

UNIFIED FACILITIES CRITERIA (UFC)

STRUCTURAL LOAD DATA



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U.S. ARMY CORPS OF ENGINEERS

NAVAL FACILITIES ENGINEERING COMMAND (Preparing Activity)

AIR FORCE CIVIL ENGINEER SUPPORT AGENCY

Record of Changes (changes are indicated by \1\ ... /1/)

Change No.	Date	Location
<u>1</u>	<u>Dec 2005</u>	<u>FOREWORD</u>

This UFC supersedes UFC 3-310-01, dated 30 June 2000.

FOREWORD

\1\

The Unified Facilities Criteria (UFC) system is prescribed by MIL-STD 3007 and provides planning, design, construction, sustainment, restoration, and modernization criteria, and applies to the Military Departments, the Defense Agencies, and the DoD Field Activities in accordance with [USD\(AT&L\) Memorandum](#) dated 29 May 2002. UFC will be used for all DoD projects and work for other customers where appropriate. All construction outside of the United States is also governed by Status of forces Agreements (SOFA), Host Nation Funded Construction Agreements (HNFA), and in some instances, Bilateral Infrastructure Agreements (BIA.) Therefore, the acquisition team must ensure compliance with the more stringent of the UFC, the SOFA, the HNFA, and the BIA, as applicable.

UFC are living documents and will be periodically reviewed, updated, and made available to users as part of the Services' responsibility for providing technical criteria for military construction. Headquarters, U.S. Army Corps of Engineers (HQUSACE), Naval Facilities Engineering Command (NAVFAC), and Air Force Civil Engineer Support Agency (AFCESA) are responsible for administration of the UFC system. Defense agencies should contact the preparing service for document interpretation and improvements. Technical content of UFC is the responsibility of the cognizant DoD working group. Recommended changes with supporting rationale should be sent to the respective service proponent office by the following electronic form: [Criteria Change Request \(CCR\)](#). The form is also accessible from the Internet sites listed below.

UFC are effective upon issuance and are distributed only in electronic media from the following source:

- Whole Building Design Guide web site <http://dod.wbdg.org/>.

Hard copies of UFC printed from electronic media should be checked against the current electronic version prior to use to ensure that they are current. /1/

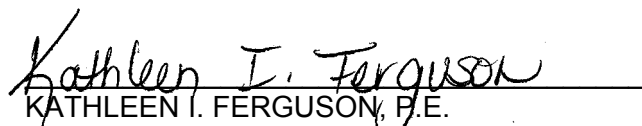
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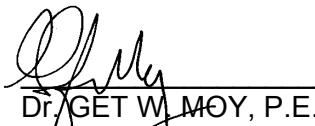
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**Unified Facilities Criteria (UFC)
Revision Summary Sheet**

Subject: UFC 3-310-01, *Design: Structural Load Data*

Cancels: UFC 3-310-01, *Load Assumptions for Buildings*, dated 30 June 2000

Description of Change: This update to UFC 3-310-01 compiles and updates the structural loading data to be used in the design of buildings and other structures. The International Building Code (IBC) has been adopted as the buildings code for the Department of Defense, as modified by UFC 1-200-01. The load data included in UFC 3-310-01 compliments and expands the usage of the IBC for DoD facilities in the following ways:

- ❑ The minimum live load table is expanded to include DoD unique occupancies or functions.
- ❑ The design wind speed, ground snow loading, frost penetration depth, and seismic spectral accelerations are identified at specific DoD facilities within the U.S. its territories and possessions.
- ❑ The best available design wind speed, ground snow loading, frost penetration depth, and seismic spectral accelerations are identified at specific DoD facilities outside if the U.S. its territories and possessions.
- ❑ The best available design seismic spectral accelerations are provided at additional locations overseas.

Reasons for Change: The existing guidance was inadequate for the following reasons:

- ❑ The minimum live load data in the existing UFC 3-310-01 did not mesh well with the data in the IBC due to differences in terminology and conflicting / out of date guidance.
- ❑ The existing lists of DoD locations, both within the United States and overseas, were incomplete and didn't reflect many locations where installations had been eliminated.
- ❑ The design wind speed and ground snow loading data in the existing UFC 3-310-01 was out of date and did not agree with the requirements of the IBC.
- ❑ The design seismic spectral accelerations for specific DoD sites within the U.S. were not available.
- ❑ The listing of design seismic spectral accelerations outside of the U.S. was inadequate, the data was out of date, and inaccurate.

Impact: The following direct benefits will result from the update of UFC 3-310-01:

- ❑ Creation of a single source reference for structural loading requirements that provide clear and consistent guidance for the design of DoD facilities.
 - Eliminates interpretation and ambiguity that could lead to design and construction conflicts.
 - Facilitates update and revision as better information becomes available.
- ❑ Creation of up to date load data that compliments the IBC and allows the use of a common minimum structural safety standards for all DoD facilities.

(The evaluation / update of the design seismic spectral accelerations at overseas sites ensures that structures are designed to the appropriate level. Revision of the seismic design values will typically result in reduced constructions costs since the previous values were approximations that were often overly conservative.)

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INTRODUCTION

1-1 **PURPOSE AND SCOPE.** This UFC provides structural loading data for the planning, design and construction of buildings for the Department of Defense (DOD). The loading data includes available site-specific ground snow load, basic wind speed, seismic spectral accelerations, and frost penetration at significant DOD installations worldwide. Also included are minimum live loadings for various facility occupancies and uses.

1-2 **BACKGROUND.** UFC 1-200-01 adopts and modifies the International Building Code (IBC) as the building code for DOD. Structural loading data including minimum live loads, ground snow load, basic wind speed, and seismic spectral accelerations, is provided for locations within the United States in chapters 1607, 1608, 1609, and 1615 of the IBC. The information included in UFC 3-310-01 is intended as a tool to assist in the consistent interpretation of the data in the IBC at significant DOD installations within the United States, and as the basis for applying the provisions of the UFC 1-200-01 to significant DOD installations outside of the United States.

1-3 **APPLICABILITY.** This UFC applies to all service elements and contractors involved in the planning, design and construction of DOD facilities worldwide.

1-4 **CONFLICTS.** This UFC supplements the information contained in the IBC as modified by UFC 1-200-01. All sections of the IBC as modified by UFC 1-200-01 remain in effect. If any conflicts or disagreements exist, the IBC as modified by UFC 1-200-01, will govern. Bring all apparent conflicts to the attention of the authorizing design agency for additional guidance.

1-5 **REFERENCES.**

- UFC 1-200-01, *Design: General Building Requirements* (<http://dod.wbdg.org/>)
- *International Building Code* (IBC), 2003 (<http://www.iccsafe.org/>)
- *Seismic Design Parameters* (Version 3.10), International Council of Building Officials and the International Code Council in conjunction with the United States Geological Survey, the Building Seismic Safety Council, the Federal Emergency Management Agency, E.V. Leyendecker, A.D. Frankel, and K.S. Rukstales. Copies available from: Building Seismic Safety Council, 1090 Vermont Avenue, NW, Suite 700, Washington, DC 20005 (telephone: 202-289-7800; fax: 202-289-1092; web site: <http://www.bssconline.org/index.html>).

1-6 **TECHNICAL GUIDANCE.** The provisions of the IBC, as modified by UFC 1-200-01, govern the structural design of buildings, structures and portions thereof, with the following modifications.

1-6.1 **IBC Section 1604.5 – Importance factors.** Use Table 1 below to determine the importance factor for snow load, wind load and seismic load in lieu of Table 1604-5, "Classification of Buildings and Other Structures for Importance Factors".

TABLE 1
CLASSIFICATION OF BUILDINGS AND OTHER STRUCTURES
FOR IMPORTANCE FACTORS

Seismic Use Group	Occupancy Category	Nature of Occupancy	Seismic Factor I_E	Snow Factor I_S	Wind Factor I_W
I	I	Buildings and other structures that represent a low hazard to human life in the event of failure, including, but not limited to: • Agricultural facilities • Certain temporary facilities • Minor storage facilities	1.00	0.8	0.87 ^a
	II	Buildings and other structures except those listed in Categories I, III, IV and V	1.00	1.00	1.00
II	III	Buildings and other structures that represent a substantial hazard to human life or represent significant economic loss in the event of failure, including, but not limited to: • Buildings and other structures where more than 300 people congregate in one area • Buildings and other structures with elementary school, secondary school, or daycare facilities with an occupant load greater than 250 • Buildings and other structures with an occupant load greater than 500 • Health care facilities with an occupant load of 50 or more resident patients, but not having surgery or emergency treatment facilities • Jails and detention facilities • Structures and equipment in power-generating stations; water treatment facilities that are required for primary treatment and disinfecting of potable water; waste water treatment facilities that are required for primary treatment; and other public utility facilities that are not included in Categories IV and V • Buildings and other structures not included in Categories IV and V containing sufficient quantities of toxic, flammable, or explosive substances to be dangerous to the public if released • Facilities having high-value equipment, as designated by the using agency	1.25	1.10	1.15

Seismic Use Group	Occupancy Category	Nature of Occupancy	Seismic Factor I_E	Snow Factor I_S	Wind Factor I_W
III	IV	Buildings and other structures designed as essential facilities, including, but not limited to: • Hospitals and other health care facilities having surgery or emergency treatment facilities • Fire, rescue, and police stations, and emergency vehicle garages • Designated earthquake, hurricane, or other emergency shelters • Designated emergency preparedness, communication, and operation centers, and other facilities required for emergency response • Power-generating stations and other utility facilities required for primary power or as emergency backup facilities for Category IV structures • Structures containing highly toxic materials as defined by Section 307, where the quantity of material exceeds the maximum allowable quantities of Table 307.7(2) • Aviation control towers, air traffic control centers, and emergency aircraft hangars that house aircraft required for post-earthquake emergency response • Buildings and other structures not included in Category V, having DOD mission-essential command, control, primary communications, data handling, and intelligence functions that are not duplicated at geographically separate locations, as designated by the using agency • Water treatment facilities required to maintain water pressure for fire suppression	1.50 ^b	1.20	1.15
IV ^c	V ^c	Facilities designed as national strategic military assets, including, but not limited to: • Key national defense assets (e.g. National Missile Defense facilities), as designated by the using agency • Facilities involved in operational missile control, launch, tracking, or other critical defense capabilities • Emergency backup power-generating facilities required for primary power for Category V structures • Power-generating stations and other utility facilities required for primary power for Category V structures, if emergency backup power generating facilities are not available • Facilities involved in storage, handling, or processing of nuclear, chemical, biological, or radiological materials, where structural failure could have widespread catastrophic consequences, as designated by the using agency.	N/A ^c	1.50 ^c	1.70 ^c

Notes to Table 1, "CLASSIFICATION OF BUILDINGS AND OTHER STRUCTURES FOR IMPORTANCE FACTORS"

a. In hurricane-prone regions with $V > 100$ miles per hour, I_W shall be 0.77.

b. In the Optional Procedure for the Design of SUG III-A Facilities, $I_E = 1.0$ (See IBC Section 1616.6.2).

c. A new Category and Seismic Use Group have been added to address national strategic military assets. A Seismic Importance Factor, I_E , is not required for the design of these facilities.

1-6.2 **IBC Section 1607 – LIVE LOADS.** Replace table 1607.1, Minimum Uniformly Distributed Live Loads and Minimum Concentrated Live Loads, with table B-1 of this UFC. Table B-1 includes IBC Table 1607.1 with additional Occupancy or Use classifications for military facilities. The additional classifications that have been added to IBC Table 1607.1 for military facilities are shown in bold italics within Table B-1.

1-6.3 **IBC Section 1608 – SNOW LOADS.** Ground snow loads are identified in Appendices C and D for specific locations.

Locations with ground snow load of 'CS' indicates that site specific Case Studies are required to establish ground snow loads due to potential extreme local variations in local ground snow loads.

1-6.3.1 **Within the United States.** Ground snow loads at DOD installations within the United States, territories and possessions are identified in table C-1 to facilitate consistent interpretation of the information provided in figure 1608.2 and table 1608.2 of the IBC.

1-6.3.2 **Outside of the United States.** Ground snow loads at specific locations outside of the United States, territories and possessions are identified in table D-1. At locations where the ground snow load is not provided, use the best available locality information. For additional guidance contact the authorizing design agency.

1-6.4 **Section 1609 – WIND LOADS.** Basic wind speeds (3-second gust) are identified in Appendices C and D for specific locations.

Mountainous terrain, gorges, ocean promontories, and locations designated as 'Special' must be examined for unusual wind conditions.

1-6.4.1 **Within the United States.** Basic wind speeds at DOD installations within the United States, territories and possessions are identified in table C-1 to facilitate consistent interpretation of the information provided in figure 1609 of the IBC.

1-6.4.2 **Outside of the United States.** Basic wind speeds at specific locations outside of the United States, territories and possessions are identified in table D-1. At locations where the basic wind speed is not provided, use the best available locality information. For additional guidance contact the authorizing design agency.

The wind speed data in table D-1 was derived from MILITARY HANDBOOK 1002/2A, adjusted to reflect a 50-year recurrence interval, and supplemented with available site specific evaluations. If reliable local information is available it may be used in lieu of the listed data with the approval of the authorizing design agency. As better site-specific information becomes available Appendix D will be revised accordingly. **Use a minimum wind speed of 137 km/h (85 mph) at all locations unless a lower wind speed is approved by the authorizing design agency.**

1-6.5 IBC Section 1615 – EARTHQUAKE LOADS– SITE GROUND MOTION.

Seismic spectral response acceleration data is provided in appendices C and D for specific locations. The short period spectral acceleration corresponding to a period of 0.2 seconds (S_S) and the 1-second spectral period acceleration (S_1) have been identified for both the Maximum Considered Earthquake (MCE) and the 10/50 Earthquake, defined as an earthquake with a 10 percent probability of being exceeded in 50 years.

