

Wind Load Analysis

Tree Number 1

Project

Project Name Geraardsbergen Goe
 Project Number 1
 Test Date 2/10/2024

Site

9500 Geraardsbergen, Belgium
 Altitude a. sea level 32 m

Tree Data

Tree Species Juglans regia
 Stem circumference 250 cm
 Stem Diameter || 78 cm
 in 1m height _|_ 79 cm
 Bark Thickness 2 cm
Tree Height 17 m

Applied Material Properties

as for Juglans regia
 Source Stuttgart
 Compressive Strength 22 MPa
 Modulus of Elasticity 5000 MPa
 Limit of Elasticity 0.44 %
 Green Density 0.9 g/cm³

Crown Outline



Load Direction Zuid

Surface Area Analysis

Crown Base 3 m
 Effective Height 11.4 m
 Total Surface Area 226 m²
 Crown Eccentricity 0.49 m

Applied Structural Parameters

Drag Factor 0.32
 Natural Frequency 0.6 Hz
 Damping Decrement 0.95
 Form Factor for Dead Weight 0.8

Applied Site Parameters

Windzone BE 3
 Speed of Applied
 Design Wind Speed 25 m/s
 Air Density 1.29 kg/m³
 Roughness Category Landscape
 Exponent for Wind Profile 0.16
 Proximity Factor for Effects
 in Near Ground Wind Flow 1.08
 Factor for Crown Exposure 1.00

Results

Wind Load Analysis

Mean Wind Pressure 33.4 kN
 Gust Reaction Factor 2.08
 Load Centre 10 m
 Torsion Moment 34 kNm

Tree Static Analysis

Dead Weight Tree 5.3 t
 Critical Degree of Hollowness 55 %
 Critical Residual Wall Thickness 17 cm
 Assuming an Uncompromised Residual Wall

