

UFC 3-310-01
25 May 2005
Including change 2, 5 December 2007

UNIFIED FACILITIES CRITERIA (UFC)

STRUCTURAL LOAD DATA



APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED

UFC 3-310-01
25 May 2005
Including change 2, 5 December 2007

UNIFIED FACILITIES CRITERIA (UFC)

STRUCTURAL LOAD DATA

Any copyrighted material included in this UFC is identified at its point of use. Use of the copyrighted material apart from this UFC must have the permission of the copyright holder.

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>
<u>2</u>	<u>5 Dec 2007</u>	<u>Changes not indicated - see change summary</u>

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

UFC 3-310-01
25 May 2005
Including change 2, 5 December 2007

FOREWORD

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:

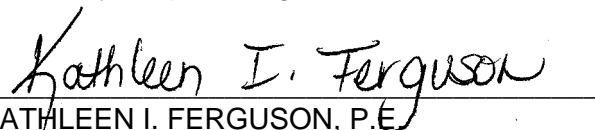
- Whole Building Design Guide web site <http://dod.wbdg.org/>.

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.


AUTHORIZED BY:



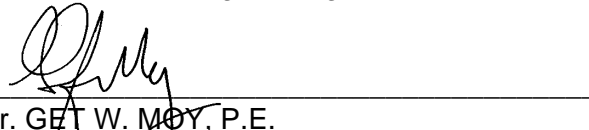
DONALD L. BASHAM, P.E.
 Chief, Engineering and Construction Division
 U.S. Army Corps of Engineers



KATHLEEN I. FERGUSON, P.E.
 The Deputy Civil Engineer
 DCS/Installations & Logistics
 Department of the Air Force



DR. JAMES W. WRIGHT, P.E.
 Chief Engineer
 Naval Facilities Engineering Command



Dr. GET W. MOY, P.E.
 Director, Installations Requirements and
 Management
 Office of the Deputy Under Secretary of Defense
 (Installations and Environment)

UFC 3-310-01
25 May 2005
Including change 2, 5 December 2007

UNIFIED FACILITIES CRITERIA (UFC) REVISION SUMMARY SHEET

Document: UFC 3-310-01, *Design: Structural Load Data, change 2*

Superseding: UFC 3-310-01, *Design: Structural Load Data*, dated 25 May 2005

Description of Changes: This update to UFC 3-310-01 incorporates changes and eliminates conflicts associated with the adoption of the International Building Code (IBC) 2006 in place of the IBC 2003, as enacted by the update of UFC 1-200-01, "General Building Requirements". This update also includes the structural loading data at a small number of additional DoD locations, and revises the data at locations where more accurate information has been made available.

Reasons for Changes:

- UFC 1-200-01 has been updated and adopts the IBC 2006 as the basic building code for the DoD, replacing the IBC 2003.
- A limited number of additional locations where loading information is required have been identified.
- Additional, more accurate loading information has been collected at select locations.

Impact: There are negligible cost impacts. However, the following benefits should be realized.

- Ensuring that the guidance in UFC 3-310-01 is consistent with the requirements of the updated UFC 1-200-01 by eliminating conflicts and inconsistencies.
- Ensuring that the locations identified and the loadings described are complete and current with the most up to date available information.

CONTENTS

			<u>Page</u>
INTRODUCTION			
Paragraph	1-1	PURPOSE AND SCOPE	1-1
	1-2	BACKGROUND	1-1
	1-3	APPLICABILITY	1-1
	1-4	CONFLICTS	1-1
	1-5	REFERENCES	1-1
	1-6	TECHNICAL GUIDANCE	1-1
	1-6.1	IBC Section 1604 – GENERAL DESIGN REQUIREMENTS....	1-1
	1-6.2	IBC Section 1607 - LIVE LOADS	1-5
	1-6.3	IBC Section 1608 - SNOW LOADS	1-5
	1-6.4	IBC Section 1609 – WIND LOADS	1-5
	1-6.5	IBC Section 1613 - EARTHQUAKE LOADS	1-6
	1-6.6	IBC Section 1805.2.1 – Frost Protection	1-7
	1-7	REVISIONS	1-7
	1-8	CREDITS	1-7
APPENDIX A		ABBREVIATIONS	A-1
APPENDIX B		MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS AND MINIMUM CONCENTRATED LIVE LOADS	B-1
APPENDIX C		SITE SPECIFIC STRUCTURAL LOADING DATA – UNITED STATES, ITS TERRITORIES AND POSSESSIONS	C-1
APPENDIX D		SITE SPECIFIC STRUCTURAL LOADING DATA – OUTSIDE OF THE UNITED STATES, ITS TERRITORIES AND POSSESSIONS	D-1
APPENDIX E		EARTHQUAKE LOADING DATA AT ADDITIONAL LOCATIONS OUTSIDE OF THE UNITED STATES, ITS TERRITORIES AND POSSESSIONS	E-1

TABLES

<u>Table</u>	<u>Title</u>	<u>Page</u>
1	OCCUPANCY CATEGORY OF BUILDINGS AND OTHER STRUCTURES	1-3
B-1	MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS AND MINIMUM CONCENTRATED LIVE LOADS	B-1
C-1	STRUCTURAL CLIMATIC LOADING DATA – UNITED STATES, ITS TERRITORIES AND POSSESSIONS	C-1
C-2	EARTHQUAKE LOADING DATA – UNITED STATES, ITS TERRITORIES AND POSSESSIONS	C-14
D-1	STRUCTURAL CLIMATIC LOADING DATA – OUTSIDE OF THE UNITED STATES, ITS TERRITORIES AND POSSESSIONS	D-1
D-2	EARTHQUAKE LOADING DATA – OUTSIDE OF THE UNITED STATES, ITS TERRITORIES AND POSSESSIONS	D-9
E-1	EARTHQUAKE LOADING DATA AT ADDITIONAL SELECTED LOCATIONS OUTSIDE OF THE UNITED STATES, ITS TERRITORIES AND POSSESSIONS	E-1

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 1613 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)*, 2006 (<http://www.iccsafe.org/>)
- *Earthquake Ground Motion Parameters Calculator*, Version 5.0.8, United States Geological Survey (USGS), for the 2006 version of the International Building Code. (<http://earthquake.usgs.gov/research/hazmaps/design/index.php>)

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 and commentary.