The seismic design parameters in appendices C and D are typically provided at the approximate geographical centroid of the installation / city. For larger installations and where the potential seismic accelerations vary considerably over relative short distances, it may not be adequate to use the acceleration values at the installation centroid. At select locations the maximum and minimum value of S_S and S_1 within the installation is listed. Use the maximum values unless site-specific location (latitude / longitude) information is available and lesser values can be justified by the use of figure 1615 of the IBC or by approved computerized tools for determining seismic design parameters. For additional guidance contact the authorizing design agency.

1-6.5.1 Within the United States. Seismic design data at DOD installations within the United States, territories and possessions is identified in table C-2 to facilitate consistent interpretation of the information provided in figure 1615 of the IBC. The data was determined using the software, “Seismic Design Parameters” Version 3.10, and is based upon geographical location data for each installation. This program or other similar software may be used to determine seismic design data where site-specific location information is available, with the approval of the authorizing design agency.

1-6.5.2 Outside of the United States. Seismic design data at specific locations outside of the United States is identified in table D-2. Use the best available locality information at locations where the earthquake accelerations are not provided. The information shown is, with a few exceptions, not based upon detailed site-specific assessments. If better information is available at a specific location it may be used with the approval of the authorizing design agency.

Table E-1 in Appendix E provides best available seismic design data at additional locations outside of the United States.

1-6.6 IBC Section 1805.2.1 – Frost Protection. The minimum depth of footings below the undisturbed ground surface must be 305 mm (12 inches). Protect foundation walls, piers and other permanent supports of buildings and structures from frost as described in the IBC as modified by UFC 1-200-01.

Depths to the frost line have been identified in table C-1 for locations within the United States, territories and possessions, and in table D-1 for specific locations outside of the United States. Use the best available locality information at locations where frost depth values are not provided. For additional guidance contact the authorizing design agency.

1-7 **REVISIONS.** The information in this UFC will be revised on an as needed basis as DOD installations close or new installations are added. In addition, structural load data will be revised or supplemented as new or better information comes available.

Contact a representative to the DOD Structural Discipline Working Group to recommend additions or changes.

1-8 **CREDITS.** The climatic loading data for locations within the United States, its territories and possessions is based upon figures 1608.2 and 1609 of the 2003 IBC supplemented with additional data taken from the previous edition of UFC 3-310-01 and Military Handbook 1002/2A. The International Code Council provided electronic versions of the figures from the IBC. These electronic maps greatly facilitated this effort and enhanced the accuracy of the information at individual locations.

The climatic loading data for locations outside of the United States, its territories and possessions represents the best available information to date based upon the previous edition of UFC 3-310-01, and Military Handbook 1002/2A, supplemented by recommendations from regional engineers and the Pond & Company study *Structural Engineering Design Parameters for OCONUS Locations*, 21 September 2001.

The earthquake loading data for locations within the United States, its territories and possessions was determined utilizing the software, "Seismic Design Parameters", Version 3.10 that was developed by International Council of Building Officials and the International Code Council in conjunction with the United States Geological Survey, the Building Seismic Safety Council, the Federal Emergency Management Agency, E.V. Leyendecker, A.D. Frankel, and K.S. Rukstales.

Dr. E.V. Leyendecker of the United States Geological Survey (USGS) provided the earthquake loading data for locations outside of the United States its territories and possessions. The Global Seismic Hazard Assessment Program provided the basis for this effort.

Dr. John R. Hayes, Jr. (Jack) of the Engineer Research and Development Center, Army Corps of Engineers, Construction Engineering Research Laboratory provided Table 1, "CLASSIFICATION OF BUILDINGS AND OTHER STRUCTURES FOR IMPORTANCE FACTORS". This table is based on table 1604.5 of the 2003 IBC as modified for unique facilities within the Department of Defense.

Tables 1 and B-1 are based on tables 1604.5 and 1607.1 of the 2003 IBC, and are reproduced with permission of the International Code Council.

APPENDIX A

ABBREVIATIONS

10/50.	.....	Earthquake with a 10% probability of being exceeded in 50 years
CS.	.....	Case Study
DOD.	.....	Department of Defense
%g.	.....	Percent Gravity
HVAC.	.....	Heating Venting and Air Conditioning
in².	.....	Square Inches
IP.	.....	Inch-Pound
kg/m³.	.....	Kilogram per Cubic Meter
km/h.	.....	Kilometer per Hour
kN.	.....	Kilo Newton
kN/m².	.....	Kilo Newton per Square Meter
kPa.	.....	Kilopascal
lbs.	.....	Pounds
MCE.	.....	Maximum Considered Earthquake (2% probability of being exceeded in 50 years)
mm.	.....	Millimeter
mm².	.....	Square Millimeter
mph.	.....	Miles per Hour
psf.	.....	Pounds per Square Foot
S_s.	.....	Spectral Response Acceleration at Short Period (5% Critical Damping, Site Class B)
S₁.	.....	Spectral Response Acceleration at 1 Second Period (5% Critical Damping, Site Class B)

APPENDIX B

MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS AND MINIMUM CONCENTRATED LIVE LOADS

B-1 REFERENCES. All section references are to the International Building Code (IBC) 2003. Table B-1 includes the IBC 2003 Table 1607.1 with additional Occupancy or Use classification for military facilities that are shown in Bold-Italics.

**TABLE B-1 MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS
AND MINIMUM CONCENTRATED LIVE LOADS⁹**

OCCUPANCY OR USE	UNIFORM		CONCENTRATED	
	kPa	(psf)	kN	(lbs.)
1. Access floor systems				
Office use	2.4	50	8.9	2,000
Computer use	4.8	100	8.9	2,000
2. Ammunition Storage				
<i>High explosives (one story)</i>	23.9	500		
<i>Inert explosives (one story)</i>	23.9	500	---	---
<i>Pyrotechnics (one story)</i>	23.9	500		
<i>Small arms (one story)</i>	23.9	500		
<i>Torpedo (one story)</i>	16.8	350		
3. Apartments (see residential)	---	---	---	---
4. Armories and drill rooms	7.2	150	---	---
5. Assembly areas and theaters				
Fixed seats (fastened to floor)	2.9	60		
Lobbies	4.8	100		
Movable seats	4.8	100	---	---
Stages and platforms	6.0	125		
Follow spot, projection and control rooms	2.4	50		
Catwalks	1.9	40		
6. Balconies (exterior)	4.8	100		
On one- and two-family residences only, and not exceeding 9.3m ² (100 ft. ²)	2.9	60	---	---
7. Battery charging room	9.6	200	---	---
8. Boiler houses	9.6	200	---	---
9. Bowling alleys	3.6	75	---	---
10. Cleaning gear / trash room compactor	3.6	75	---	---
11. Cold Storage (Food or provision freezer)				
<i>First floor</i>	19.2	400		
<i>Upper floors</i>	14.4	300		
12. Command Duty Officer Day room	2.9	60	---	---
13. Cornices	2.9	60		
14. Corridors, except as otherwise indicated	4.8	100	---	---
15. Court rooms	3.8	80	---	---
16. Dance halls and ballrooms	4.8	100	---	---

OCCUPANCY OR USE	UNIFORM		CONCENTRATED	
	kPa	(psf)	kN	(lbs.)
17. Dining rooms and restaurants	4.8	100	---	---
18. Decks	Same as Occupancy Served ^h	Same as Occupancy Served ^h	---	---
19. Dwellings (see residential)	---	---	---	---
20. Elevator machine room grating (on area of 2600 mm ² (4 in. ²))	---	---	1.33	300
21. Finish light floor plate construction (on area of 650 mm ² (1 in. ²))	---	---	0.89	200
22. Fire escapes	4.8	100	---	---
On single-family dwellings only	1.9	40		
23. Galleys				
<i>Dishwashing rooms</i>	14.4	300		
<i>General kitchen area</i>	12.0	250		
<i>Provision storage (not refrigerated)</i>	9.6	200	---	---
<i>Preparation room</i>				
<i>Meat</i>	12.0	250		
<i>Vegetable</i>	4.8	100		
24. Garages (passenger vehicles only)	1.9	40	Note a	Note a
Trucks & buses	See Section 1607.6 - IBC	See Section 1607.6 - IBC	See Section 1607.6 - IBC	See Section 1607.6 - IBC
25. Generator rooms	9.6	200	---	---
26. Grandstands (see stadium and arena bleachers)	---	---	---	---
27. Guard House	3.6	75	---	---
28. Gymnasiums, main floors and balconies	4.8	100	---	---
29. Handrails, guards and grab bars	Section 1607.7 - IBC	Section 1607.7 - IBC	Section 1607.7 - IBC	Section 1607.7 - IBC
30. Hospitals				
Operating rooms, laboratories	2.9	60	4.45	1,000
Private rooms	1.9	40	4.45	1,000
Wards	1.9	40	4.45	1,000
Corridors above first floor	3.8	80	4.45	1,000
31. Hotels (see residential)	---	---	---	---
32. Incinerators; charging room	7.2	150	---	---
33. Laboratories, normal scientific equipment	6.0	125	---	---
34. Latrines / Heads / Toilets / Washroom	3.6	75	---	---
35. Libraries				
Reading rooms	2.9	60	4.45	1,000
Stack rooms	7.2 ^b	150 ^b	4.45	1,000
Corridors above first floor	3.8	80	4.45	1,000
36. Manufacturing				
Light	6.0	125	8.9	2,000
Heavy	12.0	250	13.34	3,000
37. Marquees and canopies	3.6	75	---	---
38. Mechanical equipment room (general)	4.8	100	---	---
39. Mechanical room (HVAC)	6.0	125	---	---

OCCUPANCY OR USE	UNIFORM		CONCENTRATED	
	kPa	(psf)	kN	(lbs.)
40. Mechanical telephone and radio equipment room	7.2	150	---	---
41. Morgue	4.8	100	---	---
42. Office buildings File and computer rooms shall be designed for heavier loads based on anticipated occupancy Lobbies and first floor corridors Offices Corridors above first floor	 4.8 2.4 3.8	 100 50 80	 8.9 8.9 8.9	 2,000 2,000 2,000
43. Penal Institutions Cell blocks Corridors	 1.9 4.8	 40 100	 --- ---	 --- ---
44. Post offices General area Work rooms	4.8 6.0	100 125	---	---
45. Power plants	9.6	200	---	---
46. Projection booths	4.8	100	---	---
47. Promenade roof	2.9	60	---	---
48. Pump houses	4.8	100	---	---
49. Recreation room	4.8	100	---	---
50. Receiving rooms (radio) including roof areas supporting antennas and electronic equipment	7.2	150	---	---
51. Refrigeration storage rooms Dairy Meat Vegetable	9.6 12.0 13.2	200 250 275	---	---
52. Residential One & two family dwellings Uninhabitable attics without storage Uninhabitable attics with storage Habitable attics and sleeping areas All other areas except balconies and decks Hotels and multifamily dwellings Private rooms & corridors serving them Public rooms and corridors serving them	 0.5 1.0 1.4 1.9 1.9 4.8	 10 20 30 40 40 100	 --- ---	 --- ---
53. Reviewing stands, grandstands and bleachers	Note c	Note c	---	---
54. Roofs	Section 1607.11 - IBC	Section 1607.11 - IBC	Section 1607.11 - IBC	Section 1607.11 - IBC
55. Schools Classrooms Corridors above first floor First floor corridors	 1.9 3.8 4.8	 40 80 100	 4.45 4.45 4.45	 1,000 1,000 1,000

OCCUPANCY OR USE	UNIFORM		CONCENTRATED	
	kPa	(psf)	kN	(lbs.)
56. Scuttles, skylight ribs, and accessible ceilings	---	---	0.89	200
57. Shops: Manufacturing and Industrial				
<i>Aircraft utility</i>	9.6	200	---	---
<i>Assembly and repair</i>	12.0	250		
<i>Bombsite (w/o shielding)</i>	6.0	125		
<i>Carpenter</i>	6.0	125		
<i>Electrical</i>	14.4	300		
<i>Engine overhaul</i>	14.4	300		
58. Sidewalks, vehicular driveways and yards, subject to trucking	12.0 ^d	250 ^d	35.6 ^e	8,000 ^e
59. Skating rinks	4.8	100	---	---
60. Stadiums and arenas				
Bleachers	4.8 ^c	100 ^c	---	---
Fixed seats (fastened to floor)	2.9 ^c	60 ^c		
61. Stairs and exits	4.8	100	Note f	Note f
One- and two-family dwellings	1.9	40		
All other	4.8	100		
62. Storage warehouses (shall be designed for heavier loads if required for anticipate storage)				
General			---	---
Light	6.0	125		
Heavy	11.97	250		
<i>Aircraft</i>	9.58	200		
<i>Building Materials</i>	11.97	250		
<i>Drugs, paint, oil</i>	9.58	200		
<i>Dry Provisions</i>	14.36	300		
<i>Groceries, wine, Liquor</i>	14.36	300		
<i>Light Tools</i>	7.2	150		
<i>Pipe & metal</i>	47.88	1000		
<i>Paint and oil (one story)</i>	23.94	500		
<i>Hardware</i>	14.36	300		
63. Stores				
Retail				
First floor	4.8	100	4.45	1,000
Upper floors	3.6	75	4.45	1,000
Wholesale, all floors	6.0	125	4.45	1,000
64. Tailor shop	3.6	75	---	---
65. Telephone exchange rooms and central computer IT server spaces	7.2	150	8.9	2000
66. Vehicle barriers	Section 1607.7 - IBC	Section 1607.7 - IBC	Section 1607.7 - IBC	Section 1607.7 - IBC
67. Walkways and elevated platforms (other than exit ways)	2.9	60	---	---
68. Yards and terraces, pedestrian	4.8	100	---	---

Notes to Table B-1, “MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS AND MINIMUM CONCENTRATED LIVE LOADS”

For SI: 1 square inch = 645.16 mm², 1 pound per square foot = 0.0479 kN/m² = 0.0479 kPa, 1 pound = 0.004448 kN, 1 pound per cubic foot = 16 kg/m³.

