

Eine Tulpe als Glücksbringer Spielcasino Venlo

IHF Innsbruck, 1. Dezember 2022, Jephtha Schaffner



**Blumer
Lehmann**

Timber construction | Engineering



Content:

- About us
- Result
- Assembly
- Fabrication
- Development timber structure





Combining tradition and innovation
at the Erlenhof for 147 years



References I



References II



Casino Venlo

MVSA Architects ©Jan Maarten Lieverdink



Casino Venlo

MVSA Architects ©Barwerd van der Plas



Casino Venlo

MVSA Architects ©Barwerd van der Plas



Venlo

a **city** and municipality in the southeastern Netherlands, near the German border.



Assembly timber trunk
160m² spruce glulam
15 meter high



Assembly timber trunk
diameter top 16 meters,
bottom 3.2 meters



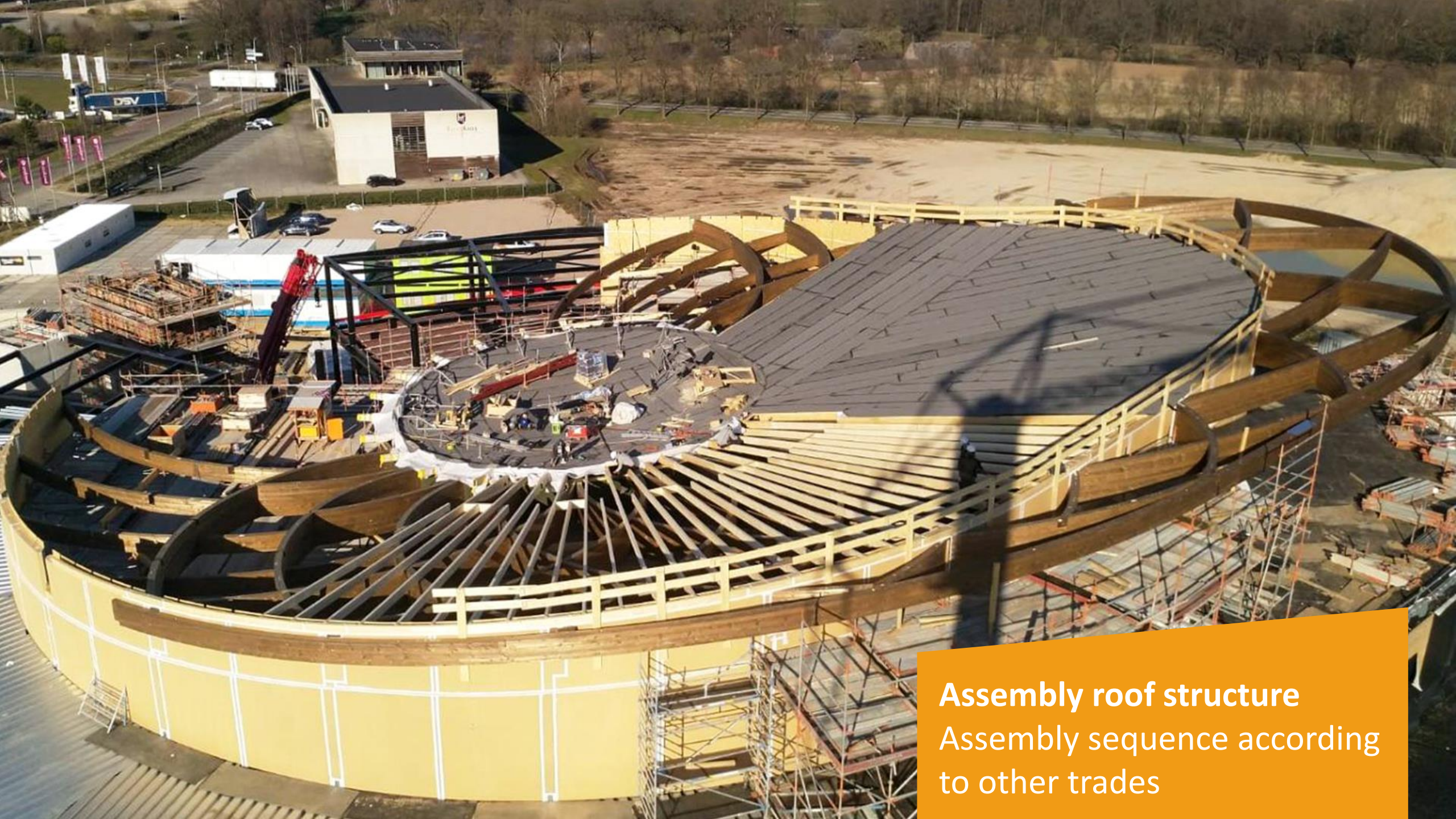
Assembly roof structure and wall elements
52 curved wall elements