1-6.1 **IBC Section 1604 – GENERAL DESIGN REQUIREMENTS.**

UFC 3-310-01
25 May 2005
Including change 2, 5 December 2007

1-6.1.1 **Replacement.** Replace IBC section 1604.5 with the following:

1604.5 Occupancy category. Buildings shall be assigned an occupancy category in accordance with Table 1 of UFC 3-310-01. Importance factors for snow load, wind load and seismic load for each occupancy category are also shown in Table 1 of UFC 3-310-01.

Note: IBC section 1604.5.1 shall remain in effect as written.

1-6.1.2 **Replacement.** Replace Table 1604.5 of the IBC with Table 1 of this UFC. (All references in the IBC to Table 1604.5 shall be interpreted as a reference to Table 1 of this UFC.)

TABLE 1
OCCUPANCY CATEGORY OF BUILDINGS AND OTHER STRUCTURES

Occupancy Category	Nature of Occupancy	Seismic Factor I_E	Snow Factor I_S	Wind Factor I_W
I	<p>Buildings and other structures that represent a low hazard to human life in the event of failure, including, but not limited to:</p> <ul style="list-style-type: none"> • Agricultural facilities • Certain temporary facilities • Minor storage facilities 	1.00	0.8	0.87 ^a
II	<p>Buildings and other structures except those listed in Categories I, III, IV and V</p>	1.00	1.00	1.00
III	<p>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:</p> <ul style="list-style-type: none"> • 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

Occupancy Category	Nature of Occupancy	Seismic Factor I_E	Snow Factor I_S	Wind Factor I_W
IV	<p>Buildings and other structures designed as essential facilities, including, but not limited to:</p> <ul style="list-style-type: none"> • 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	1.20	1.15
V ^b	<p>Facilities designed as national strategic military assets, including, but not limited to:</p> <ul style="list-style-type: none"> • 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 ^b	1.50 ^b	1.70 ^b

Notes to Table 1, "OCCUPANCY CATEGORIES OF BUILDINGS AND OTHER STRUCTURES"

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

b. 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.

Table B-1 of this UFC 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 are shown in bold italics within Table B-1.

1-6.2.1 Replacement. Replace IBC section 1607.1 with the following:

1607.1 General. Live loads are those loads defined in Section 1602.1. Table B-1 of UFC 3-310-01 defines Minimum uniformly distributed live loads and minimum concentrated live loads for the design of buildings.

1-6.2.2 Replacement. Replace Table 1607.1 of the IBC with Table B-1 of this UFC. (All references in the IBC to Table 1607.1 shall be interpreted as a reference to Table B-1 of this UFC.)

1-6.3 IBC Section 1608 – SNOW LOADS.

1-6.3.1 Addition. Add the following sections to the IBC:

1608.3 Specific Locations Within the United States. Ground snow loads at DoD installations within the United States, territories and possessions are identified in table C-1 of UFC 3-310-01, to facilitate consistent interpretation of the information provided in Figure 1608.2 and Table 1608.2.

1608.4 Specific Locations 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 of UFC 3-310-01. 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 IBC Section 1609 – WIND LOADS.

1-6.4.1 Revision. Change the section number of IBC section 1609.3.1 to section 1609.3.3

1-6.4.2 Addition. Add the following sections to the IBC:

1609.3.1 Specific Locations Within the United States. Basic wind speeds at DoD installations within the United States, territories and possessions are identified in table C-1 of UFC 3-310-01 to facilitate consistent interpretation of the information provided in Figure 1609.

1609.3.2 Specific Locations 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 of UFC 3-310-01. At locations where the basic wind speed is not provided, use the best available locality information. For additional guidance contact the authorizing design agency. **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 1613 – EARTHQUAKE LOADS.**

1-6.5.1 **Addition.** Add the following sections to the IBC.

1613.5.1.1 Specific Locations Within the United States. Mapped seismic acceleration parameters at DoD installations within the United States, territories and possessions are identified in table C-2 of UFC 3-310-01 to facilitate consistent interpretation of the information provided in Figures 1613.5(1) through 1613.5(14).

The values in table C-2 were determined utilizing the web based United States Geological Survey (USGS) Earthquake Ground Motion Parameters Calculator, Version 5.0.8, for the 2006 version of the International Building Code utilizing latitude and longitude data. This tool or other approved software may be used to determine seismic design data where site-specific location information is available, with the approval of the authorizing design agency.

The mapped seismic acceleration parameters in table C-2 were typically determined 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 appropriate 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 Figures 1613.5(1) through 1613.5(14) or by approved computerized tools for determining seismic ground motion parameters. For additional guidance contact the authorizing design agency.

1613.5.1.2 Specific Locations Outside of the United States. Seismic ground motion parameters S_S and S_1 at specific locations outside of the United States, territories and possessions are identified in table D-2 and E-1 of UFC 3-310-01. For locations not shown, the best available information shall be used with the approval of the authorizing design agency.

1-6.6 **IBC Section 1805.2.1 – Frost Protection.**

1-6.6.1 **Addition.** Add the following section to the IBC:

1805.2.2 Frost Line Depth. Depths to the frost line at specific locations within the United States, territories and possessions are identified in table C-1 of UFC 3-310-01. Frost line depths at specific locations outside of the United States are identified in table D-1 of UFC 3-310-01. At locations where frost depths are not provided, use the best available locality information. 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 web based United States Geological Survey (USGS) Earthquake Ground Motion Parameters Calculator, Version 5.0.8,, for the 2006 version of the International Building Code utilizing latitude and longitude data.