- a. Floors in garages or portions of building used for the storage of motor vehicles shall be designed for the uniformly distributed live loads shown or the following concentrated loads: (1) for passenger cars accommodating not more than nine passengers, 13.34 kN (3,000 pounds) acting on an area of 114 mm x 114 mm (4.5 inches x 4.5 inches); (2) for mechanical parking structures without slab or deck which are used for storing passenger vehicles only, 10.0 kN (2,250 pounds) per wheel.
- b. The loading applies to stack room floors that support non-mobile, double-faced library book stacks, subject to the following limitations:
 - 1) The nominal book stack unit height shall not exceed 2,290mm (90 inches).
 - 2) The nominal shelf depth shall not exceed 305mm (12 inches) for each face; and
 - 3) Parallel rows of double-faced book stacks shall be separated by aisles not less than 915 mm (36 inches) wide.
- c. Design in accordance with the ICC *Standard on Bleachers, Folding and Telescoping Seating and Grandstands*.
- d. Other uniform loads in accordance with an approved method which contains provisions for truck loadings shall also be considered where appropriate.
- e. The concentrated wheel load shall be applied on an area of 12,900 mm² (20 square inches).
- f. Minimum concentrated load on stair treads (on area of 2,600 mm² (4 square inches)) is 1.3 kN (300 pounds).
- g. Where snow loads occur that are in excess of the design conditions, the structure shall be designed to support the loads due to the increased loads caused by drift buildup or a greater snow design determined by the building official. (See IBC Section 1608). For special-purpose roofs, see IBC Section 1607.11.2.2.
- h. See IBC Section 1604.8.3 for decks attached to exterior walls.

APPENDIX C

SITE SPECIFIC STRUCTURAL LOADING DATA – UNITED STATES, ITS TERRITORIES AND POSSESSIONS

C-1 Climatic Loading Data Table. Site-specific structural climatic loading data for DoD locations within the United States, its territories and possessions is provided in Table C-1.

C-2 Earthquake Loading Data Table. Site-specific earthquake loading data for DoD locations within the United States, its territories and possessions is provided in Table C-2.

**TABLE C-1 STRUCTURAL CLIMATIC LOADING DATA –
UNITED STATES, ITS TERRITORIES AND POSSESSIONS**

TABLE C-1		Ground Snow	Wind Speed	Frost Penetration	Ground Snow	Wind Speed	Frost Penetration
State	Base / City	(psf)	(mph)	(inches)	kPa	km/h	mm
Alabama	Anniston Army Depot	5	90	6	0.24	145	152
	Birmingham	5	90	6	0.24	145	152
	Fort McClellan	5	90	6	0.24	145	152
	Fort Rucker	0	107	0	0.00	172	0
	Maxwell-Gunther AFB / Montgomery	5	97	4	0.24	156	102
	Mobile	0	130	0	0.00	209	0
	Redstone Arsenal / Huntsville	10	90	9	0.48	145	229
Alaska	Clear AS	60	90		2.87	145	
	Eielson AFB	60	90	permafrost	2.87	145	permafrost
	Elmendorf AFB	50	100	129	2.40	161	3277
	Fort Richardson	50	100	129	2.40	161	3277
	Fort Wainwright	60	90	permafrost	2.87	145	permafrost
	Galena AFB	60	100		2.87	161	
	Juneau	60	105	86	2.87	169	2184
	Ketchikan		115		0.00	185	
	Kodiak	30	130	86	1.44	209	2184
	Sitka	50	122	56	2.40	196	1422
Arizona	Valdez	160	100	136	7.66	161	3454
	Davis-Monthan AFB / Tucson AFB	0	90	0	0.00	145	0
	Fort Huachuca	10	90	0	0.48	145	0
	Luke Air Force Base	0	90	5	0.00	145	127

TABLE C-1

State	Base / City	Ground Snow (psf)	Wind Speed (mph)	Frost Penetration (inches)	Ground Snow kPa	Wind Speed km/h	Frost Penetration mm
Arizona	Phoenix	0	90	0	0.00	145	0
	Yuma MCB	0	90	0	0.00	145	0
	Yuma Proving Ground	0	90	0	0.00	145	0
Arkansas	Little Rock AFB	10	90	14	0.48	145	356
	Pine Bluff Arsenal	10	90	9	0.48	145	229
California	Alameda	0	85		0.00	137	
	MCLB Barstow	0	85	18	0.00	137	457
	Beale AFB	0	85		0.00	137	
	MCMTTC Bridgeport	150	100	36	7.19	161	914
	Camp Pendleton	0	85	4	0.00	137	102
	NWS China Lake	0	85	22	0.00	137	559
	NSWC Corona	0	85	0	0.00	137	0
	Edwards AFB	0	85 Special	22	0.00	137 Special	559
	El Centro NAF	0	85	0	0.00	137	0
	Fort Irwin	0	85	22	0.00	137	559
	Fresno ANG	0	85	0	0.00	137	0
	NAS Lemoore	0	85	0	0.00	137	0
	Los Angeles AFB / El Segundo	0	85	0	0.00	137	0
	Los Angeles	0	85	0	0.00	137	0
	March ARB	0	85	0	0.00	137	0
	McClellan AFB / Sacramento	0	85	5	0.00	137	127
	NWC Mohave Range	0	85	22	0.00	137	559
	Presidio of Monterey	0	85	4	0.00	137	102
	Point Mugu / Port Hueneme	0	85	0	0.00	137	0
	San Diego Region NAS North Island NAB Coronada MCRD Miramar Naval Medical Ctr San Diego NS Point Loma	0	85	0	0.00	137	0

TABLE C-1

State	Base / City	Ground Snow	Wind Speed	Frost Penetration	Ground Snow	Wind Speed	Frost Penetration
		(psf)	(mph)	(inches)	kPa	km/h	mm
California	Moffett Field - Onizuka / Sunnyvale	0	85	0	0.00	137	0
	San Clemente Island Naval Reservation	0	85	0	0.00	137	0
	San Nicolas Island	0	85	0	0.00	137	0
	Seal Beach NWS	0	85	0	0.00	137	0
	Seal Beach NWS - Concord Detachment	0	85	0	0.00	137	0
	Sierra Army Depot / Herlong	15	85	54	0.72	137	1372
	Stockton / San Joaquin	0	85	4	0.00	137	102
	Travis AFB	0	85	0	0.00	137	0
	Twentynine Palms	0	85	5	0.00	137	127
	Vandenberg AFB	0	85	0	0.00	137	0
Colorado	Buckley AFB / Aurora	20	90	52	0.96	145	1321
	Denver	20	90	52	0.96	145	1321
	Fort Carson	15	90 Special	38	0.72	145 Special	965
	Cheyenne Mountain AS / NORAD	15	90 Special	38	0.72	145 Special	965
	Peterson AFB / Colorado Springs	30	90	38	1.44	145	965
	Schriever AFB	CS	90		CS	145	
	USAF Academy	30	90 Special	38	1.44	145 Special	965
Connecticut	NSB New London / Groton	30	120	38	1.44	193	965
Delaware	Dover AFB	25	95	22	1.20	153	559
District of Columbia	Washington Region Bolling AFB Anacostia NS Fort McNair Marine Barracks NRL Washington NDW / Anacostia Pentagon	25	90	26	1.20	145	660

TABLE C-1

State	Base / City	Ground Snow	Wind Speed	Frost Penetration	Ground Snow	Wind Speed	Frost Penetration
		(psf)	(mph)	(inches)	kPa	km/h	mm
	Walter Reed						
Florida	Avon Park AS	0	110	0	0.00	177	0
	Cape Canaveral AFS	0	125	0	0.00	201	0
	Eglin AFB	0	133	0	0.00	214	0
	Homestead	0	150	0	0.00	241	0
	Hurlburt Field	0	135		0.00	217	
	NAS Jacksonville / Jacksonville	0	110	0	0.00	177	0
	NAS Key West	0	150	0	0.00	241	0
	MacDill AFB	0	120	0	0.00	193	0
	NAS Mayport	0	120	0	0.00	193	0
	HQ Southcom / Miami	0	140	0	0.00	225	0
	Orlando	0	108	0	0.00	174	0
	NAS Panama City	0	130	0	0.00	209	0
	Patrick AFB	0	125	0	0.00	201	0
	NAS Pensacola	0	140	0	0.00	225	0
	Tampa	0	118	0	0.00	190	0
	Tyndall AFB	0	130	0	0.00	209	0
	NAS Whiting Field / Milton	0	125	0	0.00	201	0
Georgia	MC Logistics Support / Albany	0	98	0	0.00	158	0
	Athens NCSC	5	90		0.24	145	
	Dobbins AFB / Atlanta NAS	5	90		0.24	145	
	Fort Benning	5	95	0	0.24	153	0
	Fort Gordon	10	93	0	0.48	150	0
	Fort McPherson / Fort Gillem	5	90		0.24	145	
	Fort Stewart	0	110	0	0.00	177	0
	Hunter Army Airfield / Savannah	0	120	0	0.00	193	0
	NSB Kings Bay	0	120	0	0.00	193	0
	Moody AFB	0	98	0	0.00	158	0
	Robins AFB	5	92	0	0.24	148	0
Hawaii	PMRF Barking Sands, Kauai	0	105	0	0.00	169	0

TABLE C-1

State	Base / City	Ground Snow	Wind Speed	Frost Penetration	Snow	Wind Speed	Frost Penetration
		(psf)	(mph)	(inches)	kPa	km/h	mm
Hawaii	MCBH Kaneohe Bay	0	105	0	0.00	169	0
	Pearl Harbor Region: Camp H.M. Smith Fort Shafter Hickam AFB Pearl Harbor Tripler AMC	0	105	0	0.00	169	0
	Wahiawa Region: Lualualei Wahiawa Naval Reservation Wheeler AFB Schofield Barracks	0	105	0	0.00	169	0
Idaho	ARD Bayview	10	90		0.48	145	
	Boise ANG	10	90		0.48	145	
	Mountain Home AFB	20	90	64	0.96	145	1626
Illinois	Fort Sheridan / Chicago	25	90	59	1.20	145	1499
	Great Lakes	25	90	64	1.20	145	1626
	Rock Island Arsenal	20	90	64	0.96	145	1626
	Scott AFB	20	90	38	0.96	145	965
	Springfield	20	90		0.96	145	
Indiana	Crane NWSC	20	90	36	0.96	145	914
	Grissom ARB	20	90	49	0.96	145	1245
	Fort Benjamin Harrison / Indianapolis	20	90	44	0.96	145	1118
Iowa	Des Moines	25	90	82	1.20	145	2083
Kansas	Fort Leavenworth	20	90	54	0.96	145	1372
	Fort Riley	20	90	52	0.96	145	1321
	McConnell AFB	25	90	38	1.20	145	965
Kentucky	Fort Campbell	15	90	22	0.72	145	559
	Fort Knox	15	90	32	0.72	145	813
	Louisville	15	90	32	0.72	145	813
	Richmond	15	90		0.72	145	0
Louisiana	Barksdale AFB	5	90	7	0.24	145	178
	Fort Polk / Leesville	5	95	0	0.24	153	0

TABLE C-1

State	Base / City	Ground Snow (psf)	Wind Speed (mph)	Frost Penetration (inches)	Ground Snow kPa	Wind Speed km/h	Frost Penetration mm
Louisiana	NAS JRB New Orleans / Belle Chasse	0	130	0	0.00	209	0
Maine	NAS Brunswick	50	100	86	2.40	161	2184
	Winter Harbor NSGA	50	98	86	2.40	158	2184
Maryland	Aberdeen Proving Ground	25	90	29	1.20	145	737
	Adelphi	25	90	24	1.20	145	610
	Andrews AFB	25	90	26	1.20	145	660
	Carderock NSWC / Bethesda	25	90	20	1.20	145	508
	Bloods Island	20	102		0.96	164	
	Edgewood Arsenal	25	90	29	1.20	145	737
	Fort Detrick / Fredrick	30	90	29	1.44	145	737
	Fort Meade	25	90	26	1.20	145	660
	Indian Head NSWC	25	90	22	1.20	145	559
	Martin State ANG	25	90	29	1.20	145	737
	NS Pax River , Webster Field / St. Inigoes	20	90	26	0.96	145	660
	U.S Naval Academy / Annapolis	25	90	26	1.20	145	660
Massachusetts	Fort Devens / Ayer	50	97	64	2.40	156	1626
	Hanscom AFB	50	100	54	2.40	161	1372
	Natick	50	100		2.40	161	
	Otis AGB / Falmouth	25	115	38	1.20	185	965
	Westover ARB	35	95	64	1.68	153	1626
Michigan	Battle Creek	30	90		1.44	145	
	Detroit Arsenal / Warren	25	90	61	1.20	145	1549
	Selfridge ANG Base	25	90	59	1.20	145	1499
Minnesota	Minneapolis - St Paul	50	90	125	2.40	145	3175
Mississippi	Stennis / Bay St. Louis	0	130		0.00	209	
	Columbus AFB	10	90	7	0.48	145	178

TABLE C-1

State	Base / City	Ground Snow	Wind Speed	Frost Penetration	Ground Snow	Wind Speed	Frost Penetration
		(psf)	(mph)	(inches)	kPa	km/h	mm
	Gulfport	0	135	0	0.00	217	0
Mississippi	Jackson	5	92	5	0.24	148	127
	Keesler AFB	0	135	0	0.00	217	0
	NAS Meridian	5	97	5	0.24	156	127
	Pascagoula NS	0	150	0	0.00	241	0
	Vicksburg	5	90		0.24	145	
Missouri	Fort Leonard Wood	20	90	36	0.96	145	914
	Kansas City	20	90	49	0.96	145	1245
	Overland	20	90		0.96	145	
	St. Louis	20	90	38	0.96	145	965
	Whiteman AFB	20	90	46	0.96	145	1168
Montana	Great Falls ANG	20	90	107	0.96	145	2718
	Malmstrom AFB	20	90	107	0.96	145	2718
Nebraska	Offutt AFB	25	90	73	1.20	145	1854
	Lincoln	25	90	64	1.20	145	1626
Nevada	NAS Fallon	5	90	23	0.24	145	584
	Indian Springs AFS	5	90	7	0.24	145	178
	Nellis AFB	5	90	7	0.24	145	178
	Nellis AF Range	5	90	7	0.24	145	178
New Hampshire	Portsmouth Naval Shipyard	50	100	64	2.40	161	1626
New Jersey	NWS Earle / Colts Neck	20	110		0.96	177	
	Fort Dix / Trenton	25	105	29	1.20	169	737
	Fort Monmouth	20	110	38	0.96	177	965
	Lakehurst	25	105	29	1.20	169	737
	McGuire AFB	25	105	29	1.20	169	737
	Picatinny Arsenal	35	90	32	1.68	145	813
New Mexico	Albuquerque	10	90	18	0.48	145	457
	Cannon AFB	15	90	18	0.72	145	457
	Holloman AFB	5	90	4	0.24	145	102
	Kirtland AFB	10	(a)	18	0.48	(a)	457
	White Sands	5	90	4	0.24	145	102
New York	Buffalo	45	90	59	2.16	145	1499
	Fort Drum	70	90	94	3.35	145	2388
	Fort Hamilton / Brooklyn	25	90		1.20	145	

