Taxon		LEVEL 03 TRUNK SCANNING adbian
Picea abies		
Project	**Area**	**Tree number**
CEDA Jablonec	Opletalova	No. 114

Basic information

Tree height	Stem length	Crown area
23 m	1 m	127.92 m²

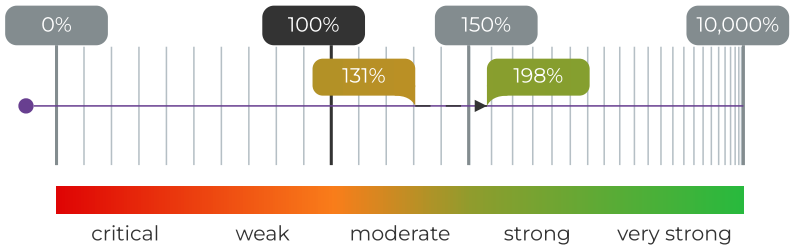
Trunk dimensions at breast height (1.3 m)

No.	Diameter	Circumference	Area
1.	46 cm	145 cm	1,609 cm²

Safety factor

Geometric analysis in the weakest point (1.6 m)

Possible stability with 6 m of prunning: **198%**



3D modeling and photo documentation



3D model shows the tree in the context of surrounding trees collected by the same method. If no other trees were collected in the area, the 3D model will be shown as a stand alone model.

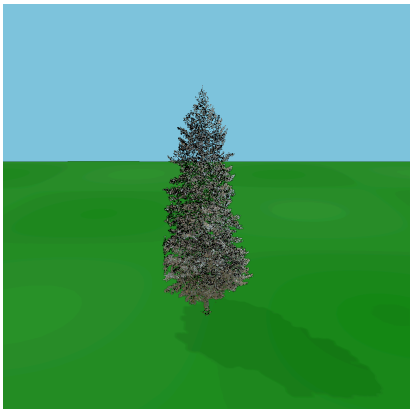


Photo documentation is used to identify the specific tree on which the analysis is performed.

Taxon		LEVEL 03 TRUNK SCANNING adbian
Picea abies		
Project	**Area**	**Tree number**
CEDA Jablonec	Opletalova	No. 114

3D Model

The 3D model from different sides is used to visualize the spatial context of a particular tree in its given environment. 3D model can be previewed using our Tree viewer app.



