Arboretum Nanterre (Fr)

Europe's largest wooden office campus

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Construire un monde durable


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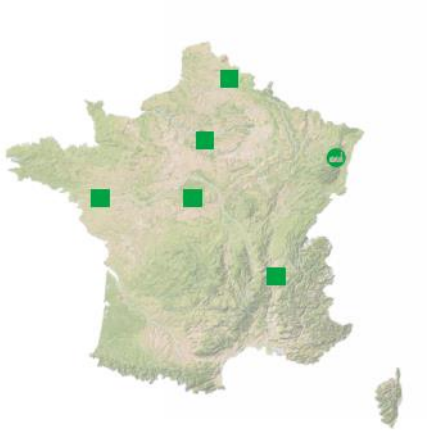
Construire un monde durable

> Our organisation

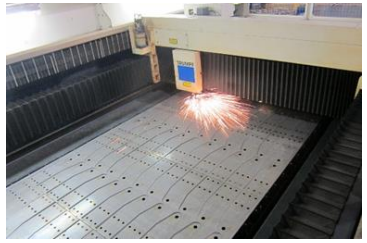


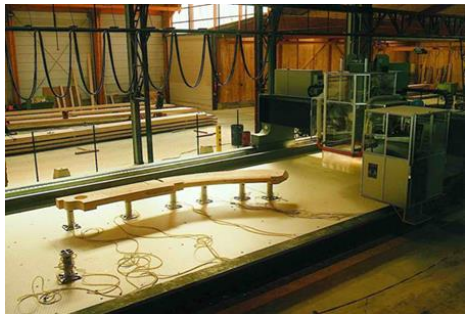
Partenariat R&D

SAINT-GOBAIN

Partenariat REP

valobat





1809: Creation of a construction company

1875: Timber trading then electric sawmill

1892: General contracting

1929: Drying then planning

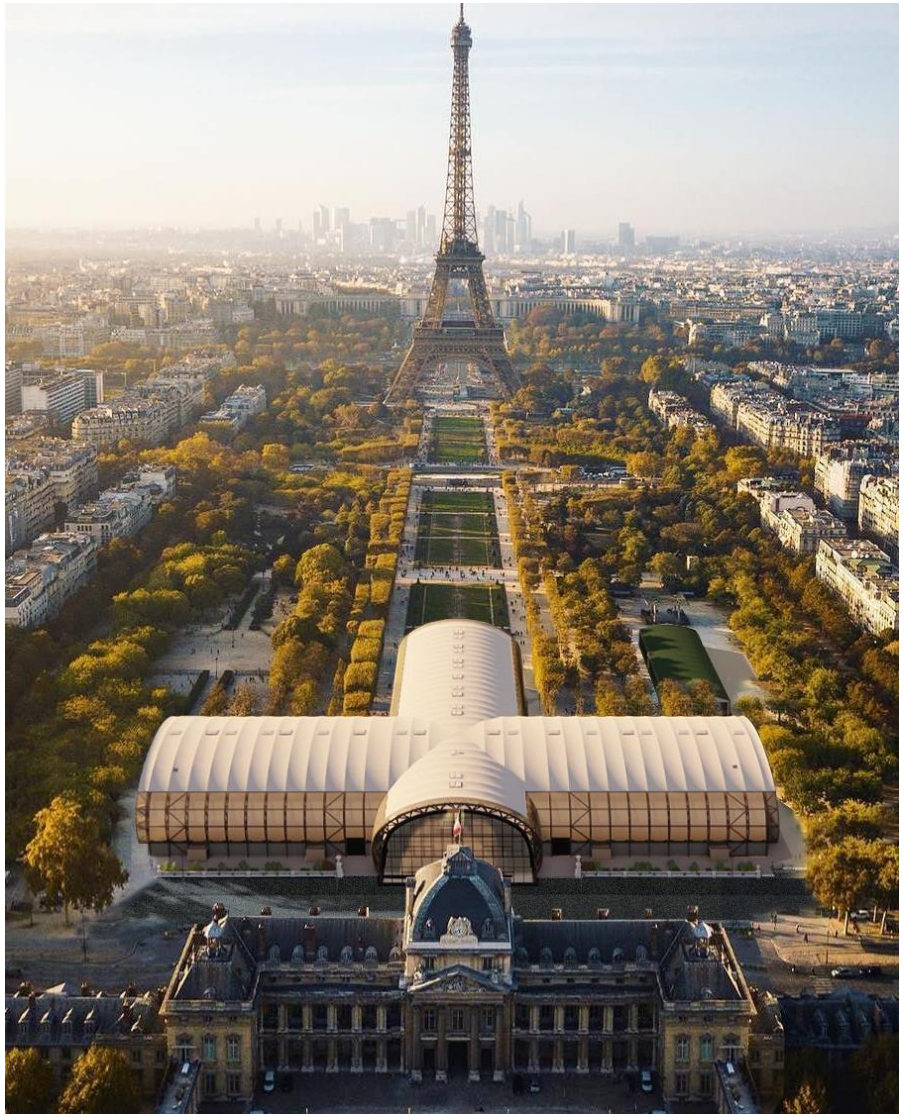
1956: Glued trellis framework, then glued laminated timber

1972: Turnkey public buildings

2000 : Timber frame walls and floors, then CLT

2016 : Timber buildings - Azurtec system

> History & Activity



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> Projects completed

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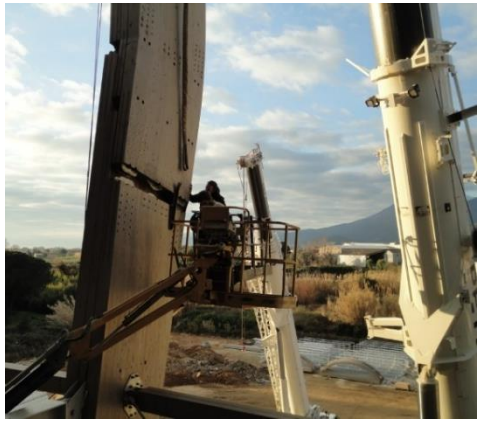
Capelle
www.groupe-capelle.fr
DAF

