

LEVITOI

While-drive bearing capacity monitoring of weak surfaces

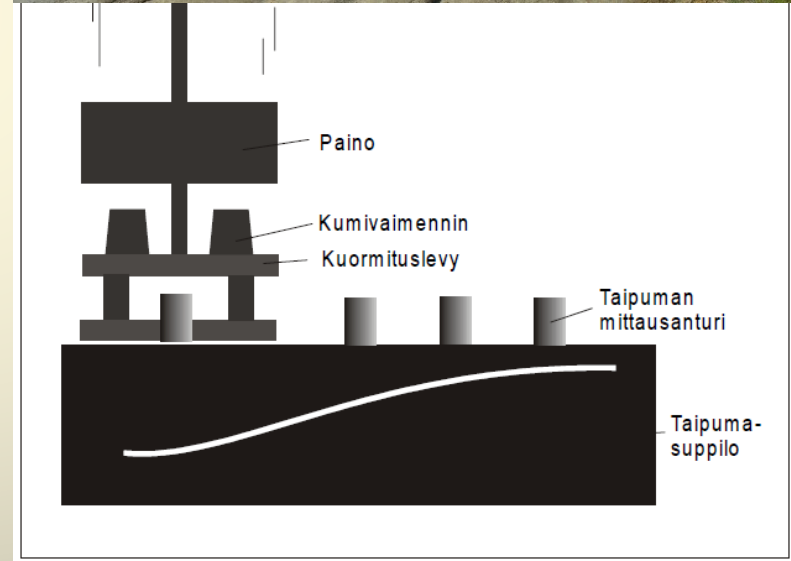
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R&D Lead

West Coast Road Masters Oy

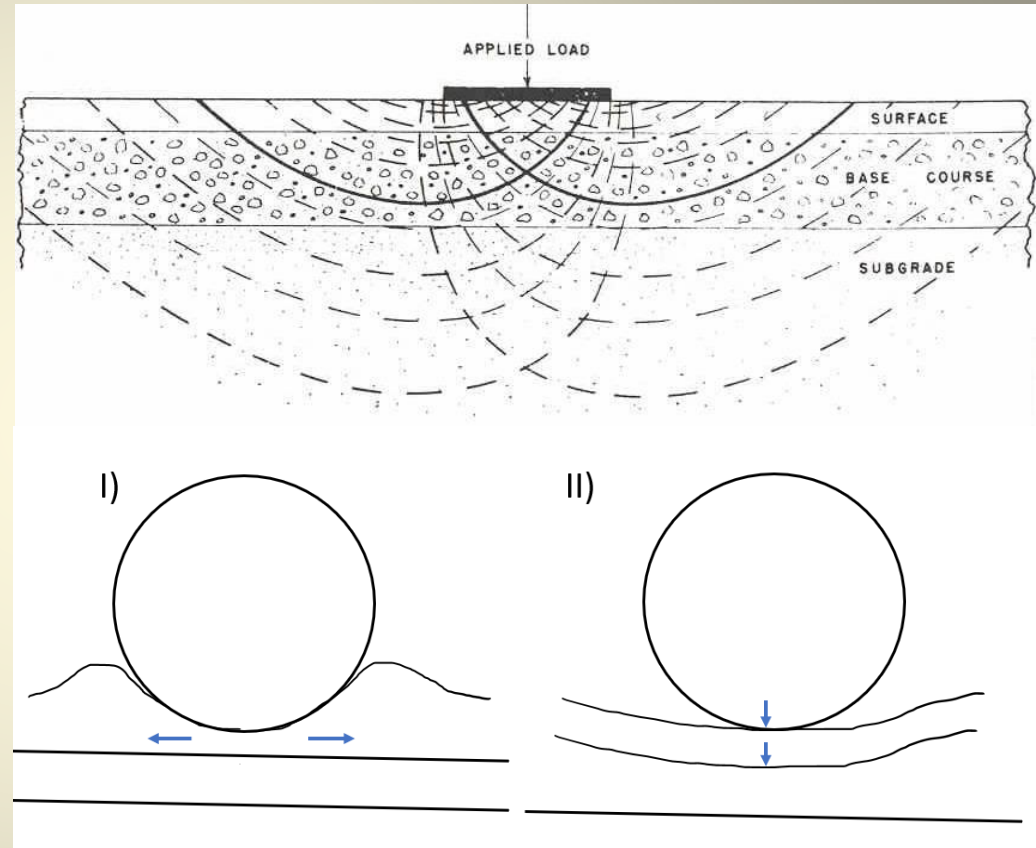
Project goal

- Falling Weight Deflectometer (FWD) measurements produce bearing capacity data to aid road improvements and estimate road feasibility for transports
- Frequent stopping required
- Elastic assumption: since developed for paved roads, results might be inaccurate



