Span/depth ratios for reinforced concrete slab design to BS8110
Alasdair N Beal BSc CEng FICE FIStructE www.anbeal.co.uk

The following table presents limits on slab span/effective depth ratio which can be used to work out the correct thickness for slabs directly at the start of design, without any need for later adjustments. They have been calculated in accordance with BS8110. The tabulated ratios are for solid slabs designed to full stress using high yield steel ($f_y = 500\text{N/mm}^2$).

<table>
<thead>
<tr>
<th>dead &amp; imposed load (unfactored)</th>
<th>total</th>
<th>slab</th>
<th>flat slab</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-way simply supported</td>
<td>1-way continuous</td>
<td>cantilever</td>
</tr>
<tr>
<td>5kN/m²</td>
<td>29</td>
<td>39</td>
<td>11</td>
</tr>
<tr>
<td>10kN/m²</td>
<td>25</td>
<td>34</td>
<td>10</td>
</tr>
<tr>
<td>20kN/m²</td>
<td>22</td>
<td>30</td>
<td>8</td>
</tr>
</tbody>
</table>

Notes
1. The calculated ratios are based on a service tensile stress $f_s$ of $500/(1.45\times1.15) = 300\text{N/mm}^2$. (BS8110 Table 3.10 incorrectly assumes a service stress of $333\text{N/mm}^2$ for $500\text{N/mm}^2$ reinforcement.)
2. For a steel service stress of $150\text{N/mm}^2$ the quoted ratios may be increased by 20%. Values for intermediate stresses may be interpolated.
3. For ribbed slabs, the ratio should be reduced by 20% ($5\text{kN/m}^2$), 10% ($10\text{kN/m}^2$), 5% ($20\text{kN/m}^2$), where the quoted loads refer to total unfactored dead and imposed load.
4. Ratios for continuous slabs are for internal bays. For end spans and corner bays the ratios should be reduced by 10%.
5. Two-way slabs have been calculated for a square panel. For a 2x1 panel, the value for a one-way panel should be used and values interpolated for intermediate proportions.
6. Flat slab design should be based on the longer panel dimension.
7. For slabs over 10m, ratios should be reduced by the factor $\sqrt{(10/\text{span in metres})}$. Cantilevers over 4m should be justified by calculation.
8. Intermediate values may be interpolated.
9. For slab loadings and layouts not covered, refer to BS8110.
10. For the technical background to these recommendations see paper ‘Span/depth ratios for concrete beams and slabs’.

The IStructE ‘Gold Book’ Recommendations for the permissible stress design of reinforced concrete building structures provides an alternative design guide for reinforced concrete guidance which is easier to use than BS8110 but has been fully updated in line with the latest edition and produces similar results.