学 位 論 文 要 旨

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題　目	Study on the rational log production and sales evaluation methods in the Osumi region (大隅地域における合理的な素材生産・販売の評価手法に関する研究)

The added value of logs at a log production site is determined by the bucking process, using a processor or an equivalent tool. Buckers work to increase profitability in the nearest area, based on the latest market prices.

Although the information obtained during the processes of log production and log sales are important for forestry management, opportunities to use this information are very few.

In this study, I collected information in real time at the log production site and examined the possibility of using the obtained log information.

I found that the log utilization yield for Sugi in Osumi area in Kagoshima, Japan was almost the same as the value reported in literature. In addition, when the frequency of appearance of log grades was analyzed using the shape ratio as an index, the shape ratios of small bent log (B) and bent log (C) were observed to be correlated.

Following this, the trunk curve formula of the felled tree and the logging method were analyzed, and the average selling price of the log was calculated from the log sales record. Based on these data, I deduced the standard harvested tree size and trunk shape of the Takakuma Experimental Forest of Kagoshima University and made a Takakuma Model based on a simplified bucking pattern.

Using this model, I estimated the timber volume of log production and the predicted value of the log sales amount and compared it with the actual log sales amount. Our results showed a high positive correlation between the log volume and the log sales amount.

Finally, based on the log analysis results of the Takakuma Model, a total of 21 log production patterns were evident, based on the 4 m and 3 m logs, mainly produced in the Takakuma Experimental Forest.

It is known that these patterns can be divided into three categories, high price range (First stage), medium price range (Second stage), and low price range (Third stage), depending on the sale value per cubic-meter and the average for each stage. The unit price and volume were derived. I observed a very high positive correlation between the actual log sales amount and the estimated value in the actual number of logs sold, regardless of the stage.

Therefore, for the purpose of estimating and visualizing the sales amount of standing trees in the Takakuma Experimental Forest, the number of standing trees per hectare was calculated from the forest register data of the experimental forest and the tree apex of the LIDAR data acquired in 2012. The sales amount was calculated for each forest sub compartment, and a price map was created for the southern area of the Takakuma Experimental Forest (about 1,000 hectares), where many logs are produced.