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.

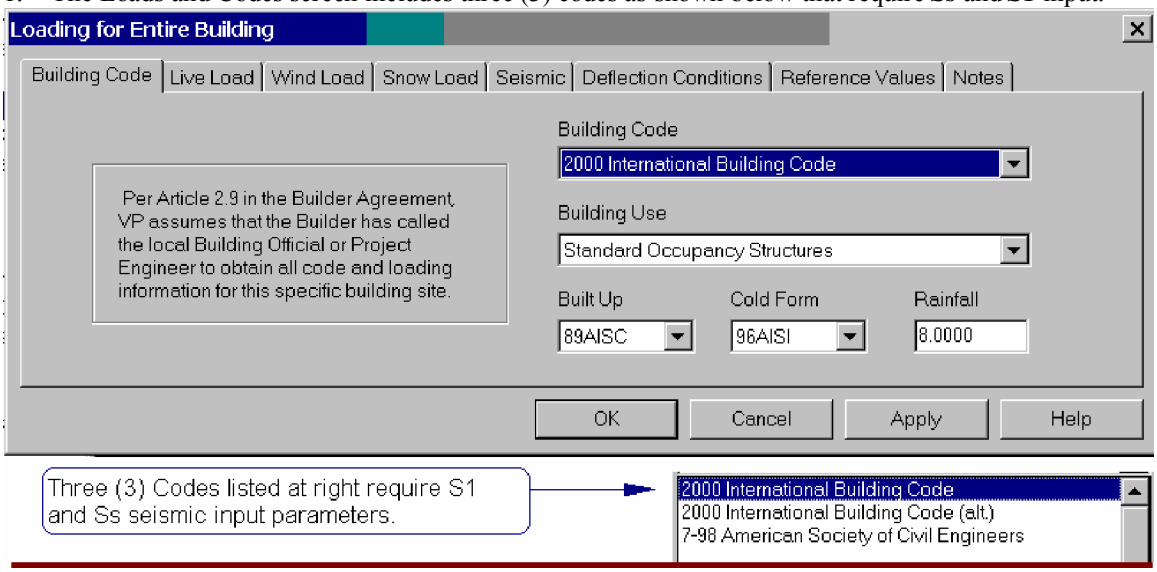
VP Buildings uses Loads databases that are published by recognized organizations such as MBMA or ASCE.

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

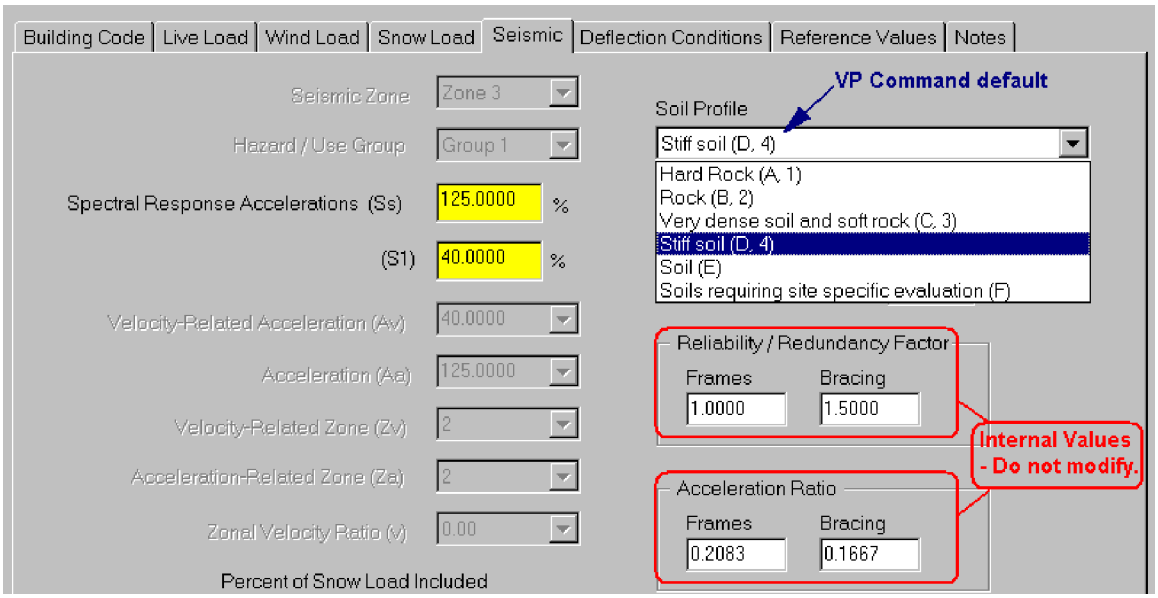
Until that time arrives, this article will assist you in getting valid Seismic values for S1 and Ss.

