

Building concepts by Stora Enso Industrial Buildings



Why a wooden industrial building

Massive engineered wood offers you the the most sustainable low-carbon alternative on the market. Wooden buildings are also known to improve wellbeing and productivity.

There are no longer any technical obstacles to building in this renewable raw material either. Wood provides an array of design opportunities for every kind of industrial building, from a premium facility to a cost-efficient warehouse space.

Our concept shows you a range of solutions to meet every need. The designs are both cost-efficient, flexible and modular. They are all designed for manufacture and assembly and can even be made for disassembly and reassembly at the end of life.

We hope this brochure inspires you to find out more. Go to buildingconcepts.storaenso.com to learn about the concept in more detail.



Low carbon



Modular



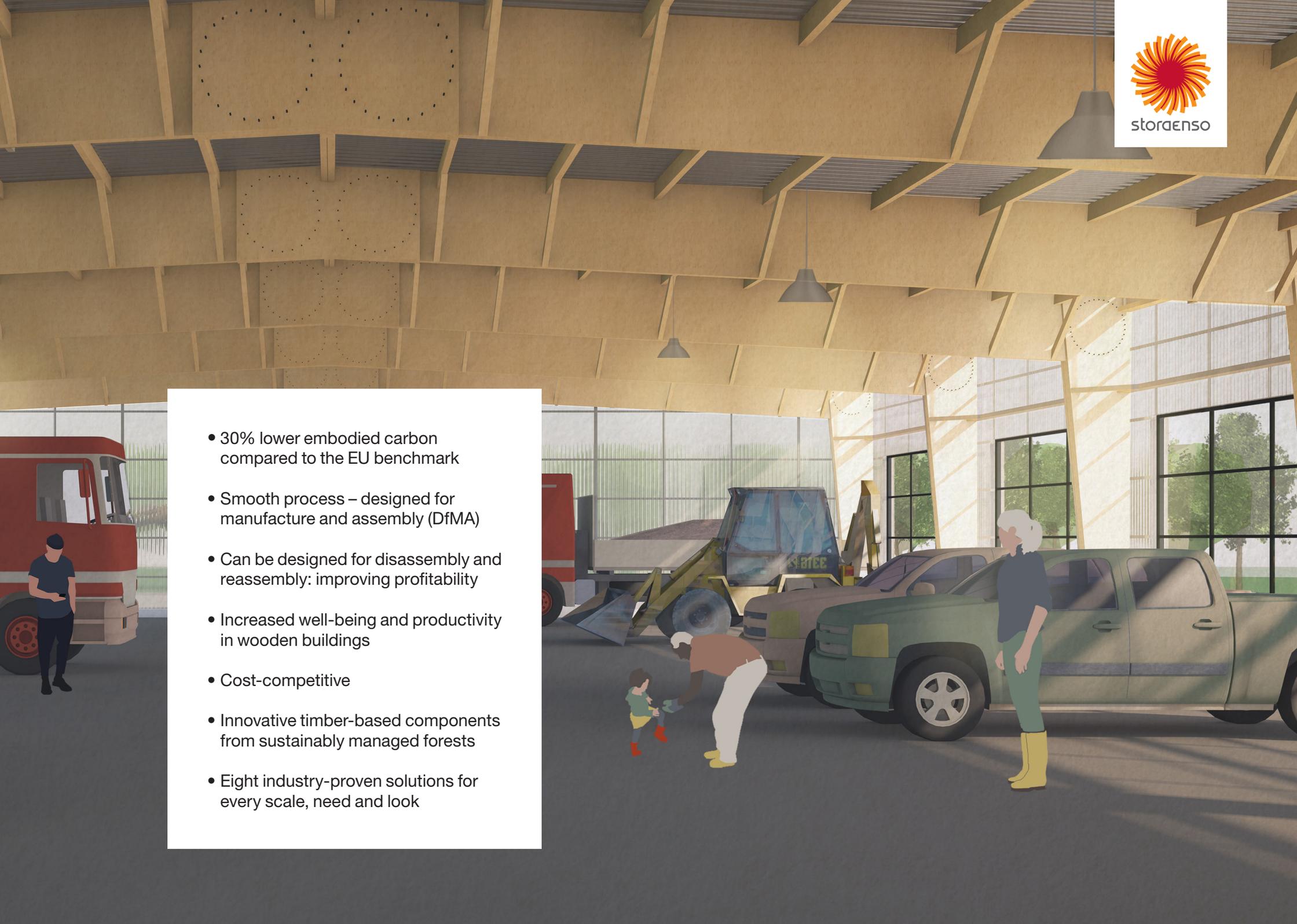
Flexible



Future proof



- 30% lower embodied carbon compared to the EU benchmark
- Smooth process – designed for manufacture and assembly (DfMA)
- Can be designed for disassembly and reassembly: improving profitability
- Increased well-being and productivity in wooden buildings
- Cost-competitive
- Innovative timber-based components from sustainably managed forests
- Eight industry-proven solutions for every scale, need and look



Small, medium, large or x-large?

Eight different typologies to help you find a solution that is quick and easy to design and construct. Each type offers design possibilities covering different spans, requirements and advantages.



