

IBC2000 Seismic Input for VP Command

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- Why can't I get VP Command assistance for S1 and Ss input? I did get help in the good old days with seismic Av and Aa input. Hang on, [VPC Help](#) is on the way!
- In the mean time this article provides a [Short Term](#) solution for determining Ss and S1 (p. 2).
- What are these new [Ss and S1](#) values anyhow (p. 4)?

General Comments:

The [Reference Values](#) screen is where long term VP Command users are accustomed to getting help.

VP Buildings uses Loads databases that are published by recognized organizations such as MBMA or ASCE.

Unfortunately, the IBC based data is not yet available for incorporating into VP Command's Reference Values.

Until that time arrives, this article will assist you in getting valid Seismic values for S1 and Ss.

VP Command Input Screens:

1. The Loads and Codes screen includes three (3) codes as shown below that require **Ss** and **S1** input.

Per Article 2.9 in the Builder Agreement, VP assumes that the Builder has called the local Building Official or Project Engineer to obtain all code and loading information for this specific building site.

Building Code: 2000 International Building Code
 Building Use: Standard Occupancy Structures
 Built Up: 89AISC, Cold Form: 96AISI, Rainfall: 8.0000

Three (3) Codes listed at right require S1 and Ss seismic input parameters.

- 2000 International Building Code
- 2000 International Building Code (alt)
- 7-98 American Society of Civil Engineers

2. The IBC type seismic input screens for VP Command are displayed below for **Ss**, **S1** and Soil Profile.

Seismic Zone: Zone 3
 Hazard / Use Group: Group 1
 Spectral Response Accelerations (Ss): 125.0000 %
 (S1): 40.0000 %
 Velocity-Related Acceleration (Av): 40.0000
 Acceleration (Aa): 125.0000
 Velocity-Related Zone (Zv): 2
 Acceleration-Related Zone (Za): 2
 Zonal Velocity Ratio (V): 0.00
 Percent of Snow Load Included

Soil Profile: Stiff soil (D, 4) (VP Command default)
 Hard Rock (A, 1)
 Rock (B, 2)
 Very dense soil and soft rock (C, 3)
 Stiff soil (D, 4)
 Soil (E)
 Soils requiring site specific evaluation (F)

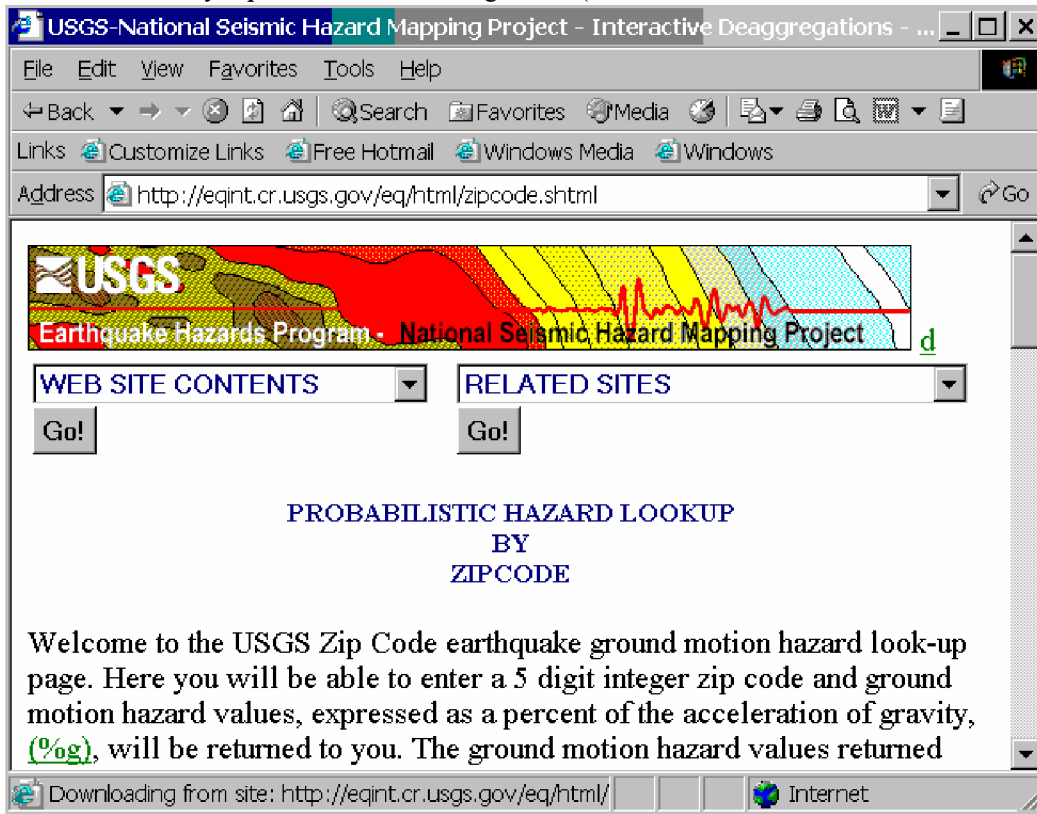
Reliability / Redundancy Factor:
 Frames: 1.0000, Bracing: 1.5000