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.

APPENDIX A

ABBREVIATIONS

10/50 S₁. ... Spectral acceleration of 5% damped short period (0.2 second) response corresponding to an earthquake with a 10% probability of being exceeded in 50 years

10/50 S_s. ... Spectral acceleration of 5% damped long period (1.0 second) response corresponding to an earthquake with a 10% probability of being exceeded in 50 years

CS. Case Study

DOD. Department of Defense

%g. Percent Gravity

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

mm. Millimeter

mm². Square Millimeter

mph. Miles per Hour

psf. Pounds per Square Foot

S_s. Spectral Accelerations for Short Periods as determined by IBC Section 1613.5.1

S₁. Spectral Accelerations for 1 Second Periods as determined by IBC Section 1613.5.1

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) 2006. Table B-1 includes the IBC 2006 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. Armories and drill rooms	7.2	150	---	---
4. Assembly areas and theaters				
Fixed seats (fastened to floor)	2.9	60	---	---
Follow spot, projection and control rooms	2.4	50	---	---
Lobbies	4.8	100	---	---
Movable seats	4.8	100	---	---
Stages and platforms	6.0	125	---	---
5. Balconies	4.8	100	---	---
On one- and two-family residences only, and not exceeding 9.3m ² (100 ft. ²)	2.9	60	---	---
6. Battery charging room	9.6	200	---	---
7. Boiler houses	9.6	200	---	---
8. Bowling alleys	3.6	75	---	---
9. Catwalks	1.9	40	1.33	300
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	---	---

UFC 3-310-01
25 May 2005
Including change 2, 5 December 2007

OCCUPANCY OR USE	UNIFORM		CONCENTRATED	
	kPa	(psf)	kN	(lbs.)
14. Corridors, except as otherwise indicated	4.8	100	---	---
15. Court rooms	3.8	80	---	---
16. Dance halls and ballrooms	4.8	100	---	---
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 On single-family dwellings only	4.8 1.9	100 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) Trucks & buses	1.9 See Section 1607.6 - IBC	40 See Section 1607.6 - IBC	Note a See Section 1607.6 - IBC	Note a 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				
Corridors above first floor	3.8	80	4.45	1,000
Operating rooms, laboratories	2.9	60	4.45	1,000
Private rooms	1.9	40	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

UFC 3-310-01
25 May 2005
Including change 2, 5 December 2007

OCCUPANCY OR USE	UNIFORM		CONCENTRATED	
	kPa	(psf)	kN	(lbs.)
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	---	---
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	4.8	100	8.9	2,000
Offices	2.4	50	8.9	2,000
Corridors above first floor	3.8	80	8.9	2,000
43. Penal Institutions				
Cell blocks	1.9	40	---	---
Corridors	4.8	100	---	---
44. Post offices				
General area	4.8	100	---	---
Work rooms	6.0	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	9.6	200	---	---
Meat	12.0	250	---	---
Vegetable	13.2	275	---	---

UFC 3-310-01
25 May 2005
Including change 2, 5 December 2007

OCCUPANCY OR USE	UNIFORM		CONCENTRATED	
	kPa	(psf)	kN	(lbs.)
52. Residential				
One & two family dwellings				
Uninhabitable attics without storage ⁱ	0.5	10	---	---
Uninhabitable attics with limited storage ^{ij,k}	1.0	20	---	---
Habitable attics and sleeping areas	1.4	30	---	---
All other areas except balconies and decks	1.9	40	---	---
Hotels and multifamily dwellings				
Private rooms & corridors serving them	1.9	40	---	---
Public rooms and corridors serving them	4.8	100	---	---
53. Reviewing stands, grandstands and bleachers	Note c	Note c	Note c	Note c
54. Roofs				
All roof surfaces subject to maintenance workers	---	---	1.33	300
Awnings and canopies				
Fabric construction supported by a light weight rigid skeleton structure	0.23 Nonreduceable	5 Nonreduceable	---	---
All other construction	1.0	20	---	---
Ordinary flat, pitched, and curved roofs	1.0	20	---	---
Primary roof members, exposed to a work floor:				
Single panel point of lower chord of roof trusses or any point along primary structural members supporting roofs:				
Over manufacturing, storage warehouses, and repair garages	---	---	8.9	2000
All other occupancies	---	---	1.33	300
Roofs used for special purposes	Note l	Note l	Note l	Note l
Roofs used for promenade purposes	2.9	60	---	---
Roofs used for roof gardens or assembly purposes	4.8 ---	100	---	---
55. Schools				
Classrooms	1.9	40	4.45	1,000
Corridors above first floor	3.8	80	4.45	1,000
First floor corridors	4.8	100	4.45	1,000
56. Scuttles, skylight ribs, and accessible ceilings	---	---	0.89	200

OCCUPANCY OR USE	UNIFORM		CONCENTRATED	
	kPa	(psf)	kN	(lbs.)
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				
One- and two-family dwellings	1.9	40	Note f	Note f
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 1607.7.3 - IBC	Section 1607.7.3 - IBC	Section 1607.7.3 - IBC	Section 1607.7.3 - 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.
- i. Attics without storage are those where the maximum clear height between the joist and rafter is less than 42 inches, or where there are not two or more adjacent trusses with the same web configuration capable of containing a rectangle 42 inches high by 2 feet wide, or greater, located within the plane of the truss. For attics without storage, this live load need not be assumed to act concurrently with any other live load requirements.

