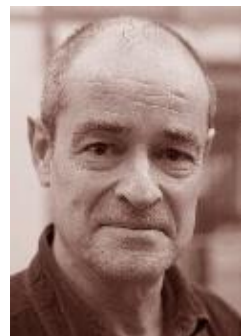


# Lorient-Bretagne Sud Railway Station, France

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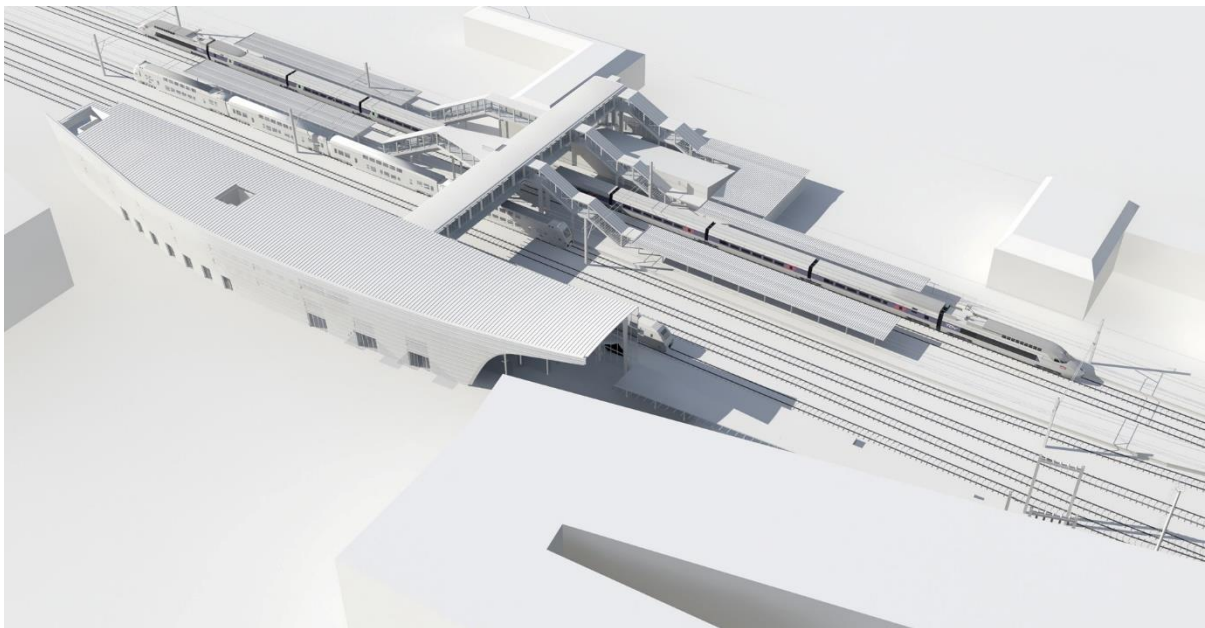
## 1. A station designed for the arrival of the high-speed rail line in 2017

The new Lorient railway station, which was inaugurated in May 2017, has been designed to deal with the increasing passenger numbers, expected to rise from 1,2 million to 2 million by 2020. The station has the capacity to accommodate two additional high-speed trains (TGV) per day and 48 intercity connections.

The view of the shipyards from the bridge overlooking the Scorff estuary plunges passengers arriving from Paris into the maritime cityscape. A few moments later, the train draws to a stop alongside the timber passenger building, which echoes the fluid forms of ship hulls. The station runs along the road, between the rail tracks and the bus rapid transit lanes.

When users get to the station, they take the timber footbridge that spans the tracks and leads to the platforms. Timber was chosen for its welcoming and comforting properties as well as durability.

