#### ShakeCast Documentation 3.0

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# **MBT** Fragility

Summary: HAZUS Model Building Fragility Table



#### High-code fragilities for HAZUS model building types

Table 1. High-code fragilities for HAZUS model building types.

FACILITY TYPE	DESCRIPTION	METRIC	ALPHA	ВЕТА	ALPHA	ВЕТА	ALPHA	ВЕТА	ALPHA	ВЕТА
W1H	Wood, Light Frame	PGA	26	0.64	55	0.64	128	0.64	201	0.64
W2H	Wood	PGA	26	0.64	56	0.64	115	0.64	208	0.64

	Commercial									
S1LH	Steel Moment Frame, Low Rise	PGA	19	0.64	31	0.64	64	0.64	149	0.64
S1MH	Steel Moment Frame, Mid Rise	PGA	14	0.64	26	0.64	62	0.64	143	0.64
S1HH	Steel Moment Frame, High Rise	PGA	10	0.64	21	0.64	52	0.64	131	0.64
S2LH	Steel Brace Frame, Low Rise	PGA	24	0.64	41	0.64	76	0.64	146	0.64
S2MH	Steel Brace Frame, Mid Rise	PGA	14	0.64	27	0.64	73	0.64	162	0.64
S2HH	Steel Brace Frame, High Rise	PGA	11	0.64	22	0.64	65	0.64	160	0.64
S3H	Steel Light Frame	PGA	15	0.64	26	0.64	54	0.64	100	0.64
S4LH	Steel Frame Shear Wall, Low Rise	PGA	24	0.64	39	0.64	71	0.64	133	0.64
S4MH	Steel Frame Shear Wall, Mid Rise	PGA	16	0.64	28	0.64	73	0.64	156	0.64
S4HH	Steel Frame Shear Wall, High Rise	PGA	13	0.64	25	0.64	69	0.64	163	0.64
C1LH	Concrete Moment Frame, Low Rise	PGA	21	0.64	35	0.64	70	0.64	137	0.64
C1MH	Concrete Moment Frame, Mid Rise	PGA	15	0.64	27	0.64	73	0.64	161	0.64
C1HH	Concrete Moment Frame, High Rise	PGA	11	0.64	22	0.64	62	0.64	135	0.64
C2LH	Concrete Shear Wall,	PGA	24	0.64	45	0.64	90	0.64	155	0.64

Shear Wall,   Mid Rise   C2HH   Concrete   Shear Wall,   High Rise   PGA   12   0.64   29   0.64   82   0.64   187   0.64   0.65   0.		Low Rise									
Shear Wall, High Rise   PGA   20   0.64   35   0.64   72   0.64   125   0.64   12	C2MH	Shear Wall,	PGA	17	0.64	36	0.64	87	0.64	195	0.64
PG2LH	С2НН	Shear Wall,	PGA	12	0.64	29	0.64	82	0.64	187	0.64
Concrete Frames, Low Rise	PC1H	Concrete Tiltup	PGA	20	0.64	35	0.64	72	0.64	125	0.64
Concrete   Frames, Mid   Rise	PC2LH	Concrete Frames, Low	PGA	24	0.64	36	0.64	69	0.64	123	0.64
Concrete Frames, High Rise	PC2MH	Concrete Frames, Mid	PGA	17	0.64	29	0.64	67	0.64	151	0.64
Masonry with Wood, Low Rise           RM1MH         Reinforced Masonry with Wood, Mid Rise         PGA         20         0.64         37         0.64         81         0.64         190         0.6           RM2LH         Reinforced Masonry with Precast Concrete, Low Rise         PGA         26         0.64         42         0.64         87         0.64         149         0.6           RM2MH         Reinforced Masonry with Precast Concrete, Low Rise         PGA         17         0.64         33         0.64         75         0.64         183         0.6           RM2HH         Reinforced Masonry with Precast Concrete, High         PGA         12         0.64         24         0.64         67         0.64         178         0.6	РС2НН	Concrete Frames, High	PGA	12	0.64	23	0.64	63	0.64	149	0.64
Masonry with Wood, Mid Rise         RM2LH       Reinforced PGA 26 0.64 42 0.64 87 0.64 149 0.64 Masonry with Precast Concrete, Low Rise         RM2MH       Reinforced PGA 17 0.64 33 0.64 75 0.64 183 0.64 Masonry with Precast Concrete, Mid Rise         RM2HH       Reinforced PGA 12 0.64 24 0.64 67 0.64 178 0.64 Masonry with Precast Concrete, High	RM1LH	Masonry with Wood, Low	PGA	30	0.64	46	0.64	93	0.64	157	0.64
Masonry with Precast Concrete, Low Rise  RM2MH Reinforced PGA 17 0.64 33 0.64 75 0.64 183 0.6  Masonry with Precast Concrete, Mid Rise  RM2HH Reinforced PGA 12 0.64 24 0.64 67 0.64 178 0.6  Masonry with Precast Concrete, High	RM1MH	Masonry with Wood, Mid	PGA	20	0.64	37	0.64	81	0.64	190	0.64
Masonry with Precast Concrete, Mid Rise  RM2HH Reinforced PGA 12 0.64 24 0.64 67 0.64 178 0.64 Masonry with Precast Concrete, High	RM2LH	Masonry with Precast Concrete, Low	PGA	26	0.64	42	0.64	87	0.64	149	0.64
Masonry with Precast Concrete, High	RM2MH	Masonry with Precast Concrete, Mid	PGA	17	0.64	33	0.64	75	0.64	183	0.64
	RM2HH	Masonry with Precast Concrete, High	PGA	12	0.64	24	0.64	67	0.64	178	0.64

