CICA – Vic / Tas Branch
Crane Safety Bulletin
#289 July 2021

Greetings all. Today's Bulletin is about when a crane is used for storm clean-up and recovery.

On the 9th of June, severe weather ravaged Victoria. The Bureau of Meteorology recorded damaging winds of 124 km/h, and up to 134mm of rain fall. The storm was on a scale not seen in many decades, thousands were forced to flee as properties and cars were destroyed in the ferocious conditions.

The wild weather was highly unusual because of the wind direction and length of time such high winds lasted, and this caused widespread tree damage. A vast amount of clean up was required because uprooted trees damaged houses and sprawled onto roads.

Picture from Herald Sun.

https://www.heraldsun.com.au/news/victoria/wild-winds-to-smash-popular-camp-spots-in-final-days-of-school-holidays/news-story/b81a2aa4c438448a4fd60efd5ffa3c09

If cranes are used for demolition of damaged buildings or tree removal jobs, control measures must be in place before the jobs commence.

- Risk assessments must be done, a Safe Work Method Statement (SWMS) has to be prepared before work commences.
- The crane manufacturer should be consulted for the use of the crane for special duties like demolition work.
- Traffic management should be implemented to prevent collision of crane boom or lifted load with pedestrians or other mobile plant.

When assessing the risks for tree removal jobs, the condition of the ground on which the crane is standing on should be assessed as the storm and flooding is likely to make the ground wet and soggy. As the crane takes the weight of the tree, the wet ground may give way under the outriggers and affect the stability of the crane. Ground preparation needs to be done if necessary.

Trees are very difficult to assess, prior to lifting, as there are many variables to consider in determining mass and centre of gravity (CoG):

1. **For mass, it should be noted that different types of trees vary greatly in density and size.**

The density of a heavier tree, for example, Narrow-leaved Red Ironbark tree, is around 1090kg/m3, while the density of a Queensland Maple tree is only 575 kg/m3.
The weight of a piece of the Ironbark tree trunk with 1 meter diameter and 1 meter length = volume x density = area (πr^2) x length x density = π x (0.5m) 2 x 1m x 1090 kg/ = 855 kg.
The same piece of tree trunk, if it's a Queensland Maple tree, using the same formula as above, the weight will be 451.4kg, only half of the weight of the Ironbark tree.

The table below from the Queensland Department of Agriculture, Forestry and Fisheries shows density for some common Australian woods for your reference.

Density and compressive strength of some common Australian woods

Common name	Type	Scientific name	Density (g/cm³)	Compressive strength - seasoned (MPa)
Narrow Leaved Red Ironbark	Hardwood	*Eucalyptus crebra*	1.090	70
Lemon Scented Gum/ Spotted Gum	Hardwood	*Corymbia Maculata/ Corymbia Citriodora subsp. variegata*	1.010	75
Southern Blue Gum	Hardwood	*Eucalyptus globulus*	0.980	83
Karri	Hardwood	*Eucalyptus diversicolour*	0.829	72
Jarrah	Hardwood	*Eucalyptus marginata*	0.835	61
Silvertop Stringybark	Hardwood	*Eucalyptus laevopinea*	0.860	73
Qld Maple	Hardwood	*Flindersia brayleyana*	0.575	44
Tasmanian Oak/Victorian Ash (commonly referred to as Mountain Ash)	Hardwood	*Eucalyptus regnans*	0.700	70
White Cypress Pine	Softwood	*Callitris glaucophylla*	0.675	53
Monterey Pine	Softwood	*Pinus radiata*	0.545	42
Western Red Cedar NB species which is not grown in Australia. Instead its timber is imported.	Softwood	*Thuja plicata*	0.380	34

(Sources: Qld Qld Dept Agriculture, Forestry and Fisheries; WoodSolutions™; and *Forest Trees of Australia* by Boland et al, CSIRO Publishing)

2. For determining CoG, be aware that the branch of a tree can be as long and heavy or even longer and heavier than the tree trunk, so the mass and the CoG of the tree can be hard to predict, and allowances need to be made if lifting a tree that is not trimmed.

Shock loading or static overloading of the crane can occur if the CoG or mass are miscalculated. For this reason, **it is recommended that the rated capacity of the crane should be capable of 2 times the calculated load** to allow for miscalculation. For example, a 4-tonne estimated load (plus hook block and rigging) should have a crane capacity of at least 8 tonnes.

Compromising this rule of thumb can mean the crane is insufficient.

Stay Safe - CICA