UFC 3-310-01

25 May 2005

Including change 2, 5 December 2007

- j. For attics with limited storage and constructed with trusses, this live load need only be applied to those portions of the bottom chord where there are two or more adjacent trusses with the same web configuration capable of containing a rectangle 42 inches high by 2 feet wide or greater, located within the plane of the truss. The rectangle shall fit between the top of the bottom chord and the bottom of any other truss member, provided that each of the following criteria is met:
 - 1. The attic area is accessible by a pull-down stairway or framed opening in accordance with Section 1209.2, and
 - 2. The truss shall have a bottom chord pitch less than 2:12
 - 3. Bottom chords of trusses shall be designed for the greater of actual imposed dead load or 10 psf, uniformly distributed over the entire span.
- k. Attic spaces served by a fixed stair shall be signed to support the minimum live load specified for habitable attics and sleeping rooms.
- l. Roofs used for other special purposes shall be designed for appropriate loads as approved by the building official.

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	70	90		3.35	145	
	Eielson AFB	75	90	permafrost	3.58	145	permafrost
	Elmendorf AFB	65	100	129	3.11	161	3277
	Fort Greely	60	90	Permafrost	2.87	145	permafrost
	Fort Richardson	65	110	129	3.11	177	3277
	Fort Wainwright	75	90	permafrost	3.58	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
Arizona	Sitka	50	122	56	2.40	196	1422
	Valdez	160	100	136	7.66	161	3454
	Davis-Monthan AFB / Tucson AFB	0	90	0	0.00	145	0

UFC 3-310-01
25 May 2005
Including change 2, 5 December 2007

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
Arizona	Fort Huachuca	10	90	0	0.48	145	0
	Luke Air Force Base	0	90	5	0.00	145	127
	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
	NRTF Dixon	0	85	0	0.00	137	0
	Edwards AFB	0	Special	22	0.00	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	

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	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	
	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	Special	38	0.72	Special	965	
Cheyenne Mountain AS / NORAD		15	Special	38	0.72	Special	965	
Peterson AFB / Colorado Springs		30	90	38	1.44	145	965	
Schriever AFB		CS	90		CS	145		
USAF Academy		30	Special	38	1.44	Special	965	
Connecticut	NSB New London / Groton	30	120	38	1.44	193	965	

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
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 Walter Reed	25	90	26	1.20	145	660
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	115	0	0.00	185	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

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
Georgia	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
	MCBH Kaneohe Bay	0	105	0	0.00	169	0
	Pohakuloa Training Area	0	105	0	0	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

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
Indiana	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
	NAS JRB New Orleans / Belle Chasse	0	130	0	0.00	209	0
Maine	NAS Brunswick	50	100	86	2.40	161	2184
	NRTF Cutler	50	98	86	2.40	158	2184
	PNSY Kittery	50	100	64	2.40	161	1626
	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

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
Maryland	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
	Gulfport	0	135	0	0.00	217	0
	Jackson	5	92	5	0.24	148	127
	Keesler AFB	0	140	0	0.00	225	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

UFC 3-310-01
25 May 2005
Including change 2, 5 December 2007

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
Nevada	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
New Jersey	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	
	Griffis AFB / Rome	60	90	86	2.87	145	2184
	NIAGARA FALLS IAP	35	90	59	1.68	145	1499
	NSU Saratoga Springs	50	90		2.40	145	
	Stewart ANG / Newburgh	35	90	54	1.68	145	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	

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
North Carolina	Seymour Johnson AFB	10	100	4	0.48	161	102
North Dakota	Grand Forks AFB	60	90	156	2.87	145	3962
	NRTF La Moure	40	90		1.92	145	
	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
	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
	Carlisle Barracks	25	90	36	1.20	145	914
	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

UFC 3-310-01
25 May 2005
Including change 2, 5 December 2007

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
South Carolina	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
	Goodfellow AFB	5	90	5	0.24	145	127
	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	

UFC 3-310-01
25 May 2005
Including change 2, 5 December 2007

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
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
	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
Radford AAP	25	90		1.20	145		
Defense Supply Ctr / Richmond	20	90	18	0.96	145	457	
Wallops Island	20	115		0.96	185		

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
Virginia	Yorktown Region: Camp Perry Cheatham Annex Yorktown NWS	15	95	9	0.72	153	229
	NS Everett	15 (b)	85		0.72(b)	137	
	Fairchild AFB	42	85	64	2.01	137	1626
Washington	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	Allegheny Ballistics Lab	CS	90		CS	145	
	Beckley	30	90		1.44	145	
	Huntington	20	90	22	0.96	145	559
	Sugar Grove NRS	30	90	38	1.44	145	965
Wisconsin	Fort McCoy	40	90	114	1.92	145	2896
	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
American Samoa	Pago Pago / Tutuila Island	0	125	0	0.00	201	0
Mariana Islands	Guam	0	170	0	0.00	274	0
	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	S_s (%g)	S₁ (%g)	10/50 S_s (%g)	10/50 S₁ (%g)
Alabama	Anniston Army Depot	28	9	11	4
	Birmingham	30	10	11	4
	Fort McClellan	28	9	11	4
	Fort Rucker	11	6	4	2
	Maxwell-Gunther AFB / Montgomery	16	7	6	3
	Mobile	12	5	4	2
	Redstone Arsenal / Huntsville	30	11	11	4
Alaska	Clear AS	108	30	47	14
	Eielson AFB	106	29	44	14
	Elmendorf AFB	149	55	100	30
	Fort Greely	81	38	34	14
	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	28	8	13	4
	Fort Huachuca	26	8	12	3
	Luke Air Force Base	17	6	11	3
	Phoenix	18	6	11	3
	Yuma MCB	68	26	37	14
	Yuma Proving Ground	47 Max 20 Min	23 Max 14 Min	29 Max 15 Min	11 Max 6 Min
Arkansas	Little Rock AFB	57	18	14	4
	Pine Bluff Arsenal	44	15	11	4
California	Alameda	150	60	123	55
	MCLB Barstow	133	48	61	22
	Beale AFB	44	20	26	11

