



The joint between column and spot footing is made with the help of steel basket and M20 (5.6) bolts (Fig. 3).



Fig. 3 Column support joint

3.2. Carrying elements

The main carrying elements are made as the single-storey frames, fabricated from glued timber of GL-28h class (Fig 3, 5). The additional elements, such as mezzanine, are mounted directly to the frame (Fig. 4)

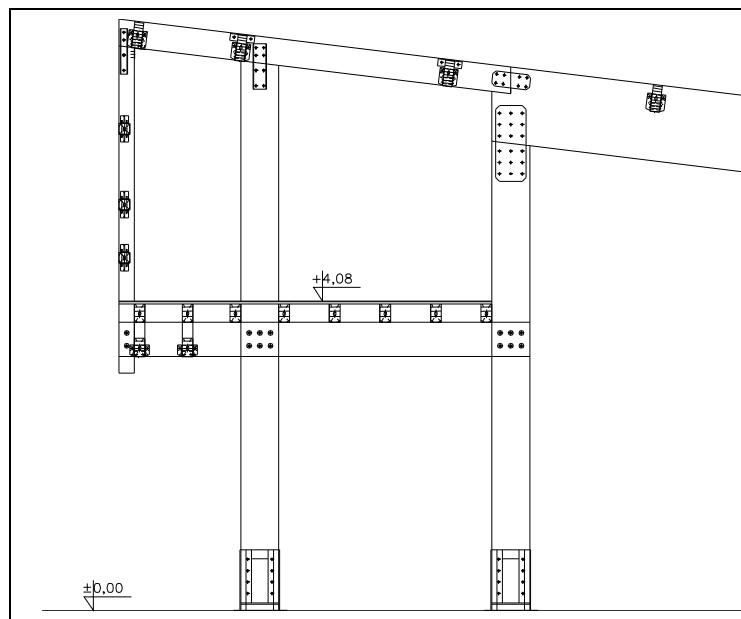


Fig. 4 Additional frame elements – mezzanine

3.3. Casing elements

The roof cover is made from trapezoid roofing sheet TR50/260 type, insulated with mineral wool. As the outer walls casing the light, multilayered and internally insulated panels were used. The casing is completed with large glass surfaces (Fig. 5).



Fig. 5 The building facade

4. Computational models used

The construction of the building is based on plane frames braced with the help of steel sway bracings. According to very useful carrying properties of marl soils it was possible to assume the static model as a frame with rigid joints (**Fig. 6**). Therefore it was possible to model the roof beam as a single-span free-ends beam, and as a result, to simplify their connection with columns (**Fig. 7**)

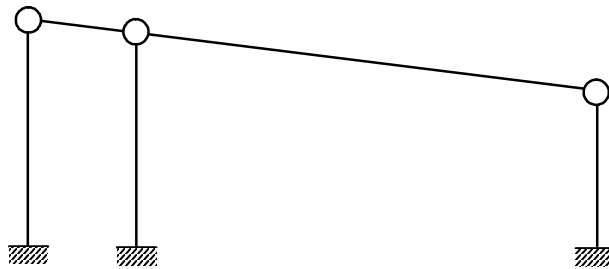


Fig. 6 Computational model of the main frame

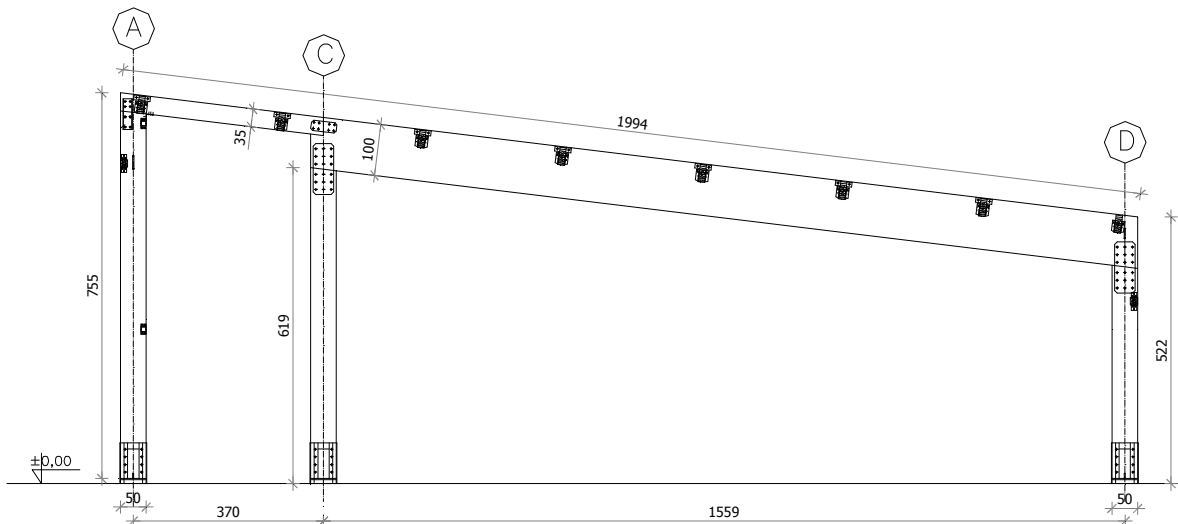


Fig. 7 The main frame plan view

5. Actions on structure

The construction is loaded with typical set of forces, according to polish standards. It is grouped into few parts:

- snow: $S_k=0,56\text{kPa}$,
- wind at 1st area according to PN (polish standard): $p_k=0,25\text{kPa}$,
- constant loading of roof (including ventilation devices), floors and walls casing,
- variable loading of mezzanine: $q_k=2,5\text{kPa}$.

