Elastic Properties of Soils

Can you suggest values for elastic soil properties?


**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)**

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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.

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