

## Project Overview & Logistics

### Project Details

**Typology:** Load-bearing timber structure and hemp insulation

**Location:** Valchiusella (TO), Italy

**Client:** Agriturismo Rantan (Traversella, Valchiusella)

**Design:** Studio Ellisse

**Execution:** Maisdabösch (in collaboration with Merlino Zeldenthuis)

**Role:** Executive engineering, on-site prefabrication, and assembly

**Materials:** Oak and steel frame; chestnut exterior cladding; fir interiors; larch roof; hemp fiber insulation, natural finishes.



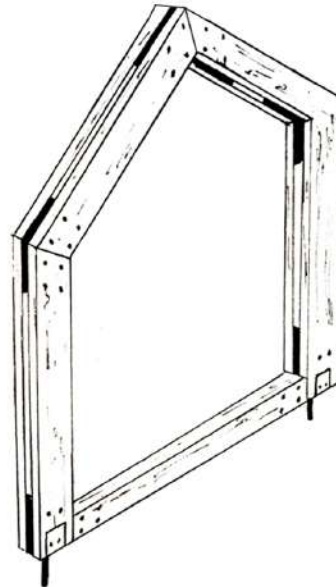
Photo 1 | Portal frame installation

### Concept & Logistical Challenge

The project involved building two timber structures connected by a central porch. The main challenge was managing logistics on a remote alpine site with limited accessibility, optimizing resources, and minimizing heavy lifting machinery.

### Construction Solution

An artisanal, on-site prefabrication process was developed. Portal frames (weighing 200–300 kg each) and timber elements were shaped and pre-assembled on the ground. Positioning and lifting were managed via manual rigging, complemented by a telescopic handler (Manitou) for the safe installation of primary structural components.



Drawing 1 | Axonometric view of portal frame

### Joint Engineering & Details

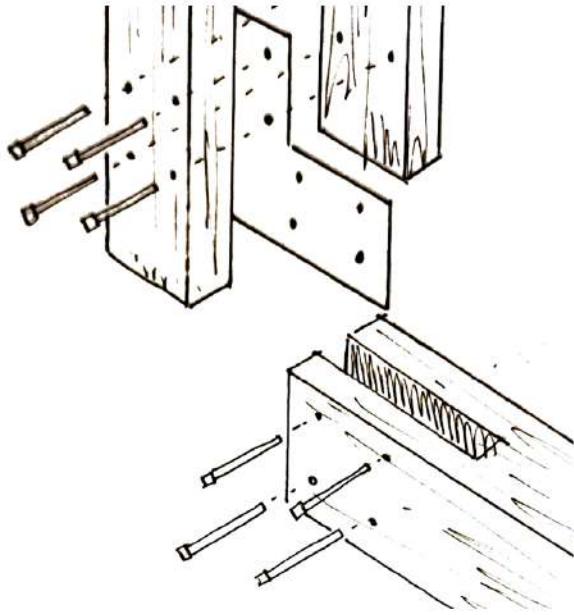


Photo 3 | Ridge joint detail

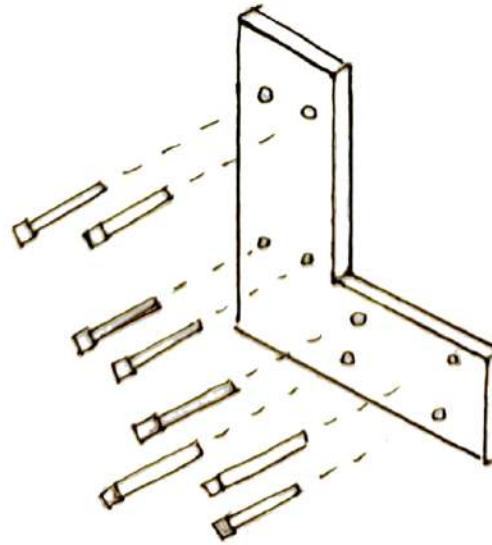


Photo 4 | Steel base plate detail

## Joint Engineering & Construction Phases



Drawing 2 | Axonometric view of joint construction detail



Drawing 3 | Axonometric view of steel plate detail

### Joint Engineering

#### Custom Timber-Steel Connection Design

To absorb frame bending stresses and enable rapid site assembly without heavy fixed equipment, a custom joint connection system was engineered.

#### Construction Details & Durability

- **Shaped steel plates:** Custom-fabricated steel connection plates integrated seamlessly into timber joinery.

- **Joint protection:** Cold-applied linseed oil treatment on timber components and iron plates, ensuring maximum durability, water repellency, and moisture protection without synthetic chemicals.

## The 4 Construction Phases



### 1- On-Site Prefabrication

Crafting and pre-assembly of modular components at ground level, reducing site risks, scaffolding needs, and assembly time.



### 2- Structure Erection

Installation of prefabricated modules and porch framing using pre-cut oak beams directly on site.



### 3- Envelope Insulation

Dry installation of high-density hemp fiber insulation panels within frame cavities, ensuring high thermo-acoustic performance.



### 4- Cladding & Finishes

Chestnut exterior cladding, fir interior wall finishes, pine-tar coated larch roof decking, and chestnut/larch flooring.