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Integrated transportation tools to optimise timber and biomass supply logistics

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To facilitate the decision making process during scheduling and to help forestry transport managers organise their fleets, the CRC for Forestry in direct collaboration with the Australian Forest Industry developed a truck scheduling system called FastTRUCK. The system creates the schedules by a simulation and a meta-heuristic (simulated annealing, SA) process minimising the total transportation cost, the number of trucks required and the waiting times at origins and destinations. The SA heuristics algorithm design allows flexible parameter management, which means complex, dynamic transportation problems can be optimised in a few minutes; this is a significant advantage for application to dynamic transportation management as compared to the more traditional optimisation methods. Transport and logistics managers are able to daily prepare a near-optimal as well as a set of good alternative transport schedules within a few minutes of running the algorithm. From a strategic and tactical planning perspective, Fast TRUCK has been demonstrated to be highly effective at testing scenarios and evaluate the sensitivity of the operation to likely changes in operating conditions. Some preliminary results indicate that savings in transport costs over 10% are possible to obtain with the implementation of FastTRUCK by the major Australian forest companies.

Although much success has been realised through the FastTRUCK optimised forest transportation, it has always been clear that translation to daily dispatch would be a challenge resulting in potential benefits being cut when considering implementation. Therefore is important to explore the integration of optimisation based decision-support into operational dispatch management systems. This project will test approaches to adapt optimisation to provide an automated system that prepares the best start condition for a day of transportation along with an associated provisional optimised schedule for the day. Practical application of the optimised starting approach will be evaluated initially by modelling scenarios with historical data and then through operational application, where the challenges and impacts will be documented and final adjustments made to be an operational solution. It is expected that this approach delivers between 10-25% reduction on transport cost compared to solutions provided by human dispatchers