

**CIVIL ENGINEERING**  
**CONSTRUCTION ENGINEERING AND MANAGEMENT**

**Design of Structures**

Name and surname .....

Group .....

Academic year .....

Date	Remarks	Signature

**Project exercise No. 2**

**Single-family building project**

Design construction elements of a single-family house:

1. Roof structure;
2. Floor structure:
  - reinforced in-situ slab,
  - rib-and-block floor;
3. Lintels, girders and columns;
4. Foundation.

Architectural design drawings taken from:

[http://www.archeton.pl/projekt-domu-.....\\_.....\\_opisogolny](http://www.archeton.pl/projekt-domu-....._....._opisogolny)

The following strength parameters of materials should be taken for calculations:

- construction timber - C24,
- structural steel - S235,
- concrete - C20/25,
- reinforcing steel - RB500 (stirrups: St0S).

For door openings with a maximum width of 1.51 m (in the light) and window openings with a maximum width of 3.30 m (in the light), the following lintels can be used:

Type of the joist	Length (mm)	Construction weight	Minimum depth of the foothold at the bearing support	Moment passed by the lower reinforcement [kNm]	Moment passed by the upper reinforcement [kNm]	Shearing force passed by 1 joist [kN]
Nn/120	1190	0,42kN	10 cm	3,25	1,7	14,21
Nn/150	1490	0,52kN	10 cm	5,3	1,7	14,21
Nn/180	1790	0,63kN	12 cm	6,37	1,7	17,74
Nn/210	2090	0,73kN	12 cm	7,57	1,7	17,74
Nn/240	2390	0,84kN	12 cm	7,57	1,7	17,74
Nn/270	2690	0,94kN	14 cm	8,68	1,7	17,74
Nn/300	2990	0,99kN	14 cm	9,65	2,95	17,69
Nn/330	3390	1,09kN	14 cm	10,70	4,46	17,69
Nn/360	3590	1,19kN	14 cm	10,77	6,16	21,77

source: <http://baupol.com.pl/en/services/prefabrication/lintel-joists/>

As the floor structure, the Teriva (rib-and-block) system with 0.6 m axial beam spacing, span width 2.0–7.2 m and dead weight of 286 kg/m<sup>2</sup> can be used.