Acceleration Ratio:
 Frames: 0.2083, Bracing: 0.1667

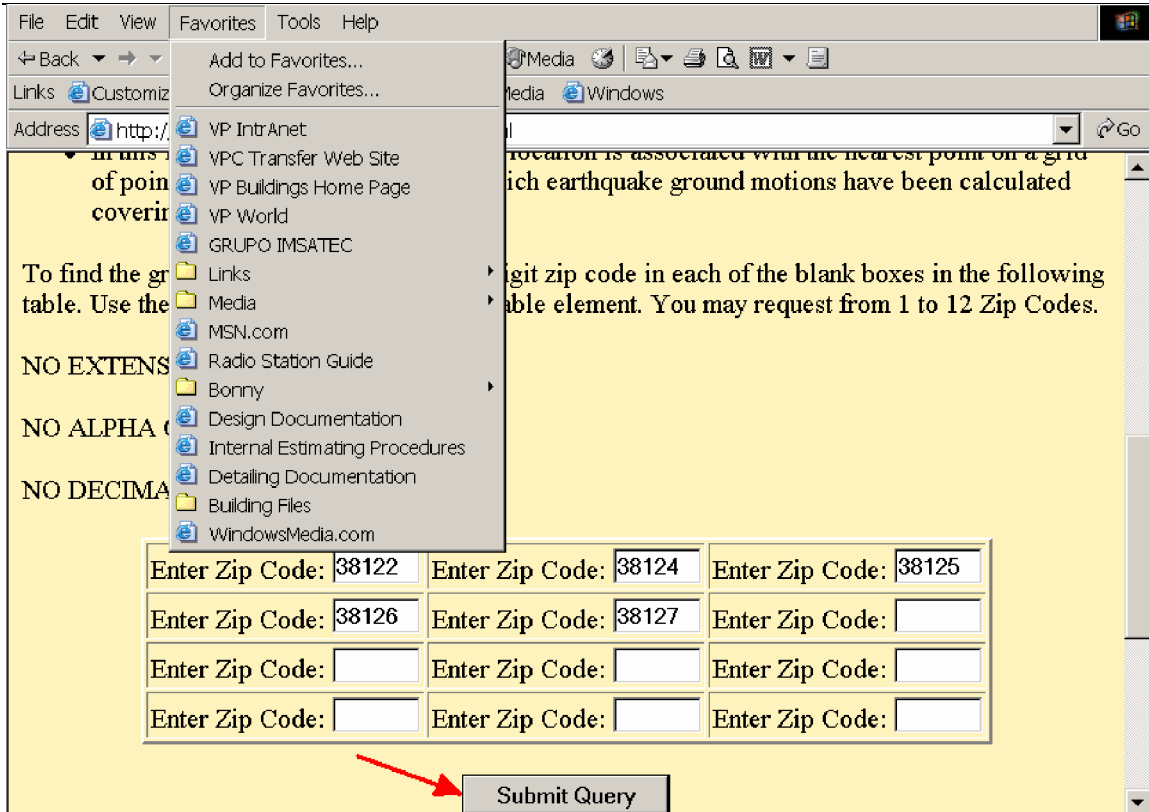
Internal Values - Do not modify.

Short Term Relief: <back>

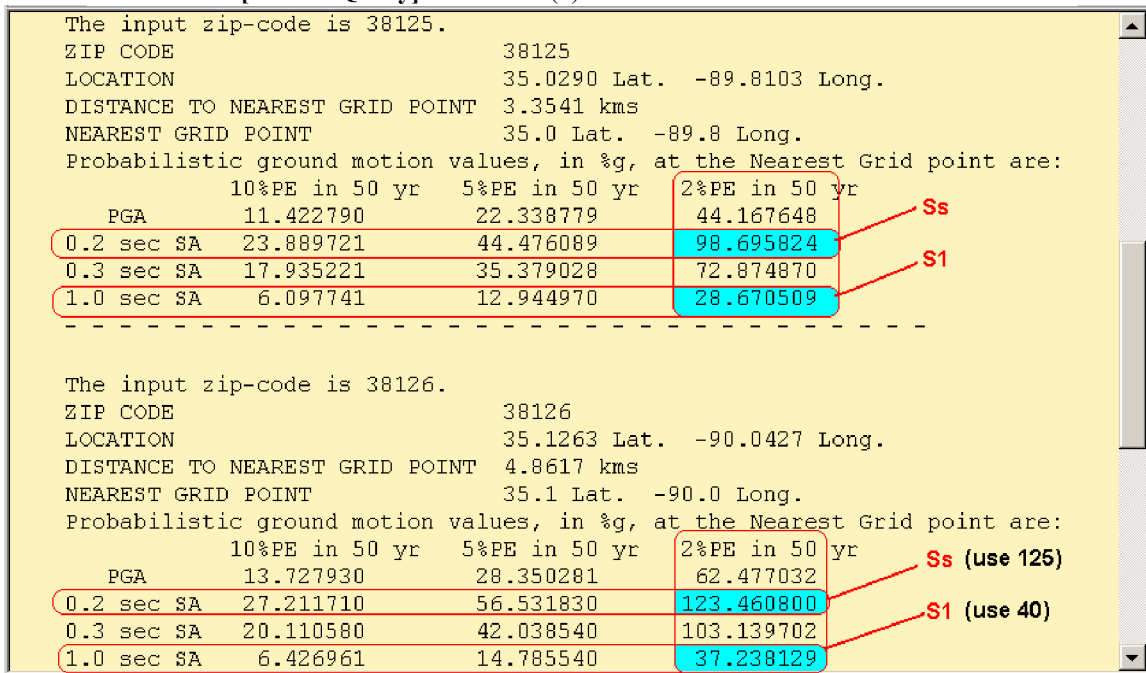
1. Click on this link <http://eqint.cr.usgs.gov/eq/html/zipcode.shtml> to access *IBC Seismic Values – USGS Web Site by Zip Code*. The following screen (Does not include values for Alaska & Hawaii) appears.