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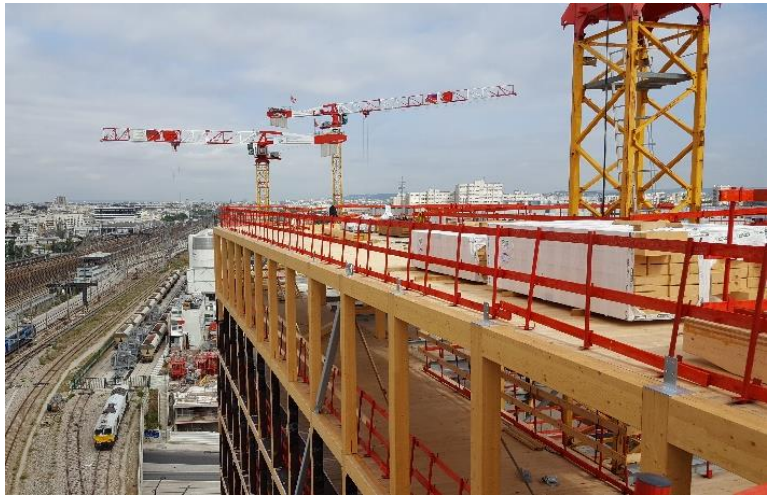

©WO2

Project manager: *WO2*

Architects:
Leclercq Associés,
Nicolas Laisné Architectes,
DREAM Dimitri Roussel,
Hubert & Roy Architectes,
Antoine Monnet

Structural Engineering: *TERRELL*

Control: *APAVE*

Co-contractor *GCC*

Location: *Nanterre - La Défense former paper mill*

Total built surface: *126,000m²*

Green spaces: *9 ha of parkland*

©WO2

5 new buildings :
Amandier (Almond), Biloba, Cèdre (Cedar), Douglas, Epicéa (Spruce)

+2 preserved and converted buildings

Timer structures:
- *32,400m³*
- Including:
  - *5,800m³ GLT*
  - *20,500m³ CLT (supplied by StoraEnso)*
  - *1100 Tons steel structure*

>> Arboretum : Project data

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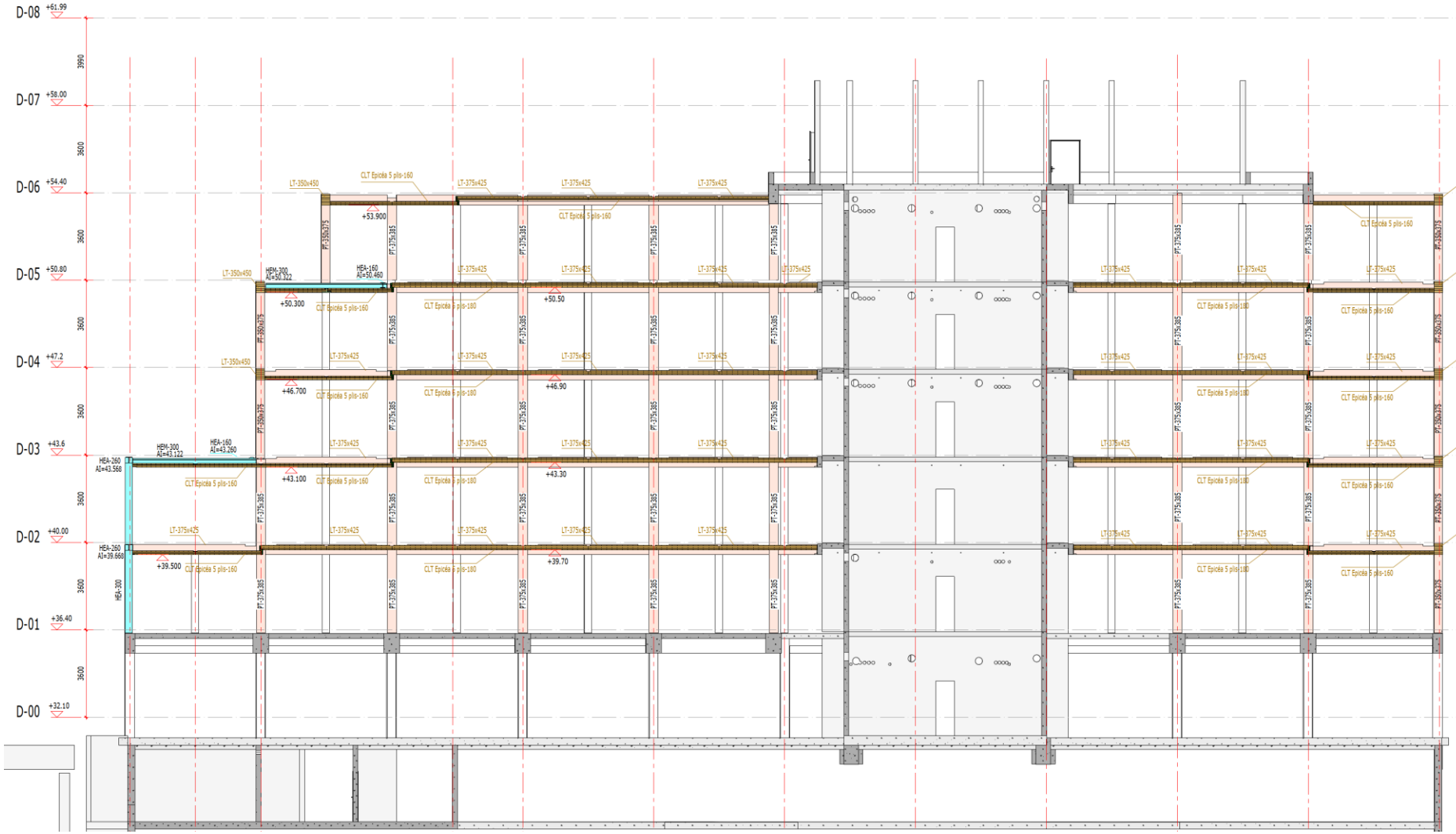
©WO2