CLT with rib roof

Span target: 16 m
Range: from 12 m to 18 m

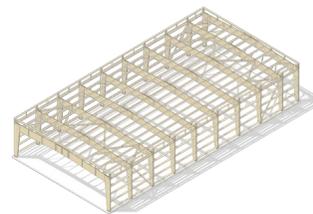
Intended for small scale workshops or storage facilities where the indoor look and feel is important. The working areas can easily be integrated with sales and visitors areas.



CLT box

Span target: 18 m
Range: from 14 m to 20 m

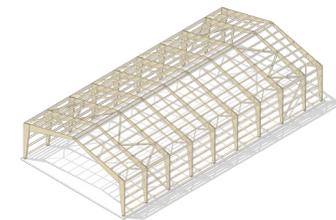
For high quality indoor spaces that integrate showrooms and other sales functions with warehouse or manufacturing processes.



2-pin portal frames

Span target: 20 m and 27 m
Range: from 18 m to 30 m

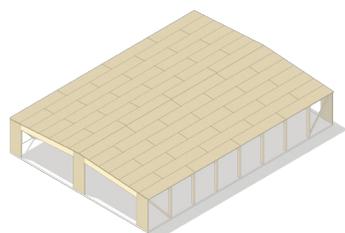
A lightweight structure and material-efficient solution for semi-flat roofs. No need for additional lateral bracing due to the portal frame structure.



3-pin portal frames

Span target: 20 m and 28 m
Range: from 18 m to 30 m

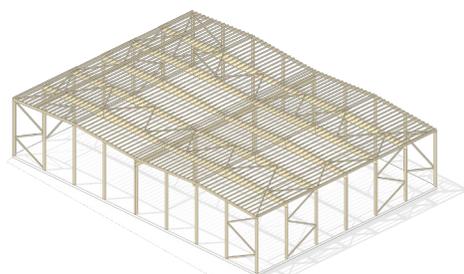
The most lightweight and material-efficient solution for pitched roofs. No need for additional lateral bracing due to the portal frame structure.



**Beam and column,
18 m**

**Span target: 18 m with
light to high loads
Range: from 16 m to 20 m**

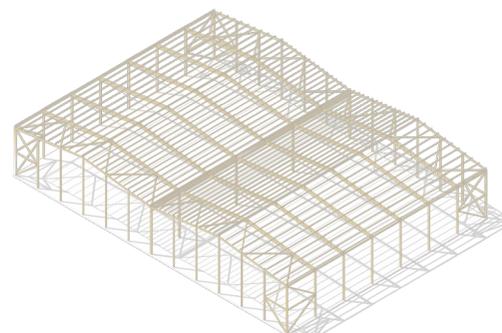
For lightweight structures with a heavy roof, such as mass timber or green roofs or in areas with high snow loads.



**Beam and column,
24 m**

**Span target: 24 m with
light to medium loads
Range: 18 m to 26 m**

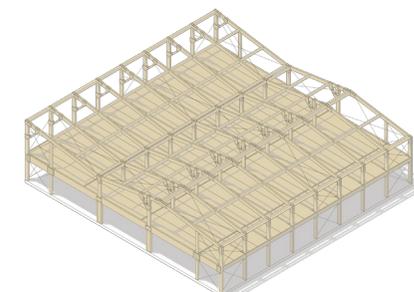
For medium to large warehouses. Works with low to medium roof loads such as moderately snowy areas.



**Beam and column,
36 m, steel hybrid
beam**

**Span target: 36 m with
light to medium loads
Range: 24 m to 36 m**

For medium to large warehouses with large spans, using a steel-hybrid main beam.



**Two-storey
warehouse**

**Span target: 16 m roof,
11 m floors with light to
medium loads
Range: 12 m to 24 m**

Timber frame for medium to large warehouses on two floors, or projects with a mezzanine.



