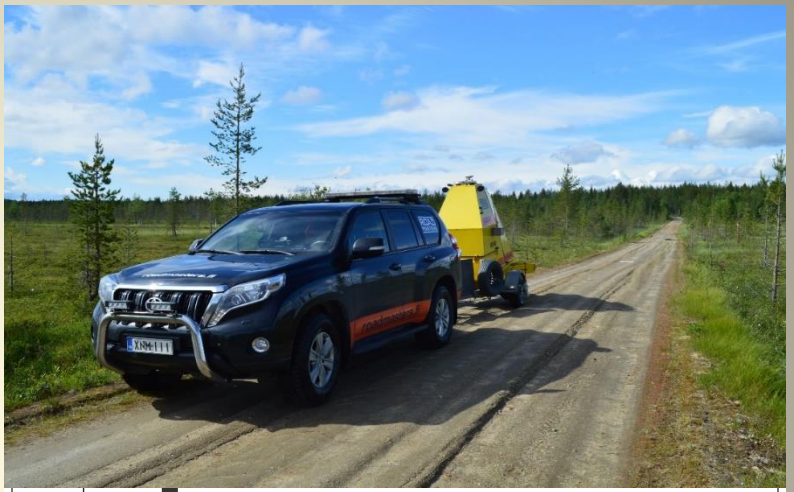
LEVITOI

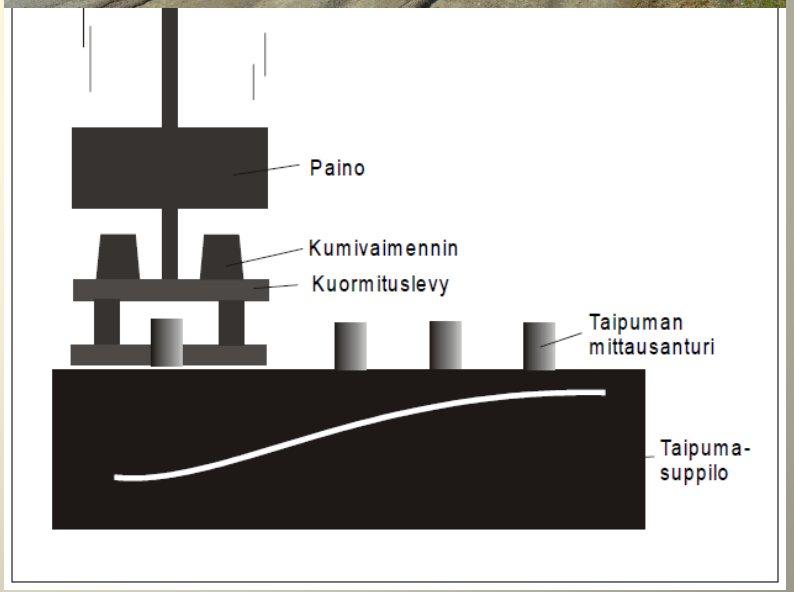
While-drive bearing capacity monitoring of weak surfaces

Sebastian Bussman
R&D Lead
West Coast Road Masters Oy

Project goal

- Current practice produce bearing capacity of roads to aid road improvements and estimate road feasibility for transports