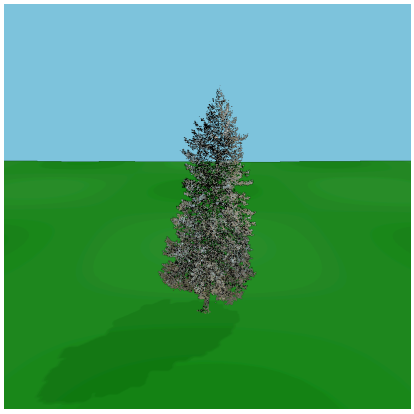
NORTH VIEW



SOUTH VIEW



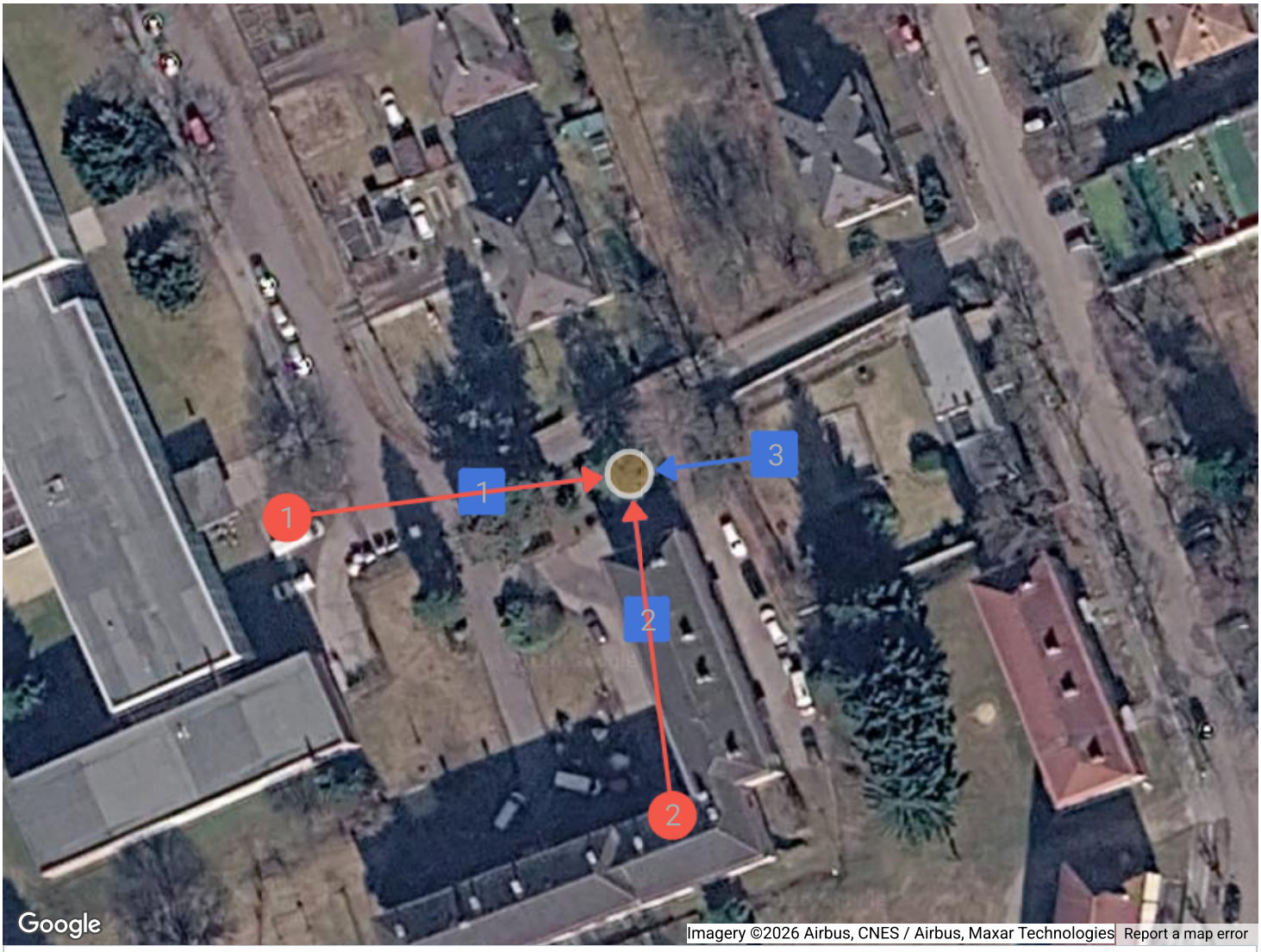
EAST VIEW



WEST VIEW

Taxon		LEVEL 03 TRUNK SCANNING adbian
Picea abies		
Project	**Area**	**Tree number**
CEDA Jablonec	Opletalova	No. 114

Localization



Tree location

1 Directions for taking photos of the whole tree

1 Directions for taking photographs of the tree trunk

Taxon		LEVEL 03 TRUNK SCANNING adbian
Picea abies		
Project	**Area**	**Tree number**
CEDA Jablonec	Opletalova	No. 114