>> Arboretum : Project data

sectional view



Technical facilities
timber or steel

Terrasses*/green roofs*
concrete or timber

5 to 7 floors
timber pillars/columns + CLT

+ steel gantries

Ground floor*: concrete*

Fundations*: concrete*

>> Static System

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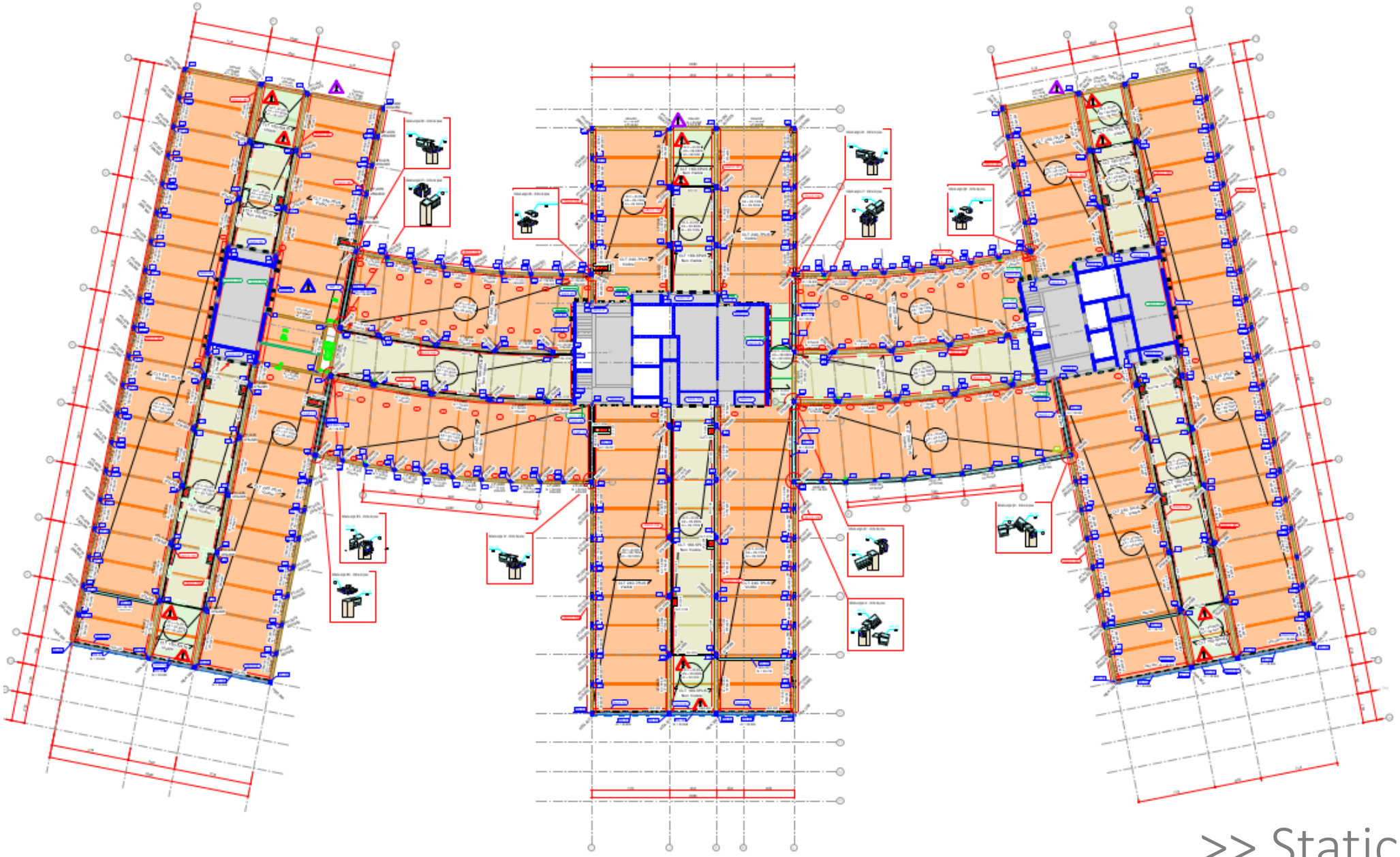
Floor plan



>> Static System

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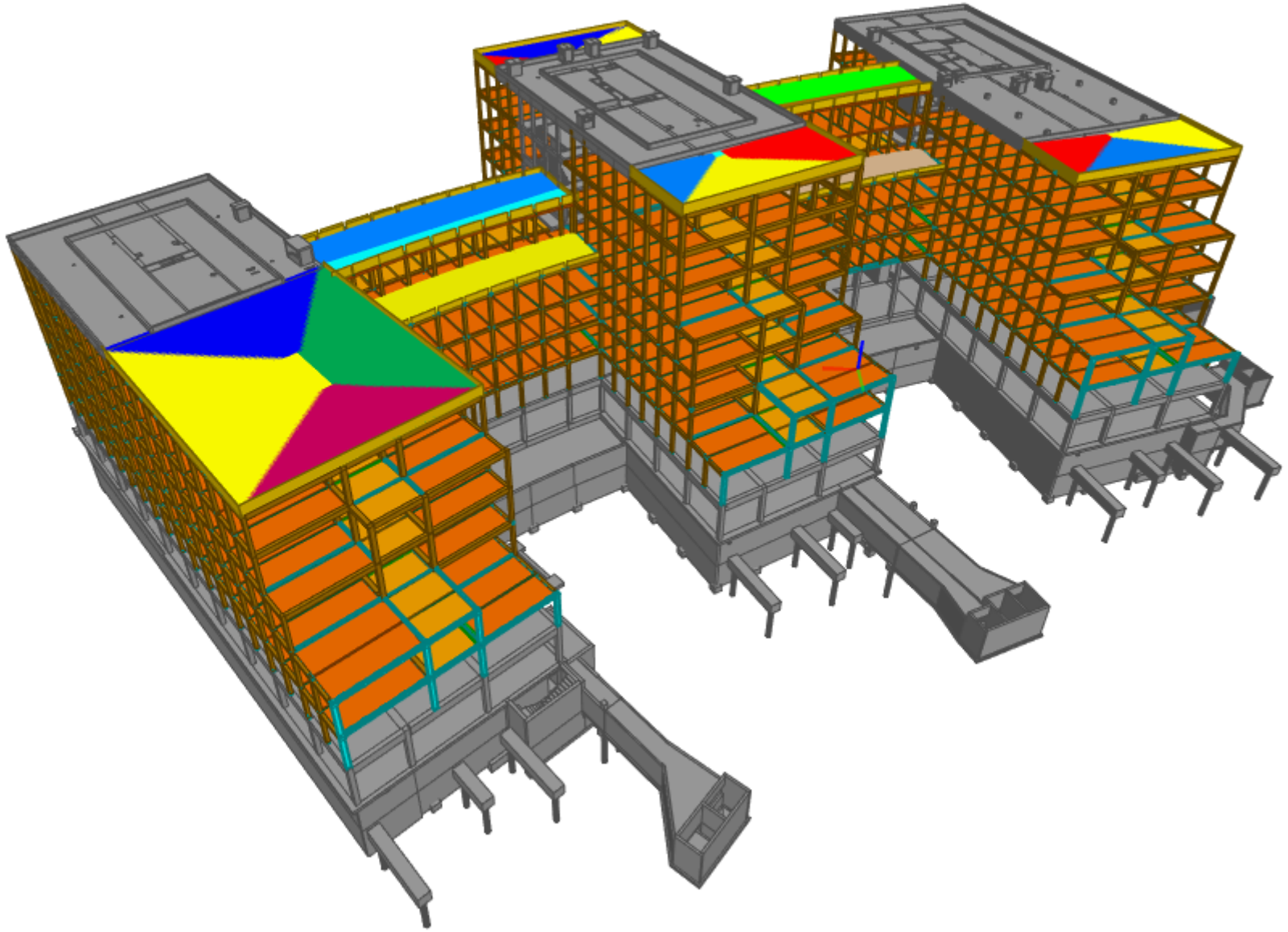