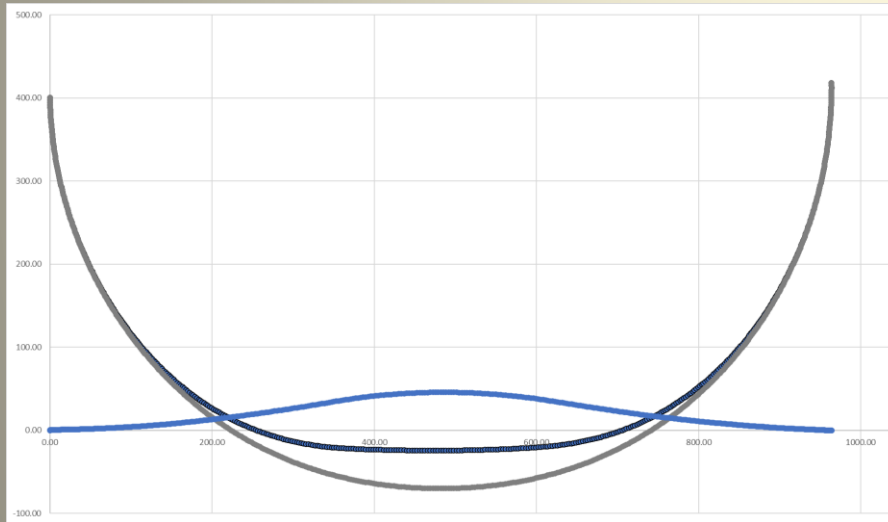
Project goal: Problem statement

- In the Levitoi-project, extensive research in sensor technology and soil mechanics was used to find a method to
 - produce continuous bearing capacity information
 - identify the plastic component of the deformation



