumption at paint shop area by conducting a case study at XYZ Company, one of the automotive companies located at Pekan, Pahang. The simulation model was developed using Tecnomatix Plant Simulation software version 13. From the simulation result, the model was accurately within $\pm 5\%$ for energy consumption and $\pm 15\%$ for maximum demand after validation with real system. Two different energy saving scenarios were tested. Scenario 1 was based on production scheduling approach under low demand situation which results energy saving up to 30% on the consumption. Meanwhile scenario 2 was based on substituting high power compressor with the lower power compressor. The results were energy consumption saving of approximately 1.42% and maximum demand reduction about 1.27%. This approach would help managers and engineers to justify worthiness of investment for implementing the reduction strategies.

KEYWORDS:

Automotive industry; Computer software; Cost reduction; Discrete event simulation