VP Command Input Screens:

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

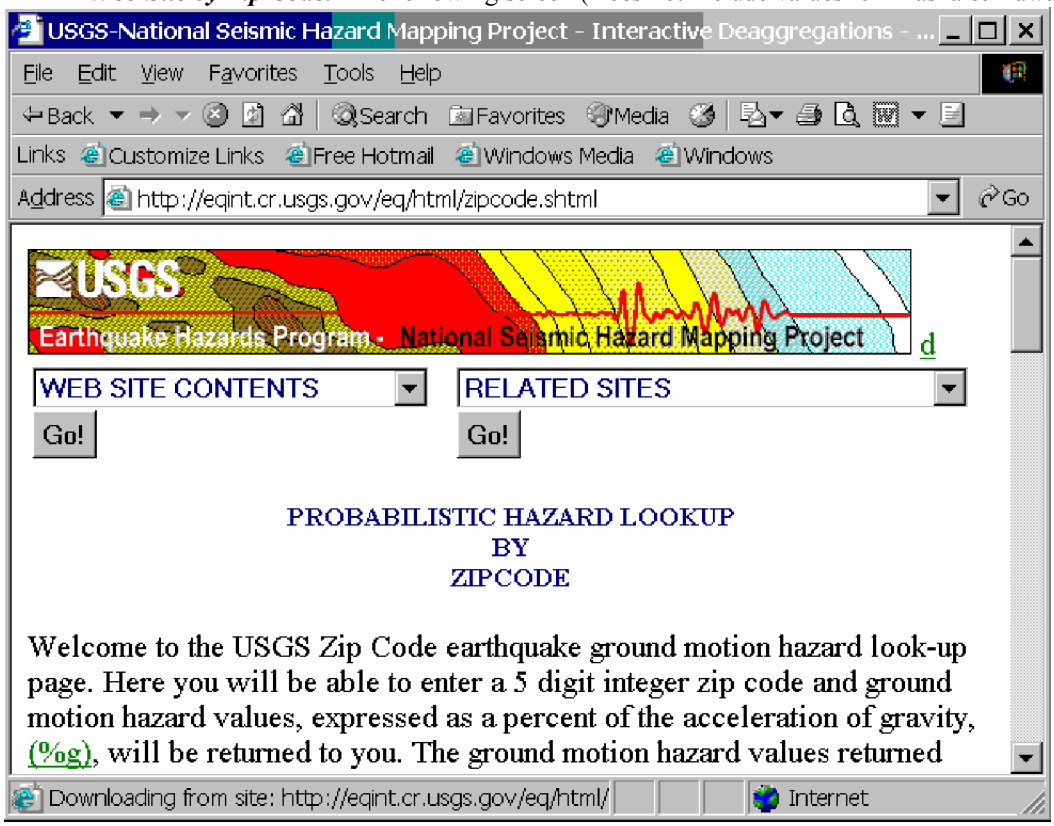


2. The IBC type seismic input screens for VP Command are displayed below for Ss, S1 and Soil Profile.



