Theeppipat Surapeepong 2007: An Application of Computer Simulation and Value Stream Mapping for Roasted and Ground Coffee Plant. Master of Science (Agro-Industry Technology Management), Major Field: Agro-Industry Technology Management, Department of Agro-Industry Technology. Thesis Advisor: Mrs. Parthana Parthanadee, Ph.D. 112 pages.

Roasted and ground coffee industry has been growing rapidly in the last ten years and becomes one of the highly competitive businesses in Thailand. By investigating production processes and improving production efficiency, companies could gain a competitive advantage for this business. In this case study, a small roasted and ground coffee producer was selected. The main products of the company are products Z and T. The total sales of the company are growing rapidly and continuously, causing the current production capacity to become insufficient. The objectives of this study were to determine appropriate ways to improve efficiency in the production process of the plant and to improve the resource utilization rates. The techniques used included computer simulation modeling technique for imitating the real production system, and Value Stream Mapping (VSM) for identifying non-value-added activities and eliminating them from the current production line. Three alternatives to improve product efficiency were evaluated through the use of computer simulation model. These alternatives were: (1) rearranging the production schedule on the two roasting machines; (2) determining the appropriate number of workers at the sorting operation, which is the bottleneck of production line, and rotating them to other operations after their main job is finished; and (3) adjusting the operating schedule of the workers at the packing operation for product T.

Computational results from the simulation model showed that: (1) sharing the resources in the roasting operation could significantly balance the workloads between the machines and between the human operators and reduced the idle time and the job waiting time; (2) appropriately increasing the number of sorting workers that could be rotated to other operations after the main job was finished would decrease the cycle time, the average worker utilization rates, the average overtime working hours, and the occurrences of overtime at the sorting operation; and (3) changing the operating schedule of the workers at the packing operation of product T resulted in a significant improvement in the average utilization rates of all resources and reduction in the idle time from waiting for the preceding jobs in the production line.

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