TABLE C-2

State	Base / City	Seismic Data (Site Class B)			
		S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
California	MCMTC Bridgeport	110	39	63	21
	Camp Pendleton	139 Max 111 Min	51 Max 42 Min	61	25
	NWS China Lake	136 Max 109 Min	45 Max 38 Min	80 Max 61 Min	27 Max 19 Min
	NSWC Corona	169	60	127	47
	NRTF Dixon	129	42		
	Edwards AFB	115 Max 86 Min	59 Max 39 Min	85 Max 47 Min	39 Max 21 Min
	El Centro NAF	190 Max 150 Min	66 Max 60 Min	160 Max 128 Min	54 Max 39 Min
	Fort Irwin	197 Max 78 Min	95 Max 29 Min	144 Max 40 Min	55 Max 15 Min
	Fresno ANG	49	22	27	12
	NAS Lemoore	89	33	49	20
	Los Angeles AFB / El Segundo	150	60	113	39
	Los Angeles	188	68	119	42
	March ARB	150	60	127	50
	McClellan AFB / Sacramento	48	22	28	13
	NWC Mohave Range	197 Max 94 Min	95 Max 33 Min	106 Max 49 Min	36 Max 20 Min
	Presidio of Monterey	151	63	105	37
	Point Mugu / Port Hueneme	219	91	128	54
	San Diego Region				
	NAS North Island	146	56	66.4	24.8
	NAB Coronada	157	63	62.8	22.8
MCRD	163	65	67.5	25.4	
Miramar	137	51	64.8	24.1	
Naval Medical Ctr	155	60	63.4	24.3	
San Diego NS	140	54	60.8	22.2	
NS Point Loma	154	61	72.5	26.1	
Moffett Field – Onizuka / Sunnyvale	150	60	125	57	
San Clemente Island Naval Reservation	83	26	31	12	
San Nicolas Island	62	22	26	10	

TABLE C-2

State	Base / City	Seismic Data (Site Class B)			
		S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
California	Seal Beach NWS	164	61	110	37
	Seal Beach NWS – Concord Detachment	150	60	145	55
	Sierra Army Depot / Herlong	95	35	48	16
	Stockton / San Joaquin	148	48	76	26
	Travis AFB	186	60	111	37
	Twentynine Palms	162 Max 88 Min	58 Max 30 Min	102 Max 39 Min	32 Max 14 Min
	Vandenberg AFB	138 Max 105 Min	49 Max 36 Min	64 Max 53 Min	24 Max 19 Min
Colorado	Buckley AFB / Aurora	20	5	7	2
	Denver	21	6	8	2
	Fort Carson	21	6	7	2
	Cheyenne Mountain AS / NORAD	21	6	7	2
	Peterson AFB / Colorado Springs	20	6	7	2
	Schriever AFB	19	6	7	2
	USAF Academy	22	6	8	2
Connecticut	NSB New London / Groton	21	6	8	3
Delaware	Dover AFB	16	5	7	2
District of Columbia	Washington Region Bolling AFB Anacostia NS Fort McNair Marine Barracks NRL Washington NDW / Anacostia Pentagon Walter Reed	15	5	6	2
Florida	Avon Park AS	8	3	2	1
	Cape Canaveral AFS	9	4	3	1
	Eglin AFB	10	5	3	2
	Homestead	5	2	1	0
	Hurlburt Field	9	5	3	2
	NAS Jacksonville / Jacksonville	14	6	5	2
	NAS Key West	3	1		

TABLE C-2

State	Base / City	Seismic Data (Site Class B)			
		S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Florida	MacDill AFB	7	3	2	1
	NAS Mayport	15	6	5	2
	HQ Southcom / Miami	5	2	1	1
	Orlando	10	4	3	1
	NAS Panama City	8	5	3	2
	Patrick AFB	8	4	2	1
	NAS Pensacola	10	5	3	2
	Tampa	8	3	2	1
	Tyndall AFB	8	4	3	2
	NAS Whiting Field / Milton	11	5	4	2
Georgia	MC Logistics Support / Albany	13	6	5	3
	Athens NCSC	26	9	12	5
	Dobbins AFB / Atlanta NAS	25	9	11	4
	Fort Benning	15	7	6	3
	Fort Gordon	33	11	14	5
	Fort McPherson / Fort Gillem	22	9	10	4
	Fort Stewart	29	10	9	4
	Hunter Army Airfield / Savannah	38	12	12	4
	NSB Kings Bay	17	7	6	3
	Moody AFB	13	6	5	3
Hawaii	Robins AFB	19	8	8	4
	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
	Pohakuloa Training Area	150	60		

TABLE C-2

State	Base / City	Seismic Data (Site Class B)			
		S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Hawaii	Wahiawa Region:				
	Lualualei				
	Wahiawa Naval Res	59	17	28	8
	Wheeler AFB Schofield Barracks				
Idaho	ARD Bayview	42	12	17	5
	Boise ANG	30	10	16	5
	Mountain Home AFB	26	9	14	4
Illinois	Fort Sheridan / Chicago	15	6	5	2
	Great Lakes	14	5	5	2
	Rock Island Arsenal	13	6	5	2
	Scott AFB	66	19	24	6
	Springfield	27	11	10	4
Indiana	Crane NWSC	35	12	13	4
	Grissom ARB	15	7	6	3
	Fort Benjamin Harrison / Indianapolis	18	8	7	3
Iowa	Des Moines	8	4	3	1
Kansas	Fort Leavenworth	13	6	4	2
	Fort Riley	19	5	6	2
	McConnell AFB	14	5	5	2
Kentucky	Fort Campbell	74 Max 59 Min	22 Max 19 Min	24 Max 18 Min	6 Max 6 Min
	Fort Knox	26	11	10	4
	Louisville	25	10	10	4
	Richmond	23	9	10	4
Louisiana	Barksdale AFB	16	7	5	2
	Fort Polk / Leesville	12	5	4	2
	NAS JRB New Orleans / Belle Chasse	11	5	4	1
Maine	NAS Brunswick	30	8	12	4
	NRTF Cutler	27	7		
	PNSY Kittery	36	8	13	4
	Winter Harbour NSGA	21	6	8	3
Maryland	Aberdeen Proving Ground	20	5	8	2
	Adelphi	16	5	6	2
	Andrews AFB	15	5	6	2