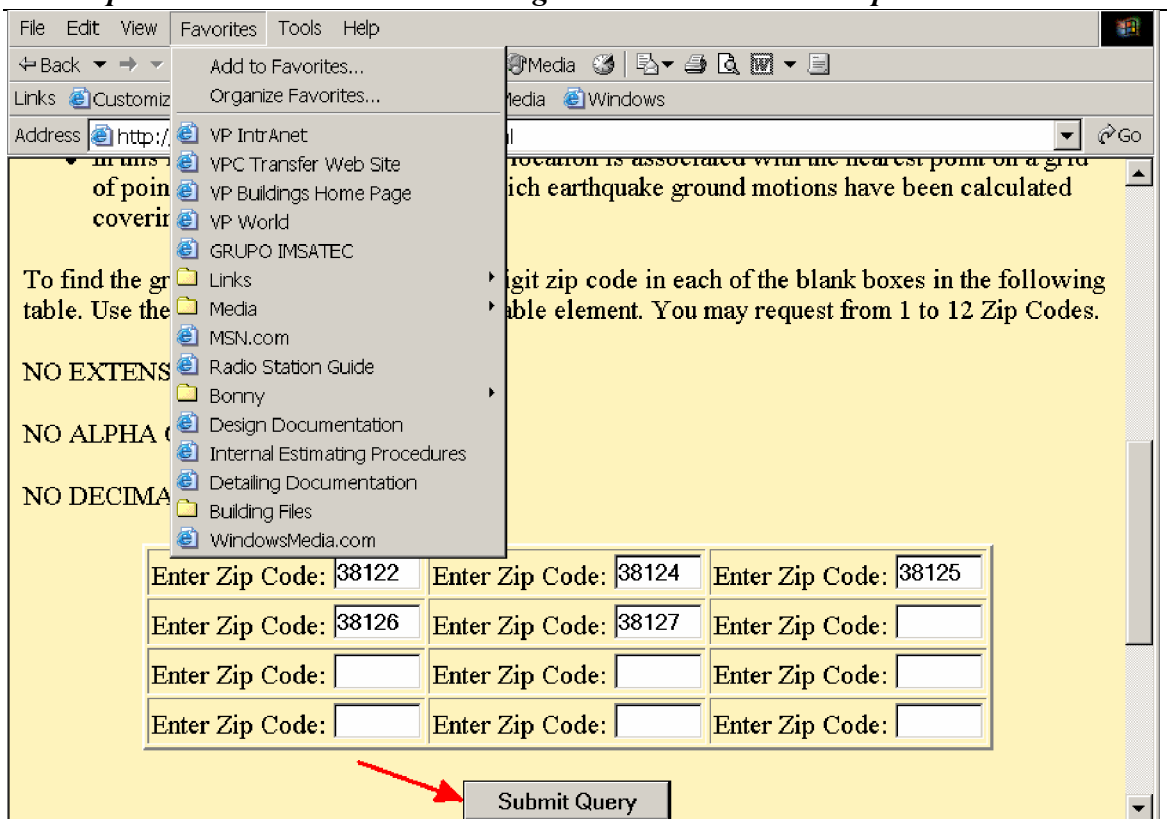
Short Term Relief: **<back>**

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.



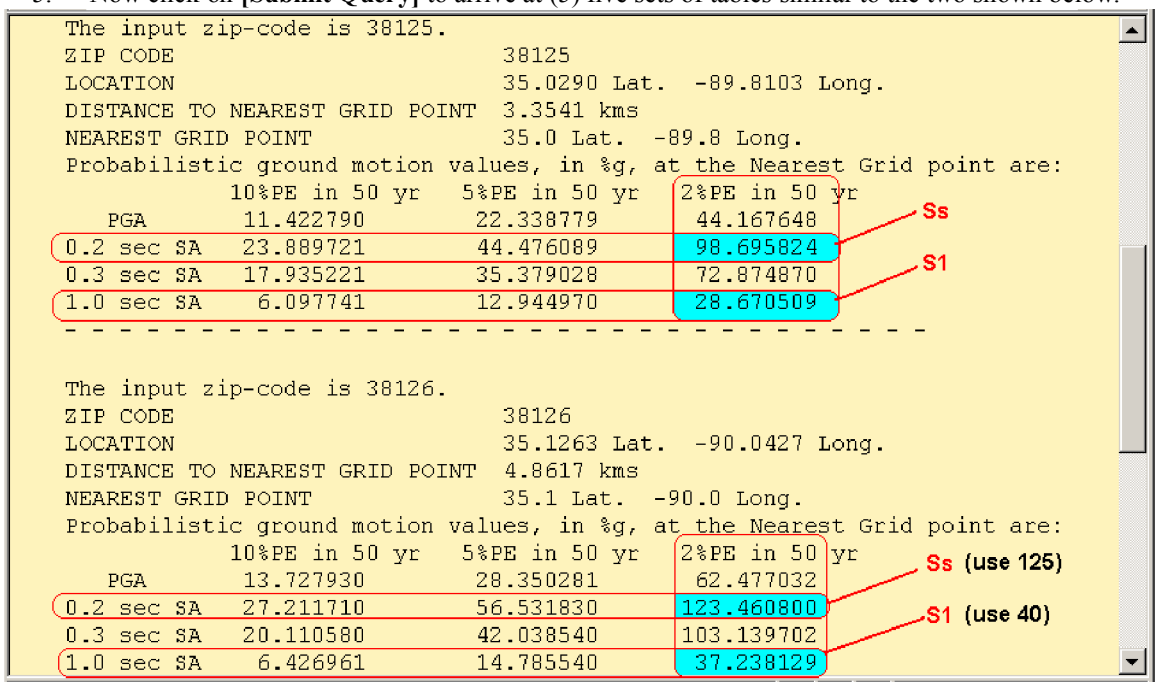
2. Now scroll (navigate) to bottom of this page.

