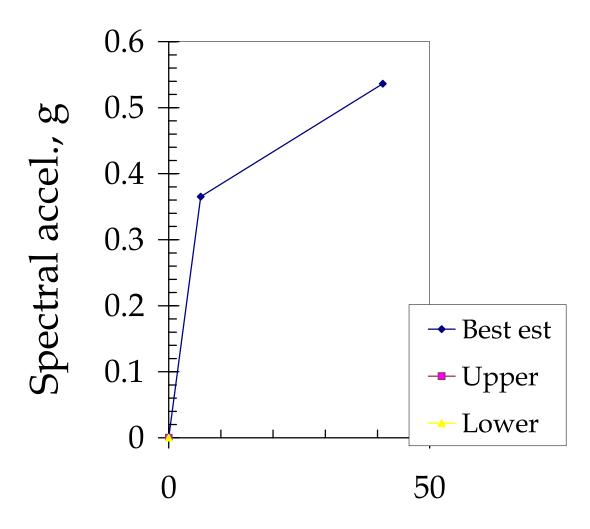
RC4.1HH Greece, Southern Europe

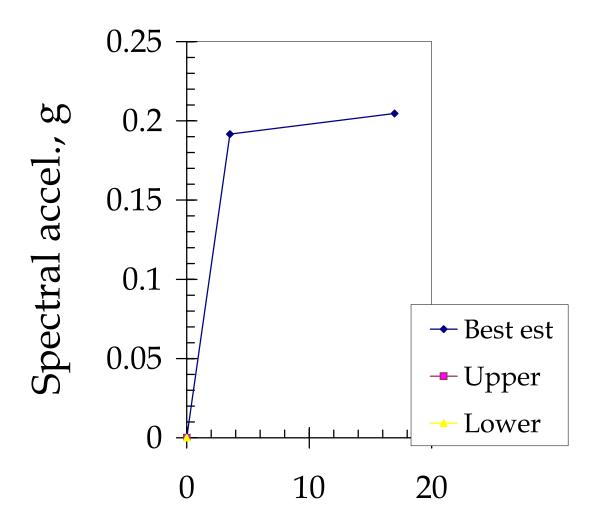
WHE-PAGER PHAS	SE 2: DEVELOPMENT OF ANALYTICAL SEISMIC VULNERABILITY FUNCTIONS	
Author:	Kappos Andreas, Panagopoulos Georgios	
Date:	9/15/2009	
Structure type (describe as broadly as possible):	RC4.1HH RC dual system, High seismic code design (1995), High-rise (9 storeys), No infill walls	
Geographic or other limitations:	Greece, Southern Europe	
	Add rows as desired	
	Basic pushover curve for this structure type	I
Pushover X-axis:	Sd (cm) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if de	sired
Pushover Y-axis:	Sa (g) Choose spectra acceleration (Sa), g; or base shear (V), kip. Change and state units if desired.	
Elastic damping ratio:	Small-amplitude damping ratio, fraction of critical	
1st mode participation factor:	1.48 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)	
Effective mass coefficient:	0.72 alpha1; generally 0.7 to 0.8	
Building weight:	11577.50 W, kN. Change and state units if desired	
How were these values & pushover points derived	?Add rows as desired	
	/ dd Towe de decircu	
Pushover curve control poi		
	0 0 5 Control point for plotting purposes	
	1 6.13 0.37 apparent yield point	
	2 41.02 0.54 ultimate point (15% drop in strength) 3 beginning of lower plateau	
	4 end of lower plateau	
	end of lower plateau	
	oper and lower-bound range of pushover curves for this structure type	
	ouildings of this type would have pushover curve inside the area bounded between this curve and the Y-axis?	
Author's meaning of "upper bound": How were these values & pushover points derived	2	
Tiow were triese values & pusitover points derived	Add rows as desired	
	Optional upper-bound pushover curve	
Pushover curve control poi		
	0 0 Control point for plotting purposes	
	E.g., yield point? E.g., ultimate point?	
	E.g., beginning of lower plateau?	
	Add rows as desired	
Lower-bound pushover curve, e.g., 99 out of 100 b. Author's meaning of "lower bound":	ouildings of this type would have pushover curve inside the area bounded between this curve and the X-axis?	
How were these values & pushover points derived	?	
	Add rows as desired	=
Pushover curve control poi	Optional lower-bound pushover curve int X Y Damping Comment	
r denover durve dentier per	0 0 Control point for plotting purposes	
	E.g., yield point?	
	E.g., ultimate point?	
	E.g., beginning of lower plateau?	
	Add rows as desired	
	Other requested parameters	
D14	41.02 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50%	chance that the structural component of the building cannot be economically r
B14	0.60-0.80 logarithmic standard deviation of drift associated with complete structural damage. May need to be guessed	The state of the s
Sdc	49.22 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift at or	
L15	indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and	
PC	mean fraction of building area collapsed, given complete structural damage. Again Porter, Comartin, and Holme	
kshort	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for short-duration (M <=	
kmed	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for medium-duration (5.4 If HAZUS-style damping preferred, and author can judge, this is the degradation factor for long-duration (M >= :	
klong Explain how these values were arrived at providing	g citations if appropriate D14=Sd(4) for 4-linear curves or Sd(2) for bilinear curves	.o) events
For frame systems Sdc/D14=1.3 for low, 1.4 for me		
For dual systems Sdc/D14=1.1 for low and 1.2 for		



Spectral displ., Sd, cm

RC4.1HL Greece, Southern Europe

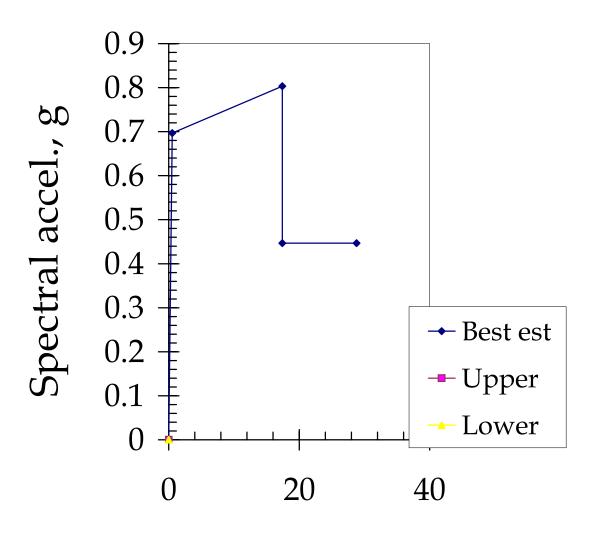
WHE-PAGER PHAS	E 2: DEVELOPMENT OF ANALYTICAL SEISMIC VULNERABILITY FUNCTIONS
Author:	Kappos Andreas, Panagopoulos Georgios
Date:	Nappos initileas, Paliagopoulos Geoligios 9/15/2009
Structure type (describe as broadly as possible):	RC4.1HL RC dual system, Low seismic code design (1959), High-rise (9 storeys), No infill walls
Geographic or other limitations:	Greece, Southern Europe
	Add rows as desired
	Basic pushover curve for this structure type
Pushover X-axis:	Sd (cm) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if desired.
Pushover Y-axis:	Sa (g) Choose spectra acceleration (Sa), g; or base shear (V), kip. Change and state units if desired.
Elastic damping ratio:	Small-amplitude damping ratio, fraction of critical
1st mode participation factor:	1.45 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)
Effective mass coefficient:	0.71 alpha1; generally 0.7 to 0.8
Building weight:	12457.38 W, kN. Change and state units if desired
How were these values & pushover points derived?	Add rows as desired
	160 1010 40 005100
Pushover curve control poi	tt X Y Damping Comment
	0 0 5 Control point for plotting purposes
	1 3.52 0.19 apparent yield point
	2 16.97 0.20 ultimate point (15% drop in strength) 3 beginning of lower plateau
	oegining of lower plateau end of lower plateau
	- Jend of lower placedu
Optional: up	per and lower-bound range of pushover curves for this structure type
	illdings of this type would have pushover curve inside the area bounded between this curve and the Y-axis?
Author's meaning of "upper bound": How were these values & pushover points derived?	
Tiow were triese values & pusitover points derived	Add rows as desired
	Optional upper-bound pushover curve
Pushover curve control poi	
	Control point for plotting purposes
	E.g., yield point? E.g., ultimate point?
	E.g., beginning of lower plateau?
	Add rows as desired
Lower-bound pushover curve, e.g., 99 out of 100 b Author's meaning of "lower bound":	illdings of this type would have pushover curve inside the area bounded between this curve and the X-axis?
How were these values & pushover points derived?	
	Add rows as desired
	Optional lower-bound pushover curve
Pushover curve control poi	
	0 0 0 Control point for plotting purposes
	E.g., yield point?
	2 E.g., ultimate point?
	E.g., beginning of lower plateau?
	Add rows as desired
	Other requested parameters
D14	16.97 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50% chance that the structural component of the building cannot be economically represented to the structural component of the building cannot be economically represented to the structural component of the building cannot be economically represented to the structural component of the building cannot be economically represented to the structural component of the building cannot be economically represented to the structural component of the building cannot be economically represented to the structural component of the building cannot be economically represented to the structural component of the building cannot be economically represented to the structural component of the building cannot be economically represented to the structural component of the building cannot be economically represented to the structural component of the building cannot be economically represented to the structural component of the building cannot be economically represented to the structural component of the structural component of the building cannot be economically represented to the structural component of the structural compo
B14	0.60-0.80 logarithmic standard deviation of drift associated with complete structural damage. May need to be guessed
Sdc	18.66 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift at collapse)/PFfR.
L15 PC	indoor fatality rate given collapse. Many contributors may be unable to provide this value, Porter, Comartin, and Holmes will fill such gaps
kshort	mean fraction of building area collapsed, given complete structural damage. Again Porter, Comartin, and Holmes will fill gaps If HAZUS-style damping preferred, and author can judge, this is the degradation factor for short-duration (M <= 5.5) events
kmed	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for medium-duration (5.5 < M < 7.5) events
klong	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for long-duration (M >= 7.5) events
	citations if appropriate D14=Sd(4) for 4-linear curves or Sd(2) for bilinear curves
For frame systems Sdc/D14=1.3 for low, 1.4 for me	
For dual systems Sdc/D14=1.1 for low and 1.2 for l	igh code design Add rows as desired



