ProtaStructure Design Guide

User Defined Acceleration Spectra

Version 1.0 March 2025

Please contact us for your training and technical support queries

asiasupport@protasoftware.com

globalsupport@protasoftware.com

Publisher

PROTA SOFTWARE

Limitation of Responsibilities

Prota shall not be held responsible for any losses caused by documentation, software, or usage errors.

In addition to Prota License Agreement Terms, it is the responsibility of the user.

- to check results generated by documentation and software,
- make sure that the users of the software and their supervisors have adequate technical capabilities,
- make sure the software is correctly used per the reference manual and documentation,

Intellectual Property

ProtaStructure is a registered trademark of **Prota Software Inc,** and all intellectual property rights belong to **Prota Software Inc**. Documentation, training, and reference manuals. Any program component cannot be copied, distributed, or used in violation of the license agreement.

Trademarks

ProtaStructure®, ProtaDetails®, ProtaSteel® ve **ProtaBIM®** are registered trademarks of Prota Software Inc. Prota logo is a trademark of Prota Software Inc.

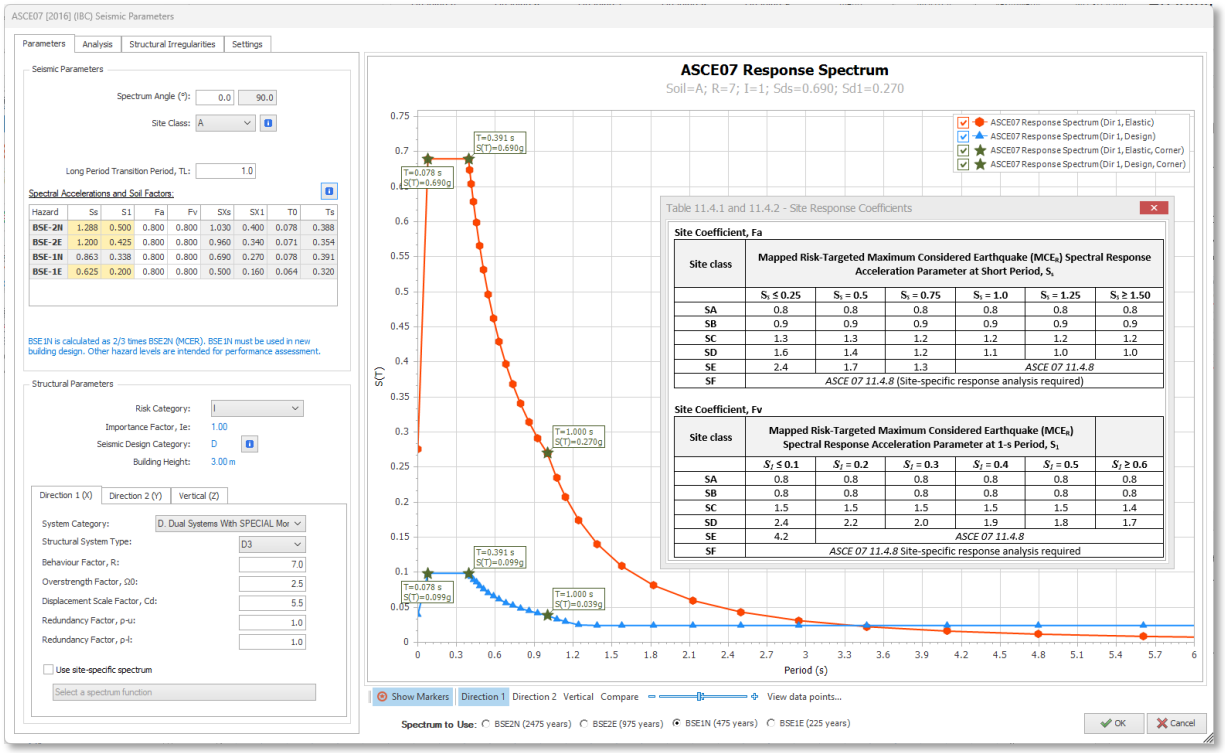
Table of Contents

User-Defined Acceleration Spectra in ProtaStructure

ProtaStructure automatically calculates the elastic and design acceleration spectra according to international seismic codes, using a highly parametric UI that encapsulates the code-specific parameters in a user-friendly manner, enabling users to customize them to fulfill their project requirements.

