NEW MICROPILE DATABASE FOR WORLD WIDE USE

Jussi Hattara & Ville Hyyppä

TURUN AMMATTIKORKEAKOULU
TURKU UNIVERSITY OF APPLIED SCIENCES

wiseGEEK

BACKGROUND

o More than 200 underpinning projects in Turku

o One of the largest underpining projects complexes in the world

o There are several major cities – e.g. St. petersburg, Copenhagen, Amsterdam and Venice – that have either started or are in need of underpinning old buildings

o One of the goals of the FIN-C2M project is to further develop the old **DATU** (Database on Turku Underpinning Project) and **MIDA** (Micropile Databases)

o The first micropile database (DATU) was developed in TUAS (Turku University of Applied Sciences) in 2006.

o Completely new micropile database

    o Internet address: www.micropile.fi

TURUN AMMATTIKORKEAKOULU
TURKU UNIVERSITY OF APPLIED SCIENCES

INTRODUCTION

o Database includes
  o about 110 different micropiling project
  o almost 400 load tests and
  o close to 9000 micropiles
o Can store various details from micropiling projects
o The core of the database is formed by the old DATU and MIDA
o Accessible and inserting data with an internet browser
o The new Micropile Database is designed to handle all kinds of piling projects from around the world
o The data already in the database and additional data collected from new underpinning projects

DATA MODEL (1/2)

o   Data is stored based on the type of micropiling projects
o   Each project is linked to a construction types
o   Construction details include the basic details of the
  o   building, volume, area, year of completion, location
o   Include also cost details and the cost of the project, various observations made before, during and after, such as
  o   vibration, settlement, moisture, cracking, noise, water level and sampling hole observations
o   Load transfer structure details include the type and basic measurements of various components of the structure
  o   the type of the load transfer structure tells the basic loyout of load transfer components

TURUN AMMATTIKORKEAKOULU
TURKU UNIVERSITY OF APPLIED SCIENCES

DATA MODEL (2/2)
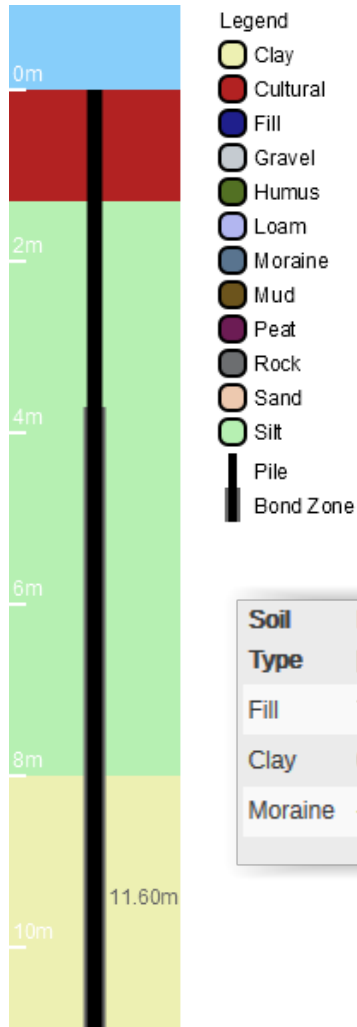
o Soil data is stored in layers
o Each site can have several columns on soil layers
o Each pile can be linked to a certain soil column
o Soil layers are characterized by soil type and few geotechnical parameters
  o soil type, elevations and undrained shear strength

Legend
- Clay
- Cultural
- Fill
- Gravel
- Humus
- Loam
- Moraine
- Mud
- Peat
- Rock
- Sand
- Silt
- Pile
- Bond Zone

| Soil Type	Elevation Top [m]	Elevation Bottom [m]	Undr. Shear Str. [kN/m^2]	Unit Weight [kg/m^3]	Median Particle Size [mm]	Clay [%]	Silt [%]	Sand [%]	Organic [%]	Friction Angle [°]
Fill	7.54	6.94								
Clay	6.94	-18.06	32.0							
Moraine	-18.06	-21.06								

