

Geotechnical Requirements for Bridges



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Geotechnical Requirements for Bridges

- ❧ AASHTO LRFD Bridge Design Specifications, Seventh Edition – Section 10: Foundations
- ❧ Section 10.4 Soil and Rock Properties
 - ❧ Project requirements and site conditions
 - ❧ Design and constructability
 - ❧ Performance criteria
 - ❧ Geologic & Hydrologic concerns
 - ❧ Engineering Analyses and required properties & parameters
 - ❧ Methods to obtain parameters, number of tests/samples needed and locations for them

Subsurface Exploration



- ❧ Extent of exploration shall be based on:
 - ❧ variability in the subsurface conditions,
 - ❧ structure type,
 - ❧ Project requirements that may affect foundation design or construction.
- ❧ Shall be extensive enough to:
 - ❧ Reveal the nature and types of soil deposits and/or formations encountered,
 - ❧ Provide engineering properties, and
 - ❧ Groundwater conditions.

Subsurface Exploration



- ❧ Borings shall be sufficient in number and depth to establish a reliable subsurface profile at areas of concern such as:
 - ❧ Foundation locations, and
 - ❧ Adjacent earthwork locations.
 - ❧ Also to investigate any adjacent geologic hazards that could affect the structure performance.

Subsurface Exploration



- ❧ At a minimum subsurface exploration and testing program shall obtain information adequate to analyze foundation stability and settlement with respect to:
 - ❧ Geological formations present,
 - ❧ Location and thickness of soil and rock units,
 - ❧ Groundwater conditions, and
 - ❧ Local considerations
 - ❧ Expansive soils, underground voids, slope instability potential.

Subsurface Exploration



❧ Single Span Deep

- ❧ One boring at each proposed abutment.
- ❧ Additional borings depending on project requirements.

❧ Multiple Span Deep

- ❧ One boring at each proposed abutment.
- ❧ One boring at each proposed bent/pier...
 - ❧ that is reachable depending on site conditions.

Subsurface Exploration



∞ Shallow Foundations

- ∞ Minimum of one boring per substructure unit.
 - ∞ Will most likely need more than one boring to define limits of rock surface within footprint of footing.
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- ∞ Be able to adjust the investigation in the field due to encountered subsurface conditions and/or topography/access

Geotechnical Requirements for Bridges

- ❧ Hole plugging as per ARSD 74:11:08
- ❧ Geotechnical recommendations shall include a drivability analysis and recommend hammer sizes.
- ❧ Common Issues we have seen:
 - ❧ Insufficient boring depths for proposed foundation type/anticipated tips.
 - ❧ Insufficient data for slope stability analysis when required.

Any questions?

