Chapter 3
DEAD LOADS, SOIL LOADS, AND HYDROSTATIC PRESSURE

3.1 DEAD LOADS

3.1.1 Definition. Dead loads consist of the weight of all materials of construction incorporated into the building including, but not limited to, walls, floors, roofs, ceilings, stairways, built-in partitions, finishes, cladding, and other similarly incorporated architectural and structural items, and fixed service equipment including the weight of cranes.

3.1.2 Weights of Materials and Constructions. In determining dead loads for purposes of design, the actual weights of materials and constructions shall be used provided that in the absence of definite information, values approved by the authority having jurisdiction shall be used.

3.1.3 Weight of Fixed Service Equipment. In determining dead loads for purposes of design, the weight of fixed service equipment, such as plumbing stacks and risers, electrical feeders, and heating, ventilating, and air conditioning systems shall be included.

3.2 SOIL LOADS AND HYDROSTATIC PRESSURE

3.2.1 Lateral Pressures. In the design of structures below grade, provision shall be made for the lateral pressure of adjacent soil. If soil loads are not given in a soil investigation report approved by the authority having jurisdiction, then the soil loads specified in Table 3-1 shall be used as the minimum design lateral loads. Due allowance shall be made for possible surcharge from fixed or moving loads. When a portion or the whole of the adjacent soil is below a free-water surface, computations shall be based upon the weight of the soil diminished by buoyancy, plus full hydrostatic pressure.

The lateral pressure shall be increased if soils with expansion potential are present at the site as determined by a geotechnical investigation.

3.2.2 Uplift on Floors and Foundations. In the design of basement floors and similar approximately horizontal elements below grade, the upward pressure of water, where applicable, shall be taken as the full hydrostatic pressure applied over the entire area. The hydrostatic load shall be measured from the underside of the construction. Any other upward loads shall be included in the design.

Where expansive soils are present under foundations or slabs-on-ground, the foundations, slabs, and other components shall be designed to tolerate the movement or resist the upward loads caused by the expansive soils, or the expansive soil shall be removed or stabilized around and beneath the structure.

TABLE 3-1 DESIGN LATERAL SOIL LOAD

Description of Backfill Material	Unified Soil Classification	Design Lateral Soil Load[a] psf per foot of depth (kN/m^2 per meter of depth)
Well-graded, clean gravels; gravel-sand mixes	GW	35 (5.50)[c]
Poorly graded clean gravels; gravel-sand mixes	GP	35 (5.50)[c]
Silty gravels, poorly graded gravel-sand mixes	GM	35 (5.50)[c]
Clayey gravels, poorly graded gravel-and-clay mixes	GC	45 (7.07)[c]
Well-graded, clean sands; gravelly-sand mixes	SW	35 (5.50)[c]
Poorly graded clean sands; sand-gravel mixes	SP	35 (5.50)[c]
Silty sands, poorly graded sand-silt mixes	SM	45 (7.07)[c]
Sand–silt clay mix with plastic fines	SM-SC	85 (13.35)[d]
Clayey sands, poorly graded sand-clay mixes	SC	85 (13.35)[d]
Inorganic silts and clayey silts	ML	85 (13.35)[d]
Mixture of inorganic silt and clay	ML-CL	85 (13.35)[d]
Inorganic clays of low to medium plasticity	CL	100 (15.71)
Organic silts and silt-clays, low plasticity	OL	[b]
Inorganic clayey silts, elastic silts	MH	[b]
Inorganic clays of high plasticity	CH	[b]
Organic clays and silty clays	OH	[b]

[a] Design lateral soil loads are given for moist conditions for the specified soils at their optimum densities. Actual field conditions shall govern. Submerged or saturated soil pressures shall include the weight of the buoyant soil plus the hydrostatic loads.
[b] Unsuitable as backfill material.
[c] For relatively rigid walls, as when braced by floors, the design lateral soil load shall be increased for sand and gravel type soils to 60 psf (9.43 kN/m^2) per foot (meter) of depth. Basement walls extending not more than 8 ft (2.44 m) below grade and supporting light floor systems are not considered as being relatively rigid walls.
[d] For relatively rigid walls, as when braced by floors, the design lateral load shall be increased for silt and clay type soils to 100 psf (15.71 kN/m^2) per foot (meter) of depth. Basement walls extending not more than 8 ft (2.44 m) below grade and supporting light floor systems are not considered as being relatively rigid walls.