



Australian Government

Assessment Requirements for AHCARB803 Analyse edaphic interactions of trees and structures

Release: 2

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Modification History

Release	Comments
Release 2	This version released with AHC Agriculture, Horticulture, Conservation and Land Management Training Package Version 2.0.
Release 1	This version released with AHC Agriculture, Horticulture, Conservation and Land Management Training Package Version 1.0.

Performance Evidence

The candidate must be assessed on their ability to integrate and apply the performance requirements of this unit in a workplace setting. Performance must be demonstrated consistently over time and in a suitable range of contexts.

The candidate must provide evidence for and demonstrate:

- researching repose angle of soil materials
- researching soil plasticity
- measuring soil moisture content and field capacity of soil
- researching the effects of soil moisture on soil cohesion and plasticity
- researching modes of soil liquefaction
- determining soil texture
- assessing level of soil cohesion
- determining shear strength of the soil of concern
- researching load bearing capacity of soil of concern
- determining mass of the soil plate
- determining root morphology, division and distribution
- determining amount of buttressing of tree
- determining species development of tap root system
- researching identifying anatomical features of tree roots
- identifying tree roots based on anatomical features
- researching, experimentally modelling or demonstrating forces and pressures exerted into or through the soil, directly and indirectly by trees
- estimating and measuring dimensions of roots exerting a force on a structure of concern
- calculating total surface area of the roots exerting a force on a structure of concern
- calculating force exerted by roots per unit of surface area of structure
- calculating total force exerted by roots of a given surface area

- measuring and determine volume of structure of concern
- researching and calculate mass of the structure and adjacent structures
- considering the impact of gravity on mass
- determining effect of leverage on the forces exerted by tree roots onto structure of concern
- determining factors of root–soil matrix interactions
- considering area of contact between root and soil
- considering elasticity, tensile strength and breaking stress of roots
- investigating root cross-sectional morphology
- assessing extent of root plate damage, deficiencies or defects
- estimating impact of static and dynamic testing for root plate stability
- evaluating the likelihood of root failure by root breakage
- evaluating the likelihood of anchorage failure by soil breakage or slippage
- researching and considering effects of increasing mass
- researching and considering methods for, and effects of, increasing the modulus of rupture
- researching and considering effects of use of curved structures
- researching and considering effects of soil mass and friction
- researching and considering effects of use of anchors, braces and props
- compiling a portfolio of above research including personal annotations and calculations
- preparing report on likelihood of tree causing damage to structure of concern including all test results, assumptions and calculations
- providing design suggestions to mitigate likelihood of damage to a similar replacement structure
- preparing report on relative stability of tree as a result of a defective or damaged root plate
- providing design suggestions to mitigate likelihood of whole tree failure as a result of defective or damaged root plate
- preparing expert witness report on harm by roots on structures; or on stability of tree with a defective or damaged root plate, as required
- reviewing construction and engineering language terminology
- discussing installation and protection measures to non-arboricultural team members
- resolving issues in construction and engineering terminology
- communicating in the language, concepts, basic science and technology of construction, architecture and engineering allied professions.

Knowledge Evidence

The candidate must demonstrate knowledge of:

- repose angle of soil materials
- soil plasticity
- soil moisture content
- field capacity of soil
- effects of soil moisture on soil cohesion and plasticity
- modes of soil liquefaction
- soil texture

- soil cohesion
- shear strength of the soil
- load bearing capacity
- mass of soil plate
- root morphology
- root division
- root distribution
- buttressing
- species development of tap root systems
- anatomical features of tree roots
- identification of tree roots based on anatomical features
- research, experimental modelling and demonstration methods
- forces and pressures exerted into or through the soil, directly and indirectly by trees
- estimation and measurement of dimensions of roots exerting a force on a structure
- calculation of the total surface area of the roots exerting a force on a structure
- calculation of the force exerted by roots per unit of surface area of structure
- calculation of the total force exerted by roots of a given surface area
- measurement of volume of structures
- calculation of the mass of structures
- impact of gravity on mass
- effect of leverage on the forces exerted by tree roots onto structure
- factors of root–soil matrix interactions
- area of contact between root and soil
- elasticity of roots
- tensile strength of roots
- breaking stress of roots
- root cross-sectional morphology
- extent of root plate damage
- extent of root plate deficiencies
- extent of root plate defects
- impact of static and dynamic testing for root plate stability
- likelihood of root failure by root breakage
- likelihood of anchorage failure by soil breakage or slippage
- effects of increasing mass
- effects of use of curved structures
- effects of soil mass and friction
- effects of, increasing the modulus of rupture
- effects of use of anchors, braces and props
- portfolio of research
- personal annotations and calculations
- report preparation
- test results and assumptions

- relative stability of tree
- whole tree failure
- design suggestions for mitigation of damage and whole tree failure
- harm by roots on structures
- expert witness reports
- expert witness report on harm by roots on structures
- construction language terminology
- engineering language terminology
- installation and protection measures
- concepts, basic science and technology of structural engineering
- concepts, basic science and technology of construction
- concepts, basic science and technology of architecture.

Assessment Conditions

It is an industry requirement that competency in this unit requires the preparation of a minimum of two (2) different reports:

- a report on harm by roots on structures
- a report on stability of tree with a defective or damaged root plate

Assessment must be demonstrated consistently over time in a suitable range of contexts and have a productivity-based outcome. No single assessment event or report is sufficient to achieve competency in this unit.

Assessment may be conducted in a simulated or real work environment, however determination of competency requires the application of work practices under work conditions.

The mandatory equipment and materials used to gather evidence for assessment include:

- equipment:
 - computer
 - word processing software
 - internet connection
 - digital camera with macro
 - diagnostic tools including sounding hammer, trowel, probe, cordless drill
 - soil testing equipment
 - digital dissection microscope 10 -100x
 - compound microscope
 - microtome, staining and slide mounting equipment
 - slides and coverslips
 - temporary/permanent mountant
 - histochemical stains
- materials:
 - structural damage and stability report

- glossary of construction, architecture and engineering terminology

Assessors must satisfy current standards for RTOs in the assessment of arboriculture units of competency.

Assessment must be conducted only by persons who have:

- tree biomechanics vocational competencies at least to the level being assessed
- current tree biomechanics skills directly relevant to the unit of competency being assessed
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Links

Companion Volumes, including Implementation Guides, are available at VETNet: -
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=c6399549-9c62-4a5e-bf1a-524b2322cf72>