Table 1.4 Weights of building materials (based on BS 648 1964)

Asphalt	
Roofing 2 layers, 19 mm thick	42 kg/m^2
Damp-proofing, 19 mm thick	41 kg/m^2
Road and footpaths, 19 mm thick	44 kg/m^2
Bitumen roofing felts	
Mineral surfaced bitumen per layer	3.5 kg/m^2
Blockwork	
Solid per 25 mm thick, stone aggregate	55 kg/m^2
Aerated per 25 mm thick	15 kg/m^2
Board	
Blockboard per 25 mm thick	12.5 kg/m^2
Brickwork	
Clay, solid per 25 mm thick medium density	55 kg/m^2
Concrete, solid per 25 mm thick	59 kg/m^2
Cast stone	2250 kg/m^3
Concrete	
Natural aggregates	2400 kg/m^3
Lightweight aggregates (structural)	1760 kg/m^3 +240 or −160
Flagstones	
Concrete, 50 mm thick	120 kg/m^2
Glass fibre	
Slab, per 25 mm thick	2.0–5.0 kg/m^2
Gypsum panels and partitions	
Building panels 75 mm thick	44 kg/m^2
Lead	
Sheet, 2.5 mm thick	30 kg/m^2
Linoleum	
3 mm thick	6 kg/m^2
Plaster	
Two coats gypsum, 13 mm thick	22 kg/m^2
Plastics sheeting	
Corrugated	4.5 kg/m^2
Plywood	
per mm thick	0.7 kg/m^2
Reinforced concrete	2400 kg/m^3
Rendering	
Cement:sand (1:3) 13 mm thick	30 kg/m^2
Screeding	
Cement:sand (1:3) 13 mm thick	30 kg/m^2
Slate tiles	
(depending upon thickness and source)	24–78 kg/m^2
Steel	
Solid (mild)	7850 kg/m^3
Corrugated roofing sheets per mm thick	10 kg/m^2
Tarmacadam	
25 mm thick	60 kg/m^2
Terrazzo	
25 mm thick	54 kg/m^2
Tiling, roof	
Clay	70 kg/m^2
Timber	
Softwood	590 kg/m^3
Hardwood	1250 kg/m^3
Water	1000 kg/m^3
Woodwool	
Slabs, 25 mm thick	15 kg/m^2

Imposed loading

This is sometimes termed superimposed loading, live loading or super loading, and may be defined as the loading assumed to be produced by the intended occupancy or use of the structure. It can take the form of distributed, concentrated or impact loads.

BS 6399 Part 1 'Loading for buildings' gives values of imposed load for floors and ceilings of various types of building. Those for residential buildings given in BS 6399 Part 1 Table 5 are reproduced here in Table 1.5.

Part 3 of BS 6399 gives the imposed loads to be adopted for the design of roofs. These consist of snow loading and, where applicable, the loading produced by access on to the roof.

In general for small pitched roof buildings where no access is provided to the roof, other than for routine cleaning and maintenance, a minimum uniformly distributed imposed load of $0.75\,kN/m^2$ may be adopted or a concentrated load of 0.9 kN, whichever produces the worst load effect. A small building in this context must have a width not greater than 10 m and a plan area not larger than $200\,m^2$, and must have no parapets or other abrupt changes in roof height likely to cause drifting of snow and hence a build-up of load. For situations outside these parameters, reference should be made to BS 6399 Part 3 for the imposed roof load to be adopted.

Wind loading

This may be defined as all the loads acting on a building that are induced by the effect of either wind pressure or wind suction. The pressure exerted by the wind is often one of the most important loads which exposed structures have to resist with regard to overall stability.

CP 3 Chapter V Part 2 'Wind loads' gives the wind speeds to be adopted for the design of buildings relative to their geographical location within the United Kingdom. It also gives pressure coefficients for the various parts of a building, such as roofs and walls, in relation to its size and shape. This code will eventually become Part 2 of BS 6399.

Combined loads

Having obtained individual loading cases, that is dead, imposed and wind, the most onerous combination should be determined and the structure designed accordingly. For a member not exposed to wind, such as a floor beam, this would normally be the combination of dead and imposed loading. For a member exposed to wind, such as the rafter of a truss or portal frame, the combination of dead and imposed load would normally be used to design the member initially. It would then be checked for reversal of stress due to a combination of dead load and wind suction.

Wind loading generally influences the overall stability of a building. Therefore, since the emphasis of this manual is on the design of individual structural elements, only the effects of dead and imposed loads will be examined.