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LIST OF SYMBOLS

SYMBOL

A	=	Cross section area
a_0	=	Mass-proportional damping coefficient
a_1	=	Stiffness- proportional damping coefficient
a_c	=	Throat thickness of the welds
C_e	=	Normalized design pseudo-acceleration (with *g*)
[C]	=	Viscous damping matrix *d*
d_2	=	Distance from the center of rotation of the top angle to the line of the force V_{pt}
d_4	=	Distance from the center of rotation of the angle connection to the line of the force V_{pa}
d_b	=	Beam depth
d_c	=	Column depth
d_h	=	Diameter of the bolt hole
E	=	Elastic modulus
F_{cr}	=	Buckling strength
F_i	=	Lateral force at level i
F_y	=	Yield strength
G	=	Shear modulus
g_1	=	Distance from the back of the angle to the center line of the bolts on the column
g_2	=	Distance from the back of the angle to the center line of the bolts on the beam
h_i; h_j	=	Height of floor level i (or level j) of the structure above the ground
h_n	=	Total height of the structure
I	=	Moment of inertia
K_0	=	Initial stiffness
K_{it}	=	Initial stiffness contributed by the top angle
K_{is}	=	Initial stiffness contributed by the seat angle
K_{ia}	=	Initial stiffness contributed by the web angle
K_s	=	Secant stiffness

K_t	=	Transition stiffness
K_u	=	Post-yielding stiffness
$[K]$	=	Stiffness matrices of the system
L	=	Length of span
L_k	=	Length of the knee portion
L_c	=	Length of the clear span
M_{max}	=	Maximum moment can be develop in beam
M_{os}	=	Plastic moment in the seat angle
M_p	=	Plastic moment
M_{pt}	=	Plastic moment in the top angle
M_u	=	Ultimate moment capacity
M_y	=	Yield moment capacity of the angle section
[M]	=	Mass matrix
n	=	Shape parameter
P_{cr}	=	Buckling strength of knee braces
P_s	=	Second yielding load
P_y	=	Yield load
R	=	Response reduction factor
R_{ki}	=	Initial connection stiffness
R_μ	=	Ductility reduction factor
r	=	Radius of gyration
r_c	=	Web-to-flange radius of the column
r_{sa}	=	Fillet radius of the seat angle
T	=	Fundamental period of the structure
t_{cf}	=	Thickness of the column flange
t_{sa},	=	Thickness of the seat angle
t_{bf}	=	Thickness of the beam flange
t_{cf}	=	Thickness of the column flange
t_w	=	Thickness of the column web
V	=	Base shear
V_d	=	Design base shear
V_i	=	Static story shear at level
V_{max}	=	Maximum shear can be develop in beam
V_n	=	Static story shear at the top level n

V_{pt}	=	Plastic shear force in vertical leg of the top angle
V_y	=	Base shear at system yielding
W	=	Total seismic weight of the structure
w	=	Angle width per bolt
w_i, w_j	=	Weight of the structure at level i (or level j)
w_n	=	Weight of the structure at the top level *n*
α	=	Post-Buckling strength reduction factor
α	=	Design base shear parameter
β	=	Post-yield stiffness factor
β_i	=	Shear proportioning factor
Δ	=	Lateral drift
Δ_y	=	Roof drift at system yielding
γ	=	Numerical factor (For knee brace design)
γ	=	Modification factor for the energy balance equation
λ_i	=	Proportioning factor of the equivalent lateral force at level *i*
μ	=	Ductility factor
μ_s	=	Structural ductility factor
θ	=	Angle that the knee brace makes with the beam
θ_0	=	Reference plastic rotation
θ_p	=	Plastic story drift
ω_n	=	Natural circular frequency
ξ	=	Overstrength factor
ξ_i	=	Overstrength factor of the beam at level *i*
ζ	=	Damping as a fraction of critical damping

LIST OF TECHNICAL VOCABULARY AND ABBREVIATIONS

BRB	=	Buckling-Restrained Brace
DBE	=	Design Basis Earthquake
ft	=	Foot
ft^2	=	Square foot
in	=	Inch
in^2	=	Square inch
KBMF	=	Knee-Braced Moment Frame
kip	=	Kilo Pound
kips.ft	=	Kilo Pound foot
kips/ft	=	Kilo Pound per foot
kips.in	=	Kilo Pound inch
$kips/in^2$	=	Kilo Pound per square inch
kN	=	Kilo Newton
kN.m	=	Kilo Newton meter
kN/m	=	Kilo Newton per meter
kN/m^2	=	Kilo Newton per square meter
kN.m/rad	=	Kilo Newton meter per radian
ksi	=	Kilo Pound per square inch
lb	=	Pound
lbs/ft	=	Pound per foot
m	=	Meter
m^2	=	Square meter
MCE	=	Maximum Considered Earthquake
MRF	=	Moment Resisting Frames
NDA	=	Nonlinear Dynamic Analysis
NSA	=	Nonlinear Static Analysis
PBPD	=	Performance-Based Plastic Design
PR	=	Partially Restrained
rad	=	Radian