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>> Static System

Some aditional stability elements

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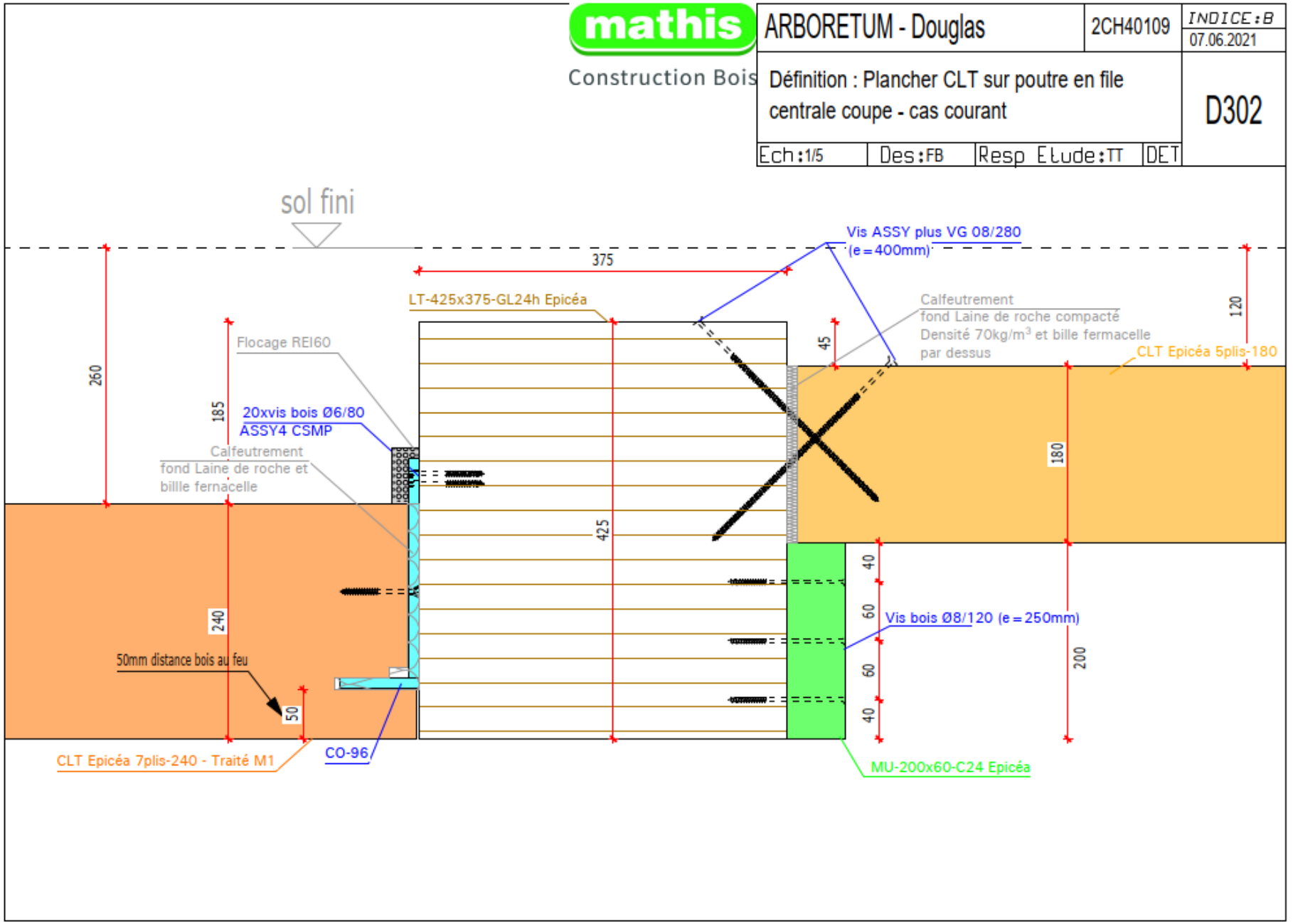
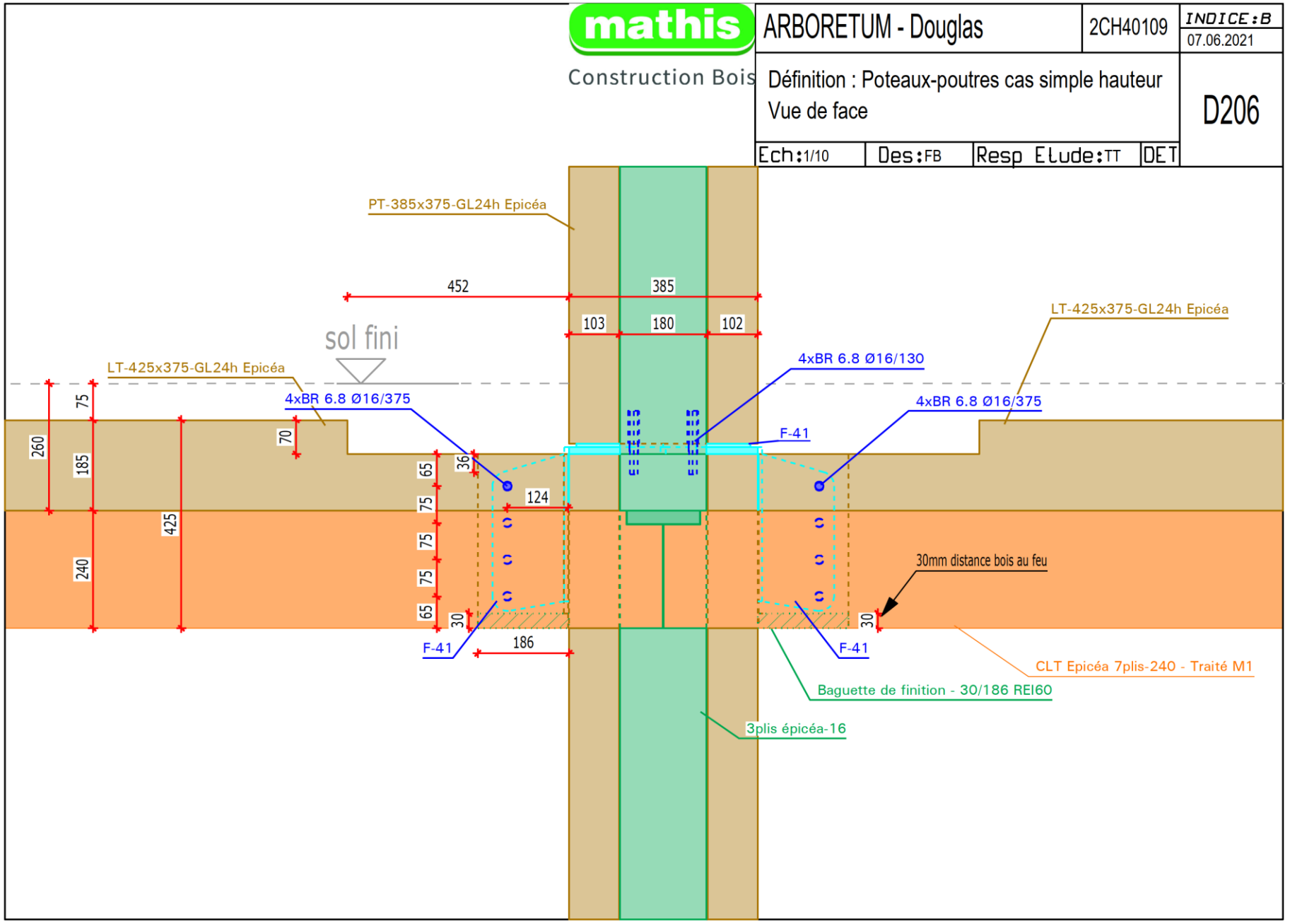
Hidden CLT support



