April 1, 2018

ERRATA
CANADIAN FOUNDATION ENGINEERING MANUAL
4th Edition, 1st printing 2006, 2nd printing 2008, 3rd printing 2012, 4th printing 2017

Corrections to the 4tn Edition of the *Canadian Foundation Engineering Manual* are noted below. These corrections apply to the 4th Edition, 1st printing (2006), 2nd printing (2008), 3rd printing (2012) and 4th printing (2017). No corrections have been made to this printing – please transfer these corrections to your copy.

For these corrections and any future corrections, please refer to the Canadian Geotechnical Society (CGS) website at www.cgs.ca.

Page 17, Section 3.1.3.2 Atterberg Limits

ASTM standards D423 and D424 have been withdrawn and replaced with standard D4318 - 17.

Page 18, Section 3.1.3.4

Classes of sensitivity may be defined as follows:

low sensitivity	$S_t < 2$
medium sensitivity	$2 < S_t < 4$
sensitive	$4 < S_t < 8$
extra- sensitive	$8 < S_t < 16$
quick clay	$S_t > 16$

Page 27, Section 3.2.4.1 Jointed Rockmass Strength and Deformability

should read: Section 3.2.4.6 Jointed Rockmass Strength and Deformability

The second bullet at the foot of page 27

- A constant, mi, that defines the frictional characteristics of the component minerals within each intact rock element

should read:

- A constant, m_i, that defines the frictional resistance of the component minerals within each intact rock element

Page 28

Equation 3.2 should read:

$$E_m = \frac{\sqrt{\sigma_{ci}}}{\sqrt{100}} * 1000 * 10^{((GSI-10)/40)}$$

Page 28, Section 3.2.4.2 Rockmass Classification

should read: Section 3.2.4.7 Rockmass Classification

Page 65, Table 4.13

Replace both ASTM Standard D423 and D424 for Liquid Limit and Plastic Limit respectively with ASTM D4318 - 17

Page 106, Section 6.6.3.2(3)

Last sentence in paragraph preceding Eqn. 6.21 should be replaced with:

> In CPT-based liquefaction evaluations, the tip resistance is normalized to approximately one atmosphere of pressure (96 kPa) by (see note 1):

«

Equation (6.21) should read: $q_{c1} = q_c \left(\frac{96}{\sigma'_{v0}} \right)^{0.5}$ or $q_{c1} = q_c \frac{1.8}{0.8 + \sigma'_{v0}/96}$ (6.21)

where q_{c1} = normalized tip resistance (kPa)
q_c = measured tip resistance (kPa)
σ'_{v0} = initial effective overburden pressure (kPa)

note 1: (96 kPa is equivalent to 1 ton per square foot (USA, Short).

Page 113, Section 6.7.1.1

Active Earth Pressure Condition M-O Method

where

ϕ = soil angle of internal friction, θ = slope of backfill with horizontal, β = slope of the back face of the retaining wall with vertical, δ = angle of friction of wall-backfill interface

Change to read:

where

ϕ = soil angle of internal friction, β = slope of backfill with horizontal, θ = slope of the back face of the retaining wall with vertical, δ = angle of friction of wall-backfill interface

Page 130, Section 7.7.1.

Notes: Line 3

For a strip footing on cohesive soil

should read:

For a square footing on cohesive soil

Line 8

When using the above expressions, care must be taken to ensure that the units are consistent, These equations were initially derived for b units in feet. Therefore, when using b in meters, the expression (b+1) needs to become (b+0.3) and (m+0.5) becomes (m+0.15)

Should be replaced by:

When using the above expressions, care must be taken to ensure that the units are consistent. These equations were initially developed for Imperial units where b is in units of feet. Therefore, when using foundation width units of b in metres and subgrade reaction modulus in MPa/m, b in the above expressions becomes 3.28 b.