Assembly roof structure
229 roof beams



Assembly roof structure
18'000 structural relevant screws
are required



Assembly roof structure
Assembly sequence according
to other trades



Assembly roof structure
Canopy



Assembly roof structure
Play room



Logistic

All shipments planned
in 3d model



Logistic

All shipments planned
in 3d model



Logistic

Transport options and their cost is crucial for segmentation



Treatment
UV-Protection



Preassembly
resin galls, chamfers,
connectors and screws



Preassembly
Glued rods as connector



Lap-Joint geometry
CNC-machine vs. hand tools



Tolerances

Wood tension and CNC machine



CNC-Machine
5-axis milling head



CNC-Machine
Quality control



Pre-cutting
Hand tools vs. CNC machine



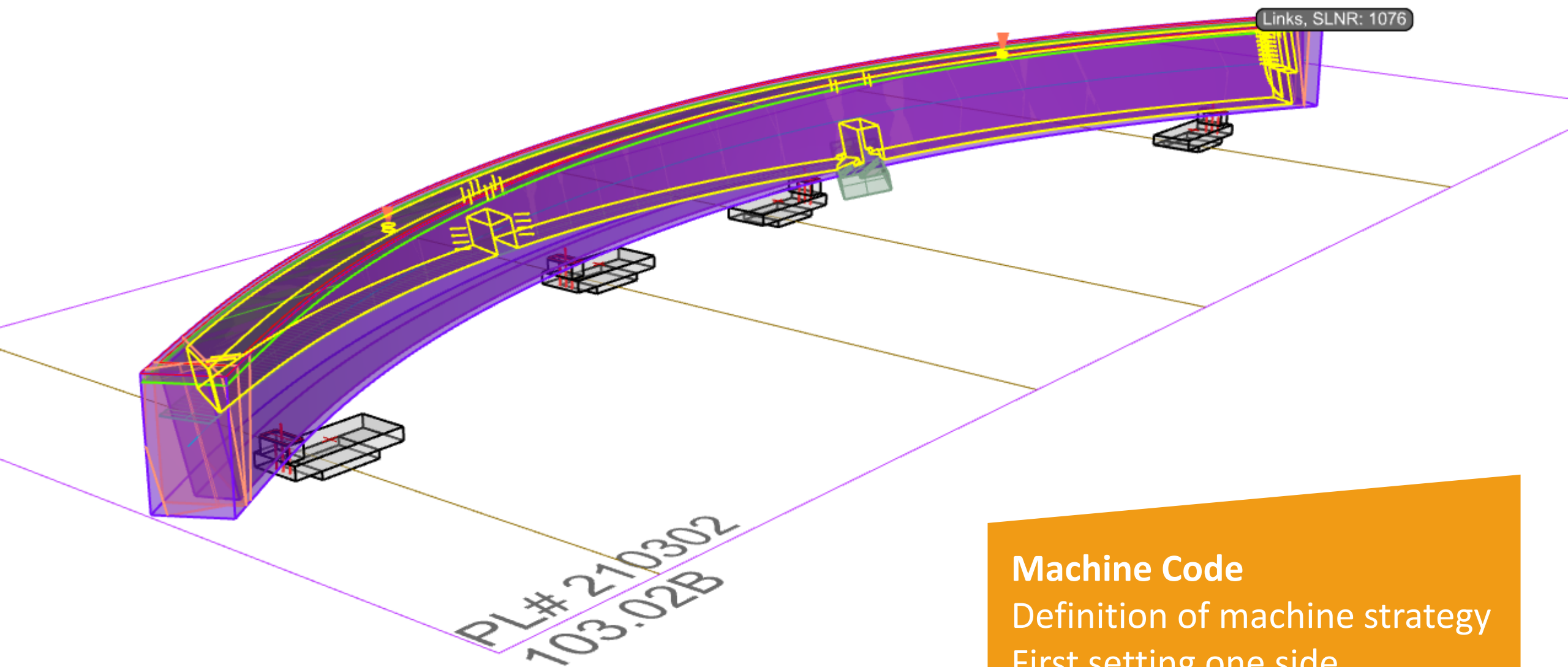
**Blumer
Lehmann**
Holzbaue Engineering

Gossau
Bischofszell
Flawil
↗

Raw Material spruce
Curved beams block glued

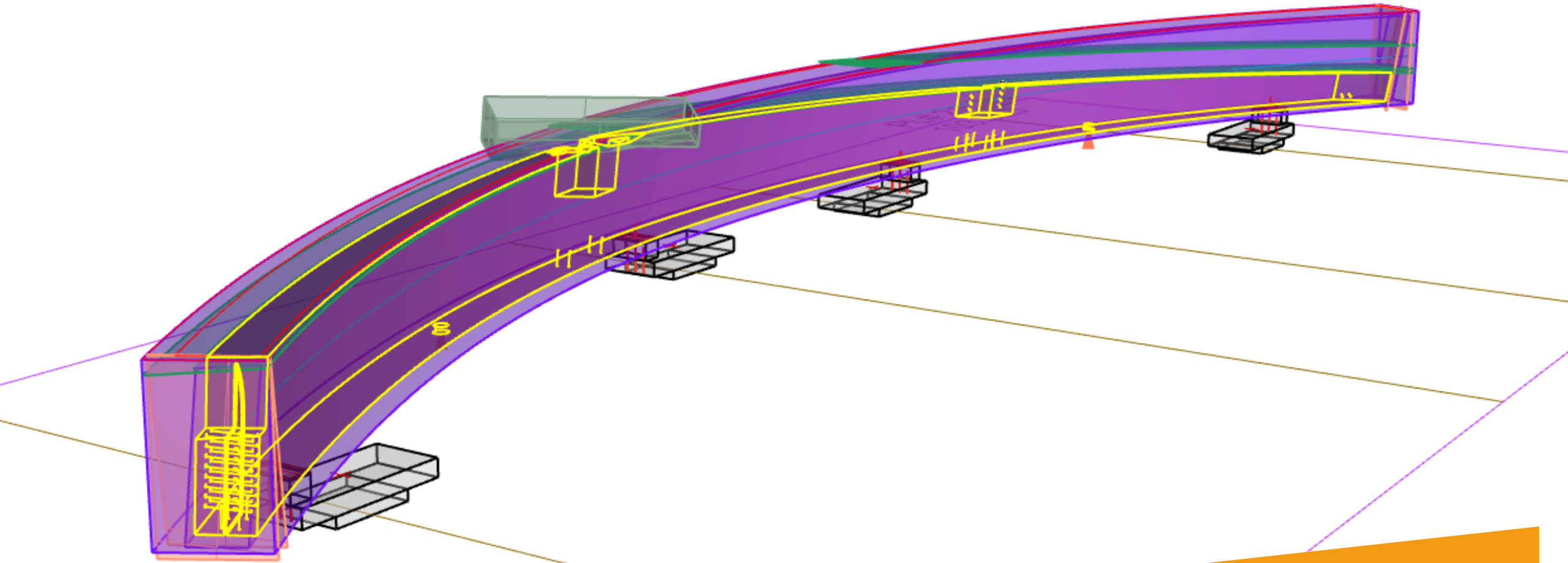


CNC machine code
Own CAM Software for
double curved beams



Machine Code

Definition of machine strategy
First setting one side



Machine Code
Second setting five sides

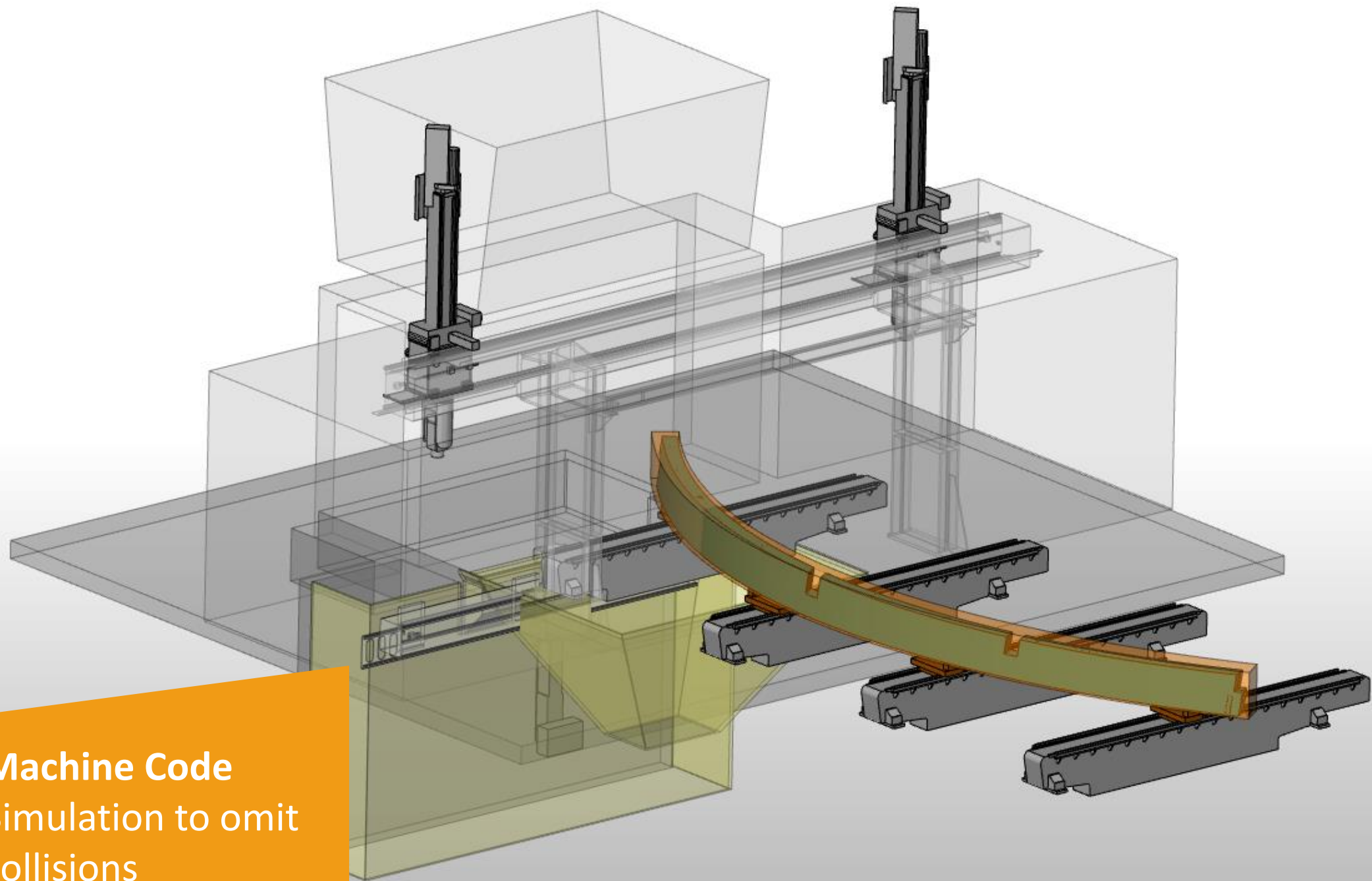
```

N100 L GOHOME.UP
N100 #RTCP OFF
N100 T200 LM06
N100 L PRE_D
N100 D200
N100 L PAST_D
N100 #RTCP ON

(>::MARK TOLDEF 0::)
(= === === === === === === === === === === === === === === === === === ===)
=== === === === ==)
(>::MARK MEDITO 1::)
#MSG SYN ["Scriptoperation Vorschnitt Vertikal"]
N11 (Vorschnitt Vertikal)
M3 S500
L SPINDLE_OK.UP
N14 G01 X -795.0 Y 2251.4 Z 1500.4 A 90.000 C 232.824 F50000
N15 G01 X -795.0 Y 2251.4 Z 74.3 A 90.000 C 232.824 F30000
N16 G01 X -715.4 Y 2191.0 Z 74.3 A 90.000 C 232.824 F60000
M3 S1500
L SPINDLE_OK.UP
N19 G01 X -544.9 Y 2415.7 Z 74.3 A 90.000 C 232.824 F5000
N20 G01 X -544.9 Y 2415.7 Z 1364.7 A 90.000 C 232.824 F5000
N21 G01 X 106.9 Y 3275.3 Z 1364.7 A 90.000 C 232.824 F15000
N22 G01 X 106.9 Y 3275.3 Z 74.3 A 90.000 C 232.824 F15000
N23 G01 X -63.5 Y 3050.6 Z 74.3 A 90.000 C 232.824 F5000
N24 G01 X -63.5 Y 3050.6 Z 1364.7 A 90.000 C 232.824 F5000
N25 G01 X -143.1 Y 3111.0 Z 1364.7 A 90.000 C 232.824 F30000
N26 G01 X -143.1 Y 3111.0 Z 1500.4 A 90.000 C 232.824 F50000
M3 S500
L SPINDLE_OK.UP
N29 G01 X 11349.8 Y 3364.9 Z 1500.4 A 90.000 C 123.525 F50000