TABLE C-1

State	Base / City	Ground Snow	Wind Speed	Frost Penetration	Snow	Wind Speed	Frost Penetration
		(psf)	(mph)	(inches)	kPa	km/h	mm
	Griffis AFB / Rome	60	90	86	2.87	145	2184
New York	NIAGARA FALLS IAP	35	90	59	1.68	145	1499
	NSU Saratoga Springs	50	90		2.40	145	
	Stewart ANG / Newburgh	35	100	54	1.68	161	1372
	Syracuse	40	90	73	1.92	145	1854
	West Point	30	90 Special	54	1.44	145 Special	1372
	Watervliet Arsenal / Albany	40	90	82	1.92	145	2083
North Carolina	MCAS Cherry Point	10	128	0	0.48	206	0
	Fort Bragg	10	95	0	0.48	153	0
	Jacksonville Region Camp Lejeune MCAS New River	10	130	0	0.48	209	0
	Pope AFB	10	95	0	0.48	153	0
	Raleigh	15	93		0.72	150	
	Seymour Johnson AFB	10	100	4	0.48	161	102
North Dakota	Grand Forks AFB	60	90	156	2.87	145	3962
	Minot AFB	40	90	163	1.92	145	4140
Ohio	Cleveland	20	90	52	0.96	145	1321
	DSC Whitehall / Columbus	20	90	46	0.96	145	1168
Ohio	Wright-Patterson AFB	20	90	49	0.96	145	1245
	Youngstown ARS / Vienna	20	90		0.96	145	
Oklahoma	Altus AFB	10	90	14	0.48	145	356
	Fort Sill	10	90	14	0.48	145	356
	McAlester Army Ammunition Plant	10	90	16	0.48	145	406
	Tinker AFB / Oklahoma City	10	90	17	0.48	145	432
	Tulsa	10	90	23	0.48	145	584
	Vance AFB	15	90	22	0.72	145	559
Oregon	Portland	10	85	14	0.48	137	356
Pennsylvania	ARS Coraopolis / Pittsburg	25	90	38	1.20	145	965

TABLE C-1

State	Base / City	Ground Snow (psf)	Wind Speed (mph)	Frost Penetration (inches)	Snow kPa	Wind Speed km/h	Frost Penetration mm
	Carlisle Barracks	25	90	36	1.20	145	914
Pennsylvania	Fort Indiantown Gap / Annville	35	90	49	1.68	145	1245
	Letterkenny / Chambersburg	30	90	36	1.44	145	914
	Mechanicsburg	25	90		1.20	145	
	Philadelphia	25	90	30	1.20	145	762
	New Cumberland / Defense Depot Susquehanna	25	90		1.20	145	0
	Tobyhanna Army Depot	50	90	52	2.40	145	
	Willow Grove ARS / NAS	30	90		1.44	145	0
Rhode Island	NS Newport	30	115	35	1.44	185	889
South Carolina	MCAS Beaufort	5	122	0	0.24	196	0
	Charleston Region: Charleston AFB NWS Charleston	5	125	0	0.24	201	0
	Columbia Region: McEntire Fort Jackson Shaw AFB	10	97	0	0.48	156	0
	MCRD Parris Island	0	125	0	0.00	201	0
South Dakota	Ellsworth AFB	20	90	86	0.96	145	2184
Tennessee	Arnold AFB	10	90		0.48	145	
	NSWC LCC / Memphis	10	90	0	0.48	145	0
	NSA Mid-South / Millington	10	90		0.48	145	
	Nashville	10	90	22	0.48	145	559
Texas	NAS JRB, Carswell / Fort Worth	5	90	7	0.24	145	178
	NAS Corpus Christi	0	130	0	0.00	209	0
	Dallas / Irving	5	90	7	0.24	145	178
	Dyess AFB	5	90	7	0.24	145	178
	Ellington ANG / Houston	0	115	0	0.00	185	0
	Fort Bliss / El Paso	5	90	0	0.24	145	0
	Fort Hood / Killeen	5	90	6	0.24	145	152

TABLE C-1

State	Base / City	Ground Snow	Wind Speed	Frost Penetration	Snow	Wind Speed	Frost Penetration
		(psf)	(mph)	(inches)	kPa	km/h	mm
	Goodfellow AFB	5	90	5	0.24	145	127
Texas	NS Ingleside	0	130	0	0.00	209	0
	NAS Kingsville	0	115	0	0.00	185	0
	Laughlin AFB	0	90	0	0.00	145	0
	Red River Army Depot / Texarkana	5	90	8	0.24	145	203
	San Antonio Region Brooks AFB Fort Sam Houston Kelly AFB Lackland AFB Randolph AFB	5	90	0	0.24	145	0
	Sheppard AFB	5	90	11	0.24	145	279
Utah	Dugway Proving Ground	10	90	54	0.48	145	1372
	Hill AFB	40	90	73	1.92	145	1854
	Salt Lake City	15	90	59	0.72	145	1499
	Tooele Army Depot	25	90	52	1.20	145	1321
Virginia	Dahlgren	25	90		1.20	145	
	Dam Neck / Virginia Beach Ocean front	10	115	5	0.48	185	127
	Fort A. P. Hill	25	90		1.20	145	
	Fort Belvoir	25	90	26	1.20	145	660
	Fort Eustis	15	97	9	0.72	156	229
	Fort Lee	20	90	14	0.96	145	356
	Fort Monroe	10	105	9	0.48	169	229
	Fort Myer	25	90	26	1.20	145	660
	Fort Story	10	113	9	0.48	182	229
	Henderson Hall / Arlington	25	90	26	1.20	145	660
	Langley AFB / Hampton	10	105	9	0.48	169	229
	NAB Little Creek	10	110	9	0.48	177	229
	Norfolk Region: Camp Elmore Craney Island Depot Norfolk Naval Base	10	107	9	0.48	172	229

TABLE C-1

State	Base / City	Ground Snow	Wind Speed	Frost Penetration	Snow	Wind Speed	Frost Penetration
		(psf)	(mph)	(inches)	kPa	km/h	mm
Virginia	Norfolk Shipyard - Naval Hospital / Portsmouth	10	105	9	0.48	169	229
	NSA Northwest / Chesapeake	10	105	9	0.48	169	229
	NAS Oceana / Virginia Beach	10	113	9	0.48	182	229
	Quantico	25	90	22	1.20	145	559
	Defense Supply Ctr / Richmond	20	90	18	0.96	145	457
	Wallops Island	20	115		0.96	185	
	Yorktown Region: Camp Perry Cheatham Annex Yorktown NWS	15	95	9	0.72	153	229
Washington	NS Everett	15 (b)	85		0.72(b)	137	
	Fairchild AFB	42	85	64	2.01	137	1626
	Fort Lewis / Tacoma	15 (b)	85	9	0.72(b)	137	229
	Indian Island SWC	15 (b)	85		0.72(b)	137	
	NRS Jim Creek	15 (b)	85		0.72(b)	137	
	Keyport / Bangor Engin. Sta Annex	15 (b)	85	9	0.72(b)	137	229
	McChord AFB	15	85	9	0.72	137	229
	Puget Sound Region: Bangor NSB Bremerton NS Puget Sound NSY	15 (b)	85	9	0.72(b)	137	229
	NAS Whidbey Island / Oak Harbor	15 (b)	85		0.72(b)	137	
	Seattle	15	85	9	0.72	137	229
West Virginia	Beckley	30	90		1.44	145	
	Huntington	20	90	22	0.96	145	559
	Sugar Grove NRS	30	90	38	1.44	145	965
	Fort McCoy	40	90	114	1.92	145	2896
Wisconsin	General Mitchell AFRC / Milwaukee	30	90	75	1.44	145	1905
	Madison	30	90	75	1.44	145	1905
Wyoming	F. E. Warren AFB	20	90	59	0.96	145	1499

TABLE C-1

State	Base / City	Ground Snow	Wind Speed	Frost Penetration	Snow	Wind Speed	Frost Penetration
		(psf)	(mph)	(inches)	kPa	km/h	mm
American Samoa	Pago Pago / Tutuila Island	0	125	0	0.00	201	0
Mariana Islands	Guam	0	170	0	0.00	274	0
Mariana Islands	Saipan / Tinian	0	150	0	0.00	241	0
Puerto Rico	All	0	145	0	0.00	233	0

Notes to TABLE C-1, “STRUCTURAL CLIMATIC LOADING DATA – UNITED STATES, ITS TERRITORIES AND POSSESSIONS”

(a) - Wind speed equals 125 mph (201 km/h) in the south sector of Kirtland AFB.
Wind speed equals 100 mph (161 km/h) on the remainder of the base.

(b) – Ground snow load to be used for Navy facilities at identified locations in Washington State equals 25 psf (1.20 kPa).

CS – Site specific case studies are required to establish ground snow loads.

Special - Special wind regions where unusual geographic conditions require consideration for potential unusual wind conditions. The wind speeds shown are minimum values. The potential for higher wind speeds due to unusual geographic conditions should also be considered.

**TABLE C-2 EARTHQUAKE LOADING DATA –
UNITED STATES, ITS TERRITORIES AND POSSESSIONS**

TABLE C-2		Seismic Data (Site Class B)			
State	Base / City	MCE S_s (%g)	MCE S₁ (%g)	10/50 S_s (%g)	10/50 S₁ (%g)
Alabama	Anniston Army Depot	31	12	11	4
	Birmingham	32	12	11	4
	Fort McClellan	31	12	11	4
	Fort Rucker	12	7	4	2
	Maxwell-Gunther AFB / Montgomery	17	8	6	3
	Mobile	12	6	4	2
	Redstone Arsenal / Huntsville	29	13	11	4
Alaska	Clear AS	108	30	47	14
	Eielson AFB	106	29	44	14
	Elmendorf AFB	149	55	100	30
	Fort Richardson	152	57	101	31
	Fort Wainwright	111	31	49	14
	Galena AFB	35	10	15	4
	Juneau	57	27	27	14
	Ketchikan	23	14	11	8
	Kodiak	179	66	116	37
	Sitka	102	52	52	31
	Valdez	147	57	93	30
Arizona	Davis-Monthan AFB / Tucson AFB	31	9	13	4
	Fort Huachuca	28	8	12	3
	Luke Air Force Base	24	7	11	3
	Phoenix	23	7	11	3
	Yuma MCB	68	24	37	14
	Yuma Proving Ground	59 Max 27 Min	20 Max 10 Min	29 Max 15 Min	11 Max 6 Min
Arkansas	Little Rock AFB	54	19	14	4
	Pine Bluff Arsenal	41	16	11	4
California	Alameda	150	60	123	55
	MCLB Barstow	127	47	61	22
	Beale AFB	43	19	26	11
	MCMTC Bridgeport	124	43	63	21
	Camp Pendleton	116	42	61	25
California	NWS China Lake	132 Max	51 Max	80 Max	27 Max

TABLE C-2

State	Base / City	Seismic Data (Site Class B)			
		MCE S _s (%g)	MCE S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
		119 Min	38 Min	61 Min	19 Min
	NSWC Corona	164	60	127	47
	Edwards AFB	128 Max 90 Min	60 Max 40 Min	85 Max 47 Min	39 Max 21 Min
	El Centro NAF	195 Max 150 Min	66 Max 60 Min	160 Max 128 Min	54 Max 39 Min
	Fort Irwin	197 Max 78 Min	91 Max 27 Min	144 Max 40 Min	55 Max 15 Min
	Fresno ANG	43	20	27	12
	NAS Lemoore	99	32	49	20
	Los Angeles AFB / El Segundo	174	63	113	39
	Los Angeles	193	76	119	42
	March ARB	150	60	127	50
	McClellan AFB / Sacramento	45	20	28	13
	NWC Mohave Range	212 Max 99 Min	90 Max 32 Min	106 Max 49 Min	36 Max 20 Min
	Presidio of Monterey	174	64	105	37
	Point Mugu / Port Hueneme	181	99	128	54
	San Diego Region				
	NAS North Island	145	59	66.4	24.8
	NAB Coronada	130	50	62.8	22.8
	MCRD	155	72	67.5	25.4
	Miramar	147	55	64.8	24.1
	Naval Medical Ctr	154	79	63.4	24.3
	San Diego NS	138	54	60.8	22.2
	Point Loma	149	60	72.5	26.1
	Moffett Field - Onizuka / Sunnyvale	150	60	125	57
	San Clemente Island Naval Reservation	63	21	31	12
	San Nicolas Island	53	18	26	10
	Seal Beach NWS	185	75	110	37
	Seal Beach NWS - Concord Detachment	165	61	145	55
	Sierra Army Depot / Herlong	108	34	48	16
	Stockton / San Joaquin	140	50	76	26