VISUALIZATION (1/3)

o Several ways to visualize tha data in database
o Some visualizations can be drawn from the entire database such as the distribution of various piling methods used during each year
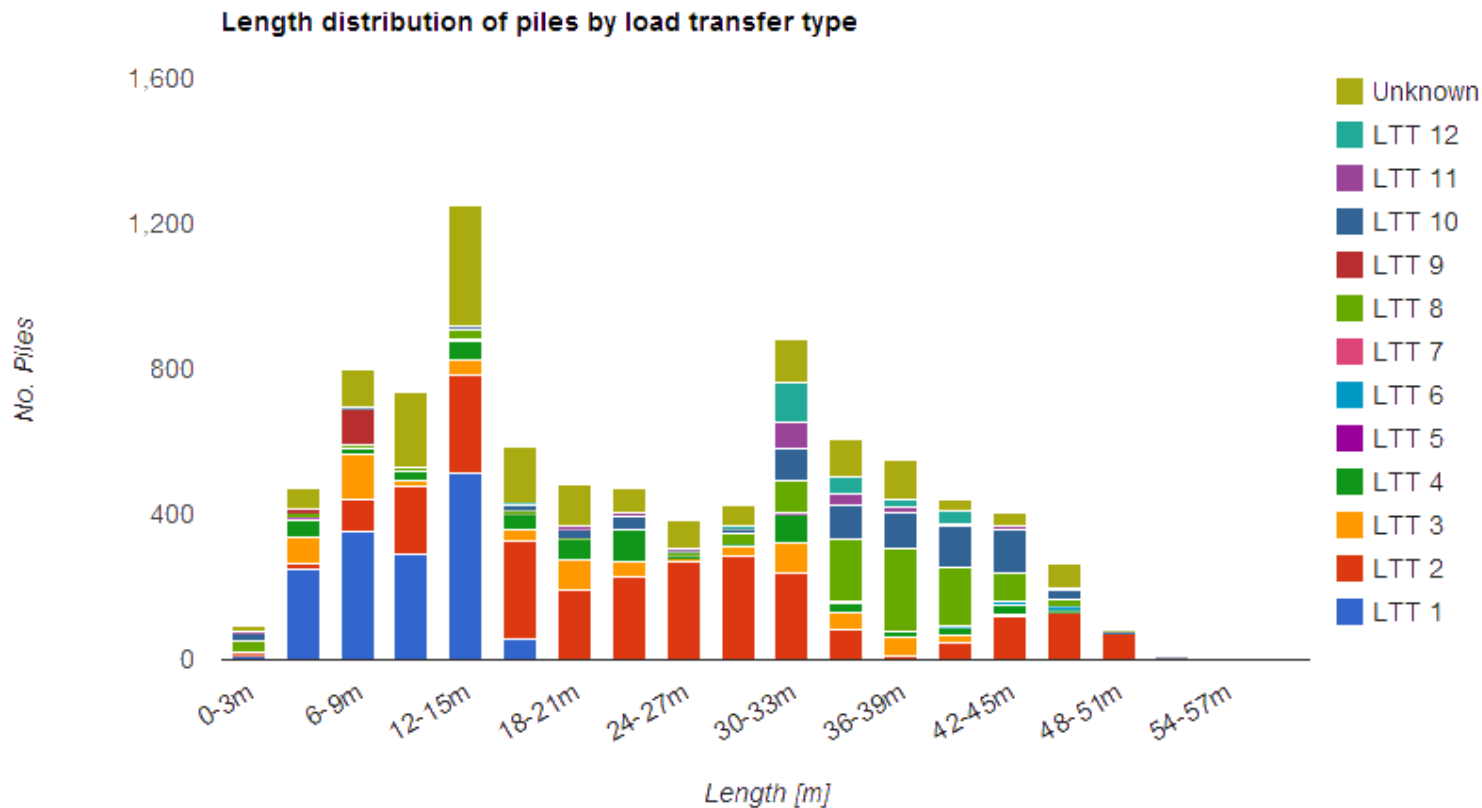