Photo documentation

Pictures taken: 11/02/2026



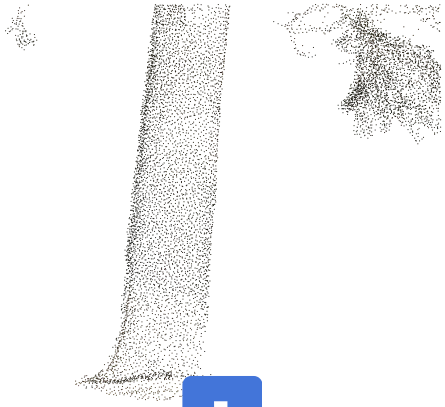
1

Whole tree
distance: 10.0 m



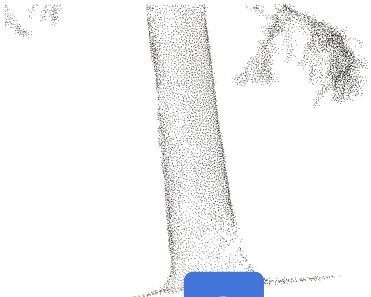
2

Whole tree
distance: 10.0 m



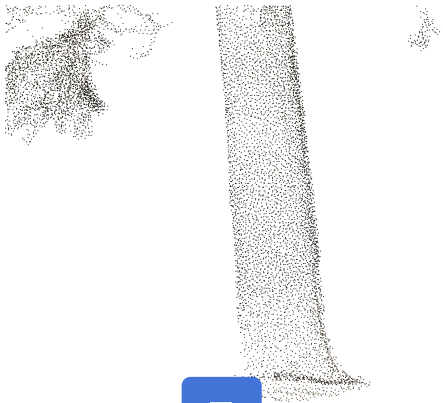
1

Tree trunk
distance: 10.0 m



2

Tree trunk
distance: 10.0 m



3

Tree trunk
distance: 10.0 m

Taxon		LEVEL 03 TRUNK SCANNING adbian
Picea abies		
Project	**Area**	**Tree number**
CEDA Jablonec	Opletalova	No. 114

Wind load analysis

Direction 1

Load profile
Eurocode 4, CZ profile

Environmental coefficient
soliter

Aerodynamic coefficient
0.20

Crown area
121 m²

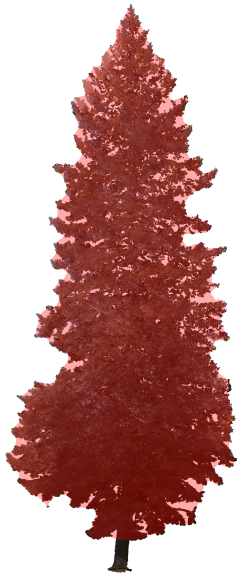
Height of center gravity
10.8 m

Eccentricity
0.3 m

Wind load
12.49 kN

Critical bending moment
135.29 kN·m

Wind speed
25 m/s





Direction 2

Load profile
Eurocode 4, CZ profile

Environmental coefficient
soliter

Aerodynamic coefficient
0.20

Crown area
129 m²

Height of center gravity
10.8 m

Eccentricity
0.7 m

Wind load
13.27 kN

Critical bending moment
142.88 kN·m

Wind speed
25 m/s



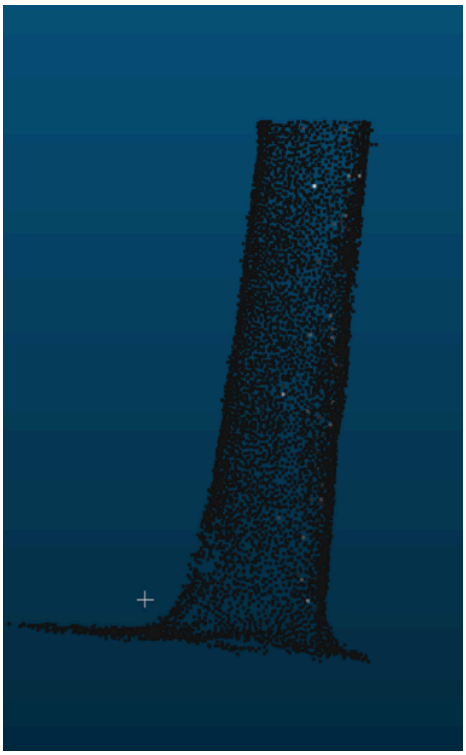


Taxon		LEVEL 03 TRUNK SCANNING adbian
Picea abies		
Project	**Area**	**Tree number**
CEDA Jablonec	Opletalova	No. 114

Beam model - stem dimensions

The beam model is based on 3D scanning and assumes full stem profiles, excluding any cavities not scanned and included in the model.