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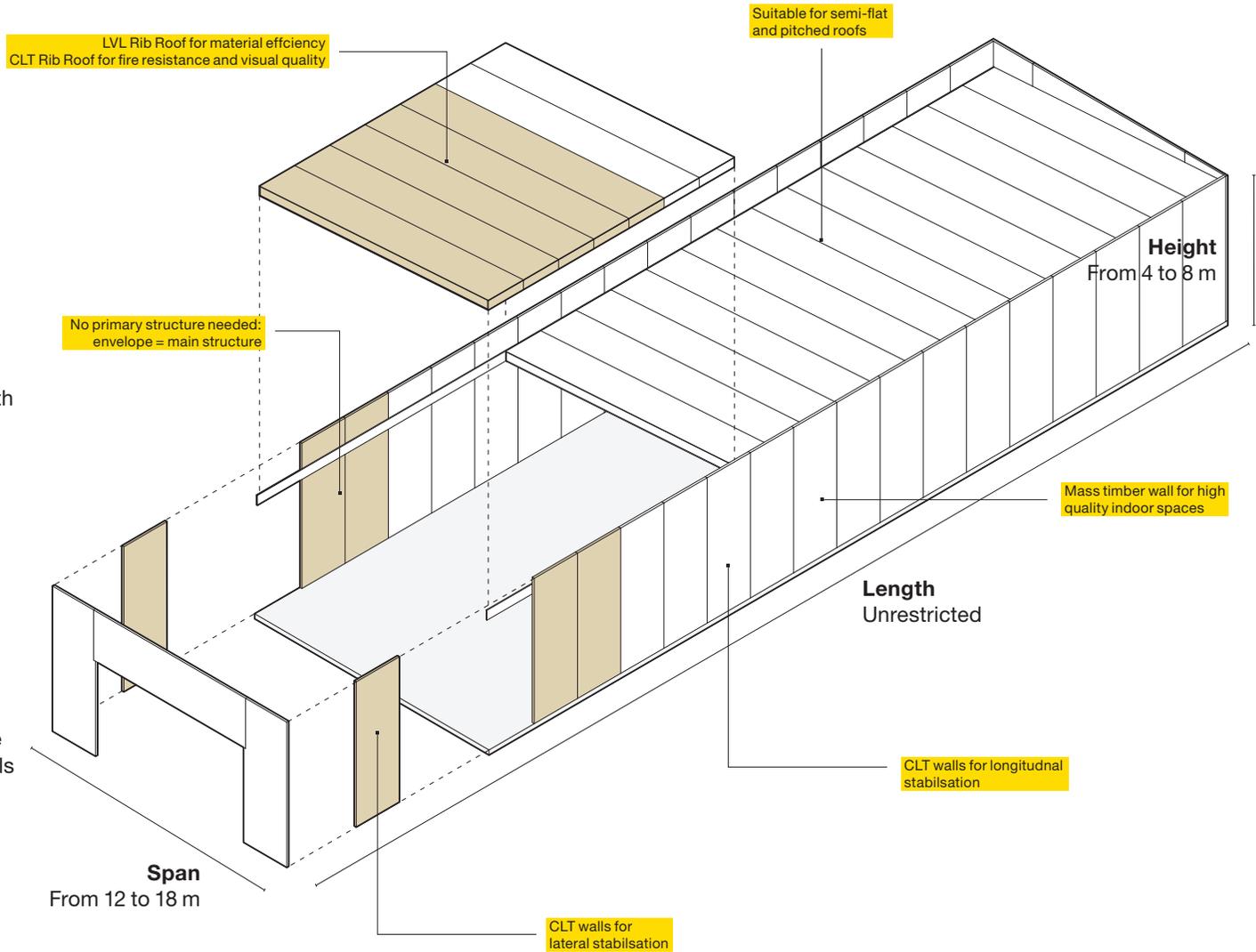
CLT with rib roof

Span target: 16 m

Range: from 12 m to 18 m

An efficient build using mass timber to provide an attractive indoor environment while reducing emissions at the same time. High-quality premium look and feel with exposed timber walls.

- Premium indoor look with timber walls
- Robust, high-quality building with CLT envelope
- Great for semi-flat roofs and green roofs in particular
- Efficient erection sequence – fewer elements required to complete the build
- No need for additional longitudinal bracing due to use of diaphragm walls
- Suitable for all mass-timber envelopes





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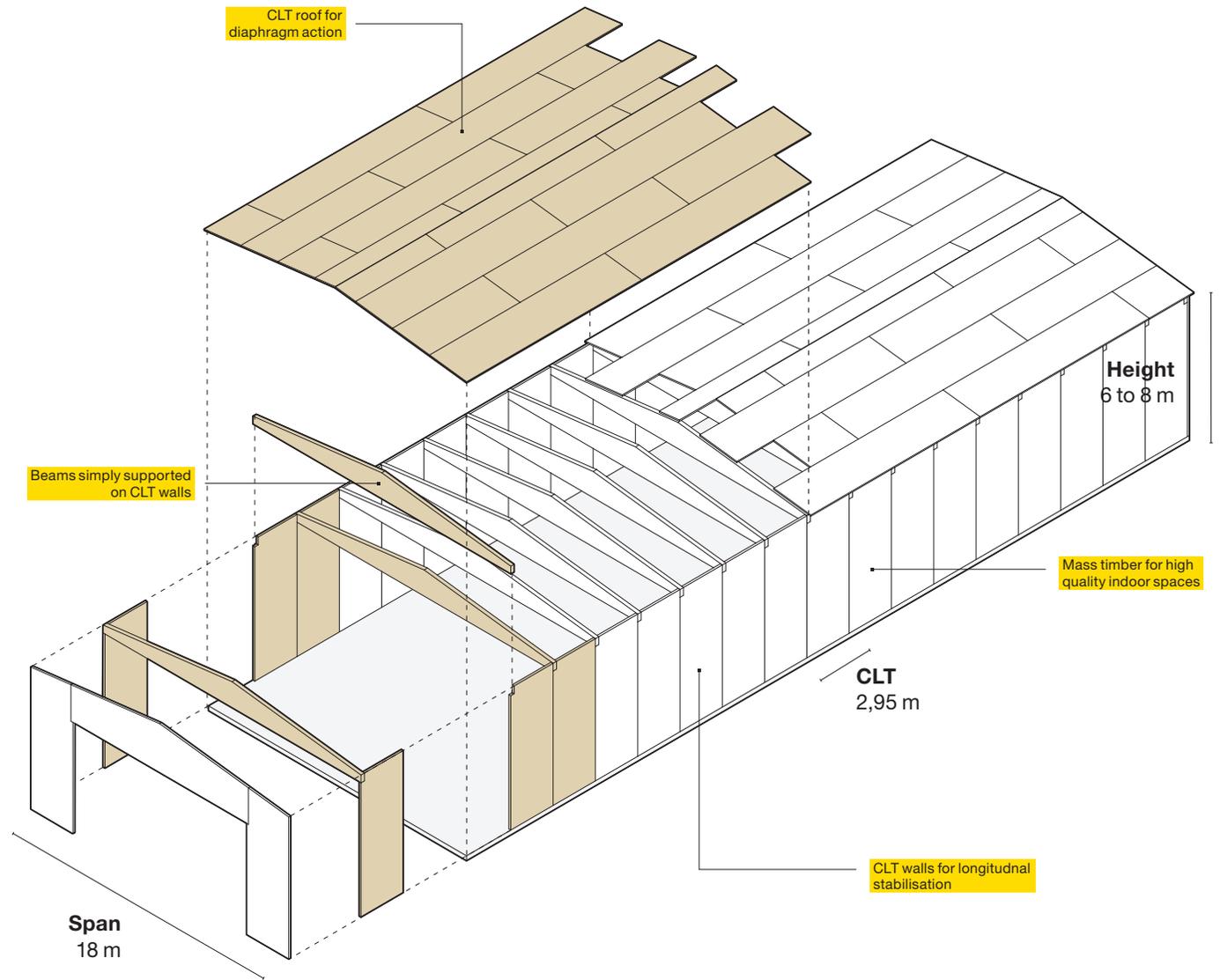
CLT box

