Wind Load Analysis

Tree Number **10**

Project

Project Name	_	
Project Number	3	
Test Date	30.10.2023	

Site

	165	m

Tree Data

Tree Species	Acer platanoides		
Stem circumference		188	cm
Stem Diameter	||	63	cm
in 1m height	_|_	63	cm
Bark Thickness		1,5	cm
Tree Height		**12,8**	**m**

Applied Material Properties

as for	Acer platanoides	
Source	Stuttgart	
Compressive Strength	24	MPa
Modulus of Elasticity	10550	MPa
Limit of Elasticity	0,23	%
Green Density	0,98	g/cm³

Crown Outline

Load Direction	E	
Surface Area Analysis		
Crown Base	2,3	m
Effective Height	8,6	m
Total Surface Area	96	m²
Crown Eccentricity	0,36	m
Applied Structural Parameters		
Drag Factor	0,25	
Natural Frequency	0,52	Hz
Damping Decrement	0,45	
Form Factor for Dead Weight	0,8	
Applied Site Parameters		
Windzone	D 1	
Speed of Applied		
Design Wind Speed	22,5	m/s
Air Density	1,26	kg/m³
Roughness Catagory	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			**Tree Static Analysis**		
Mean Wind Pressure	7,9	kN	Dead Weight Tree	2,8	t
Gust Reaction Factor	2,3		Critical Degree of Hollowness	90	%
Load Centre	7,3	m	Critical Residual Wall Thickness	3	cm
Torsion Moment	6	kNm	Assuming an Uncompromised Residual Wall		
Design Wind Load	**131**	**kNm**	**Basic Safety Factor**	**3,8**	

General

Comments

Calculated Tipping Stability according to Pull Test

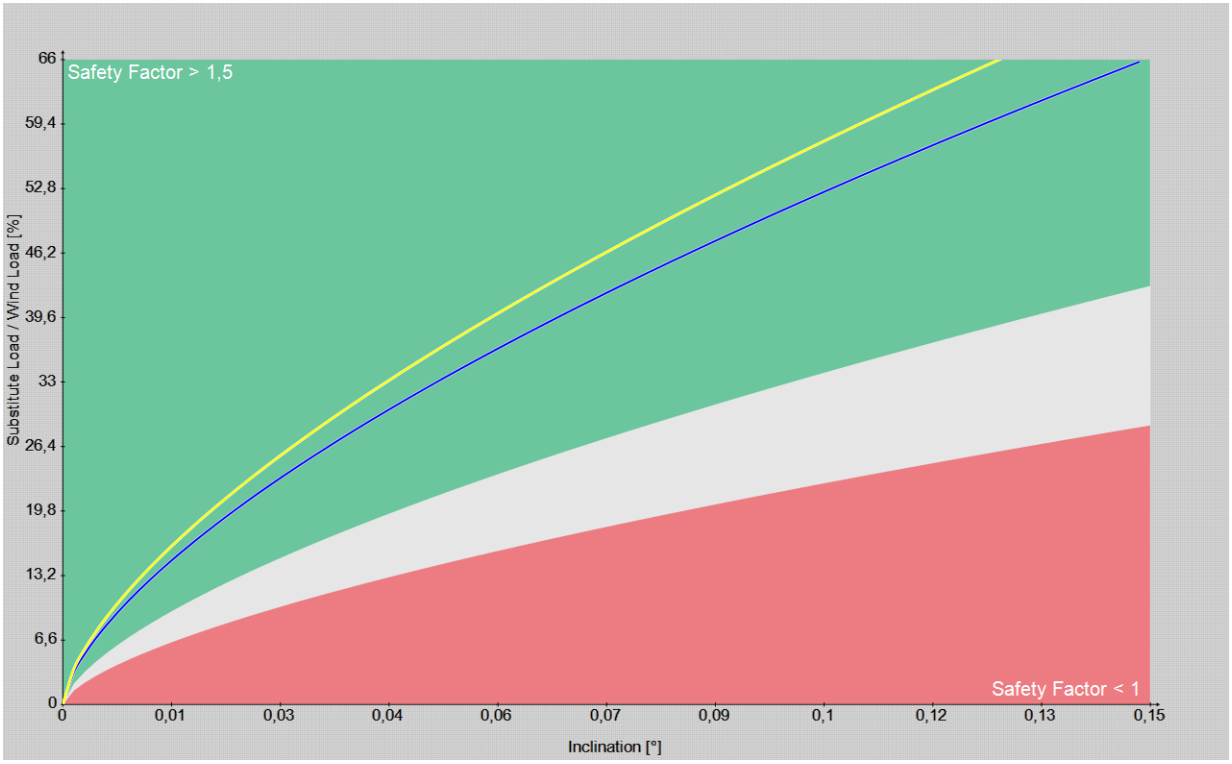
Tree Data

Project		**Tree Number**	**10**
Tree Species	Acer platanoides	Date	30.10.2023

Setup Pulling Test

Height of the Stem Anchor	7,6 m	**Measurement No.**	**1**
Rope Angle	10 °	Load Direction	E