2. Now scroll (navigate) to bottom of this page.
3. While at this location, add this web site to your Favorites folder for future use. Click on the Windows “Add to Favorites” menu option as shown.



- Fill in the open cells with the required zip code(s). Note that a job site may straddle two zip codes at which point it is recommended that you generate the worst-case values of two or more zips.
- Now click on **[Submit Query]** to arrive at (5) five sets of tables similar to the two shown below.



- Select largest of (5) Ss & S1 values shown, **Ss = 123.46800** and **S1 = 37.238129**. Round off values to an integer value for input in VP Command, i.e., Ss = 125 and S1 = 40. **Congratulations! You've made it!**

VP Command Help is on the way: [<back>](#)

Future releases of VP Command will include Reference Values that may look like this.

These values will be generated based on the selected Code.

Loading for Entire Building

Building Code | Live Load | Wind Load | Snow Load | Seismic | Reference Values | Notes

Item	Value	Units
Data for Selected Location:		
State (Province)	Tennessee	
County (Location)	Shelby	
Ground Snow	10.00	psf
Rain Surcharge	N/A	
Wind	70.00	mph
Wind 1/10 year	N/A	
Wind 1/30 (1/50) year	N/A	
Wind 1/100 (1/200) year	N/A	
Temperature Correction Factor	N/A	
Oceanline Distance	101.00	Miles
Seismic Zone	Zone 3	
A _a (Z _a) (S _s)	125	
A _v (Z _v) (S ₁)	40	
Velocity Ratio	N/A	
Rainfall Intensity	7.00	in per hour

Note: These values should not be used if they are less severe than the Building Code or specification requirements.


Apply Values

What are these new S_s and S₁ values:

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Compare the values at right with the more familiar A_v, A_a and Seismic Zone parameters.

Using the Memphis location as an example, note that S_s must be input in VP Command as 125 (not 1.25)



Seismic Coeff. Comparison

● Example for low and high seismic:

	BOCA/SBC	UBC	IBC
Atlanta (Low seismic)	A _v = 0.05 A _a = 0.05	Zone=1	S _s = 27 % S ₁ = 12 %
Memphis (High seismic)	A _v = 0.20 A _a = 0.22	Zone = 3	S _s = 125 % S ₁ = 40 %

VP Command defaults to a Soil Profile of “Stiff Soil (D,4)” which yields the most conservative seismic loads.

In lieu of actual soil studies at a job site, the prudent thing to do is accept the default values. See table and note b. below.



Soil Profile [=Site Class] (1)



- A classification assigned to a site based on the types of soil present and their engineering properties
- Applies to the upper 100 ft. of the soil

Site Class	Description
A	Hard rock
B	Rock
C	Very dense soil or soft rock
D	Stiff soil
E	Soil
F	Vulnerable soils (clays...)



Examples of VP Command’s Ss & S1 input and corresponding results for Frames only:

Soil Profile \ Ss & S1	Ss = 15	Ss = 35	Ss = 125	Ss = 300
	S1 = 8	S1 = 10	S1 = 40	S1 = 100
Hard Rock (A,1)	0.0000	0.0458	0.1667	0.4000
Rock (B,2)	0.0000	0.0573	0.2083	0.5000
Very dense soil and soft rock (C,3)	0.0300	0.0700	0.2083	0.5000
Stiff Soil (D,4)	0.0400	0.0887	0.2083	0.5000
Soil (E)	0.0625	0.1272	0.1875	0.4500
Soils requiring site specific evaluation (F)	0.0000	0.0573	0.2083	0.5000

Notes:

- In a very general sense, for Ss = 125 & S1 = 40 with Stiff Soil (D,4), every 10,000lbs dead or Cg weights supported by building (masonry walls, ceilings, Collateral, frame and crane weights, etc.) will apply a seismic load of (0.2083 x 10,000) = 2083 lbs to framing system.
- Consider soil investigation for buildings supporting heavy mass and/or located in higher seismic regions. As shown in table, seismic loads for Ss = 125 may vary as much as 25% depending on type of soil at job site (High of 0.2083 and Low of 0.1667). The potential exists for significant impact on project costs.