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.



4. 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.

5. Now click on **[Submit Query]** to arrive at (5) five sets of tables similar to the two shown below.



```
The input zip-code is 38125.
ZIP CODE                          38125
LOCATION                          35.0290 Lat.  -89.8103 Long.
DISTANCE TO NEAREST GRID POINT    3.3541 kms
NEAREST GRID POINT                35.0 Lat.  -89.8 Long.
Probabilistic ground motion values, in %g, at the Nearest Grid point are:
             10%PE in 50 yr   5%PE in 50 yr   2%PE in 50 yr
   PGA         11.422790        22.338779        44.167648
0.2 sec SA     23.889721        44.476089        98.695824   <-- Ss
0.3 sec SA     17.935221        35.379028        72.874870
1.0 sec SA      6.097741        12.944970        28.670509   <-- S1
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The input zip-code is 38126.
ZIP CODE                          38126
LOCATION                          35.1263 Lat.  -90.0427 Long.
DISTANCE TO NEAREST GRID POINT    4.8617 kms
NEAREST GRID POINT                35.1 Lat.  -90.0 Long.
Probabilistic ground motion values, in %g, at the Nearest Grid point are:
             10%PE in 50 yr   5%PE in 50 yr   2%PE in 50 yr
   PGA         13.727930        28.350281        62.477032
0.2 sec SA     27.211710        56.531830       123.460800   <-- Ss (use 125)
0.3 sec SA     20.110580        42.038540       103.139702
1.0 sec SA      6.426961        14.785540        37.238129   <-- S1 (use 40)
```
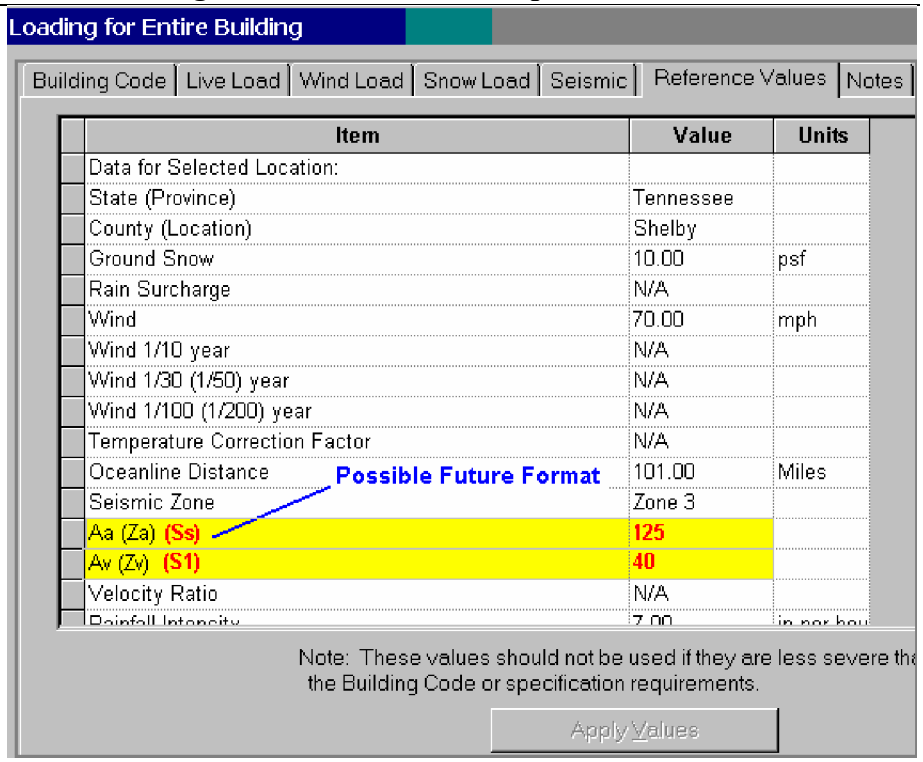

6. Select largest of (5) Ss & S1 values shown, Ss = 123.46800 and S1 = 37.238129. Round off values to an integer value for input in VP Command, i.e., Ss = 125 and S1 = 40. **Congratulations! You've made it!**

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.



