DETAILS OF RESPONDENT – Reply sheet

Name (optional) ……

Email (optional) ……

Occupation □ Student □ Academic □ Design consultant □ Contractor

□ Other (please specify) ……....

Experience □ 0 – 10 years □ 10 – 20 years □ 20 – 30 years □ 30+ years

Country ……

Design methods used in your country

□ WLD: Working load design with global factor of safety

□ LRFD: Load and resistance factor design (e.g. AASHTO codes)

□ PF LSD: Partial factor limit states design (e.g. Eurocodes)

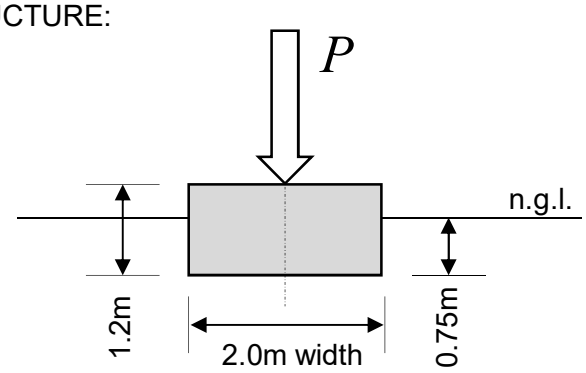
□ Other (please specify:

Geotechnical design codes used in your country:
(please specify standard number and year, e.g. EN1997-1:2004)

Your favourite geotechnical engineering textbooks (3 max.):

Problem CLAY 1 – Vertically loaded spread footing

STRUCTURE:



- 2.0m wide concrete strip footing founded on clay at 0.75m below ground level
- Concentric line load P excludes weight of footing

PROBLEM:

This problem requires the prediction of the performance of the footing.

1. Predict the applied load that will cause bearing capacity failure of the footing, P_{ult} (kN/m).
2. Predict the applied load P_{25mm} (kN/m) that will cause the footing to settle by 25mm in the long term.
3. Predict the expected performance of the footing based on the test results, not a conservative assessment as may be used in design calculations.

Problem CLAY 1 – Reply sheet

RESPONDENT PROFILE:

Country …….

Occupation □ Student □ Academic □ Design consultant □ Contractor □ Other

Experience □ 0 – 10 years □ 10 – 20 years □ 20 – 30 years □ 30+ years

PREDICTION:

P_{ult} = _____ kN/m P_{25mm} = _____ kN/m

DETAILS OF ANALYSIS:

Method of bearing capacity analysis: …….

Type of analysis: □ Total stress (undrained) □ Effective stress (drained) □ Both

Method of settlement analysis: …….

Codes or Standards used (if any): …….

Parameter values (if appropriate):

c_u Undrained shear strength ……kPa

c' Drained cohesion ……kPa

ϕ' Drained friction angle ……deg

E' Drained elastic modulus ……MPa

Other parameters / empirical factors used: (please specify)

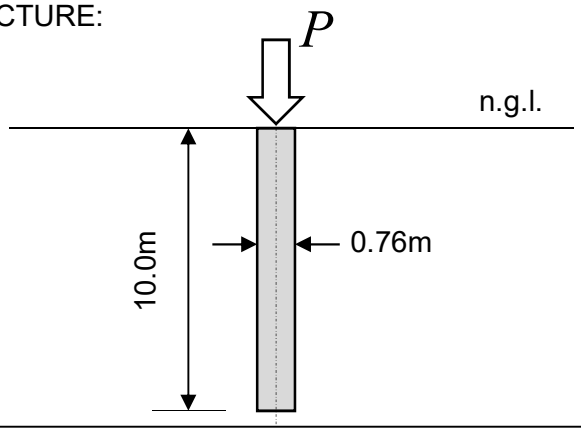
If you used a Skempton-type analysis, what value of N_c was used? …….

References used:

Any comments:

Problem CLAY 2 – Axially loaded pile

STRUCTURE:



- 0.76m diameter, bored, cast in situ pile in clay
- Depth 10.0m below natural ground level.