In addition to this, ProtaStructure also allows user-defined acceleration spectra to be used in cases where a site-specific survey is required for specific site conditions.

ProtaStructure 2026 introduces a powerful new feature, allowing engineers to import as many user-defined acceleration spectra functions as they want and assign different spectrum curves in the X, Y, and Z directions. This enhancement provides greater flexibility and precision in seismic analysis, enabling our users to tailor their designs to specific project requirements and regional seismic conditions.

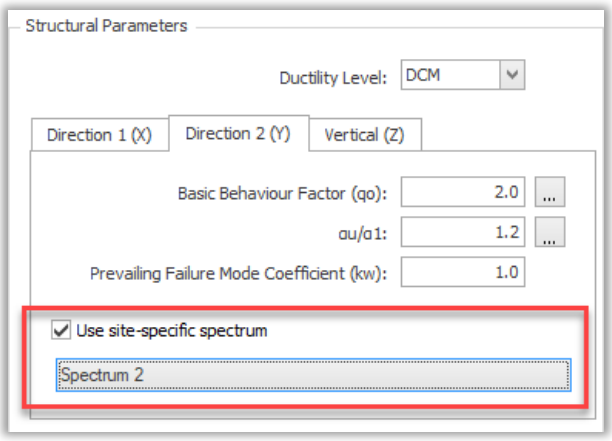


Creating Your Own User-Defined Spectrum Library

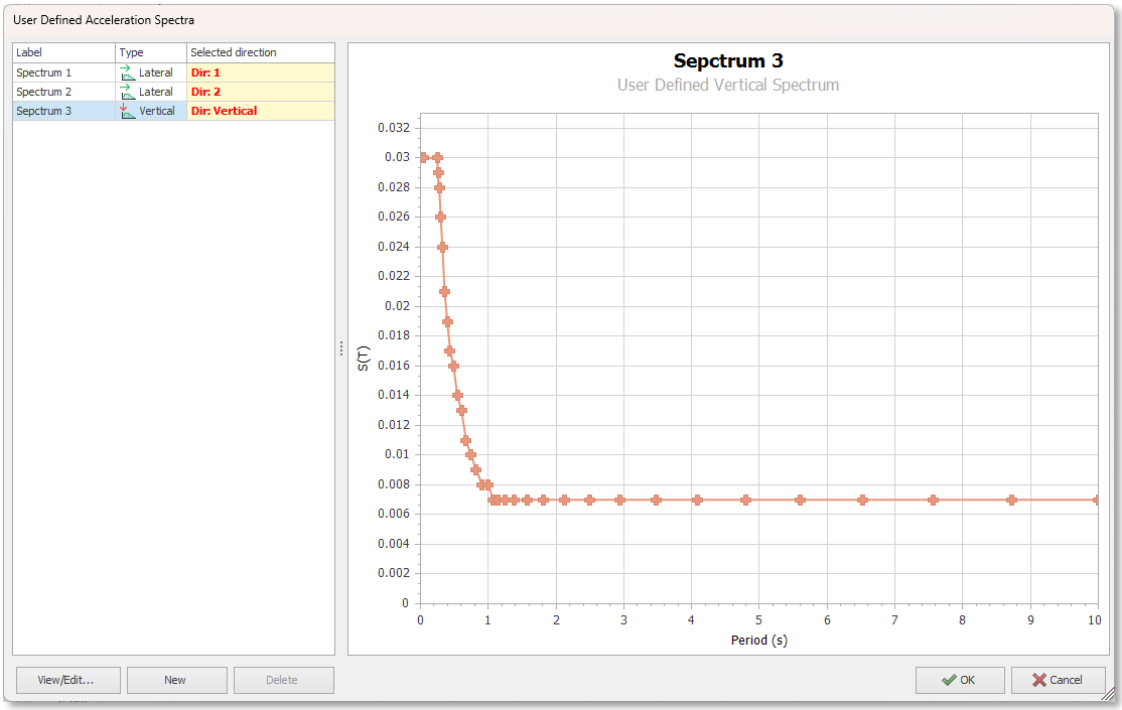
You can create as many spectrum functions as you want and save them as an integral part of your project. You can assign any of these functions to directions 1, 2 or vertical direction.