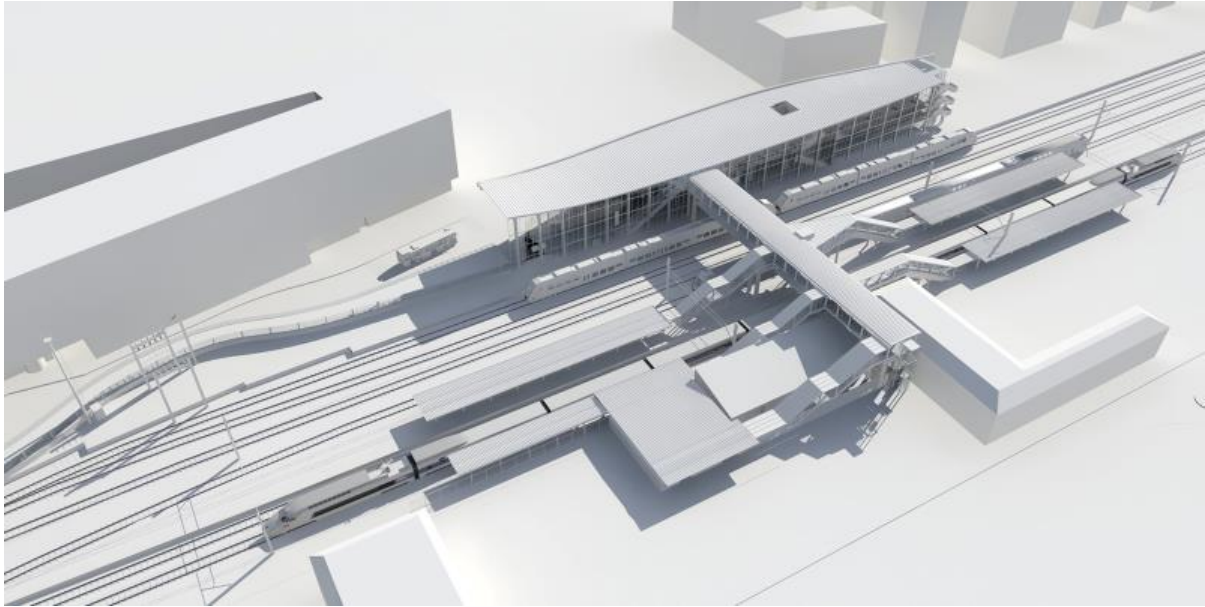
The major challenge has been to design a lightweight and slender timber structure that serves a legible, safe and welcoming station.



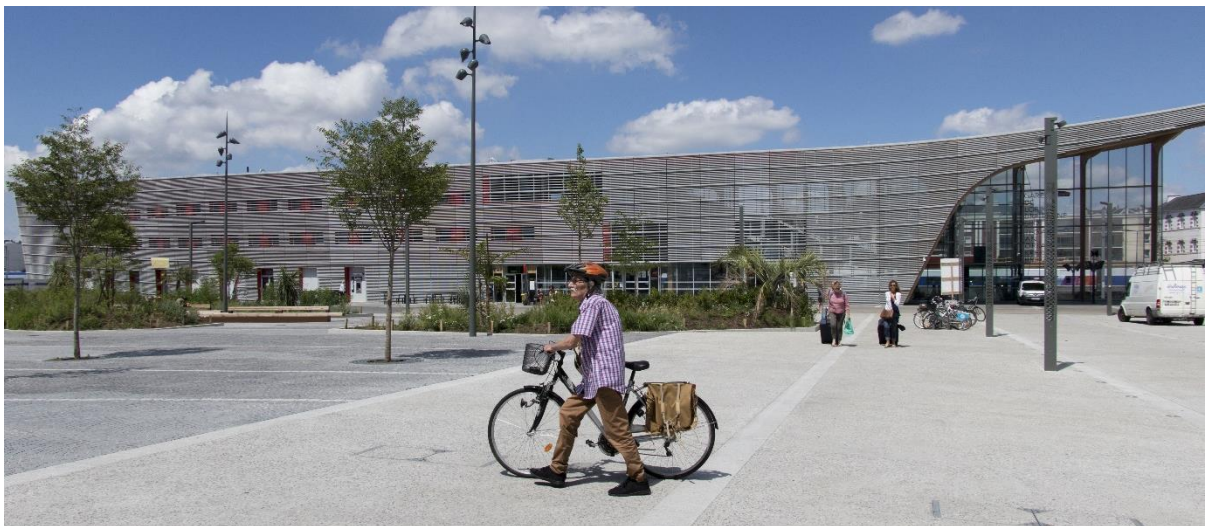
## 2. Lorient railway station: An urban connection in the heart of intermodality

The former station building was located to the north of the rail tracks, turning its back on the city. The project has placed the new building to the south of the rail tracks: opening up both to the ocean and the city centre, the station now acts as a gateway to the entire conurbation and beyond, to the Ile de Groix.

The access point to the north accommodates passenger services. It is connected to the main building by the footbridge, which does not only allow to access the platforms, but also acts as a pedestrian urban connection.



The main building combines two adjoining spaces comprising the passenger building on the east side and a commercial development on the west side, thus responding to the municipality's intention to create a building that would extend to the forecourt recently developed in the heart of the Odysée special planning district (ZAC).



The entrance to the station is located at the east end of the concourse and faces Avenue Franchet d'Espérey, the main city thoroughfare. It opens up onto vistas along the thoroughfare and the south forecourt, as well as onto the bus rapid transit lanes and the coach station that is being developed along the tracks in the east.

