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Comparative analysis of four estimation methods of stand volume and different staged measurement and analysis of sub-compartment output volume in Eucalyptus stump area

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In order to seek a simple and high-precision method of estimating stand volume and master output volume changes during the process of harvesting-transportation-sale, this study took an operational sub-compartment of Guangxi Stora Enso Forestry Co., Ltd(SEGX) as a sample, considered harvester over-bark data as true value of stand volume and under-bark data as original reference value of output volume. Four measuring methods that Strip sampling, Circle sampling, tally and Angle Gauge plot were adopted to estimate stand volume. Their precision were analyzed by being compared with true value. Log volume was measured for three times which were pile measurement, truck measurement and sale. Results showed estimating precision of Strip sample, Circle sample and tally were all above 90%, satisfying the requirements of sampling precision. Though precision of tally was the highest, its workload was also the largest. Lower precision measured by Angle Gauge was 87.2%, mainly caused by many factors such as slot error of its own, sampling point displacement and so on. For many operational units with large area and complex terrain, it's not easy for sample plot inventory. In this case, measuring by Angle Gauge strictly according to the requirements of technology is still recommended to obtain a higher inventory efficiency. For logs, the error between pile measurement and truck transportation was bigger (13.9%), and others were reasonable(±10%). Advices for SEGX are showed as follow: (i) strengthen technical training of harvester & forwarder operators and cullers to improve harvesting & forwarding quality and measurement accuracy. (ii) Establish a reasonable test standard for work handover to make sure the internal work goes methodically.