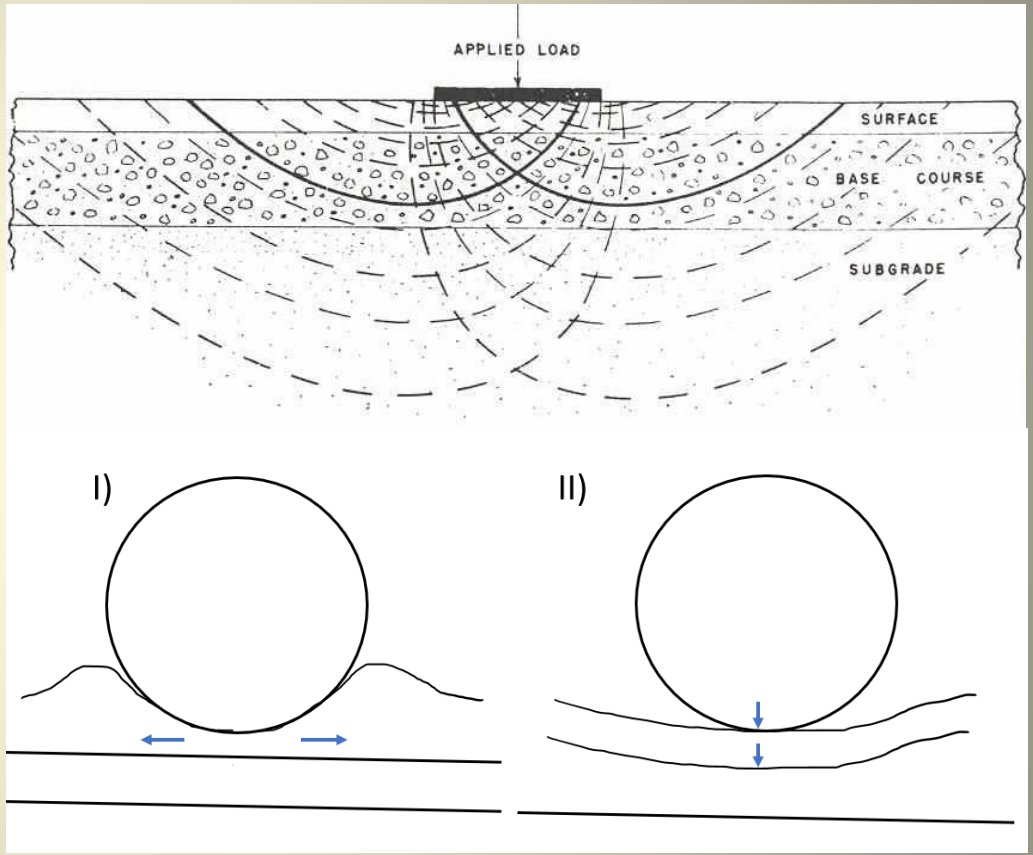
Project goal: Problem statement

with aid of the Levitoi-project, with its extensive soil and sensor testing

find a way

i) to produce continuous bearing capacity information, whereby the stopping the vehicle isn't needed

II) to identify the type of settlement



The setup

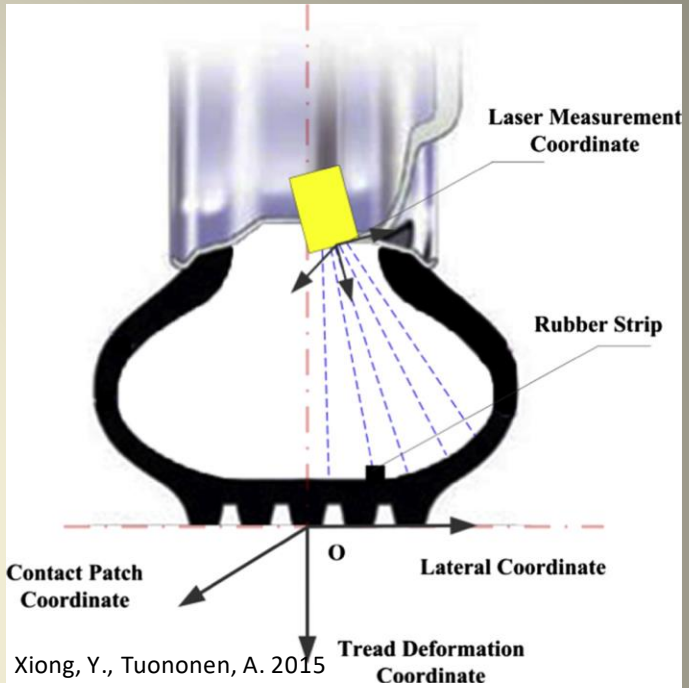
using initial observations, a sensor system was created, with sensors for monitoring