To access the user-defined spectrum library:

1. Open the Seismic Parameters window
2. Check "**Use site-specific spectrum**" option in one of the directions.



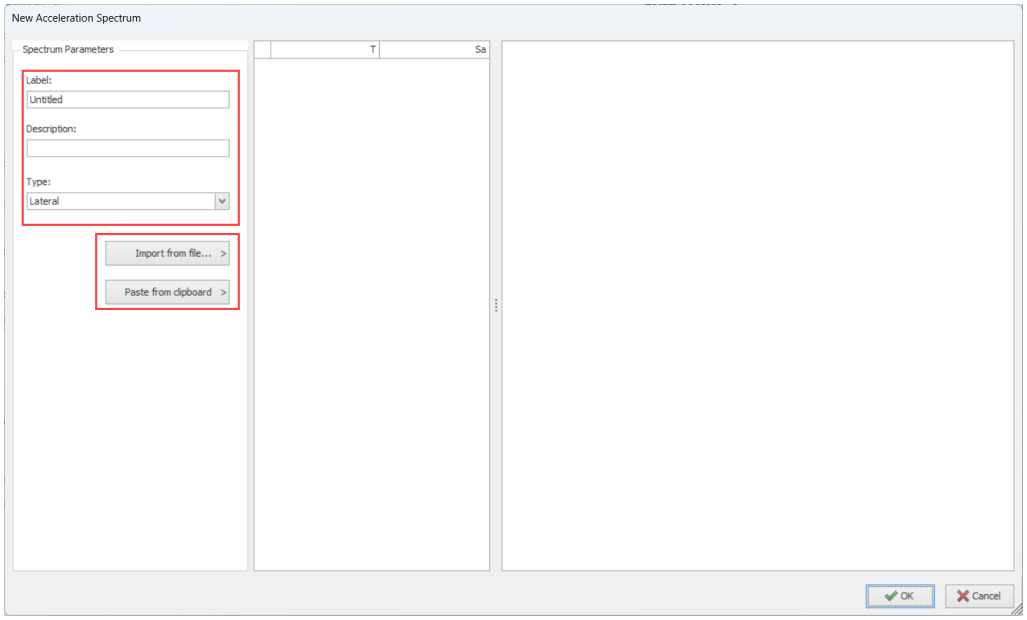
3. The library window will open with a list on the left and the selected spectrum preview on the right. Spectrum functions which are assigned to a direction will be indicated on the list with red and bold text such as **Dir: 1**, **Dir: 2** or **Dir: Vertical**.



4. To edit the selected spectrum function, select it on the list and click "**View/Edit...**" button. To create a new spectrum from scratch, click "**New**" button.

Creating a New Spectrum

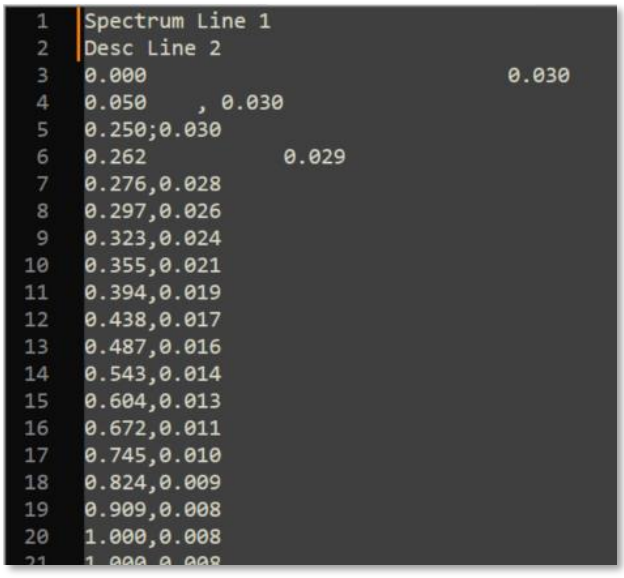
When you click "**New**" button, an empty window will open. On this window, the only way to create a new spectrum is to import or paste spectrum data.