PROBLEM:

This problem requires the prediction of the performance of the pile.

1. Predict the ultimate load capacity of the pile P_{ult}.
2. If the method used separates shaft and base resistance, state $P_{ult\ (shaft)}$ and $P_{ult\ (base)}$.
3. Predict the load-settlement curve to failure.
4. Predict the expected performance of the pile based on the test results, not a conservative assessment as may be used in design calculations.

Problem CLAY 2 – Reply sheet

RESPONDENT PROFILE:

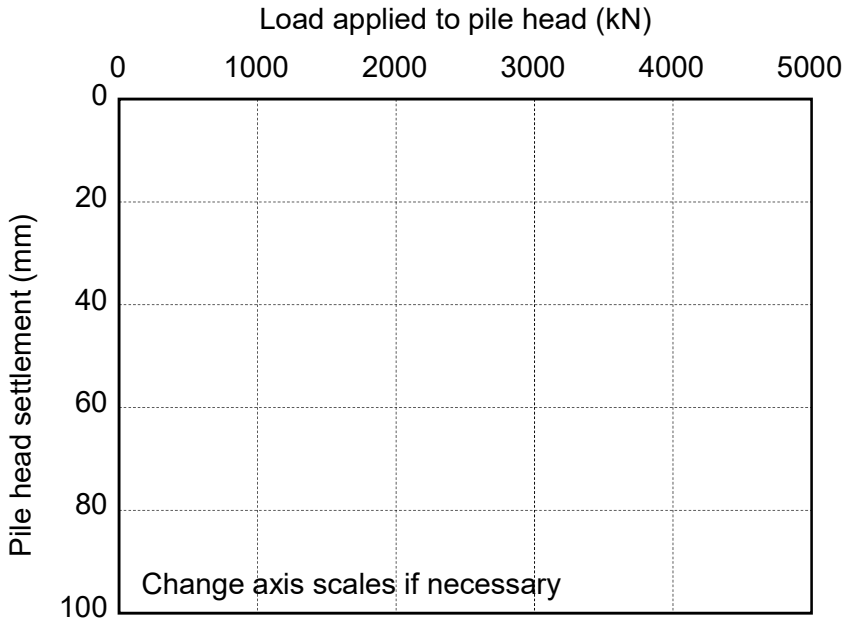
Country …….

Occupation □ Student □ Academic □ Design consultant □ Contractor □ Other

Experience □ 0 – 10 years □ 10 – 20 years □ 20 – 30 years □ 30+ years

PREDICTION: P_{ult} = _____ kN

$P_{ult\ (shaft)}$ = _____kN $P_{ult\ (base)}$ = _____kN



Load (kN)	Settlement (mm)

DETAILS OF ANALYSIS:

Analysis based on: □ Empirical correlations with test results e.g. SPT, CPT, etc.

(specify tests …….)

□ Soil strength and deformation parameters

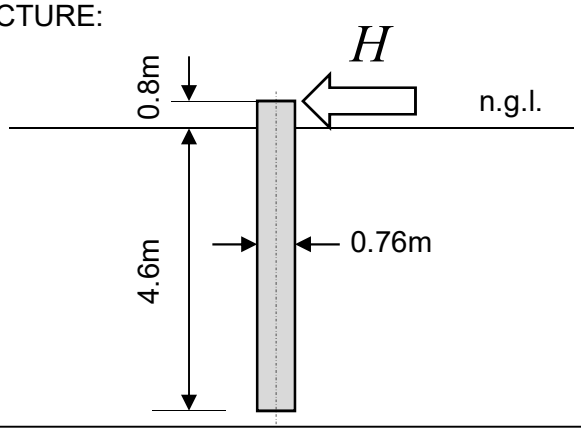
(specify parameters ……..……)

References used:

Any comments:

Problem CLAY 3 – Laterally loaded pile

STRUCTURE:



- 0.76m diameter, bored, cast in situ pile in clay
- Founding depth 4.6m below natural ground level
- Load applied at 0.8m above ground level
- Pile reinforcement sufficient to prevent bending or shear failure of pile shaft.