```

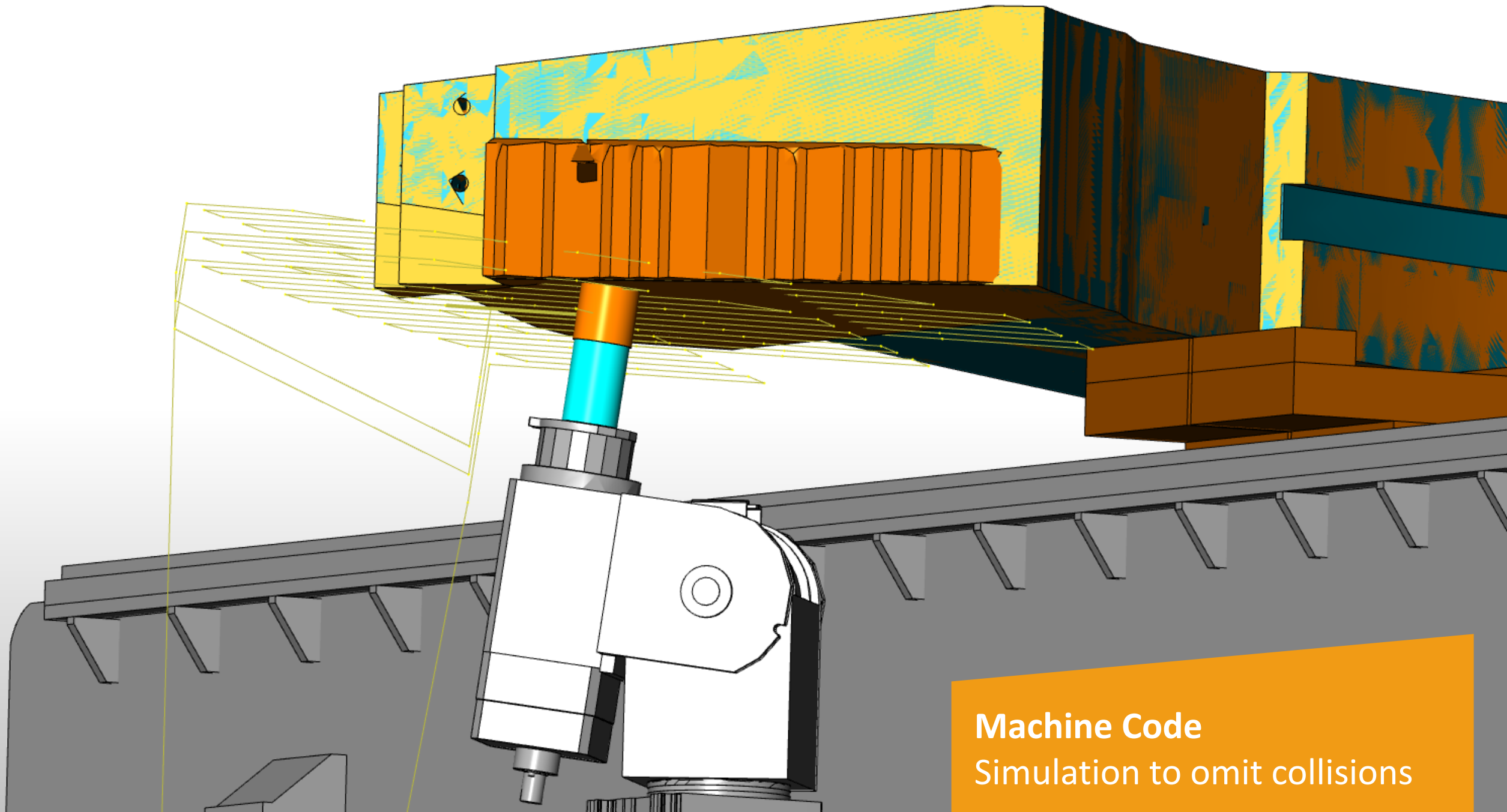
Machine Code
NC-Code as result



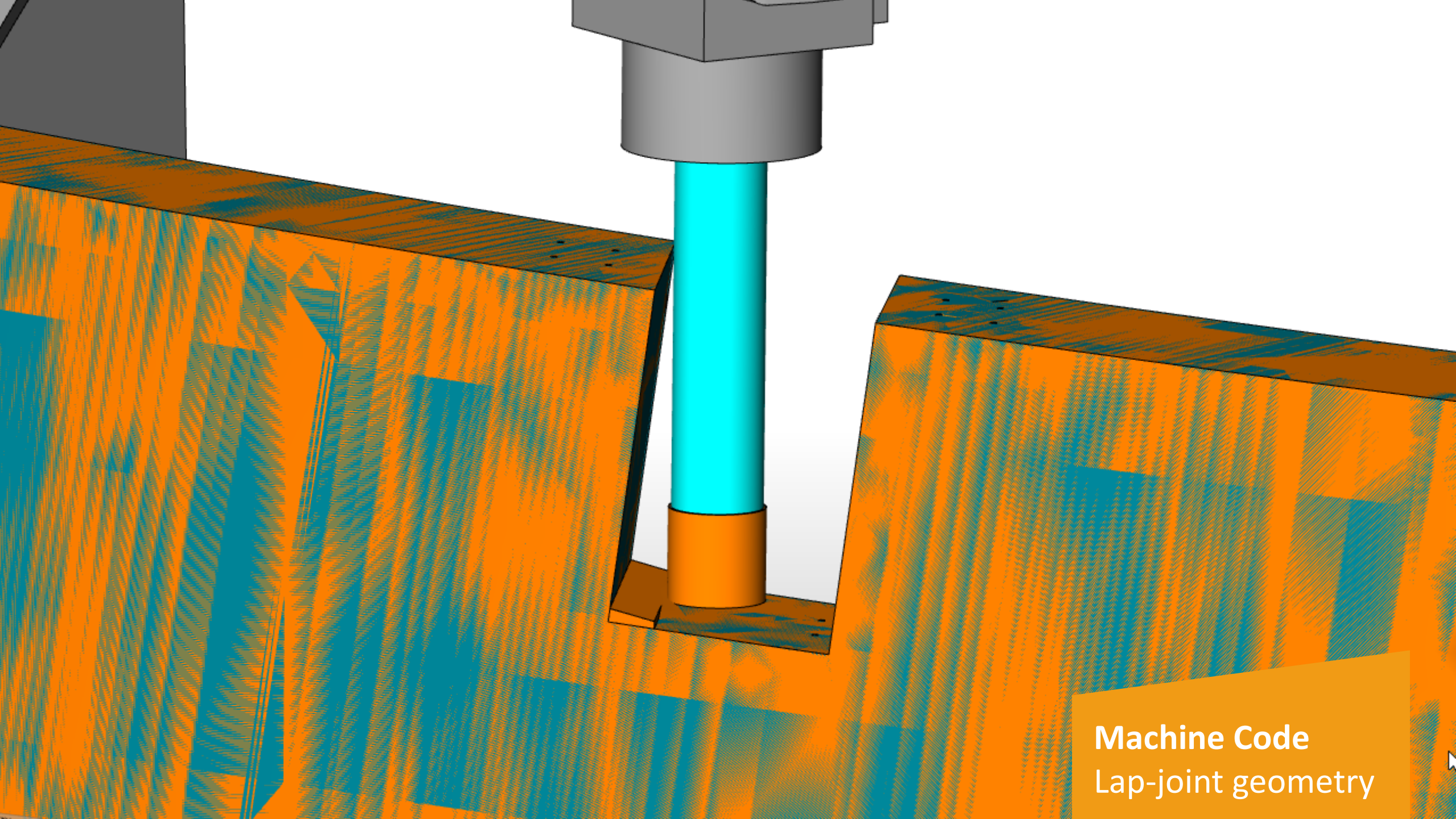
Machine Code
Simulation to omit
collisions

z





Machine Code
Simulation to omit collisions



Machine Code
Lap-joint geometry



Mock-up
Treatment, shape, LED



Casino Venlo Renderings
MVSA Architects



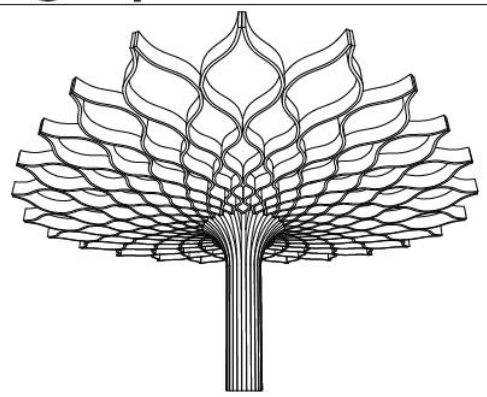
Casino Venlo Renderings
MVSA Architects



Casino Venlo Renderings
MVSA Architects

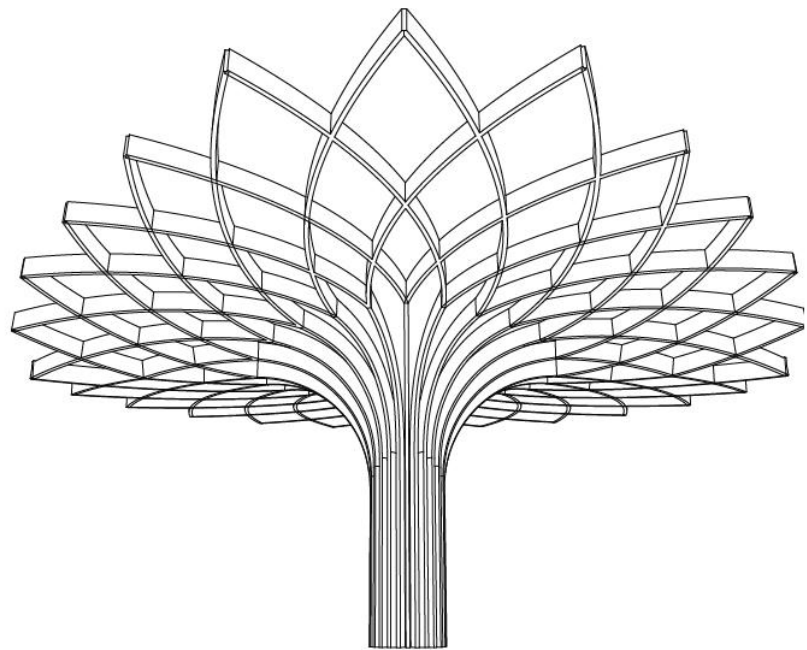
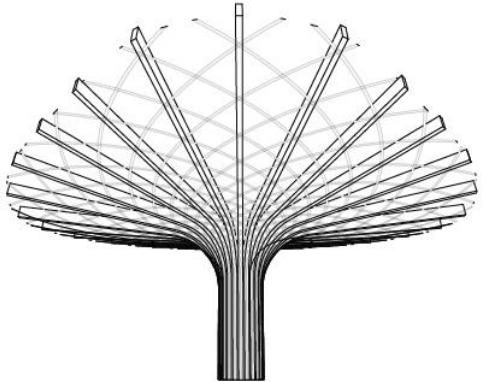
Roofstructure design process