Design Wind Load 695 kNm

Basic Safety Factor 1.2

General

Comments

Calculated Tipping Stability according to Pull Test

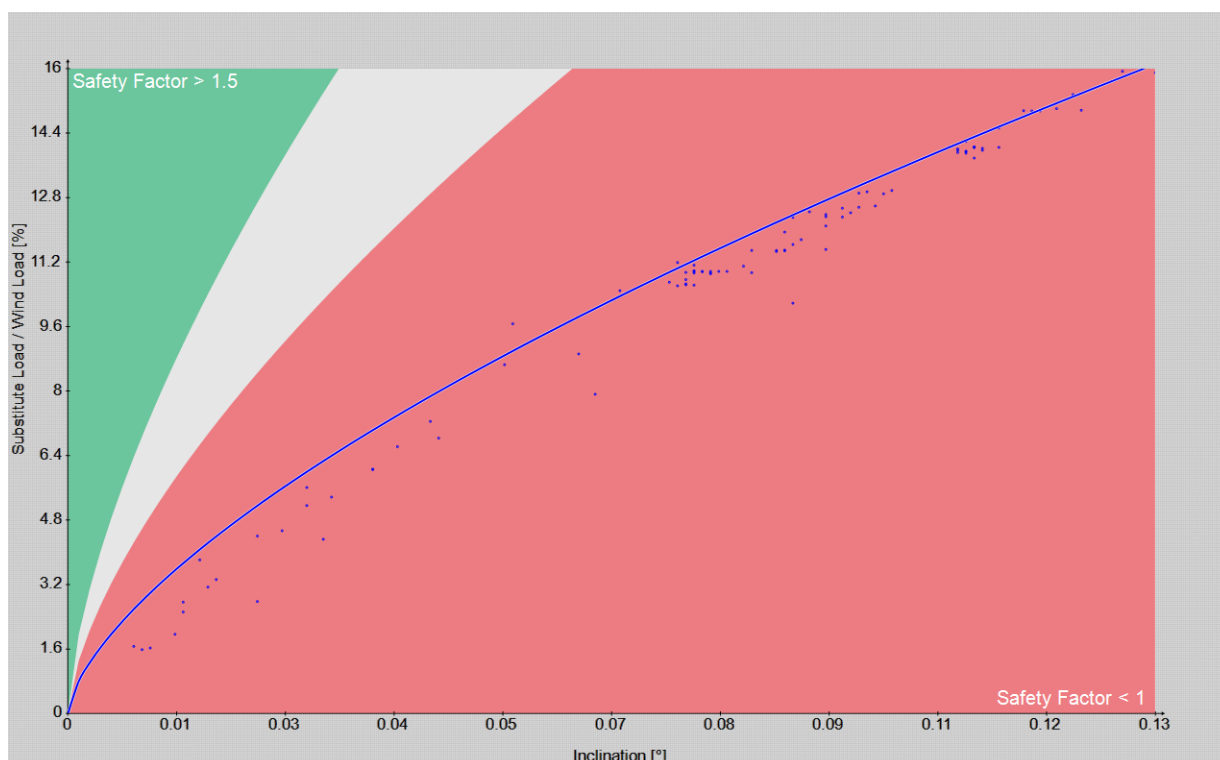
Tree Data

Project	Geraardsbergen Goefdingeplein	Tree Number	1
Tree Species	Juglans regia	Date	2/10/2024

Setup Pulling Test

Height of the Stem Anchor	6 m	Measurement No.	1
Rope Angle	19.8 °	Load Direction	Zuid

Graphic Display (test data and best fit to tipping curve)



Inclinometer Measurement

80

Position

Tipping Stability (based on Generalized Tipping Curve)

Safety Factor **0.61**

Control Value

in

Standard Deviation	%	0.71
Substitue Load	%	16
Load Direction at Inclinometer		x-Axis

General for Pull Test

Consultant Natan
 Witness / Assistant

Measurement Comments

Calculated Tipping Stability according to Pull Test

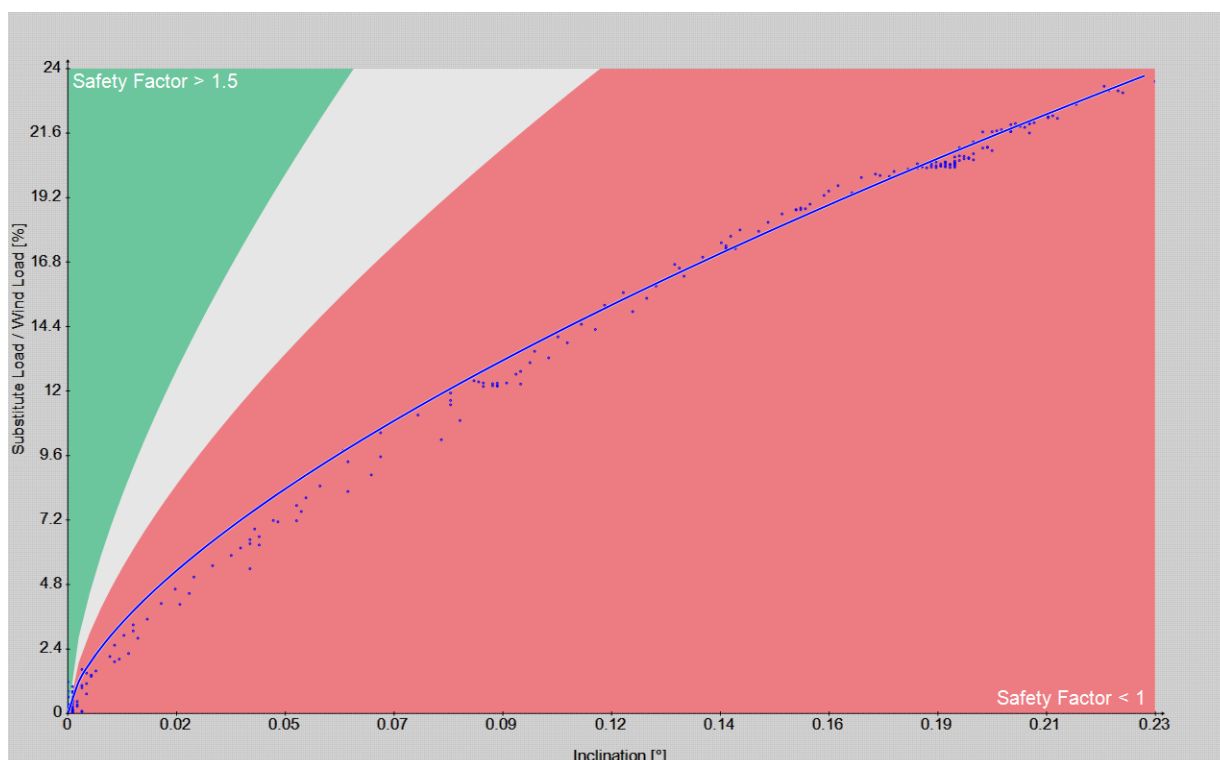
Tree Data

Project	Geraardsbergen Goefdingeplein	Tree Number	1
Tree Species	Juglans regia	Date	2/10/2024