PROBLEM:

This problem requires the prediction of the performance of the pile.

1. Predict the ultimate load capacity of the pile H_{ult}.
2. Predict the long term load-deflection curve to failure.
3. Predict the expected performance of the pile based on the test results, not a conservative assessment as may be used in design calculations.

Problem CLAY 3 – Reply sheet

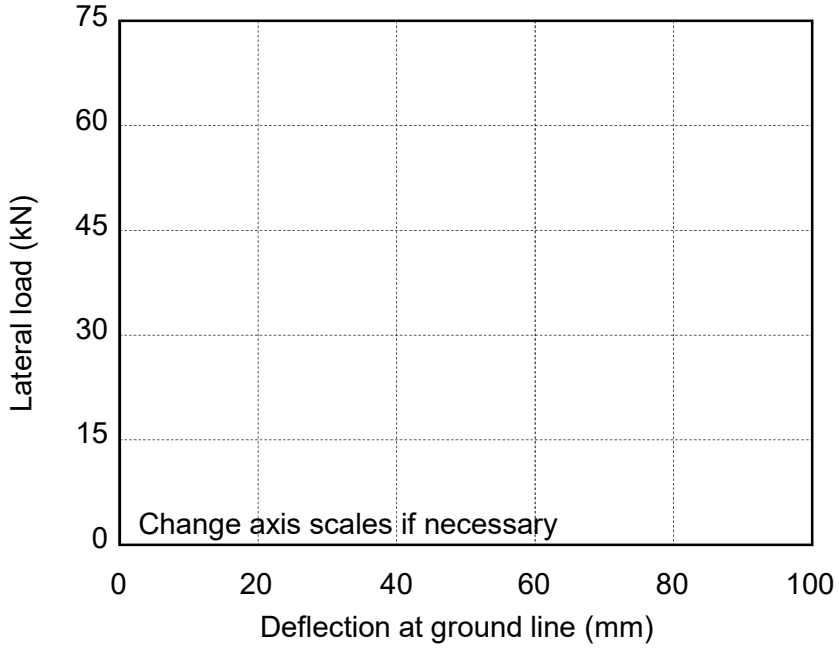
RESPONDENT PROFILE:

Country …….

Occupation □ Student □ Academic □ Design consultant □ Contractor □ Other

Experience □ 0 – 10 years □ 10 – 20 years □ 20 – 30 years □ 30+ years

PREDICTION: H_{ult} = _____ kN



Load (kN)	Deflection (mm)

DETAILS OF ANALYSIS:

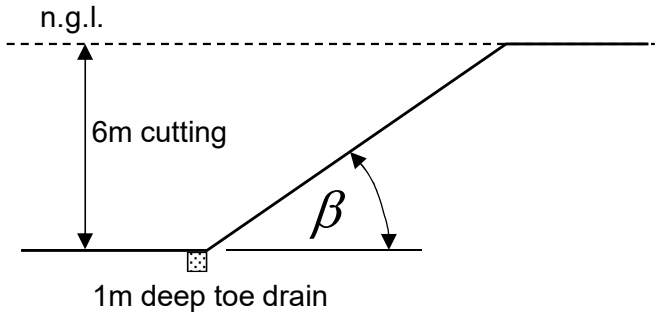
Analysis based on: □ Empirical correlations with test results e.g. SPT, CPT, etc.
(specify tests …….)

□ Soil strength and deformation parameters
(specify parameters ……..……)

References used:

Problem CLAY 4 – Slope design

STRUCTURE:



- Permanent cutting for a public road.
- No surcharges.

PROBLEM:

This is a design problem requiring the specification of the slope angle for construction.

1. Specify the angle β at which the slope is to be cut.

Problem CLAY 4 – Reply sheet

RESPONDENT PROFILE:

Country …….