>> Details



Post head assembly

>> Details

Hidden supports

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>> Details

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Pre-fitted connexions

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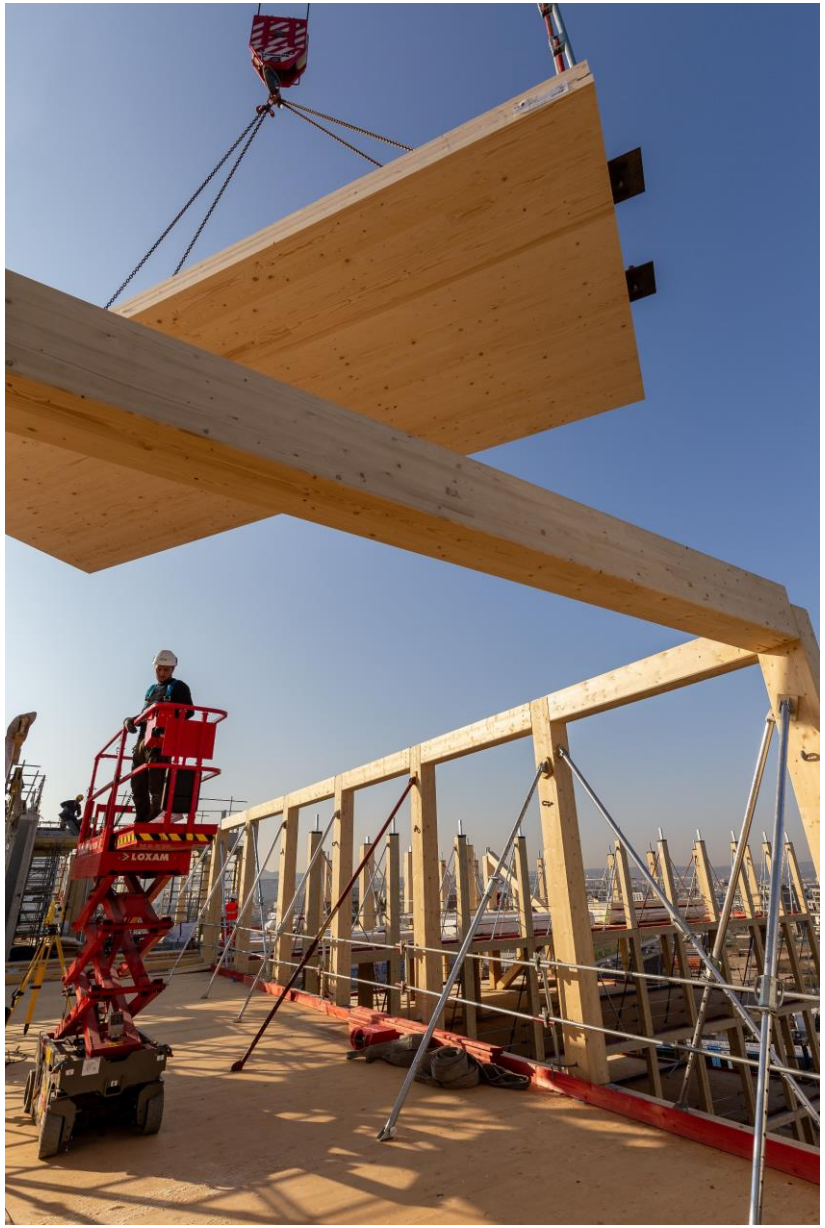
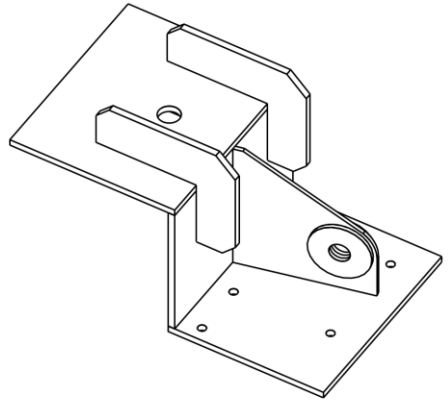
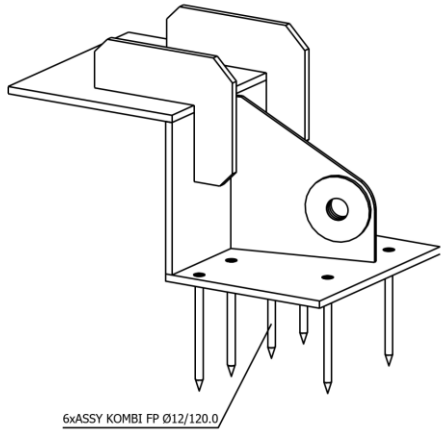
>> Details