Spectral displ., Sd, cm

RC4.1LH Greece, Southern Europe

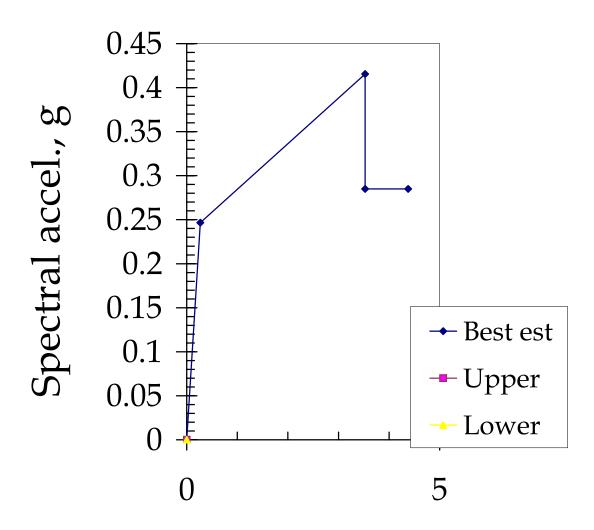
WHE-PAGER PHAS	SE 2: DEVELOPMENT OF ANALYTICAL SEISMIC VULNERABILITY FUNCTIONS	
Author:	Kappos Andreas, Panagopoulos Georgios	
Date:	9/15/2009	
Structure type (describe as broadly as possible):	RC4.1LH RC dual system, High seismic code design (1995), Low-rise (2 storeys), No infill walls	
Geographic or other limitations:	Greece, Southern Europe	
	Add rows as o	desired
	Basic pushover curve for this structure type	
Pushover X-axis:	Sd (cm) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state un	ts if desired.
Pushover Y-axis:	Sa (g) Choose spectra acceleration (Sa), g; or base shear (V), kip. Change and state units if desired.	
Elastic damping ratio:	Small-amplitude damping ratio, fraction of critical	
1st mode participation factor:	1.26 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)	
Effective mass coefficient:	0.90 alpha1; generally 0.7 to 0.8	
Building weight:	2239.04 W, kN. Change and state units if desired	
How were these values & pushover points derived?	Add rows as	desired
Pushover curve control poi		
	0 0 0 5 Control point for plotting purposes 1 0.53 0.70 apparent yield point	
	2 17.42 0.80 ultimate point (15% drop in strength)	
	3 17.42 0.45 beginning of lower plateau	
	4 28.79 0.45 end of lower plateau	
	pper and lower-bound range of pushover curves for this structure type	
Author's meaning of "upper bound":	uildings of this type would have pushover curve inside the area bounded between this curve and the Y-axis?	
How were these values & pushover points derived		
	Add rows as o	desired
	Ontional upper hound push over ourse	
Pushover curve control poi	Optional upper-bound pushover curve nt X Y Damping Comment	
i usilovei cuive control poi	0 0 Control point for plotting purposes	
	1 E.g., yield point?	
	E.g., ultimate point?	
	E.g., beginning of lower plateau?	
	Add rows as desired	
Lower-bound pushover curve, e.g., 99 out of 100 b	uildings of this type would have pushover curve inside the area bounded between this curve and the X-axis?	
Author's meaning of "lower bound":		
How were these values & pushover points derived'	? Add rows as	docirod
	Adu IOWS as i	lesileu
	Optional lower-bound pushover curve	
Pushover curve control poi		
	0 0 Control point for plotting purposes	
	E.g., yield point? E.g., ultimate point?	
	3 E.g., beginning of lower plateau?	
	4 Add rows as desired	
	Other requested parameters	
D14 B14	28.79 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift wi 0.60-0.80 logarithmic standard deviation of drift associated with complete structural damage. May need to be gues	
Sdc	34.55 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof di	
L15	indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comar	
PC	mean fraction of building area collapsed, given complete structural damage. Again Porter, Comartin, and	
kshort	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for short-duration	(M <= 5.5) events
kmed	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for medium-durat	
klong	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for long-duration	(M >= 7.5) events
Explain how these values were arrived at, providing For frame systems Sdc/D14=1.3 for low, 1.4 for me	g citations if appropriate D14=Sd(4) for 4-linear curves or Sd(2) for bilinear curves	
For dual systems Sdc/D14=1.3 for low, 1.4 for me		desired
. c. dda. cyclomo cdo/D 14=1.1 for low and 1.2 for l	ng. odd dosig.	



Spectral displ., Sd, cm

RC4.1LL Greece, Southern Europe

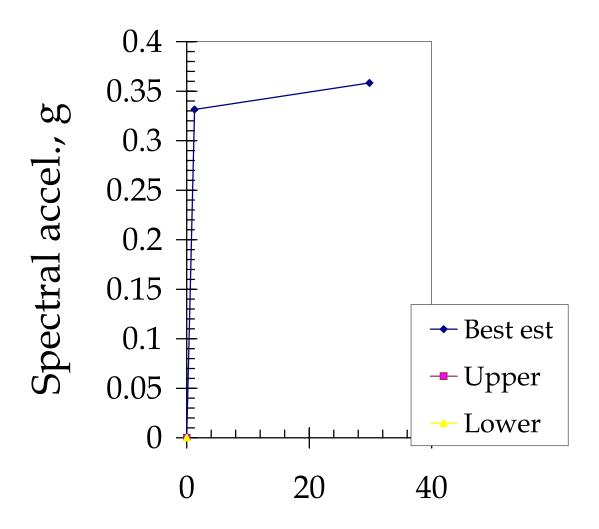
WHE-PAGER PHAS	SE 2: DEVELOPMENT OF ANALYTICAL SEISMIC VULNERABILITY FUNCTIONS	
Author:	Kappos Andreas, Panagopoulos Georgios	
Date:	9/15/2009	
Structure type (describe as broadly as possible):	RC4.1LL RC frame, High seismic code design (1995), High-rise (9 storeys), No infill walls	
Geographic or other limitations:	Greece, Southern Europe	
	Add rows as desired	
	Basic pushover curve for this structure type	
Pushover X-axis:	Sd (cm) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if des	red
Pushover Y-axis:	Sa (g) Choose spectra acceleration (Sa), g; or base shear (V), kip. Change and state units if desired.	·
Elastic damping ratio:	Small-amplitude damping ratio, fraction of critical	
1st mode participation factor:	1.26 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)	
Effective mass coefficient:	0.89 alpha1; generally 0.7 to 0.8	
Building weight:	2555.74 W, kN. Change and state units if desired	
How were these values & pushover points derived?	? Add rows as desired	
Pushover curve control poi		
	0 0 5 Control point for plotting purposes	
	1 0.27 0.25 apparent yield point 2 3.53 0.42 ultimate point (15% drop in strength)	
	2 3.53 0.42 ultimate point (15% drop in strength) 3 3.53 0.28 beginning of lower plateau	
	4 4.38 0.28 end of lower plateau	
	ond of lower plateau	
Optional: up	pper and lower-bound range of pushover curves for this structure type	
	uildings of this type would have pushover curve inside the area bounded between this curve and the Y-axis?	
Author's meaning of "upper bound": How were these values & pushover points derived?		
Thow were these values & pushover points derived	Add rows as desired	
	Optional upper-bound pushover curve	
Pushover curve control poi		
	0 0 Control point for plotting purposes	
	E.g., yield point? E.g., ultimate point?	
	3 E.g., beginning of lower plateau?	
	Add rows as desired	
Lower-bound pushover curve, e.g., 99 out of 100 b Author's meaning of "lower bound":	uildings of this type would have pushover curve inside the area bounded between this curve and the X-axis?	
How were these values & pushover points derived?	?	
	Add rows as desired	
Pushover curve control poi	Optional lower-bound pushover curve int X Y Damping Comment	
r acriever curve control por	0 0 Control point for plotting purposes	
	1 E.g., yield point?	
	2 E.g., ultimate point?	
	E.g., beginning of lower plateau?	
	Add rows as desired	
	Other requested parameters	
D14	4.38 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50% of	hance that the structural component of the building cannot be economically rep
B14	0.60-0.80 logarithmic standard deviation of drift associated with complete structural damage. May need to be guessed	
Sdc	4.82 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift at col	
L15	indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and I	
PC	mean fraction of building area collapsed, given complete structural damage. Again Porter, Comartin, and Holmes	
kshort	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for short-duration (M <= 5 If HAZUS-style damping preferred, and author can judge, this is the degradation factor for medium-duration (5.5	
kmed klong	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for medium-duration (5.5 lift HAZUS-style damping preferred, and author can judge, this is the degradation factor for long-duration (M >= 7.	
	g citations if appropriate D14=Sd(4) for 4-linear curves or Sd(2) for bilinear curves	o) evente
For frame systems Sdc/D14=1.3 for low, 1.4 for me		
For dual systems Sdc/D14=1.1 for low and 1.2 for l		



