

Engineering Information

Date Weight of Materials

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Where p = the pressure in kg/m^2
 w = the unit weight of earth kg/m^3
 h = the height of fill in Metre.
 ϕ = the angle of repose of the fill in degrees.

The unit weight of earth and the angle of repose, will of course vary depending upon the degree of saturation of the retained material.

The Pressures exerted on inclined surface and due to the effect of sloping fills are also derived from the normal formulate, for which reference may be made to text book on the subject.

Seismic Effects
 The forces exerted as a result of seismic effects can be calculated directly from the formulate given in clause 7 of the I.S. Code of Practice No. 875 = 1957.

Table No. 1

DEAD WEIGHT OF MATERIALS

| Item | Weight |
|-----------------------------|---------------------------|
| Bituminous substance | |
| Anthracite coal | 1550 kg/m^3 |
| Pear | 750 kg/m^3 |
| Heavy charcoal | 530 kg/m^3 |
| Coke | 1200 kg/m^3 |
| Graphite | 500 kg/m^3 |
| Crude oil | 880 kg/m^3 |
| Pitch | 1100 kg/m^3 |
| Coaltar | 1200 kg/m^3 |
| Excavated Material | |
| Clay (dry) | 1600 kg/m^3 |
| Clay (damp, plastic) | 1760 kg/m^3 |
| Earth (dry, loose) | 1200 kg/m^3 |
| Earth (Packed) | 1520 kg/m^3 |
| Sand (dry, loose) | 1440-1700 kg/m^3 |
| Sand (dry, packed) | 1600-1900 kg/m^3 |

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DEAD WEIGHT OF MATERIALS

| Item | Weight |
|---|-------------------------|
| Liquids | |
| Alcohol | 780 kg/m^3 |
| Gasoline | 670 kg/m^3 |
| Ice | 913 kg/m^3 |
| Nitric acid | 1500 kg/m^3 |
| Sulphuric acid | 1800 kg/m^3 |
| Vegetable Oil | 930 kg/m^3 |
| Water | 1000 kg/m^3 |
| Building Materials | |
| Bricks | 1600 kg/m^3 |
| Cement | 1400 kg/m^3 |
| Chalk | 2200 kg/m^3 |
| Glass | 2560 kg/m^3 |
| Limestone | 2650 kg/m^3 |
| Sandstone | 2800 kg/m^3 |
| Steel | 7800 kg/m^3 |
| Timber | 570-720 kg/m^2 |
| Structural Items, Ceilings, Finishes, etc. | |
| A. C. Sheets | 17 kg/m^2 |
| Brick masonry | 1920 kg/m^2 |
| Brick wall, 6 in. thick | 295 kg/m^2 |
| Brick wall, 9 in. thick | 440 kg/m^2 |
| Cement Plaster, 2.5 cm. thick | 44 kg/m^2 |
| Concrete | 2306 kg/m^2 |
| G.I. sheet, 24 gauge | 5 kg/m^2 |
| G.I. sheet, 16 gauge | 10 kg/m^2 |
| Mangalore tiles with battens | 69 kg/m^2 |
| Rubble masonry | 2100 kg/m^2 |

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