COMPRESSIVE LOADING

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Calculation of vertical load capacity

Decide t and h

Obtain t_{ef}

Obtain h_{ef} using ρ

Calculate SR

Calculate e

Choose **masonry unit and mortar**

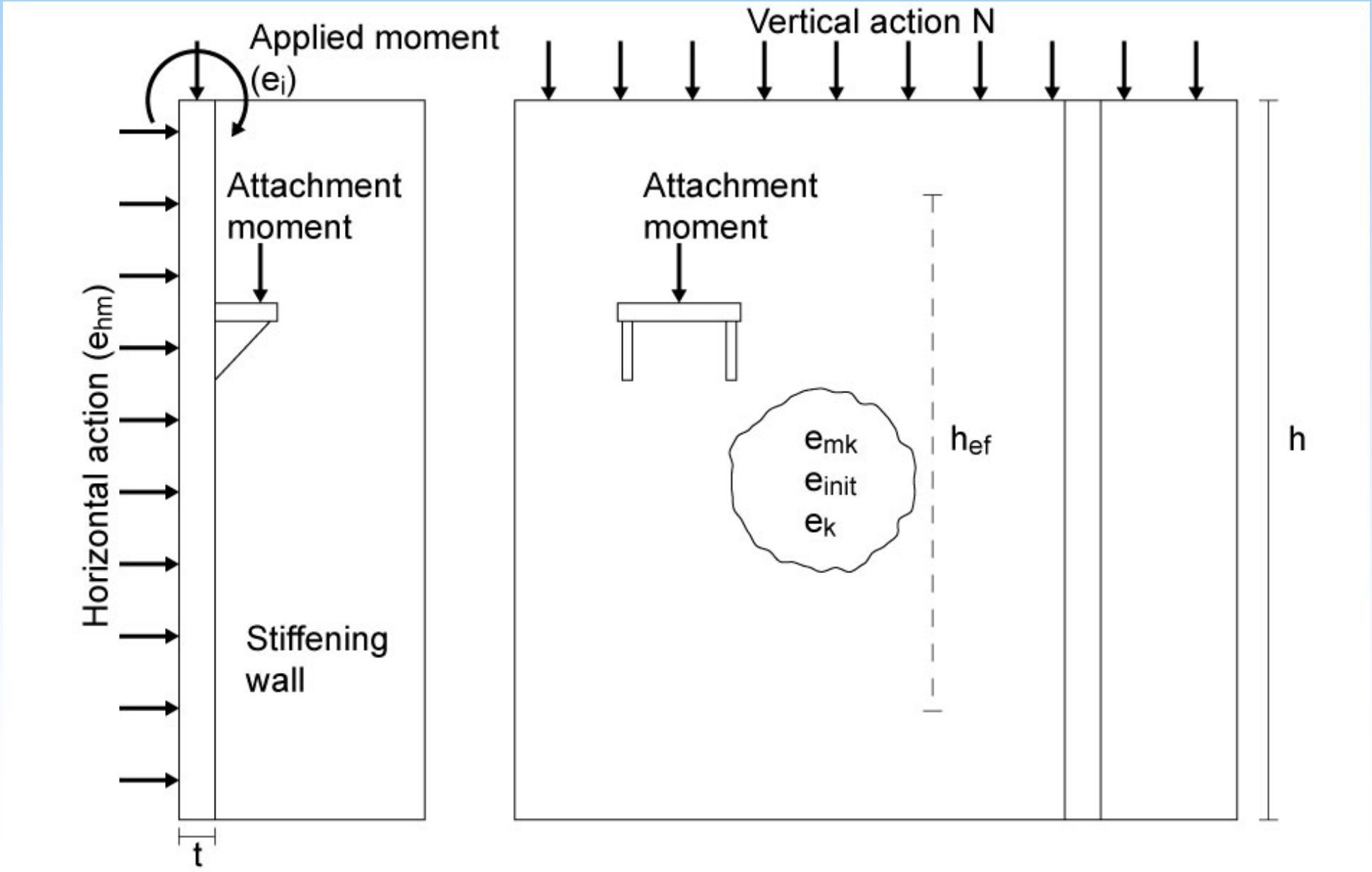
Obtain f_k

Choose γ_M hence get f_d

Get Φ

Calculate t f_d Φ

Compressive loading



Characteristic Compressive Strength of Masonry

$$f_k = K f_b^{0.7} f_m^{0.3}$$

According to UK National Annex

$$f_d = f_k / \gamma_M$$

Unit Grouping

Group 1 : Solid or < 25% vertical holes

Group 2 : 25 to 55% vertical holes

Group 3 : 55 to 70% vertical holes

Group 4 : 25 to 60% horizontal holes

EN 1996-1-1

Ultimate limit state Partial factor for materials, γ_M, is an NDP

Recommended values

Material		γ_M				
		Class				
		1	2	3	4	5
A B C	Masonry made with: Units of Category I, designed mortar[1] Units of Category I, prescribed mortar[2] Units of Category II, any mortar[1,2,5]	1,5 1,7 2,0	1,7 2,0 2,2	2,0 2,2 2,5	2,2 2,5 2,7	2,5 2,7 3,0
D	Anchorage of reinforcing steel	1,7	2,0	2,2	2,5	2,7
E	Reinforcing steel and prestressing steel	1,15				
F	Ancillary components[3,4]	1,7	2,0	2,2	2,5	2,7
G	Lintels according to EN 845-2[3]	1,5 to 2,5				

Notes:
1. Requirements for designed mortars are given in EN 998-2 and EN 1996-2
2. Requirements for prescribed mortars are given in EN 998-2 and EN 1996-2
3. Declared values are mean values.
4. Damp proof courses are assumed to be covered by masonry γ_M.
5. When the coefficient of variation for Category II units is not greater than 25%.

