

Engineering Shrinkage for Prestressed Structures



$\epsilon_{s_end_basic} := 350 \cdot 10^{-6}$

300 to 400·E -6 for RH 60 to 80% exposed structures
400 to 500·E -6 for RH 30 to 40% inside building structures

$WC := 0.4$

Water to Cementitious Materials Ratio

$C := 430 \cdot \frac{\text{kg}}{\text{m}^3}$

Cementitious content

$MC := 0.45$

Mortar content, the ratio of the weight of aggregates under 7 mm to the total weight of the aggregates

$ds := \begin{pmatrix} 20 \\ 18 \\ 20 \\ 18 \\ 20 \end{pmatrix} \cdot \text{cm}$

$b_{\text{exposed}} := \begin{pmatrix} 80 \\ 40 \\ 60 \\ 40 \\ 80 \end{pmatrix} \cdot \text{cm}$

the thickness of parts and corresponding exposed surfaces

$d := \frac{\sum_{j=1}^{\text{length}(ds)} (ds_j \cdot b_{\text{exposed}_j})}{\sum b_{\text{exposed}}}$

$d = 19.47 \text{ cm}$

Average thickness of the structure

$d := 15 \cdot \text{cm}$

Average thickness of the structure, override any calculation of d above if wanted, here



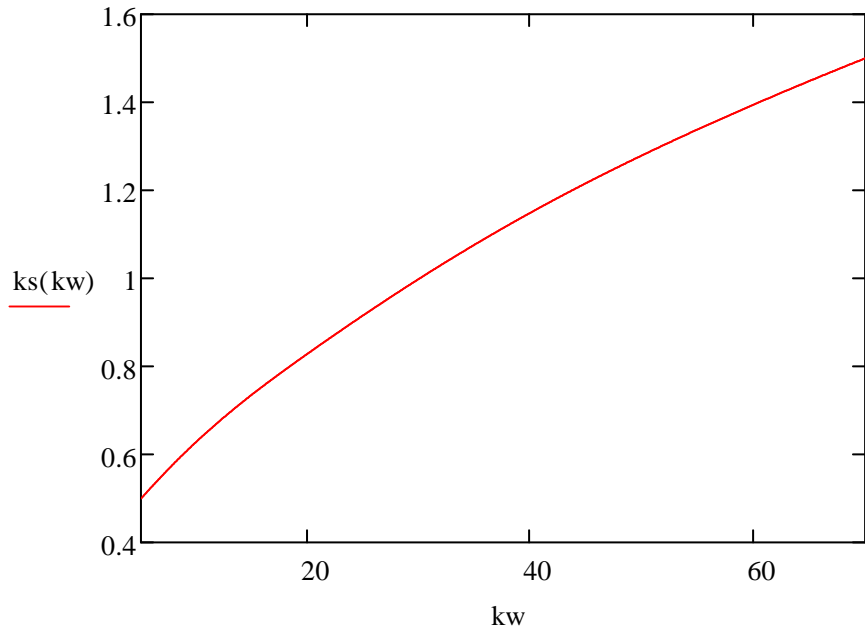
$$KW := \frac{WC \cdot \frac{C}{\frac{\text{kg}}{\text{m}^3}} \cdot MC}{\left(\frac{d}{\text{cm}}\right)^{\frac{1}{3}}}$$

KW = 31.38

kws :=	5	kss :=	0.5
	10		0.63
	20		0.83
	30		1
	40		1.15
	50		1.28
	60		1.395
	70		1.5

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vs := pspline(kws,kss)
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```
ks(kw) := interp(vs,kws,kss,kw)
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€s_end := €s_end_basic·ks(KW)
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$\epsilon_{s_end} = 0.000358$