Page 151, Section 10.2.2

See paragraph 1, 1st sentence, which reads:
"The values of *c* and ϕ' for use - - ", change to read as: "The values of *c* and ϕ for use - - "

See paragraph 1, 5th sentence, which reads:
" - - *c*' and ϕ' equal to the - - " change to read as: " - - *c*' and ϕ equal to the - - "

Page 151, Section 10.2.3

(a) See paragraph 2, 3rd sentence;

" - - and Brooker (1971). An approximate value of N_γ suitable for ϕ' > 10° obtained - - "

change to read:

" - - and Brooker (1971). An approximate value of N_γ suitable for ϕ > 10° obtained - - ":

(b) Equation (10.5) should read:

$$N_\gamma \cong 0.1054 e^{0.1675\phi} \quad (10.5)$$

Page 152, Section 10.2.3

See paragraph 1, 1st sentence, which reads:
"For the case of undrained stability ($c = s_u$, $\phi' = 0$) the bearing capacity- - -"

change to read:

"For the case of undrained stability ($c = s_u$, $\phi = 0$) the bearing capacity - - -"

Page 183, Section 12.3.3, Line 18

"defines a ratio H/F that is deemed indicative of potential instability when H/F > 1. "

Change to read:

"defines a ratio H/F that is deemed indicative of potential instability when H/F < 1. "

Page 192, Section 13.4.2

Figure caption should read:

FIGURE 13.5 **Mean freezing index in degree days (ºC) for Canada (after Boyd, 1973).**

Page 194, Section 13.4.2, Line 16

Replace $\mu = \frac{CI_s}{Lt}$ with $\mu = \frac{CI_s}{L_s t}$

Page 266, Section 18.2.1.3, 2nd paragraph

Furthermore, it is important to install the toe of the pile... (toe instead of top).

Page 271, Section 18.2.3.2

Table 18.4 Friction Coefficient, α

Table column header "Maximum Limit of q_c (MPa)"

should read:

Table column header "Maximum Limit of q_s (MPa)"

Page 272, Section 18.2.3.3

Equation (18.16) should read:

$$(Q_v)_{ult} = mNA_t + n\overline{N}A_s \qquad (18.16)$$

where

$(Q_v)_{ult}$ = ultimate axial capacity of single pile in granular soils (kN)

m = an empirical coefficient equal to 400 for driven piles and to 120 for bored piles
N = SPT index at the pile toe
A_t = pile toe area (m^2)
n = an empirical coefficient equal to two for driven piles and to one for bored piles
$\overline{N}$ = average SPT index along the pile
A_s = pile embedded shaft area (m^2)

where $\overline{N}$ is average corrected SPT value = $C_N N$, in which

$$C_N = 0.77\log_{10}\frac{2000}{\sigma_v{}'} \qquad \sigma_v{}' \geq 25kPa \qquad \sigma_v{}' \text{ in kPa}$$

Page 279, Section18.2.7.9 Penetration Resistance

The penetration per blow (the set) decreases rapidly after a resistance of 5mm/blow for shaft-bearing piles and 3mm/blow for toe-bearing piles. There is little justification in requiring sets smaller than 3mm/blow for an end-bearing pile that may only be warranted if driving is easy in the soil above the bearing stratum, or under special circumstances.

Replace with:

The penetration per blow (the set) decreases rapidly after a resistance of 5mm/blow for shaft-bearing piles and 3mm/blow for friction piles. There is little justification in requiring sets smaller than 3mm/blow for friction piles. A final set of 2mm/blow for the toe bearing piles may only be warranted if driving is easy in the soil above the bearing stratum, or under special circumstances.

Page 280, Section 18.3.1.1

Equation 18.24 should read: $S_{St} = C_t \frac{Q_{ta}}{dq_t}$

where
C_t = empirical coefficient (typical values given in Table 18.6)
d = pile diameter
q_t = ultimate bearing capacity of the pile toe

Equation 18.25 should read: $$C_S = \left(0.93 + 0.16(L/d)^{0.5}\right)C_t$$

Page 298, Section 18.6.5

Design for Combined Toe and Shaft Resistance

Equation 18.45 should read: $$q_s = \frac{(1-n)Q}{\pi L_s b_s}$$

Page 374, Section 24.2

Where m is the exponent related to the soil type and can be estimated as approximately equal to 1-sinϕ'…..