Occupation □ Student □ Academic □ Design consultant □ Contractor □ Other

Experience □ 0 – 10 years □ 10 – 20 years □ 20 – 30 years □ 30+ years

DESIGN:

β = _____ degrees

DETAILS OF ANALYSIS:

Design Code used (if any): …….

Method of slope stability analysis: …….

Type of analysis: □ Total stress (undrained) □ Effective stress (drained) □ Both

Parameter values:	z<6m	z>6m	(* delete as required)
c_u Undrained shear strength	……	……kPa	(average* / characteristic*)
c' Drained cohesion	…….	……kPa	(average* / characteristic*)
ϕ' Drained friction angle	…….	……deg	(average* / characteristic*)

Other parameters / empirical factors used: (please specify)

Did your analysis include a tension crack? □ Yes □ No

If so, to what depth? …… m

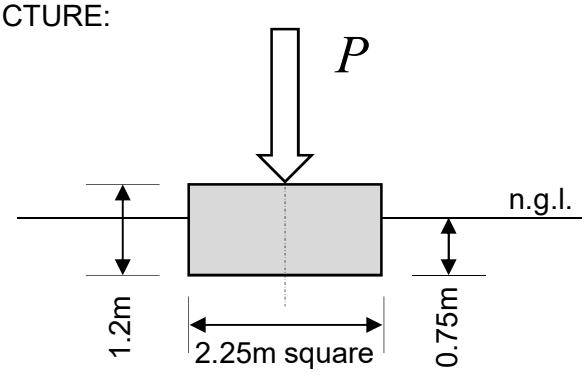
Did you assume this crack could fill with water? □ Yes □ No

References used:

Any comments:

Problem SAND 1 – Vertically loaded spread footing

STRUCTURE:



- 2.25m square concrete footing founded on sand at 0.75m below ground level
- Concentric applied load P excludes weight of footing

PROBLEM:

This problem requires the prediction of the performance of the footing.

1. Predict the ultimate load capacity of the footing P_{ult}.
2. Predict the load P_{25mm} that will cause the footing to settle by 25mm in the long term.
3. Predict the expected performance of the footing based on the test results, not a conservative assessment as may be used in design calculations.

Problem SAND 1 – Reply sheet

RESPONDENT PROFILE:

Country …….

Occupation □ Student □ Academic □ Design consultant □ Contractor □ Other

Experience □ 0 – 10 years □ 10 – 20 years □ 20 – 30 years □ 30+ years

PREDICTION:

P_{ult} = _____ kN P_{25mm} = _____ kN

DETAILS OF ANALYSIS:

Method of bearing capacity analysis: …….

Method of settlement analysis: …….

Codes or Standards used (if any): …….

Parameter values (if appropriate):

c' Drained cohesion ……kPa

ϕ' Drained friction angle ……deg

E' Drained elastic modulus ……MPa

Other parameters used: (please supply)

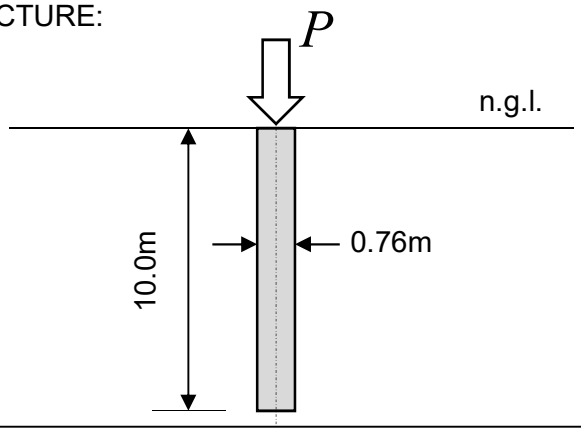
Did your method of bearing capacity analysis include depth correction factors? □ Yes □ No

References used:

Any comments:

Problem SAND 2 – Axially loaded pile

STRUCTURE:



- 0.76m diameter, bored, cast in situ pile in sand. Installed under slurry.
- Depth 10.0m below natural ground level.