Setup Pulling Test

Height of the Stem Anchor	6 m	Measurement No.	2
Rope Angle	19.8 °	Load Direction	Zuid

Graphic Display (test data and best fit to tipping curve)



Inclinometer Measurement

80

Position 270

Tipping Stability (based on Generalized Tipping Curve)

Safety Factor 0.62

Control Value

in

Standard Deviation % 0.58
 Substitute Load % 23.6
 Load Direction at Inclinometer x-Axis

General for Pull Test

Consultant Natan
 Witness / Assistant

Measurement Comments

Calculated Fracture Stability according to Pull Test

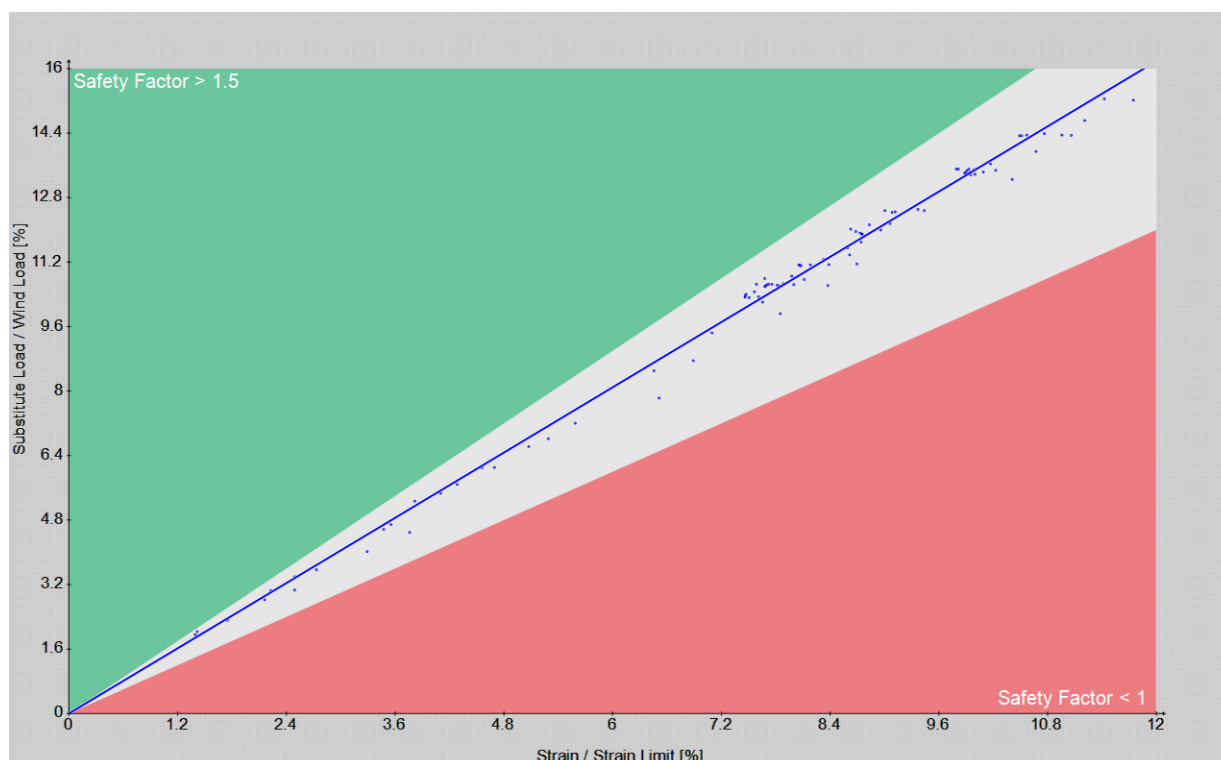
Tree Data

Project	Geraardsbergen Goefdingeplein	Tree Number	1
Tree Species	Juglans regia	Date	2/10/2024

Setup Pulling Test

Height of the Stem Anchor	6 m	Measurement No.	1
Rope Angle	19.8 °	Load Direction	Zuid

Graphic Display (test data and best linear fit)



Elastometer Measurement in 90

Measurement Height	m	1
Position		
Stem Diameter 1	cm	78
Stem Diameter 2	cm	79
Bark Thickness	cm	3
Load share	%	100