### Moderate-code fragilities for HAZUS model building types

Table 2. Moderate-code fragilities for HAZUS model building types.

FACILITYTYPE	DESCRIPTION	METRIC	ALPHA	BETA	ALPHA	BETA	ALPHA	BETA	ALPHA	BETA
W1M	Wood, Light Frame	PGA	24	0.64	43	0.64	91	0.64	134	0.64
W2M	Wood Commercial	PGA	20	0.64	35	0.64	64	0.64	113	0.64
S1LM	Steel Moment Frame, Low Rise	PGA	15	0.64	22	0.64	42	0.64	80	0.64
S1MM	Steel Moment Frame, Mid Rise	PGA	13	0.64	21	0.64	44	0.64	82	0.64
S1HM	Steel Moment Frame, High Rise	PGA	10	0.64	18	0.64	39	0.64	78	0.64
S2LM	Steel Brace Frame, Low Rise	PGA	20	0.64	26	0.64	46	0.64	84	0.64
S2MM	Steel Brace Frame, Mid Rise	PGA	14	0.64	22	0.64	53	0.64	97	0.64
S2HM	Steel Brace Frame, High Rise	PGA	11	0.64	19	0.64	49	0.64	102	0.64
S3M	Steel Light Frame	PGA	13	0.64	19	0.64	33	0.64	60	0.64
S4LM	Steel Frame Shear Wall, Low Rise	PGA	19	0.64	26	0.64	41	0.64	78	0.64
S4MM	Steel Frame Shear Wall, Mid Rise	PGA	14	0.64	22	0.64	51	0.64	92	0.64
S4HM	Steel Frame Shear Wall, High Rise	PGA	12	0.64	21	0.64	51	0.64	97	0.64
C1LM	Concrete Moment Frame, Low	PGA	16	0.64	23	0.64	41	0.64	77	0.64

	Rise									
C1MM	Concrete Moment Frame, Mid Rise	PGA	13	0.64	21	0.64	49	0.64	89	0.64
C1HM	Concrete Moment Frame, High Rise	PGA	11	0.64	18	0.64	41	0.64	74	0.64
C2LM	Concrete Shear Wall, Low Rise	PGA	18	0.64	30	0.64	49	0.64	87	0.64
C2MM	Concrete Shear Wall, Mid Rise	PGA	15	0.64	26	0.64	55	0.64	102	0.64
С2НМ	Concrete Shear Wall, High Rise	PGA	12	0.64	23	0.64	57	0.64	107	0.64
PC1M	Precast Concrete Tiltup Wall	PGA	18	0.64	24	0.64	44	0.64	71	0.64
PC2LM	Precast Concrete Frames, Low Rise	PGA	18	0.64	25	0.64	40	0.64	74	0.64
PC2MM	Precast Concrete Frames, Mid Rise	PGA	15	0.64	21	0.64	45	0.64	86	0.64
PC2HM	Precast Concrete Frames, High Rise	PGA	12	0.64	19	0.64	46	0.64	90	0.64
RM1LM	Reinforced Masonry with Wood, Low Rise	PGA	22	0.64	30	0.64	50	0.64	85	0.64
RM1MM	Reinforced Masonry with Wood, Mid Rise	PGA	18	0.64	26	0.64	51	0.64	103	0.64
RM2LM	Reinforced Masonry with Precast Concrete, Low Rise	PGA	20	0.64	28	0.64	47	0.64	81	0.64

RM2MM	Reinforced Masonry with Precast Concrete, Mid Rise	PGA	16	0.64	23	0.64	48	0.64	99	0.64
RM2HM	Reinforced Masonry with Precast Concrete, High Rise	PGA	12	0.64	20	0.64	48	0.64	101	0.64
МНМ	Mobile Homes	PGA	11	0.64	18	0.64	31	0.64	60	0.64

## Low-code fragilities for HAZUS model building types

 Table 3. Low-code fragilities for HAZUS model building types.