Piles per year by piling method

VISUALIZATION (2/3)

o Length distribution of piles by piling method
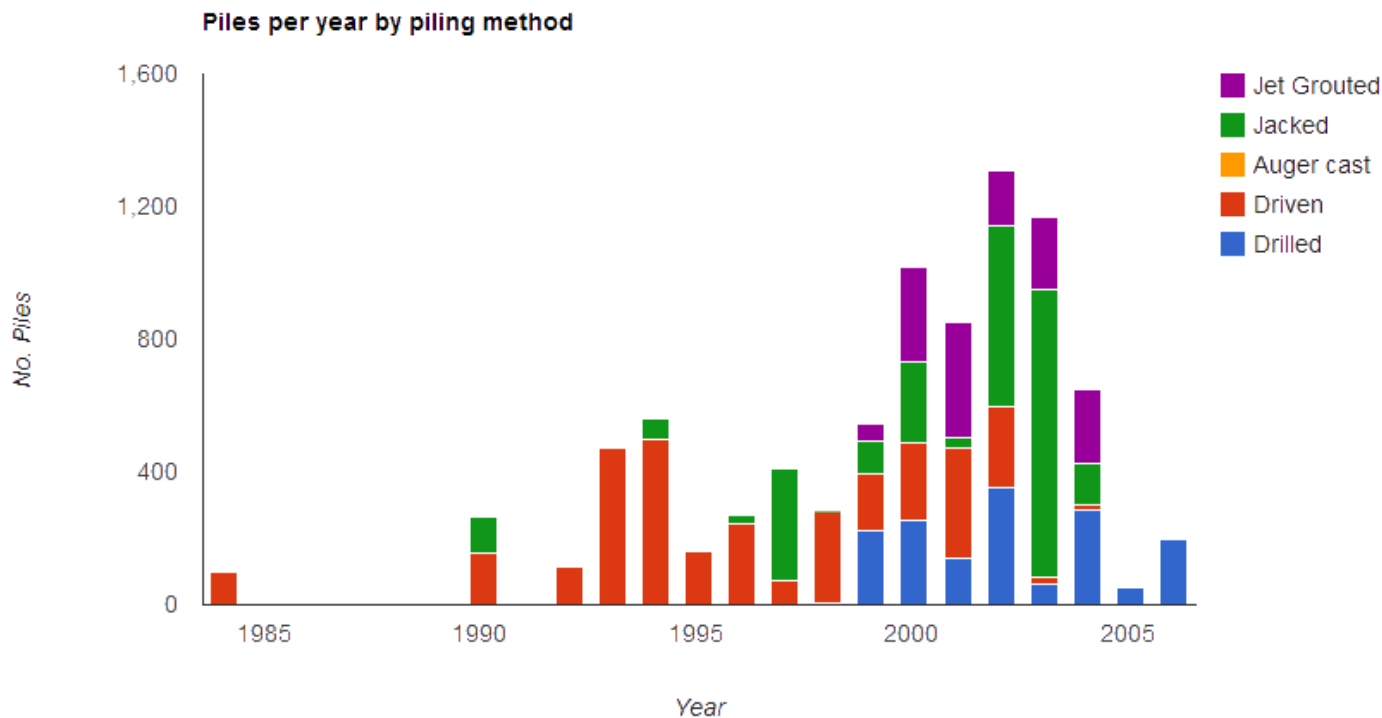