TABLE C-2

State	Base / City	Seismic Data (Site Class B)			
		MCE S _s (%g)	MCE S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
California	Travis AFB	152	60	111	37
	Twentynine Palms	155 Max 83 Min	60 Max 26 Min	102 Max 39 Min	32 Max 14 Min
	Vandenberg AFB	151 Max 118 Min	62 Max 34 Min	64 Max 53 Min	24 Max 19 Min
Colorado	Buckley AFB / Aurora	19	6	7	2
	Denver	19	6	8	2
	Fort Carson	18	6	7	2
	Cheyenne Mountain AS / NORAD	18	6	7	2
	Peterson AFB / Colorado Springs	18	6	7	2
	Schriever AFB	17	6	7	2
	USAF Academy	19	6	8	2
Connecticut	NSB New London / Groton	25	8	8	3
Delaware	Dover AFB	19	6	7	2
District of Columbia	Washington Region Bolling AFB Anacostia NS Fort McNair Marine Barracks NRL Washington NDW / Anacostia Pentagon Walter Reed	18	6	6	2
Florida	Avon Park AS	10	4	2	1
	Cape Canaveral AFS	10	5	3	1
	Eglin AFB	10	6	3	2
	Homestead	6	2	1	0
	Hurlburt Field	10	5	3	2
	NAS Jacksonville / Jacksonville	14	7	5	2
	NAS Key West	3	1		
	MacDill AFB	8	4	2	1
	NAS Mayport	15	8	5	2
	HQ Southcom / Miami	6	2	1	1
	Orlando	11	5	3	1
	NAS Panama City	13	7	3	2
	Patrick AFB	10	4	2	1

TABLE C-2

State	Base / City	Seismic Data (Site Class B)			
		MCE S _s (%g)	MCE S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Florida	NAS Pensacola	10	6	3	2
	Tampa	9	4	2	1
	Tyndall AFB	9	5	3	2
	NAS Whiting Field / Milton	11	6	4	2
Georgia	MC Logistics Support / Albany	14	8	5	3
	Athens NCSC	28	12	12	5
	Dobbins AFB / Atlanta NAS	28	11	11	4
	Fort Benning	16	9	6	3
	Fort Gordon	39	14	14	5
	Fort McPherson / Fort Gillem	25	11	10	4
	Fort Stewart	28	12	9	4
	Hunter Army Airfield / Savannah	38	14	12	4
	NSB Kings Bay	17	9	6	3
	Moody AFB	14	8	5	3
	Robins AFB	21	10	8	4
Hawaii	PMRF Barking Sands, Kauai	19	6	8	2
	MCBH Kaneohe Bay	63	18	30	8
	Pearl Harbor Region: Camp H.M. Smith Fort Shafter Hickam AFB Pearl Harbor Tripler AMC	61	18	29	8
	Wahiawa Region: Lualualei Wahiawa Naval Res Wheeler AFB Schofield Barracks	59	17	28	8
Idaho	ARD Bayview	40	11	17	5
	Boise ANG	34	10	16	5
	Mountain Home AFB	29	9	14	4
Illinois	Fort Sheridan / Chicago	17	6	5	2
	Great Lakes	16	6	5	2
	Rock Island Arsenal	13	6	5	2

TABLE C-2

State	Base / City	Seismic Data (Site Class B)			
		MCE S _s (%g)	MCE S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Illinois	Scott AFB	64	20	24	6
	Springfield	26	12	10	4
Indiana	Crane NWSC	38	14	13	4
	Grissom ARB	15	8	6	3
	Fort Benjamin Harrison / Indianapolis	18	9	7	3
Iowa	Des Moines	7	4	3	1
Kansas	Fort Leavenworth	13	6	4	2
	Fort Riley	21	6	6	2
	McConnell AFB	14	6	5	2
Kentucky	Fort Campbell	76 Max 56 Min	24 Max 20 Min	24 Max 18 Min	6 Max 6 Min
	Fort Knox	26	13	10	4
	Louisville	25	12	10	4
	Richmond	25	10	10	4
Louisiana	Barksdale AFB	17	8	5	2
	Fort Polk / Leesville	14	6	4	2
	NAS JRB New Orleans / Belle Chasse	12	6	4	1
Maine	NAS Brunswick	34	10	12	4
	Winter Harbour NSGA	25	8	8	3
Maryland	Aberdeen Proving Ground	24	7	8	2
	Adelphi	18	6	6	2
	Andrews AFB	18	6	6	2
	Carderock NSWC / Bethesda	18	6	6	2
	Bloods Island	15	6	5	2
	Edgewood Arsenal	23	7	7	2
	Fort Detrick / Fredrick	19	6	7	2
	Fort Meade	18	6	6	2
	Indian Head NSWC	18	6	7	2
	Martin State ANG	21	6	7	2
	NS Pax River , Webster Field / St. Inigoes	16	6	6	2
	U.S Naval Academy / Annapolis	18	6	6	2
Massachusetts	Fort Devens / Ayer	32	9	11	3
	Hanscom AFB	33	9	11	3
	Natick	29	9	10	3

TABLE C-2

State	Base / City	Seismic Data (Site Class B)			
		MCE S _s (%g)	MCE S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁
Massachusetts	Otis AGB / Falmouth	25	7	8	2
	Westover ARB	26	9	9	3
Michigan	Battle Creek	12	5	4	2
	Detroit Arsenal / Warren	12	4	4	2
	Selfridge ANG Base	11	4	4	2
Minnesota	Minneapolis - St Paul	6	3	2	1
Mississippi	Stennis / Bay St. Louis	15	6	4	2
	Columbus AFB	25	12	8	4
	Gulfport	15	6	4	2
	Jackson	19	10	6	3
	Keesler AFB	14	6	4	2
	NAS Meridian	19	9	7	3
	Pascagoula NS	13	6	4	2
	Vicksburg	19	9	6	3
	Fort Leonard Wood	28	13	10	4
Missouri	Kansas City	12	6	4	2
	Overland	54	17	19	5
	St. Louis	59	19	21	6
	Whiteman AFB	13	8	5	2
	Great Falls ANG	26	8	13	4
Montana	Malmstrom AFB	24	8	12	4
	Offutt AFB	12	4	4	1
Nebraska	Lincoln	18	5	5	2
	NAS Fallon	101	29	43	14
Nevada	Indian Springs AFS	50	15	24	8
	Nellis AFB	53	16	26	9
	Nellis AF Range	78 Max 60 Min	24 Max 19 Min	37 Max 28 Min	13 Max 9 Min
New Hampshire	Portsmouth Naval Shipyard	40	10	13	4
New Jersey	NWS Earle / Colts Neck	37	9	11	3
	Fort Dix / Trenton	32	8	10	3
	Fort Monmouth	37	9	11	3
	Lakehurst	30	8	10	3
	McGuire AFB	32	8	10	3
	Picatinny Arsenal	38	9	12	3

TABLE C-2

State	Base / City	Seismic Data (Site Class B)			
		MCE S _s (%g)	MCE S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
New Mexico	Albuquerque	62	19	27	7
	Cannon AFB	11	4	4	1
	Holloman AFB	35	10	13	4
	Kirtland AFB	61	18	27	7
	White Sands	39	12	13	4
New York	Buffalo	32	7	9	2
	Fort Drum	32	10	12	4
	Fort Hamilton / Brooklyn	42	9	12	3
	Griffis AFB / Rome	24	9	9	3
	NIAGARA FALLS IAP	31	7	9	2
	NSU Saratoga Springs	31	10	11	4
	Stewart ANG / Newburgh	33	9	11	3
	Syracuse	19	8	8	3
	West Point	37	9	12	3
	Watervliet Arsenal / Albany	27	9	10	3
North Carolina	MCAS Cherry Point	18	8	5	2
	Fort Bragg	29	13	9	4
	Jacksonville Region Camp Lejeune MCAS New River	22	10	6	3
	Pope AFB	28	13	9	4
	Raleigh	21	10	8	4
	Seymour Johnson AFB	21	10	7	3
North Dakota	Grand Forks AFB	5	2	2	0
	Minot AFB	7	2	2	1
Ohio	Cleveland	21	6	6	2
	DSC Whitehall / Columbus	16	7	7	3
	Wright-Patterson AFB	22	8	8	3
	Youngstown ARS / Vienna	17	6	6	2
Oklahoma	Altus AFB	21	7	6	2
	Fort Sill	36	9	8	2
	McAlester Army Ammunition Plant	20	8	7	2
Oklahoma	Tinker AFB / Oklahoma City	34	9	10	3
	Tulsa	16	7	6	2
	Vance AFB	22	6	7	2
Oregon	Portland	103	32	43	17

TABLE C-2

State	Base / City	Seismic Data (Site Class B)			
		MCE S _s (%g)	MCE S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Pennsylvania	ARS Coraopolis / Pittsburg	13	6	5	2
	Carlisle Barracks	19	6	7	2
	Fort Indiantown Gap / Annville	26	7	8	2
	Letterkenny / Chambersburg	19	6	6	2
	Mechanicsburg	20	6	7	2
	Philadelphia	33	8	10	3
	New Cumberland / Defense Depot Susquehanna	21	6	7	2
	Tobyhanna Army Depot	26	8	9	3
	Willow Grove ARS / NAS	33	8	11	3
Rhode Island	NS Newport	26	8	8	2
South Carolina	MCAS Beaufort	74	22	19	6
	Charleston Region:				
	Charleston AFB	154	43	34	8
	NWS Charleston	160	45	36	8
	Columbia Region:				
	McEntire	67	21	22	6
	Fort Jackson	61	20	20	6
	Shaw AFB	80	24	22	6
	MCRD Parris Island	62	20	18	5
South Dakota	Ellsworth AFB	14	4	5	2
Tennessee	Arnold AFB	30	13	12	5
	NSWC LCC / Memphis	137	42	28	7
	NSA Mid-South / Millington	158	47	32	7
	Nashville	30	14	12	5
Texas	NAS JRB, Carswell / Fort Worth	11	5	4	2
	NAS Corpus Christi	9	2	2	1
	Dallas / Irving	12	6	4	2
	Dyess AFB	8	4	3	1
	Ellington ANG / Houston	10	4	3	1
	Fort Bliss / El Paso	35	11	14	4
	Fort Hood / Killeen	8	4	3	1
	Goodfellow AFB	8	3	3	1
	NS Ingleside	10	3	2	1
	NAS Kingsville	10	2	2	1
	Laughlin AFB	7	2	2	1

TABLE C-2

State	Base / City	Seismic Data (Site Class B)			
		MCE S _s (%g)	MCE S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁
Texas	Red River Army Depot / Texarkana	18	9	6	2
	San Antonio Region				
	Brooks AFB	13	3	3	1
	Fort Sam Houston	12	3	3	1
	Kelly AFB	12	3	3	1
	Lackland AFB	12	3	3	1
	Randolph AFB	12	4	3	1
	Sheppard AFB	17	6	5	2
Utah	Dugway Proving Ground	34	12	17	6
	Hill AFB	138	46	50	17
	Salt Lake City	177	79	61	20
	Tooele Army Depot	78	26	35	12
Virginia	Dahlgren	18	6	6	2
	Dam Neck / Virginia Beach Ocean front	12	6	4	2
	Fort A. P. Hill	22	7	7	2
	Fort Belvoir	18	6	6	2
	Fort Eustis	14	6	5	2
	Fort Lee	23	8	7	3
	Fort Monroe	14	6	5	2
	Fort Myer	18	6	6	2
	Fort Story	12	6	4	2
	Henderson Hall / Arlington	18	6	6	2
	Langley AFB / Hampton	14	6	5	2
	NAB Little Creek	13	6	5	2
	Norfolk Region:				
	Camp Elmore Craney Island Depot Norfolk Naval Base	13	6	5	2
	Norfolk Shipyard - Naval Hospital / Portsmouth	13	6	5	2
	NSA Northwest / Chesapeake	13	6	5	2
	NAS Oceana / Virginia Beach	12	6	4	2
	Quantico	19	7	7	2
	Defense Supply Ctr / Richmond	28	8	8	3
	Wallops Island	12	5	4	2

TABLE C-2

State	Base / City	Seismic Data (Site Class B)			
		MCE S_s (%g)	MCE S_1 (%g)	10/50 S_s (%g)	10/50 S_1
Virginia	Yorktown Region: Camp Perry Cheatham Annex Yorktown NWS	16	6	5	2
Washington	NS Everett	123 (a)	40 (b)	62	20
	Fairchild AFB	30	9	13	4
	Fort Lewis / Tacoma	120 (a)	38 (b)	59	20
	Indian Island SWC	126 (a)	45 (b)	63	21
	NRS Jim Creek	120 (a)	37 (b)	59	19
	Keyport / Bangor Engin. Sta Annex	128 (a)	45 (b)	69	22
	McChord AFB	122	38	61	20
	Puget Sound Region: Bangor NSB Bremerton NS Puget Sound NSY	149 (a) 138 (a) 138 (a)	51 (b) 48 (b) 48 (b)	76 72 73	23 23 23
	NAS Whidbey Island / Oak Harbor	119 (a)	39(b)	59	20
	Seattle	158	55	75	22
West Virginia	Beckley	29	10	10	4
	Huntington	21	9	8	3
	Sugar Grove NRS	20	8	7	3
Wisconsin	Fort McCoy	7	3	2	1
	General Mitchell AFRC / Milwaukee	12	5	4	1
	Madison	11	5	4	1
Wyoming	F. E. Warren AFB	19	6	8	2
American Samoa	Pago Pago / Tutuila Island	100	40	50	20
Mariana Islands	Guam	150	60	75	30
	Saipan / Tinian	150	60	75	30
Puerto Rico	All	100	40	50	20

Notes to TABLE C-2, "EARTHQUAKE LOADING DATA – UNITED STATES, ITS TERRITORIES AND POSSESSIONS"

(a) – MCE S_s to be used for Navy facilities at identified locations in Washington State equals 150 %g.

(b) – MCE S_1 to be used for Navy facilities at identified locations in Washington State equals 50 %g.

APPENDIX D

SITE SPECIFIC STRUCTURAL LOADING DATA – OUTSIDE OF THE UNITED STATES, ITS TERRITORIES AND POSSESSIONS

D-1 Climatic Loading Data Table. Site-specific structural climatic loading data for potential DoD locations outside of the United States, its territories and possessions is provided in Table D-1.