Replace with:

Where m is the exponent related to the soil type and can be estimated as approximately equal to sinϕ'…..

Page 386, Figure 24.9

Replace $$\text{P(roller load)} = \frac{\text{dead weight of roller+centrifugal force}}{\text{weight of roller}}$$

With $$\text{P(roller load)} = \frac{\text{dead weight of roller+centrifugal force}}{\text{width of roller}}$$

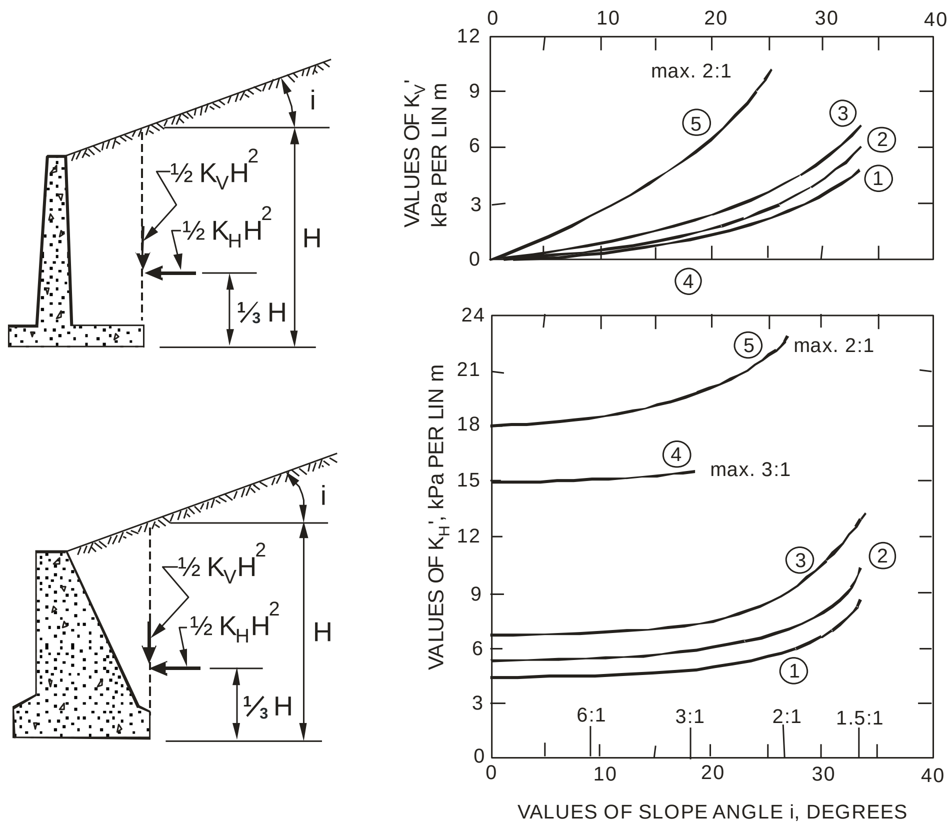
Page 387, Section 24.9

Equation 24.10 should read: $$K_{ae} = \frac{\cos(\delta + i)\cos^2(\phi' - \varphi - i)}{\cos^2 i \cos\varphi \cos(\delta + i + \varphi)\left(1 + X_a^{1/2}\right)^2}$$

Equation 24.11 should read: $$X_a = \frac{\sin(\delta + \phi')\sin(\phi' - \varphi - \beta)}{\cos(\delta + i + \varphi)\cos(i - \beta)}$$

Page 388 Section 24.11

Figure 24.10 Note changes in scale on vertical axes (multiplied by a factor of 3)