TABLE C-2

State	Base / City	Seismic Data (Site Class B)			
		S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Maryland	Carderock NSWC / Bethesda	16	5	6	2
	Bloods Island	12	5	5	2
	Edgewood Arsenal	19	5	7	2
	Fort Detrick / Fredrick	16	5	7	2
	Fort Meade	16	5	6	2
	Indian Head NSWC	16	5	7	2
	Martin State ANG	18	5	7	2
	NS Pax River , Webster Field / St. Inigoes	14	5	6	2
	U.S Naval Academy / Annapolis	16	5	6	2
Massachusetts	Fort Devens / Ayer	28	7	11	3
	Hanscom AFB	28	7	11	3
	Natick	26	7	10	3
	Otis AGB / Falmouth	20	5	8	2
	Westover ARB	23	7	9	3
Michigan	Battle Creek	11	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	12	5	4	2
	Columbus AFB	28	11	8	4
	Gulfport	12	5	4	2
	Jackson	20	9	6	3
	Keesler AFB	12	5	4	2
	NAS Meridian	20	8	7	3
	Pascagoula NS	11	5	4	2
	Vicksburg	20	9	6	3
Missouri	Fort Leonard Wood	30	12	10	4
	Kansas City	13	6	4	2
	Overland	52	16	19	5
	St. Louis	58	17	21	6
	Whiteman AFB	14	7	5	2
Montana	Great Falls ANG	23	8	13	4
	Malmstrom AFB	20	8	12	4

TABLE C-2

State	Base / City	Seismic Data (Site Class B)			
		S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Nebraska	Offutt AFB	13	4	4	1
	Lincoln	18	5	5	2
Nevada	NAS Fallon	81	29	43	14
	Indian Springs AFS	45	16	24	8
	Nellis AFB	50	17	26	9
	Nellis AF Range	70Max 59 Min	26 Max 19 Min	37 Max 28 Min	13 Max 9 Min
New Hampshire	Portsmouth Naval Shipyard	36	8	13	4
New Jersey	NWS Earle / Colts Neck	30	6	11	3
	Fort Dix / Trenton	26	6	10	3
	Fort Monmouth	30	6	11	3
	Lakehurst	25	6	10	3
	McGuire AFB	26	6	10	3
	Picatinny Arsenal	32	7	12	3
New Mexico	Albuquerque	55	17	27	7
	Cannon AFB	11	3	4	1
	Holloman AFB	32	10	13	4
	Kirtland AFB	56	17	27	7
	White Sands	41	13	13	4
New York	Buffalo	28	6	9	2
	Fort Drum	30	8	12	4
	Fort Hamilton / Brooklyn	35	7	12	3
	Griffis AFB / Rome	22	7	9	3
	NIAGARA FALLS IAP	28	6	9	2
	NSU Saratoga Springs	26	7	11	4
	Stewart ANG / Newburgh	28	7	11	3
	Syracuse	18	6	8	3
	West Point	31	7	12	3
	Watervliet Arsenal / Albany	23	7	10	3
North Carolina	MCAS Cherry Point	16	7	5	2
	Fort Bragg	29	10	9	4
	Jacksonville Region Camp Lejeune MCAS New River	21	8	6	3
	Pope AFB	29	10	9	4

TABLE C-2

State	Base / City	Seismic Data (Site Class B)			
		S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
North Carolina	Raleigh	20	8	8	4
	Seymour Johnson AFB	20	8	7	3
North Dakota	Grand Forks AFB	5	2	2	0
	NRTF La Moure	6	2		
	Minot AFB	7	2	2	1
Ohio	Cleveland	19	5	6	2
	DSC Whitehall / Columbus	15	6	7	3
	Wright-Patterson AFB	19	7	8	3
	Youngstown ARS / Vienna	17	5	6	2
Oklahoma	Altus AFB	20	6	6	2
	Fort Sill	38	9	8	2
	McAlester Army Ammunition Plant	21	7	7	2
	Tinker AFB / Oklahoma City	32	7	10	3
	Tulsa	16	7	6	2
	Vance AFB	23	6	7	2
Oregon	Portland	93	32	43	17
Pennsylvania	ARS Coraopolis / Pittsburg	12	5	5	2
	Carlisle Barracks	17	5	7	2
	Fort Indiantown Gap / Annville	21	6	8	2
	Letterkenny / Chambersburg	16	5	6	2
	Mechanicsburg	18	5	7	2
	Philadelphia	28	6	10	3
	New Cumberland / Defense Depot Susquehanna	19	5	7	2
	Tobyhanna Army Depot	22	6	9	3
Willow Grove ARS / NAS	28	6	11	3	
Rhode Island	NS Newport	21	6	8	2
South Carolina	MCAS Beaufort	71	19	19	6
	Charleston Region:				
	Charleston AFB	192	49	34	8
NWS Charleston	219	55	36	8	

