Forwarding on soft soils, comparison of rutting with and without wooden bridge sections

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Machines can be equipped with tracks, but sometimes this is not enough.
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Covering those logs with soil almost make a permanent road
In Swedish forestry today, it quit often looks like this after a harvest operation “on wrong side of a weak spot”. Pulp-wood or energy wood logs was used, making it possible to pass without sever soil damages
This way of reinforcing the forest ground is often used.

However, it also creates losses of wood volumes, even if the logs rather often might be used for low payed energy assortments.
Another option is to use “portable wooden sections” purpose built to drive on.
They can be used as a bridge over small creaks, but also just directly on the ground on weak spots. They are put in position with a forwarder.
The objective of this study was to document rut depths and soil compaction when using “portable wooden sections” in comparison with driving directly on the ground.

As far as we know, no real studies about this has been performed before.
A standard John Deere 1110 D loaded forwarder was used. The total weight was 28.5 tonnes including tracks on the rear bogie.
Materials and Methods
Soil compaction measurements

A Con-penetrometer was used
Soil compaction measurements

A Con-penetrometer was used

Before trials:
Con-index
1.6 – 2.5 MPa
Three pairs of comparisons
A very fine textured moraine soil
Rut depth measurements
Results
All three comparisons gave the same result
All three comparisons gave the same result. The rut depths were 4-5 times larger when not using wooden sections to drive on.
One of the comparisons more in detail
One of the comparisons more in detail

Already after one machine passing the rut depths significantly differed.
One of the comparisons more in detail

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After 20 passes, the difference in rut depth was at least 30 cm

≈ 42 cm

≈ 8 cm
The soil compaction then
The soil compaction then

When using wooden sections the con-index increased by 7-14%, but this increase was not significant for any of the 3 comparisons.
The soil compaction then

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Without wooden sections the Con-index increased by 23-58% and this was significant for all comparisons.
Conclusions

Wooden bridge sections do help to prevent severe soil damages, and should be considered in the ordinary planning of many harvest operations. They can be produced and used in all countries, so no excuse for not using them!
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The End

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