Spectral displ., Sd, cm

RC4.1MH Greece, Southern Europe

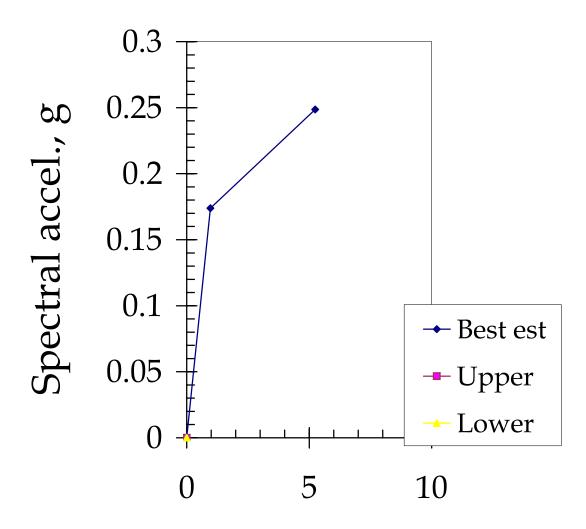
Author: Date: Structure type (describe as broadly as possible): Geographic or other limitations: Basic pushover curve for this structure type Pushover X-axis: Pushover Y-axis: Pushover Y-axis: Sa (g) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if desired. Sa (g)	
Date: Structure type (describe as broadly as possible): Geographic or other limitations: Basic pushover curve for this structure type Pushover X-axis: Pushover Y-axis: Sa (g) Choose spectral displacement (Sd), g; or base shear (V), kip. Change and state units if desired. Sa (J) Small-amplitude damping ratio; St mode participation factor: 1.40 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)	
Structure type (describe as broadly as possible): Geographic or other limitations: Basic pushover curve for this structure type Pushover X-axis: Pushover Y-axis: Sa (g) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if desired. Sa (g) Choose spectral displacement (V), kip. Change and state units if desired. Sa (g) Small-amplitude damping ratio, fraction of critical 1.40 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)	
Basic pushover curve for this structure type Pushover X-axis: Pushover Y-axis: Sa (g) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if desired. Pushover Y-axis: Sa (g) Choose spectral acceleration (Sa), g; or base shear (V), kip. Change and state units if desired. Small-amplitude damping ratio; article factor of critical Ist mode participation factor: 1.40 PFIR: generally 1.3 to 1.5; same as (effective height)/(total roof height)	
Pushover X-axis: Pushover Y-axis: Sa (g) Choose spectral displacement (Sd), inches, or Roof displacement (Deltar), inches. Change and state units if desired. Sa (g) Choose spectra acceleration of critical 1st mode participation factor: 1.40 Sa (g) PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)	
Pushover X-axis: Pushover Y-axis: Sa (g) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if desired. Sa (g) Choose spectra acceleration (Sa), g; or base shear (V), kip. Change and state units if desired. Elastic damping ratio: Small-amplitude damping ratio, fraction of critical 1,40 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)	
Pushover X-axis: Pushover Y-axis: Sa (cm) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if desired. Pushover Y-axis: Sa (g) Choose spectra acceleration (Sa), g; or base shear (V), kip. Change and state units if desired. Sall-amplitude damping ratio, fraction of critical 1 through participation factor: 1.40 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)	
Pushover Y-axis: Elastic damping ratio: Small-amplitude damping ratio, fraction of critical 1st mode participation factor: 1.40 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)	
1st mode participation factor: 1.40 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)	
Effective mass coefficient: 0.81 alpha1; generally 0.7 to 0.8	
Building weight: 4810.14 W, kN. Change and state units if desired	
How were these values & pushover points derived? Add rows as desired	
Pushover curve control point X Y Damping Comment	
0 0 5 Control point for plotting purposes	
1 1.28 0.33 apparent yield point 2 29.83 0.36 ultimate point (15% drop in strength)	
3 beginning of lower plateau	
degriffing frower plateau	
,	
Optional: upper and lower-bound range of pushover curves for this structure type	
Upper-bound pushover curve, e.g., 99 out of 100 buildings of this type would have pushover curve inside the area bounded between this curve and the Y-axis?	
Author's meaning of "upper bound": How were these values & pushover points derived?	
Add rows as desired	
Optional upper-bound pushover curve	
Pushover curve control point X Y Damping Comment	
0 0 Control point for plotting purposes	
1 E.g., yield point? 2 E.g., ultimate point?	
3 E.g., beginning of lower plateau?	
Add rows as desired	
Lower-bound pushover curve, e.g., 99 out of 100 buildings of this type would have pushover curve inside the area bounded between this curve and the X-axis? Author's meaning of "lower bound":	
How were these values & pushover points derived?	
Add rows as desired	
Optional lower-bound pushover curve	
Pushover curve control point X Y Damping Comment	
0 0 Control point for plotting purposes	
1 E.g., yield point?	
2 E.g., ultimate point?	
E.g., beginning of lower plateau?	
4 Add rows as desired	
Other requested parameters	
D14 29.83 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50% chance that the structural component of the building of	annot be economic
B14 O	
Sdc 35.80 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift at collapse)/PFIR.	
L15 indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and Holmes will fill such gaps PC mean fraction of building area collapsed, given complete structural damage. Again Porter, Comartin, and Holmes will fill gaps	
mean reaction or building area conlapsed, given complete structura darmage. Again Porter, Comartin, and Florines will fill gaps	
If HAZUS-siye damping preferred, and author can judge, this is the degradation factor for medium-duriation (1.5 - 5.5) events	
klong If HAZUS-skipe damping preferred, and author can judge, this is the degradation factor for long-duration (M >= 7.5) events	
Explain how these values were arrived at, providing citations if appropriate D14=Sd(4) for 4-linear curves or Sd(2) for bilinear curves	
For frame systems Sdc/D14=1.3 for low, 1.4 for medium and 1.5 for high code design	
For dual systems Sdc/D14=1.1 for low and 1.2 for high code design Add rows as desired	



Spectral displ., Sd, cm

RC4.1ML Greece, Southern Europe

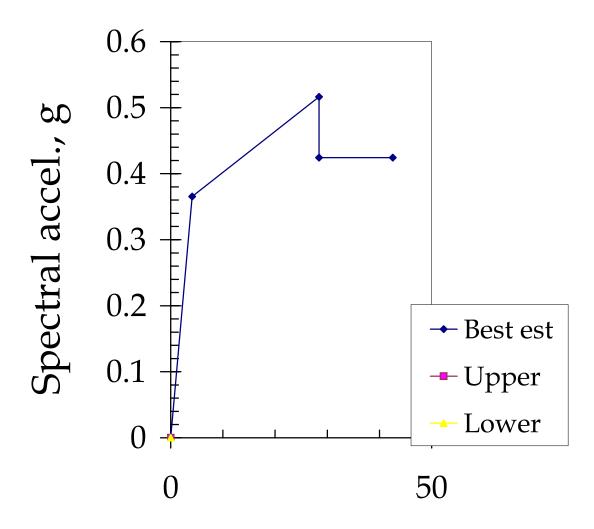
WHE-PAGER PHAS	SE 2: DEVELOPMENT OF ANALYTICAL SEISMIC VULNERABILITY FUNCTIONS	
Author:	Kappos Andreas, Panagopoulos Georgios	
Date:	Nappos niniteas, i alinagopodios deorgios 9/15/2009	
Structure type (describe as broadly as possible):	RC4.1ML RC dual system, Low seismic code design (1959), Medium-rise (4 storeys), No infill walls	
Geographic or other limitations:	Greece, Southern Europe	
	Add rows as desired	
	Basic pushover curve for this structure type	
Pushover X-axis:	Sd (cm) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if desired.	
Pushover Y-axis:	Sa (g) Choose spectra acceleration (Sa), g; or base shear (V), kip. Change and state units if desired.	
Elastic damping ratio:	Small-amplitude damping ratio, fraction of critical	
1st mode participation factor:	1.40 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)	
Effective mass coefficient:	0.80 alpha1; generally 0.7 to 0.8	
Building weight:	5523.02 W, kN. Change and state units if desired	
How were these values & pushover points derived?	Add rows as desired	
Pushover curve control point		
	0 0 5 Control point for plotting purposes	
	1 0.97 0.17 apparent yield point 2 5.24 0.25 ultimate point (15% drop in strength)	
	2 5.24 05 beginning of lower plateau	
	end of lower plateau	
	pper and lower-bound range of pushover curves for this structure type	
	ouildings of this type would have pushover curve inside the area bounded between this curve and the Y-axis?	
Author's meaning of "upper bound": How were these values & pushover points derived?		
Tiew were these values a pasitover points derived in	Add rows as desired	
	Optional upper-bound pushover curve	
Pushover curve control point		
	0 0 0 Control point for plotting purposes 1 E.g., yield point?	
	E.g., ultimate point?	
	E.g., beginning of lower plateau?	
	4 Add rows as desired	
	The state of the s	
Author's meaning of "lower bound":	buildings of this type would have pushover curve inside the area bounded between this curve and the X-axis?	
How were these values & pushover points derived?	2	
	Add rows as desired	
	Optional lower-bound pushover curve	
Pushover curve control poi		
·	0 0 Control point for plotting purposes	
	E.g., yield point?	
	2 E.g., ultimate point?	
	E.g., beginning of lower plateau?	
	4 Add rows as desired	
	Other requested parameters	
D14	5.24 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50% chance that the structural component of the building cannot be	economically
B14	0.60-0.80 logarithmic standard deviation of drift associated with complete structural damage. May need to be guessed	
Sdc	5.77 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift at collapse)/PFIR.	
L15 PC	indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and Holmes will fill such gaps mean fraction of building area collapsed, given complete structural damage. Again Porter, Comartin, and Holmes will fill gaps	
kshort	mean traction or outloing after a collapsed, given complete structural darrage. Again morer, comartin, and normes will fill gaps If HAZUS-style damping preferred, and author can judge, this is the degradation factor for short-duration (M <= 5.5) events	
kmed	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for medium-duration (5.5 < M < 7.5) events	
klong	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for long-duration (M >= 7.5) events	
Explain how these values were arrived at, providing	g citations if appropriate D14=Sd(4) for 4-linear curves or Sd(2) for bilinear curves	
For frame systems Sdc/D14=1.3 for low, 1.4 for me		
For dual systems Sdc/D14=1.1 for low and 1.2 for h	high code design Add rows as desired	



Spectral displ., Sd, cm

RC4.2HH Greece, Southern Europe

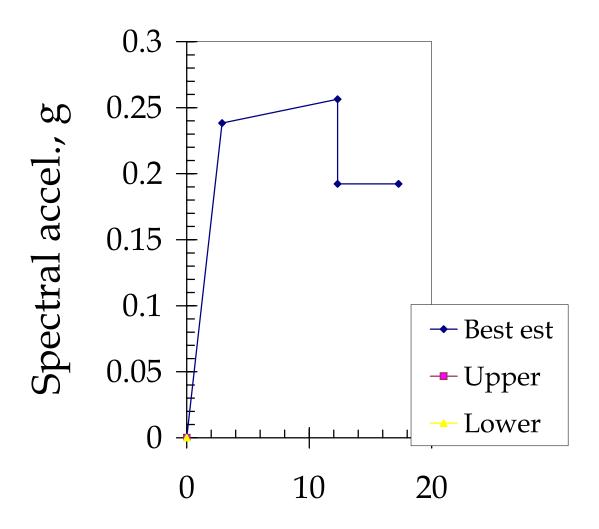
WHE-PAGER PHAS	SE 2: DEVELOPMENT OF ANALYTICAL SEISMIC VULNERABILITY FUNCTIONS	
Author:	Kappos Andreas, Panagopoulos Georgios	
Date:	9/15/2009	
Structure type (describe as broadly as possible):	RC4.2HH RC dual system, High seismic code design (1995), High-rise (9 storeys), Fully infilled	
Geographic or other limitations:	Greece, Southern Europe	
	Add rows as desir	ed
	Basic pushover curve for this structure type	
Pushover X-axis:	Sd (cm) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if	desired
Pushover Y-axis:	Sa (g) Choose spectra acceleration (Sa), g; or base shear (V), kip. Change and state units if desired.	
Elastic damping ratio:	Small-amplitude damping ratio, fraction of critical	
1st mode participation factor:	1.44 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)	
Effective mass coefficient:	0.75 alpha1; generally 0.7 to 0.8	
Building weight:	11577.50 W, kN. Change and state units if desired	
How were these values & pushover points derived	Add rows as desir	ed
Pushover curve control poi		
	0 0 5 Control point for plotting purposes 1 4.10 0.37 apparent yield point	
	2 28.40 0.52 ultimate point (15% drop in strength)	
	3 28.40 0.42 beginning of lower plateau	
	4 42.55 0.42 end of lower plateau	
		_
	oper and lower-bound range of pushover curves for this structure type	_
Author's meaning of "upper bound":	ouldings of this type would have pushover curve inside the area bounded between this curve and the Y-axis?	
How were these values & pushover points derived	?	
	Add rows as desir	ed
Duebeure energia	Optional upper-bound pushover curve	
Pushover curve control poi	int X Y Damping Comment 0 0 0 Control point for plotting purposes	
	1 E.g., yield point?	
	E.g., ultimate point?	
	E.g., beginning of lower plateau?	
	Add rows as desired	
Lower-hound pushover curve, e.g., 99 out of 100 b	ouildings of this type would have pushover curve inside the area bounded between this curve and the X-axis?	
Author's meaning of "lower bound":		
How were these values & pushover points derived'		
	Add rows as desir	ed
	Optional lower-bound pushover curve	
Pushover curve control poi		
	0 0 Control point for plotting purposes	
	E.g., yield point?	
	E.g., ultimate point? E.g., beginning of lower plateau?	
	Add rows as desired	
		<u>_</u>
	Other requested parameters	
D14 B14	42.55 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50 0.60-0.80 logarithmic standard deviation of drift associated with complete structural damage. May need to be guessed	% chance that the structural component of the building cannot be economically re
Sdc	51.06 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift associated with collapse, e.g., e.g	collapse)/PFfR.
L15	indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, a	
PC	mean fraction of building area collapsed, given complete structural damage. Again Porter, Comartin, and Hol	mes will fill gaps
kshort	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for short-duration (M	
kmed	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for medium-duration (
klong Explain how these values were arrived at providing	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for long-duration (M > g citations if appropriate D14=Sd(4) for 4-linear curves or Sd(2) for bilinear curves	= 7.5) events
For frame systems Sdc/D14=1.3 for low, 1.4 for me		
For dual systems Sdc/D14=1.1 for low and 1.2 for low		ed
	<u> </u>	