Length distribution of piles by piling method
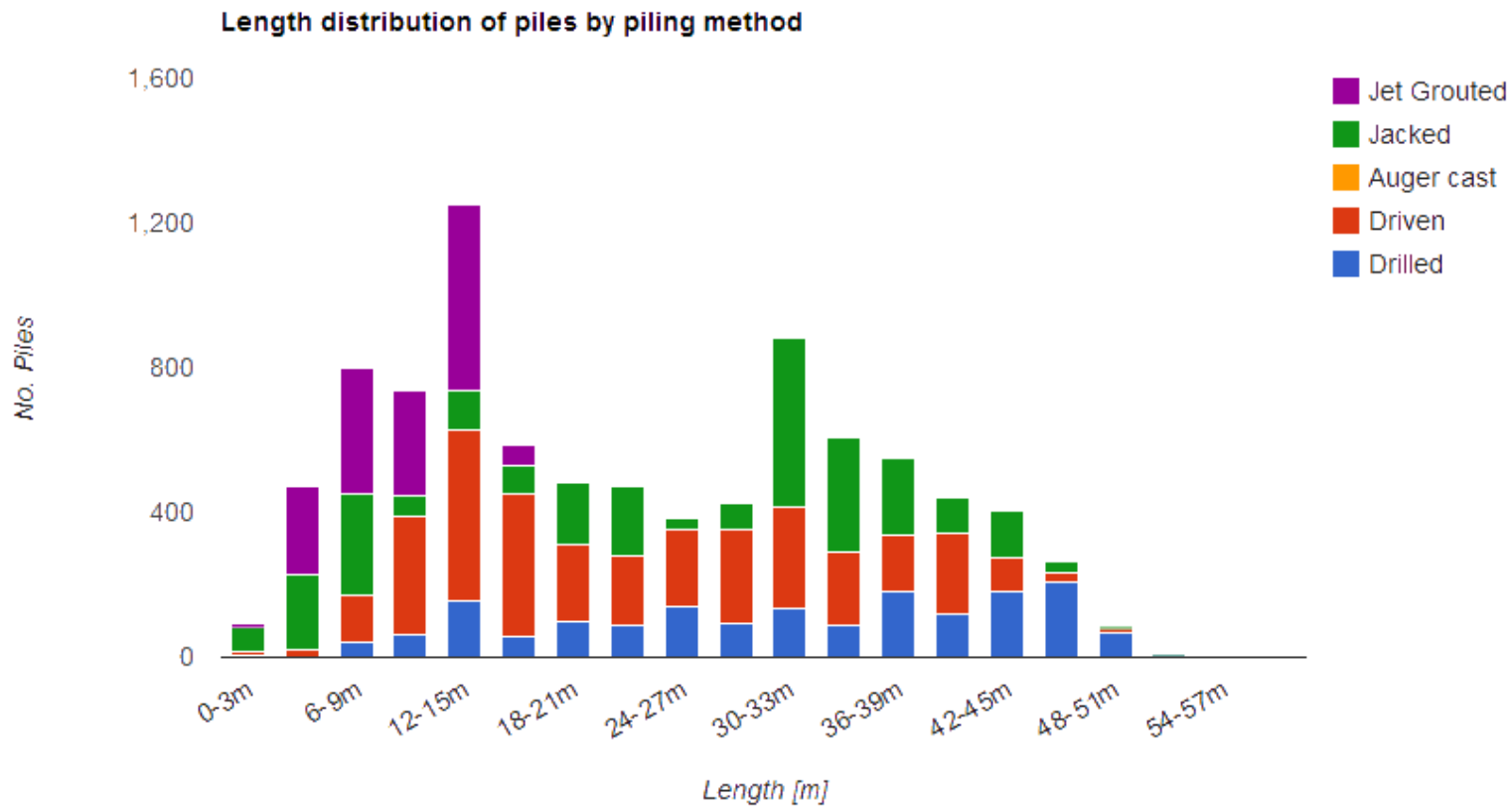
VISUALIZATION (3/3)