D-2 Earthquake Loading Data Table. Site-specific earthquake loading data for potential DoD locations outside of the United States, its territories and possessions is provided in Table D-2.

TABLE D-1 STRUCTURAL CLIMATIC LOADING DATA – OUTSIDE OF THE UNITED STATES, ITS TERRITORIES AND POSSESSIONS

TABLE D-1			Ground Snow	Wind Speed	Frost Penetration	Ground Snow	Wind Speed	Frost Penetration
Continent / Region	Country	Base / City	(psf)	(mph) Note (a)	(inches)	kPa	km/h Note (a)	mm
Africa	Egypt	Alexandria	0	85	0	0.00	137	0
	Morocco	Casablanca	0	90	0	0.00	145	0
Asia	Afghanistan	Kabul						
	Bahrain	NSA Bahrain	0	85	0	0.00	137	0
	India	Bombay	0	91	0	0.00	146	0
		Calcutta	0	114	0	0.00	183	0
		Madras	0	92	0	0.00	148	0
		New Delhi	0	91	0	0.00	146	0
	Iraq	Baghdad						
		Basra						
	Japan	NAF Atsugi	15	120	25	0.72	193	635
		MCAS Iwakuni	12	120	10	0.57	193	254
		Misawa AFB	40	101	30	1.92	163	762
		Okinawa Camp Butler (Leshima, Camps Gonsalves, Hansen, Schwab, Kinser, Foster, Lester) MCAS Futenma Kakena AB Torii Station White Beach	0	180	0	0.00	290	0

TABLE D-1

Continent / Region	Country	Base / City	Ground Snow	Wind Speed	Frost Penetration	Ground Snow	Wind Speed	Frost Penetration
			(psf)	(mph) Note (a)	(inches)	kPa	km/h Note (a)	mm
Asia	Japan	Sagamihara	12	100	10	0.57	161	254
		Sasebo	12	100	5	0.57	161	127
		Tokyo	12	100	6	0.57	161	152
		COMFLTACT Yokosuka	12	100	5	0.57	161	127
		Yokata AFB, Honshu						
		Wakkanai	55	130	36	2.63	209	914
		Camp Zama						
	Kuwait	Kuwait City	0		0	0.00		0
	Oman	Areas south and west of Jabal Akehadar						
		- Ibri	0	105	0	0.00	169	0
		- Nazwa	0	105	0	0.00	169	0
		Batinah Coast						
		- Ash Shinash	0	105	0	0.00	169	0
		- Sib	0	105	0	0.00	169	0
		- Suhar	0	105	0	0.00	169	0
		Central, Southern, and Coastal Areas Sur to Sarfait						
		- Barik	0	115	0	0.00	185	0
		- Dawqa	0	115	0	0.00	185	0
		- Hayma	0	115	0	0.00	185	0
		- Salalah	0	115	0	0.00	185	0
		- Shalim	0	115	0	0.00	185	0
		High Jabal Locations						
		- Miskin	0	115	0	0.00	185	0
		- Sumail	0	115	0	0.00	185	0
		- Rikshah	0	115	0	0.00	185	0
		- Shaww	0	115	0	0.00	185	0
		Kuria Muria Island	0	120	0	0.00	193	0
		Masirah Island	0	120	0	0.00	193	0
	Oman	Mussandam Island	0	120	0	0.00	193	0

TABLE D-1

Continent / Region	Country	Base / City	Ground Snow	Wind Speed	Frost Penetration	Ground Snow	Wind Speed	Frost Penetration
			(psf)	(mph) Note (a)	(inches)	kPa	km/h Note (a)	mm
Asia	Pakistan	Peshawar	10	88	6	0.48	142	152
	Quatar	Doha	0		0	0.00		0
	Saudi Arabia	Dhahran	0	87	0	0.00	140	0
		Hafr al Batin	0	80	0	0.00	129	0
		Khamis Mushayt	0	80	0	0.00	129	0
		Jeddah	0	80	0	0.00	129	0
		Jubail	0	80	0	0.00	129	0
		Qadimah	0	80	0	0.00	129	0
		Riyadh	0	80	0	0.00	129	0
		Tabuk	0	80	0	0.00	129	0
	South Korea	Camp Casey						
		Camp Hialeah, Pusan						
		Camp Humphreys / Pyongtaek	0	95	45	0.00	153	1143
		Chinhae	20	105	24	0.96	169	610
		Kimpo AFB	20	105	48	0.96	169	1219
		Kunsan / Kunsan City	0	100	30	0.00	161	762
		Osan AFB / Songtan	0	95	45	0.00	153	1143
		Pohang	20	110	24	0.96	177	610
		Seoul	20	105	48	0.96	169	1219
		Taegu	0	115	40	0.00	185	1016
		Uijongbu	20	105	48	0.96	169	1219
		Yongsan / Seoul	20	105	45	0.96	169	1143
	Vietnam	Da Nang	0	120	0	0.00	193	0
		Ho Chi Minh City	0	95	0	0.00	153	0
		Nha Trang	0	95	0	0.00	153	0
	Taiwan	Tainan	0	120	0	0.00	193	0
		Taipei	0	130	0	0.00	209	0
		Tsoying						
	Thailand	Bangkok	0	80	0	0.00	129	0
		Chiang Mai	0	95	0	0.00	153	0
		Sattahip	0	85	0	0.00	137	0
	Thailand	Udonthani	0	85	0	0.00	137	0

TABLE D-1

Continent / Region	Country	Base / City	Ground Snow	Wind Speed	Frost Penetration	Ground Snow	Wind Speed	Frost Penetration
			(psf)	(mph) Note (a)	(inches)	kPa	km/h Note (a)	mm
Asia	Turkey	Ankara	20	99	24	0.96	159	610
		Incirlik AB / Adana	0	70	5	0.00	113	127
		Izmir AS						
		Karamursel	15	95	12	0.72	153	305
Central America	Canal Zone		0	95	0	0.00	153	0
Europe	Belgium	Brussels						
		Kester						
		Kleine Brogel						
		Shape - Chievres						
	Bosnia - Herzegovina	Tulza AFB						
	England	RAF Alconbury, Molesworth / Huntingdon						
		Birmingham	15	89	12	0.72	143	305
		RAF Croughton / Brackley	15	100	15	0.72	161	381
		RAF Fairford						
		RAF Lakenheath / Lakeheath Village	15	100	15	0.72	161	381
		USNA UK / London	15	95	12	0.72	153	305
		RAF Menwith Hill / Harrogate						
		RAF Mildenhall	15	104	12	0.72	167	305
		Plymouth	10	94	12	0.48	151	305
		RAF Upwood / Ramsey						
		JMF St. Mawgan / Cornwall						
		Sculthorpe AB	15	99	12	0.72	159	305
		Southport	10	104	12	0.48	167	305
		South Shields	15	99	12	0.72	159	305
		Spurn Head	15	99	12	0.72	159	305
	Germany	Ansbach						
		Bamberg						

TABLE D-1

			Ground Snow	Wind Speed	Frost Penetration	Ground Snow	Wind Speed	Frost Penetration
Continent / Region	Country	Base / City	(psf)	(mph) Note (a)	(inches)	kPa	km/h Note (a)	mm
Europe	Germany	Baumholder						
		Bremen	25	85	30	1.20	137	762
		Buechel Air Base / Cochem						
		Darmstadt						
		Garmisch AST						
		Geilenkirchen						
		Grafenwoehr	25	90	0	1.20	145	0
		Hanau	25	55	25	1.20	89	635
		Heidelberg	25	55	30	1.20	89	762
		Hohenfels						
		Illesheim						
		Kaiserslautern						
		Kalkar						
		Mannheim						
		Munich	40	98	36	1.92	158	914
		Ramstein AB						
		Rhein-Main Air Base	25	85	30	1.20	137	762
		Schweinfurt						
		Spangdahlem Air Base	25	55	30	1.20	89	762
		Stuttgart	45	90	36	2.16	145	914
		Vilseck						
		Wiesbaden / Mainz / Dexheim						
		Wuerzburg / Kitzingen / Giebelstadt	25	90	35	1.20	145	889
	Greece	Athens	5	92	0	0.24	148	0
		Larissa						
		NAS Soudi Bay / Mouzouras	5	86	0	0.24	138	0
	Iceland	Keflavik - NSA	30	115	24	1.44	185	610
		Thorshofn	30	146	36	1.44	235	914
	Italy	Aviano AB	10	80	18	0.48	129	457
		Brindisi / San Vito	5	110	6	0.24	177	152

TABLE D-1

Continent / Region		Base / City	Ground Snow	Wind Speed	Frost Penetration	Ground Snow	Wind Speed	Frost Penetration
			(psf)	(mph) Note (a)	(inches)	kPa	km/h Note (a)	mm
Europe	Italy	Camp Darby Livorno						
		Gaeta - NSA	20	80	0	0.96	129	0
		Ghedì						
		NSA La Maddalena	20	80	5	0.96	129	127
		NSA Naples	20	80	5	0.96	129	127
		NAS Sigonella	20	90	5	0.96	145	127
		Vicenza	35	80	25	1.68	129	635
	Netherlands	Volkel Air Base						
		AF North Brunssum						
		Schinnen	15	70	120	0.72	113	3048
	Northern Ireland	Londonderry	15	133	12	0.72	214	305
	Norway	Stavanger						
	Portugal	Azores / Lajes Field	0	120	0	0.00	193	0
		Southlant / Oeiras						
	Scotland	Aberdeen	15	90	12	0.72	145	305
		Edinburgh	15	99	12	0.72	159	305
		Edzell	15	85	12	0.72	137	305
		Glasgow	15	99	12	0.72	159	305
		Prestwick	15	100	12	0.72	161	305
		Stornoway	15	120	12	0.72	193	305
		Thurso	15	105	12	0.72	169	305
	Spain	Madrid / JHQ SW	10	83	6	0.48	134	152
		Moron AB						
		NS Rota	5	90	5	0.24	145	127
		San Pablo	5	117	6	0.24	188	152
		HRF Valencia						
		Zaragoza	10	117	6	0.48	188	152
North America	Canada	Argentia NAS, Newfoundland	47	115	36	2.25	185	914
		Churchill, Manitoba	66	107	permafrost	3.16	172	permafrost
		Cold Lake, Alberta	41	81	72	1.96	130	1829
		Edmonton, Alberta	27	84	60	1.29	135	1524

TABLE D-1

Continent / Region		Base / City	Ground Snow	Wind Speed	Frost Penetration	Ground Snow	Wind Speed	Frost Penetration
			(psf)	(mph) Note (a)	(inches)	kPa	km/h Note (a)	mm
North America	Canada	E. Harmon AFB, Newfoundland	86	113	60	4.12	182	1524
		Fort William, Ontario	73	81	60	3.50	130	1524
		Frobisher, N.W.T.	50	107	permafrost	2.40	172	permafrost
		Goose Airport, Newfoundland	100	89	60	4.79	143	1524
		Ottawa, Ontario	60	90	48	2.87	145	1219
		St. John's, Newfoundland	72	114	36	3.45	183	914
		Toronto, Ontario	40	90	36	1.92	145	914
		Winnipeg, Manitoba	45	82	60	2.16	132	1524
	Greenland	Narsarssuak AB	30	139	60	1.44	224	1524
		Simiutak AB	25	166	60	1.20	267	1524
		Sondrestrom AB	20	120	permafrost	0.96	193	permafrost
		Thule AB	25	135	permafrost	1.20	217	permafrost
Atlantic Ocean	Ascension Island		0	67	0	0.00	108	0
Caribbean Sea	The Bahamas	Eleuthera Island	0	148	0	0.00	238	0
		Grand Bahama Island	0	148	0	0.00	238	0
		Grand Turk Island	0	161	0	0.00	259	0
		Great Exuma Island	0	148	0	0.00	238	0
		NS Guantanamo Bay	0	105	0	0.00	169	0
	Cuba							
Caribbean Sea	Trinidad Island	Port of Spain	0	59	0	0.00	95	0
Indian Ocean	British Indian Ocean Territory	NSF Diego Garcia		105	0	0.00	169	0
Pacific Ocean	Caroline Islands	Koror, Paulau Islands	0	95	0	0.00	153	0
		Ponape	0	110	0	0.00	177	0
	Johnston Atoll		0	85	0	0.00	137	0
	Marcus Island		0	150	0	0.00	241	0
	Marshall Islands	Kwajalein	0	105	0	0.00	169	0

TABLE D-1

Continent / Region		Base / City	Ground Snow	Wind Speed	Frost Penetration	Ground Snow	Wind Speed	Frost Penetration
			(psf)	(mph) Note (a)	(inches)	kPa	km/h Note (a)	mm
Pacific Ocean	Marshall Islands	Wake Island	0	110	0	0.00	177	0
	Midway Island		0	95	0	0.00	153	0
	Phillipine Is.	Clark AFB	0	90	0	0.00	145	0
		Sangley Point	0	90	0	0.00	145	0
		Subic Bay	0	90	0	0.00	145	0
	Samoa	Apia / Upolu	0	150	0	0.00	241	0
	Volcano Island	Iwo Jima	0	210	0	0.00	338	0

Notes to Table D-1, “STRUCTURAL CLIMATIC LOADING DATA – OUTSIDE OF THE UNITED STATES, ITS TERRITORIES AND POSSESSIONS”