Spectral displ., Sd, cm

RC4.2HL Greece, Southern Europe

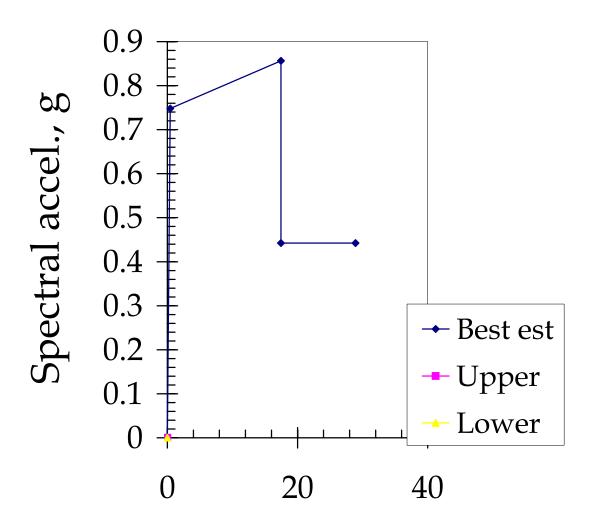
WHE-PAGER PHAS	SE 2: DEVELOPMENT OF ANALYTICAL SEISMIC VULNERABILITY FUNCTIONS	
Author:	Kappos Andreas, Panagopoulos Georgios	
Date:	9/15/2009	
Structure type (describe as broadly as possible):	RC4.2HL RC dual system, Low seismic code design (1959), High-rise (9 storeys), Fully infilled	
Geographic or other limitations:	Greece, Southern Europe	
	Add rows as desired	
	Basic pushover curve for this structure type	ī
Pushover X-axis:	Sd (cm) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if de	sired
Pushover Y-axis:	Sa (g) Choose spectra acceleration (Sa), g; or base shear (V), kip. Change and state units if desired.	
Elastic damping ratio:	Small-amplitude damping ratio, fraction of critical	
1st mode participation factor:	1.43 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)	
Effective mass coefficient:	0.74 alpha1; generally 0.7 to 0.8	
Building weight:	12457.38 W, kN. Change and state units if desired	
How were these values & pushover points derived	? Add rows as desired	
	Add town do doubled	
Pushover curve control poi		
	0 0 5 Control point for plotting purposes	
	1 2.88 0.24 apparent yield point 2 12.32 0.26 ultimate point (15% drop in strength)	
	2 12.32 0.26 ultimate point (15% drop in strength) 3 12.32 0.19 beginning of lower plateau	
	4 17.29 0.19 end of lower plateau	
	ond or lower placed	
	pper and lower-bound range of pushover curves for this structure type	
	uildings of this type would have pushover curve inside the area bounded between this curve and the Y-axis?	
Author's meaning of "upper bound": How were these values & pushover points derived'	2	
now were these values a pusitover points derived	Add rows as desired	
	Optional upper-bound pushover curve	
Pushover curve control poi		
	0 0 Control point for plotting purposes	
	E.g., yield point? E.g., ultimate point?	
	E.g., beginning of lower plateau?	
	4 Add rows as desired	
Lower-bound pushover curve, e.g., 99 out of 100 b Author's meaning of "lower bound":	uildings of this type would have pushover curve inside the area bounded between this curve and the X-axis?	
How were these values & pushover points derived	7	
	Add rows as desired	=
	A.C. Hardania	
Pushover curve control poi	Optional lower-bound pushover curve int X Y Damping Comment	
r deliterer curve continer per	0 0 Control point for plotting purposes	
	E.g., yield point?	
	2 E.g., ultimate point?	
	E.g., beginning of lower plateau?	
	Add rows as desired	
	Other requested parameters	ī
D14	17.29 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50%	chance that the structural component of the building cannot be economically re
B14	0.60-0.80 logarithmic standard deviation of drift associated with complete structural damage. May need to be guessed	
Sdc	19.02 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift at c	
L15	indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and	
PC kehart	mean fraction of building area collapsed, given complete structural damage. Again Porter, Comartin, and Holm	
kshort kmed	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for short-duration (M <= If HAZUS-style damping preferred, and author can judge, this is the degradation factor for medium-duration (5.)	
klong	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for medium-duration (5.	
	g citations if appropriate D14=Sd(4) for 4-linear curves or Sd(2) for bilinear curves	10, 555.10
For frame systems Sdc/D14=1.3 for low, 1.4 for me		
For dual systems Sdc/D14=1.1 for low and 1.2 for l	high code design Add rows as desired	



Spectral displ., Sd, cm

RC4.2LH Greece, Southern Europe

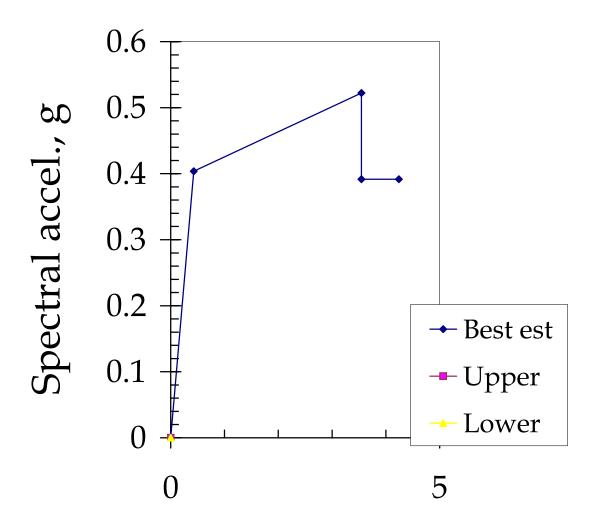
WHE-PAGER PH	HASE 2: DEVELOPMENT OF ANALYTICAL SEISMIC VULNERABILITY FUNCTIONS
Author:	Kappos Andreas, Panagopoulos Georgios
Date:	9/15/2009
Structure type (describe as broadly as possible):	RC4.2LH RC dual system, High seismic code design (1995), Low-rise (2 storeys), Fully infilled
Geographic or other limitations:	Greece, Southern Europe
	Add rows as desired
	Basic pushover curve for this structure type
Pushover X-axis:	Sd (cm) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if desired.
Pushover Y-axis:	Sa (g) Choose spectra acceleration (Sa), g; or base shear (V), kip. Change and state units if desired.
Elastic damping ratio:	Small-amplitude damping ratio, fraction of critical
1st mode participation factor:	1.26 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)
Effective mass coefficient: Building weight:	0.91 alpha1; generally 0.7 to 0.8 2239.04 W, kN. Change and state units if desired
How were these values & pushover points derived	
Tion were trese values a pusitover points derived	Add rows as desired
Dunk anna anna anna anna an	- Paris Commit
Pushover curve control po	int X Y Damping Comment 0 0 0 5 Control point for plotting purposes
	1 0.44 0.75 apparent yield point
	2 17.46 0.86 ultimate point (15% drop in strength)
	3 17.46 0.44 beginning of lower plateau
	4 28.91 0.44 end of lower plateau
Ontional	: upper and lower-bound range of pushover curves for this structure type
	uplication of this type would have pushover curve inside the area bounded between this curve and the Y-axis?
Author's meaning of "upper bound":	
How were these values & pushover points derived	Add rows as desired
	Add to the de desired
	Optional upper-bound pushover curve
Pushover curve control po	
	0 0 Control point for plotting purposes 1 E.g., yield point?
	L.sg., ylend point?
	E.g., beginning of lower plateau?
	4 Add rows as desired
Lower-hound pushover curve, e.g., 99 out of 100 b	buildings of this type would have pushover curve inside the area bounded between this curve and the X-axis?
Author's meaning of "lower bound":	Anithings of this type would have pushover curve historic are also bounded between this curve and the Araxis:
How were these values & pushover points derived	
	Add rows as desired
	Optional lower-bound pushover curve
Pushover curve control po	
	0 0 Control point for plotting purposes 1 E.g., yield point?
	E.g., yleid point?
	E.g., beginning of lower plateau?
	Add rows as desired
	Other required description
D14	Other requested parameters 28.91 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50% chance that the structural component of the building cannot be economical
D14 B14	
B14 Sdc	28.91 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50% chance that the structural component of the building cannot be economica 0.60-0.80 logarithmic standard deviation of drift associated with complete structural damage. May need to be guessed 34.70 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift at collapse)/PFfR.
B14 Sdc L15	28.91 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50% chance that the structural component of the building cannot be economica 0.60-0.80 logarithmic standard deviation of drift associated with complete structural damage. May need to be guessed 34.70 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift at collapse)/PFfR. indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and Holmes will fill such gaps
B14 Sdc L15 PC	28.91 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50% chance that the structural component of the building cannot be economics 0.60-0.80 [ogarithmic standard deviation of drift associated with complete structural damage. May need to be guessed 34.70 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift at collapse)/PFIR. Indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and Holmes will fill such gaps mean fraction of building area collapsed, given complete structural damage. Again Porter, Comartin, and Holmes will fill gaps
B14 Sdc L15 PC kshort	28.91 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50% chance that the structural component of the building cannot be economica 0.60-0.80 garithmic standard deviation of drift fin same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift at collapse)/PFIR. 1. Indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and Holmes will fill such gaps 1. Indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and Holmes will fill gaps 1. Indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and Holmes will fill gaps 1. Indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and Holmes will fill gaps 1. Indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and Holmes will fill gaps 1. Indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and Holmes will fill gaps 1. Indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and Holmes will fill gaps 1. Indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and Holmes will fill gaps
B14 Sdc L15 PC kshort kmed	28.91 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50% chance that the structural component of the building cannot be economica 0.60-0.80 [ogarithmic standard deviation of drift associated with complete structural damage. May need to be guessed 34.70 [the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift at collapse)/PFfR. indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and Holmes will fill such gaps mean fraction of building area collapsed, given complete structural damage. Again Porter, Comartin, and Holmes will fill gaps If HAZUS-style damping preferred, and author can judge, this is the degradation factor for medium-duration (5.5 < M < 7.5) events
B14 Sdc L15 PC kshort kmed klong	28.91 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50% chance that the structural component of the building cannot be economica 0.60-0.80 [ogarithmic standard deviation of drift associated with complete structural damage. May need to be guessed 34.70 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift at collapse)/PFfR. indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and Holmes will fill such gaps mean fraction of building area collapsed, given complete structural damage. Again Porter, Comartin, and Holmes will fill gaps If HAZUS-style damping preferred, and author can judge, this is the degradation factor for short-duration (M <= 5.5) events If HAZUS-style damping preferred, and author can judge, this is the degradation factor for long-duration (M >= 7.5) events
B14 Sdc L15 PC kshort kmed	28.91 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50% chance that the structural component of the building cannot be economica 0.60-0.80 [ogarithmic standard deviation of drift associated with complete structural damage. May need to be guessed 34.70 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift at collapse)/PFIR. indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and Holmes will fill such gaps mean fraction of building area collapsed, given complete structural damage. Again Porter, Comartin, and Holmes will fill gaps If HAZUS-style damping preferred, and author can judge, this is the degradation factor for short-duration (M <= 5.5) events If HAZUS-style damping preferred, and author can judge, this is the degradation factor for medium-duration (5.5 < M < 7.5) events If HAZUS-style damping preferred, and author can judge, this is the degradation factor for long-duration (M >= 7.5) events If HAZUS-style damping preferred, and author can judge, this is the degradation factor for long-duration (M >= 7.5) events If HAZUS-style damping preferred, and author can judge, this is the degradation factor for long-duration (M >= 7.5) events If HAZUS-style damping preferred, and author can judge, this is the degradation factor for long-duration (M >= 7.5) events If HAZUS-style damping preferred, and author can judge, this is the degradation factor for long-duration (M >= 7.5) events