Schetsontwerp



+ =

Schetsontwerp alternatief



Inspiratie



Story of the geometry
MVSA Architects



solar roof

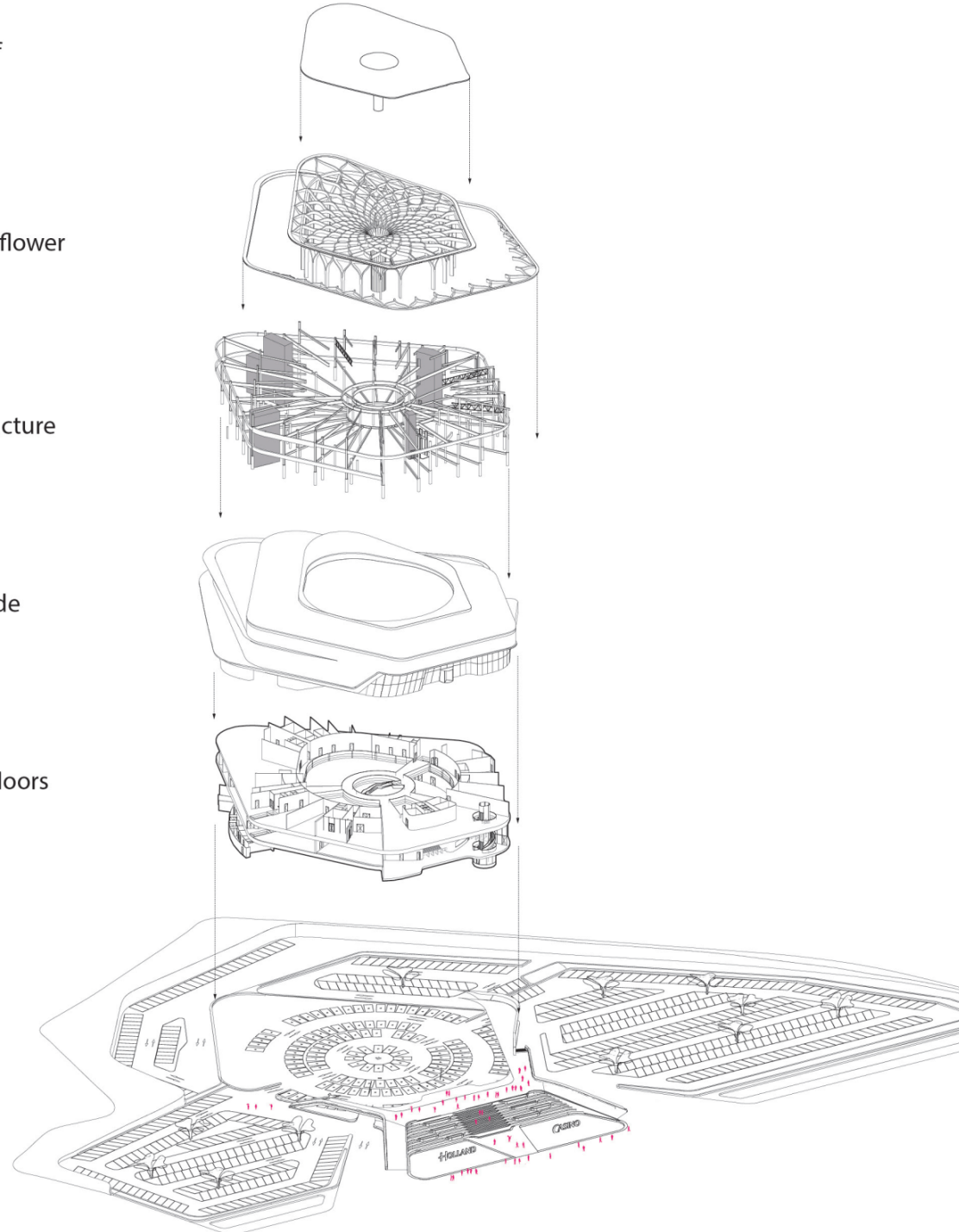
wooden flower

steel structure

LED facade

gaming floors

site



Request for a feasibility study
Dimensions: 53 by 42 meter
and 24 height



Feasibility study

Project development with our partners



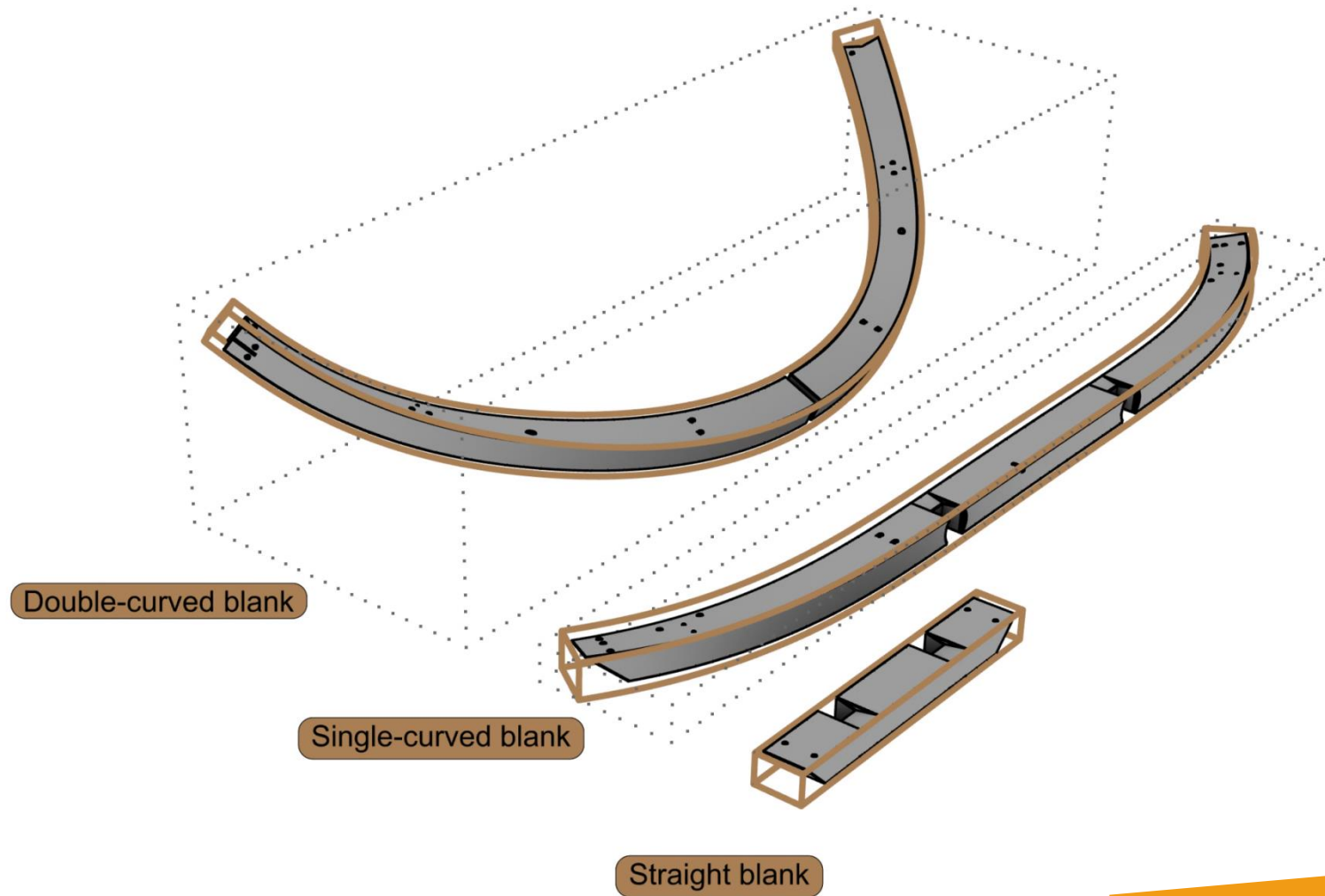
Feasibility study, project development
Version MVSA Architects



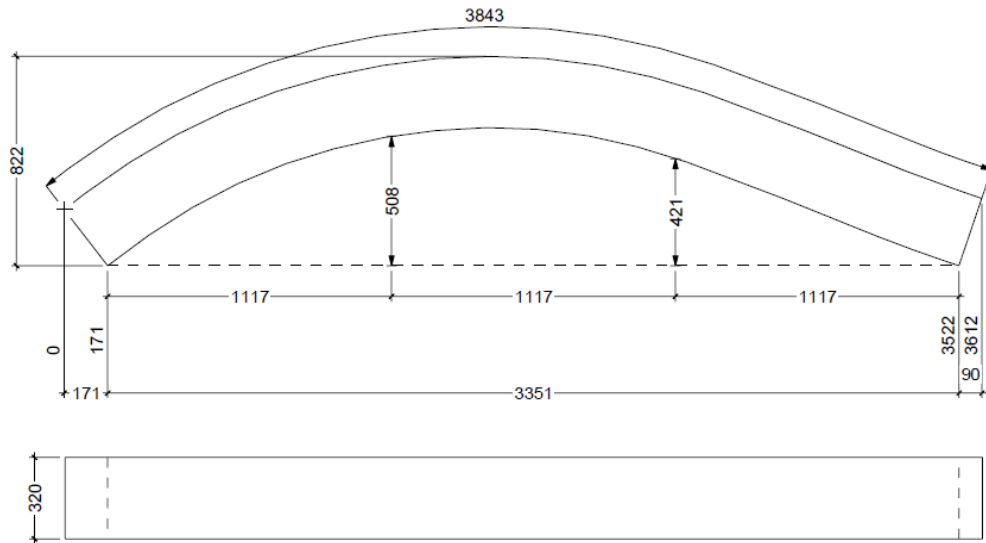
Feasibility study, project development
Proposal Blumer-Lehmann