a) tire deflection

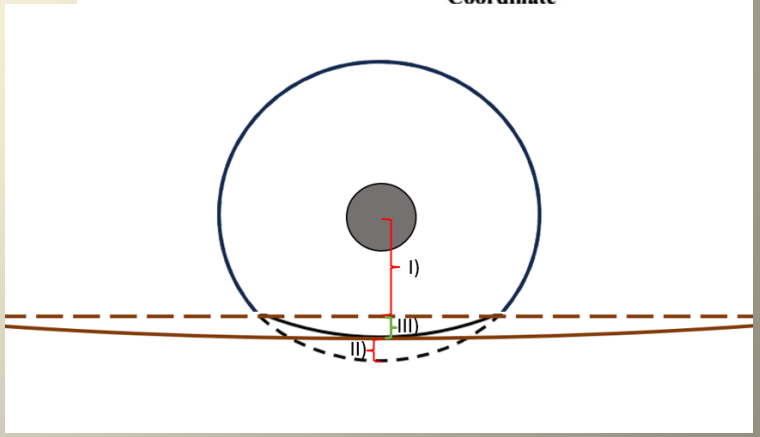
b) driving surface displacement

based on monitoring tire deflection and tire position in relation to original position of the driving surface, whereby driving surface settlement under the tire to be monitored

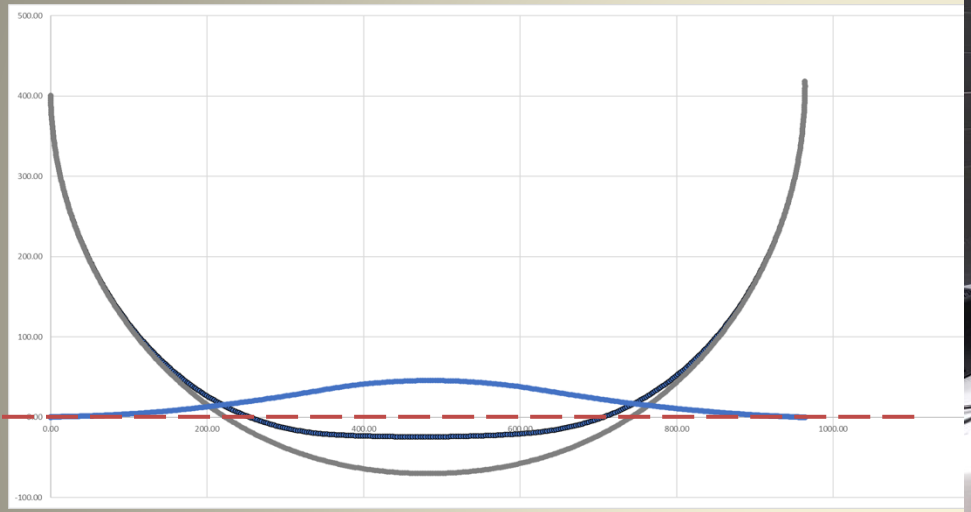
this combines both tire and vehicle and soil technics in a unique way



