

# 5<sup>th</sup> Forest Engineering Conference

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## **Influence of wheel load and wheel slip on rutting in forest operations**

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The demand for raw timber is increasing in wide areas of the world. At the same time public is getting more sensitized to the impact of forest operations. The visible results of forest operations create problems with the acceptance of forest management. Especially rutting after harvesting and forwarding operations is seen very critical. Changes in the soil properties as a result of machine traffic are well known and documented. The main source for the negative modification in soil characteristics is often seen in the wheel loads applied by the machines used in forest operations. Thereby the loads cause soil compaction with increased bulk density and reduced pore volume. A second but often underestimated effect is erosion caused by high wheel slip. Independent of the driveline, the top most soil becomes loose by (wheel) slip and rutting is started.

Both treats to the soil occur parallel and it is hard to decide to which part wheel load or wheel slip causes rutting in forest operations. Tests with a forwarder will answer that question. Variation of wheel load is realized by fixed weights for the test machine while the changes in wheel slip result from a dynamometer winch with a specified control system. Tests will be done on different test areas, therefor with a fixed soil type at varying soil moisture contents. The results of the project can help to optimize forest operations for reduced rutting. Depending on the present soil conditions machines and equipment can be chosen with focus on traction or flotation.