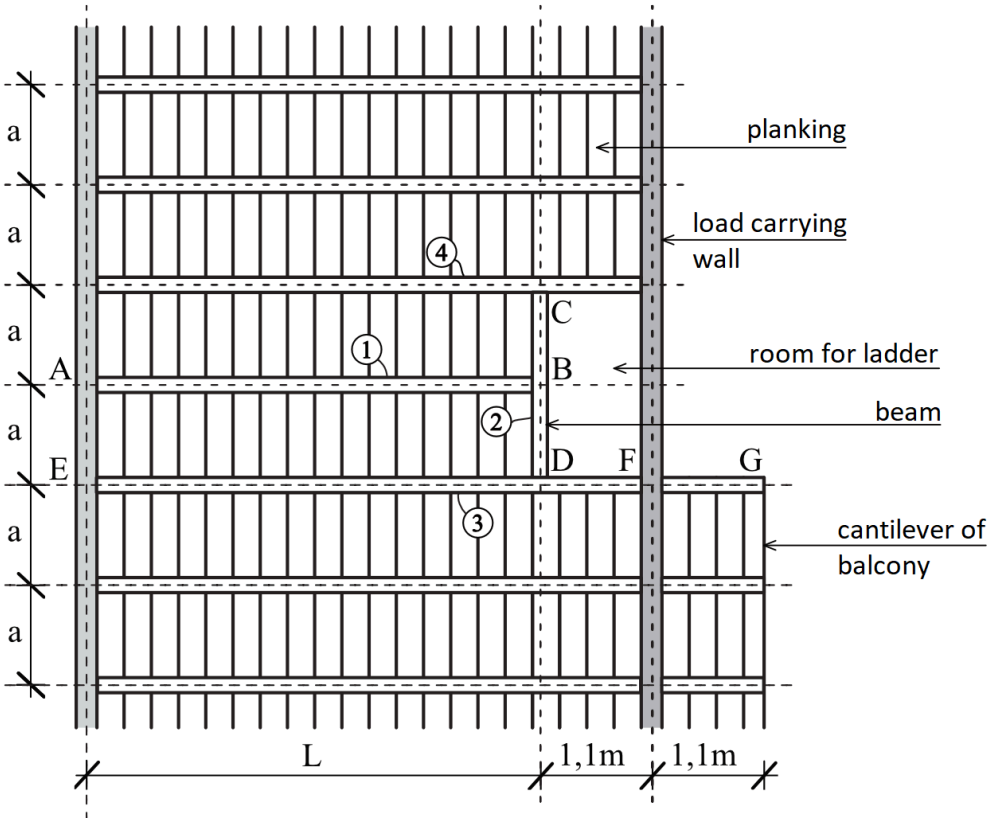
**2. In the figure a timber slab system held by masonry walls can be seen from bottom view. The planking on the beams can be modelled as simply supported beams. The joints between beams do not transmit moment. The loads of the ladder at the given room can be neglected. (10 + 20 points)**




The characteristic value for the self weight of the floor system on the beams: $g_k^f\ [kN/m^2]$

The characteristic value for the live load on the balcony and on the floor: $q_k\ [kN/m^2]$

The characteristic value for the self weight of the beams: $g_k^{beam} = 1{,}5\ kN/m$

The safety factor for the self weight: $\gamma_g = 0.9$ or $\gamma_g = 1.35$

The safety factor for the live load: $\gamma_q = 0$ or $\gamma_q = 1.5$

Data:

| $a\ [m]$ | $L\ [m]$ | $g_k^f [kN/m^2]$ | $q_k\ [kN/m^2]$ |
|---|---|---|---|
| | | | |

**a) What is the order of the construction of the beams No. 1 to 4 and the planking?**

**b) What is the mechanical model for the planking and the beams? Give also the design value for the loads in case of the maximal field moment at beam No.3 between point E and F! Draw the internal force diagrams of each beam!**

Results:

**The data marked by grey colour should be given as signed value on the website!**

**Rules: positive supports: ↑, the moment is positive if the beam is under tension at the bottom.**

Beam No.1:

| $p_{A-B}$ [kN/m] | $A_y$ [kN] | $B_y$ [kN] | $V_A$ $[kN]$ | $V_B$ [kN] | $M^1_{max}$ $[kNm]$ |
|---|---|---|---|---|---|
| | | | | | |

Beam No.2:

| $p_{C-D}$ [kN/m] | $C_y$ [kN] | $D_y$ [kN] | $V_C$ $[kN]$ | $V_D$ [kN] | $M^2_{max}$ $[kNm]$ |
|---|---|---|---|---|---|
| | | | | | |

Beam No.3:

| $p_{E-D}$ [kN/m] | $p_{D-F}$ [kN/m] | $p_{F-G}$ [kN/m] | $E_y[kN]$ | $F_y$[kN] | |
|---|---|---|---|---|---|
| | | | | | |
| $V_E$ | $V_D^{bal}$(left) | $V_D^{jobb}$(right) | $V_F^{bal}$(left) | $V_F^{jobb}$(right) | $V_G$ |
| | | | | | |
| $M_E$ | $M_D$ | $M_F$ | $M_G$ | $M^3_{max}$ | |
| | | | | | |