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Flexible extra wheel-attachment to decrease ground pressure of a harvester

Authors: Öhman Mikael; Bergsten Urban; Nordfjell Tomas; Ågren Anneli

SLU, Sweden, mikael.ohman@slu.se

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Heavy vehicles used in forestry may create rutting, soil compaction and erosion of soil particles into aquatic ecosystems. Even though the use of bogies with tracks reduces rut depth and soil compaction, the rectangular contact area create shearing damage when turning. To reduce negative effects on soil the contact area should be increased on soft soils or in difficult terrain, and decreased when turning on firm ground.

In this study we evaluated a new technique (patent pending) where a flexible extra wheel and a track were attached to the single wheels on the rear part of a harvester. By this technique the contact area can be increased when needed. We compared the new and conventional techniques on a soft soil. The harvester was driven in reverse gear, eight passes (five blocks) in the same rut while soil compaction (cone penetration resistance) and rut depth was measured. We also quantified the support given by the new technique during crane work (sinking was registered).

Cone penetration resistance was higher (870 kPa) already after four passes with the conventional technique compared to the new one (650 kPa) and the rut depth was deeper from the conventional technique during all passes. The support given by the extra wheel and track reduced sinking during crane work. To conclude, the new technique giving increased contact area in a flexible way can decrease rutting and soil compaction and offer a more stable platform for crane work compared to a single-wheel solution, which is expected to increase productivity.