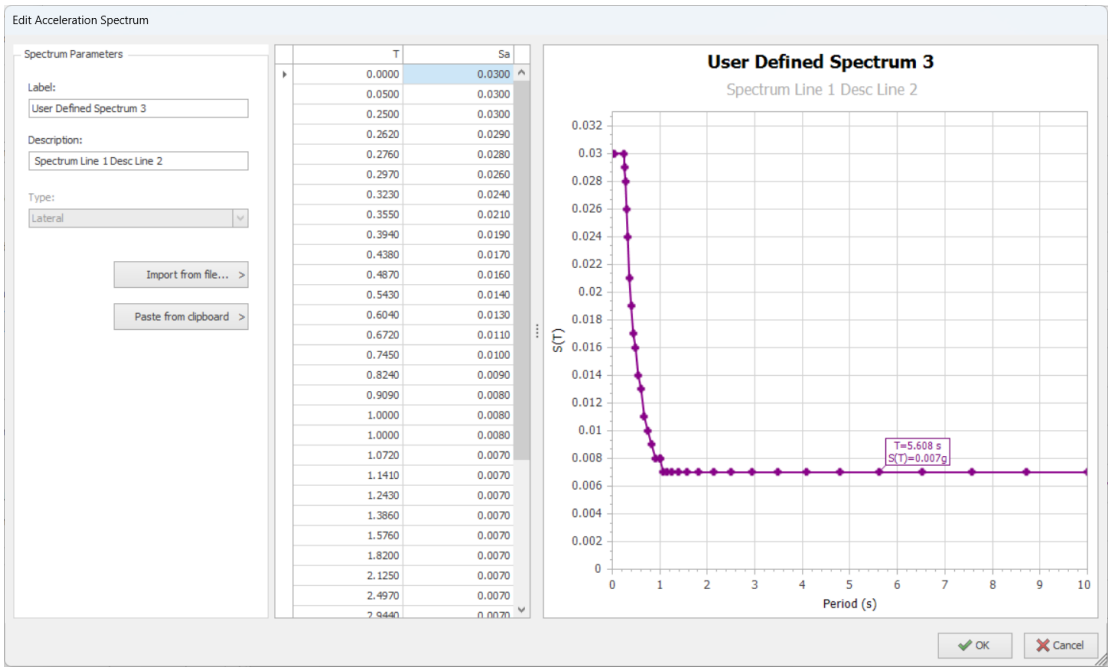


Importing the Spectrum from File

1. Click "**Import from File…**" button if you have spectrum data available on a file. The file can be located anywhere on your computer and can have as many header lines as required. ProtaStructure will automatically understand the text and will not consider these lines as data points.

2. The data points can be delimited with a mixture of **space, tab, comma** or **semi-colon**. The **Period** values must be specified first, followed by the **Spectral Acceleration** value in terms of **gravitational acceleration, g**. A sample file is given in the following picture. The data points that cannot be parsed will be skipped.





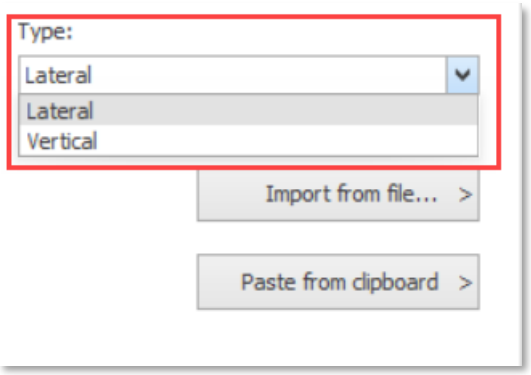
You can update the name, description and spectrum data points manually after importing the spectrum.

Pasting Spectrum Data from Clipboard

If you have copied the spectrum data points, say, from an **Excel** or **Text** file, you can click "**Paste from clipboard**" button to immediately paste the values in the table. This provides an even quicker way for you to bring the spectrum into ProtaStructure. Of course, the copied data must be compatible and suitable for parsing. In other words, the data you have copied must be already delimited by space, tab, comma or semi-colon or must be in different columns in Excel.

Setting the Spectrum Type: Lateral or Vertical

The user-defined spectrum function can be a lateral or vertical spectrum. This discrimination is necessary for correctly assigning the spectrum to X, Y or Z directions. You can select one of **Lateral** or **Vertical** options from the **Type** list, while creating the new spectrum.



You can not assign a **Vertical** spectrum to X or Y direction. Similarly, a **Lateral** spectrum cannot be assigned to Z direction.

Viewing or Editing an Existing Spectrum

Like new spectrum creation, the same window will open when you click "**View/Edit...**" button. This time, the window will be preloaded with the selected spectrum data and the updates you make will affect the selected spectrum if OK is clicked.

On this window, you can change the name and description of the spectrum or edit the values of the data points. Alternatively, you can import or paste new spectrum data which will completely overwrite the existing spectrum data points.

