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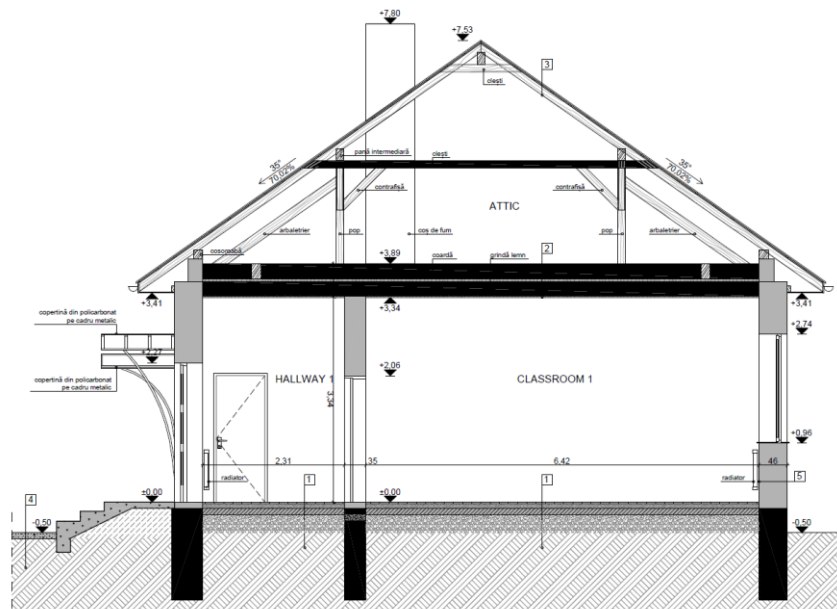
Technical characteristics of the building

Romanian case study - School

1. Data on the thermal envelope

The school building features continuous foundations made of stone and concrete, with walls constructed from solid brick or stone masonry. The attic floor is supported by wooden beams, and the roof is wooden, covered with bituminous corrugated boards. Inside, the walls are finished with washable paint or tiles, while the exterior is adorned with decorative plaster. The concrete floors are topped with either parquet or tiles. The building lacks insulation, and the windows are PVC with double glazing.

Figures 1 and 2 highlight the internal structure and roofing system of the school, while Table 1 summarizes the characteristics of the building elements.



SECTION A-A

LEGEND:

- | | |
|--|--|
| 1. Parquet / Tile
Structural concrete screed
Reinforce concrete | 3. Roofing
Wooden slats
Wooden rafters |
| 2. Wooden board
Wooden beams
Wooden board
Interior plastering | 4. Concrete pavement
Soil |
| | 5. Exterior plastering
Masonry solid brick/stone
Interior plastering |

Figure 1. School from Romania – section

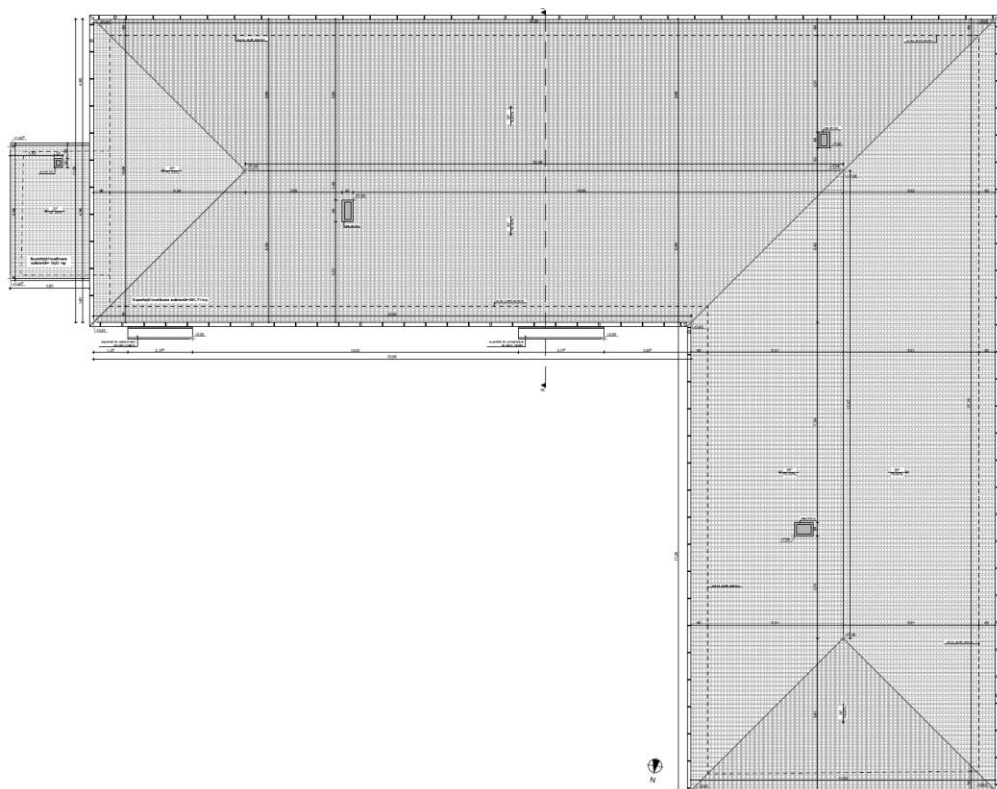


Figure 2. School from Romania – roofing

Table 1. School from Romania - building elements

Type of building element	No. [-]	Layer [-]	Description [-]	Heat transfer coefficient U [W/m²K]
Exterior wall 45	1	Interior plastering	Lime, sand	
	2	Masonry	Solid brick	
	3	Exterior plastering	Lime, sand	
	TOTAL 48.5 cm			1.38
Exterior wall 50	1	Interior plastering	Lime, sand	
	2	Masonry	Solid brick	
	3	Exterior plastering	Lime, sand	
	TOTAL 53.5 cm			1.27
Exterior wall 55	1	Interior plastering	Lime, sand	
	2	Masonry	Solid brick	
	3	Exterior plastering	Lime, sand	
	TOTAL 58.5 cm			1.19



Type of building element	No.	Layer	Description	Heat transfer coefficient U
	[-]	[-]	[-]	[W/m ² K]
Interior wall 35	1	Interior plastering	Lime, sand	
	2	Masonry	Solid brick	
	3	Interior plastering	Lime, sand	
	TOTAL 38 cm			1.45
Interior wall 65	1	Interior plastering	Lime, sand	
	2	Masonry	Solid brick	
	3	Interior plastering	Lime, sand	
	TOTAL 68 cm			0.98
Floor slab	1	Tile	Ceramic/porcelain	
	2	Structural concrete screed	Cement, sand	
	3	Reinforced concrete	Reinforced concrete	
	4	Structural concrete screed	Cement, sand	
	5	Gravel	Sand and gravel	
	TOTAL 42 cm			0.85
Roof	1	Wooden board	Timber	
	2	Wooden board	Timber	
	3	Wooden board	Timber	
	4	Interior plastering	Lime, sand	
	TOTAL 28.5 cm			0.45

Windows are from PVC with double glazing $R=0.48$ [m²K/W], $U= 2.1$ [W/m²K]

2. Data on the existing heating and air conditioning system

The heating of the building is done through steel radiators, using as heat source a solid fuel heating plant (wood) and a boiler.

The wood heating plant has low efficiency and there is no individual heat control for each radiator according to usage duration (see Fig. 2).

The building has no ventilation or air conditioning system.



Figure 2. School from Romania – heating source