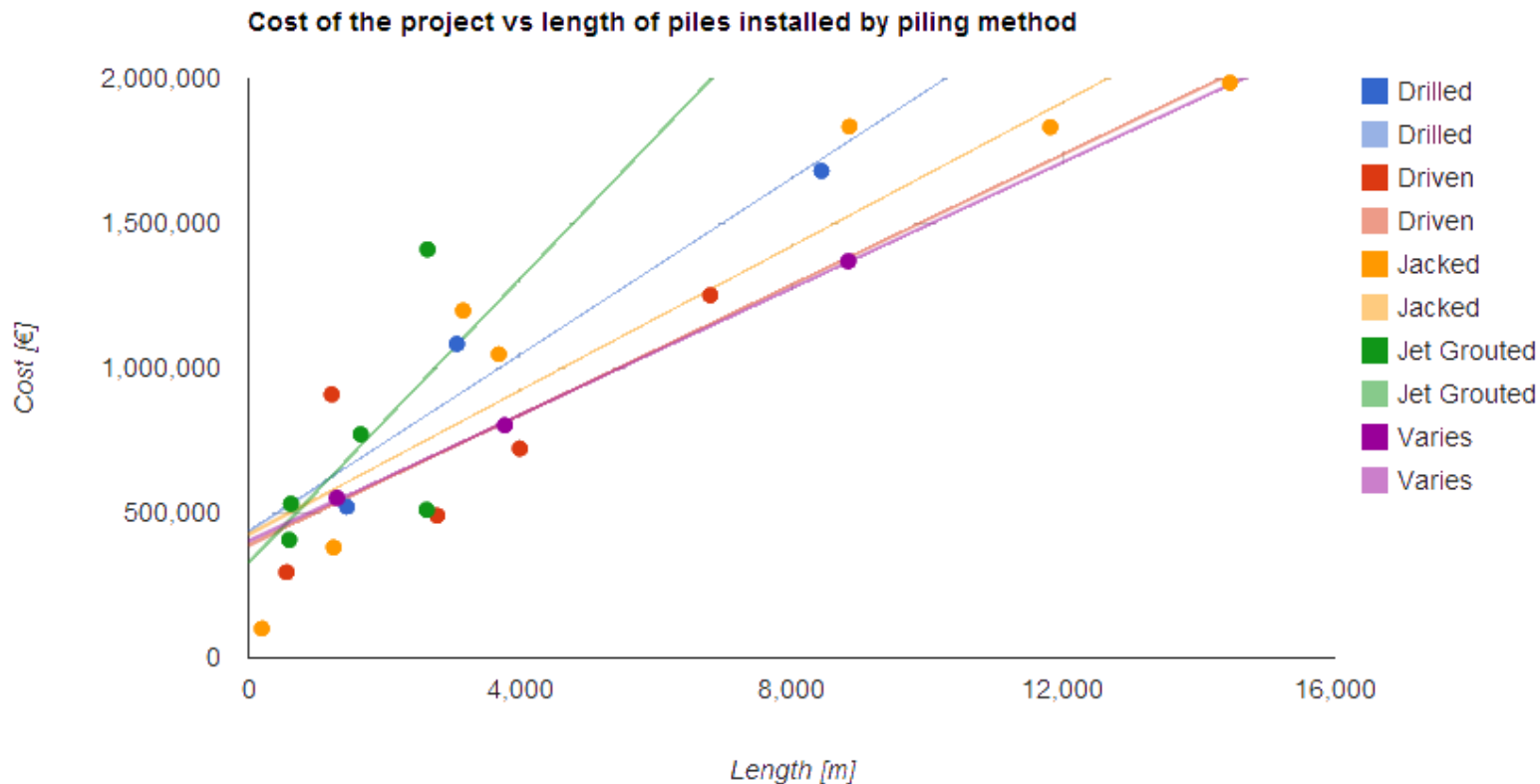o   Length distribution of piles by load transfer type