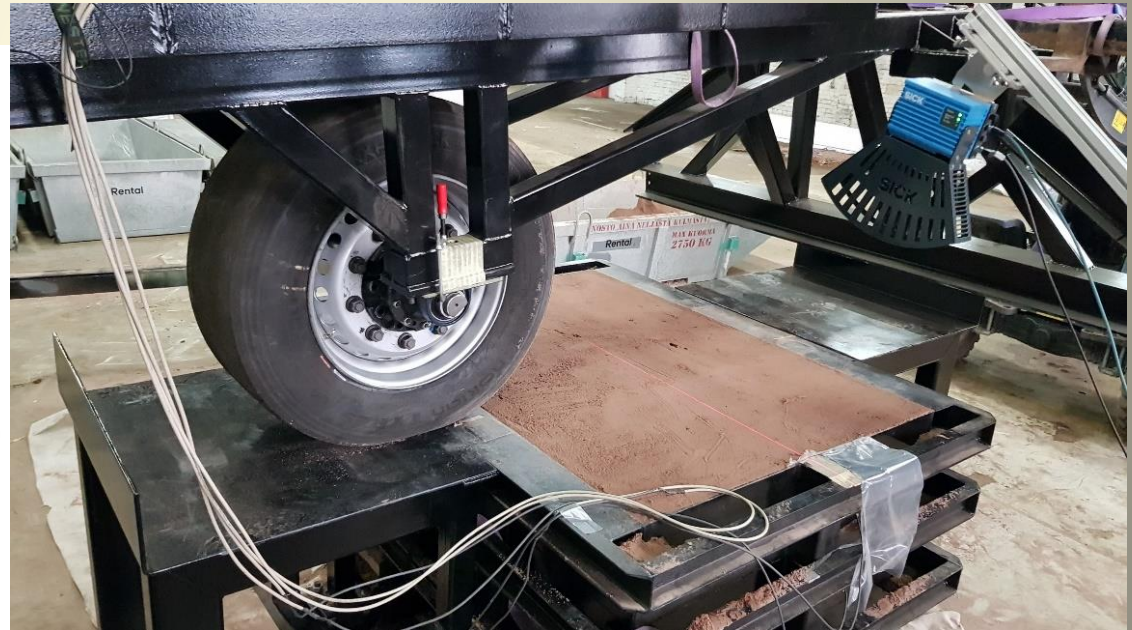
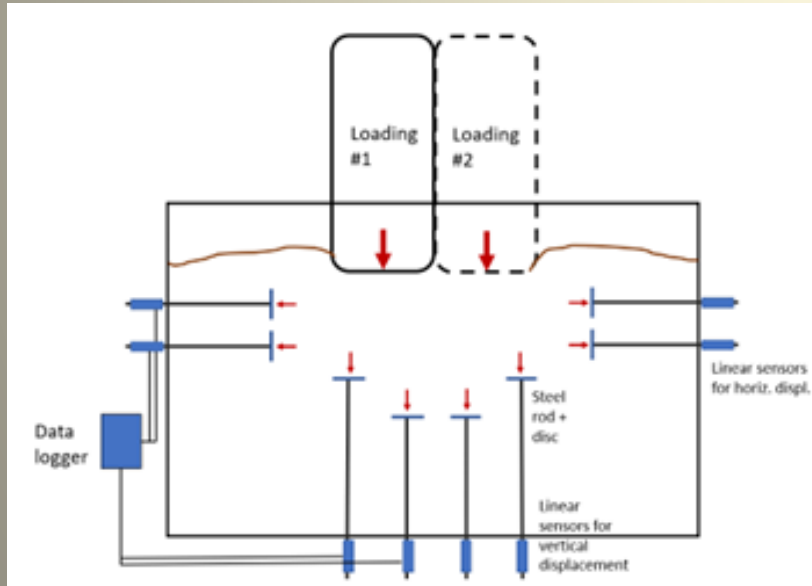
Method testing: NRR test facility

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



Method testing: Soil-box

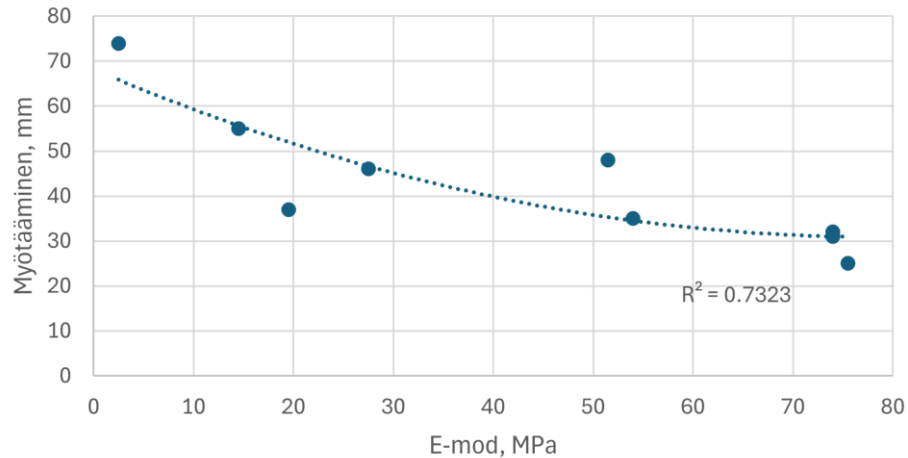
- to assess the method observations of both internal (with LUT) and surface (OAMK) deformations of driving surface were carried out
- a “Soil-box” allowed different soil types to be used, with comprehensive monitoring of internal and surface deformations