PROBLEM:

This problem requires the prediction of the performance of the pile.

1. Predict the ultimate load capacity of the pile P_{ult}.
2. If the method used separates shaft and base resistance, state $P_{ult\ (shaft)}$ and $P_{ult\ (base)}$.
3. Predict the load-settlement curve to failure.
4. Predict the expected performance of the pile based on the test results, not a conservative assessment as may be used in design calculations.

Problem SAND 2 – Axially loaded pile

RESPONDENT PROFILE:

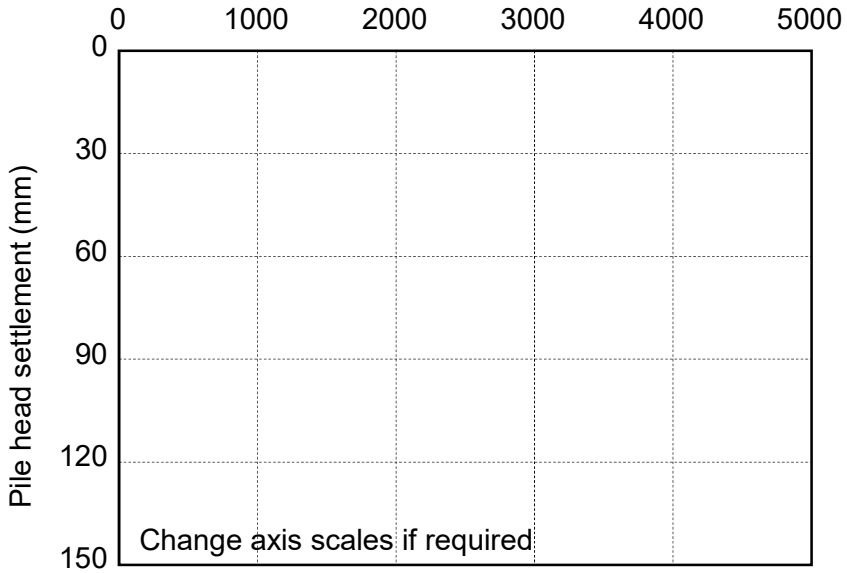
Country ……

Occupation □ Student □ Academic □ Design consultant □ Contractor □ Other

Experience □ 0 – 10 years □ 10 – 20 years □ 20 – 30 years □ 30+ years

Prediction: P_{ult} = _____ kN

$P_{ult\ (shaft)}$ = _____kN $P_{ult\ (base)}$ = _____kN



Load (kN)	Settlement (mm)

DETAILS OF ANALYSIS:

Analysis based on: □ Empirical correlations with test results e.g. SPT, CPT, etc.
(specify tests ……)

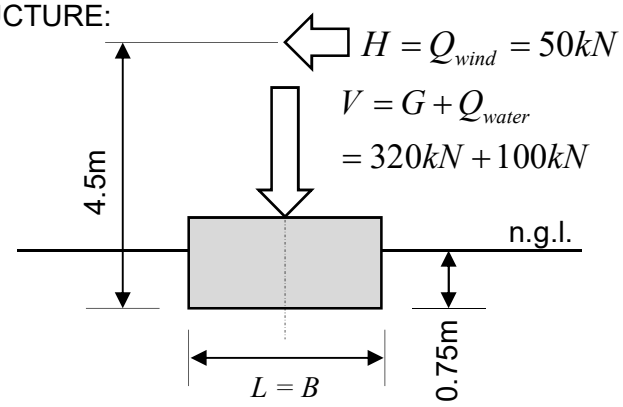
□ Soil strength and deformation parameters
(specify parameters ……)

Did you include end bearing of bored pile below water table?: □ Yes □ No

References used:

Problem SAND 3 – Design of spread footing with horizontal load

STRUCTURE:



- Foundation is for a water tank stand
- Vertical load V includes dead load G excluding weight of footing) and weight of water in tank Q_{water}.
- Horizontal load H is due to wind only Q_{wind}. Can act in any horizontal direction.
- Loads are given as characteristic values.