Note (a) – Use a minimum wind speed of 85 mph (137 km/h) for all locations

TABLE D-2 EARTHQUAKE LOADING DATA – OUTSIDE OF THE UNITED STATES, ITS TERRITORIES AND POSSESSIONS

TABLE D-2			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	MCE S_s (%g)	MCE S₁ (%g)	10/50 S_s (%g)	10/50 S₁ (%g)
Africa	Egypt	Alexandria	23	9	11	5
	Morocco	Casablanca	25	10	13	5
Asia	Afghanistan	Kabul	128	51	64	26
	Bahrain	NSA Bahrain	31	12	15	6
	India	Bombay	26	10	13	5
		Calcutta	50	20	25	10
		Madras	14	6	7	3
		New Delhi	71	28	35	14
	Iraq	Baghdad	124 (a)	56 (a)	62 (a)	29 (a)
		Basra	98	39	49	20
	Japan	NAF Atsugi	259	104	130	52
		MCAS Iwakuni	94	38	47	19
		Misawa AFB	104	42	52	21
		Okinawa Camp Butler (Leshima, Camps Gonsalves, Hansen, Schwab, Kinser, Foster, Lester) MCAS Futenma Kakena AB Torii Station White Beach	165 (a)	75 (a)	83 (a)	38 (a)
		Sagamihara	325	130	162	65
		Sasebo	91	36	45	18
		Tokyo	187	75	94	37
		COMFLTACT Yokosuka	313	125	157	63
		Yokata AFB, Honshu	200	80	100	40
		Wakkanai	54	22	27	11
		Camp Zama	334	134	167	67
	Kuwait	Kuwait City	54	22	27	11
	Oman	Areas south and west of Jabal Akehadar				
		- Ibri	91	36	46	18
		- Nazwa	88	35	44	18
		Batinah Coast				
		- Ash Shinash	166	66	83	33

TABLE D-2

			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	MCE S _s (%g)	MCE S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Asia	Oman	- Sib	129	52	65	26
		- Suhar	149	60	75	30
		Central, Southern, and Coastal Areas Sur to Sarfait				
		- Barik				
		- Dawqa	3	1	2	1
		- Hayma	0	0	0	0
		- Salalah	8	3	4	2
		- Shalim	0	0	0	0
		High Jabal Locations				
		- Miskin	107	43	54	21
		- Sumail				
		- Rikshah	98	39	49	20
		- Shaww	99	40	50	20
		Kuria Muria Island				
		Masirah Island	19	8	9	4
		Mussandam Island				
	Pakistan	Peshawar	105	42	53	21
	Quatar	Doha	6 (a)	6 (a)	3 (a)	3 (a)
	Saudi Arabia	Dhahran	10	4	5	2
		Hafr al Batin				
		Khamis Mushayt	6	2	3	1
		Jeddah	49	20	24	10
		Jubail	35	14	18	7
		Qadimah	24	10	12	5
		Riyadh	6 (a)	6 (a)	3 (a)	3 (a)
		Tabuk	28	11	14	6
	South Korea	Camp Casey	15	6	7	3
		Camp Hialeah, Pusan	30	12	15	6
		Camp Humphreys / Pyongtaek	19	7	9	4
		Chinhae	17	7	8	3
		Kimpo AFB	15	6	8	3
		Kunsan / Kunsan City	17	7	8	3
		Osan AFB / Songtan	19	7	9	4
		Pohang	14	6	7	3
		Seoul	17	7	8	3

TABLE D-2

			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	MCE S _s (%g)	MCE S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Asia	South Korea	Taegu	29	11	14	6
		Uijongbu	17	7	8	3
		Yongsan / Seoul	17	7	9	3
	Vietnam	Da Nang	18	7	9	4
		Ho Chi Minh City	14	6	7	3
		Nha Trang	13	5	6	3
	Taiwan	Tainan	239	96	120	48
		Taipei	325	130	162	65
		Tsoying	251	100	125	50
	Thailand	Bangkok	28	11	14	6
		Chiang Mai	27	11	14	5
		Sattahip	21	9	11	4
	Turkey	Udonthani	24	10	12	5
		Ankara	99	40	49	20
		Incirlik AB / Adana	105	42	52	21
		Izmir AS	242	97	121	48
		Karamursel	139	56	70	28
Central America	Canal Zone		93	37	46	19
Europe	Belgium	Brussels	32	13	16	6
		Kester	36	14	18	7
		Kleine Brogel	31	13	16	6
		Shape - Chievres	54	22	27	11
	Bosnia - Hertzegovina	Tulza AFB	92	37	46	18
	England	RAF Alconbury, Molesworth / Huntingdon	18	7	9	4
		Birmingham	22	9	11	4
		RAF Croughton / Brackley	28	11	14	6
		RAF Fairford	16	6	8	3
		RAF Lakenheath / Lakeheath Village	15	6	8	3
		USNA UK / London	13	3	6	1
		RAF Menwith Hill / Harrogate	21	9	11	4
		RAF Mildenhall	15	6	8	3
		Plymouth	20	8	10	4
		RAF Upwood / Ramsey	16	6	8	3

TABLE D-2

			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	MCE S _s (%g)	MCE S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Europe	England	JMF St. Mawgan / Cornwall	20	4	10	2
		Sculthorpe AB	16	6	8	3
		Southport	23	9	12	5
		South Shields	11	5	6	2
		Spurn Head				
	Germany	Ansbach	24	10	12	5
		Bamberg	21	8	10	4
		Baumholder	25	10	13	5
		Bremen	10	4	5	2
		Buechel Air Base / Cochem	33	13	16	7
		Darmstadt	40	16	20	8
		Garmisch AST	46	18	23	9
		Geilenkirchen	55	22	27	11
		Grafenwoehr	24	10	12	5
		Hanau	38	15	19	8
		Heidelberg	38	15	19	8
		Hohenfels	26	10	13	5
		Illesheim	23	9	11	5
		Kaiserslautern	25	10	13	5
		Kalkar	22	9	11	4
		Mannheim	40	16	20	8
		Munich	26	10	13	5
		Ramstein AB	24	10	12	5
		Rhein-Main Air Base	39	16	20	8
		Schweinfurt	21	8	10	4
		Spangdahlem Air Base	24	10	12	5
		Stuttgart	44	18	22	9
		Vilseck	22	9	11	4
		Wiesbaden / Mainz / Dexheim	38	15	19	8
		Wuerzburg / Kitzingen / Giebelstadt	21	9	11	4
	Greece	Athens	81	32	40	16
		Larissa	140	26	70	13
	Iceland	NAS Soudi Bay / Mouzouras	120	34	60	17
		Keflavik - NSA	100	40	50	20

TABLE D-2

			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	MCE S _s (%g)	MCE S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Europe	Iceland	Thorshofn	49	19	24	10
	Italy	Aviano AB	115	46	57	23
		Brindisi / San Vito	37	15	18	7
		Camp Darby Livorno	62	25	31	12
		Gaeta - NSA	50	21	25	11
		Ghedi	71	29	36	14
		NSA La Maddalena	23	9	12	5
		NSANaples	67	27	34	14
		NAS Sigonella	120	31	60	16
		Vicenza	93	37	46	19
	Netherlands	Volkel Air Base	29	12	15	6
		AF North Brunssum	55	22	28	11
		Schinnen	6 (a)	6 (a)	3 (a)	3 (a)
	Northern Ireland	Londonderry	8	3	4	2
	Norway	Stavanger				
	Portugal	Azores / Lajes Field	165	75	83	38
		Southlant / Oeiras	61	25	31	12
	Scotland	Aberdeen	9	4	5	2
		Edinburgh	17	7	8	3
		Edzell	11	4	5	2
		Glasgow	21	9	11	4
		Prestwick	12	5	6	2
		Stornoway	10	4	5	2
		Thurso	9	3	4	2
	Spain	Madrid / JHQ SW	13	5	6	3
		Moron AB	61	24	31	12
		NS Rota	72	28	36	14
		San Pablo				
		HRF Valencia	66	27	33	13
		Zaragoza	15	6	8	3
North America	Canada	Argentia NAS, Newfoundland	21	8	10	4
		Churchill, Manitoba	1	0	0	0
		Cold Lake, Alberta	5	2	3	1
		Edmonton, Alberta	8	3	4	2
		E. Harmon AFB, Newfoundland	16	6	8	3
		Fort William, Ontario				

TABLE D-2

			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	MCE S _s (%g)	MCE S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
North America	Canada	Frobisher, N.W.T.	7	3	3	1
		Goose Airport, Newfoundland	16	6	8	3
		Ottawa, Ontario	91	36	46	18
		St. John's, Newfoundland	19	8	10	4
		Toronto, Ontario	36	15	18	7
		Winnipeg, Manitoba	31 (a)	14 (a)	16 (a)	7 (a)
	Greenland	Narsarsuak AB	31 (a)	14 (a)	16 (a)	7 (a)
		Simiutak AB	31 (a)	14 (a)	16 (a)	7 (a)
		Sondrestrom AB	22	9	11	4
		Thule AB	37	15	18	7
Atlantic Ocean	Ascension Island					
Caribbean Sea	The Bahamas	Eleuthera Island	2	1	1	0
		Grand Bahama Island	2	1	1	0
		Grand Turk Island	58	23	29	12
		Great Exuma Island	19	8	10	4
	Cuba	NS Guantanamo Bay	126	50	63	25
	Trinidad Island	Port of Spain	171	68	86	34
Indian Ocean	British Indian Ocean Territory	NSF Diego Garcia	70	28	35	14
Pacific Ocean	Caroline Islands	Koror, Paulau Islands	70	28	35	14
		Ponape	103	41	51	21
	Johnston Atoll		136	54	68	27
	Marcus Island		95	38	47	19
	Marshall Islands	Kwajalein	119	48	60	24
		Wake Island	137	55	68	27
	Midway Island					
	Phillipine Is.	Clark AFB	159	64	79	32
		Sangley Point	195	78	97	39
		Subic Bay	177	71	88	35
		Apia / Upolu	158	63	79	32
		Volcano Island	89	36	45	18

Notes to Table D-2, "EARTHQUAKE LOADING DATA – OUTSIDE OF THE UNITED STATES, ITS TERRITORIES AND POSSESSIONS"

Note (a) – Values from TI 809-04, *Seismic Design for Buildings*. No updated data available.

APPENDIX E

EARTHQUAKE LOADING DATA AT ADDITIONAL SELECTED LOCATIONS OUTSIDE OF THE UNITED STATES, ITS TERRITORIES AND POSSESSIONS

E-1 Earthquake Loading Data Table. Earthquake loading data for additional selected cities outside of the United States, its territories and possessions is provided in Table E-1.

**TABLE E-1 EARTHQUAKE LOADING DATA AT ADDITIONAL
LOCATIONS OUTSIDE OF THE UNITED STATES, ITS
TERRITORIES AND POSSESSIONS**

TABLE E-1			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	MCE S_s (%g)	MCE S	(%g)	10/50 S₁ (%g)
Africa	Algeria	Alger	96.1	38.4	48.0	19.2
		Oran	60.0	24.0	30.0	12.0
	Angola	Luanda	5.6	2.2	2.8	1.1
	Benin	Cotonou	10.9	4.4	5.4	2.2
	Botswana	Gaborone	2.6	1.0	1.3	0.5
	Burkina Faso	Kampala	44.1	17.7	22.1	8.8
	Burundi	Bujumbura	66.1	26.5	33.1	13.2
	Cameroon	Douala	15.8	6.3	7.9	3.2
		Yaounde	26.0	10.4	13.0	5.2
	Central African Republic	Bangui				
			26.0	10.4	13.0	5.2
	Chad	Ndjamena	5.6	2.2	2.8	1.1
	Congo	Brazzaville				
	Congo, Democratic Republic of the	Bukavu				
			74.0	29.6	37.0	14.8
		Kinshasa				
		Lubumbashi	37.4	14.9	18.7	7.5
	Cote d'Ivoire	Abidjan	3.7	1.5	1.8	0.7
	Djibouti	Djibouti	81.5	32.6	40.7	16.3
	Egypt	Cairo	67.2	26.9	33.6	13.4
		Port Said	65.1	26.1	32.6	13.0
	Equatorial Guinea	Malabo	15.8	6.3	7.9	3.2
	Eritrea	Asmara	43.0	17.2	21.5	8.6
	Ethiopia	Addis Ababa	55.3	22.1	27.6	11.1
	Gabon	Libreville	26.0	10.4	13.0	5.2

TABLE E-1

			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	MCE S _s (%g)	MCE S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Africa	Gambia	Banjul				
	Ghana	Accra	35.6	14.3	17.8	7.1
	Guinea	Conakry	36.1	14.5	18.1	7.2
	Guinea-Bissau	Bissau	0.9	0.4	0.5	0.2
	Kenya	Nairobi	30.7	12.3	15.3	6.1
	Lesotho	Maseru	6.3	2.5	3.1	1.3
	Liberia	Monrovia	21.4	8.5	10.7	4.3
	Libya	Tripoli	57.1	22.9	28.6	11.4
	Madagascar	Tananarive	18.4	7.3	9.2	3.7
	Malawi	Blantyre	46.3	18.5	23.1	9.3
		Lilongwe	26.3	10.5	13.2	5.3
		Zomba	48.3	19.3	24.2	9.7
	Mali	Bamako				
	Mauritania	Nouakchott	7.7	3.1	3.8	1.5
	Morocco	Kenitra	27.0	10.8	13.5	5.4
		Rabat	25.5	10.2	12.7	5.1
		Tangier	44.3	17.7	22.2	8.9
	Mozambique	Maputo	10.2	4.1	5.1	2.0
	Niger	Niamey	0.2	0.1	0.1	0.0
	Nigeria	Ibadan				
		Kaduna	5.6	2.2	2.8	1.1
		Lagos	0.3	0.1	0.1	0.1
	Rwanda	Kigali	27.8	11.1	13.9	5.6
	Senegal	Dakar	7.7	3.1	3.8	1.5
	Sierra Leone	Freetown	34.9	14.0	17.4	7.0
	Somalia	Mogadishu				
	South Africa	Cape Town	26.0	10.4	13.0	5.2
		Durban	28.7	11.5	14.3	5.7
		Johannesburg	3.1	1.2	1.5	0.6
		Natal	6.4	2.6	3.2	1.3
	Swaziland	Pretoria	3.1	1.2	1.5	0.6
	Tanzania	Dar es Salaam	17.1	6.8	8.5	3.4
		Mbabane	17.9	7.2	9.0	3.6
	Togo	Zanzibar	11.5	4.6	5.7	2.3
	Tunisia	Lome	37.5	15.0	18.8	7.5
	Uganda	Tunis	91.0	36.4	45.5	18.2
	Zambia	Ougadougou				
	Zimbabwe	Harare	5.6	2.2	2.8	1.1
		Lusaka	21.9	8.8	11.0	4.4
Asia	Bahrain	Manama	26.9	10.8	13.5	5.4
	Bangladesh	Dhaka	69.5	27.8	34.8	13.9
	Brunei	Bandar Seri Begawan	37.2	14.9	18.6	7.4
	Burma	Mandalay	201.0	80.4	100.5	40.2