Feasibility study, project development
Version BL and MVSA



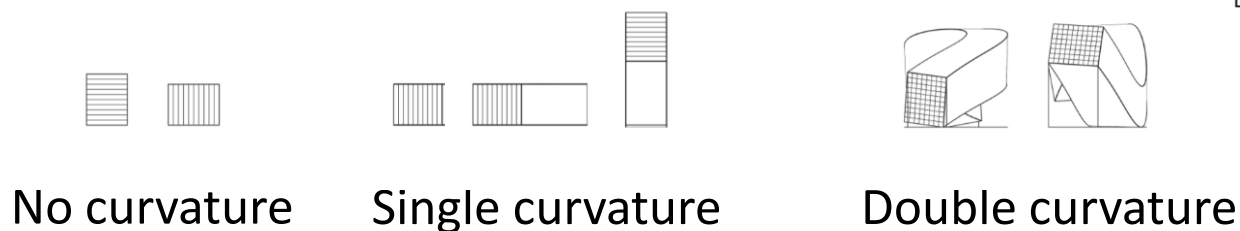
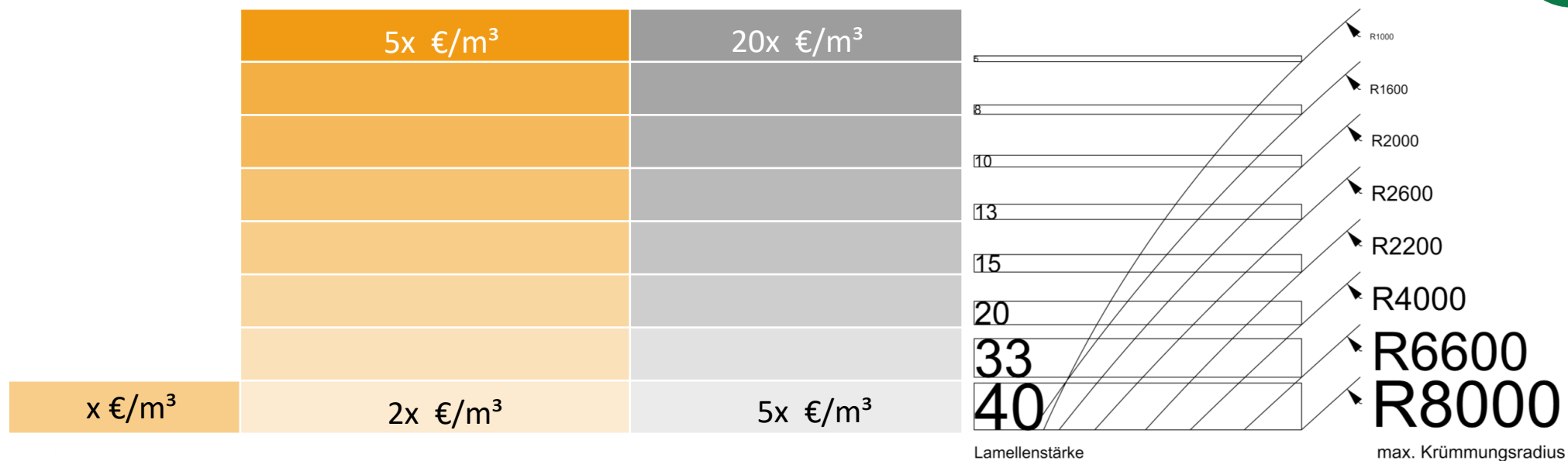
Other parameters to consider
Different types of raw beams



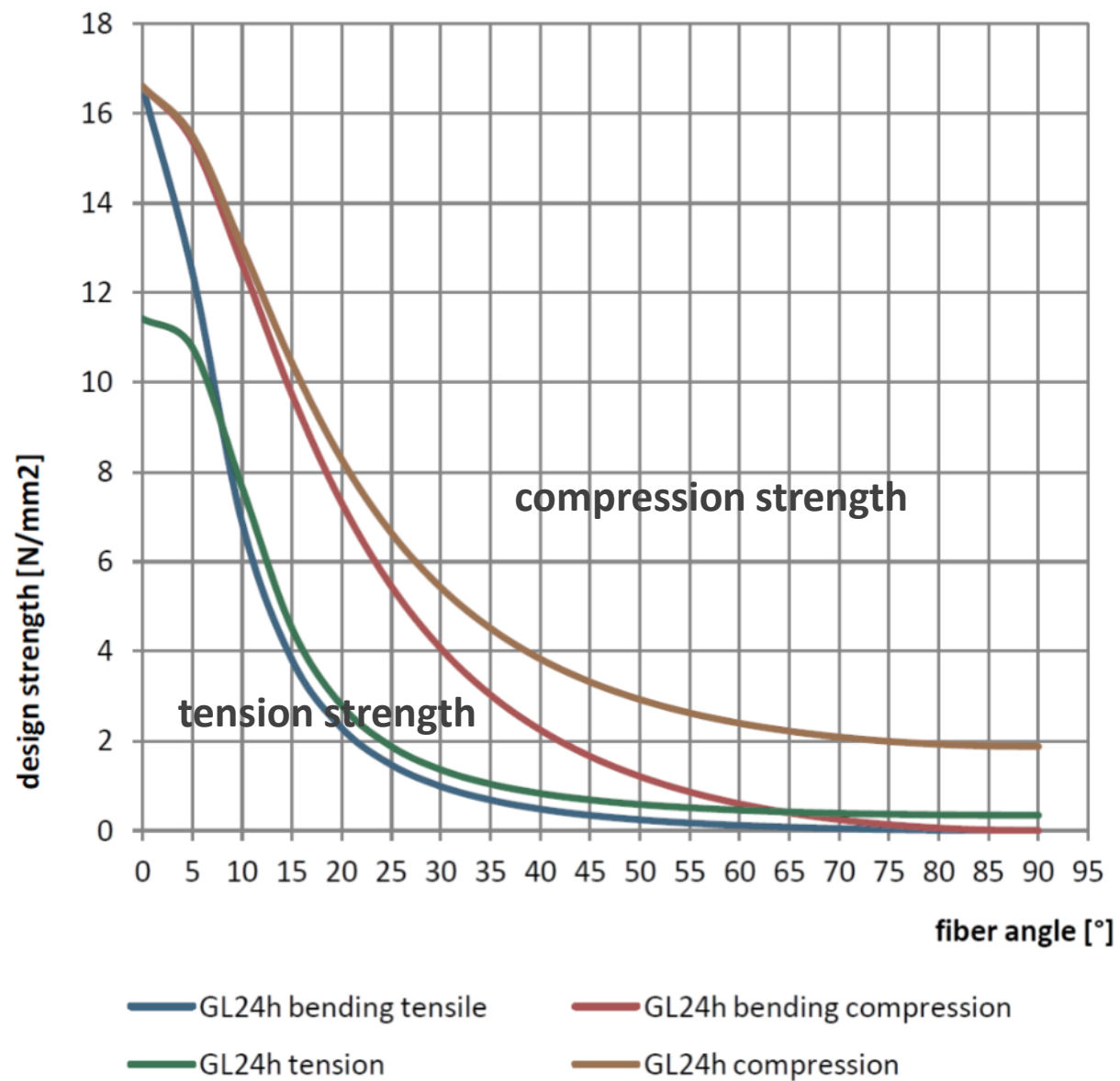
$$\frac{R_{\min}}{200} = t_{\text{lamella}}$$

Design parameter raw material

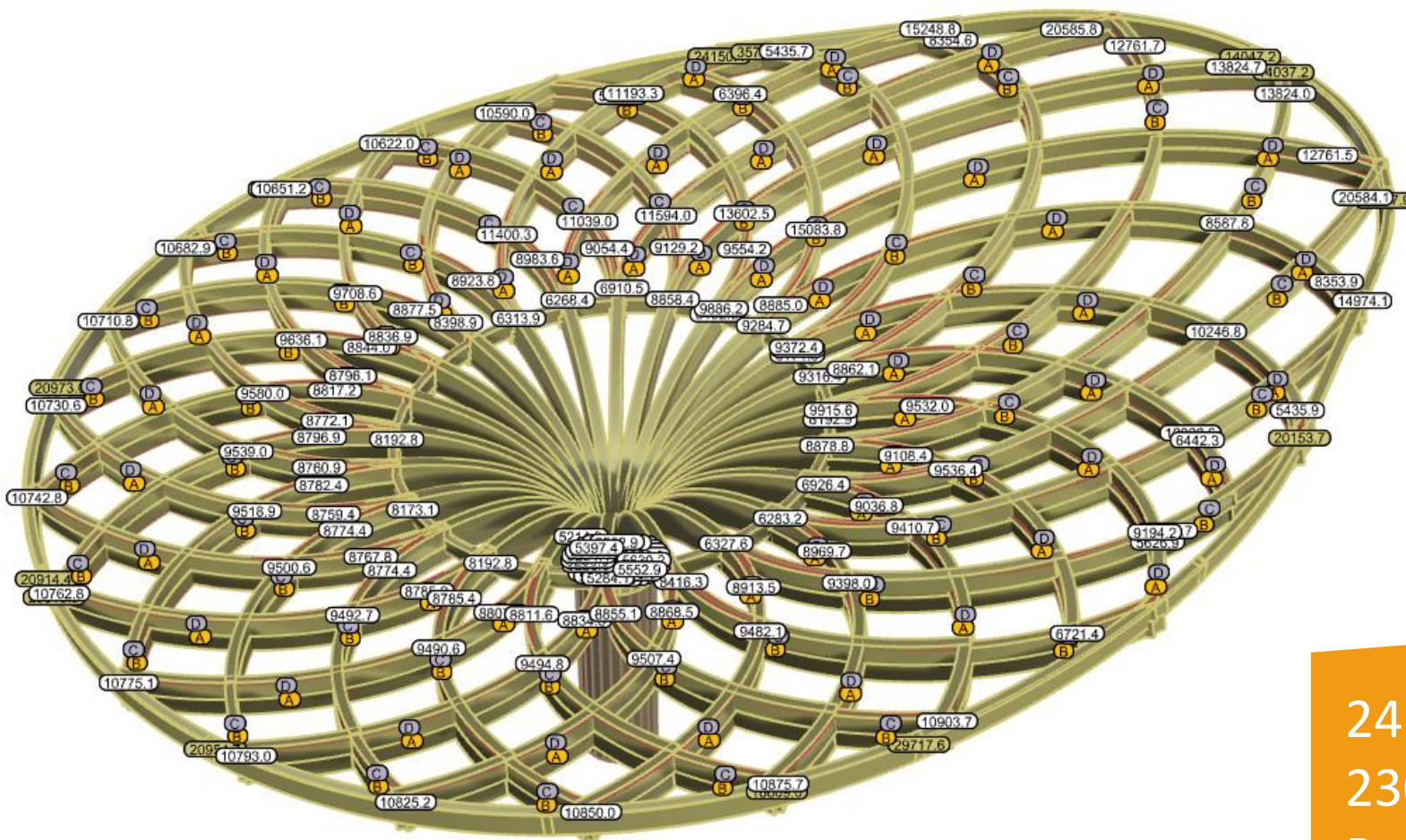
Lamella thickness is related to beam radius
Width of lamellas limited around 240mm