Xiong, Y., Tuononen, A. 2015

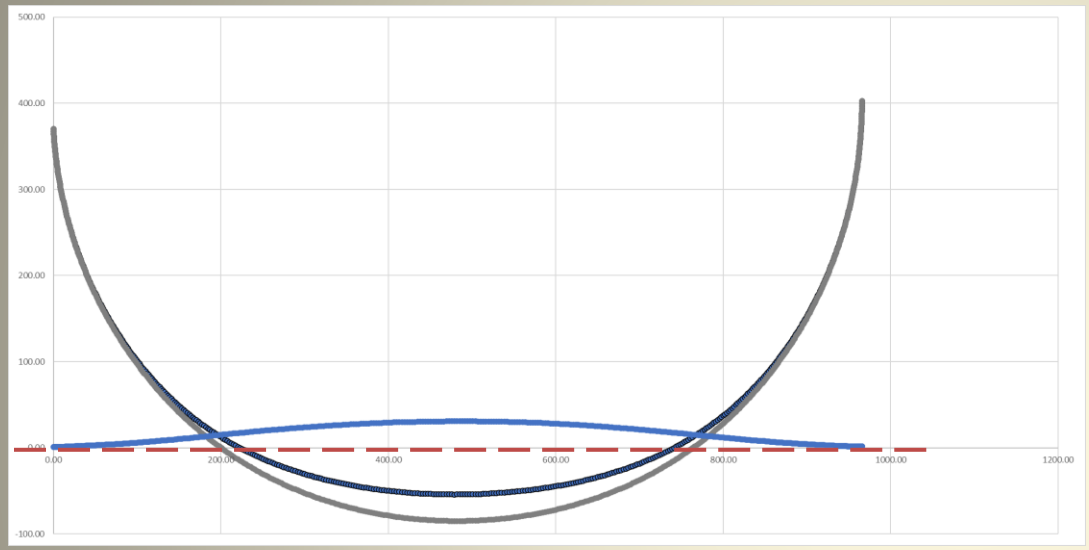


NRR test faculty



initial tests of the tire sensor were carried out at the NRR testing facilites

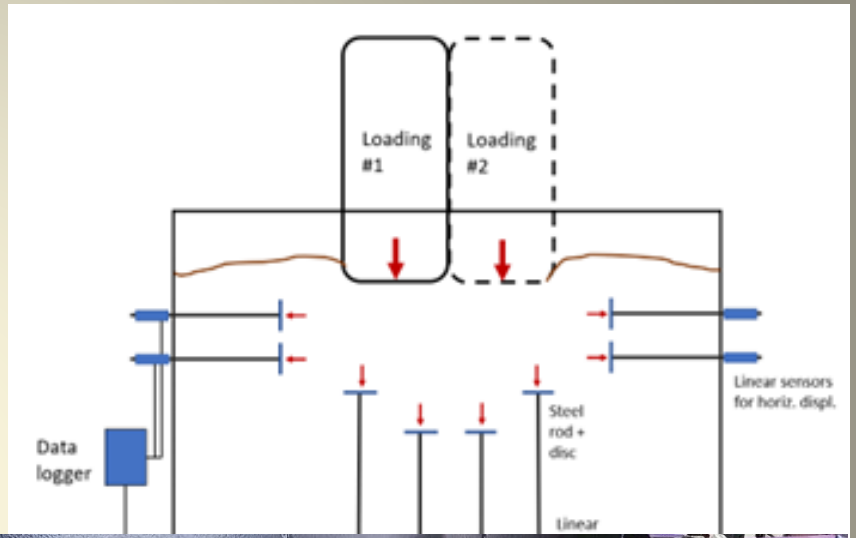
NRR test faculty

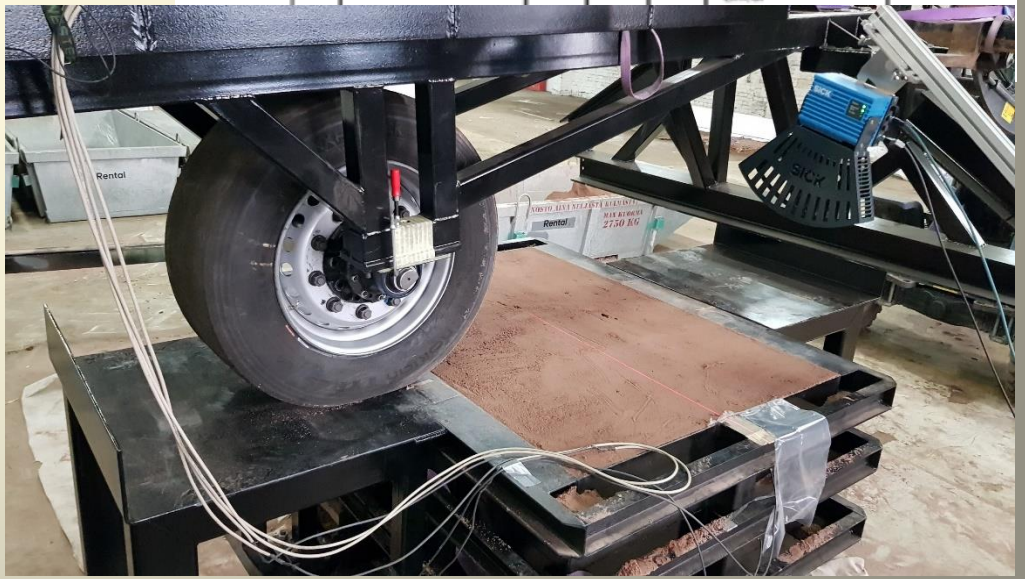


Soil-box: The setup

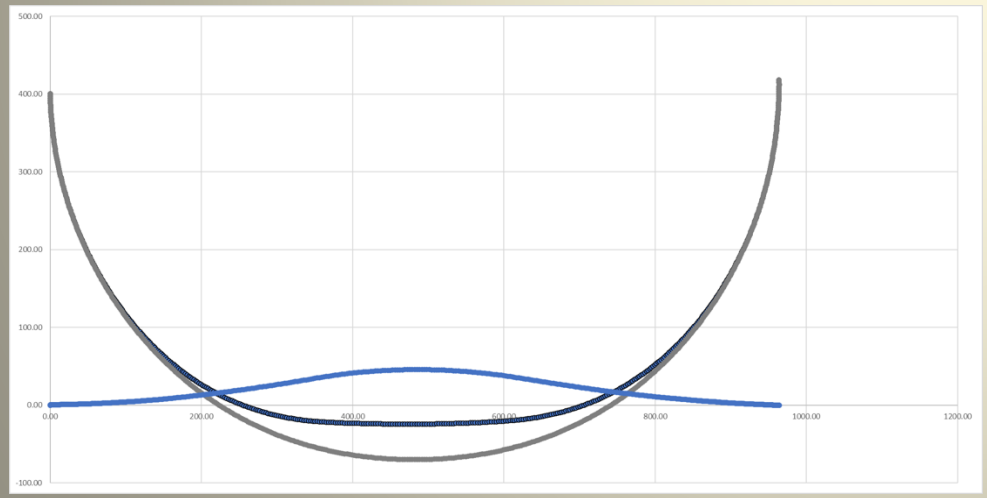