Span target: 18 m

Range: from 14 m to 20 m

Similar to the CLT with rib-panel roof. This is a high-quality robust building with a premium look and feel. This option is better for higher spans and when transport of elements to the site is a challenge.

- Premium indoor look with timber walls
- Robust, high-quality building with CLT envelope
- Great for semi-flat roofs and green roofs in particular
- Efficient erection sequence - fewer elements required to complete the build
- No need for additional longitudinal bracing due to use of diaphragm walls
- Suitable for all mass-timber envelopes
- Only the beam requires special transport





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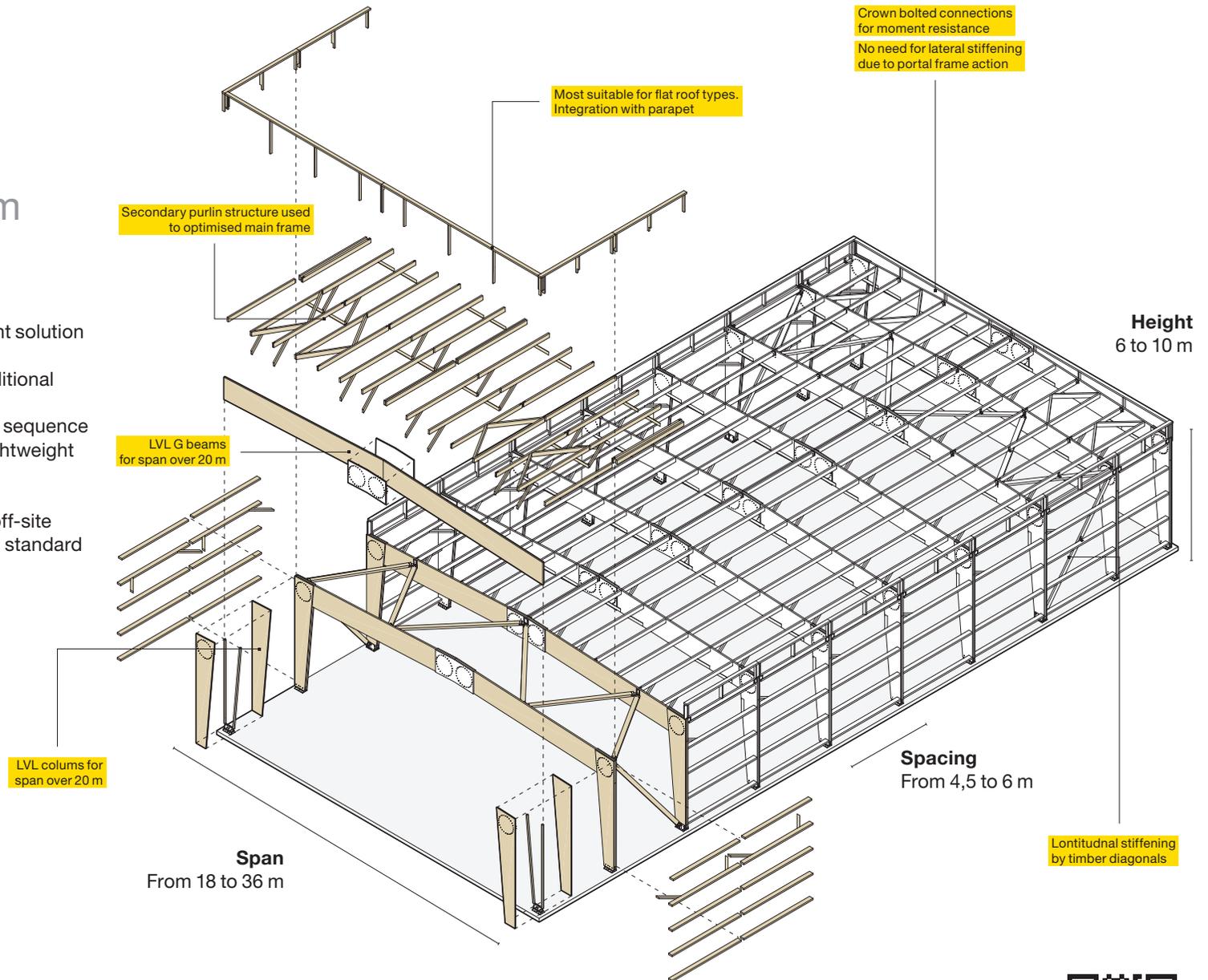
2-pin portal frames

