

## Field Study of a Forwarder Trailer Concept – Lower Cost and Fuel Consumption at Long Distances

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### **Abstract:**

*In ground based transport of products from the forest to roadside the impact on the soil should be minimized, which implies small (i.e. light) loads and careful driving. However, economical rationality implies large loads and high speed. Recently, the concept of adding a trailer to a conventional forwarder has revived, with the objective to comply with both concerns and to fit into the current mechanized CTL system. Here we present the results from field experiments of the forwarder trailer concept compared to conventional forwarding at final felling operations. The tested forwarder's ordinary payload was 15 tonnes, and the trailer added another 10 tonnes. This increased the total travel time and fuel consumption during transportation, but resulted in a reduction of time and fuel required per forwarded tonne. To load and unload the trailer took longer time and required more fuel than for the forwarder. Thus, viability of trailer usage was dependent on the transportation distance. The results show that usage of the forwarder trailer should reduce fuel consumption for transportation distance over circa 300 m single way. Given the costs for the tested forwarder and the rather simple trailer (cost ca 20 000 €), the trailer should be cost-efficient at distances over circa 500 m. However, those distance limits are under more or less optimal condition (i.e. flat terrain). There was no recorded soil disturbance differences between forwarder with or without trailer, most likely due to the good bearing capacity of the stand's till soil. The field studies indicated some practical limitations with the tested trailer. The attachment of the trailer needs further development and some kind of load fixation should be considered, to prevent slippery logs to slide off in slopes. Moreover, the continuous use of trailers might harmfully stress the forwarder's crane and powertrain components, and should be evaluated before large scale implementation. Nevertheless, based on the results it can be concluded that there are environmental and economical potentials that warrant a further investigation of the forwarder trailer concept, which currently is tested in practice on several places in Sweden.*

**Keywords:** forwarder, ground pressure, productivity, cost-efficiency, fuel consumption, comparative field study