assessing the method required observations about both internal (with LUT) and surface (OAMK) deformations of driving surface

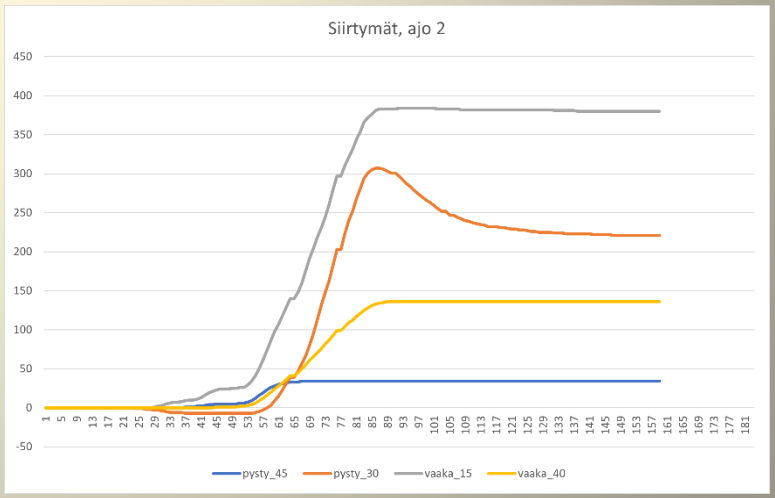
the soil-box allowed different soil types to be tested, as well as conmprehensive monitoring of internal and surface deformations