Stem dimensions

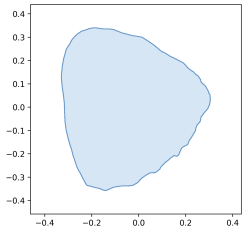


Profile	Diameter	Moment of inertia	Section modulus	Tension	Safety factor
0.0 m	70 × 63 cm	0.0076 m^4	0.0212 m^3	6.7 MPa	312%
0.1 m	60 × 57 cm	0.0047 m^4	0.0166 m^3	8.5 MPa	246%
0.2 m	56 × 54 cm	0.0034 m^4	0.0138 m^3	10.2 MPa	207%
0.3 m	54 × 53 cm	0.0031 m^4	0.0125 m^3	11.1 MPa	189%
0.4 m	53 × 52 cm	0.0029 m^4	0.0117 m^3	11.8 MPa	178%
0.5 m	51 × 50 cm	0.0026 m^4	0.0110 m^3	12.4 MPa	169%
0.6 m	49 × 49 cm	0.0025 m^4	0.0106 m^3	12.8 MPa	165%
0.7 m	49 × 49 cm	0.0025 m^4	0.0106 m^3	12.6 MPa	167%
0.8 m	49 × 49 cm	0.0023 m^4	0.0097 m^3	13.6 MPa	155%
0.9 m	49 × 49 cm	0.0022 m^4	0.0099 m^3	13.2 MPa	160%
1.0 m	49 × 49 cm	0.0022 m^4	0.0098 m^3	13.2 MPa	159%
1.1 m	48 × 48 cm	0.0020 m^4	0.0092 m^3	13.9 MPa	151%
1.2 m	47 × 46 cm	0.0019 m^4	0.0086 m^3	14.7 MPa	143%
1.3 m	46 × 46 cm	0.0018 m^4	0.0085 m^3	14.8 MPa	141%
1.4 m	45 × 46 cm	0.0018 m^4	0.0080 m^3	15.5 MPa	136%
1.5 m	45 × 46 cm	0.0018 m^4	0.0081 m^3	15.1 MPa	139%
1.6 m	45 × 44 cm	0.0016 m^4	0.0076 m^3	16.1 MPa	131%
1.7 m	46 × 43 cm	0.0016 m^4	0.0077 m^3	15.6 MPa	134%
1.8 m	46 × 43 cm	0.0016 m^4	0.0077 m^3	15.4 MPa	137%
1.9 m	45 × 43 cm	0.0016 m^4	0.0077 m^3	15.2 MPa	138%
2.0 m	45 × 43 cm	0.0016 m^4	0.0078 m^3	14.8 MPa	141%

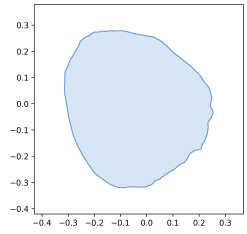
Taxon		
Picea abies	LEVEL 03 TRUNK SCANNING	adbian

Project	Area	Tree number
CEDA Jablonec	Opletalova	No. 114

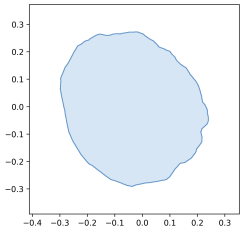
Beam model - bearing profiles 1/2



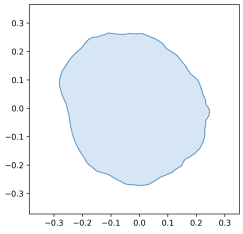
Profile: 0.0 m
Safety factor: 312%
Stem circumference: 211 cm
Area of cross section: 0.318 m²
Ideal diameter: 70 × 63 cm