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



Inclinometer Measurement	80	81
Position	X270	X120

Tipping Stability (based on Generalized Tipping Curve)

Safety Factor	**2,32**	**2,55**

Control Value	in		
Standard Deviation	%	2,87	3,33
Substitute Load	%	65,9	65,9
Load Direction at Inclinometer		x-Axis	x-Axis

General for Pull Test

Consultant	Martin Blažek
Witness / Assistant	Vítězslav Prchal

Measurement Comments

Calculated Fracture Stability according to Pull Test

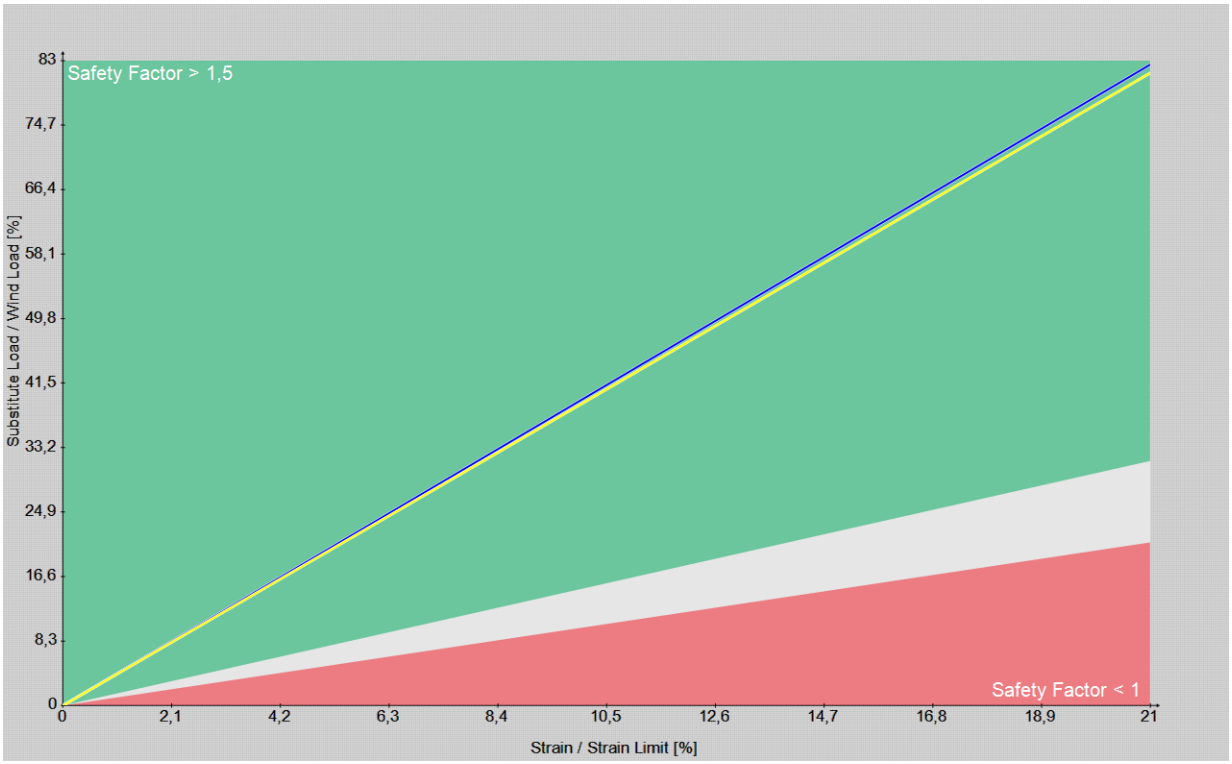
Tree Data

Project		**Tree Number**	**10**
Tree Species	Acer platanoides	Date	30.10.2023

Setup Pulling Test

Height of the Stem Anchor	7,6 m	**Measurement No.**	**2**
Rope Angle	10 °	Load Direction	E

Graphic Display (test data and best linear fit)



Elastometer Measurement	in	90	91
Measurement Height	**m**	**0,15**	**0,52**
Position		T	T
Stem Diameter 1	cm	62	59
Stem Diameter 2	cm	67	68
Bark Thickness	cm	2	2
Load share	%	100	100

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

Safety Factor		**3,93**	**3,88**

Control Value

Coefficient of Determination R^2		0,9992	0,9989
Residual Stiffness	%	>100	>100
Degree of Hollowness	%	0	0
Compression originating from			
Dead Weight	%	0,4	0,4
Substitute Load	%	81,3	82,8