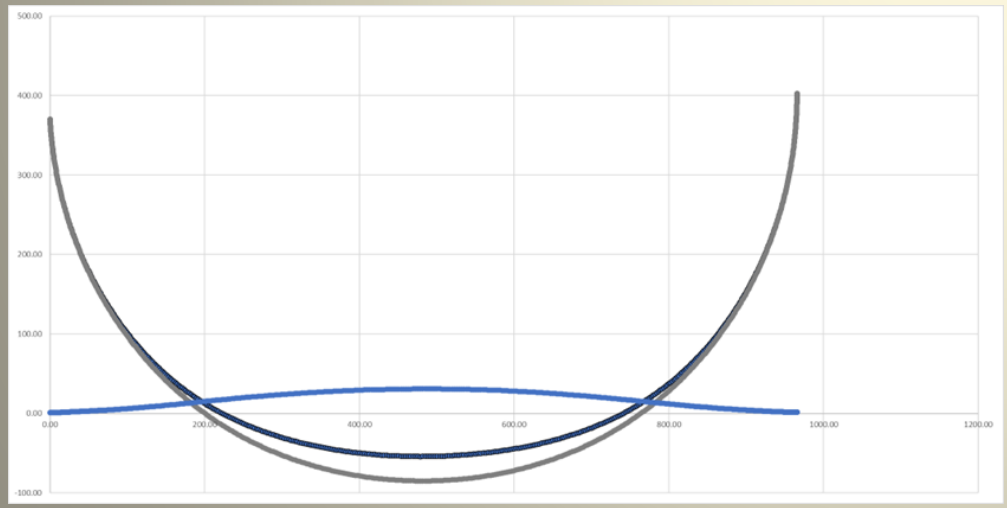


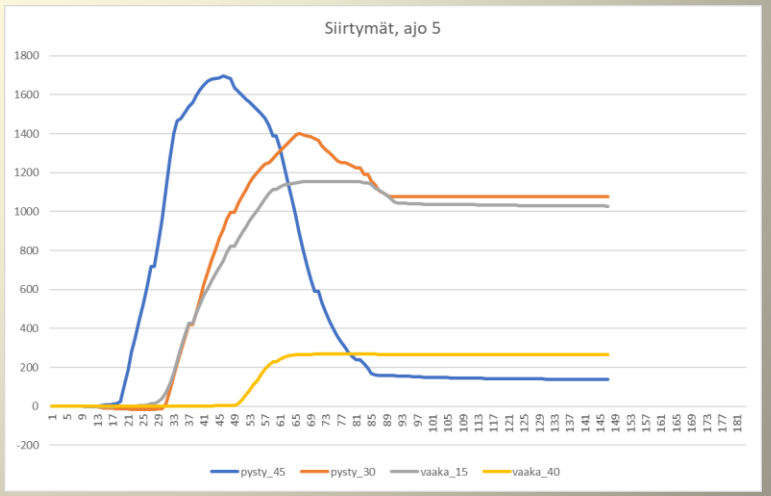
Soil monitoring, soil-box tests





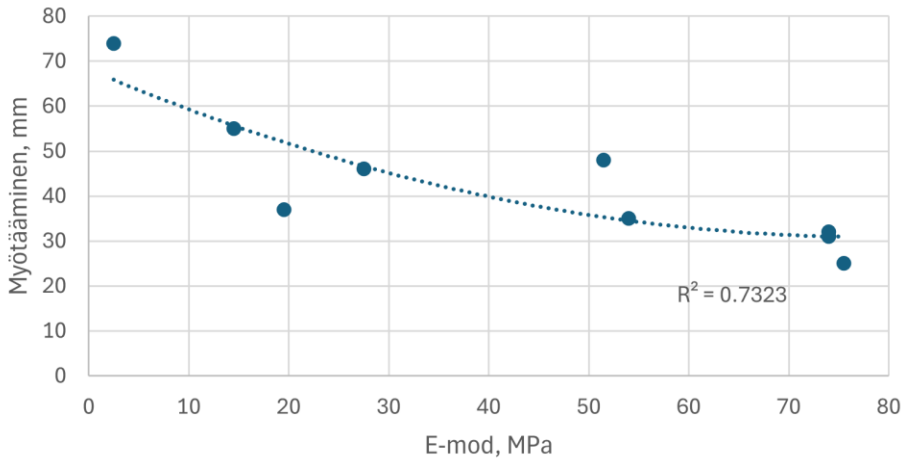
Soil monitoring, soil-box tests



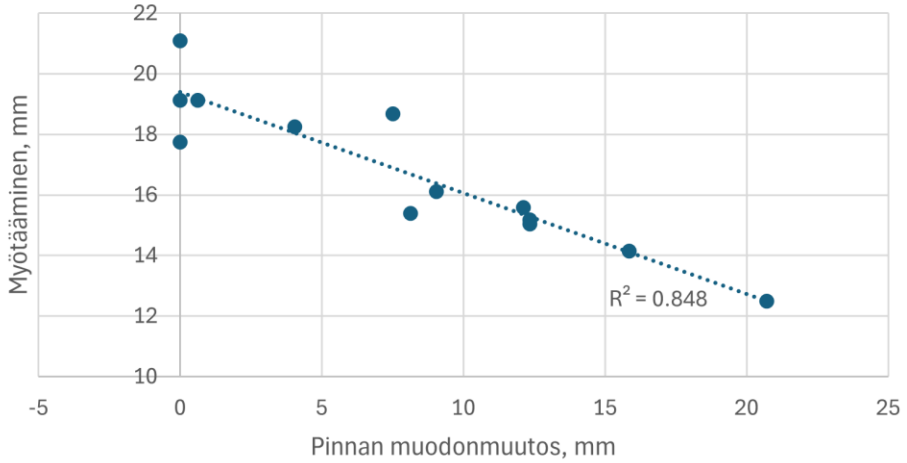