Spectral displ., Sd, cm

RC4.2LL Greece, Southern Europe

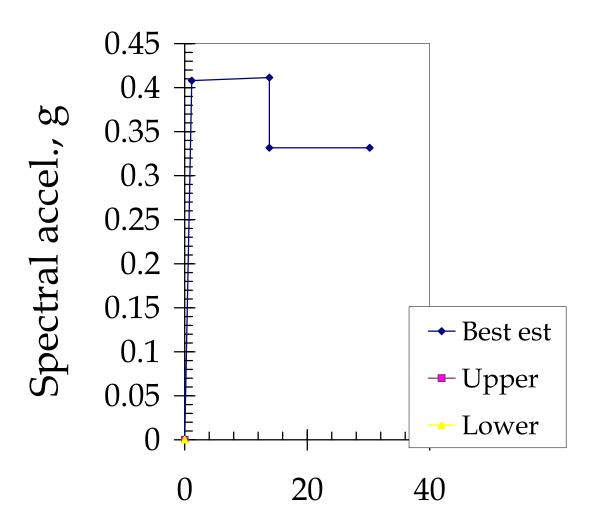
WHE-PAGER PHAS	SE 2: DEVELOPMENT OF ANALYTICAL SEISMIC VULNERABILITY FUNCTIONS	
Author:	Kappos Andreas, Panagopoulos Georgios	
Date:	9/15/2009	
Structure type (describe as broadly as possible):	RC4.2LL RC dual system, Low seismic code design (1959), Low-rise (2 storeys), Fully infilled	
Geographic or other limitations:	Greece, Southern Europe	
	Add rows as desired	
	Basic pushover curve for this structure type	
Pushover X-axis:	Sd (cm) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if des	red.
Pushover Y-axis:	Sa (g) Choose spectra acceleration (Sa), g; or base shear (V), kip. Change and state units if desired.	·
Elastic damping ratio:	Small-amplitude damping ratio, fraction of critical	
1st mode participation factor:	1.25 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)	
Effective mass coefficient:	0.91 alpha1; generally 0.7 to 0.8	
Building weight:	2555.74 W, kN. Change and state units if desired	
How were these values & pushover points derived	? Add rows as desired	
Pushover curve control poi		
	0 0 5 Control point for plotting purposes	
	1 0.43 0.40 apparent yield point	
	2 3.55 0.52 ultimate point (15% drop in strength) 3 3.55 0.39 beginning of lower plateau	
	4 4.24 0.39 end of lower plateau	
	end of lower plateau	
Optional: up	pper and lower-bound range of pushover curves for this structure type	
	uildings of this type would have pushover curve inside the area bounded between this curve and the Y-axis?	
Author's meaning of "upper bound": How were these values & pushover points derived:		
riow were triese values & pusitover points derived	Add rows as desired	
	Optional upper-bound pushover curve	
Pushover curve control poi		
	0 0 Control point for plotting purposes	
	E.g., yield point? E.g., ultimate point?	
	E.g., beginning of lower plateau?	
	Add rows as desired	
Lower-bound pushover curve, e.g., 99 out of 100 b Author's meaning of "lower bound":	uildings of this type would have pushover curve inside the area bounded between this curve and the X-axis?	
How were these values & pushover points derived	7	
	Add rows as desired	
Pushover curve control poi	Optional lower-bound pushover curve int X Y Damping Comment	
r denotes during control por	0 0 Control point for plotting purposes	
	1 E.g., yield point?	
	2 E.g., ultimate point?	
	E.g., beginning of lower plateau?	
	Add rows as desired	
	Other requested parameters	
D14	4.24 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50% of	hance that the structural component of the building cannot be economically
B14	0.60-0.80 logarithmic standard deviation of drift associated with complete structural damage. May need to be guessed	
Sdc	4.67 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift at col	
L15	indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and I	
PC	mean fraction of building area collapsed, given complete structural damage. Again Porter, Comartin, and Holmes	
kshort	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for short-duration (M <= 5	
kmed klong	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for medium-duration (5.5 If HAZUS-style damping preferred, and author can judge, this is the degradation factor for long-duration (M >= 7.	
	g citations if appropriate D14=Sd(4) for 4-linear curves or Sd(2) for bilinear curves	J) evente
For frame systems Sdc/D14=1.3 for low, 1.4 for me		
For dual systems Sdc/D14=1.1 for low and 1.2 for		



Spectral displ., Sd, cm

RC4.2MH Greece, Southern Europe

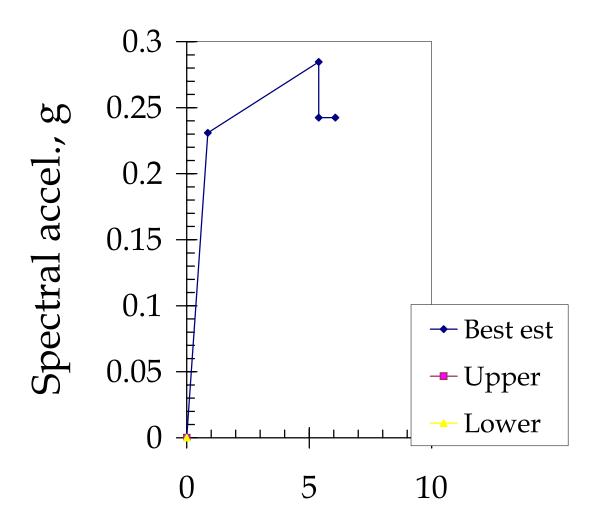
WHE-PAGER PHAS	E 2: DEVELOPMENT OF ANALYTICAL SEISMIC VULNERABILITY FUNCTIONS
Author:	Kappos Andreas, Panagopoulos Georgios
Date:	9/15/2009
Structure type (describe as broadly as possible):	RC4.2MH RC dual system, High seismic code design (1995), Medium-rise (4 storeys), Fully infilled
Geographic or other limitations:	Greece, Southern Europe
* *	Add rows as desired
	Basic pushover curve for this structure type
Pushover X-axis:	Sd (cm) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if desired.
Pushover Y-axis:	Sa (g) Choose spectra outsplacement (su), increase, or word insplacement (behan), increase, change and state units it desired. Sa (g) Choose spectra occeleration (Sa), g; or base shear (V), kip. Change and state units if desired.
Elastic damping ratio:	Sad (y) Clickee spectra acceleration (cay, g, or base sirear (v), kp. Cliarige and state units it desired. Small-amplitude damping ratio, fraction of critical
1st mode participation factor:	1.38 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)
Effective mass coefficient:	0.83 lalpha1; generally 0.7 to 0.8
Building weight:	4810.14 W, kN. Change and state units if desired
How were these values & pushover points derived?	
Tiow were these values a pusitover points derived:	Add rows as desired
Pushover curve control point	
	0 0 5 Control point for plotting purposes
	1 1.15 0.41 apparent yield point
	2 13.82 0.41 ultimate point (15% drop in strength)
	3 13.82 0.33 beginning of lower plateau
	4 30.20 0.33 end of lower plateau
Ontional: un	per and lower-bound range of pushover curves for this structure type
Upper-bound pushover curve, e.g., 99 out of 100 bi	illdings of this type would have pushover curve inside the area bounded between this curve and the Y-axis?
Author's meaning of "upper bound":	the region and type flower hard passion of carrier mode in care accurate and an order to an area.
How were these values & pushover points derived?	
	Add rows as desired
	Optional upper-bound pushover curve
Pushover curve control point	
	0 0 0 Control point for plotting purposes
	E.g., yield point?
	E.g., ultimate point?
	E.g., beginning of lower plateau? Add rows as desired
	* Aud I ows as desired
Lower-bound pushover curve, e.g., 99 out of 100 b	illdings of this type would have pushover curve inside the area bounded between this curve and the X-axis?
Author's meaning of "lower bound":	
How were these values & pushover points derived?	
	Add rows as desired
	Optional lower-bound pushover curve
Pushover curve control poi	
	0 0 0 Control point for plotting purposes
	E.g., yield point?
	E.g., ultimate point?
	E.g., beginning of lower plateau?
	4 Add rows as desired
D14	Other requested parameters 30.20 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50% chance that the structural component of the building cannot be economically repaire
B14	30.2d integration that (in same units as pushover A-axis) associated with complete structural damage, i.e., one with 30% chance that the structural component of the building cannot be economically repaire 1.660-0.80 logarithmic standard deviation of drift associated with complete structural damage. May need to be quessed
Sdc	36.24 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift at collapse)/PFfR.
L15	indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and Holmes will fill such qaps
PC	mean fraction of building area collapsed, given complete structural damage. Again Porter, Comartin, and Holmes will fill gaps
kshort	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for short-duration (M <= 5.5) events
kmed	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for medium-duration (5.5 < M < 7.5) events
klong	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for long-duration (M >= 7.5) events
	citations if appropriate Di4=Sd(4) for 4-linear curves or Sd(2) for bilinear curves
For frame systems Sdc/D14=1.3 for low, 1.4 for me	
For dual systems Sdc/D14=1.1 for low and 1.2 for h	igh code design Add rows as desired