EN 1996-1-1

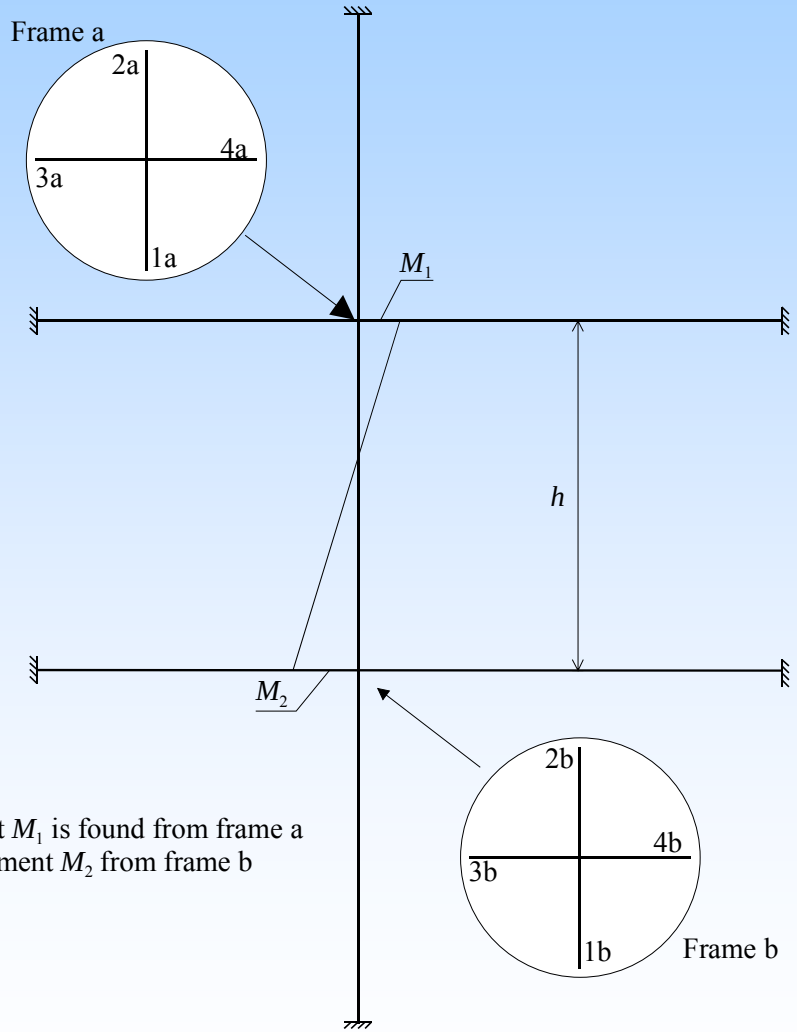
Vertical loadbearing capacity

Verification $N_{Rd} \geq N_{Ed}$