PROBLEM:

This is a design problem requiring the specification of the footing size for construction.

1. Determine the size of footing required ($L = B$).

Problem SAND 3 – Reply sheet

RESPONDENT PROFILE:

Country …….

Occupation □ Student □ Academic □ Design consultant □ Contractor □ Other

Experience □ 0 – 10 years □ 10 – 20 years □ 20 – 30 years □ 30+ years

DESIGN:

$L=B$ = _____ m

DETAILS OF ANALYSIS:

Design method (Limit states, working load, etc.): ……...

Code or standard used: …….

Method of bearing capacity calculation: …….

Parameter values (if appropriate): (* delete as required)

c' Drained cohesion* ……kPa (average* / characteristic*)

ϕ' Drained friction angle* ……deg (average* / characteristic*)

γ Bulk density of sand* ……kN/m^3 (average* / characteristic*)

Other parameters used: (please supply)

Design situation: □ Tank empty □ Tank full

Factors applied (load factors, combination factors, material factors, resistance factors, FoS, etc.)

……

……

Allowance for large eccentricity (if any): …….

For EN1997-1 users:

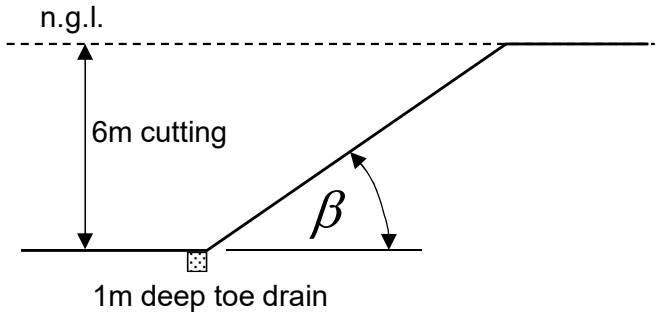
Design approach used: □ DA1 □ DA2 □ DA2* □ DA3

Critical ultimate limit state: □ GEO □ STR □ EQU

Any comments:

Problem SAND 4 – Slope design

STRUCTURE:



- Permanent cutting for a public road.
- No surcharges.

PROBLEM:

This is a design problem requiring the specification of the slope angle for construction.

1. Specify the angle β at which the slope is to be cut.

Problem SAND 4 – Reply sheet

RESPONDENT PROFILE:

Country ……

Occupation □ Student □ Academic □ Design consultant □ Contractor □ Other

Experience □ 0 – 10 years □ 10 – 20 years □ 20 – 30 years □ 30+ years

DESIGN:

β = _____ degrees

DETAILS OF ANALYSIS:

Design Code used: ……

Method of slope stability analysis: ……

Type of analysis: □ Total stress (undrained) □ Effective stress (drained) □ Both

Parameter values:	z<4m	4m - 8m	z>8m	(* delete as required)
c' Drained cohesion	…….	…….	……. kPa	(average* / characteristic*)
ϕ' Drained friction angle	…….	…….	……. deg	(average* / characteristic*)

For WLD, specify Factor of Safety used: …….

Other parameters / empirical factors used: (please specify):

For EN1997-1 users:

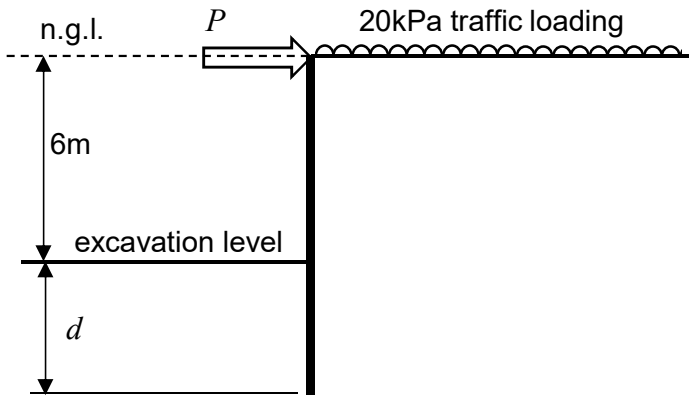
Design approach used: □ DA1 □ DA2 □ DA3

References used:

Any comments:

Problem SAND 5 – Propped embedded retaining wall design

STRUCTURE:



- Permanent retaining wall propped at top.
- 6.0m deep excavation.
- 20kPa variable loading (surcharge) due to traffic.