Lifting and adjustment fitting





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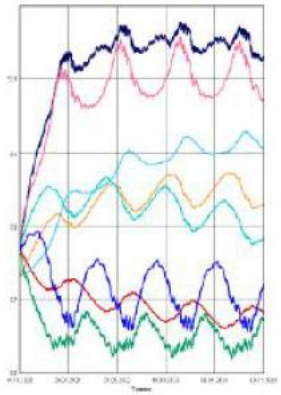
>> Details

application of a saturator at the factory to prevent black marks and limit horizontal deformations

temporary waterproofing to protect the wood and lower floors and limit distortion
+ use of connected moisture sensors

1. CAPTEUR



2. APPLICATION DE GESTION DES CAPTEURS

>> Details

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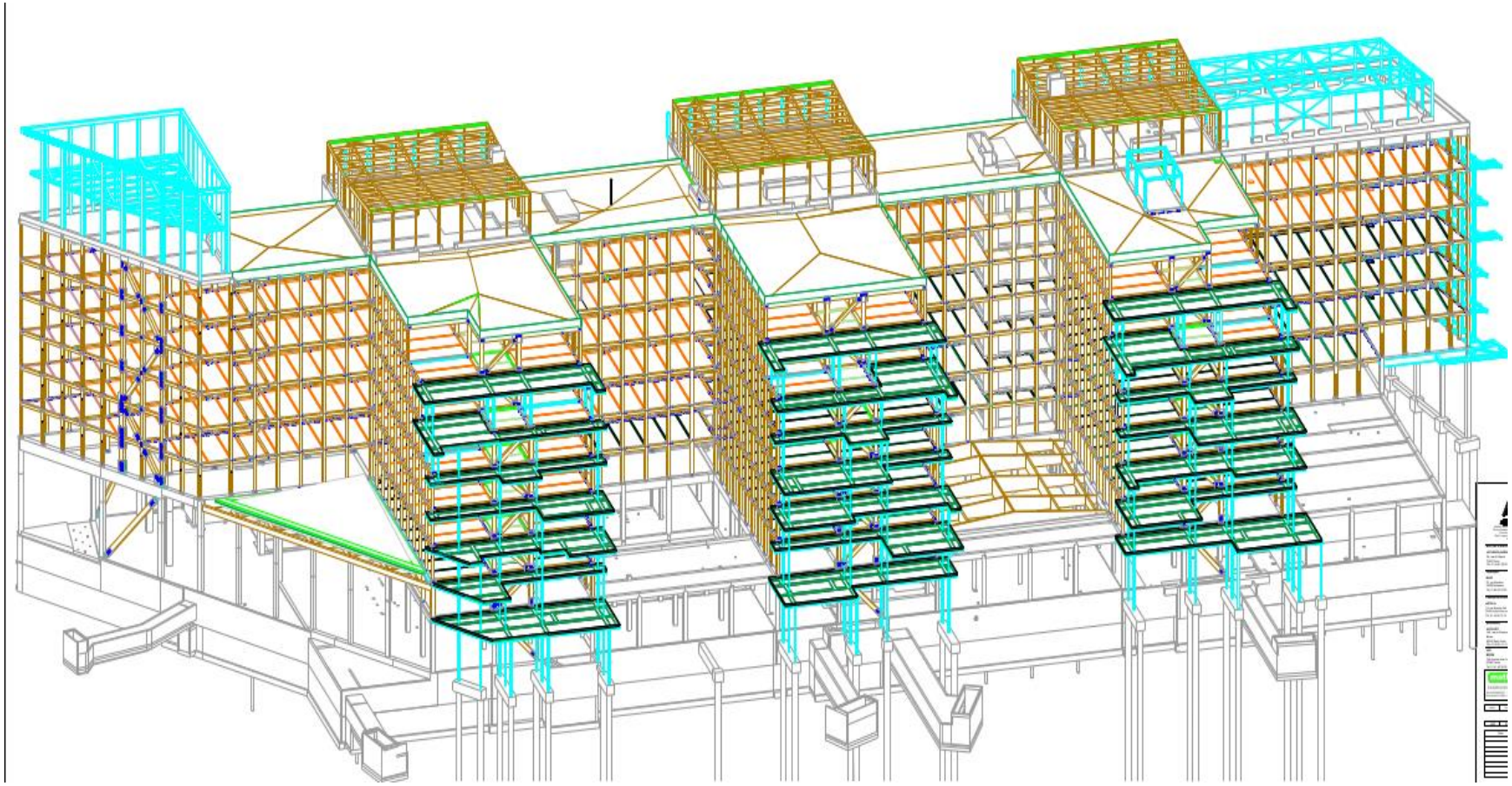
BIM operation – main points