Soil-box tests: Test results

I)



II)

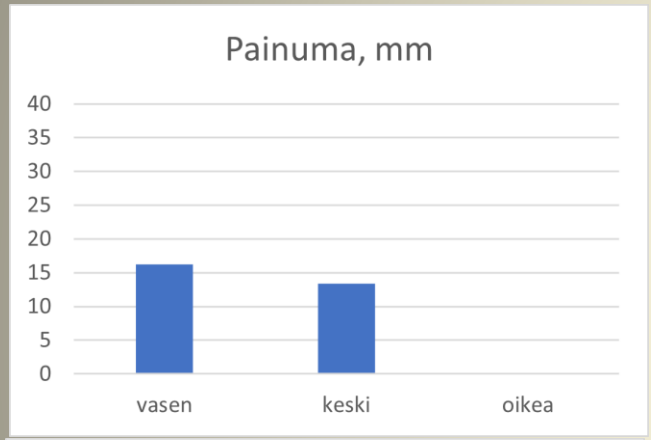


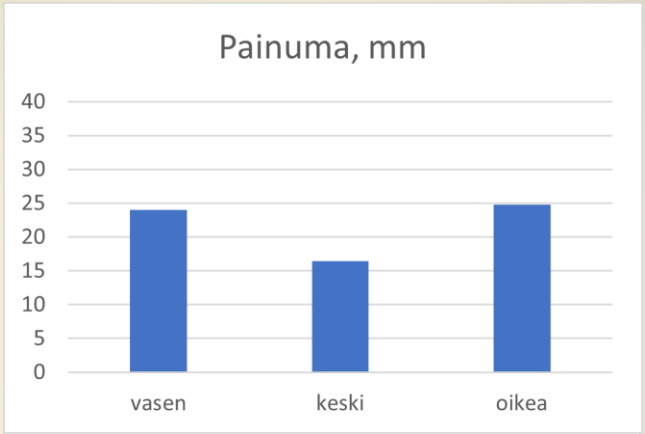
Field tests

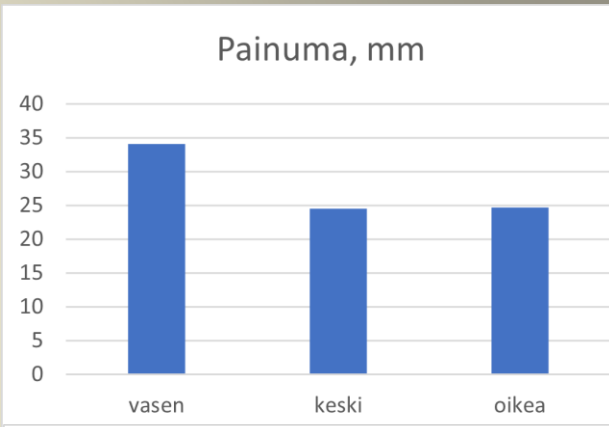
the method was tested in situ field tests