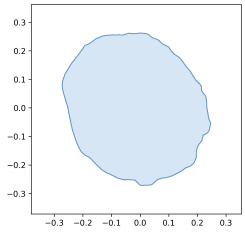
Profile: 0.1 m
Safety factor: 246%
Stem circumference: 185 cm
Area of cross section: 0.257 m²
Ideal diameter: 60 × 57 cm



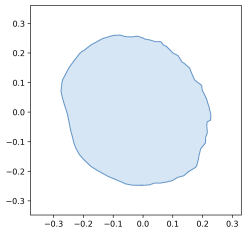
Profile: 0.2 m
Safety factor: 207%
Stem circumference: 174 cm
Area of cross section: 0.224 m²
Ideal diameter: 56 × 54 cm



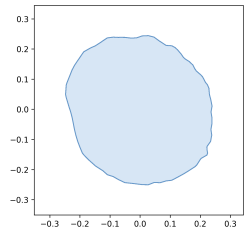
Profile: 0.3 m
Safety factor: 189%
Stem circumference: 167 cm
Area of cross section: 0.209 m²
Ideal diameter: 54 × 53 cm



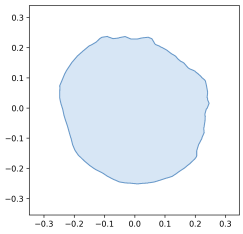
Profile: 0.4 m
Safety factor: 178%
Stem circumference: 166 cm
Area of cross section: 0.204 m²
Ideal diameter: 53 × 52 cm



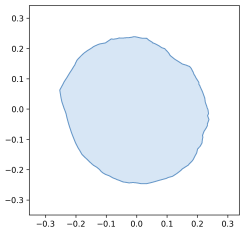
Profile: 0.5 m
Safety factor: 169%
Stem circumference: 161 cm
Area of cross section: 0.195 m²
Ideal diameter: 51 × 50 cm



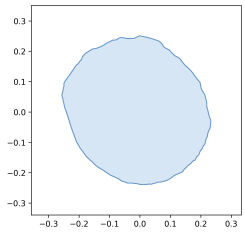
Profile: 0.6 m
Safety factor: 165%
Stem circumference: 157 cm
Area of cross section: 0.189 m²
Ideal diameter: 49 × 49 cm



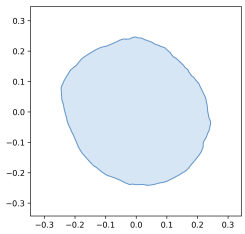
Profile: 0.7 m
Safety factor: 167%
Stem circumference: 157 cm
Area of cross section: 0.186 m²
Ideal diameter: 49 × 49 cm



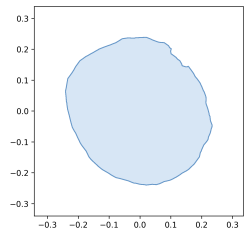
Profile: 0.8 m
Safety factor: 155%
Stem circumference: 152 cm
Area of cross section: 0.177 m²
Ideal diameter: 49 × 49 cm



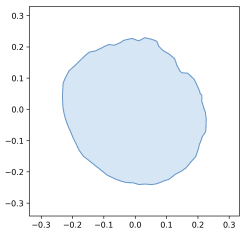
Profile: 0.9 m
Safety factor: 160%
Stem circumference: 152 cm
Area of cross section: 0.177 m²
Ideal diameter: 49 × 49 cm



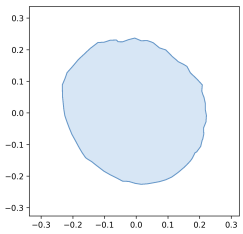
Profile: 1.0 m
Safety factor: 159%
Stem circumference: 151 cm
Area of cross section: 0.176 m²
Ideal diameter: 49 × 49 cm



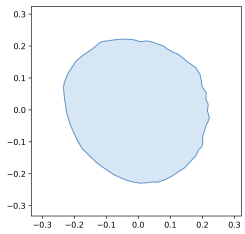
Profile: 1.1 m
Safety factor: 151%
Stem circumference: 150 cm
Area of cross section: 0.170 m²
Ideal diameter: 48 × 48 cm