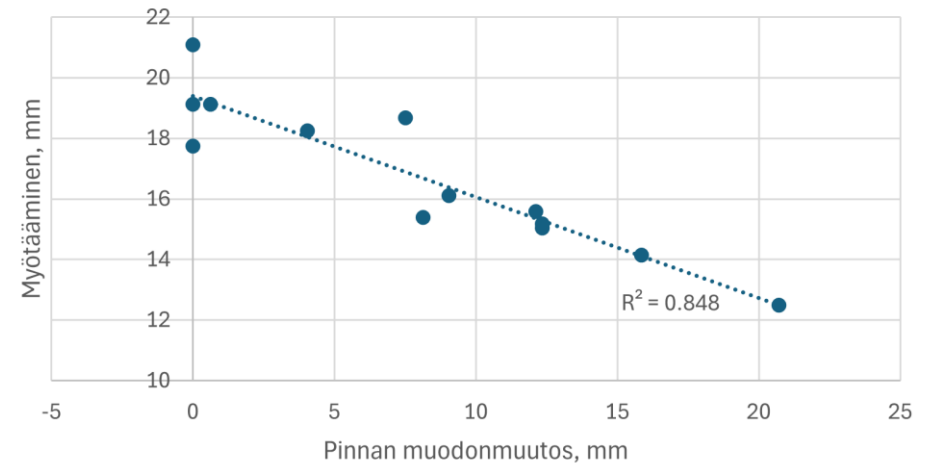
Method testing: Soil-box

- the system was found to allow both observation of the surface settlement (~ bearing capacity) and the amount of plastic deformation

E-moduuli vs. myötääminen renkaan alla



Maksimidefleksio vs. harjanteen korkeus

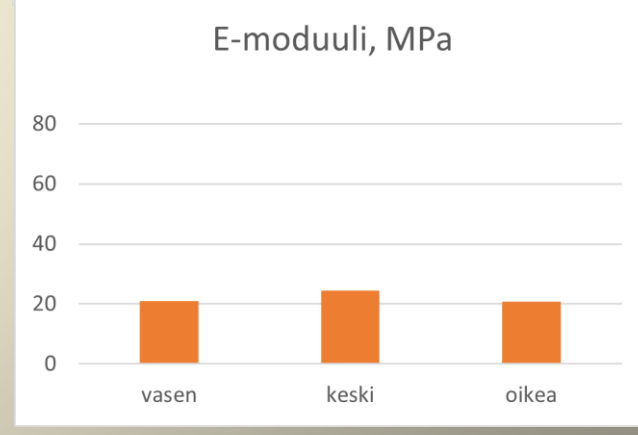
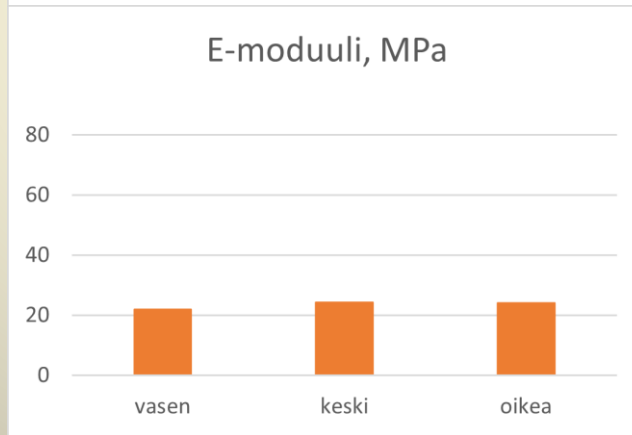
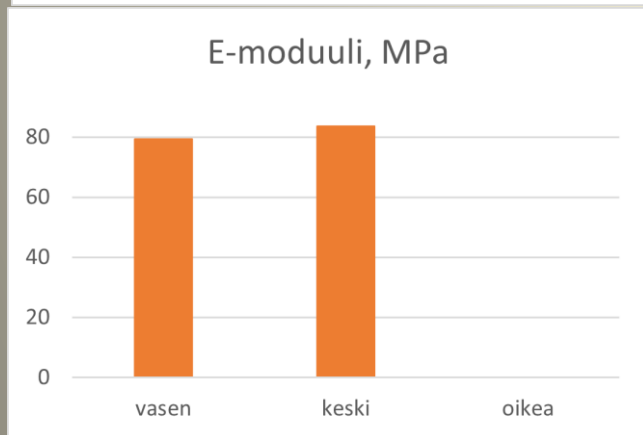
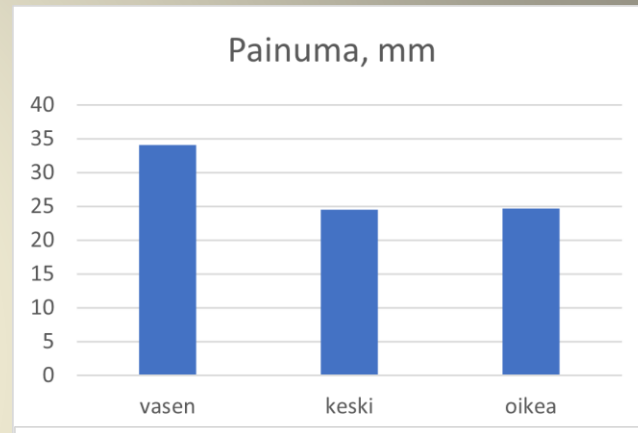
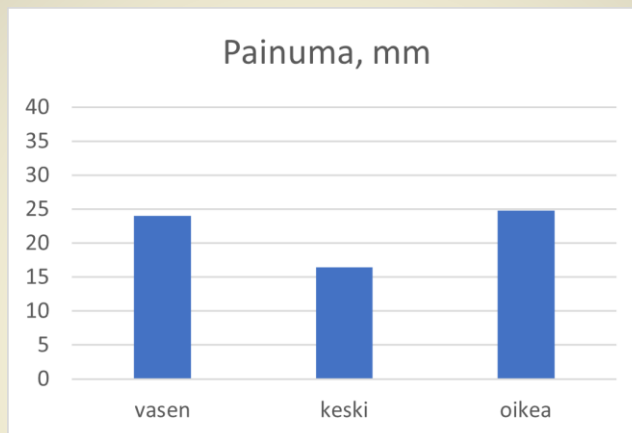
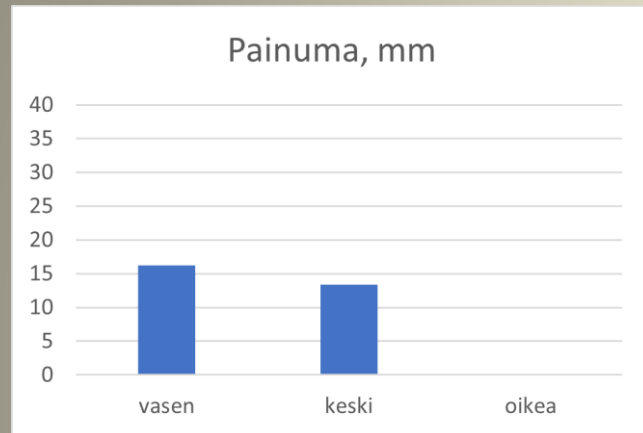


