



SCHOOL CENTRE NOVO MESTO
Secondary school of construction,
civil engineering and wood technology

TECHINICAL REPORT

**Low-energy prefabricated house
(cross laminated wooden elements)**



UPGRADE SCHOOL BUILDING COMPETITION for ARCA

PROJECT TEAM:

Jernej Koretič, student
Tim Lukman, student

PLANS:

**FLOOR PLANS, SECTIONS, FACADE,
CONSTRUCTION DETAILS, 3D VIEWS**

MENTOR:

Mirko Gorenc

DATE:

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GENERAL INFORMATION

The subject of the project is upgrading the school building for one storey. The project is a part of an international competition Wooden house ARCA. It was carried out by third year students of the educational programme construction technician at the secondary school of construction, civil engineering and wood technology.

LOCATION OF THE FACILITY

The facility is situated in the complex of The Centre of Secondary Schools Novo mesto, in the south-east of Slovenia. The chosen building was built in 2011. The following image shows the selected building:



THE EXSISTING BUILDING DATA

The existing building was made in 2011. In the ground floor there are woodwork workshops and in the 1st floor there are several special classrooms. The floorplan dimension of object is 55 by 19 meters. Supporting construction (foundation, walls, columns, beams, slabs) was made out of reinforced concrete. The roof is flat. All facades were insulated with mineral wool insulation.

DESIGN OF THE UPGRADED STORY

The facility is planned as a single-storey prefabricated wooden building , in the same dimension as the existing first floor. The area in usage will be about 1000m2 big.

The walls and ceiling boards are made out of cross laminated wooden panels. All external areas like facades and roof are thermally insulated by wood fibre insulation. Facades are coated with steamed natural wooden cladding.

CONSTRUCTION

External walls

Structure construction of external walls is made out of 3-layer cross laminated wood panels that are 10 centimeters thick. The external side is lined with wood fibre insulation (24 cm) and UV resistant foil. Facade is made from steamed wood cladded covering. Wooden facade is ventilated by 6 cm air plane. On the internal side o the wall there is an insulated instalation plane 6 cm wide. The wall is finished with two layers of plater board. Total thickness of the external wall is 52 cm. Thermal transmittance of the entire structure is 0,11 W/m²K.

Internal walls

The main load-bearing wall in the middle of the building is made from 5-layer layer cross laminated wood panels that are 15 centimeters thick. On both sides of the wall there is an instalation panel which is 6 centimeters wide and is finished with two layers of plater board.

The other internal walls is made from 3-layer layer cross laminated wood panels that are 10 centimeters thick. On both sides of the wall there is an instalation panel which is 6 centimeters wide and is finished with two layers of plater board.

The partition walls in toilets is made from plaster drywall system.

Ceiling ant flat roof

The ceiling is also made from 3-layer cross laminated wood panels, 10 cm thickness. On the top of X-lam panel is placed beams, made from laminated wood. Dimension of beams is 12 by 35 cm, placed in the interval of 60 cm. Place between woden beams is insulated. On the top of laminated wooden beams is placed OSB plate. The flat roof is made up from vapour barrier, slope wedge insulatiun and roof membrane. Thermal transmittance of the entire structure is 0,09 W/m²K.

THERMAL INSULATION CHARACTERISTICS OF THE FACILITY

Calculations of heat losses for the engineered facility concerning the efficient use of energy in buildings comply with valid Slovene regulations, which are made in accordance with the guidelines 31/2010ÉU of the European parliament and council of 19th May 2010, about energy efficiency of buildings.

For calculations we used a computer program made by company URSA Uralita, that has its production of thermal insulations located in Novo mesto. Thermal transmittance of individual structural elements of the building is listed in plan of details. Necessary annual amount of warmth for heating of the building is 28,29 kW/m² net surface of the building

DOORS AND WINDOWS

Windows, doors and panoramic walls are plastic with thermal transmittance of U=0.79 W/m²K.