$N_{Rd} = \Phi\ t\ f_d$

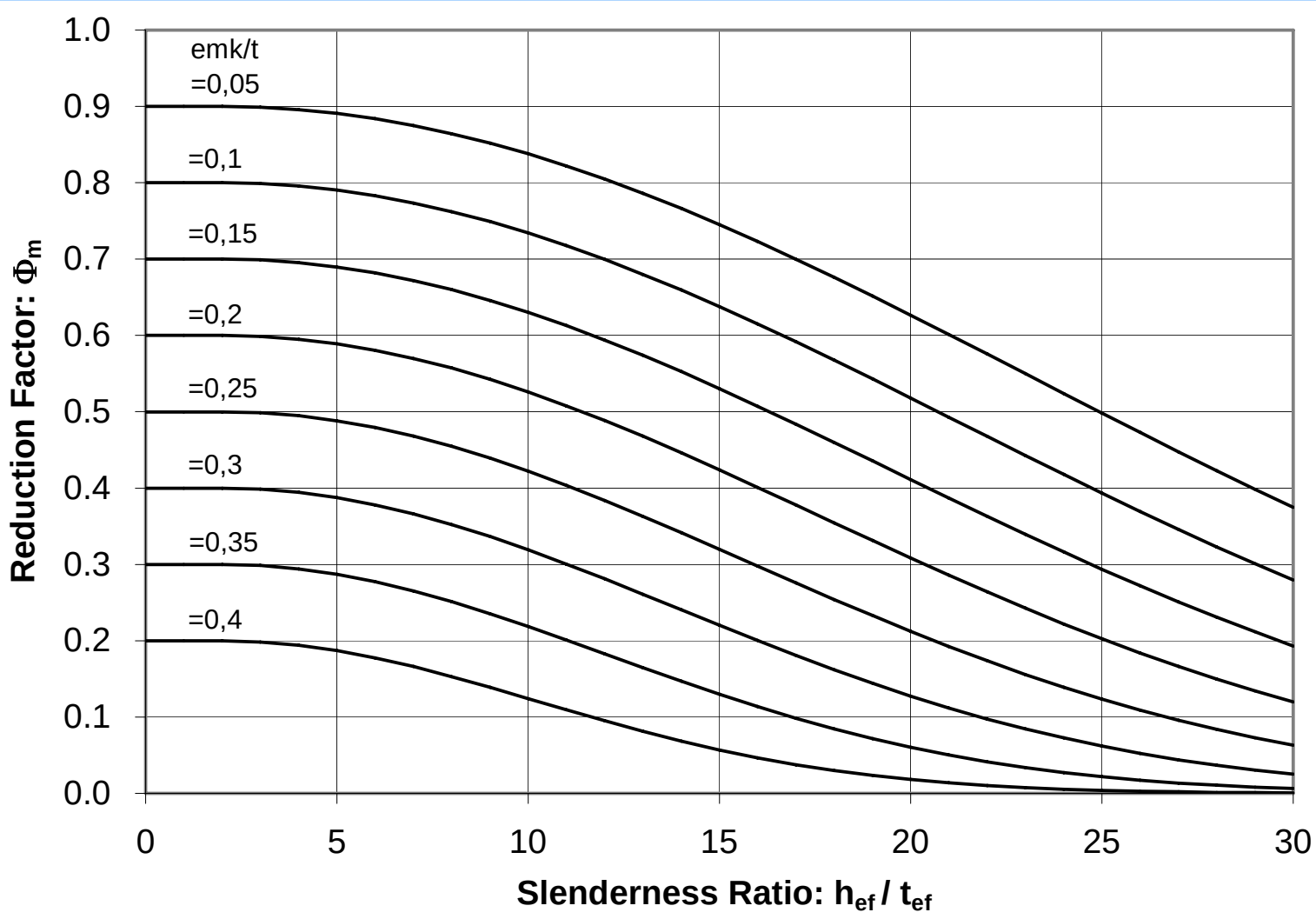
Φ takes account of slenderness and eccentricity