FACILITY TYPE	DESCRIPTION	METRIC	ALPHA	BETA	ALPHA	ВЕТА	ALPHA	BETA	ALPHA	BETA
W1L	Wood, Light Frame	PGA	20	0.64	34	0.64	61	0.64	95	0.64
W2L	Wood Commercial	PGA	14	0.64	23	0.64	48	0.64	75	0.64
S1LL	Steel Moment Frame, Low Rise	PGA	12	0.64	17	0.64	30	0.64	48	0.64
S1ML	Steel Moment Frame, Mid Rise	PGA	12	0.64	18	0.64	29	0.64	49	0.64
S1HL	Steel Moment Frame, High Rise	PGA	10	0.64	15	0.64	28	0.64	48	0.64
S2LL	Steel Brace Frame, Low Rise	PGA	13	0.64	17	0.64	30	0.64	50	0.64
S2ML	Steel Brace Frame, Mid Rise	PGA	12	0.64	18	0.64	35	0.64	58	0.64
S2HL	Steel Brace Frame, High Rise	PGA	11	0.64	17	0.64	36	0.64	63	0.64
S3L	Steel Light Frame	PGA	10	0.64	13	0.64	20	0.64	38	0.64
S4LL	Steel Frame Shear Wall, Low Rise	PGA	13	0.64	16	0.64	26	0.64	46	0.64

S4ML	Steel Frame Shear Wall, Mid Rise	PGA	12	0.64	17	0.64	31	0.64	54	0.64
S4HL	Steel Frame Shear Wall, High Rise	PGA	12	0.64	17	0.64	33	0.64	59	0.64
S5LL	Steel Frame Unreinforced Wall, Low Rise	PGA	13	0.64	17	0.64	28	0.64	45	0.64
S5ML	Steel Frame Unreinforced Wall, Mid Rise	PGA	11	0.64	18	0.64	34	0.64	53	0.64
S5HL	Steel Frame Unreinforced Wall, High Rise	PGA	10	0.64	18	0.64	35	0.64	58	0.64
C1LL	Concrete Moment Frame, Low Rise	PGA	12	0.64	15	0.64	27	0.64	45	0.64
C1ML	Concrete Moment Frame, Mid Rise	PGA	12	0.64	17	0.64	32	0.64	54	0.64
C1HL	Concrete Moment Frame, High Rise	PGA	10	0.64	15	0.64	27	0.64	44	0.64
C2LL	Concrete Shear Wall, Low Rise	PGA	14	0.64	19	0.64	30	0.64	52	0.64
C2ML	Concrete Shear Wall, Mid Rise	PGA	12	0.64	19	0.64	38	0.64	63	0.64
C2HL	Concrete Shear Wall, High Rise	PGA	11	0.64	19	0.64	38	0.64	65	0.64
C3LL	Concrete Unreinforced Wall, Low Rise	PGA	12	0.64	17	0.64	26	0.64	44	0.64
C3ML	Concrete Unreinforced Wall, Mid Rise	PGA	11	0.64	17	0.64	32	0.64	51	0.64
C3HL	Concrete Unreinforced	PGA	9	0.64	16	0.64	33	0.64	53	0.64

	Wall, High Rise									
PC1L	Precast Concrete Tiltup Wall	PGA	13	0.64	17	0.64	25	0.64	45	0.64
PC2LL	Precast Concrete Frames, Low Rise	PGA	13	0.64	15	0.64	24	0.64	44	0.64
PC2ML	Precast Concrete Frames, Mid Rise	PGA	11	0.64	16	0.64	31	0.64	52	0.64
PC2HL	Precast Concrete Frames, High Rise	PGA	11	0.64	16	0.64	31	0.64	55	0.64
RM1LL	Reinforced Masonry with Wood, Low Rise	PGA	16	0.64	20	0.64	29	0.64	54	0.64
RM1ML	Reinforced Masonry with Wood, Mid Rise	PGA	14	0.64	19	0.64	35	0.64	63	0.64
RM2LL	Reinforced Masonry with Precast Concrete, Low Rise	PGA	14	0.64	18	0.64	28	0.64	51	0.64
RM2ML	Reinforced Masonry with Precast Concrete, Mid Rise	PGA	12	0.64	17	0.64	34	0.64	60	0.64
RM2HL	Reinforced Masonry with Precast Concrete, High Rise	PGA	11	0.64	17	0.64	35	0.64	62	0.64
URMLL	Unreinforced Masonry, Low Rise	PGA	14	0.64	20	0.64	32	0.64	46	0.64
URMML	Unreinforced Masonry, Mid Rise	PGA	10	0.64	16	0.64	27	0.64	46	0.64

#### Pre-code fragilities for HAZUS model building types

Table 4. Pre-code fragilities for HAZUS model building types.

