Relative Flexural Stiffness of Beam Section to Flexural Stiffness of a Width of Slab

The parameter used to define the relative stiffness of the beam and slab spanning in either direction is α, calculated from $\alpha = \frac{\mathbf{E}_{cb}\,\mathbf{I}_b}{\mathbf{E}_{cs}\,\mathbf{I}_s}$.

In which $\mathbf{E}_{cb}$ and $\mathbf{E}_{cs}$ are the modulus of elasticity of the beam and slab concrete (usually the same) and $\mathbf{I}_b$ and $\mathbf{I}_s$ are the moments of inertia of the effective beam and the slab.

Effective top width of beam for interior and edge beam

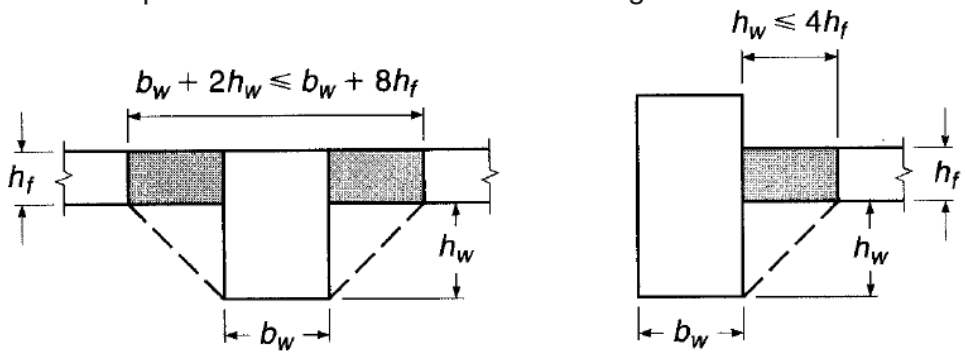
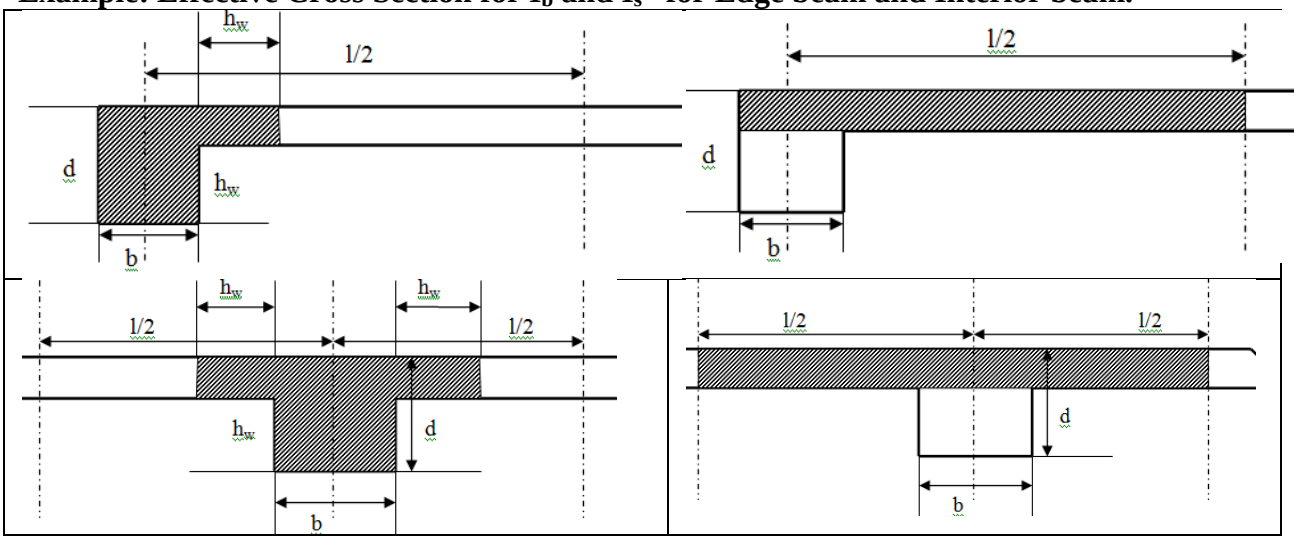


Figure: Effective top width of beam for (a) interior and (b) edge beam

Example: Effective Cross Section for I_b and I_s for Edge beam and Interior beam.



