APPENDIX G
NOTATION

Symbol	Description
a_o	Acceleration of vibrations at foundation level, g
a_{crit}	Critical acceleration, g
a_{max}	Maximum horizontal acceleration of the ground surface from earthquakes, g
c_u	Uniformity coefficient, D_{60}/D_{10}
c_v	Coefficient of consolidation, ft^2/day
d	Dial reading, inch
e	Void ratio
e_1	Void ratio at beginning of increment
e_c	Void ratio after soaking at σ = 2 tsf
e_f	Final void ratio
e_o	Natural or initial void ratio
e_r	Void ratio from which rebound occurs
e_{LL}	Void ratio at liquid limit
f	Frequency of vibration, revolutions/minute
f_1	Layer thickness correction factor
f_t	Time dependent factor relating immediate settlement with settlement at time t
f_s	Shape correction factor
h_a	Average specimen height betrween time t_2 and t_1 , inch
h_e	Equivalent specimen thickness, ft
h_f	Final specimen height, inch
h_o	Initial specimen height, inch
k	Constant relating the elastic soil modulus with depth, E_o + kz ksf/ft
k_d	Coefficient of subsidence

Symbol	Description
ℓ	Lateral distance between two adjacent points, ft
m	$[(1+e)/C_c] \cdot \ln 10$
m’	Shape factor
q	Vertical pressure applied to soil at bottom of footing, tsf
q_1	Soil pressure from Figure 3-3a using corrected blowcount N’ and ratio of embedment depth D to footng width B, tsf
q_c	Cone tip resistance, tsf
q_{oave}	Average pressure in stratum from foundation load, tsf
q_p	Plate pressure, tsf
r_d	Stress reduction factor for earthquakes
r_m	Scaling factor for earthquakes
s	Slope of curve or plot of 1/2 deviator stress versus effective horizontal confining pressure
t	Time, days (minutes, years)
t_{50}	Time at 50 percent of primary consolidation, days (minutes)
t_{100}	Time at 100 percent of primary consolidation, days (minutes)
u_h	Average excess pore water pressure at the bottom of the specimen over the time interval t_1 and t_2 , psi
u_w	Pore water pressure, tsf
u_{we}	Pore water pressure induced in the soil by foundation loads, tsf
u_{wf}	Final pore water pressure, tsf
z	Depth, ft
z_1	Depth of influence of loaded area, ft
z_w	Height of column of water above depth z, ft
A_{max}	Maximum displacement of vibration, inch
B	Footing width, ft
B_p	Diameter of plate, inch

Symbol	Description
C	Clay content, percent < 2 microns
C_1	Correction accounting for strain relief from embedment, $1 - 0.5\Delta p'/\Delta q' > 0.5$
C_t	Correction for time dependent increase in settlement, $1 + 0.2 \cdot \log_{10}(t/0.1)$
C_α	Coefficient of secondary compression
CP	Collapse potential
C_c	Compression index
C_r	Recompression index
Cw	Correction for water table depth
Cn	Correction for overburden pressure
C_N	Depth correction factor for earthquakes
C_s	Swell index
C_u	Undrained shear strength, tsf
CPT	Cone penetration test
D	Depth of embankment, ft
D_{10}	Grain diameter at which 10 percent of soil weight is finer
D_{60}	Grain diameter at which 60 percent of soil weight is finer
D_b	Depth of mat base or stiffening beams below ground surface, ft
D_f	Thickness of foundation, ft
D_r	Relative density, percent
D_w	Depth to groundwater level, ft
DMT	Dilatometer test
E	Elastic modulus, tsf
E_d	Constrained modulus, tsf
E_D	Dilatometer modulus, tsf

Symbol	Description
E_f	Young's modulus of foundation, tsf
E_i	Initial pressuremeter modulus, tsf
E_o	Elastic soil modulus at the ground surface, tsf
E_m	Deformation modulus, tsf
E_s	Young's soil modulus, tsf (psi)
E_s^*	Equivalent elastic modulus of soil beneath the excavation or foundation, tsf
E_{si}	Elastic modulus of soil layer i, tsf
E_t	Tangent elastic modulus, tsf
E_{ti}	Initial tangent elastic modulus, tsf
ER_i	Measured energy ratio for the drill rig and hammer system
E*	Theoretical SPT energy applied by a 140-lb hammer falling freely 30 inches, 4200 inch-lb
E_i	Available energy, inch-lb
F_{RD}	Rebound depth factor
F_{RS}	Rebound shape factor
G	Shear modulus, tsf
G_{eff}	Effective shear modulust at earthquake induced shear stress, tsf
G_{max}	Maximum shear modulus, tsf
G_s	Shear soil modulus, tsf
H	Depth of stratum below footing to a rigid base or layer thickness, ft
H_e	Equivalent compressible soil height, ft
H_j	Thickness of stratum j, ft
H_w	Wall height, ft
I	Influence factor for infinitely deep and homogeneous soil in Perloff procedure

Symbol	Description
I_c	Center influence factor in Perloff procedure, compressibility influence factor
I_e	Edge influence factor in Perloff procedure
I_w	Influence factor, $\pi/4$ for circular plates
I_z	Depth influence factor
I_{zi}	Depth influence factor of soil layer i
I_p	Peak influence factor
L	Span length or length of footing, ft
L_{SAG}	Span length with center depression, ft
L_{HOG}	Span length with center heave, ft
K	Bulk modulus, tsf
K_c	Correlation factor
K_o	Coefficient of lateral earth pressure at rest
K_R	Relative stiffness between soil and foundation
LL	Liquid limit, percent
M	Magnitude of earthquake
N_{ave}	Average blowcount/ft in depth H
N_{col}	Number of columns in a diagonal line on the foundation
N_k	Cone factor
N	Average blowcount per foot in the stratum, number of blows of a 140-lb hammer falling 30 inches to drive a standard sampler (1.42" ID, 2.00" O D) 1 ft
N_c	Number of cycles
N_j	Blowcount by Japanese standards, blows/ft
N_m	Blowcounts measured with available energy E, blows/ft
N_{60}	Blowcounts corrected to 60 percent energy, blows/ft
$(N_1)_{60}$	Normalized blow count at 60 percent energy for earthquakes, blows/ft