LOAD TRANSFER SYSTEMS
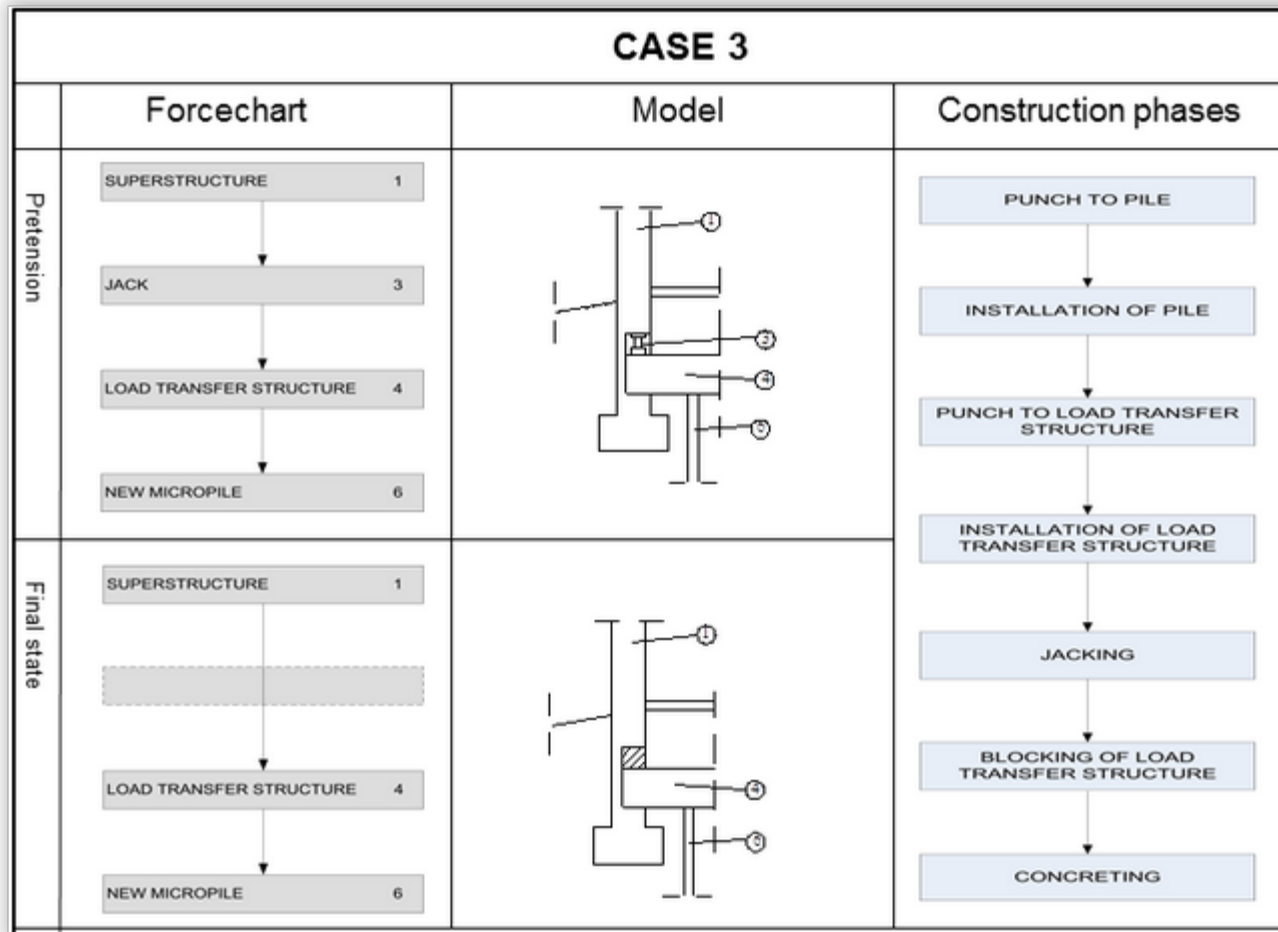
o When viewing load transfer systems a generic schematics