### **3. The passenger building: A timber shed**

#### **3.1. The timber frame**

The Douglas-fir timber frame is fixed on a set of concrete posts, beams and floors that ensure stability. The main structure is composed of 23 portal frames made of Douglas-fir laminated timber having a span of between 12 and 19 metres and a height of 13 metres. The stress in the braces is distributed across the frame over a length of 113 metres through the timber roof.

Thereby, neither the fully transparent north façade that opens onto the platforms, nor the south hall façade need any triangular elements.



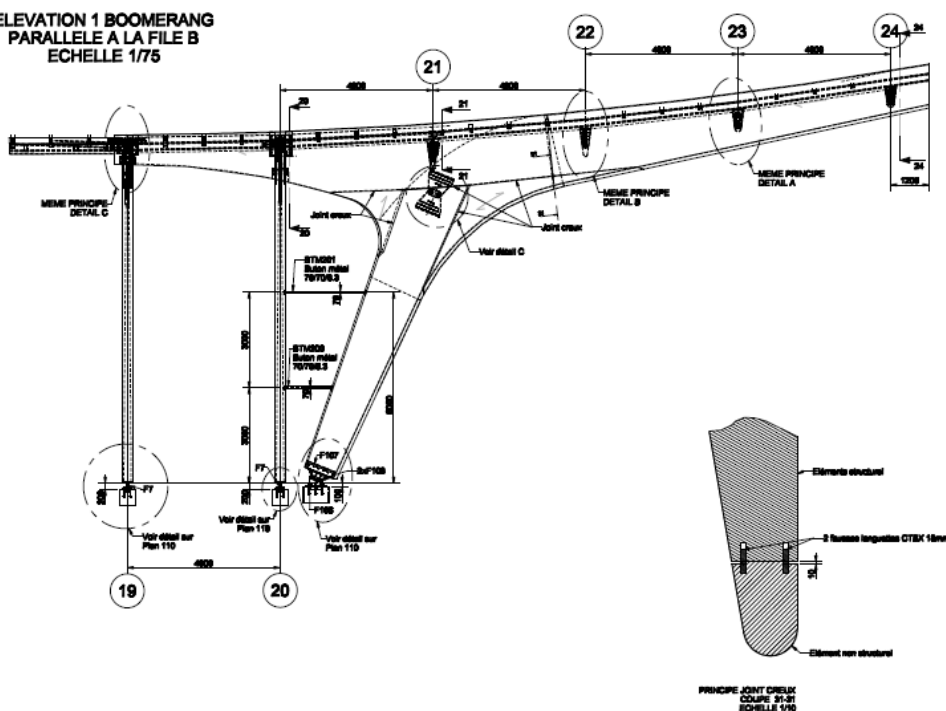
The portal frames are composed of posts and beams whose varying cross-sections depend on the internal stress, and of rib-like profiled sections describing a continuous form. The four half-portal frames which are perpendicular to the canopy are supported by the trident-like main structural element.

The embedded fastening elements have platinum ends that are incorporated into the timber beams.



A canopy, supported by a key, trident-like structural element, extends the concourse outwards. This structural element in laminated timber supports the four cantilevered half-portals and the roof. The north façade extends to shelter the entrance from the wind. Fully glazed, it allows sweeping views of the trains from the concourse and expands towards the linear canopy of the coach station. The structure itself conveys the idea of intermodality at the Lorient station.

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### 3.2. The roof: Fifth façade and bracing

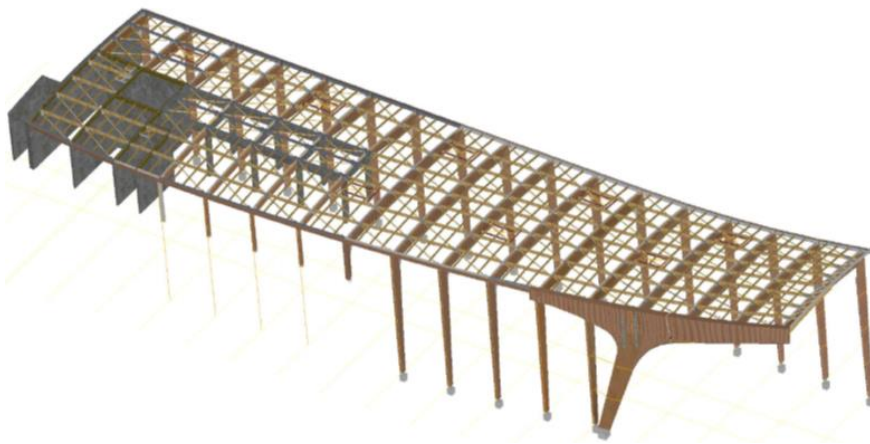
The double-curved roof matches the supple form and outline of the building and forms a fifth façade that can be seen from the buildings of the Odysée special planning district (ZAC) that bring to mind lighthouses.