Symbol	Description
N′	Corrected blowcount (Figure 3-3), blows/ft
OCR	Overconsolidation ratio
PI	Plasticity index, percent
PL	Plastic limit, percent
PMT	Pressuremeter test
R	Equivalent radius, $\sqrt{LB/\pi}$, ft
R_3	Time-dependent settlement ratio as a proportion of ρ_i during first 3 years following construction, ≈ 0.3
R_t	Time-dependent settlement ratio as a proportion of ρ_i for each log cycle of time after 3 years, ≈ 0.2
R_{po}	Radius of pressuremeter probe, inch
R_ε	Strain resistance
R_D	$(1-\nu_s)/[(1+\nu_s)(1-2\nu_s)]$, relates E_s to E_d
S	Swell under confinement, percent
S_f	Free swell, percent
S_{max}	Maximum potential heave, ft
SPT	Standard penetration test
S_{min}	Minimum potential heave, ft
S_{RE}	Undrained elastic rebound, ft
T_v	Consolidation time factor
U_t	Degree of consolidation of the compressible stratum at time t , percent
W	Water content, percent
W_n	Natural water content, percent
Z_a	Depth of active zone for heave, ft
α	Correction factor for subgrade soil in Perloff procedure

Symbol	Description
α_c	Correlation factor depending on soil type and cone bearing resistance
α_o	Parameter applied in the Alpan method, Figure 3-1a
β	Angular distortion
β_{max}	Maximum angular distortion
β_v	Coefficient of vibratory compaction
γ	Saturated unit weight of soil mass, ton/ft^3
γ_c	Cyclic shear strain
γ_d	Dry density, lbs/ft^3
γ_{do}	Initial dry density, lbs/ft^3
γ_{eff}	Effective cyclic shear strain induced by earthquake
γ_w	Unit weight of water, 0.031 ton/ft^3
γ'	Effective unit wet weight, ton/ft^3
Δ	Deflection, ft
Δ_a	Allowable differential movement, ft
Δe	Change in void ratio
Δp	Net applied footing pressure, tsf
ΔP	Change in pressure measured by pressuremeter, tsf
$\Delta P'_{ave}$	Average effective bearing pressure, $q_{oave} + \sigma'_{oave}$, tsf
ΔR_{pm}	Change in radius from R_o at midpoint of pressuremeter curve, inch
ΔR_p	Change in radius between selected straight portions of the pressuremeter curve, inch
Δz_i	Depth increment i , ft
$\Delta\sigma$	Increase in effective vertical stress, tsf (psi)
δ	Vertical differential movement between two adjacent points, ft
ε_c	Volumetric strain
$\varepsilon_{c,M}$	Volumetric strain for earthquake with magnitude M

Symbol	Description
ε_z	Strain in z direction
$\dot{\varepsilon}_N$	Rate of strain at number of cycles N_c
$\dot{\varepsilon}_1$	Rate of strain at $N_c = 1$
λ	Skempton-Bjerrum correction factor
λ_L	Lame's constant
λ_d	Decay constant
μ_0	Influence factor for depth D in improved Janbu procedure
μ_1	Influence factor for foundation shape in improved Janbu procedure
ν	Poisson's ratio
ν_s	Soil Poisson's ratio
ρ	Total settlement, ft
ρ_c	Primary consolidation settlement or center settlement, ft
ρ_{ct}	Consolidation settlement at time t , ft
ρ_e	Edge settlement, ft
ρ_{col}	Settlement of collapsible soil, ft
ρ_e	Earthquake settlement, inch
ρ_i	Immediate elastic settlement, ft
ρ_{max}	Maximum settlement, ft
ρ_s	Secondary compression settlement, ft
ρ_t	Settlement at time t , ft
ρ_v	Vibratory load settlement, ft (inch)
$\rho_{\lambda c}$	Corrected consolidation settlement considering effects of overconsolidation and pore pressure changes from three-dimensional loading, ft
σ_1	Total vertical stress at time t_1 , tsf
σ_2	Total vertical stress at time t_2 , tsf

Symbol	Description
σ_a	$(\sigma_1 + \sigma_2)/2$, tsf
σ_f	Vertical confining pressure, tsf
σ'_{izp}	Effective overburden pressure at the depth of I_{zp} , tsf
σ'_{oave}	Average effective overburden pressure in stratum H , tsf
σ'_{od}	Effective overburden pressure at depth D or bottom of footing, tsf
σ_{oz}	Total overburden pressure at depth z, tsf
σ_p	Total maximum past pressure, tsf
σ'_{qp}	Apparent preconsolidation stress, tsf
σ_{rd}	Repeated deviator stress, tsf
σ_{st}	Vertical pressure from foundation loads transmitted to a saturated compressible soil mass, tsf
σ_s	Swell pressure, tsf
σ'_f	Final effective pressure, tsf
σ'_{hz}	Effective horizontal pressure at rest at depth z, tsf
σ'_o	Effectivre overburden pressure, tsf
σ'_{od}	Effective overburden pressure at bottom of footing, tsf
σ'_m	Mean effective pressure, tsf
σ'_p	Preconsolidation stress or maximum past effective stress, tsf
τ_{av}	Average cyclic shear stress induced by earthquake shaking, tsf
ω	Fraction tilt
ω_o	Angular rotation, radians/sec