Spectral displ., Sd, cm

RC4.2ML Greece, Southern Europe

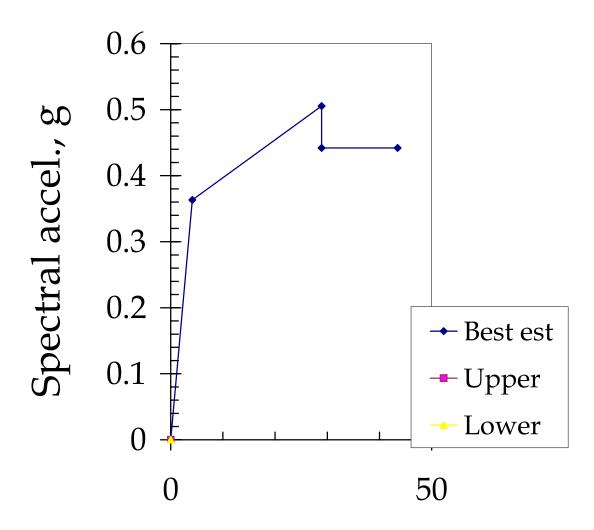
WHE-PAGER PHAS	SE 2: DEVELOPMENT OF ANALYTICAL SEISMIC VULNERABILITY FUNCTIONS	
Author:	Kappos Andreas, Panagopoulos Georgios	
Date:	9/15/2009	
Structure type (describe as broadly as possible):	RC4.2ML RC dual system, Low seismic code design (1959), Medium-rise (4 storeys), Fully infilled	
Geographic or other limitations:	Greece, Southern Europe	
	Add rows as d	esired
	Basic pushover curve for this structure type	
Pushover X-axis:	Sd (cm) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state unit	s if desired.
Pushover Y-axis:	Sa (g) Choose spectra acceleration (Sa), g; or base shear (V), kip. Change and state units if desired.	
Elastic damping ratio:	Small-amplitude damping ratio, fraction of critical	
1st mode participation factor:	1.38 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)	
Effective mass coefficient:	0.82 alpha1; generally 0.7 to 0.8	
Building weight:	5523.02 W, kN. Change and state units if desired	
How were these values & pushover points derived	Add rows as d	esired
Pushover curve control poi		
	0 0 0 5 Control point for plotting purposes 1 0.86 0.23 apparent yield point	
	2 5.39 0.28 ultimate point (15% drop in strength)	
	3 5.39 0.24 beginning of lower plateau	
	4 6.07 0.24 end of lower plateau	
		_
	per and lower-bound range of pushover curves for this structure type uildings of this type would have pushover curve inside the area bounded between this curve and the Y-axis?	
Author's meaning of "upper bound":	undings of this type would have pushover curve inside the area bounded between this curve and the 1-axis?	
How were these values & pushover points derived'		
	Add rows as d	esired
	Optional upper-bound pushover curve	
Pushover curve control poi		
r acriever curve control per	0 0 Control point for plotting purposes	
	1 E.g., yield point?	
	E.g., ultimate point?	
	E.g., beginning of lower plateau?	
	Add rows as desired	
Lower-bound pushover curve, e.g., 99 out of 100 b	uildings of this type would have pushover curve inside the area bounded between this curve and the X-axis?	
Author's meaning of "lower bound":		
How were these values & pushover points derived'	Add rows as d	paired
	Add lows as d	esileu
	Optional lower-bound pushover curve	
Pushover curve control poi		
	0 0 Control point for plotting purposes	
	E.g., yield point? E.g., ultimate point?	
	3 E.g., beginning of lower plateau?	
	4 Add rows as desired	
Did	Other requested parameters	
D14 B14	6.07 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with one of drift associated with complete structural damage. May need to be guess	
Sdc	6.68 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift)	
L15	indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comarti	
PC	mean fraction of building area collapsed, given complete structural damage. Again Porter, Comartin, and	
kshort	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for short-duration	
kmed	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for medium-durati	
klong	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for long-duration (M >= 7.5) events
For frame systems Sdc/D14=1.3 for low, 1.4 for me	g citations if appropriate D14=Sd(4) for 4-linear curves or Sd(2) for bilinear curves	
For dual systems Sdc/D14=1.3 for low and 1.2 for low		esired



Spectral displ., Sd, cm

RC4.3HH Greece, Southern Europe

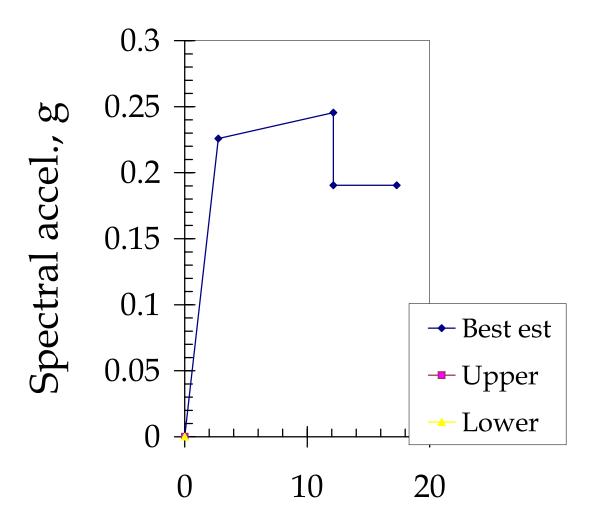
WHE-PAGER PHAS	SE 2: DEVELOPMENT OF ANALYTICAL SEISMIC VULNERABILITY FUNCTIONS	
Author:	Kappos Andreas, Panagopoulos Georgios	
Date:	9/15/2009	
Structure type (describe as broadly as possible):	RC4.3HH RC dual system, High seismic code design (1995), High-rise (9 storeys), Soft storey (pilotis)	
Geographic or other limitations:	Greece, Southern Europe	
	Add rows as	desired
	Basic pushover curve for this structure type	
Pushover X-axis:	Sd (cm) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state up	its if desired.
Pushover Y-axis:	Sa (g) Choose spectra acceleration (Sa), g; or base shear (V), kip. Change and state units if desired.	
Elastic damping ratio:	Small-amplitude damping ratio, fraction of critical	
1st mode participation factor:	1.44 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)	
Effective mass coefficient:	0.76 alpha1; generally 0.7 to 0.8 11577.50 W, kN. Change and state units if desired	
Building weight: How were these values & pushover points derived'		
riow were these values & pushover points derived	Add rows as	desired
Pushover curve control poi	nt X Y Damping Comment 0 0 0 5 Control point for plotting purposes	
	1 4.14 0.36 apparent yield point	
	2 28.91 0.51 ultimate point (15% drop in strength)	
	3 28.91 0.44 beginning of lower plateau	
	4 43.48 0.44 end of lower plateau	
Outland	way and laway having young of muchaving armine for this atmost up true	
	pper and lower-bound range of pushover curves for this structure type uildings of this type would have pushover curve inside the area bounded between this curve and the Y-axis?	
Author's meaning of "upper bound":	and the state of t	
How were these values & pushover points derived		
	Add rows as	desired
	Optional upper-bound pushover curve	
Pushover curve control poi		
	0 0 Control point for plotting purposes	
	E.g., yield point?	
	E.g., ultimate point? E.g., beginning of lower plateau?	
	Add rows as desired	
	uildings of this type would have pushover curve inside the area bounded between this curve and the X-axis?	
Author's meaning of "lower bound": How were these values & pushover points derived'		
Tion were those values a paoriers penne delired	Add rows as	desired
Pushover curve control poi	Optional lower-bound pushover curve nt X Y Damping Comment	
r donovor our re donice por	0 0 Control point for plotting purposes	
	1 E.g., yield point?	
	E.g., ultimate point?	
	E.g., beginning of lower plateau?	
	4 Add rows as desired	
	Other requested parameters	
D14	43.48 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift w	
B14	0.60-0.80 logarithmic standard deviation of drift associated with complete structural damage. May need to be gue	
Sdc	52.18 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof of the collapse, e.g., Sdc = (roof of the collapse) associated with collapse.	
L15 PC	indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comamean fraction of building area collapsed, given complete structural damage. Again Porter, Comartin, ar	
kshort	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for short-duration	
kmed	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for medium-dura	
klong	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for long-duration	
	g citations if appropriate D14=Sd(4) for 4-linear curves or Sd(2) for bilinear curves	
For frame systems Sdc/D14=1.3 for low, 1.4 for me For dual systems Sdc/D14=1.1 for low and 1.2 for		decired
For dual systems Suc/D14=1.1 for low and 1.2 for	ilgii coue desigii Add rows as	uesiieu



Spectral displ., Sd, cm

RC4.3HL Greece, Southern Europe

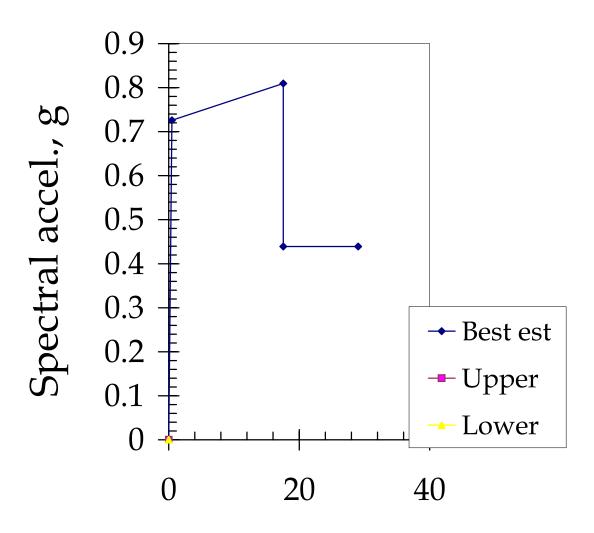
WHE-PAGER PHAS	SE 2: DEVELOPMENT OF ANALYTICAL SEISMIC VULNERABILITY FUNCTIONS	
Author:	Kappos Andreas, Panagopoulos Georgios	
Date:	9/15/2009	
Structure type (describe as broadly as possible):	RC4.3HL RC dual system, Low seismic code design (1959), High-rise (9 storeys), Soft storey (pilotis)	
Geographic or other limitations:	Greece, Southern Europe	
	Add rows as desired	
	Basic pushover curve for this structure type	ī
Pushover X-axis:	Sd (cm) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if de	■ sired.
Pushover Y-axis:	Sa (g) Choose spectra acceleration (Sa), g; or base shear (V), kip. Change and state units if desired.	
Elastic damping ratio:	Small-amplitude damping ratio, fraction of critical	
1st mode participation factor:	1.43 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)	
Effective mass coefficient:	0.75 alpha1; generally 0.7 to 0.8	
Building weight:	12457.38 W, kN. Change and state units if desired	
How were these values & pushover points derived?	Add rows as desired	_
Pushover curve control poi		
	0 0 5 Control point for plotting purposes 1 2.75 0.23 apparent yield point	
	2 12.13 0.25 ultimate point (15% drop in strength)	
	3 12.13 0.19 beginning of lower plateau	
	4 17.30 0.19 end of lower plateau	
		_
	per and lower-bound range of pushover curves for this structure type uildings of this type would have pushover curve inside the area bounded between this curve and the Y-axis?	<u> </u>
Author's meaning of "upper bound":	ulidings of this type would have pushover curve inside the area bounded between this curve and the Y-axis?	
How were these values & pushover points derived?		
	Add rows as desired	
	Optional upper-bound pushover curve	
Pushover curve control poi		
	0 0 0 Control point for plotting purposes	
	1 E.g., yield point?	
	E.g., ultimate point?	
	E.g., beginning of lower plateau? Add rows as desired	
	Add rows as desired	
Lower-bound pushover curve, e.g., 99 out of 100 b	uildings of this type would have pushover curve inside the area bounded between this curve and the X-axis?	
Author's meaning of "lower bound":		
How were these values & pushover points derived?	Add rows as desired	
	Optional lower-bound pushover curve	
Pushover curve control poi		
	0 0 0 Control point for plotting purposes 1 E.g., yield point?	
	E.g., ultimate point?	
	E.g., beginning of lower plateau?	
	Add rows as desired	
	Other an accepted a comment of	-
D14	Other requested parameters 17.30 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50%	chance that the structural component of the building cannot be economic:
B14	0.60-0.80 logarithmic standard deviation of drift associated with complete structural damage. May need to be guessed	
Sdc	19.03 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift at co	ollapse)/PFfR.
L15	indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and	
PC	mean fraction of building area collapsed, given complete structural damage. Again Porter, Comartin, and Holmo	
kshort	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for short-duration (M <=	
kmed	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for medium-duration (5.4 If HAZUS-style damping preferred, and author can judge, this is the degradation factor for long-duration (M >= 1	
klong Explain how these values were arrived at providing	g citations if appropriate D14=Sd(4) for 4-linear curves or Sd(2) for bilinear curves	.o) events
For frame systems Sdc/D14=1.3 for low, 1.4 for me		
For dual systems Sdc/D14=1.1 for low and 1.2 for l		
· · · · · · · · · · · · · · · · · · ·		



