

Salinee Chuayyok 2014: Productivity and Cost of Para Rubber Logging Operations in Surat Thani Province. Master of Science (Forest Engineering), Major Field: Forest Engineering, Department of Forest Engineering. Thesis Advisor: Assistant Professor Wanchai Arunpraparat, D.agr. 137 pages.

The aim of this study was to evaluate the potential of existing harvesting operations of Para Rubber and operating costs. Data was collected in three different Para Rubber plantations in Southern of Thailand, Surat Thani Province. Each studied plantation has their own distinguish harvesting operations in terms of harvesting patterns and harvesting tools. Work study was applied for data collection in order to measure the working time and the amount of work done, and to investigate all the factors that influence the efficiency of the system being studied. Multiple regression was applied in this study to find the best fit models for time consumption.

The results showed that the harvesting operations in Para Rubber plantations can be divided into four work phases: felling, extraction, processing, and loading. For felling phase, felling can identified into felling inside of cutting block, and felling on border of felling block. Chainsaws are the key equipment for felling inside of cutting block, whereas farm tractors are applied for felling on border of fell in block mainly use for direction control. Based on the results, average time consumption for felling inside and on border of cutting block were 0.97 and 2.17 minutes per work cycle, respectively. Average skidding time by tractor was 8.12 minutes per cycle. Mean processing time was 4.07 seconds per cubic meter. In addition, there were two different loading methods: by manpower and loader. Mean loading times were 0.31 and 10.31 minutes per cycle, respectively. Multivariate regression was applied for the modelling and examined the factors that influence the productivity. The results showed that the felling time most likely depended on stump diameter, tree height, and walking distance. Skidding distance and the number of logs per cycle had an influence of skidding time consumption. Processing time relied on the number of log, log diameter, and log length. Loading operation depended on loading methods, operating distance, and the number of logs. The overall felling productivity for inside cutting block and on border of cutting block were 59.22 and 18.82 m<sup>3</sup>/h, respectively. Skidding and processing productivities were 8.85 and 14.73 m<sup>3</sup>/h, respectively. The productivities of loading by manpower and loader were 14.33 and 42.51 m<sup>3</sup>/h, respectively. From eco-nomic point of view, cost of felling inside cutting block were twofold higher than cutting on border of cutting block (74.28 bath/m<sup>3</sup> and 36.52 bath/m<sup>3</sup>, respectively). Costs of skidding and processing were 80.30 and 20.69 bath/m<sup>3</sup>, respectively. Cost of loading by manpower is two times higher than loading cost by loader. Cost of loading by manpower and loading were 41.52 and 19.60 m<sup>3</sup>/h, respectively. .In summary, using chainsaw for tree felling is rather preferred than using farm tractor, since it saves time and operating cost. Furthermore, in loading phase, loader provides a better productivity and less operating cost compared to manpower. Thus, applying of loader in loading phase is recommended.

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Thesis Advisor's signature