PROBLEM:

This is a design problem requiring the specification of the geometry of the wall, the propping force and the strength of the wall in bending.

1. Specify the required depth of embedment d (m).
2. Specify the propping force P (kN/m).
3. Specify the minimum yield moment of wall element M_{yield} (kNm/m).

Design to be based on the stability of the wall without considering serviceability requirements.

Problem SAND 5 – Reply sheet

RESPONDENT PROFILE:

Country …….

Occupation □ Student □ Academic □ Design consultant □ Contractor □ Other

Experience □ 0 – 10 years □ 10 – 20 years □ 20 – 30 years □ 30+ years

DESIGN:

d = _____ metres

P = _____ kN/m (working load* / LSD design value*)

M_{yield} = _____ kNm/m (minimum yield moment)

(* delete as required)

DETAILS OF ANALYSIS:

Design Code used: ……

Method of analysis: ……

Parameter values:	z<4m	4m - 8m	z>8m	(* delete as required)
c' Drained cohesion	…….	…….	…… kPa	(average* / characteristic*)
ϕ' Drained friction angle	…….	…….	…… deg	(average* / characteristic*)

Other parameters / empirical factors used: (please specify)

For EN1997-1 users:

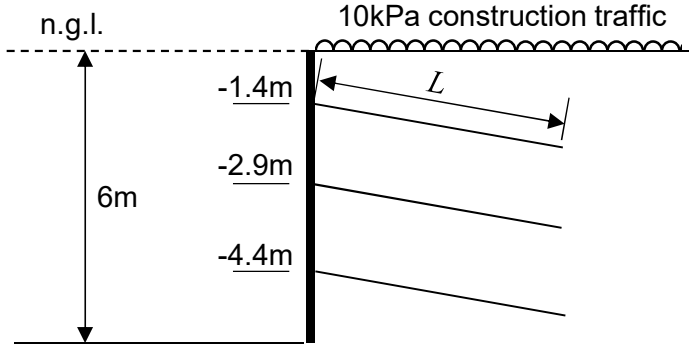
Design approach used: □ DA1 □ DA2 □ DA3

References used:

Any comments:

Problem SAND 6 – Soil nailed retaining wall design

STRUCTURE:



- Temporary soil nailed wall.
- 10kPa variable loading (construction traffic).
- 10^o nail inclination.
- 20mm nails: F_y = 140kN.
- All nails L m long.

PROBLEM:

This is a design problem requiring the specification of the length of the soil nails and their horizontal spacing.

1. Specify the required length of the soil nails (L).
2. Specify horizontal spacing (S_H).

Design to be based on the stability of the wall without considering serviceability requirements.

Problem SAND 6 – Reply sheet

RESPONDENT PROFILE:

Country …….

Occupation □ Student □ Academic □ Design consultant □ Contractor □ Other

Experience □ 0 – 10 years □ 10 – 20 years □ 20 – 30 years □ 30+ years

DESIGN:

L = _____ m

S_H = _____ m

DETAILS OF ANALYSIS:

Design Code used: ……..……

Method of analysis: ……..……

Parameter values:	z<4m	4m - 8m	z>8m	(* delete as required)
c' Drained cohesion	…….	…….	…… kPa	(average* / characteristic*)
ϕ' Drained friction angle	…….	…….	…… deg	(average* / characteristic*)

Other parameters / empirical factors used: (please specify)

For EN1997-1 users:

Design approach used: □ DA1 □ DA2 □ DA3

References used:

Any comments: