

PROKON Support Portal

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Elastic Properties of Soils

Renier Cloete - 2020-10-01 - 2 Comments - in Reference Data

Can you suggest values for elastic soil properties?

Many sources list elastic properties of various soil types. The data below is taken from *Foundation Analysis and Design (5th Edition)*, by J.E. Bowles, 1996 McGraw-Hill.

Poisson's ratio:

Clay, saturated: 0.4 to 0.5

Clay, unsaturated: 0.1 to 0.3

Sandy clay: 0.2 to 0.3

Silt: 0.3 to 0.35

Sand, gravelly sand: 0.1 to 1.0 (not elastic but 0.3 to 0.4 commonly used)

Rock: 0.1 to 0.3

Loess: 0.1 to 0.3

Poisson's ratio:

Most clay soils: 0.4 to 0.5

Saturated clay soils: 0.45 to 0.5

Cohesionless, medium and dense: 0.3 to 0.4

Cohesionless, loose to medium: 0.2 to 0.35

Young's modulus (MPa):

Clay:

Very soft: 2 to 15

Soft: 5 to 25

Medium: 15 to 50

Hard: 50 to 100

Sandy: 25 to 250

Glacial till:

Loose: 10 to 150

Dense: 150 to 720

Very dense: 500 to 1440

Loess: 15 to 60

Sand:

Silty: 5 to 20

Loose: 10 to 25

Dense: 50 to 81

Sand and gravel:

Loose: 50 to 150
Dense: 100 to 200
Shale: 150 to 5,000
Silt: 2 to 20

Modulus of subgrade reaction (Westergaard's modulus) (kN/m³):

Loose sand: 4,800 to 16,000
Medium dense sand: 9,600 to 80,000
Dense sand: 64,000 to 128,000
Clayey medium dense sand: 32,000 to 80,000
Silty medium dense sand: 24,000 to 48,000
Clayey soil:
qa < 200kPa: 12,000 to 24,000
200kPa < qa < 800kPa: 24,000 to 48,000
qa > 800kPa: > 48,000

Comments (2)

Anthony Too
2015-05-18 05:38
5MayUTC

I would like to know how we can model a spring support or spring element to take compressive load only and free up the tension.

Stephen Pienaar
2015-05-25 16:14
16MayUTC

The gap support feature models scenarios such as uplift. You can combine the gap behaviour with the elastic supports in Frame Analysis.