Breaking Stability (derived from the gradient of the best linear fit)

Safety Factor **1.35**

Control Value

Coefficient of Determination R ²	0.9936
Residual Stiffness	% >100
Degree of Hollowness	% 0
Compression originating from	
Dead Weight	% 0.5
Substitute Load	% 15.3

Calculated Fracture Stability according to Pull Test

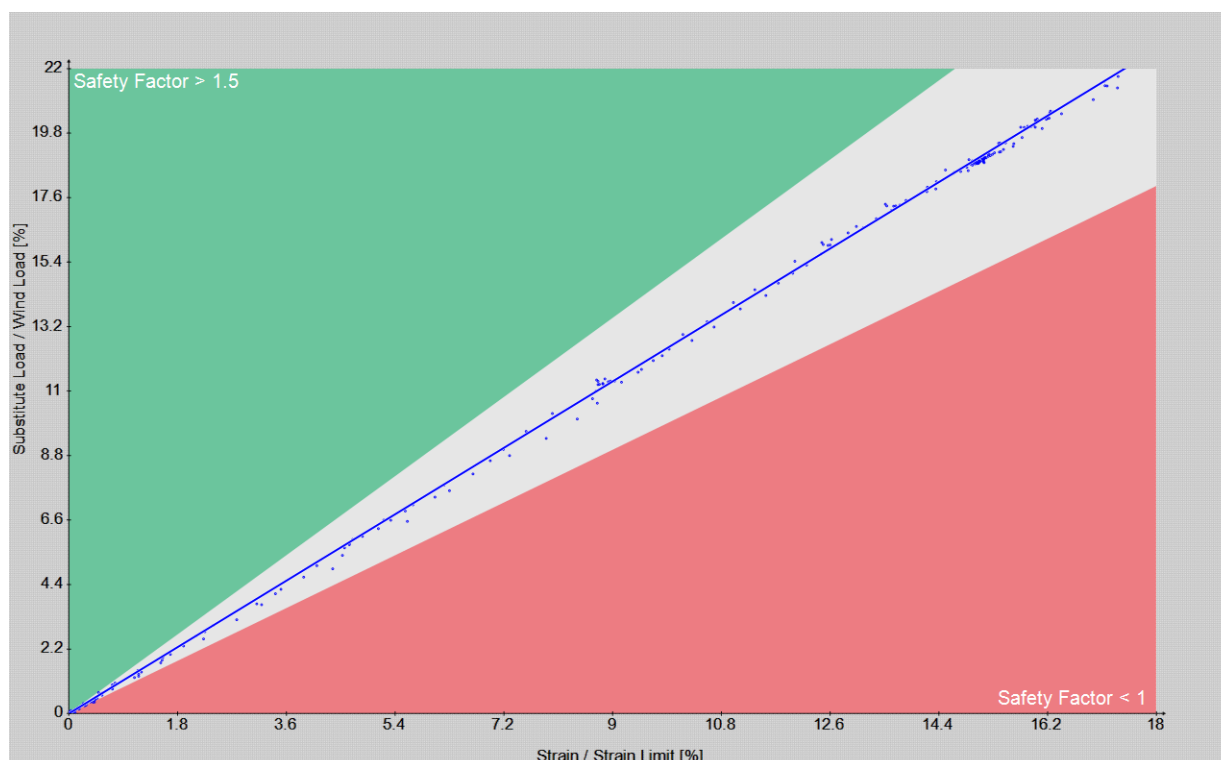
Tree Data

Project	Geraardsbergen Goeferdingleplein	Tree Number	1
Tree Species	Juglans regia	Date	2/10/2024

Setup Pulling Test

Height of the Stem Anchor	6 m	Measurement No.	2
Rope Angle	19.8 °	Load Direction	Zuid

Graphic Display (test data and best linear fit)



Elastometer Measurement in 90

Measurement Height	m	1
Position		180
Stem Diameter 1	cm	78
Stem Diameter 2	cm	79
Bark Thickness	cm	3
Load share	%	100

Breaking Stability (derived from the gradient of the best linear fit)

Safety Factor **1.26**

Control Value

Coefficient of Determination R ²		0.9996
Residual Stiffness	%	96.9
Degree of Hollowness	%	31.5
Compression originating from		
Dead Weight	%	0.6
Substitute Load	%	21.8