Moreover, the ground-floor was designed for variable operational loading $q=15\text{kPa}$.

6. Project documentation, plans, and drawings

At the below pictures one can see respectively: plan view of the structure at roof level, the stairs leading to mezzanine and roof bracing.

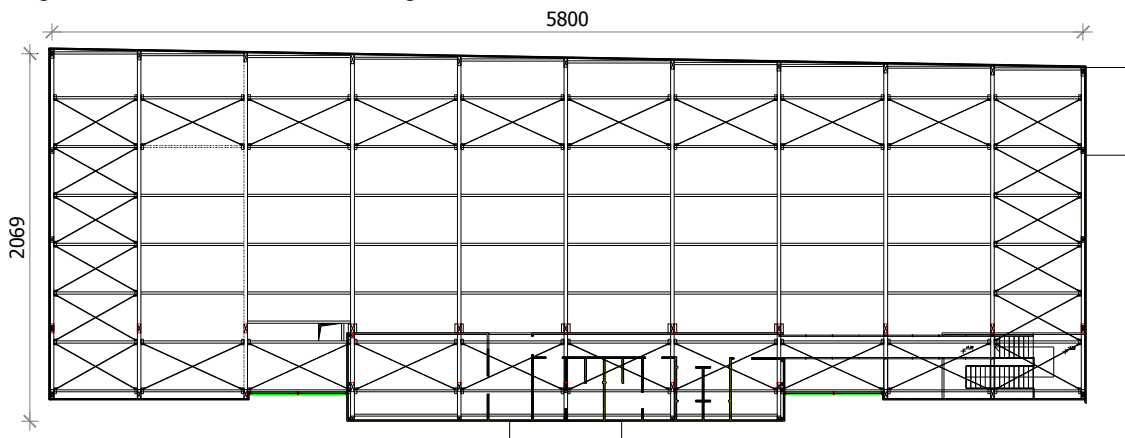


Fig. 8 Plan view of construction at roof level

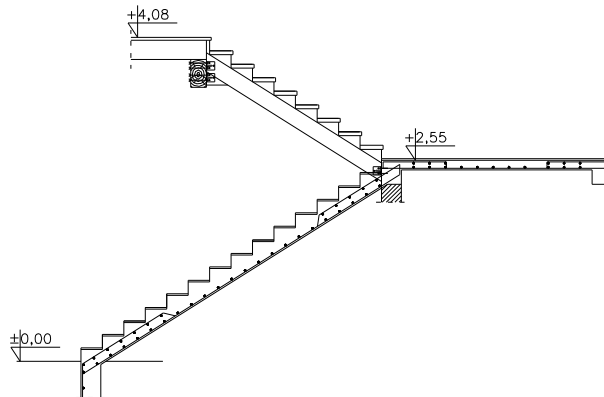


Fig. 9 Stairs cross-section

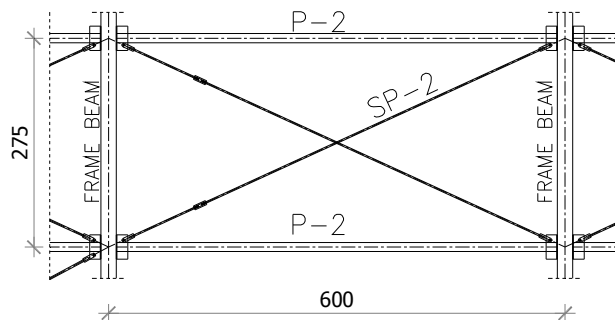


Fig. 10 Roof bracing

7. Erection

The erection of structure was led from 10.2006 to 05.2007. A sequence of works was typical for this type of constructions:

- earth work – foundation digging
- spot and continuous footings
- columns and its supports
- frame beams
- brick-made staircase and concrete stairs
- roof covering
- light-walls casing
- finishing work

8. Interesting construction details

The main interesting points of described structure were mentioned above, but one should pay attentions especially at:

- connection of columns with spot footings,
- connections between timber elements (made with nailed plates),
- bracings.

9. Protection from weather effects

As a target solution the typical, commonly available protective fungicide and insecticide media were used. Additionally, during the erection some of the elements were protected in the simple way against weather influence (**Fig.11**).



Fig. 11 Weather dumping protection of a column element

10. Economical and ecological aspects

From the economical point of view a structure made from glued timber elements is not profitable. Now in Poland exists too few factories producing this kind of composite materials and this is the main reason of their relatively high prices. The analogical structure made from steel would cost approx. 40% less. But if we consider ecological and esthetical aspect we will see, that timber has unquestionable values. Moreover, the designed function of the building – being furniture shop – causes that using of timber structure is most suitable for that design and can emphasize its appropriation.

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