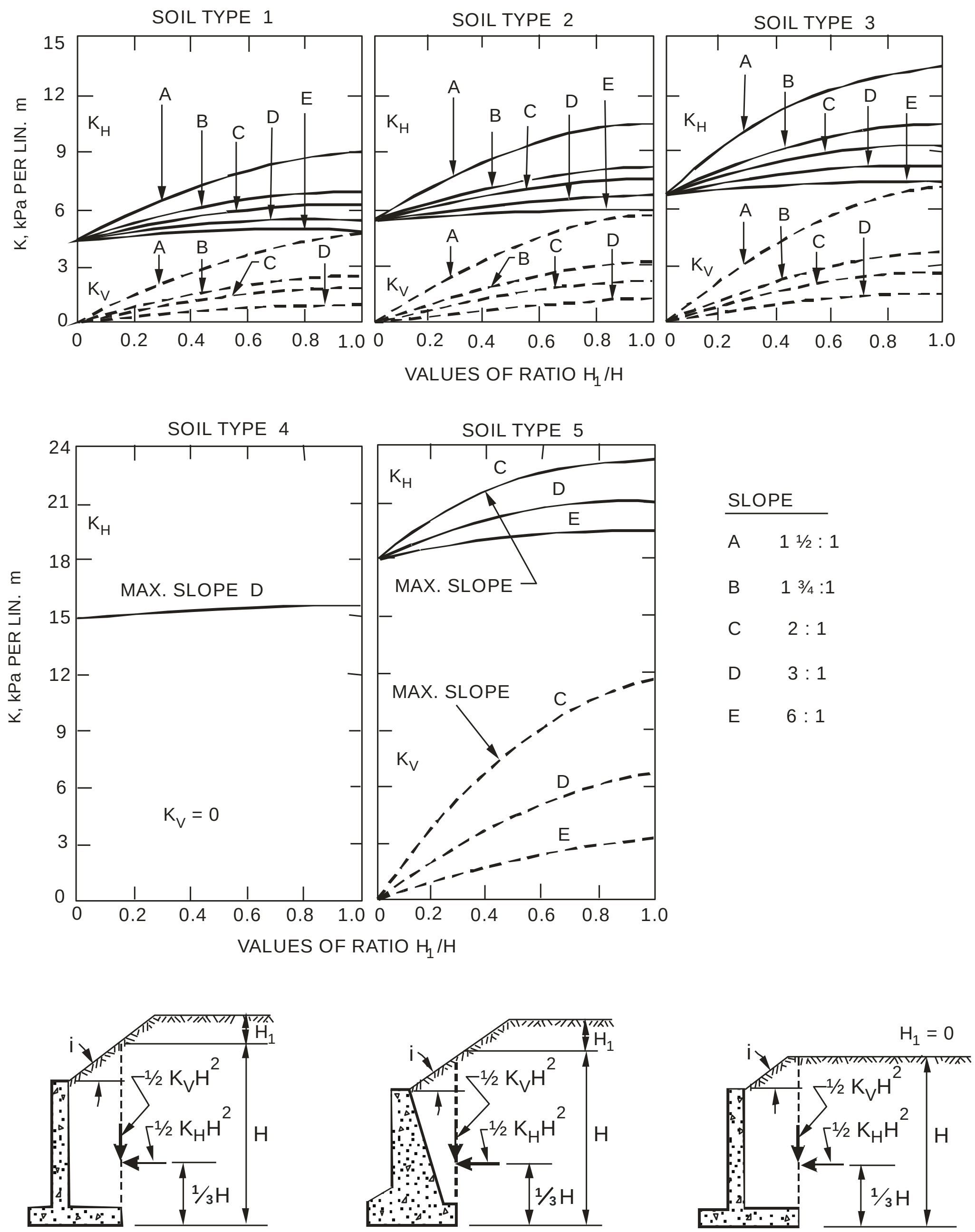
Circled numbers indicate the following soil types :

1. Clean sand and gravel : GW, GP, SW, SP.
2. Dirty sand and gravel of restricted permeability : GM, GM-GP, SM, SM-SP.
3. Stiff residual silts and clays, silty fine sands, clayey sands and gravels : CL, ML, CH, MH, SM, SC GC
4. Very soft tosoft clay, silty clay, organic silt and clay : CL, ML, OL, CH, MH, OH.
5. Medium to stiff clay deposited in chunks and protected from infiltration : CL, CH.

