WHE-PAGER PROJECT: BUILDING CONSTRUCTION VULNERABILITY AND INVENTORY

This form is divided into 3 parts:

Part I: **Contributors' Information**
Part II: **Summary of Construction Types, Vulnerability and Population**
Part III: **Colleagues Consulted, Additional Sources of Information Used**

PART I: Contributors' Information

1. Country or Region (if you are only responding for part of a country, please indicate which geographic region. Note: the WHE strongly prefers national estimates, unless you have data that clearly apply to only one region):

Greece

2. Name(s) of Contributors

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3. Affiliation (Organization)

1) RMS Rep in Greece; 2) PhD graduate Cambridge Univ, Dept of Engineering,

4. Mailing address (include city and country)

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6. Your self-rating of expertise or confidence: On a scale of 1=low and 5=high, please estimate your level of expertise: 5

Part II: Summary of Construction Types, Vulnerability and Population

For other combinations, use blank fields below:

	Construction Material (choose from drop-down list)	Construction Subtype (Choose from drop-down list--refer to instructions to see complete list)	Probability of collapse (%) of building type when subjected to the specified shaking intensity				Fraction of population who LIVES in this building type		Fraction of population who WORKS in this building type		Peak average # of occupants per building
			IX (~0.65-1.24g)	VIII (~0.34-0.65g)	VII (~0.18-0.34g)	(~0.092	urban	rural	urban	rural	
21	Masonry	Rubble (field) stone masonry usually on lime mortar with wooden floors (it also contains cut-stone masonry and some buildings of class 2 in urban areas). 86% built pre-1960. Usually 1 or 2 storeys. Also contains some adobe (4) buildings (all pre-1960)	40%	21%	7%	###	1.10%	20.60%	5.10%	23.8	0.6 to 8.0
22	Masonry	Unreinforced brick masonry usually with cement mortar and RC floors (it also contains in smaller fractions some class 7, 8 buildings). Mostly pre-1960. Usually 1-2 storeys. Also contains Concrete block (13) masonry (usually unreinforced) with RC floors (it also contains in smaller fractions some class 11, 13 buildings). Usually post-1960. Usually 1-2 storeys.	16%	7.50%	2.50%	0%	2.30%	20.60%	9.70%	28.60%	0.6 to 8.5
	Timber	Wooden (post and beam frame): it also contains some class 31 buildings. Usually 1-2 storeys.	0.00	0.20%	0.00%	0%	0.10%	0.30%	0.30%	0.50%	0.6 to 8.5
24	Steel	Steel MRF with unreinforced clay brick masonry infill-partition walls (usually up to 3 floors). 96% after 1960 (30% after 1995).	0.50%	0.25%	0.03%	0	0	0	0.4	0.4	2.0 to 7.5
25	Concrete	RC MRF with unreinforced clay brick masonry infill-partition walls. Built prior to 1961 (no code). Low-rise (1-2 floors).	1.15%	0.75%	0.25%	0	0	0	0.4	0.4	1.6 to 5.5
26	Concrete	RC MRF with unreinforced clay brick masonry infill-partition walls. Built in 1961-1995 (low code). Low-rise (1-2 floors)	0.40%	0.25%	0%	0	12%	22.1%	12.2%	19.55	1.5 to 6.5
27	Concrete	RC MRF with unreinforced clay brick masonry infill-partition walls. Built after 1995 (high code). Low-rise (1-2 floors).	0.20%	0%	0%	0%	2.1%	7.1%	2.9%	6.8%	1.8 to 8.5
28	Concrete	RC MRF with unreinforced clay brick masonry infill-partition walls. Built prior to 1961 (no code). Mid-rise (3-8 floors).	0.70%	0.45%	0.17%	0%	7.90%	2%	6.5%	1.0%	17 to 51
29	Concrete	RC MRF with unreinforced clay brick masonry infill-partition walls. Built in 1961-1995 (low code). Mid-rise (3-8 floors). Very few 9-11 storey also contained. (Greece has only 51 buildings that exceed 11 storeys).	0.35%	0.20%	0%	0%	62.20%	18.90%	49.5%	13.2%	17 to 51
30	Concrete	RC MRF with unreinforced clay brick masonry infill-partition walls. Built after 1995 (high code). Mid-rise (3-8 floors). Very few 9-11 storey buildings also contained.	0.18%	0.00%	0.00%	0%	10.90%	6.10%	11.80%	4.60%	17 to 70

Part III: Colleagues Consulted, Additional Sources of Information Used

1	Name	
	Affiliation	
	Mailing address	
	e-mail	

4 Sources of information you used (websites, publications, etc.) Please provide as much detail as possible.

National Statistics Agency of Greece (Buildings Census of December 2000; Housing Census of March 2001; Latest Yearbooks for data in 2001-7)
Greece Earthquake Protection Organization Projects following 1986 Kalamata & 1995 Aeghion earthq.
own study of the 1999 Athens earthquake (sent by e-mail).

5 Additional comments

Note from first author Antonios Pomonis

The probability of collapse of each of the 10 proposed construction types in Greece, is derived from analysis of a damage survey in the city of Kalamata affected by the 1986 M6 earthquake (epicentre near the city) and similar data from the 1995 Aeghion earthquake and the 1999 Mt Parnitha earthquake (near Athens). All these surveys contained the entire building stock in the affected areas and are thus suitable for this exercise. We have used the collapse definition provided in the form to estimate the collapse probabilities. Estimation of intensity in each of the affected areas that we consulted has been taken from literature and/or from our own assessment, taking into consideration the PGA ranges provided for each intensity degree. Expert judgment has been used for some classes (particularly the post-1995 buildings) that have not yet been tested in big numbers by an earthquake. In the 1999 earthquake of the 60,000+ buildings inspected, only around 100 qualified as collapsed, 28 of which caused human casualties. All of the 28 severe collapses were constructed prior to 1990 and were reinforced concrete buildings (WHE class 14 or 16).

and Rural areas of Greece has been done using data of the National Statistics Agency of Greece and is based on this Agency's definition of Urban & Rural. The same stands for the peak average number of occupants estimation, for which we give a range, the low value is for residential use in rural areas and the higher value is for non-residential use in urban areas. In the working population we have added people that do not work in the non-residential buildings (e.g. the student & soldier population; the population of tourists in hotels; the population of hospital patients and visitors etc: all after reference to appropriate statistics). The occupancy of some low-rise residential buildings in Greece is quite low (<1 person per building) due to the high number of secondary housing, holiday homes, temporarily occupied dwellings. Weak masonry buildings also have low occupancy, because there are numerous such buildings in the rural zones of the country that are only temporarily occupied (i.e. not permanent residence). We have somewhat lower confidence in the working population distribution by construction class because of somewhat less detailed data in the non-residential sector. In Greece 23% of the building stock in non-residential (this is quite a high ratio compared to other countries), and many of these buildings are simple URM agricultural farms and warehouses for animal or grain storage that are not occupied by people much of the time (Greece