

ROTHOBLAAS GIRAFFE TECHNICAL REVIEW



Arboralis Pty Ltd were commissioned to complete a technical review of the GIRAFFE extendable propping system and its use in Australia in accordance with local standards.

Rothoblaas provided test data for the following props for a range of lengths:

- GIR2200
- GIR3000
- GIR4000
- GIR6000

The tests were completed in December 2022 by the University of Bologna. Each prop had three tests completed for a variety of different prop lengths to determine characteristic failure loads.

Arboralis undertook a statistical analysis of the props based on the most relevant Australian Standards. Two approaches were considered:

1. AS1170.0. Structural Design Principles. Part 0: General Principles. Appendix B
2. AS3610. Formwork for Concrete. Appendix A

Both approaches utilise a statistical analysis of actual failure loads to calculate a design load. The number of tests completed and the coefficient of variation from the test results are related to a sampling factor, k_s , which is used to reduce the tested capacities. There are slight differences in the values of k_s between AS1170.0 and AS3610, so the values derived from the AS3610 methodology were used as the more conservative capacities.

The strength limit state design capacity is based upon the following calculations noted in clause A4.4.3 of AS3610.

$$\phi R_u = \frac{\bar{x}}{k_s}$$

where:

ϕR_u = strength limit state capacity

$\bar{x}$ = mean value of test data (Paragraph A4.4.1)

k_s = sampling factor, from Table A1. In the determination of the sampling factor, a value of the coefficient of variation is needed. This coefficient of variation shall be obtained from Table A2. Alternatively, where destructive tests have been previously carried out on formwork components or assemblies of the same type in numbers adequate to enable calculation of the coefficient of variation in accordance with Paragraph A4.4.2, the calculated value may be used

k_{d1} = modification factor for duration of load

= 1.0 for steel, aluminium; for timber, see Table A3.

In addition to the calculations of the capacities based on Australian Standards, Rothoblaas also completed the equivalent calculations to the European Standard EN1065. Where there was a difference between the two figures, the lower values were chosen.

The following values can be adopted for use in Australia in accordance with the principles of AS3610 and AS1170.0.

Prop Reference	Prop Length (mm)	Design Capacity (kN)
GIR2200	2000	5.04
GIR3000	1750	20.86
	2400	14.60
	3000	6.11
GIR4000	1750	29.48
	2850	14.16
	4000	4.45
GIR6000	3000	59.43
	4000	29.70
	5000	16.07
	6000	7.01

The following limitations apply.

- Design capacities are provided for the props only. The propped elements, fixings and all supporting structure should be checked by a suitably qualified and experienced engineer.
- Propping installation and use are in strictly in accordance with Rothoblaas technical literature.
- Prop capacities are based on short term wind-loading on vertical elements only. Where propped elements may be exposed for a significant time or used to support sustained vertical loads then these capacities should be reviewed by a suitably qualified engineer.
- All capacities are derived from structural load test data provided by Rothoblaas and Arboralis Pty Ltd take no responsibility for their authenticity.
- It is the manufacturer's responsibility to ensure that the testing remains representative of each product batch and any changes to design or manufacturing methods which may impact the capacity may invalidate this document.
- Arboralis Pty Ltd shall not be liable for the design or installation of the props on any specific projects. The ultimate responsibility for the propping design rests with the temporary works engineer for each project.



Arborealis

This report has been prepared by:

A handwritten signature in black ink, appearing to read 'Nick Hewson', with a long horizontal stroke extending to the right.

Nick Hewson

Director of Arborealis Pty Ltd

CPEng, MStructE, NPER, RBP

E: admin@arborealis.com.au