Pinit Fuangkamolwesh 2014: Life Cycle Assessment of Mechanical Machine Manufacturing for Steel Industry. Master of Engineering (Engineering Management), Major Field: Engineering Management, Faculty of Engineering at Si Racha. Thesis Advisor: Assistant Professor Sirang Klankamsorn, Ph.D. 151 pages.

Mechanical machine manufacturing industry is concerned as a heavy industry that has mass consumptions of raw material, mainly on steel, and energy. The manufacturing processes use different types of machining that lead to environmental problems. The government regulation, ISO 14000 series (14040, 14041, 14042 and 14043) and social requirement has an important role to force the manufacturer to control and develop the sustainable management strategies to protect the environment. The main problem in developing such an efficient plan is a lack of environmental impacts data. The objective of this research proposes the gate to gate life cycle assessment of the machine manufacturing since raw material acquisition, transportation and production. The life cycle inventory was developed to evaluate the carbon dioxide emission. The manufacturing processes compose of preparation fabrication heat treatment sand blasting painting machining hardening surface (heat treatment nitriding induction) assembly and packing. The case study is conducted in a large machine manufacturer in Thailand. The procedure is to quantify the materials and energy consumptions, outputs and wastes that are released from processes by using the commercial software SimaPro version 7.3 to evaluate impact assessment of environment and Carbon dioxide emissions in the production process as a results of study found that transportation process is released an emissions of carbon dioxide to 1.84 CO_2 equivalent and production process is released an emissions of carbon dioxide to 26.76 CO_2 equivalent that hardening process is a maximum value of carbon dioxide emission and impact on the environment The assessment results in the study will be used to develop the carbon reduction plan, energy conservation and environmental management policies of the industry.

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Student's Signature Thesis Advisor's Signature