TABLE C-2

State	Base / City	Seismic Data (Site Class B)			
		S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
South Carolina	Columbia Region:				
	McEntire	56	16	22	6
	Fort Jackson	56	15	20	6
	Shaw AFB	67	18	22	6
	MCRD Parris Island	62	17	18	5
South Dakota	Ellsworth AFB	15	4	5	2
Tennessee	Arnold AFB	30	11	12	5
	NSWC LCC / Memphis	141	38	28	7
	NSA Mid-South / Millington	150	43	32	7
	Nashville	33	13	12	5
Texas	NAS JRB, Carswell / Fort Worth	11	5	4	2
	NAS Corpus Christi	8	2	2	1
	Dallas / Irving	12	5	4	2
	Dyess AFB	9	4	3	1
	Ellington ANG / Houston	9	4	3	1
	Fort Bliss / El Paso	31	10	14	4
	Fort Hood / Killeen	8	4	3	1
	Goodfellow AFB	8	3	3	1
	NS Ingleside	8	2	2	1
	NAS Kingsville	8	2	2	1
	Laughlin AFB	6	2	2	1
	Red River Army Depot / Texarkana	17	8	6	2
	San Antonio Region				
	Brooks AFB	12	3	3	1
	Fort Sam Houston	11	3	3	1
	Kelly AFB	11	3	3	1
	Lackland AFB	11	3	3	1
	Randolph AFB	11	3	3	1
	Sheppard AFB	17	6	5	2
Utah	Dugway Proving Ground	35	14	17	6
	Hill AFB	114	48	50	17
	Salt Lake City	153	60	61	20
	Tooele Army Depot	73	27	35	12
Virginia	Dahlgren	16	5	6	2
	Dam Neck / Virginia Beach Ocean front	11	5	4	2
	Fort A. P. Hill	18	5	7	2

TABLE C-2

State	Base / City	Seismic Data (Site Class B)			
		S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Virginia	Fort Belvoir	15	5	6	2
	Fort Eustis	13	5	5	2
	Fort Lee	19	6	7	3
	Fort Monroe	12	5	5	2
	Fort Myer	15	5	6	2
	Fort Story	11	5	4	2
	Henderson Hall / Arlington	15	5	6	2
	Langley AFB / Hampton	12	5	5	2
	NAB Little Creek	11	5	5	2
	Norfolk Region: Camp Elmore Craney Island Depot Norfolk Naval Base	12	5	5	2
	Norfolk Shipyard – Naval Hospital / Portsmouth	12	5	5	2
	NSA Northwest / Chesapeake	12	5	5	2
	NAS Oceana / Virginia Beach	11	5	4	2
	Quantico	17	5	7	2
	Defense Supply Ctr / Richmond	22	6	8	3
	Radford AAP	32	8		
	Wallops Island	10	4	4	2
	Yorktown Region: Camp Perry Cheatham Annex Yorktown NWS	13	5	5	2
	Washington	NS Everett	118(a)	42(b)	62
Fairchild AFB		39	11	13	4
Fort Lewis / Tacoma		117	41	59	20
Indian Island SWC		127(a)	46(b)	63	21
NRS Jim Creek		110(a)	38(b)	59	19
Keyport / Bangor Engin. Sta Annex		129(a)	45(b)	69	22
McChord AFB		119	41	61	20

TABLE C-2

State	Base / City	Seismic Data (Site Class B)			
		S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Washington	Puget Sound Region:				
	Bangor NSB	158(a)	56(b)	76	23
	Bremerton NS	150(a)	53(b)	72	23
	Puget Sound NSY	153(a)	54(b)	73	23
	NAS Whidbey Island / Oak Harbor	133(a)	47(b)	59	20
	Seattle	151	52	75	22
West Virginia	Allegheny Ballistics Lab	13	6		
	Beckley	26	8	10	4
	Huntington	19	7	8	3
	Sugar Grove NRS	18	6	7	3
Wisconsin	Fort McCoy	6	3	2	1
	General Mitchell AFRC / Milwaukee	11	5	4	1
	Madison	11	4	4	1
Wyoming	F. E. Warren AFB	20	5	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	NRTF Aguada	119	38		
	Fort Buchanan	89	31	50	20
	Ramey AFB	120	38		
	NS Roosevelt Roads	87	28		
	Sebana Seca NRS	90	31		

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

(a) – For Navy facilities at identified locations in Washington State use minimum S_s of 150 %g.

(b) – For Navy facilities at identified locations in Washington State use minimum S₁ of 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		78			125		
	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	21	100	6	1.00	161	152
			MCAS Iwakuni	12	120	10	0.57	193	254
Iwo Jima			0	210	0	0.00	338	0	
Misawa AFB			58	101	30	2.78	163	762	
Okinawa (All installations)			0	180	0	0.00	290	0	
Sagamihara			21	100	6	1.00	161	152	
Sasebo			12	100	6	0.57	161	152	
		Tokyo	15	100	6	0.71	161	152	

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	COMFLTACT Yokosuka	12	100	6	0.57	161	152
		Yokota AFB, Honshu	21	100	6	1.00	161	161
		Camp Zama	21	100	6	1.00	161	152
	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
		Mussandam Island	0	120	0	0.00	193	0
	Pakistan	Peshawar	10	88	6	0.48	142	152
	Qatar	Doha	0		0	0.00		0
	Saudi Arabia	Dhahran	0	87	0	0.00	140	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	Saudi Arabia	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	20	105	48	0.96	169	1219		
		Camp Hialeah, Pusan	20	110	24	0.96	177	610		
		Camp Humphreys / Pyongtaek	20	95	45	0.96	153	1143		
		Chinhae	20	105	24	0.96	169	610		
		Kimpo AFB	20	105	48	0.96	169	1219		
		Kunsan / Kunsan City	20	100	30	0.96	161	762		
		Osan AFB / Songtan	20	95	45	0.96	153	1143		
		Pohang	20	110	24	0.96	177	610		
		Seoul	20	105	48	0.96	169	1219		
		Taegu	20	115	40	0.96	185	1016		
		Uijongbu	20	105	48	0.96	169	1219		
		Yongsan	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	0	110	0	0.00	177	0		
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		
Turkey		Ankara	20	99	24	0.96	159	610		

