

Topic: Energy Assessment of Steel Wheel Manufacturing in Thailand

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ABSTRACT

This study focuses on a major steel wheel manufacturing company located in the Well Grow Industry Estate in Chachoengsao, Thailand. The objective of the research is to investigate the energy consumption associated to steel wheel manufacturing (gate-to-gate assessment), major contributing units and possible options for improvement. Data were collected from each unit process of the company and calculations made based on a number of basic rules and assumptions. It was found that a large amount of electricity is consumed to satisfy the high and constant production of steel wheel with about 291 kWh of consumed per tonne of product. The total energy consumed on an annual basis was found to amount to about 164 TJ, i.e. about 3,330 MJ per tonne of product. In comparison to another similar still wheel manufacturing process in EU, this requirement in energy appears to be large as about twice higher (about 1,730 MJ per tonne of product is consumed in the EU's case). This energy consumption is contributed at 87.4 % by electricity, 10.2 % by LPG, and 2.4 % by diesel. Most of the electricity consumed is from the compressor, i.e. about 31% of total electricity consumption. The production of steel wheel from steel sheet appears to be efficient as only 16 % of scraps are produced as compared to 29 % in the EU's case. In terms of energy cost, it was found that 85.4 % of the total cost is contributed by electricity followed by LPG with 10.9% and diesel with 3.7 %. If the steel wheel manufacturing company investigated in this study could improve the energy efficiency of its operation and reach that reported for the EU's steel wheel manufacturing company, cost saving could reach 830 THB per tonne of product, which is about 40 million THB per year.

Keywords: Steel wheel manufacturing, Energy consumption, Energy conservation, Energy efficiency, Energy cost, Thailand