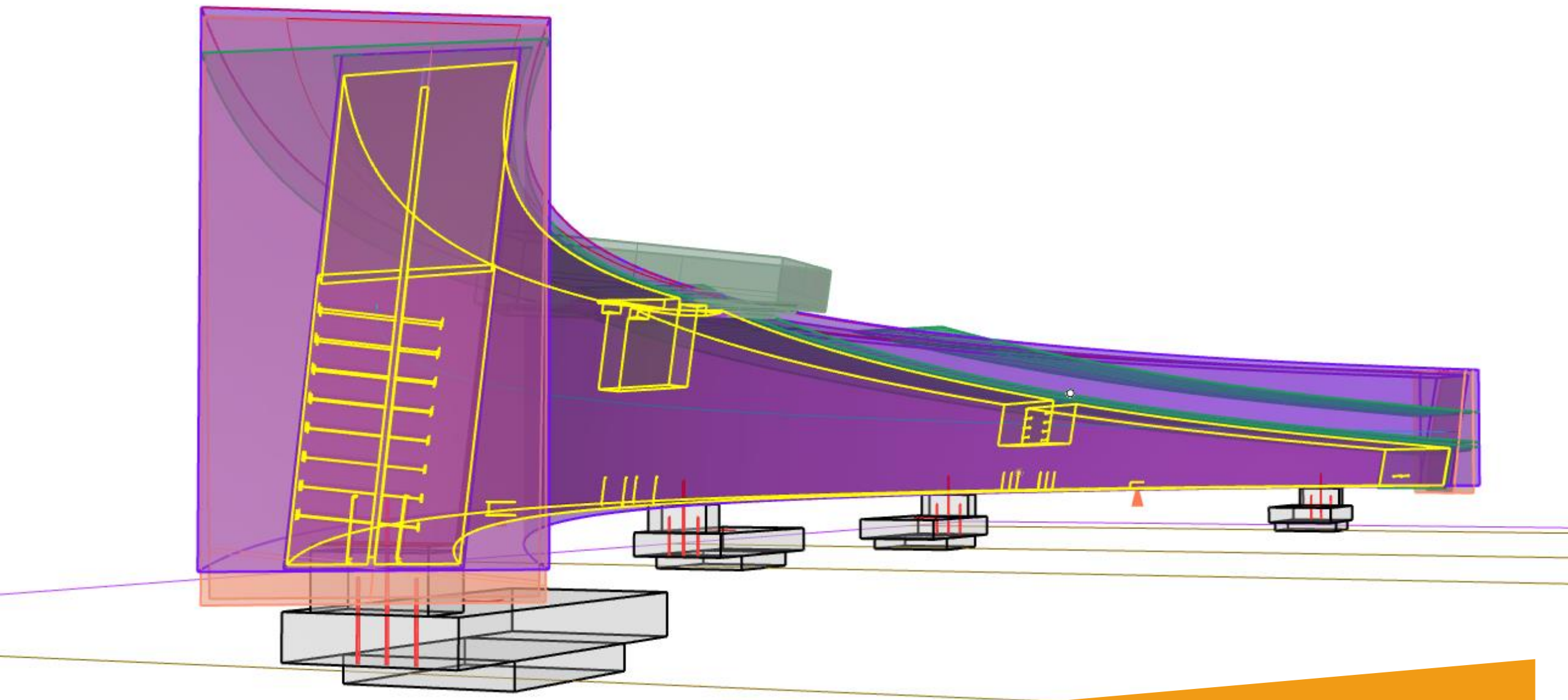
Design parameter raw material
Geometry vs. cost of materials BSH



