

Analyzing and Estimating Delays in Harvester Operations

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Abstract

Delays are recognized as being one of the major factors that limit productivity in most forestry operations and are therefore an integral part of most time studies. However, delay events are erratic in both occurrence and magnitude and are therefore difficult to precisely quantify within the relatively short observation period of a typical time and motion study. This paper analyzes the delay component of thirty-four harvester time study data sets that were recorded between 1998 and 2006. All the studies were designed and carried out by the same principal investigators. The data sets were all based on harvesters either harvesting or processing. Three delays categories were used: mechanical, operator and other. Delays averaged 28.9% of the total scheduled time for all 34 studies, comprising of 7.1% mechanical, 4.7% operator and 17.1% other delays. Delay averages were compared within category description assigned to each data set for statistical significance. Example results include: total delays were higher for operations working on hot decks versus cold decks, and operations working in natural forests had more than twice the overall delays compared to operations in plantations. Machines that both felled and processed had higher mechanical delays than machines used just for processing,. Interestingly, dedicated harvesting machines had higher operator delays than excavator-base units.