Spectral displ., Sd, cm

RC4.3LH Greece, Southern Europe

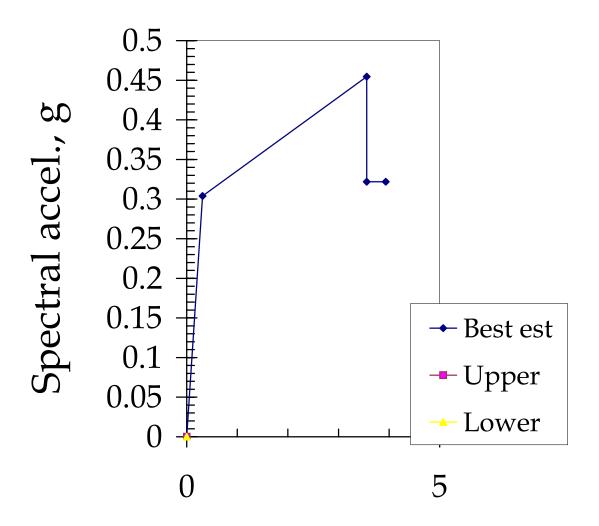
WHE-PAGER PHAS	SE 2: DEVELOPMENT OF ANALYTICAL SEISMIC VULNERABILITY FUNCTIONS	
Author:	Kappos Andreas, Panagopoulos Georgios	
Date:	Nappos Antietas, i aliagopoulos Georgios 9/15/2009	
Structure type (describe as broadly as possible):	RC4.3LH RC dual system, High seismic code design (1995), Low-rise (2 storeys), Soft storey (pilotis)	
Geographic or other limitations:	Greece, Southern Europe	
	Add rows as desired	
	Basic pushover curve for this structure type	
Pushover X-axis:	Sd (cm) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if desired.	
Pushover Y-axis:	Sa (g) Choose spectra acceleration (Sa), g; or base shear (V), kip. Change and state units if desired.	
Elastic damping ratio:	Small-amplitude damping ratio, fraction of critical	
1st mode participation factor:	1.26 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)	
Effective mass coefficient:	0.91 alpha1; generally 0.7 to 0.8	
Building weight:	2239.04]W, kN. Change and state units if desired	
How were these values & pushover points derived?	Add rows as desired	
Pushover curve control poir		
	0 0 0 5 Control point for plotting purposes 1 0.49 0.73 apparent yield point	
	1.55 0.81 ultimate point (15% drop in strength)	
	3 17.55 0.44 beginning of lower plateau	
	4 29.04 0.44 end of lower plateau	
	pper and lower-bound range of pushover curves for this structure type	
Upper-bound pushover curve, e.g., 99 out of 100 but Author's meaning of "upper bound":	buildings of this type would have pushover curve inside the area bounded between this curve and the Y-axis?	
How were these values & pushover points derived?	2	
	Add rows as desired	
B. d	Optional upper-bound pushover curve	
Pushover curve control poir		
	0 0 0 Control point for plotting purposes 1 E.g., yield point?	
	E.g., ultimate point?	
	E.g., beginning of lower plateau?	
	4 Add rows as desired	
Lower hound pushover ourse as a 00 out of 100 hi	suit library of this type would have purposer array inside the array hounded between this array and the V avid	
Author's meaning of "lower bound":	buildings of this type would have pushover curve inside the area bounded between this curve and the X-axis?	
How were these values & pushover points derived?		
	Add rows as desired	
	Optional lower-bound pushover curve	
Pushover curve control poir		
·	0 0 0 Control point for plotting purposes	
	1 E.g., yield point?	
	E.g., ultimate point?	
	E.g., beginning of lower plateau?	
	4 Add rows as desired	
	Other requested parameters	
D14	29.04 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50% chance that the structural com	ponent of the building cannot be economic
B14	0.60-0.80 logarithmic standard deviation of drift associated with complete structural damage. May need to be guessed	
Sdc	34.84 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift at collapse)/PFfR.	
L15 PC	indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and Holmes will fill such gaps mean fraction of building area collapsed, given complete structural damage. Again Porter, Comartin, and Holmes will fill gaps	
kshort	mean reaction or bulloting area collapsed, given complete structural damage. Again Porter, Comartin, and informes will till gaps If HAZUS-style damping preferred, and author can judge, this is the degradation factor for short-duration (M <= 5.5) events	
kmed	If HAZUS-style damping preferred, and author can judge, this is the degladation factor for medium-duration (5.5 < M < 7.5) events	
klong	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for long-duration (M >= 7.5) events	
Explain how these values were arrived at, providing	g citations if appropriate D14=Sd(4) for 4-linear curves or Sd(2) for bilinear curves	
For frame systems Sdc/D14=1.3 for low, 1.4 for me		
For dual systems Sdc/D14=1.1 for low and 1.2 for h	high code design Add rows as desired	



Spectral displ., Sd, cm

RC4.3LL Greece, Southern Europe

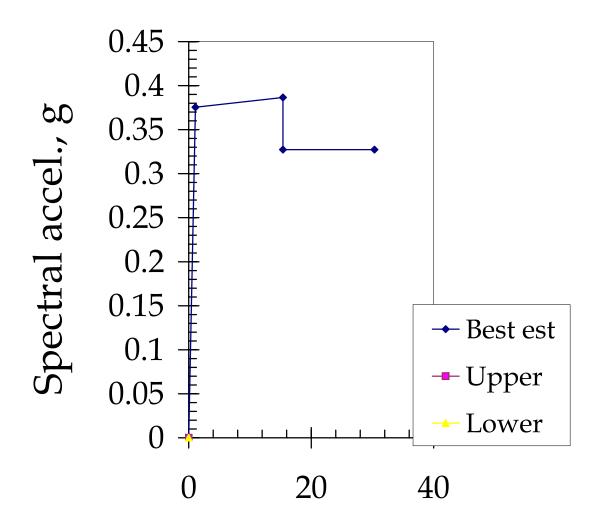
Author: Date: Structure type (describe as broadly as possible): Geographic or other limitations: Basic pushover curve for this structure type Pushover X-axis: Pushover Y-axis: Elastic damping ratio: Structure type Effective mass coefficient: Structure type Structure type Pushover X-axis: Pushover X-axis: Sa (g) Sa (g) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if desired. Small-amplitude damping ratio, fraction of critical Small-amplitude damping ratio or critical Structure type Structure type Pushover X-axis: Elastic damping ratio: Small-amplitude damping ratio, fraction of critical Small-amplitude damping ratio or critical Small-amplitude damping ratio or critical Structure type Structure type Structure type Pushover X-axis: Sa (g) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if desired. Small-amplitude damping ratio, fraction of critical
Date: Structure type (describe as broadly as possible): Geographic or other limitations: Basic pushover curve for this structure type Pushover X-axis: Pushover Y-axis: Sa (g) Sa (g) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if desired. Sa (g) Choose spectral displacement (Sd), g; or base shear (V), kip. Change and state units if desired. Sa (g) Sa
Structure type (describe as broadly as possible): Geographic or other limitations: RC4.3LL RC dual system, Low seismic code design (1959), Low-rise (2 storeys), Soft storey (pilotis) Greece, Southern Europe Add rows as desired Basic pushover curve for this structure type Pushover X-axis: Pushover Y-axis: Sa (g) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if desired. Sa (g) Choose spectral acceleration (Sa), g; or base shear (V), kip. Change and state units if desired. Small-amplitude damping ratio; St mode participation factor: Small-amplitude damping ratio, fraction of critical 1.25 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height) Effective mass coefficient: 0.91
Basic pushover curve for this structure type Pushover X-axis: Pushover Y-axis: Sa (g) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if desired. Choose spectra acceleration (Sa), g; or base shear (V), kip. Change and state units if desired. Sa (g) Choose spectra acceleration (Sa), g; or base shear (V), kip. Change and state units if desired. Small-amplitude damping ratio, fraction of critical 1st mode participation factor: 1.25 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height) Effective mass coefficient: 0.91
Pushover X-axis: Pushover Y-axis: Sa (g) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if desired. Sa (g) Choose spectral acceleration (Sa), g; or base shear (V), kip. Change and state units if desired. Small-amplitude damping ratio, fraction of critical 1st mode participation factor: 1.25 PFIR; generally 1.3 to 1.5; same as (effective height)/(total roof height) Effective mass coefficient: 0.91
Pushover X-axis: Pushover Y-axis: Sa (g) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if desired. Choose spectra acceleration (Sa), g; or base shear (V), kip. Change and state units if desired. Small-amplitude damping ratio, fraction of critical 1st mode participation factor: 1.25 PFIR; generally 1.3 to 1.5; same as (effective height)/(total roof height) Effective mass coefficient: 0.91
Pushover X-axis: Pushover Y-axis: Sa (g) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if desired. Sa (g) Choose spectra acceleration (Sa), g; or base shear (V), kip. Change and state units if desired. Samil-amplitude damping ratio: Sa (g) Sa
Pushover Y-axis: Elastic damping ratio: State of the control of
1st mode participation factor: 1.25 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height) Effective mass coefficient: 0.91 alpha1; generally 0.7 to 0.8
Effective mass coefficient: 0.91 alpha1; generally 0.7 to 0.8
Building weight: 2555.74 W, kN. Change and state units if desired
How were these values & pushover points derived? Add rows as desired
, and to the defende
Pushover curve control point X Y Damping Comment
0 0 5 Control point for plotting purposes
1 0.31 0.30 apparent yield point 2 3.56 0.45 ultimate point (15% drop in strength)
2 3.56 0.32 Julinate point (13% urby in strength) 3 3.56 0.32 Deginning of lower plateau
4 3.93 0.32 end of lower plateau
Optional: upper and lower-bound range of pushover curves for this structure type
Upper-bound pushover curve, e.g., 99 out of 100 buildings of this type would have pushover curve inside the area bounded between this curve and the Y-axis?
Author's meaning of "upper bound": How were these values & pushover points derived?
Add rows as desired
Optional upper-bound pushover curve
Pushover curve control point X Y Damping Comment
0 0 0 Control point for plotting purposes 1 E.g., yield point?
E.g., ultimate point?
3 E.g., beginning of lower plateau?
4 Add rows as desired
Lower-bound pushover curve, e.g., 99 out of 100 buildings of this type would have pushover curve inside the area bounded between this curve and the X-axis? Author's meaning of "lower bound":
How were these values & pushover points derived?
Add rows as desired
Optional lower-bound pushover curve
Pushover curve control point X Y Damping Comment
0 0 Control point for plotting purposes
1 E.g., yield point?
2 E.g., ultimate point?
E.g., beginning of lower plateau?
4 Add rows as desired
Other requested parameters
D14 3.93 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50% chance that the structural component of the building ca
B14 O
Sdc 4.33 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift at collapse)/PFIR.
L15 indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and Holmes will fill such gaps PC mean fraction of building area collapsed, given complete structural damage. Again Porter, Comartin, and Holmes will fill gaps
kshort lift HAZUS-style damping preferred, and author can judge, this is the degradation factor for short-duration (M <= 5.5) events
ksriot an In AZOS-style damping preferred, and author can judge, this is the degradation factor for medium-duration (S. 5.4 M < 7.5) events ### HAZOS-style damping preferred, and author can judge, this is the degradation factor for medium-duration (S. 5.4 M < 7.5) events
klong If HAZUS-style damping preferred, and author can judge, this is the degradation factor for long-duration (M >= 7.5) events
Explain how these values were arrived at, providing ditations if appropriate D14=Sd(4) for 4-linear curves or Sd(2) for bilinear curves
For frame systems Sdc/D14=1.3 for low, 1.4 for medium and 1.5 for high code design
For dual systems Sdc/D14=1.1 for low and 1.2 for high code design Add rows as desired