Span target: 20 m and 27 m

Range: from 18 m to 30 m

The most material-efficient and labour-efficient option with a clever structure where lateral bracing is built into the design. The lower ceiling also allows for more efficient operational heating costs during the building's lifetime. This option is suitable for areas with little or moderate amounts of snow.

- Material-efficient solution
- Lightweight
- No need for additional lateral bracing
- Simple erection sequence
- Suitable with lightweight envelope
- All elements manufactured off-site and delivered in standard trucks





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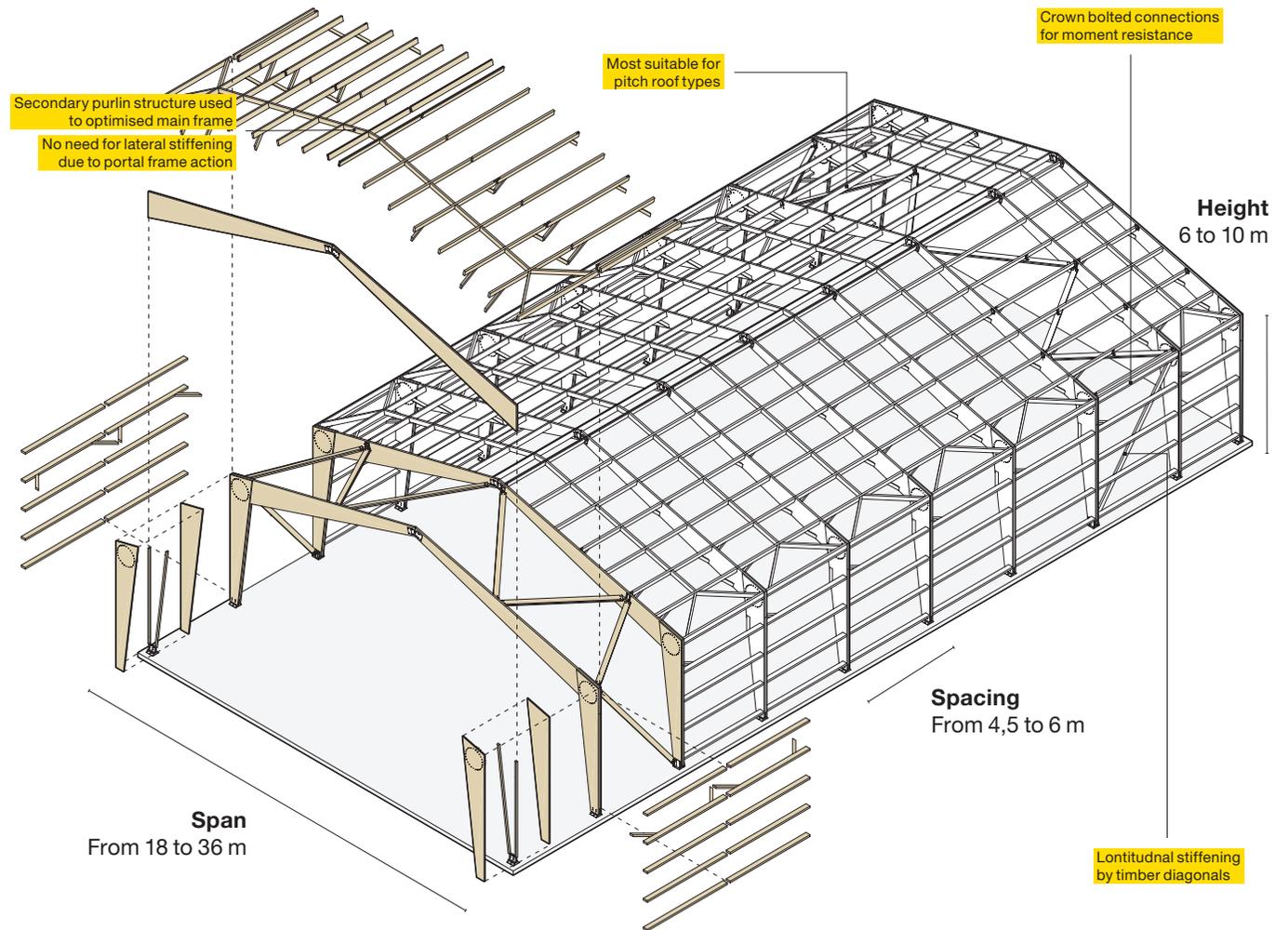
3-pin portal frames

Span target: 20 m and 28 m

Range: from 18 m to 30 m

Similar to the 2-pin portal frames option but with a pitched roof. This option is suitable in moderately snowy areas or areas that require low to medium roof loads.