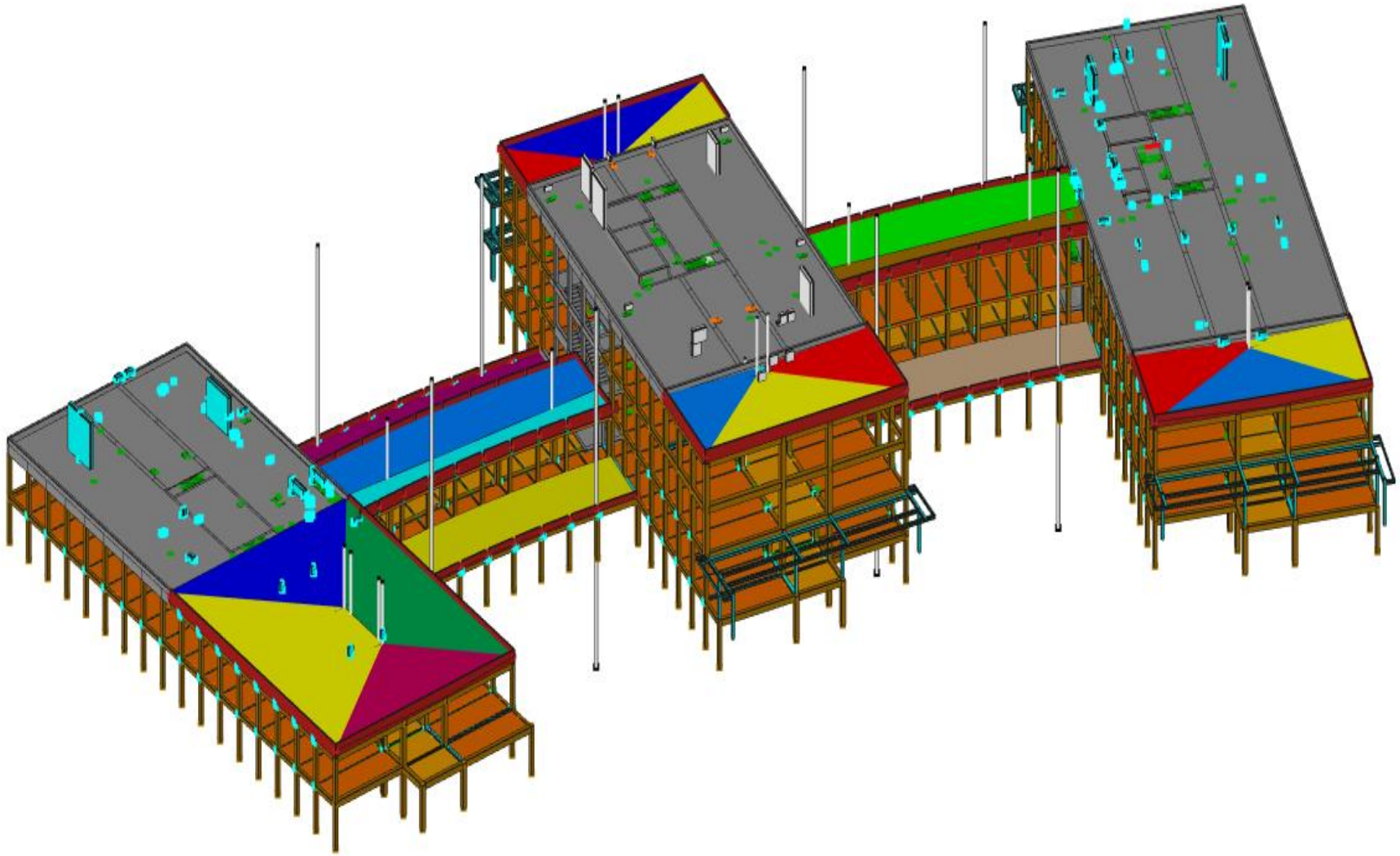
BIM synthesis by TREEGRAM, using Revit. The exchange formats are *.rvt files, but also *.ifc. Maximum file size requested: 250 MB.

Level of development (LOD) 5, files include all the parts required for execution: wood and metal parts, screws and other accessories.

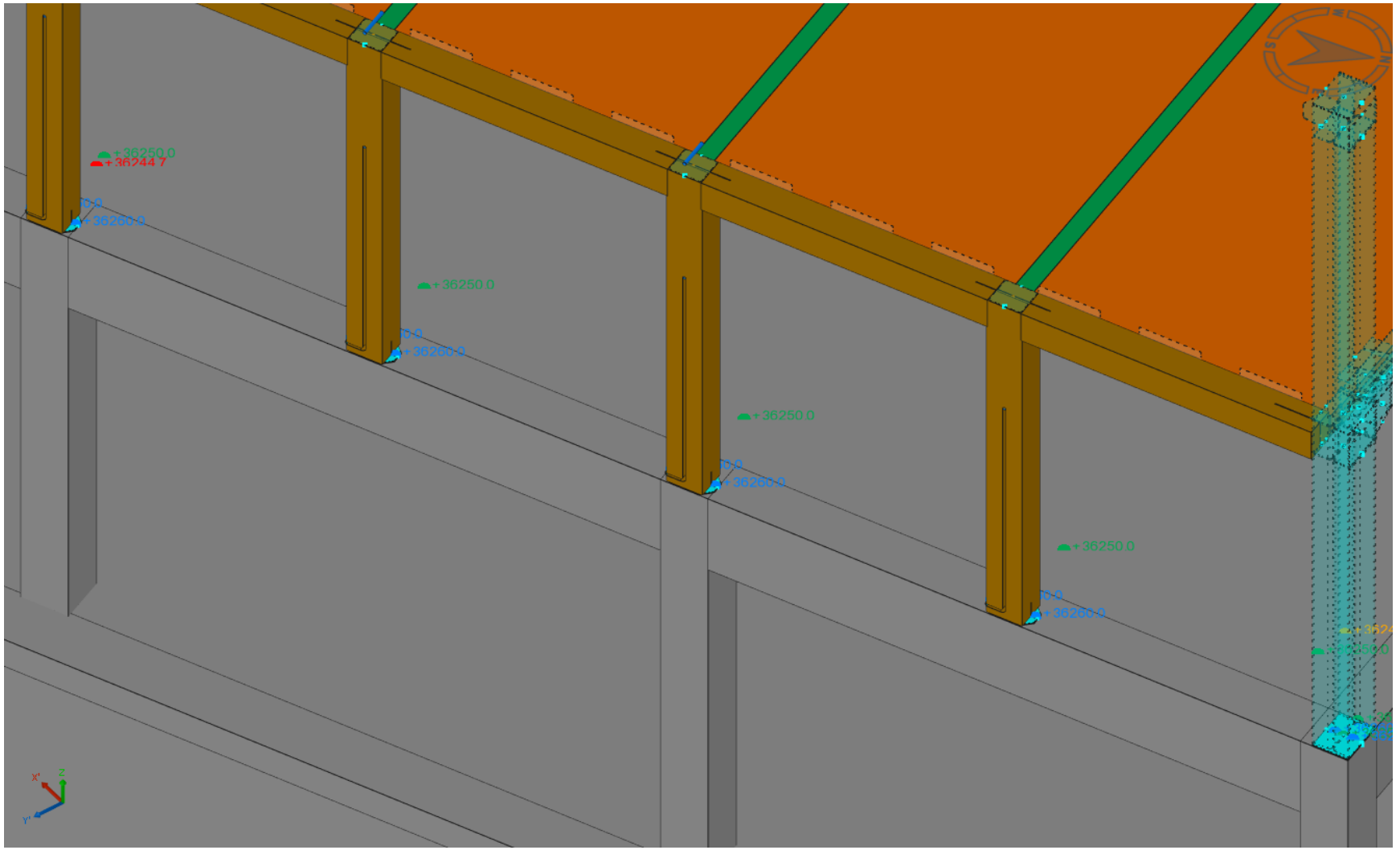
The models are updated every 15 days via the online exchange platform (Kairnial).