For Type 5 material, H is reduced by 1.2 m; resultant acts at a height of (H-1.2)/3 above base.

Page 389 Section 24.11

Figure 24.11   Note changes in scale on vertical axes (multiplied by a factor of 3)
Add the footnote shown below Figure 24.11, but replace reference to Figure 29.2 with Figure 24.10.



For Type 5 material, H is reduced by 1.2 m; resultant acts at a height of (H-1.2)/3 above base.
For description of soil type, see Figure 29.2.

Page 393, 22.12.4.5 Overall Stability

Should read: 24.12.4.5 Overall Stability

Page 399, Table 26.1

The schematic figures (only) in the System column for tangent piles (row 6) and secant piles (row 7) should be reversed.

Page 419, Figure 26.14

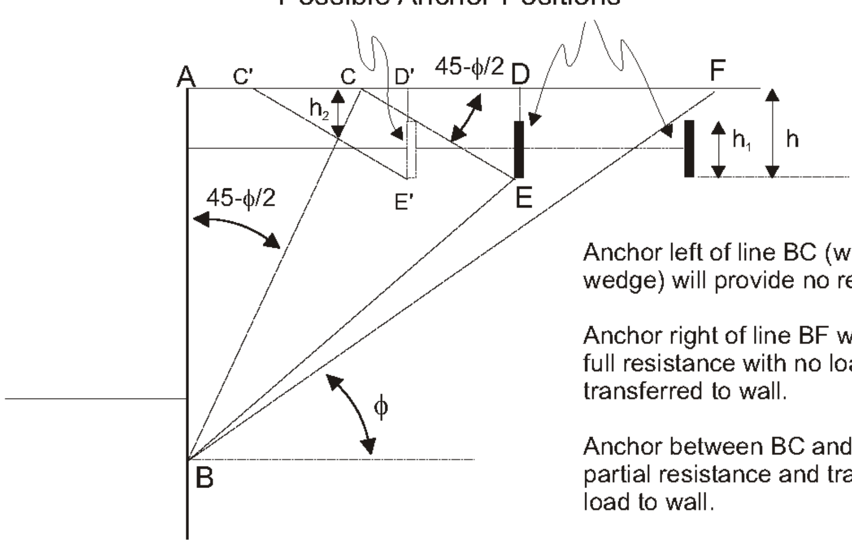
For the case where d<b+h

Replace $P_{ar} = P_{arC}/d - L/h\ (0.3P_{arC}/d)$ **With** $P_{ar}/d = P_{arC}/d - L/h\ (0.3P_{arC}/d)$

Page 419

Replace Figure 26.14 – Section Through Wall, Backfill, and Anchors with

SECTION THROUGH WALL, BACKFILL, AND ANCHORS



Anchor left of line BC (within active wedge) will provide no resistance.

Anchor right of line BF will provide full resistance with no load transferred to wall.

Anchor between BC and BF provides partial resistance and transfers some load to wall.

Anchor Right of CE

$P_P = 1/2K_p\gamma h^2$ against front (wall side) face of anchor

$P_A = 1/2K_A\gamma h^2$ against rear (backfill side) face of anchor

Anchor Left of CE

For h_1 greater than or equal to h_2

$P_P = 1/2K_p\gamma h^2 - (1/2K_P\gamma h_2^2 - 1/2\ K_A\gamma h_2^2)$ against front (wall side) face of anchor

$P_A = 1/2K_A\gamma h^2$ against rear (backfill side) face of anchor

Page 457, Missing reference

Côté, J. and Konrad, J.M. (2005). Thermal conductivity of base course materials. *Canadian Geotechnical Journal*, Vol. 42, No. 1, pp. 61-78.