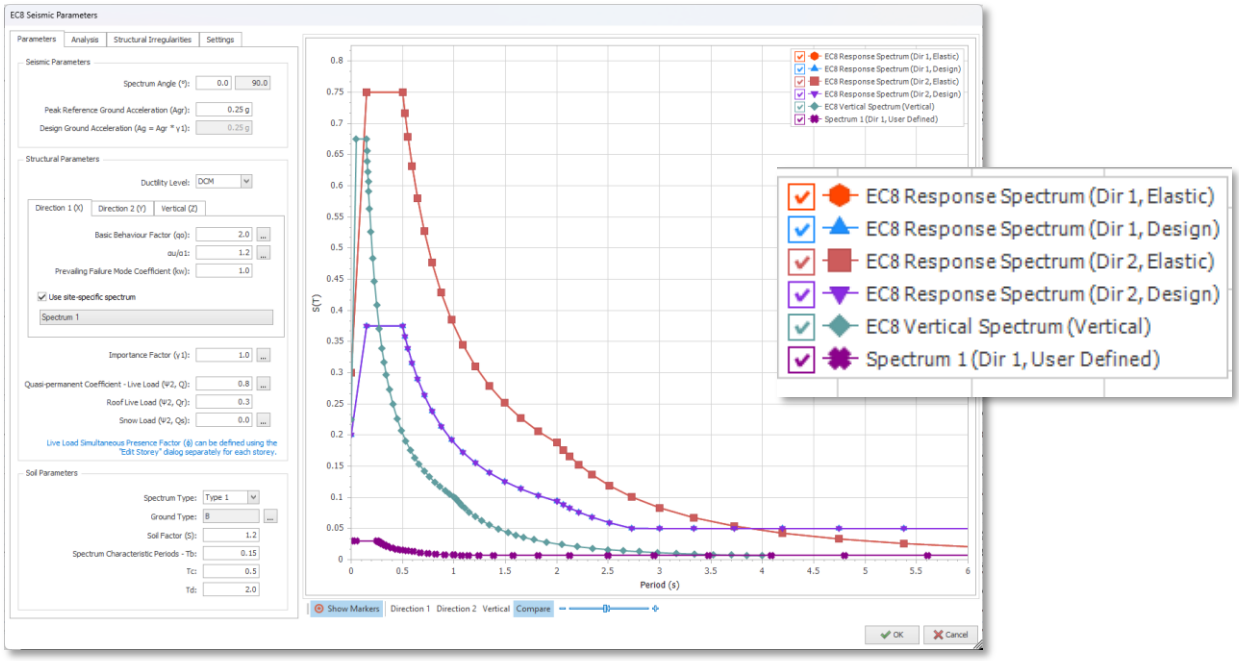
You cannot change the **Spectrum Type** (**Lateral** or **Vertical**) if the spectrum is already in use.

Comparing All Acceleration Spectra on the Same Chart

With the new redesigned and streamlined user interface and user experience, you will achieve smoother usage with an ability to compare user-defined spectrum with the code spectra on the same chart for all directions to obtain a better grasp on the expected structural behavior.

To compare the actively used spectra (including user-defined ones), click "Compare" button. The chart area will now contain **Elastic** and **Design Code Spectra** and the **User-Defined Spectra** you have defined in all directions.

You can further display or hide the relevant spectrum curves by clicking the checkboxes on the chart legend.



Important Note:

The user-defined spectrum you introduce must be a "**Design Spectrum**" (i.e. divided by R factor and multiplied with Importance Factor) if you are aiming to use it in the design.

If you intend to use an elastic spectrum, then the spectrum curve you introduce must be an elastic spectrum. A possible use-case may be the Target Displacement calculation in pushover analysis or an intentional elastic design with your custom spectrum.

In both cases, ProtaStructure will use the user-defined spectra "**as it is**" without doing any modifications.

Thank You…

Thank you for choosing the ProtaStructure Suite product family.

Our top priority is to make your experience excellent with our software technology solutions.

Should you have any technical support requests or questions, please do not hesitate to contact us at all times through globalsupport@protasoftware.com and asiasupport@protasoftware.com

Our dedicated online support center and our responsive technical support team are available to help you get the most out of Prota's technology solutions.

The Prota Team

PROTA Structure®

PROTA Steel®

PROTA Details®

PROTA BIM®