AHCARB701 Tree Biomechanics Form

Arboriculture Australia™

Prerequisite competency completion		
Not applicable. There are no prerequisite requirements.		
Required reports completion		
Has the candidate successfully completed the **required reports?**	**Yes/No (Y/N)**	**Signed (Initialled)**
Structural integrity report		
Mandatory Equipment (as a minimum)		
Has each of the mandatory equipment items been used to gather evidence for assessment?	**Yes/No (Y/N)**	**Signed (Initialled)**
computer		
word processing software		
internet connection		
wind environment statistics		
static load equipment		
models of tree dynamics		
Knowledge Evidence		
Has the candidate successfully completed the **Knowledge Evidence** requirements by demonstrating knowledge of each of the line items below?	**Yes/No (Y/N)**	**Signed (Initialled)**
physical loads affecting trees		
areas of high stress on trees		
root plate environment including depth and consistency of soil, spatial limitations and history of site excavations		
prior tree pruning operations to branches and roots		
extent of decay and damage of trunk and root system		
extent of decay of trunk and root system		
extent of damage of trunk and root system		
assessment of strength and material properties of structural wood		
wind environment of tree		
surface area of structure exposed to wind		
crown surface area exposed to wind		
aerodynamic drag factor of tree crown in relation to trunk diameter and extent of hollowness		
estimation of primary loads occurring in seasonal climatic events		

wind-load of prevailing storms		
load associated with saturated foliage		
additional drag associated with saturated foliage		
static load		
static load test		
appropriateness of a static load on trees for structural integrity testing as an estimate of a wind equivalent load		
calibrating static load testing instruments		
limits of structural safety during a static test		
measurement of trunk strength		
assessment of root plate anchorage in the ground		
monitoring loads and forces electronically		
monitoring of tree to ensure loads are kept within safe limits		
avoidance of damage to tree		
maintenance of accurate records of all data from static test		
benchmarks obtained from stable tree populations		
reporting on structural integrity testing of tree		
researching tree biomechanics studies using dynamic methods of analysis		
simple models of tree dynamics		
complex models and finite element analyses		
multimodal approaches		
dynamics of branches on trees		
calculations of existing mass of branches		
open-grown form of tree		
vector of force on trees		
tree dynamic response		
wind velocity and direction		
material properties in tree dynamics		
dynamic effect of branches on frequency and damping		
form and morphology in tree dynamics		
invasive and non-invasive methods of testing		
likelihood of structural failure		
level of anchoring potential of root system		
stability of tree		
structural integrity reporting		

Performance evidence		
Has the candidate successfully demonstrated the **Performance Evidence** requirements of the unit of competency AHCARB701 Analyse tree biomechanics**, and as per listed line items below?**	**Yes/No (Y/N)**	**Signed (Initialled)**
determining existing physical loads affecting trees		
identifying areas of high stress on trees and the factors that affect these areas of high stress		
assessing root plate environment including depth and consistency of soil, spatial limitations and history of site excavations		
assessing prior tree pruning operations to branches and roots		
determining extent of decay and damage of trunk and root system		
assessing strength and material properties of structural wood, particularly in areas of high stress		
determining wind environment of tree		
determining surface area of structure exposed to wind		
determining crown surface area exposed to wind		
assessing aerodynamic drag factor of tree crown in relation to trunk diameter and extent of hollowness		
estimating primary loads occurring in seasonal climatic events		
determining wind-load of prevailing storms		
determining load associated with saturated foliage		
considering additional drag associated with saturated foliage		
determining appropriate static load on trees for structural integrity testing as an estimate of a wind equivalent load		
calibrating static load testing instruments so loads are accurately applied and maintained within limits of structural safety during a static test		
carrying out a static test that loads the tree, measures the trunk strength and assesses root plate anchorage in the ground		
monitoring loads and forces electronically		
monitoring tree to ensure loads are kept within safe limits and damage is avoided to tree		
maintaining accurate records of all data from static test.		
comparing data with benchmarks obtained from stable tree populations		
documenting a report on structural integrity testing of tree from the static load test.		
researching tree biomechanics studies using dynamic methods of analysis		
understanding simple models of tree dynamics		

reviewing complex models and finite element analyses that provide multimodal approaches representing dynamics of branches on trees		
calculating the existing mass of branches		
determining degree of open-grown form of tree by calculation the of branch mass		
calculating the vector of force on the tree		
determining the tree dynamic response in defined wind velocity and direction		
researching the level of contribution of material properties in tree dynamics		
researching the dynamic effect of branches on frequency and damping		
determining the level of contribution of form and morphology in tree dynamics		
reviewing suitability of invasive and non-invasive methods of testing		
evaluating and determining likelihood of structural failure		
confirming level of anchoring potential of root system and stability of tree		
documenting a structural integrity report and provide to client		
Assessment conditions		
It is an industry requirement that competency in this unit requires the assessment of: **five (5)** static load tests, and **five (5)** dynamic load analyses.		
Have the assessments incorporated the assessment conditions and met the industry requirements for competency in this unit **as per listed line items below?**	**Yes/No (Y/N)**	**Signed (Initialled)**
Has the assessment confirmed the completion of **five (5)** static load tests?		
Has the assessment confirmed the completion of **five (5)** dynamic load analyses?		
Assessment may be conducted in a simulated or real work environment; however, determination of competency requires the application of work practices under work conditions.	**Yes/No (Y/N)**	**Signed (Initialled)**
Have assessments been demonstrated consistently over time?		
Have assessments been demonstrated in a suitable range of contexts?		
Have assessments been demonstrated with a productivity-based outcome?		

Have assessments been demonstrated with multiple assessment events and reports?			
Assessor Declaration			
Assessors must satisfy current standards for RTOs in the assessment of arboriculture units of competency. **Has assessment been conducted only by persons who have:**		**Yes/No (Y/N)**	**Signed (Initialled)**
• **tree biomechanics vocational competencies at least to the level being assessed?**			
• **current tree biomechanics skills directly relevant to the unit of competency being assessed?**			
Assessor name	**Assessor qualification**	**Year**	**Full Signature**
Competency Determination			
This section determines the skills and knowledge required to identify and analyse aspects of tree biomechanics that affect the physical loads and strengths of trees, branches and anchorage in the ground; understand the assessment of tree strength and the loads that occur; and assess factors that can weaken the tree and are likely to increase the chance of failure.			**Competent /Not yet competent**
The candidate is competent in analysis of tree biomechanics.			

Competency Assessment Completion		
Assessor name	**Date**	**Full Signature**