Strength according to the fibre angle
5° fibre cutting angle as maximum

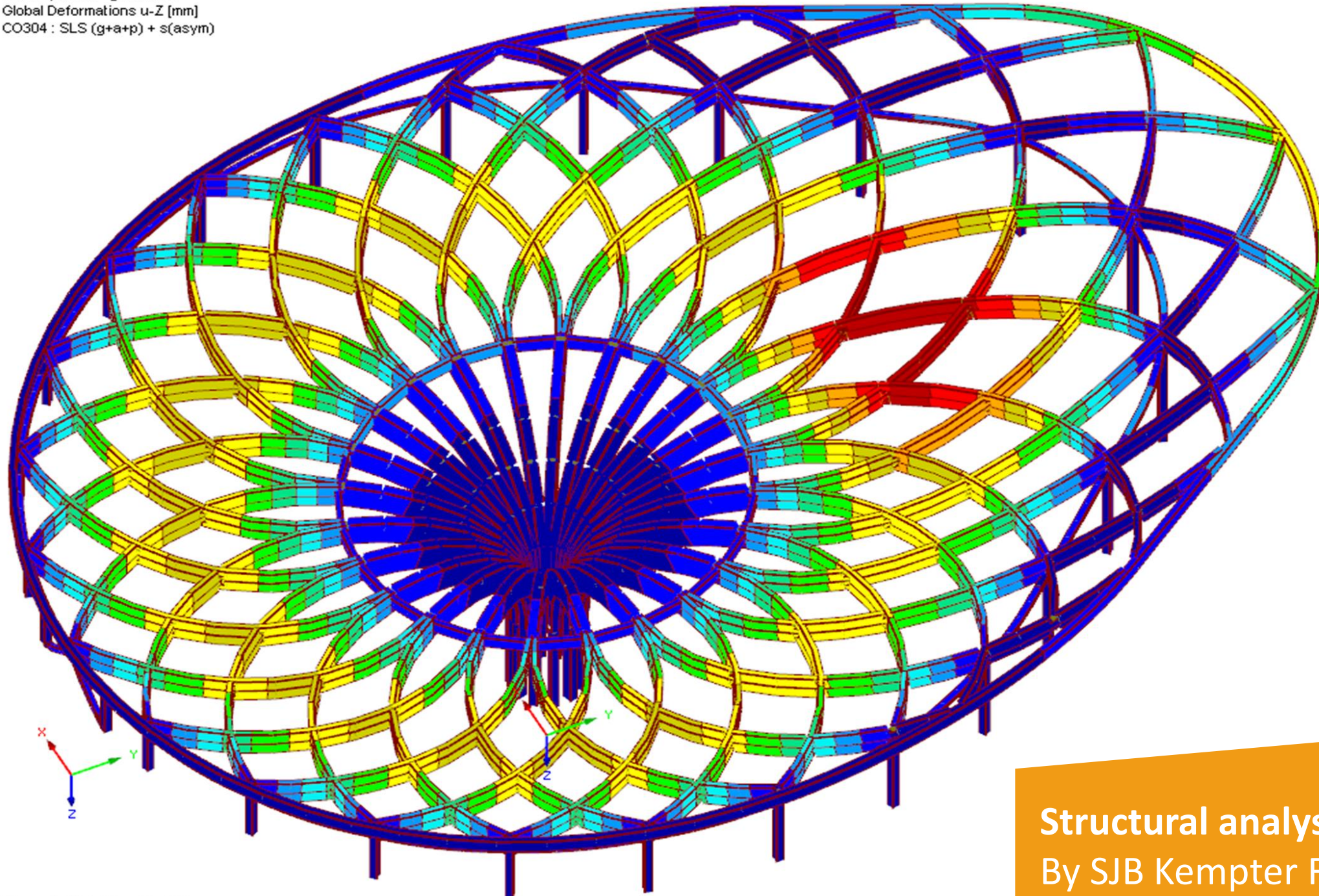


24 Straight Blanks
230 Single Curved Blanks
Radius 5 – 20m
700 m3 BSH with PEFC Certificate



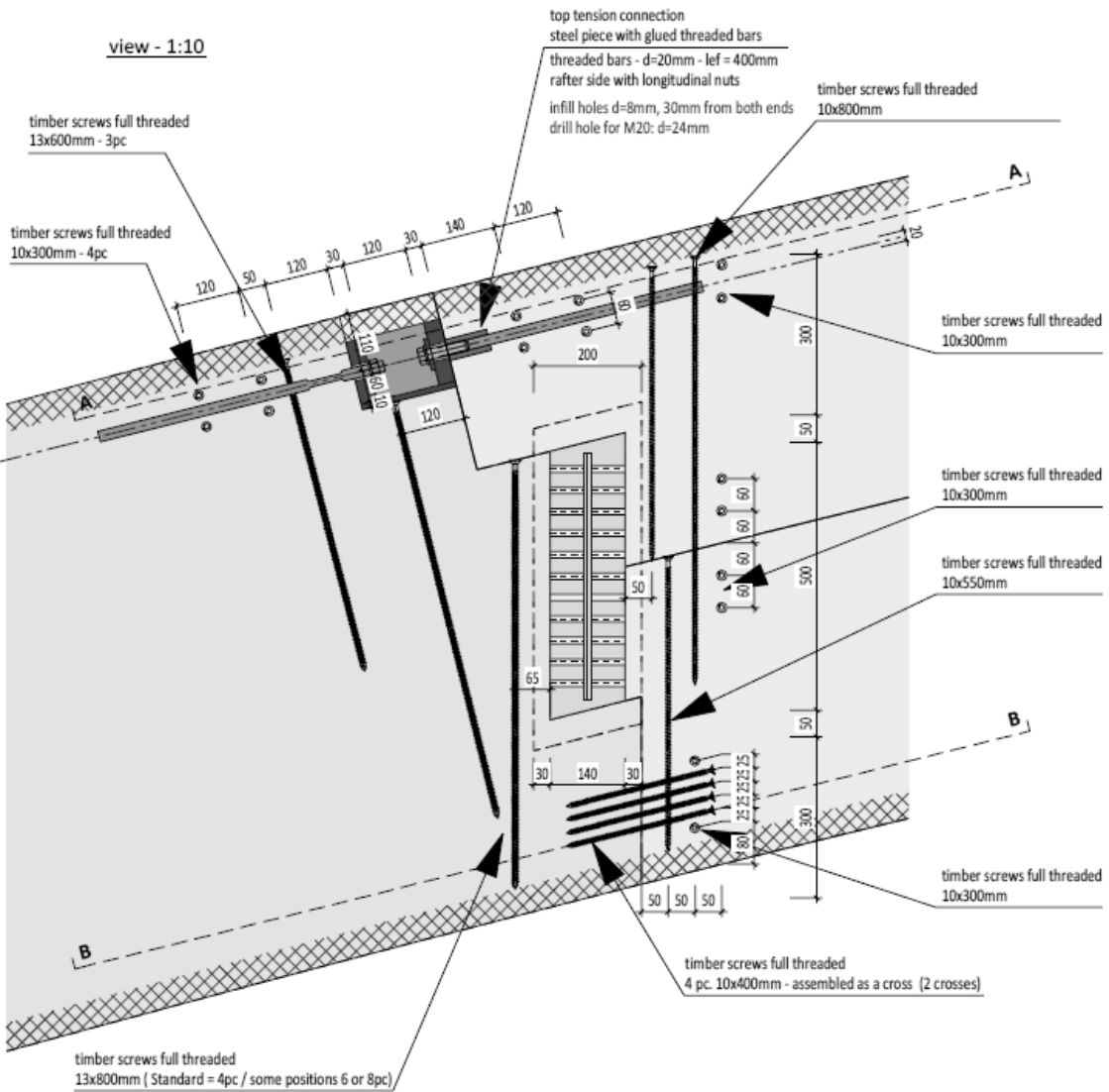
Raw beam vs. Finish beam

Visibility mode - generated
Global Deformations u-Z [mm]
CO304 : SLS (g+a+p) + s(asym)

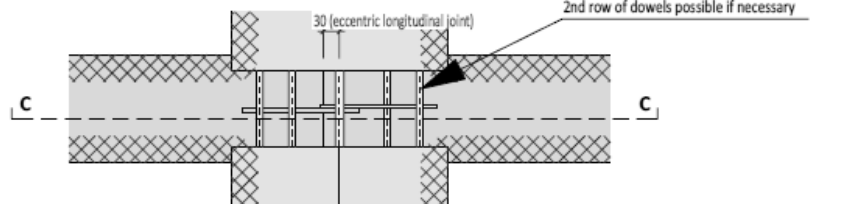


Max u-Z: 65.4, Min u-Z: -4.5 mm

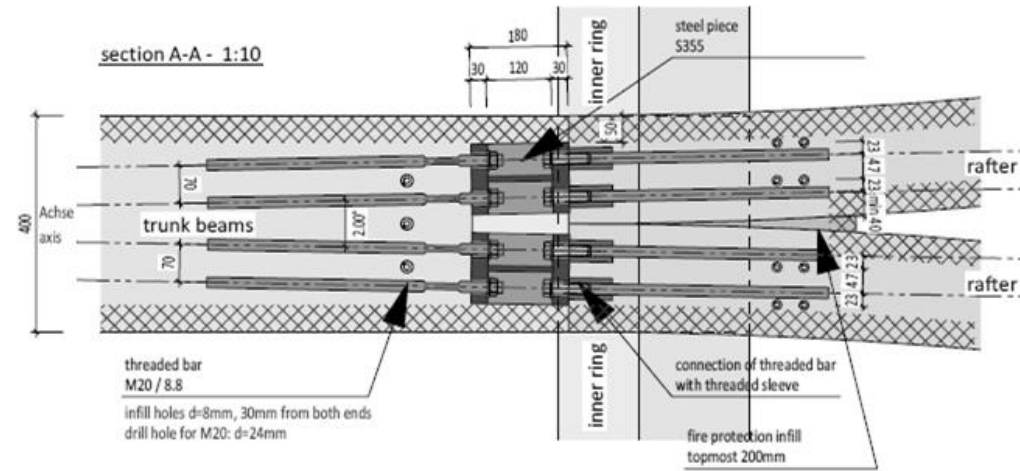
Structural analysis model
By SJB Kempter Fitze



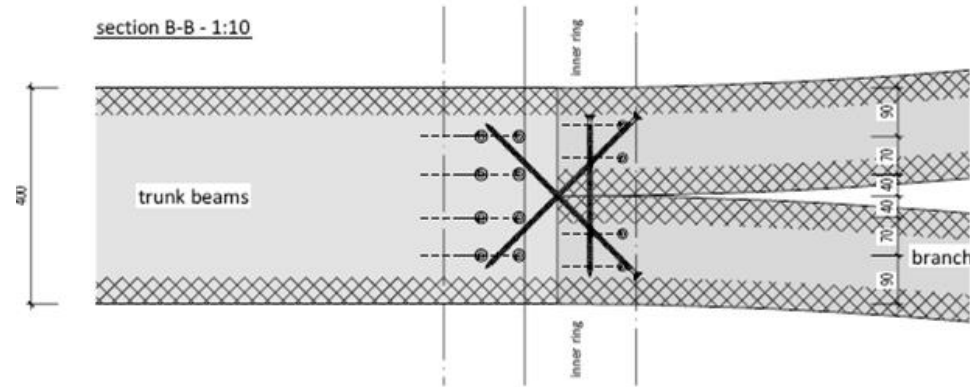
longitudinal joint ring beam - top view - 1:10