The plan of the roof contributes to the overall bracing as the stress is transferred from the portal frames and the east canopy towards the internal reinforced concrete structures.

The purlins that are fitted on the portal frames support the timber panelling. The whole structure is braced by triangulation, consisting in inserting steel tie rods into the purlins.

The underside of the roof in the 12-metre-high concourse features a 5cm x 5cm spruce lattice supporting a sound-absorbing material aimed at minimising background noise levels to ensure that audio announcements are audible.

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### 3.3. The south façade: A sheltered timbered façade

The south façade features timber-frame panels that provide thermal insulation. The panels feature a 4.80-metre span that matches the portal frame span and have openings corresponding to the windows of the operational premises and offices.

The interior façade is covered with uncoated chipboard panels. A rainscreen cladding prevents water from penetrating into the exterior façade. Its red tint evokes the range of colours used during Lorient's Reconstruction era. The rain screen is protected by an ultra-high-performance fibre-reinforced concrete (UHPFRC) screen wall which also reduces solar radiation.





The screen wall gives the building consistency by homogenizing the size of the various openings, each corresponding to a different function:

- The fully glazed station hall to the east;
- The retail outlets on the ground floor;
- Station offices;
- The open plan space of the adjoining commercial development.



### 3.4. The north façade: A transparent façade overlooking the Platforms

The fully glazed north façade has been designed according to two principles:

- The station façade features a steel frame and profile, as well as glazed openings. The concourse has no thermal insulation except for the waiting areas;
- The façade of the commercial development features an aluminium frame and profile, as well as double-glazing to comply with the 2012 thermal regulations.

These self-supporting façades are fixed to the timber portal frames by steel bearings allowing adjustments and movements of the façades thanks to oblong holes.



### 3.5. The east façade

There was practically no need for an east façade (the various types of transport means would have been better connected). However, the concourse needs both to remain inaccessible during the closing hours and provide shelter from bad weather. To this end, a simple glass screen separates the concourse from the canopy.

Five cable-stayed masts rise from the ground. They are connected to each other at their base and are fixed to the portal frames by bearings. They support the glazed panels thanks to ties in order to avoid any horizontal or vertical profile and to attenuate the presence of the façade. The fastening devices at the top of the mast allow structural frame movement.



### 3.6. The footbridge and platform access

The pedestrian bridge leads directly into the station concourse and connects the city centre to the northern district of Kerentrech.

- The footbridge forms a horizontal link composed of 18-metre spans;
- The sloping diagonals that lead to the platforms are designed in the same way.

Each span is supported by steel frames and features a double Vierendeel truss made of Douglas-fir laminated timber. The chords and posts are linked and embedded. The beams have been reinforced by steel diagonal tie rods having a 6 cm diameter so that chords can be the slimmest possible at a 40cm x 30 cm height and the posts at a 30 cm square section.

This solution resulted in a transparent and lightweight structure and minimized the difference in height as the pedestrian bridge lies seven metres above the rail tracks.

The lower chords and posts are covered with steel cladding and copings to protect the embedded fastening elements. The chords are protected by the overhanging deck, thus reinforcing the image of a lightweight and plane footbridge.

The platform accesses accommodate all the vertical circulations – stairs, escalators and lifts.

This layout offers both sheltered and legible circulation routes and a safe environment while allowing sweeping views of the station and the city.





### 3.7. The platform shelters and the coach station

The platform shelters are made of Douglas-fir timber according to a double-pole system in order to minimise spread footing. The roof is supported by tie beams featuring varying sections; they are linked by a central double beam that incorporates the eaves gutter. The tie beams cantilever from the Kalzip® double-sloped roof (the same material has been used for the station roof).

The coach station shelter stretches out over 300 metres and forms a canopy supported by posts set every 4.80 metres. The glazed end of the canopy allows views of the station canopy.

### 3.8. Flooring

The floors of the pedestrian bridge and stairs are covered with 6 cm wide Moabi hardwood slats set on stringer beams, themselves resting on the structural purlins perpendicular to the wooden truss. Linear ribs ensure anti-slip flooring.



#### Architects:

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#### Structural engineering and façades:

H.D.A. Hugh Dutton & Associés

#### Envelope:

Timber frame and steel structure: Mathis et Baudin Châteauneuf

Façades: A.C.M.L.

Foundations and concrete structure: S.R.B.