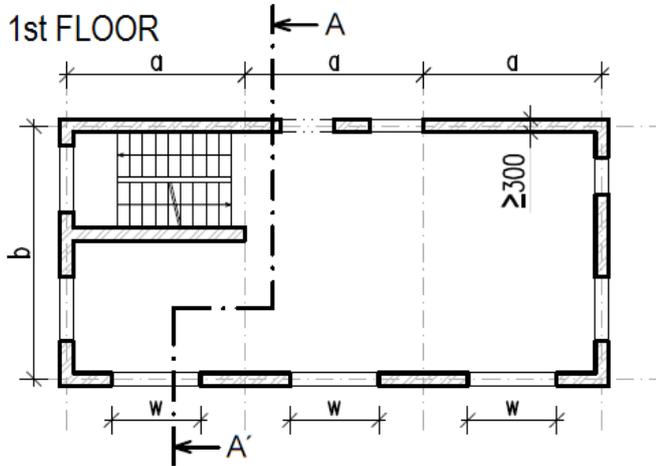# Concrete and Masonry Structures 2
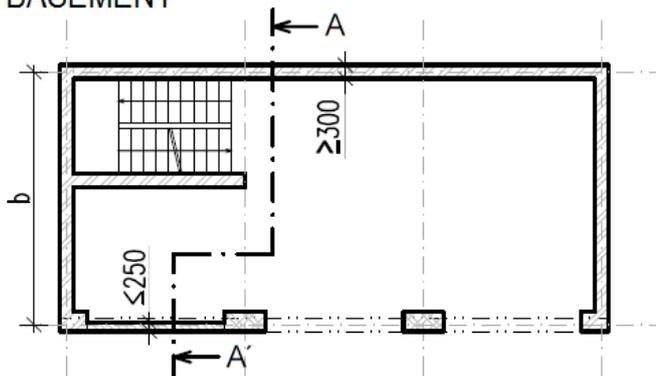## Task M (masonry)

Asses all masonry elements of the building pictured below. The geometry parameters of the building are given **a [m], b [m], h_p [m]**.
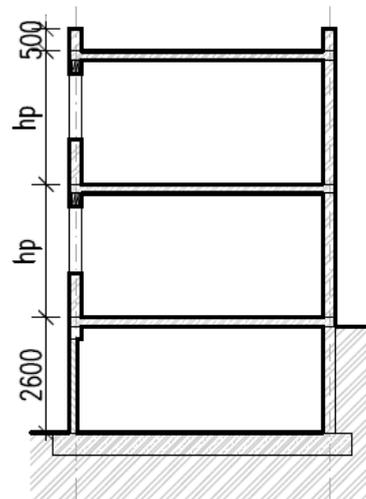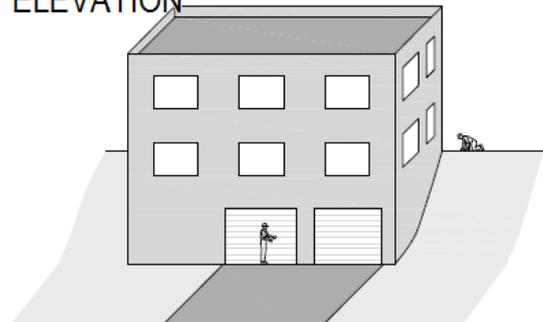
PLAN OF 1st FLOOR
←A

SECTION AA´

PLAN OF BASEMENT
←A

ELEVATION

For the pillars in the basement, use solid brick (290 x 140 x 65 mm) of strength category P15 and cement mortar of strength category M5. One of the pillar dimensions is 450 mm, the second dimension will be designed. For the basement walls, use Porotherm masonry of thickness 400 mm. For load-bearing walls of 1st and 2nd floor, the Porotherm wall thickness is 300 mm. For non-load bearing Porotherm walls, the wall thickness is 150 mm.

The floor slabs are made of reinforced concrete. The slabs above the basement and first floor are loaded by self-weight, additional dead load $g_{add,f,k}$ [kN/m²] and live load q_k [kN/m²]. The slab above the second floor is loaded by self-weight, additional dead load $g_{add,r,k}$ [kN/m²] and snow load s_k [kN/m²]. The walls are loaded by horizontal wind loading w_k [kN/m²]. All loads are given as characteristic values according to Eurocode.

Subtasks:

1. Preliminary design the dimensions of concrete floor slabs.
2. Design and check the load bearing capacity of masonry pillar between garage doors. Design the bond of bricks as well.
3. Check the basement wall loaded by earth pressure at rest.
4. Check the non-load bearing wall next to garage door loaded by wind loads.
5. Structural (assembling) drawing of the 1st floor. All the dimensions (including the assigned ones) will be adjusted appropriately in accordance with modular dimensions of masonry. In sections, describe both the typical detail and detail of window head.

Concrete and Masonry Structures 2
Task M (masonry)

No.	Student	a [m]	b [m]	w [m]	h_p [m]	$g_{add,f,k}$ [kN/m²]	$g_{add,r,k}$ [kN/m²]	q_k [kN/m²]	s_k [kN/m²]	γ [kg/m³]	w_k [kN/m²]
1		3.60	5.90	1.45	2.90	2.1	1.8	1.5	1.0	1950	0.6
2		3.90	5.60	1.85	2.80	2.2	1.7	2.0	1.0	1900	0.9
3		4.20	5.30	1.80	3.10	2.3	1.6	2.5	1.5	1900	1.0
4		4.50	5.00	1.85	2.90	2.4	1.5	3.0	0.7	1900	0.7
5		4.80	4.70	1.65	2.90	2.5	1.4	1.5	2.0	1900	1.0
6		5.10	4.40	1.65	3.00	2.0	2.1	2.0	0.7	1900	0.7
7		3.60	5.90	1.45	2.80	2.1	2.0	2.5	0.7	1850	0.7
8		3.90	5.60	1.80	2.90	2.2	1.9	3.0	1.5	1900	0.8
9		4.20	5.30	1.60	2.80	2.3	1.8	1.5	2.0	1800	0.8
10		4.50	5.00	1.45	3.20	2.4	1.7	2.0	0.7	1900	0.9
11		4.80	4.70	1.85	3.10	2.1	2.1	2.5	1.0	1950	1.0
12		5.10	4.40	1.80	3.10	2.2	2.0	3.0	1.0	2000	0.6
13		3.60	5.90	1.70	3.00	2.3	1.9	1.5	0.7	1900	0.9
14		3.90	5.60	1.65	2.80	2.4	1.8	2.0	1.0	1850	0.7
15		4.20	5.30	1.50	3.00	2.5	1.7	2.5	2.0	1900	0.6
16		4.50	5.00	1.65	3.10	2.0	2.1	3.0	1.0	1950	0.8
17		4.80	4.70	1.85	2.90	2.1	2.0	1.5	2.0	2000	0.8
18		5.10	4.40	1.50	3.10	2.2	1.9	2.0	1.0	1900	0.9