- Material-efficient solution
- Lightweight
- Simple erection sequence
- No need for additional lateral bracing
- Suitable with lightweight envelope
- All elements manufactured off-site and delivered in standard trucks





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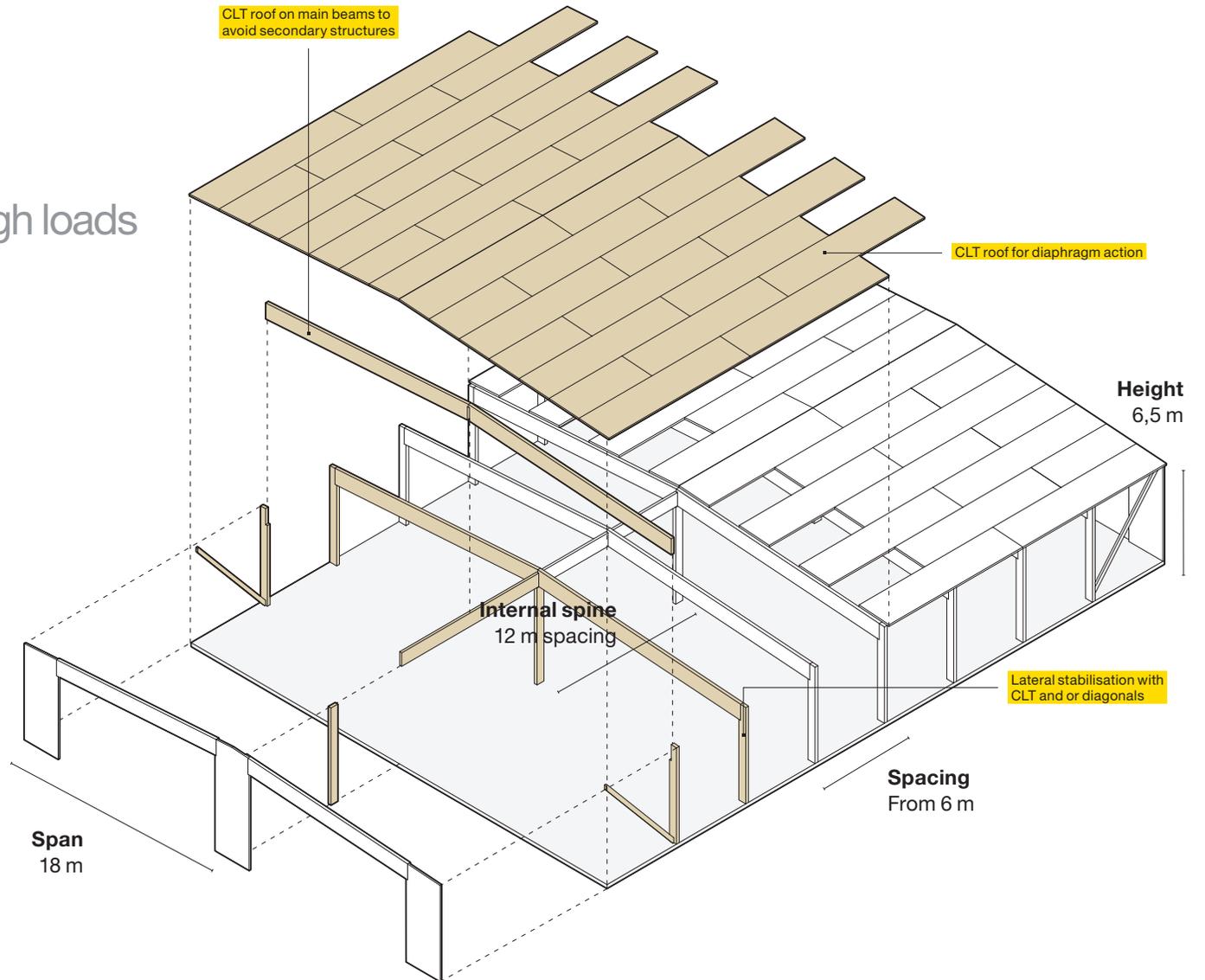
Beam and column, 18 m

Span target: 18 m with light to high loads

Range: from 16 m to 20 m

A typical modular post and beams solution that is highly flexible. Can easily be expanded to suit size requirements.

- Can be used with any kind of envelope
- Suitable for high roof loads
- Works well with semi-flat roofs and green roofs in particular
- Only the beam requires special transport
- 30-minute fire resistance. No additional protection measures required.