of the load transfer types are shown as pop-up images
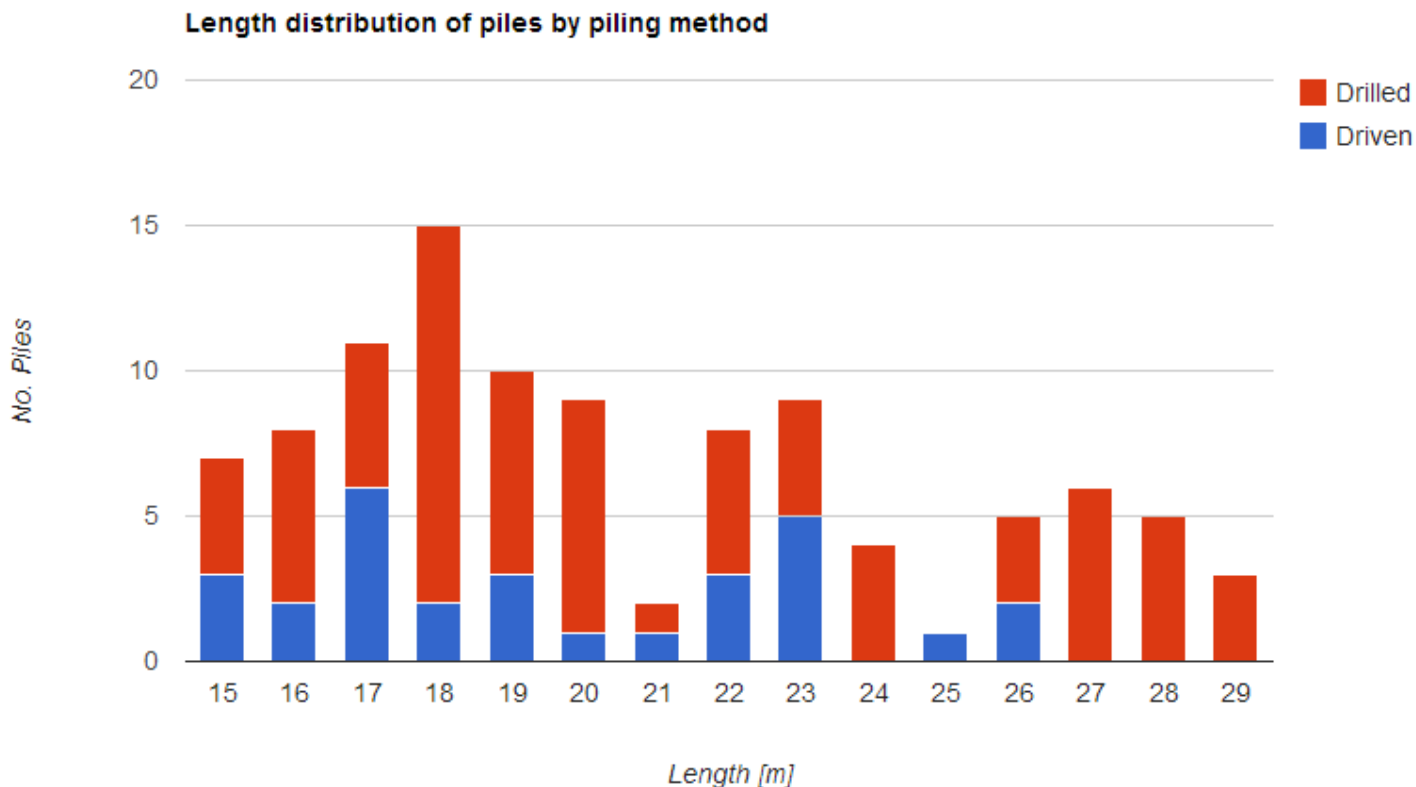
o Case 3 in this case