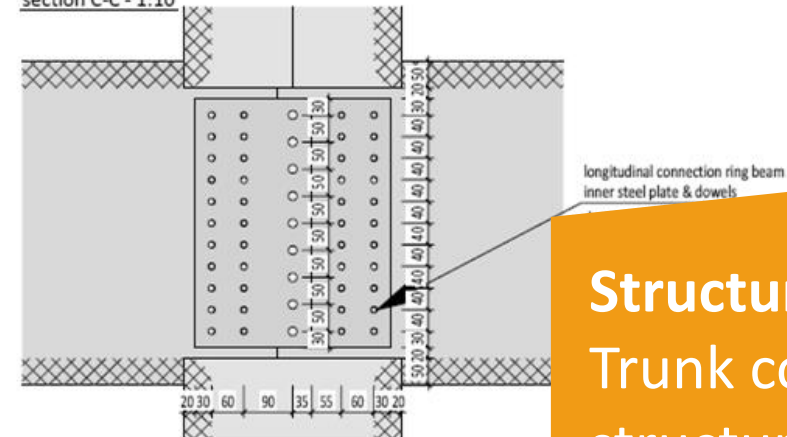
section A-A - 1:10



section B-B - 1:10



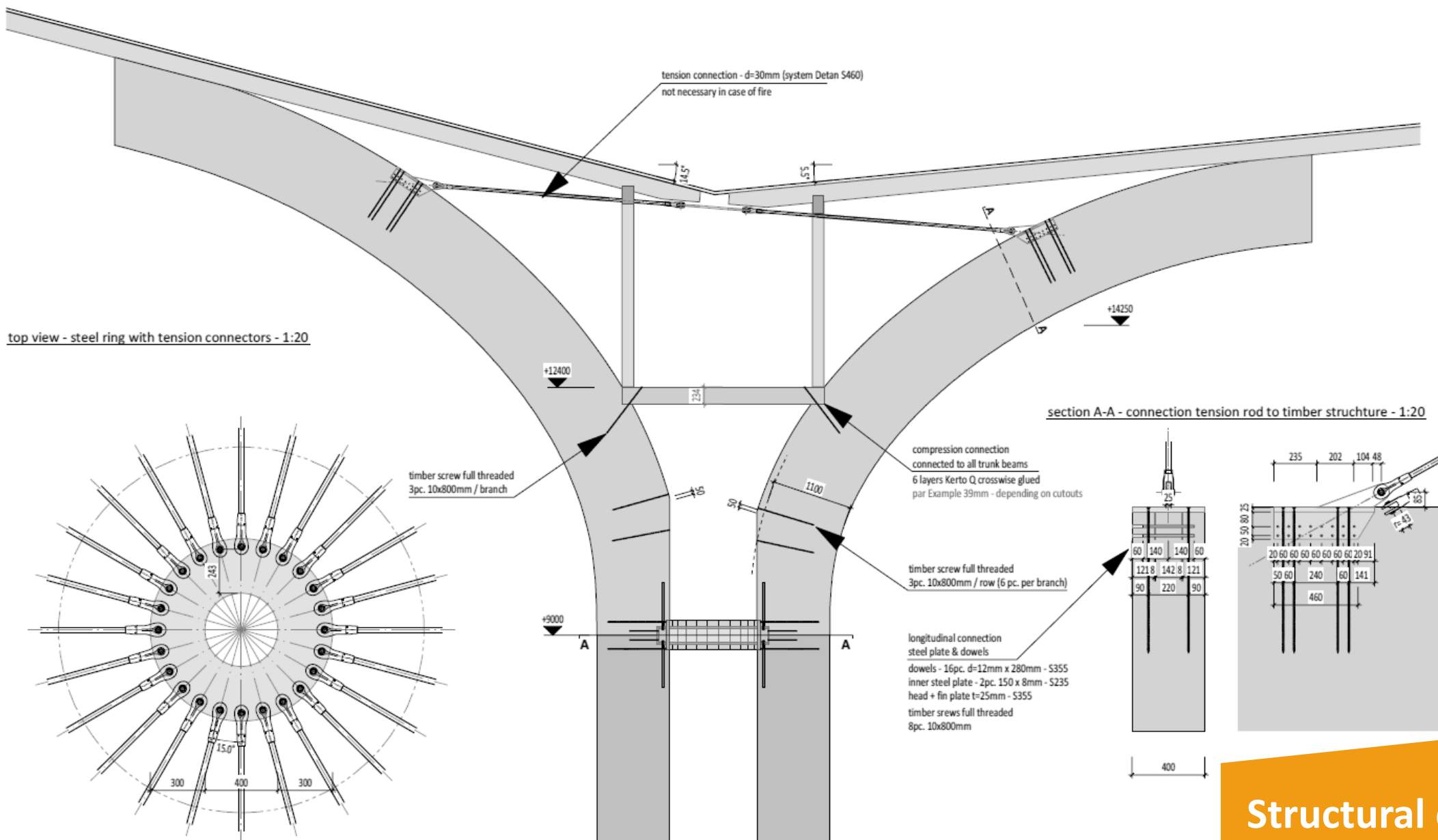
section C-C - 1:10



Structural details

Trunk connection to roof structure

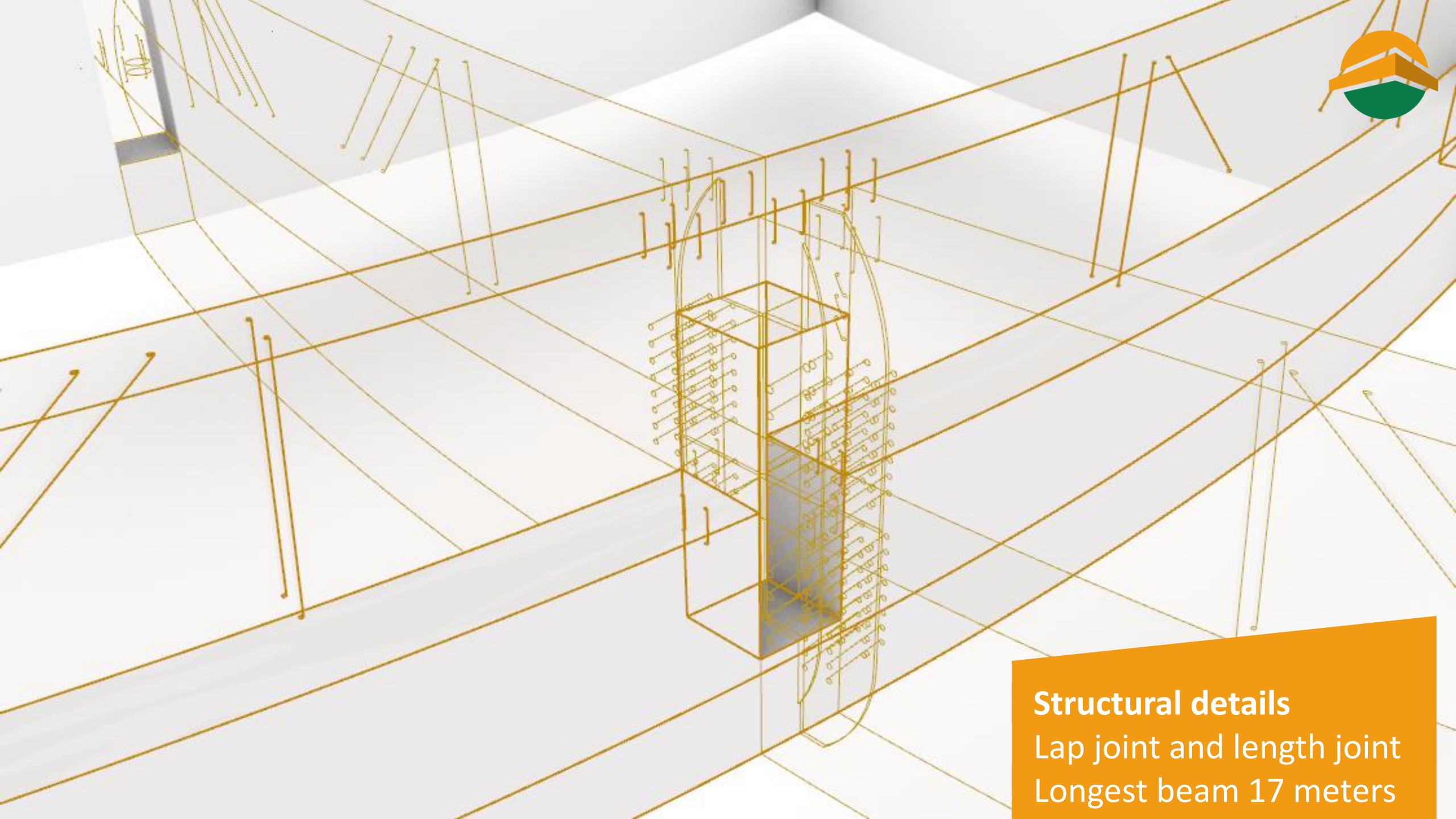




Structural details
Trunk top connection



Structural details
Lap joint
Total height 1200mm
and width 200mm

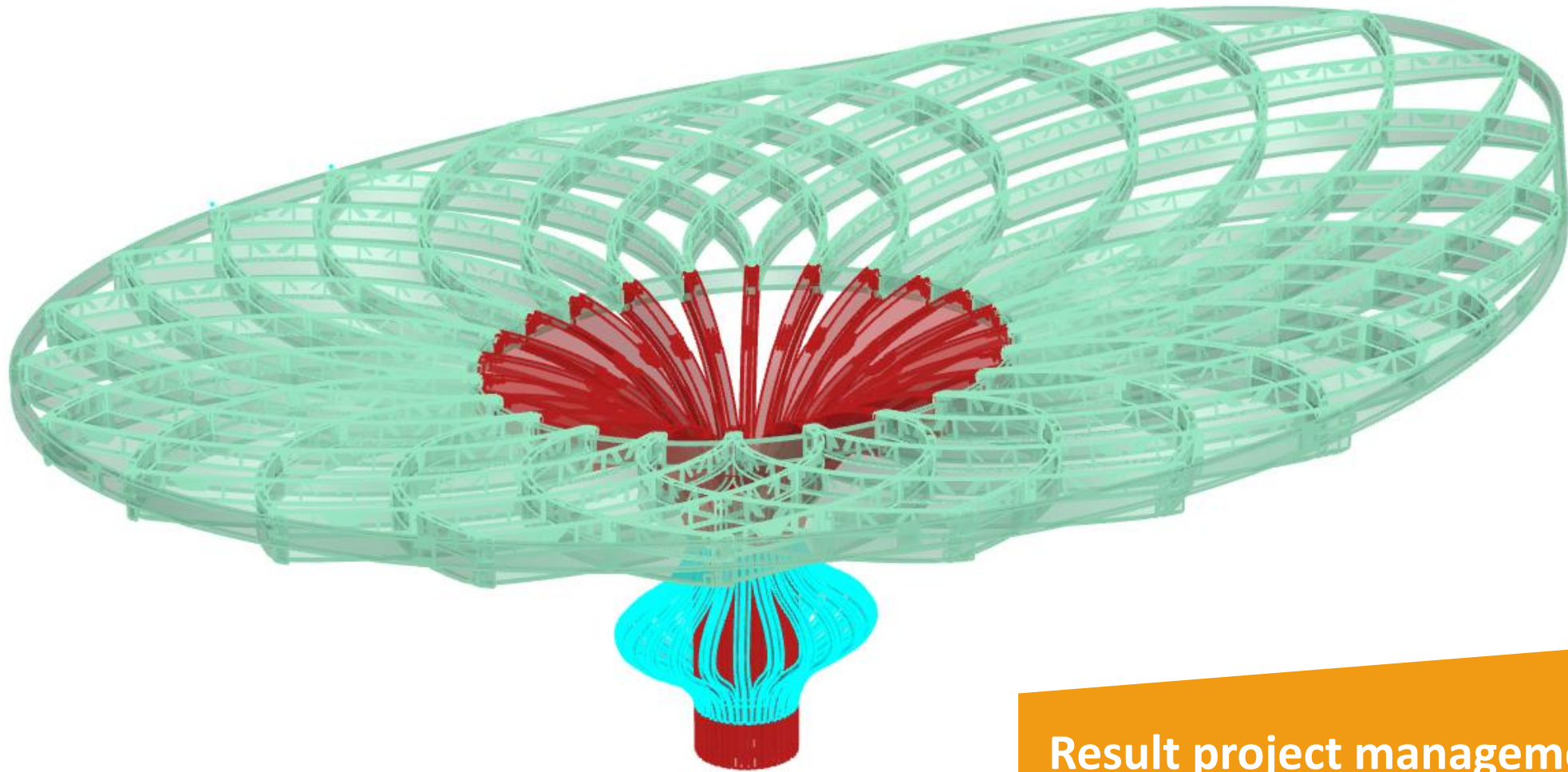


Structural details

Lap joint and length joint
Longest beam 17 meters



Result project management
4- layer structural roof system



Result project management
3d model with all 18'000 screws
and all detailed beams



Create your future in wood

Casino Venlo - MVSA Architects ©Laurens_Eggen

Visit us at the exhibition



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