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Beam and column, 24 m

Span target: 24 m with light to medium loads

Range: 18 m to 26 m

Similar to the 18 m option above, this version aligns with the standard 24 m span in logistics buildings in central Europe. All elements can be transported in standard trucks, including the 24 m long beam, delivered in two parts that can be quickly connected on site.

- Can be used with any kind of envelope
- Suits low to medium loads
- Works in moderately snowy areas. In other words, low to medium roof loads.
- 30-minute fire resistance. No additional protection measures required.

Lateral stabilisation with timber diagonals

Span
24 m main beam

Main beam delivered in parts to reduce transport costs

Roof stiffening with timber diagonals

Height
approx. 12 m

Internal spine
12 m spacing

Spacing
From 6 m





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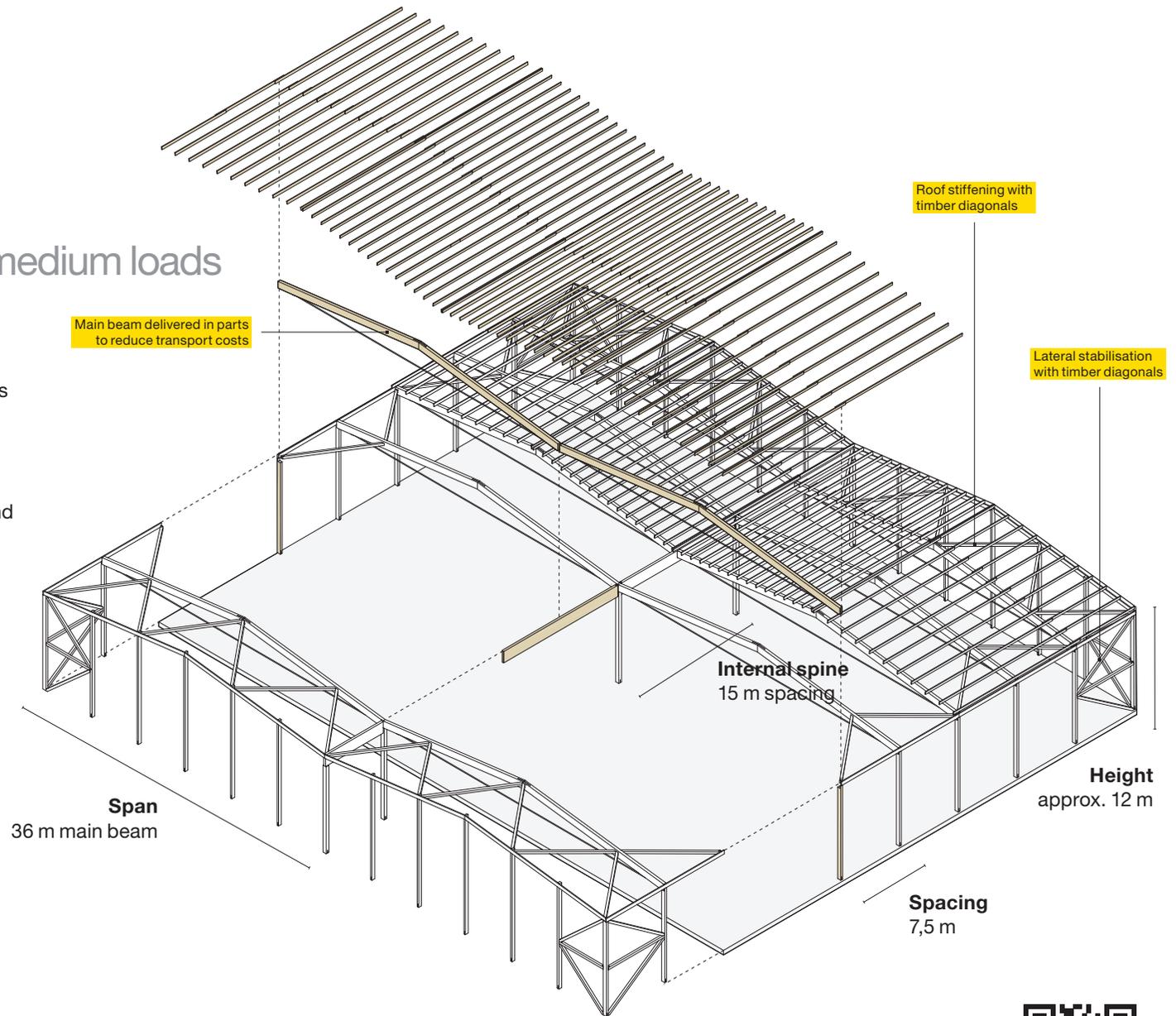
Beam and column, 36 m, steel hybrid beam

Span target: 36 m with light to medium loads

Range: 24 m to 36 m

Similar to the two options above but using the standard 36 m span for logistics buildings in the UK. This option is a hybrid solution making the best use of wood and steel in combination.