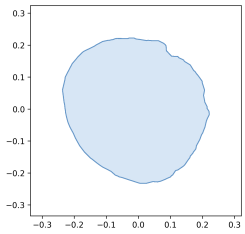
Profile: 1.2 m
Safety factor: 143%
Stem circumference: 147 cm
Area of cross section: 0.162 m²
Ideal diameter: 47 × 46 cm



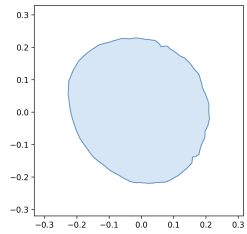
Profile: 1.3 m
Safety factor: 141%
Stem circumference: 145 cm
Area of cross section: 0.161 m²
Ideal diameter: 46 × 46 cm



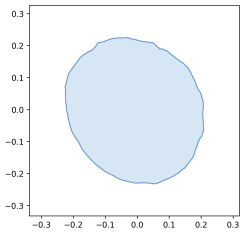
Profile: 1.4 m
Safety factor: 136%
Stem circumference: 143 cm
Area of cross section: 0.158 m²
Ideal diameter: 45 × 46 cm



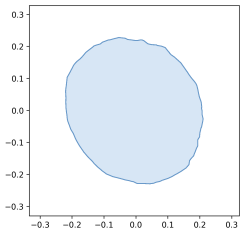
Profile: 1.5 m
Safety factor: 139%
Stem circumference: 144 cm
Area of cross section: 0.157 m²
Ideal diameter: 45 × 46 cm



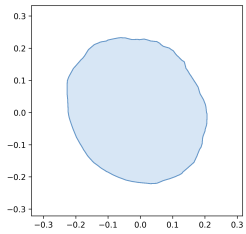
Profile: 1.6 m
Safety factor: 131%
Stem circumference: 141 cm
Area of cross section: 0.151 m²
Ideal diameter: 45 × 44 cm



Profile: 1.7 m
Safety factor: 134%
Stem circumference: 141 cm
Area of cross section: 0.154 m²
Ideal diameter: 46 × 43 cm



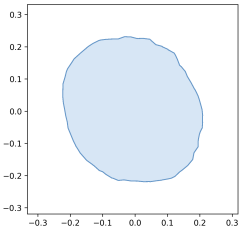
Profile: 1.8 m
Safety factor: 137%
Stem circumference: 141 cm
Area of cross section: 0.153 m²
Ideal diameter: 46 × 43 cm



Profile: 1.9 m
Safety factor: 138%
Stem circumference: 141 cm
Area of cross section: 0.153 m²
Ideal diameter: 45 × 43 cm

Taxon		LEVEL 03 TRUNK SCANNING adbian
Picea abies		
Project	**Area**	**Tree number**
CEDA Jablonec	Opletalova	No. 114

Beam model - bearing profiles 2/2



Profile: **2.0 m**
Safety factor: **141%**
Stem circumference: 142 cm
Area of cross section: 0.154 m²
Ideal diameter: 45 × 43 cm

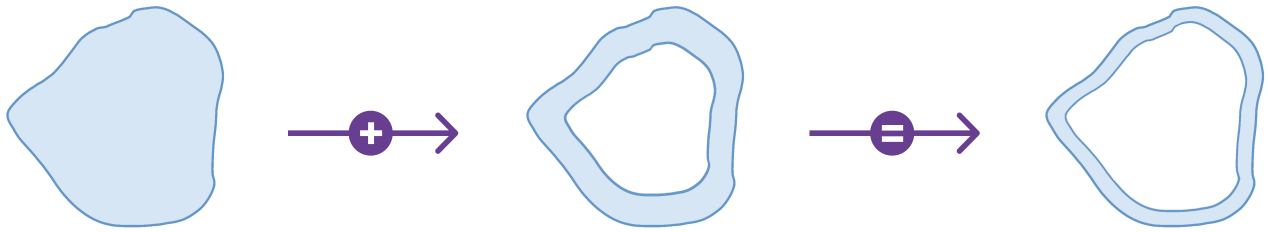
Taxon		LEVEL 03 TRUNK SCANNING
Picea abies		

