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AGGREGATE PRODUCTION PLANNING WITH OUTSOURCING FOR WIND TURBINE MANUFACTURING PROCESS

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Thesis submitted in fulfillment of the requirements for the degree of

Master in Engineering Management

Faculty of Mechanical Engineering

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This topic has not been submitted to any other academic institution or non- academic institution for any degree or qualification.

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I hereby declare that I have read this thesis and in my opinion is sufficient in terms of scope and quality for award of the degree of Master in Engineering Management.

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ABSTRACT

The purpose of this research project is to understand and propose solutions to the process of manufacturing of wind turbine by resolving the instantaneous high demand issue faced by the company. The research project focuses on the production planning that the company should employ and decide whether it is feasible at all to take on the new demand and the cost savings if the company involves outsourcing some of the components to local vendors/suppliers. By studying and evaluating the current facility and resources of the company, the research is able to analyze factors contributing to the current total cost, which are the production, inventory and man-hour (regular and overtime) costs. By introducing a set of formulation to represent the objective of reducing cost and its bounded constraints, Linear Programming (LP) method was utilized in coming up with the optimized production planning. The results shows that the cost for the total manufacturing amounting to RM14,163,700.00 while an option of outsourcing will result in savings of RM218,100.00 for the manufacturing of the 200 units within the duration of 24 months. The issue of outsourcing motive, risk and ways to mitigate them are discussed extensively in the discussion section, suggesting that the company should take extra precaution and build closer relationship with multiple suppliers to instigate trust and healthy working environment. This whole research is about finding the optimal solution, if the company decides to start the project, and maximize profit to satisfy stakeholders involved.

Keywords: Project Supply Chain Management, Linear Programming Method, Outsourcing