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	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

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
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	35	80	18	1.68	129	457	

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	
Europe	Italy	Brindisi / San Vito	5	110	6	0.24	177	152	
		Camp Darby Livorno							
		Gaeta - NSA	20	80	0	0.96	129	0	
		Ghedi							
		NSA La Maddalena	20	80	5	0.96	129	127	
		NSA Naples	20	80	5	0.96	129	127	
		Niscemi	20	90	5	0.96	145	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	20	0.72	113	508
		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	

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
North America	Canada	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
		E. Harmon AFB, Newfoundland	86	113	60	4.12	182	1524
		Fort William, Ontario	73	81	60	3.50	130	1524
		Frobisher, NWT	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
	Cuba	NS Guantanamo Bay	0	105	0	0.00	169	0
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	Australia	H.E. Holt / N.W. Cape	0	130	0	0	209	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
Pacific Ocean	Australia	Woomera	0	80	0	0	129	0
	Caroline Islands	Koror, Paulau Islands	0	95	0	0.00	153	0
		Ponape	0	110	0	0.00	177	0
	Johnston Atoll		0	95	0	0.00	137	0
	Marcus Island		0	150	0	0.00	241	0
	Marshall Islands	Kwajalein	0	105	0	0.00	169	0
		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

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	S_s (%g)	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	56	62	29
		Basra	98	39	49	20
	Japan	NAF Atsugi	187	75		
		MCAS Iwakuni	94	38	47	19
		Iwo Jima	89	36	45	18
		Misawa AFB	124	56		
		Okinawa (All installations)	165	75	83	38
		Sagamihara	187	75		
		Sasebo	91	36	45	18
		Tokyo	187	75	94	37
		COMFLTACT Yokosuka	187	75		
		Yokota AFB, Honshu	200	80	100	40
		Camp Zama	187	75		
	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	
	- Sib	129	52	65	26	
	- Suhar	149	60	75	30	
	Central, Southern, and Coastal Areas Sur to Sarfait					
	- Barik					

TABLE D-2

Continent / Region	Country	Base / City	Seismic Loading (Site Class B)			
			S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Asia	Oman	- 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
	Qatar	Doha	6	6	3	3
	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	
Taegu		29	11	14	6	
Uijongbu	17	7	8	3		
Yongsan / Seoul	17	7	9	3		
Vietnam	Da Nang	18	7	9	4	

TABLE D-2

			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Asia	Vietnam	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
		Udonthani	24	10	12	5
	Turkey	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
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 - Herzegovina	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
	JMF St. Mawgan / Cornwall	20	4	10	2	
		Sculthorpe AB	16	6	8	3

TABLE D-2

			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Europe	England	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
		NAS Soudi Bay / Mouzouras	120	34	60	17
	Iceland	Keflavik - NSA	100	40	50	20
		Thorshofn	49	19	24	10

TABLE D-2

			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Europe	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
		NSA Naples	67	27	34	14
		Niscemi	120	31	60	16
		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	6	3	3
	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
	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

TABLE D-2

			Seismic Loading (Site Class B)				
Continent / Region	Country	Base / City	S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)	
North America	Canada	Fort William, Ontario					
		Frobisher, NWT	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	14	16	7	
		Greenland	Narsarsuak AB	31	14	16	7
			Simiutak AB	31	14	16	7
			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	Australia	H.E. Holt / N.W. Cape	47	19	23	9	
		Woomera	47	19	23	9	
	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		

UFC 3-310-01

25 May 2005

Including change 2, 5 December 2007

TABLE D-2

			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Pacific Ocean	Samoa	Apia / Upolu	158	63	79	32

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	S_s (%g)	S₁ (%g)	10/50 S_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

TABLE E-1

			Seismic Loading (Site Class B)				
Continent / Region	Country	Base / City	S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)	
Africa	Gabon	Libreville	26.0	10.4	13.0	5.2	
	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	

TABLE E-1

			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Asia	Brunei	Bandar Seri Begawan	37.2	14.9	18.6	7.4
	Burma	Mandalay	201.0	80.4	100.5	40.2
		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	
	Osaka	178.1	71.2	89.0	35.6	
	Sapporo	100.4	40.2	50.2	20.1	
	Yokohama	187	75			
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	

TABLE E-1

			Seismic Loading (Site Class B)				
Continent / Region	Country	Base / City	S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)	
Asia	Pakistan	Lahore	117.1	46.8	58.5	23.4	
		Singapore	All	37.5	15.0	18.8	7.5
		Sri Lanka	Colombo	2.6	1.0	1.3	0.5
		South Korea	Kimhae	18.3	7.3	9.2	3.7
			Kwangju	12.9	5.2	6.5	2.6
		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	

TABLE E-1

			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Europe	Germany	Frankfurt am Main	37.7	15.1	18.8	7.5
		Giebelstadt	21.9	8.8	11.0	4.4
		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	
Warszawa		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	

TABLE E-1

			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
Europe	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
	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
Halifax			25.0	10.0	12.5	5.0
Montreal			102.9	41.2	51.4	20.6
Vancouver			90.4	36.2	45.2	18.1
Mexico		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	

TABLE E-1

			Seismic Loading (Site Class B)			
Continent / Region	Country	Base / City	S _s (%g)	S ₁ (%g)	10/50 S _s (%g)	10/50 S ₁ (%g)
South America	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
	Venezuela	Maracaibo	104.4	41.8	52.2	20.9
Caribbean Sea	Bahamas	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
	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
	Marshall Islands	Majuro	121.4	48.6	60.7	24.3
	New Zealand	Auckland	83.8	33.5	41.9	16.8

UFC 3-310-01
25 May 2005
Including change 2, 5 December 2007

TABLE E-1

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