Project	Area	Tree number
CEDA Jablonec	Opletalova	No. 114

Theoretical residual wall

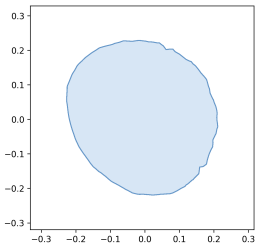
The method of evaluating the residual wall

The residual wall is a **theoretical value** that indicates the safety coefficient a tree would achieve if its residual wall were reduced to 30%, 20%, or 10% of its cross section surface area. To accurately determine the actual residual wall, we recommend conducting device tests.



Weakest profile | Modelation of the residual wall | Modelation of the residual wall

Weakest profile: 1.60 m



Full profile

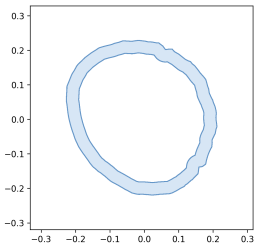
Safety factor
131%

Residual area
0.151 m^2

Moment of inertia
0.0016 m^4

Tension
16.1 MPa

Section modulus
0.0076 m^3



30% of residual area

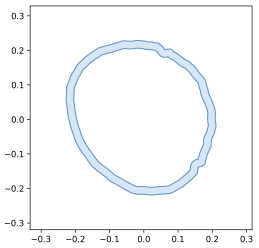
Safety factor
69%

Residual area
0.046 m^2

Moment of inertia
0.0008 m^4

Tension
30.4 MPa

Section modulus
0.0040 m^3



20% of residual area

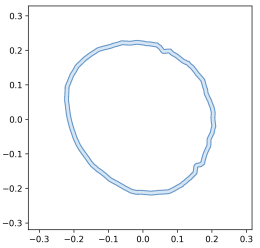
Safety factor
47%

Residual area
0.030 m^2

Moment of inertia
0.0006 m^4

Tension
44.5 MPa

Section modulus
0.0027 m^3



10% of residual area

Safety factor
25%

Residual area
0.015 m^2

Moment of inertia
0.0003 m^4

Tension
82.5 MPa

Section modulus
0.0015 m^3

Taxon		LEVEL 03 TRUNK SCANNING adbian
Picea abies		
Project	**Area**	**Tree number**
CEDA Jablonec	Opletalova	No. 114

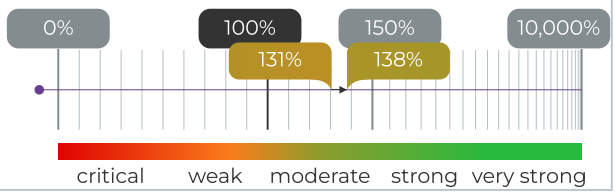
Stabilization pruning

In this case, a stabilization pruning is information about the change in the safety coefficient that can be achieved by reducing the crown, which will decrease the wind load surface. We calculate this information for three scenarios, which simulate the potential achieved change in the biomechanical stability of the tree. These scenarios are **not a recommendation**, only a theoretical value for understanding dynamics of a specific tree.

Safety factor after 9% reduction (2 m)

Bending

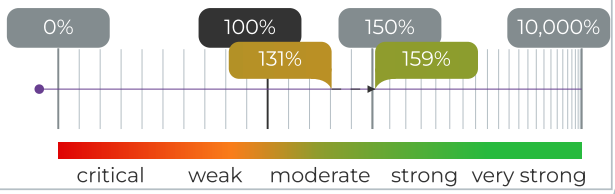
Geometry analysis: 138%



Safety factor after 17% reduction (4 m)

Bending

Geometry analysis: 159%



Safety factor after 26% reduction (6 m)

Bending

Geometry analysis: 198%