Graphically finding Relative Flexural Stiffness of Beam:

Another way of determining α_{fm} is graphically, using Figures below.

α_{fm} = average value of α_f for all beams on edgs of a panel

β = ratio of clear spans in long to short direction of slab.

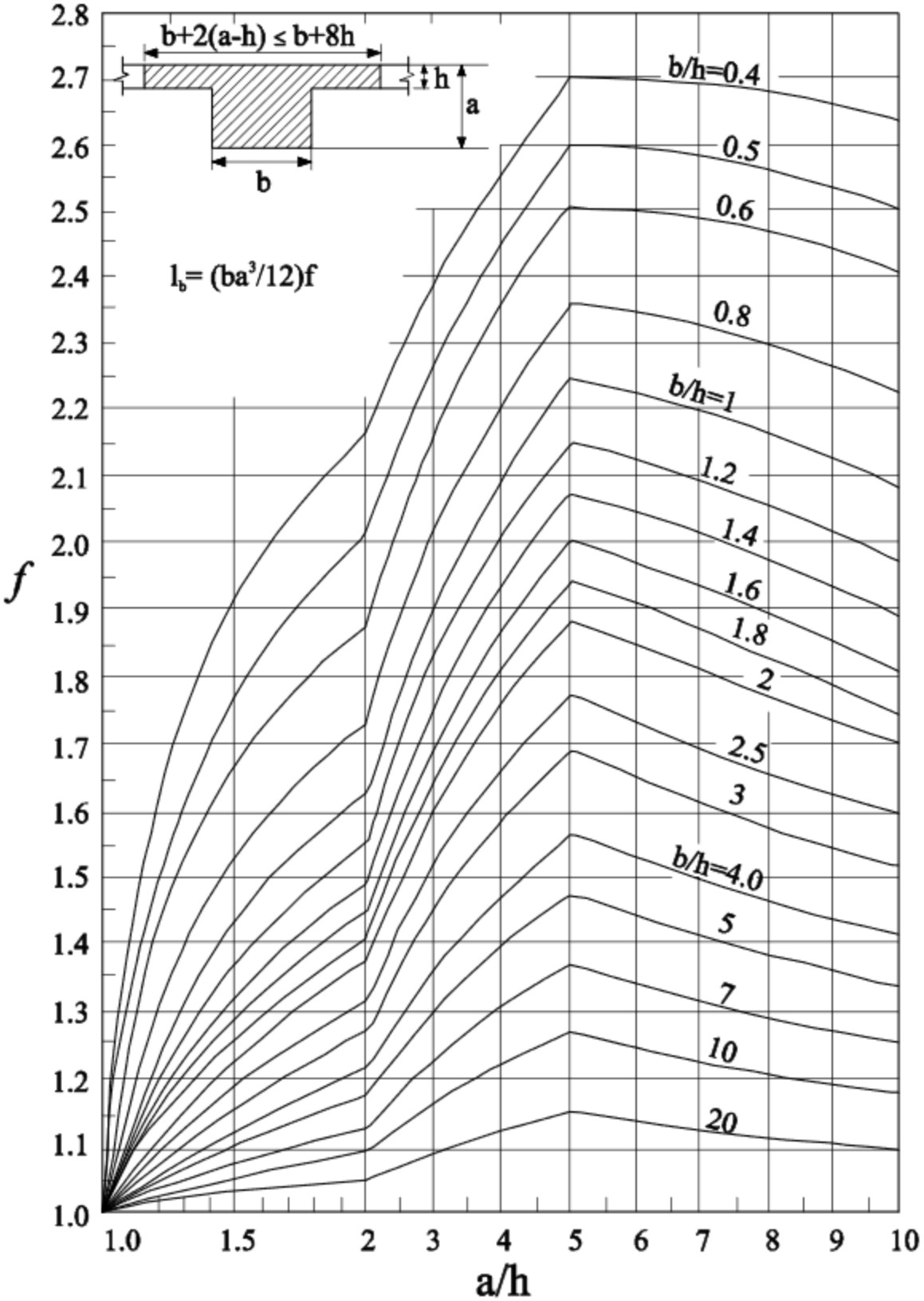


Figure: Beam Stiffness (Interior Beam)