Simplified frame diagram

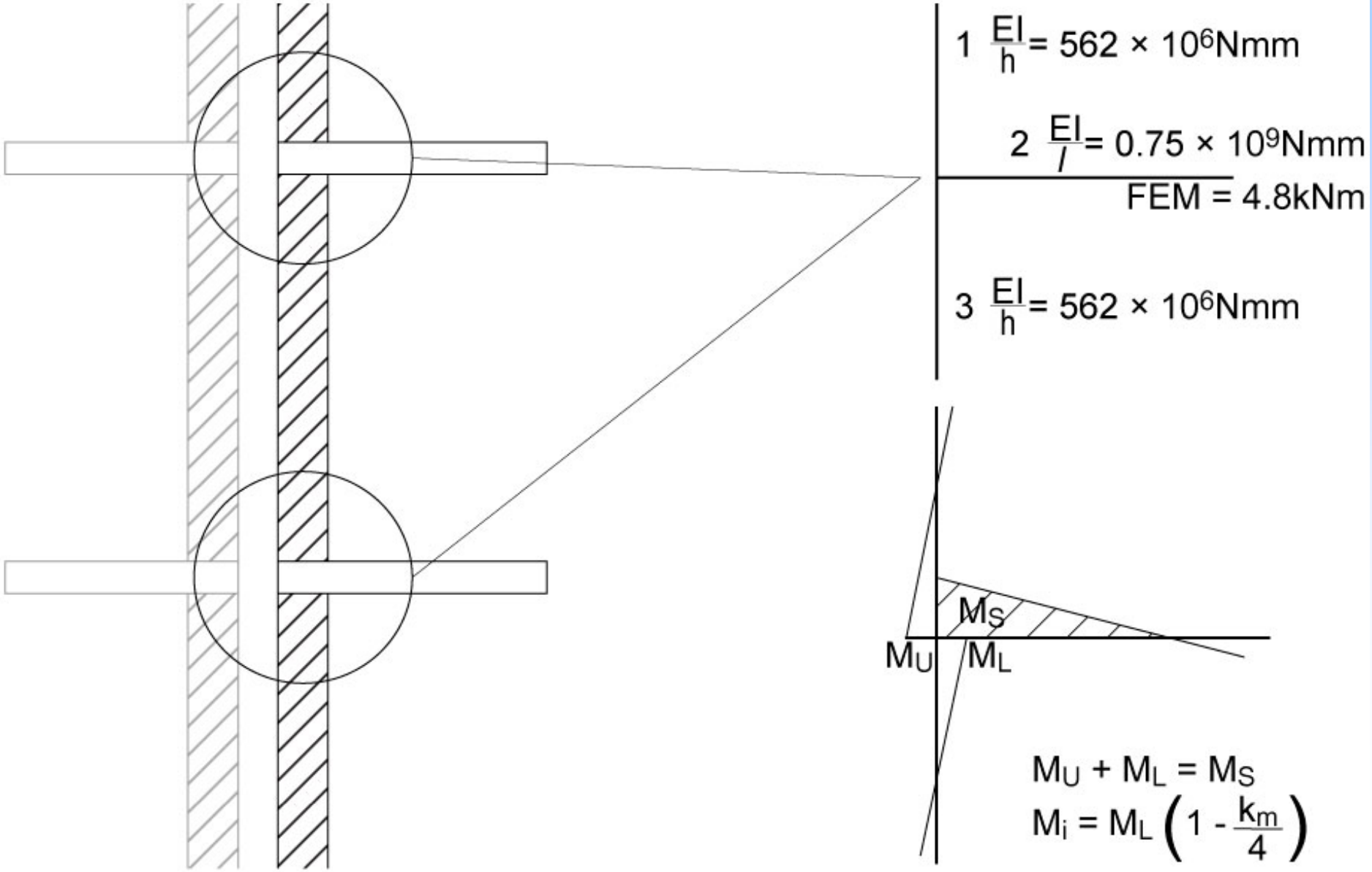


moment M_1 is found from frame a
and moment M_2 from frame b

Values of Φm against slenderness ratio for different eccentricities



Calculation of eccentricity



IMS Guide on EN 1996-1-1 and -2

Eurocode for Masonry, EN 1996-1-1 and EN 1996-2:

Guidance and worked examples

Purchase from IMS

£35.00 for members of IMS

£45.00 for non-members

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