Spectral displ., Sd, cm

RC4.3MH Greece, Southern Europe

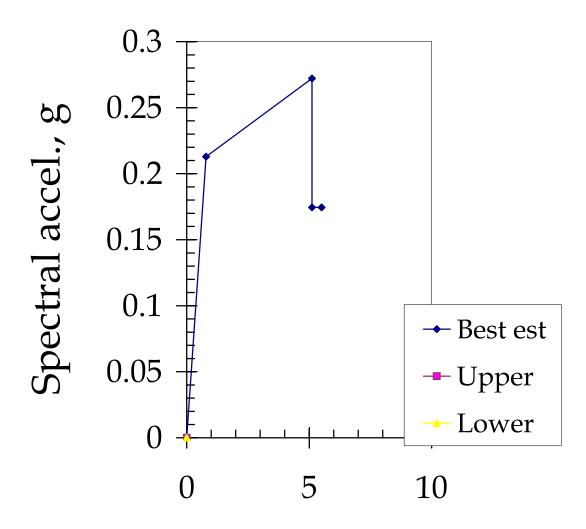
WHE-PAGER PHAS	SE 2: DEVELOPMENT OF ANALYTICAL SEISMIC VULNERABILITY FUNCTIONS	
Author:	Kappos Andreas, Panagopoulos Georgios	
Date:	9/15/2009	
Structure type (describe as broadly as possible):	RC4.3MH RC dual system, High seismic code design (1995), Medium-rise (4 storeys), Soft storey (pilotis)	
Geographic or other limitations:	Greece, Southern Europe	
	Add rows as desire	ed
	Basic pushover curve for this structure type	_
Pushover X-axis:	Sd (cm) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if or	desired.
Pushover Y-axis:	Sa (g) Choose spectra acceleration (Sa), g; or base shear (V), kip. Change and state units if desired.	
Elastic damping ratio:	Small-amplitude damping ratio, fraction of critical	
1st mode participation factor:	1.38 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)	
Effective mass coefficient:	0.84 alpha1; generally 0.7 to 0.8	
Building weight:	4810.14 W, kN. Change and state units if desired	
How were these values & pushover points derived	Add rows as desire	ed
Pushover curve control poi		
	0 0 5 Control point for plotting purposes 1 1.10 0.38 apparent yield point	
	2 15.40 0.39 ultimate point (15% drop in strength)	
	3 15.40 0.33 beginning of lower plateau	
	4 30.33 0.33 end of lower plateau	
		_
	pper and lower-bound range of pushover curves for this structure type uildings of this type would have pushover curve inside the area bounded between this curve and the Y-axis?	_
Author's meaning of "upper bound":	likings of this type would have pushover curve inside the area bounded between this curve and the Y-axis?	
How were these values & pushover points derived		
	Add rows as desire	ed
	Optional upper-bound pushover curve	
Pushover curve control poi		
	0 0 Control point for plotting purposes	
	1 E.g., yield point?	
	E.g., ultimate point?	
	E.g., beginning of lower plateau? Add rows as desired	
	Audi lows as desiled	
Lower-bound pushover curve, e.g., 99 out of 100 b	uildings of this type would have pushover curve inside the area bounded between this curve and the X-axis?	
Author's meaning of "lower bound":		
How were these values & pushover points derived?	Add rows as desire	ed
B. J	Optional lower-bound pushover curve	
Pushover curve control poi	nt X Y Damping Comment Control point for plotting purposes	
	1 E.g., yield point?	
	2 E.g., ultimate point?	
	3 E.g., beginning of lower plateau?	
	4 Add rows as desired	
	Other requested parameters	
D14	30.33 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50'	 chance that the structural component of the building cannot be economical
B14	0.60-0.80 logarithmic standard deviation of drift associated with complete structural damage. May need to be guessed	
Sdc	36.40 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift at	
L15	indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, at	
PC	mean fraction of building area collapsed, given complete structural damage. Again Porter, Comartin, and Holr	
kshort	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for short-duration (M <	
kmed klong	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for medium-duration (\$\frac{1}{2}\$ If HAZUS-style damping preferred, and author can judge, this is the degradation factor for long-duration (M >=	
	g citations if appropriate D14=Sd(4) for 4-linear curves or Sd(2) for bilinear curves	- 1.0) events
For frame systems Sdc/D14=1.3 for low, 1.4 for me		
For dual systems Sdc/D14=1.1 for low and 1.2 for l	high code design Add rows as desire	ed



Spectral displ., Sd, cm

RC4.3ML Greece, Southern Europe

WHE-PAGER PHAS	SE 2: DEVELOPMENT OF ANALYTICAL SEISMIC VULNERABILITY FUNCTIONS	
Author:	Kappos Andreas, Panagopoulos Georgios	
Date:	Nappos Antietas, i anagopoulos deorgios 9/15/2009	
Structure type (describe as broadly as possible):	RC4.3ML RC dual system, Low seismic code design (1959), Medium-rise (4 storeys), Soft storey (pilotis)	
Geographic or other limitations:	Greece, Southern Europe	
	Add rows as desired	
	Basic pushover curve for this structure type	
Pushover X-axis:	Sd (cm) Choose spectral displacement (Sd), inches; or Roof displacement (Deltar), inches. Change and state units if desired.	
Pushover Y-axis:	Sa (g) Choose spectra acceleration (Sa), g; or base shear (V), kip. Change and state units if desired.	
Elastic damping ratio:	Small-amplitude damping ratio, fraction of critical	
1st mode participation factor:	1.38 PFfR; generally 1.3 to 1.5; same as (effective height)/(total roof height)	
Effective mass coefficient:	0.83 alpha1; generally 0.7 to 0.8	
Building weight: How were these values & pushover points derived?	5523.02 W, kN. Change and state units if desired	
now were triese values & pusitover points derived	Add rows as desired	
Pushover curve control poi		
	0 0 5 Control point for plotting purposes 1 0.79 0.21 apparent yield point	
	1	
	3 5.12 0.17 beginning of lower plateau	
	4 5.51 0.17 end of lower plateau	
	oper and lower-bound range of pushover curves for this structure type	
Upper-bound pushover curve, e.g., 99 out of 100 be Author's meaning of "upper bound":	buildings of this type would have pushover curve inside the area bounded between this curve and the Y-axis?	
How were these values & pushover points derived?		
	Add rows as desired	
	Optional upper-bound pushover curve	
Pushover curve control point		
	0 0 Control point for plotting purposes 1 E.g., yield point?	
	E.g., ultimate point?	
	E.g., beginning of lower plateau?	
	4 Add rows as desired	
Lower hound pushover ourse or a 00 out of 100 h	uildings of this type would have purkeyer ever inside the area hounded between this every and the V avis?	
Author's meaning of "lower bound":	buildings of this type would have pushover curve inside the area bounded between this curve and the X-axis?	
How were these values & pushover points derived?		
	Add rows as desired	
	Optional lower-bound pushover curve	
Pushover curve control poi		
·	0 0 Control point for plotting purposes	
	E.g., yield point?	
	E.g., ultimate point?	
	E.g., beginning of lower plateau?	
	4 Add rows as desired	
	Other requested parameters	
D14	5.51 median drift (in same units as pushover X-axis) associated with complete structural damage, i.e., drift with 50% chance that the	structural component of the building cannot be economically
B14	0.60-0.80 logarithmic standard deviation of drift associated with complete structural damage. May need to be guessed	
Sdc	6.06 the median value of drift (in same units as pushover X-axis) associated with collapse, e.g., Sdc = (roof drift at collapse)/PFfR.	
L15 PC	indoor fatality rate given collapse. Many contributors may be unable to provide this value. Porter, Comartin, and Holmes will fill mean fraction of building area collapsed, given complete structural damage. Again Porter, Comartin, and Holmes will fill gaps	sucn gaps
kshort	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for short-duration (M <= 5.5) events	
kmed	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for medium-duration (w < 5.5 events).	ents
klong	If HAZUS-style damping preferred, and author can judge, this is the degradation factor for long-duration (M >= 7.5) events	
Explain how these values were arrived at, providing	g citations if appropriate D14=Sd(4) for 4-linear curves or Sd(2) for bilinear curves	
For frame systems Sdc/D14=1.3 for low, 1.4 for me		
For dual systems Sdc/D14=1.1 for low and 1.2 for h	high code design Add rows as desired	



Spectral displ., Sd, cm