What are these new Ss and S1 values:
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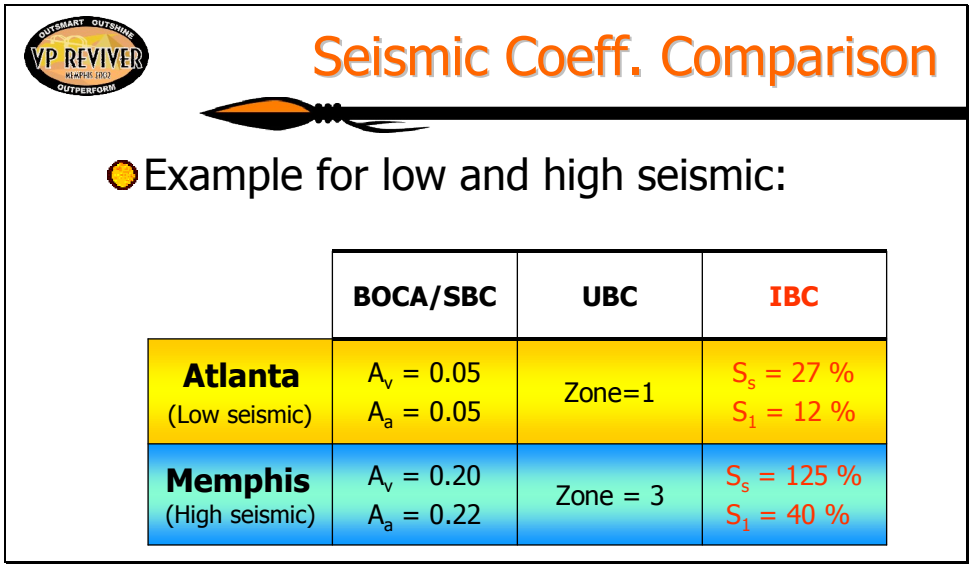
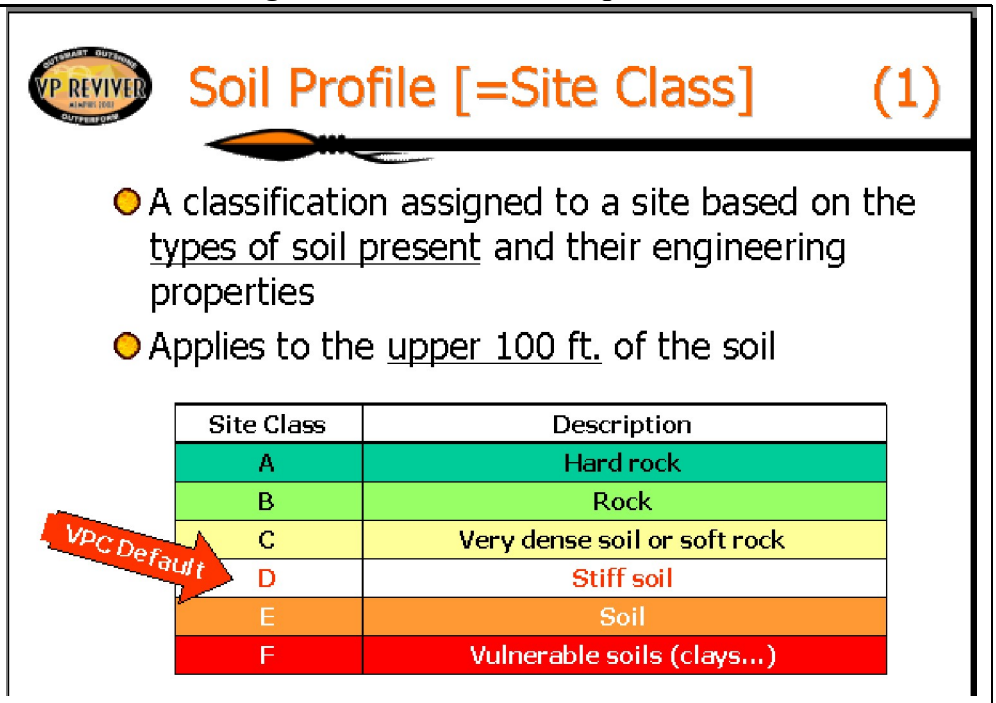
Compare the values at right with the more familiar Av, Aa and Seismic Zone parameters.

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



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.



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

Soil Profile \ Ss & S1	Ss = 15 S1 = 8	Ss = 35 S1 = 10	Ss = 125 S1 = 40	Ss = 300 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:

a. 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.

b. 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.