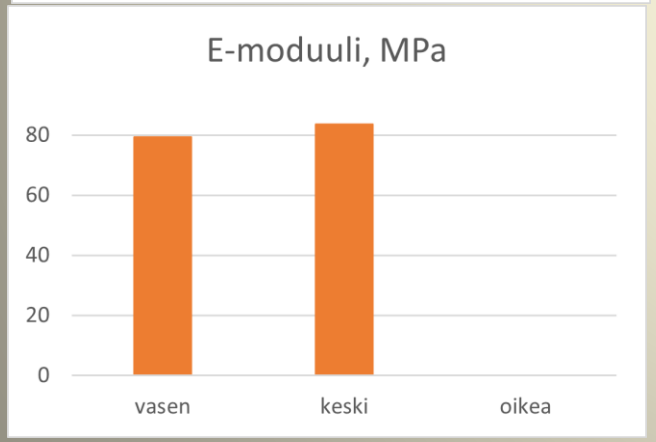
representing a selection of different soil types

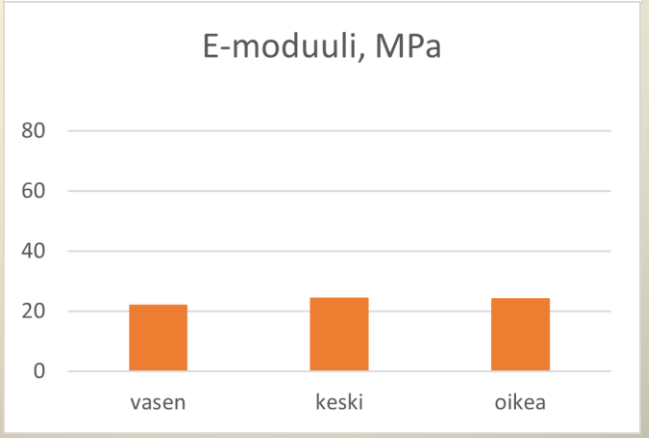
Field tests: Test results

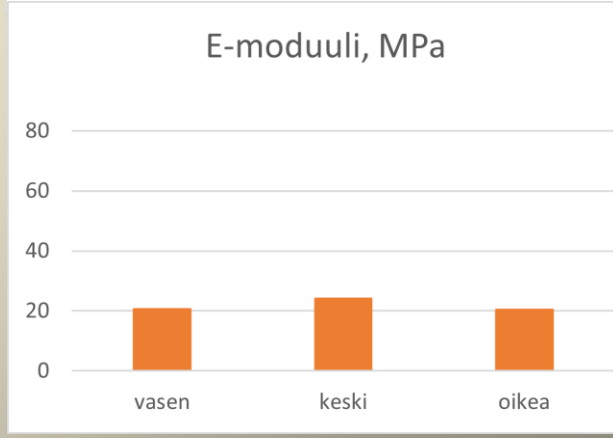






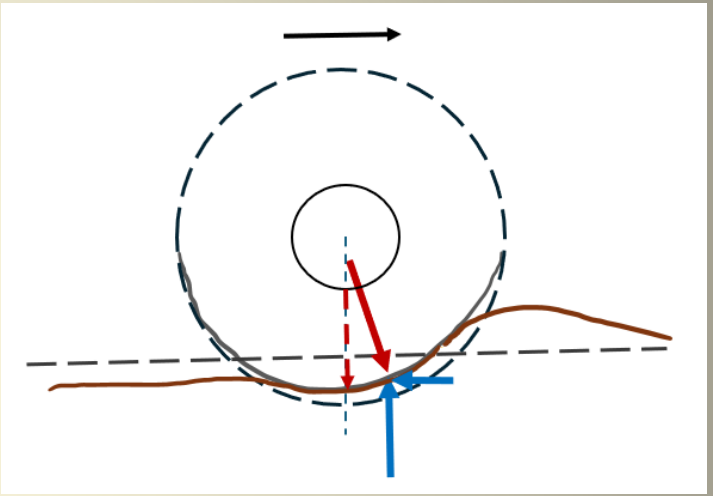






Field tests: Test results

will require adaptations and to both surface deformation and tire deflection monitoring sensors



Watt-1

due to the promising results,

the method is studied further a new project started April 2024

with the ultimate goal to produce a crowd-sourced bearing capacity