Method testing: Field test

- Finally, performance in field conditions was tested at several locations, with varying subgrades

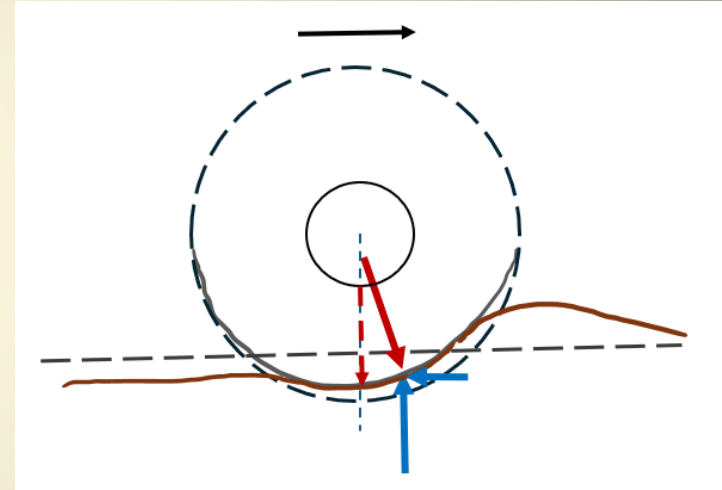


Test results; field tests



Further development; Soil wave

- Wheel will cause a “soil wave”, which affects magnitude and placement of tire deflection
- → will require adaptations to tire sensors, as well as additional sensing to monitor surface deformation



Test results; Watt-1

- owing to promising results, the method is developed further in a project started April 2024, named “Watt-1”
- here, the ultimate goal will be to produce a device allowing crowd-sourced bearing capacity monitoring