BIM exchanges – holes for networks



On-site implantation + geometric controls (Cadwork - Leica exchanges)



>> BIM

BIM Issues

- Discrepancies between 3d models and 2d plans.
- Discrepancies in the progress of studies between the various lots.
- Some companies are not yet using BIM: 2d only.
- Development level 5 could not be met in full: file size would be too large, screws need to be removed.
- Limitations of the IT hardware: not possible to create *.ifc files without removing the assembly pins
- Long export and import times: ~30 minutes.

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Constraints

- **French code for offices for all buildings, except Cèdre :**

Fire stability of the structure: R 60 -> Eurocode

Floors: REI 60 -> Eurocodes + CLT laboratory assessment

Reaction to fire under CLT floors: B-s3, d0 (M1): by treatment on site.

- **Cèdre (Cedar) building: public building (shops and restaurant):**

Fire stability: R 90

Floors: REI 90 => Problem: current R 60 Eurocode limitation.

Solution for R 90 and REI 90

- Justification by laboratory assessment: CSTB

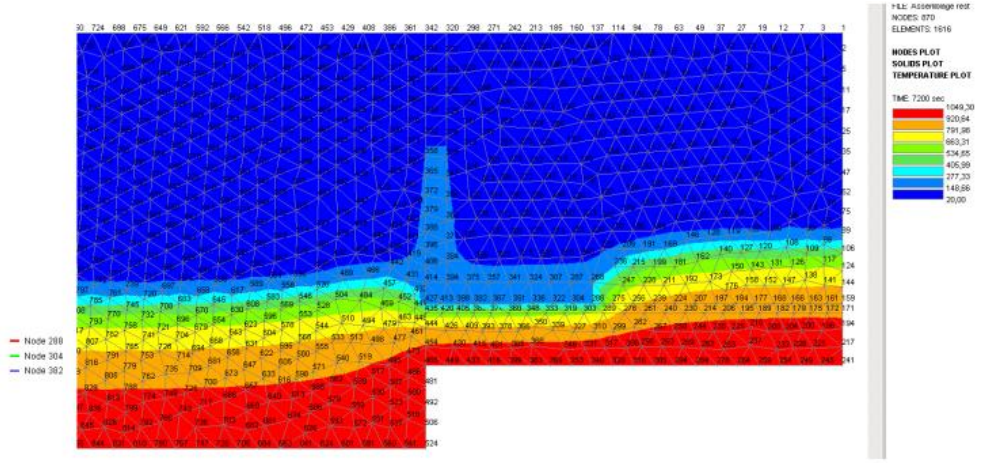


Figure 13 : Champ de température dans la section au bout de 7200 secondes.

- Fire tests on R 90 and R 120 assemblies: ADIVbois work.

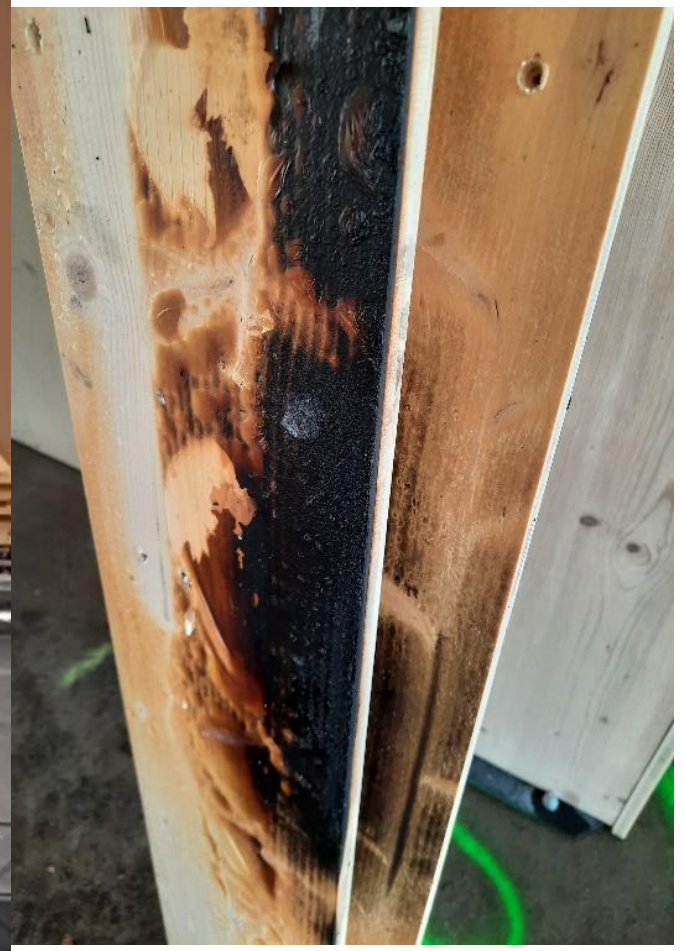
Figure A5.3 Campagne 1 – Configuration 1 – Assemblage après essai

Insurability + Fire policy of the Prefecture of Paris

Full-scale test campaign organised by WO2 in a laboratory (Efectis)

- Different fire starting positions.
- Different sprinkler or water mist configurations.

Insurability + Fire policy of the



Full-scale test campaign … y (Efectis)

- Different fire starting …
- Different sprinkler or …

>> Fire safety

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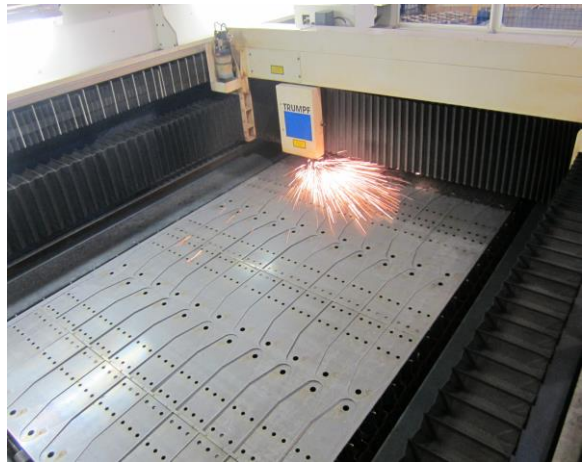
Gluing - Block gluing - CNC joinery

(Floors : CLT + Ribbs + fire protection
not produced by MATHIS for Arboretum)

Steel parts



>> Production and mounting

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Studies (calculations, drawings, 3D,..)*: ~17500 hours (6 people)*
Fabrication*: ~50% of the factory production for 1,5 years*
Transports*: ~200 truck delivery (just for GLT)*
Site installation*: ~18 people for 1,5 years*

>> Data: production and mounting

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>> Thanks for your attention

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