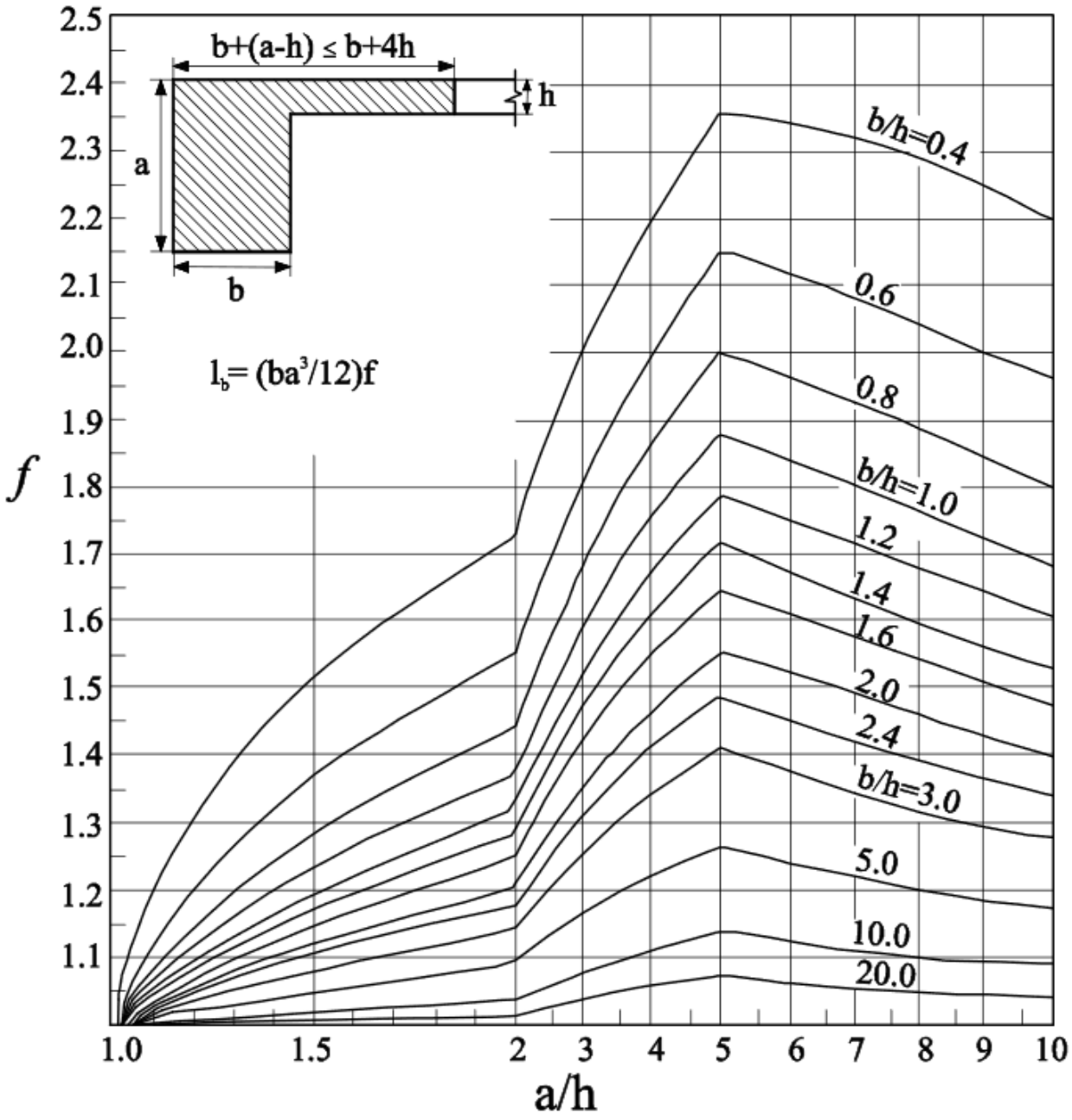


Figure: Beam Stiffness (Edge or Exterior Beam)