TABLE E-1

			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	MCE S _s (%g)	MCE S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Asia	Burma	Rangoon	76.8	30.7	38.4	15.4
	China	Beijing (Peking)	55.9	22.4	28.0	11.2
		Chengdu	44.2	17.7	22.1	8.8
		Chongqing	8.4	3.4	4.2	1.7
		Guangzhou (Canton)	13.5	5.4	6.8	2.7
		Harbin	12.4	4.9	6.2	2.5
		Nanjing	23.4	9.4	11.7	4.7
		Qingdao (Tsingtao)	31.6	12.6	15.8	6.3
		Shanghai	17.3	6.9	8.7	3.5
		Shengyang	88.7	35.5	44.3	17.7
		Tianjin (Tientsan)	72.2	28.9	36.1	14.4
		Wuhan	7.3	2.9	3.7	1.5
	Cyprus	Nicosia	118.0	47.2	59.0	23.6
	Hong Kong	Hong Kong	12.8	5.1	6.4	2.6
	Indonesia	Bandung	164.3	65.7	82.1	32.9
		Jakarta	138.1	55.2	69.0	27.6
		Medan	111.5	44.6	55.7	22.3
		Surabaya	96.4	38.6	48.2	19.3
	Iran	Isfahan	90.8	36.3	45.4	18.2
		Shiraz	173.2	69.3	86.6	34.6
		Tabriz	181.2	72.5	90.6	36.2
		Tehran	205.0	82.0	102.5	41.0
	Israel	Haifa	136.9	54.7	68.4	27.4
		Jerusalem	106.9	42.8	53.4	21.4
		Tel Aviv	95.2	38.1	47.6	19.0
	Japan	Fukuoka	67.4	27.0	33.7	13.5
		Itazuke AFB	73.6	29.4	36.8	14.7
		Kobe	189.8	75.9	94.9	38.0
		Naha, Okinawa				
		Osaka	178.1	71.2	89.0	35.6
		Sapporo	100.4	40.2	50.2	20.1
		Yokohama	248.2	99.3	124.1	49.6
	Jordan	Amman	70.2	28.1	35.1	14.0
	Kuwait	Ali Al Salem	24.2	9.7	12.1	4.8
	Laos	Vientiane	53.9	21.6	27.0	10.8
	Lebanon	Beirut	149.7	59.9	74.9	29.9
	Malaysia	Kuala Lumpur	55.8	22.3	27.9	11.2
	Nepal	Kathmandu	245.5	98.2	122.8	49.1
	Oman	Muscat	123.6	49.5	61.8	24.7
	Pakistan	Islamabad	128.9	51.6	64.5	25.8
		Karachi	73.3	29.3	36.6	14.7
		Lahore	117.1	46.8	58.5	23.4
	Singapore	All	37.5	15.0	18.8	7.5

TABLE E-1

			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	MCE S _s (%g)	MCE S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Asia	Sri Lanka	Colombo	2.6	1.0	1.3	0.5
	South Korea	Kimhae	18.3	7.3	9.2	3.7
	South Korea	Kwangju	12.9	5.2	6.5	2.6
		Pusan	32.8	13.1	16.4	6.6
	Syria	Aleppo	64.3	25.7	32.2	12.9
		Damascus	79.1	31.6	39.5	15.8
	Taiwan	Changhua	274.4	109.8	137.2	54.9
		Kao-hsiung	250.6	100.3	125.3	50.1
	Thailand	Songkhla	29.6	11.8	14.8	5.9
		Udon	24.1	9.6	12.0	4.8
	Turkey	Istanbul	145.8	58.3	72.9	29.2
	United Arab Emirates	Abu Dhabi	107.0	42.8	53.5	21.4
		Dubai	168.4	67.4	84.2	33.7
	Yemen	Aden City	36.6	14.7	18.3	7.3
		Sanaa	34.3	13.7	17.2	6.9
Central America	Belize	Belmopan	53.7	21.5	26.8	10.7
	Costa Rica	San Jose	280.4	112.2	140.2	56.1
	El Salvador	San Salvador	170.8	68.3	85.4	34.2
	Guatemala	Guatemala	168.3	67.3	84.2	33.7
	Honduras	Tegucigalpa	99.9	40.0	50.0	20.0
Europe	Albania	Tirana	111.6	44.6	55.8	22.3
	Austria	Salzburg	41.5	16.6	20.7	8.3
		Vienna	49.3	19.7	24.7	9.9
	Belgium	Antwerp	19.7	7.9	9.9	3.9
	Bulgaria	Sofia	116.3	46.5	58.1	23.3
	Czech Republic	Prague	12.8	5.1	6.4	2.6
	Denmark	Copenhagen	11.6	4.7	5.8	2.3
	England	Liverpool	23.0	9.2	11.5	4.6
	Finland	Helsinki	5.1	2.0	2.6	1.0
	France	Bordeaux	16.4	6.6	8.2	3.3
		Istres AFB	36.2	14.5	18.1	7.2
		Lyon	28.6	11.4	14.3	5.7
		Marseille	44.4	17.8	22.2	8.9
		Nice	41.3	16.5	20.7	8.3
		Strasbourg	42.7	17.1	21.3	8.5
	Germany	Babenhausen	34.2	13.7	17.1	6.8
		Berlin	5.1	2.0	2.6	1.0
		Bonn	42.2	16.9	21.1	8.4
		Dusseldorf	30.6	12.3	15.3	6.1
		Frankfurt am Main	37.7	15.1	18.8	7.5
		Giebelstadt	21.9	8.8	11.0	4.4

TABLE E-1

			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	MCE S _s (%g)	MCE S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Europe	Germany	Hamburg	9.2	3.7	4.6	1.8
		Kitzingen	21.2	8.5	10.6	4.2
		Landstuhl	23.7	9.5	11.9	4.7
		Vaihingen an der Enz	38.7	15.5	19.4	7.7
	Greece	Kavalla	108.2	43.3	54.1	21.6
		Nea Makri	86.7	34.7	43.4	17.3
		Rhodes	137.0	54.8	68.5	27.4
		Thessaloniki	142.1	56.8	71.0	28.4
	Hungary	Budapest	46.3	18.5	23.1	9.3
		Taszar AB				
	Iceland	Reykjavik	91.8	36.7	45.9	18.4
	Italy	Florence	96.4	38.6	48.2	19.3
		Genoa	66.1	26.4	33.0	13.2
		Milan	41.3	16.5	20.7	8.3
		Palermo	66.9	26.8	33.5	13.4
		Rome	89.8	35.9	44.9	18.0
		Siculiana	44.8	17.9	22.4	9.0
		Trieste	72.3	28.9	36.2	14.5
		Turin	53.7	21.5	26.8	10.7
	Luxembourg	Luxembourg	21.4	8.6	10.7	4.3
	Malta	Valletta	28.6	11.5	14.3	5.7
	Netherlands	Amsterdam	13.0	5.2	6.5	2.6
	Northern Ireland	Belfast	8.7	3.5	4.3	1.7
	Norway	Oslo	14.8	5.9	7.4	3.0
	Poland	Krakow	19.1	7.6	9.5	3.8
		Poznan	5.6	2.2	2.8	1.1
		Waraszawa	11.7	4.7	5.9	2.3
		Warsow	10.2	4.1	5.1	2.0
	Portugal	Lisbon	67.7	27.1	33.9	13.5
		Oporto	64.5	25.8	32.2	12.9
	Republic of Ireland	Dublin	9.4	3.8	4.7	1.9
	Romania	Bucharest	104.9	42.0	52.5	21.0
	Russia	Kiev	6.6	2.7	3.3	1.3
		Moscow	6.6	2.7	3.3	1.3
		St. Petersburg (Leningrad)	6.6	2.7	3.3	1.3
	Scotland	Hamilton	18.3	7.3	9.2	3.7
		Renfrew	21.6	8.6	10.8	4.3
	Serbia and Montenegro	Belgrade	97.2	38.9	48.6	19.4
		Zagrebac	103.9	41.6	52.0	20.8
	Slovakia	Bratislava	56.2	22.5	28.1	11.2

TABLE E-1

			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	MCE S _s (%g)	MCE S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Europe	Spain	Barcelona	60.0	24.0	30.0	12.0
		Bilbao	32.1	12.9	16.1	6.4
		Sevilleja de la Jara	12.8	5.1	6.4	2.6
	Sweden	Goteborg	14.4	5.7	7.2	2.9
		Stockholm	7.7	3.1	3.8	1.5
	Switzerland	Bern	44.0	17.6	22.0	8.8
		Geneva	46.3	18.5	23.1	9.3
		Zurich	38.9	15.6	19.5	7.8
North America	Canada	Calgary	19.8	7.9	9.9	4.0
		Halifax	25.0	10.0	12.5	5.0
		Montreal	102.9	41.2	51.4	20.6
	Mexico	Vancouver	90.4	36.2	45.2	18.1
		Ciudad Juarez	18.2	7.3	9.1	3.6
		Guadalajara	146.9	58.8	73.4	29.4
		Hermosillo	46.3	18.5	23.1	9.3
		Matamoros	2.0	0.8	1.0	0.4
		Mazatlan	97.4	39.0	48.7	19.5
		Merida	3.6	1.4	1.8	0.7
		Mexico City	56.9	22.8	28.5	11.4
		Monterrey	21.5	8.6	10.8	4.3
		Nuevo Laredo	14.8	5.9	7.4	3.0
		Tijuana	92.7	37.1	46.4	18.5
South America	Argentina	Buenos Aires	6.6	2.7	3.3	1.3
	Bolivia	La Paz	111.0	44.4	55.5	22.2
	Brazil	Belem	0.5	0.2	0.3	0.1
		Belo Horizonte	0.5	0.2	0.3	0.1
		Brasilia	0.5	0.2	0.3	0.1
		Manaus	1.7	0.7	0.8	0.3
		Porto Alegre	0.5	0.2	0.3	0.1
		Recife	4.1	1.6	2.0	0.8
		Rio de Janeiro	0.5	0.2	0.3	0.1
		Salvador	0.5	0.2	0.3	0.1
		Sao Paulo	0.5	0.2	0.3	0.1
	Chile	Santiago	202.5	81.0	101.2	40.5
		Valparaiso	289.3	115.7	144.7	57.9
	Colombia	Bogata	166.4	66.6	83.2	33.3
	Ecuador	Guayaquil	136.9	54.8	68.5	27.4
		Quito	204.6	81.8	102.3	40.9
	Paraguay	Asuncion	15.3	6.1	7.7	3.1
	Peru	Lima	355.2	142.1	177.6	71.0
		Piura	188.3	75.3	94.1	37.7
	Uruguay	Montevideo	3.6	1.4	1.8	0.7
	Venezuela	Caracas	131.0	52.4	65.5	26.2

TABLE E-1

			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	MCE S _s (%g)	MCE S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
South America	Venezuela	Maracaibo	104.4	41.8	52.2	20.9
Caribbean Sea	Bahamas, The	Nassau	7.1	2.9	3.6	1.4
	Barbados	Bridgetown	37.4	15.0	18.7	7.5
	Cuba	Havana	25.5	10.2	12.8	5.1
Caribbean Sea	Dominica	Roseau	107.7	43.1	53.8	21.5
	Dominican Republic	Santo Domingo	173.6	69.5	86.8	34.7
	Grenada	Saint Georges	107.3	42.9	53.6	21.5
	Guadeloupe	Basse-Terre	131.0	52.4	65.5	26.2
	Haiti	Port au Prince	80.0	32.0	40.0	16.0
	Jamaica	Kingston	144.9	58.0	72.4	29.0
	Martinique	Fort-de-France	97.4	39.0	48.7	19.5
	Montserrat	Plymouth	162.4	65.0	81.2	32.5
	Saint Kitts and Nevis	Basseterre	149.6	59.8	74.8	29.9
	Saint Lucia	Castries	89.8	35.9	44.9	18.0
	Saint Vincent and The Grenadines	Port Eliazabeth	53.1	21.2	26.5	10.6
	St. Croix	Frederiksted	80.5	24.2	40.2	12.4
	St. John	Bethany	108.1	32.6	60.1	17.8
	St. Thomas	Charlotte Amalie	107.5	32.5	59.7	17.8
	Trinidad & Tobago	Scarborough	111.8	44.7	55.9	22.4
	Trinidad	Trinidad NS	0.0	0.0	0.0	0.0
	Vieques	Isabel Segunda	93.1	28.8	49.1	15.4
Pacific Ocean	Australia	Brisbane	30.6	12.2	15.3	6.1
		Canberra	46.4	18.6	23.2	9.3
		Melbourne	46.9	18.8	23.4	9.4
		Perth	45.1	18.0	22.5	9.0
		Sydney	43.9	17.6	21.9	8.8
	Caroline Islands	Yap	78.6	31.4	39.3	15.7
	Fiji	Suva	57.1	22.8	28.5	11.4
	Guam	Agana	100.0	40.0	50.0	20.0
	Marshall Islands	Majuro	121.4	48.6	60.7	24.3
	New Zealand	Auckland	83.8	33.5	41.9	16.8
		Wellington	228.2	91.3	114.1	45.6
	Papau New Guinea	Port Moresby	78.1	31.3	39.1	15.6
	Phillipine Is.	Baguio	164.0	65.6	82.0	32.8
		Cebu	114.0	45.6	57.0	22.8
		Manila	193.2	77.3	96.6	38.6

TABLE E-1

			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	MCE S_s (%g)	MCE S_1 (%g)	10/50 S_s (%g)	10/50 S_1 (%g)
Pacific Ocean	Saipan	Capitol Hill	99.8	39.9	49.9	20.0
	Tinian		99.4	39.8	49.7	19.9