# THE CANADIAN ENGINEER

- At = Area of tensile reinforcement (in square inches).
- Av = Area of vertical or longitudinal reinforcement in square inches.
- a = arm of resting moment or lever arm (in inches).
- $a = Arm ratio = a'd \cdot a_1d = a.$
- B = Bending moment of the external loads and reactions (in pound inches).
- $B_1B_2 = Bending moments$  at consecutive cross-sections. Generally b = breadth.

## In Tee Beams.

- b = breadth of flange of beam (in inches).
- br = breadth of rib of T beam (in inches).
- $C_1C_2C_2 = a$  series of constants.

## In Beams.

c = compressive stress on the compressed edge of the concrete (in lb. per sq. in.).

## In Pillars.

- c = working compressive stress on the concrete of the hooped core.
- cp = the working compressive stress on a prism of concrete (not hooped) or the working compressive stress of plain concrete.
- cu = compressive stress on concrete at the underside of the slab (in tee) beams.

 $c_i = c/t = the ratio of c to t.$ 

### In Circular Sections.

Generally d = diameter.

# In Rectangular Sections.

Generally d = depth.

# In Pillars.

d = the diameter of the hooped core in inches.

### In Beams.

- d = effective depth of the beam (in inches).
- dc = depth or distance of the centre of compression from the compressed edge.
- dn = deflection.
- $ds^1 = total depth of the slab (in inches).$

# In Pillars.

- dv = distance between the centres of vertical bars measured perpendicular to the neutral axis.
- Ec = Elastic modulus of concrete (in lb. per sq. in.).
- Es = Elastic modulus of steel (in lb. per sq. in.).
- $e^{e}$  = eccentricity of the load measured from the center of the pillar (in inches).

## In Beams.

f = extreme fibre stress—i. e., stress at the extreme "fibre" of any members under transverse load.

# In Pillars.

- f = a form factor or constant which will vary according to whether the hooping is corvilinear or rectilinear, etc.
- I = Inertia moment of a member.
- Ic = Inertia moment of concrete only.
- Is = Inertia moment of steel only.
- $I_{XX}$  = Inertia moment on axis xx when necessary.
- lyy = Inertia moment on axis yy when necessary.
- 1 = length of a pillar or effective length of span of beam or slab.
- m = modular ratio = Es, Ec.
- N = a numerical coefficient.
- n = neutral axis depth—i.e., depth of neutral axis from the extreme compressed edge (in inches).

 $n_{i} = n/d = the neutral axis ratio ... n, d, = n.$ 

- $N_2N_3N_4 = a$  series of numerical co-efficients.
- P = total safe pressure.

# In Pillars.

p = the pitch of the laterals in inches (i.e., the axial spacing of the laterals).

#### In Shear Formulae.

- p = pitch of distance apart (center to center) of the shear members or groups of shear members (measured horizontally).
- $\pi$  = peripheral ratio or the ratio of the circumference of a circle to its diameter.
- Re = Compressive Resistance moment = Resistance moment of the beam in terms of the compressive stress (in lb. in. units).
- Rt = Tensile Resistance moment or Resistance moment in terms of the tensile stress (in lb. in.).

### In Beams.

- r = At/bd = ratio of area of tensile reinforcement to the area bd.
  In Pillars.
  - r = Vh/V = the ratio of volumes—i.e., the ratio of the volume of helical or horizontal reinforcement to the volume of hooped core.

#### In Beams,

- S = the total shear in lb. at a vertical section.
- Sm = the section modulus.

## In Pillars,

s = Spacing factor or constant which will vary with the pitch of the laterals.

## In Beams.

- s = intensity of the shearing stress on concrete in lb. per sq. in.
- ss = shearing stress on the steel (in units of force per unit of area).
- s, = ds/d = the slab depth ratio.
- T = Total tension in the steel (in lb.).
- $T_1T_2$  = Total tensile forces at consecutive cross-sections.
- t = tensile stress on the steel (in lb. per. sq. in.).
- U = Total ultimate breaking load on any member. [Compare W = Working load.]
- u = intensity of ultimate crushing resistance of plain concrete per unit of area or ultimate compressive stress on prisms of concrete not hooped.

# In Pillars.

- V = Volume of hooped core in cu. in.
- Vh = Volume of hooping reinforcement in cu. in.
- W = total working load or weight on any member.
- Wf = the working factor = cp/u = the reciprocal of the safety factor.
- w = weight or load per unit of length of span.

# VENEER MANUFACTURED AND USED IN CANADA, 1910.

Statistics for the amount of veneer manufactured or used in Canada during 1910, have just been compiled by the Forestry Branch of the Department of the Interior. Including natural and imported veneer 92,066,000 square feet, valued at \$768,500 were produced or used. This is an average cost of \$7.47 per M. square feet. Of this amount, 90.9 per cent. was native wood and consisted of 14 species; the most important of these were birch and maple, which together form over one-half of the total native woods. These were manufactured into veneer in the hardwood belt and were used chiefly for furniture, panel work and vehicles. Elm and bass-wood are next in importance, and together form about one-third of the native wood. These two species of veneer are made by smaller mills in the fruit district and are used for fruit baskets, packages and cheese boxes. Imported woods \$140,687 amounted to one-tenth of the total amount of veneer used. These were more expensive than native woods, costing on the average \$17.48 per M. square ft. and were used for more extensive furnishings.