

## Masonry Structures 2nd Seminar

### Seminar task

# Design of masonry storage house Structural analysis, drawings



### 2nd homework

- Preliminary design of ceilings using tables
- Analysis of the slabs according to Eurocode
- Draw a detail of slab-wall joint

Combined slabs





#### 3 different slabs



Calculation of loadings – self-weight not included in this stage



Slab depth estimation

$$h \approx \left(\frac{1}{25} \sim \frac{1}{20}\right) L$$

#### Design of the slabs using tables

- Length and spacing of girders
- Depth of the slab
- Type of brick inserts

#### Resistance of the slab for girders in spacing 500 mm

Length of the girder	Clear span	Reinfor cement	MIAKO 15/62,5 PTH MIAKO 19/62,5 PTH MIAKO 23/62,5 PTH											
			190		210		230		250		270		290	
[mm]	[mm]	Profile	<b>q</b> <sub>d</sub>	q <sub>n</sub>	<b>q</b> d	q <sub>n</sub>	<b>q</b> d	qn	$q_{\rm d}$	<b>q</b> n	$q_{\rm d}$	q <sub>n</sub>	<b>q</b> d	<b>q</b> n
1 750	1 500	2ø8	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
2 000	1 750	2ø8	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
2 250	2 000	208	17.28	15.30	19.61	17.40	20.00	20.00	20.00	10.00	20.00	20.00	20.00	20.00

### Analysis of the slabs

□ Eurocode 2:  $m_{Ed} \le m_{Rd}$ 

Simply supported slabs:

Total design load (incl. self-weight) Span of the slab

Loading 
$$m_{\rm Ed} = \frac{1}{8} f_{\rm d} L^2 [kNm/m]$$
  
Capacity  $m_{\rm Rd} = a_{\rm s} f_{\rm yd} z [kNm/m]$   
Cross-sectional area  
of reinforcement per  
1 m of the slab  
 $m_{\rm Rd} = a_{\rm s} f_{\rm yd} z [kNm/m]$   
Design strength  
of reinforcement forces

### Analysis of the slabs



$$f_{\rm yd} = \frac{f_{\rm yk}}{\gamma_{\rm s}} = \frac{500}{1,15} = 435 \text{ MPa}$$

(use B500 reinforcement)

### Analysis of the slabs



### Slab-wall joint (typical floor)





- + Dimensions
- + Annotate all the elements
- Do not use internal insulation
- ! Collar min. 200 mm



### Advice for calculations

- Use N, mm and MPa units and you will not have any problems with the units anymore ③
- The only problem is with moments you get moments in Nmm. This unit is not used in practice => divide by 1,000,000 to get kNm

### Thank you for your attention

### **Any questions?**