- Hybrid solution optimises material use and performance
- Long spans maximise flexibility for the user
- Can be used with any kind of envelope





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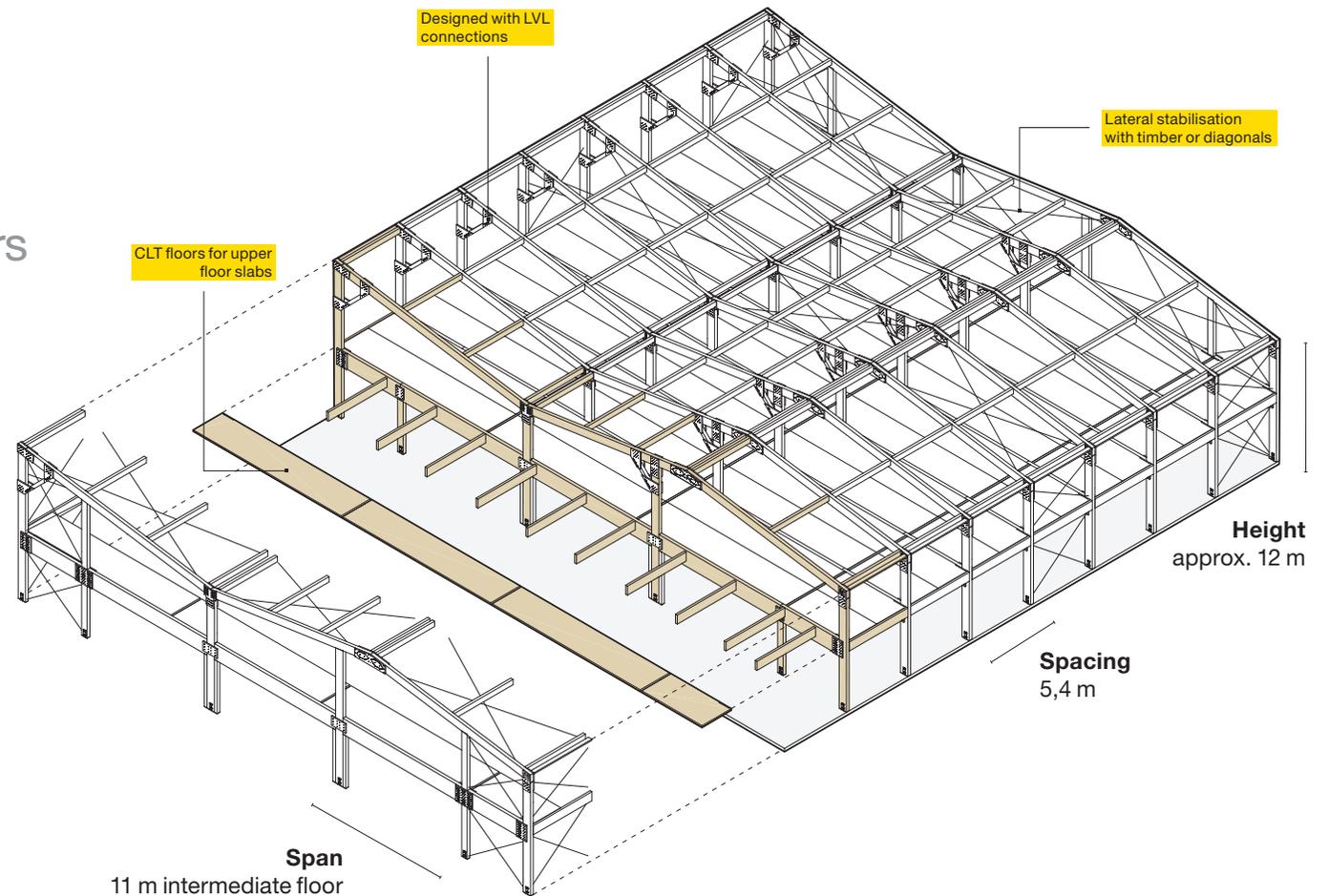
Two-storey warehouse

Span target: 16 m roof, 11 m floors
with light to medium loads

Range: 12 m to 24 m

All the benefits of a premium timber building in a two-storey facility. Clear health and well-being benefits from the exposed timber walls. Fire-resistance is resolved without any additional protection.

- Separate floors for different uses
- Middle floors can take high loads and provide fire resistance
- Premium look with timber walls
- Can be used with any kind of envelope



Sustainable industrial buildings

We hope that the eight solutions above inspire you into using wood for your next industrial building project. The options above can be developed as is or used as a base from which to start your next design.

In addition, at Stora Enso we have a series of digital tools to support you when you decide to embark on a wooden building project. These include free web-based tools for structural analysis and a BIM toolbox that provides you with BIM object data for Stora Enso's building components.

Get in touch and we can help you embark on your next sustainable wooden building.



For examples of industrial buildings today go to references.buildingsolutions.storaenso.com.







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Disclaimer

This concept is intended to show what possibilities exist when it comes to constructing industrial buildings from wood. This information should be treated as an overall concept for the preliminary design of buildings and structures.

It does not replace the need for final design and calculations by responsible designers, including but not limited to structural, acoustic, fire or buildings physics design.

Concept developed together with:

WAUGH THISTLETON
ARCHITECTS



RAMBOLL



EURBAN