MORE SPECIFIC VISUALIZATION (1/3)

o Cost analysis by for example length of piles and piling method

Cost of the project vs length of piles installed by piling method

MORE SPECIFIC VISUALIZATION (2/3)
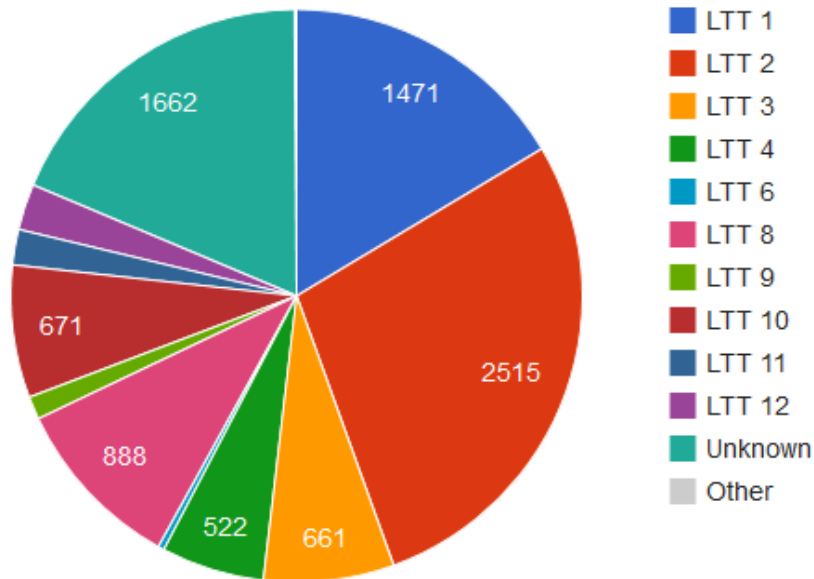
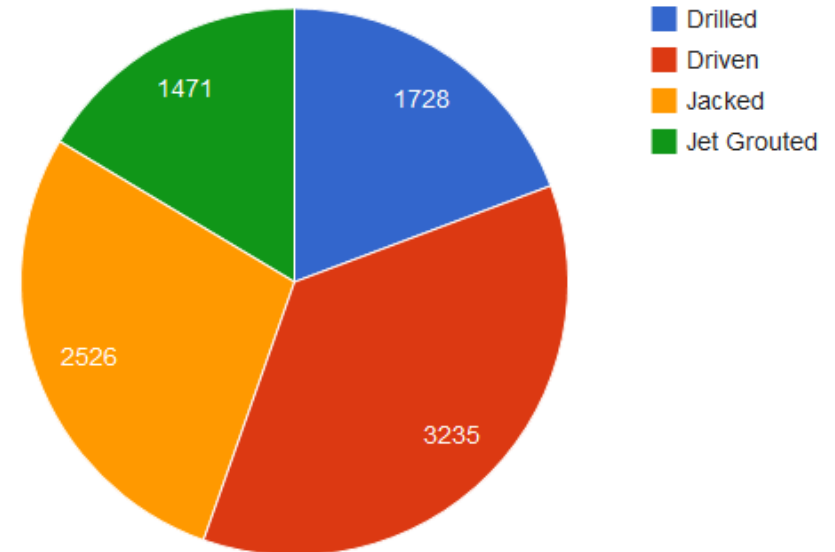o Length distibution of piles by piling method in a single project

Length distribution of piles by piling method

MORE SPECIFIC VISUALIZATION (3/3)

o Total 8960 piles shown in two different charts

HOW TO REGISTER AND USE THE DATABASE?

FIN-C2M

Case 2 Micropile Research in Finland

1. To register on the site
   o go to the front page: www.micropile.fi/
   o choose your language
2. Click on the *Create an account* link
   o close to the bottom of the page
3. Fill in the form and press *Register* button
4. To activate your account, you will need to open the activation link sent to your e-mail address in a browser

User Name

Password

☐ Remember Me

Log in

Create an account ❯

Forgot your username?

Forgot your password?

Frontend language *   English (United Kingdom)

Register   Cancel

TURUN AMMATTIKORKEAKOULU
TURKU UNIVERSITY OF APPLIED SCIENCES

IN CONCLUSION

o As a result of the new Micropile Database, an invaluable tool for analyzing micropiling projects will be available.

o The database could be used for analyzing various details in micropiling projects and their effects e.g. on load bearing capacity or costs.

o for example, researchers, teachers and students can to analyze the differences between the undeppinng projects or even micropiles

o The number of project and data will increase in the future.

o The data available in the database has already been used to analyze the cost of underpinning projects by Lehtonen & Kiiras.

THANK YOU!

"The more information, the better the database!" ☺