FACILITYTYPE	DESCRIPTION	METRIC	ALPHA	BETA	ALPHA	BETA	ALPHA	BETA	ALPHA	BETA
W1P	Wood, Light Frame	PGA	18	0.64	29	0.64	51	0.64	77	0.64
W2P	Wood Commercial	PGA	12	0.64	19	0.64	37	0.64	60	0.64
S1LP	Steel Moment Frame, Low Rise	PGA	9	0.64	13	0.64	22	0.64	38	0.64
S1MP	Steel Moment Frame, Mid Rise	PGA	9	0.64	14	0.64	23	0.64	39	0.64
S1HP	Steel Moment Frame, High Rise	PGA	8	0.64	12	0.64	22	0.64	38	0.64
S2LP	Steel Brace Frame, Low Rise	PGA	11	0.64	14	0.64	23	0.64	39	0.64
S2MP	Steel Brace Frame, Mid Rise	PGA	10	0.64	14	0.64	28	0.64	47	0.64
S2HP	Steel Brace Frame, High Rise	PGA	9	0.64	13	0.64	29	0.64	50	0.64
S3P	Steel Light Frame	PGA	8	0.64	10	0.64	16	0.64	30	0.64
S4LP	Steel Frame Shear Wall, Low Rise	PGA	10	0.64	13	0.64	20	0.64	36	0.64
S4MP	Steel Frame Shear Wall, Mid Rise	PGA	9	0.64	13	0.64	25	0.64	43	0.64
S4HP	Steel Frame Shear Wall, High Rise	PGA	9	0.64	14	0.64	27	0.64	47	0.64
S5LP	Steel Frame Unreinforced Wall, Low Rise	PGA	11	0.64	14	0.64	22	0.64	37	0.64

S5MP	Steel Frame Unreinforced Wall, Mid Rise	PGA	9	0.64	14	0.64	28	0.64	43	0.64
S5HP	Steel Frame Unreinforced Wall, High Rise	PGA	8	0.64	14	0.64	29	0.64	46	0.64
C1LP	Concrete Moment Frame, Low Rise	PGA	10	0.64	12	0.64	21	0.64	36	0.64
C1MP	Concrete Moment Frame, Mid Rise	PGA	9	0.64	13	0.64	26	0.64	43	0.64
C1HP	Concrete Moment Frame, High Rise	PGA	8	0.64	12	0.64	21	0.64	35	0.64
C2LP	Concrete Shear Wall, Low Rise	PGA	11	0.64	15	0.64	24	0.64	42	0.64
C2MP	Concrete Shear Wall, Mid Rise	PGA	10	0.64	15	0.64	30	0.64	50	0.64
C2HP	Concrete Shear Wall, High Rise	PGA	9	0.64	15	0.64	31	0.64	52	0.64
C3LP	Concrete Unreinforced Wall, Low Rise	PGA	10	0.64	14	0.64	21	0.64	35	0.64
СЗМР	Concrete Unreinforced Wall, Mid Rise	PGA	9	0.64	14	0.64	25	0.64	41	0.64
СЗНР	Concrete Unreinforced Wall, High Rise	PGA	8	0.64	13	0.64	27	0.64	43	0.64
PC1P	Precast Concrete Tiltup Wall	PGA	11	0.64	14	0.64	21	0.64	35	0.64
PC2LP	Precast Concrete Frames, Low Rise	PGA	10	0.64	13	0.64	19	0.64	35	0.64
PC2MP	Precast Concrete	PGA	9	0.64	13	0.64	24	0.64	42	0.64

	Frames, Mid Rise									
PC2HP	Precast Concrete Frames, High Rise	PGA	9	0.64	13	0.64	25	0.64	43	0.64
RM1LP	Reinforced Masonry with Wood, Low Rise	PGA	13	0.64	16	0.64	24	0.64	43	0.64
RM1MP	Reinforced Masonry with Wood, Mid Rise	PGA	11	0.64	15	0.64	28	0.64	50	0.64
RM2LP	Reinforced Masonry with Precast Concrete, Low Rise	PGA	12	0.64	15	0.64	22	0.64	41	0.64
RM2MP	Reinforced Masonry with Precast Concrete, Mid Rise	PGA	10	0.64	14	0.64	26	0.64	47	0.64
RM2HP	Reinforced Masonry with Precast Concrete, High Rise	PGA	9	0.64	13	0.64	27	0.64	50	0.64
URMLP	Unreinforced Masonry, Low Rise	PGA	13	0.64	17	0.64	26	0.64	37	0.64
URMMP	Unreinforced Masonry, Mid Rise	PGA	9	0.64	13	0.64	21	0.64	38	0.64
MHP	Mobile Homes	PGA	8	0.64	11	0.64	18	0.64	34	0.64

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 Tags:
 troubleshooting (tag\_troubleshooting)
 shakecast\_v3 (tag\_shakecast\_v3)

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