



**Soil susceptibility testing for the supporting structure of a
photovoltaic farm - guidelines**

1. Please provide the location of the tested area:

Country:

Locality:

Lot no.:

Municipality:

County:

GPS coordinates:

2. Site guidelines before the testing:

- a. carrying out research after the final preparation of the site (in particular, levelling, felling trees, compaction of embankment soils, soil replacement)
- b. number of trials must be consistent with the obtained grid of measurement points
- c. min. ramming depth – 1.5 m
- d. the test is considered complete when a value greater than the specified axial support reaction is obtained
- e. when repeating a given trial within one point, the next ramming must be made at a distance of at least 1.0 m from the previous trial

3. Design guidelines before starting the test:

- a. providing geotechnical research documentation
- b. submitting a draft drawing of the construction; in case of a change in the structure, it should be consulted with the designer
- c. submitting a project layout in a DWG format, including the measurement points

4. Carrying out the test:

For the pull-out test, a steel profile is used as a support in the structure (Fig.1):

- Profile dimensions: 105x50x12x3
- Profile's material: S350GD steel covered with ZM620 Magnelis coating

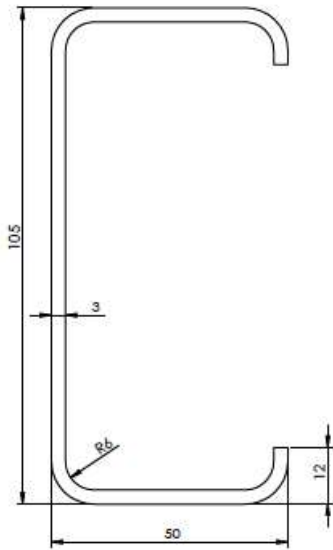


Fig.1 Cross-section of the support used in the tests

Tests are carried out with the use of:

- a ramming machine with hammer for 105x50x12x3 C profiles
- a strain gauge with measurement range of up to 7.5 t

The tests are aimed at determining skin friction occurring at the contact point between the steel profile and the soil (Fig.2).

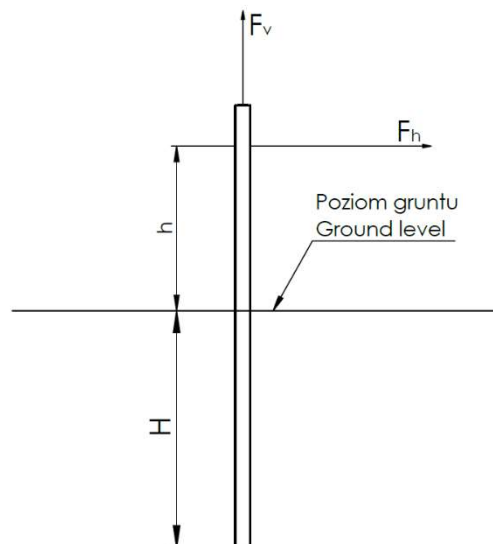


Fig. 2 Load diagram. F_v = Support pull-out force, H = Support ramming depth

The measuring device is attached between the steel profile and the hammer housing in the machine used for ramming supports. Trials are usually conducted at a depth of min. 1.5 m (Photo 1).

Load testing begins after the supports ramming to the required depth is finished. During an attempt to pull a steel pile out of the ground, the course of the force curve is read and recorded. From there, you can read the maximum force appearing at the moment when the profile is found on the border of static friction (a moment before moving).

The reading is made by preparing 100 measurement points with a sampling time of 0.2 seconds.



Photo 1. Preparation for the pull-out test.

5. Elaboration of the measurement results:

5.1 Presentation of the arrangement of measurement points in a given investment site.

Example, photo 2.

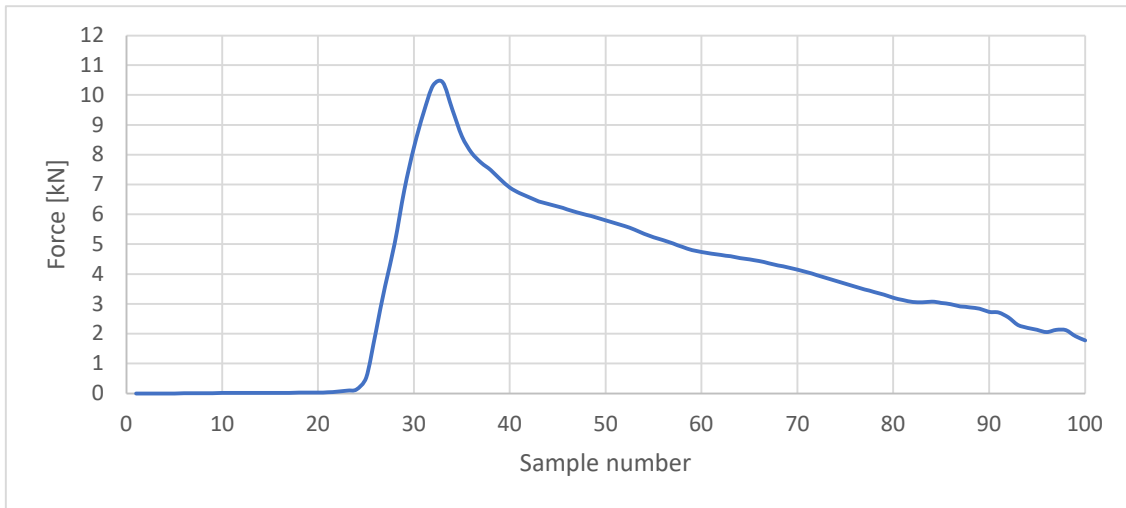


Photo 2. Arrangement of measurement points.

5.2 The obtained results should be presented in the form of graphs, where:

- force read from the measuring device – in the axis of ordinates
- numbers of consecutive samples – in the axis of abscissas

Example:



Graph 1. Measurement of pulling out the profile rammed to a depth of 1.5 m in the vicinity of E1 measurement point.

5.3 The obtained results should be presented in the form of a table, e.g.

Point	Depth	Force (kN)
E1	1.5	10.43
E2	1.5	17.35
E3	1.5	12.85
E4	1.5	12.15
E5	1.5	14.02
E6	1.5	25.80
E7	1.5	22.61

If it was necessary to ram the support deeper than 1.5 m, because of the fact that the appropriate reaction force was not achieved, all measurement results should be provided in a table and in the form of a graph, i.e. at 1.5 m and at the required greater depth.

5.4 Conclusions

Presentation of conclusions and signature of the person carrying out the measurements.