

WE MechLoad Viewer

The Complete User Manual

!(<https://www.google.com/search?q=https://placeholder.co/800x200/5E72E4/FFFFFF%3Ftext%3DWE%2520MechLoad%2520Viewer>)

Chapter 1: Getting Started

1.1 Welcome to the WE MechLoad Viewer!

Welcome! You're about to use a powerful tool designed to make the complex job of analyzing mechanical load data much simpler. Whether you're a design engineer comparing simulation results, a test engineer validating physical measurements, or an analyst preparing data for further simulation, this tool is built for you.

At its core, the **WE MechLoad Viewer** is a specialized graphical interface for loading, visualizing, and processing large sets of mechanical load data, which can be in either the **time domain** (how a load changes over time) or the **frequency domain** (the frequencies that make up a load signal).

Its main purpose is to bridge the gap between raw data output from solvers or data acquisition systems and the practical insights you need to make engineering decisions.

1.2 Who This Manual is For

This manual is written for the end-user of the application. It assumes you have a background in mechanical engineering or a related field, but **no programming experience is required**. We'll walk through every feature, from the basics of loading a file to the advanced functions like data processing and exporting to Ansys.

1.3 System Requirements

The application is designed to run on a standard Windows operating system.

- **Operating System:** Windows 10 or Windows 11
- **RAM:** A minimum of 8 GB is recommended, especially when working with very large data files.
- **Disk Space:** At least 100 MB of free space for the application itself. You will need additional space for your data files.

1.4 Understanding the Main Window

Before we dive into loading data, let's get familiar with the main parts of the application window. When you first launch the program, you'll see a layout with three primary sections.

1. The Menu Bar (Top)

- This is the standard menu bar at the very top of the window.
- **File:** This menu is your starting point. It's where you'll go to Open New Data to load your initial dataset.
- **View:** This menu allows you to show or hide the Directory Tree panel on the left. If you ever lose the panel, you can bring it back from here.

2. The Directory Tree Dock (Left)

- This panel on the left side is your navigation center.
- After you load your first dataset, this tree will populate with the folder structure of your data.
- **Its most powerful feature is for multi-data analysis.** You can click the checkboxes next to different data folders in the tree to instantly load and overlay them in the plot window. This is incredibly useful for comparing different load cases or design iterations.

3. The Main Tab Widget (Center/Right)

- This is the largest area of the application and where all the action happens. It's organized into a series of tabs, each designed for a specific type of analysis.
- You'll switch between these tabs depending on what you want to investigate in your data. We'll dedicate a full chapter to each of these tabs later in the manual.

Here's a quick preview of what each tab does:

- **Single Data:** Look at one specific data channel (e.g., the force in the X-direction on a single sensor).
- **Interface Data:** Look at all the related forces and moments for a single connection point (e.g., F_x , F_y , F_z , M_x , M_y , and M_z for one bolt).
- **Part Loads:** Group data by a component or "side" (e.g., show all the vertical forces on the "Left-Hand-Side" suspension). This tab is also where you export data for Ansys.
- **Compare Data:** Directly compare a channel from your main dataset against a channel from a second, separately loaded dataset.
- **Compare Data (Part Loads):** Similar to the above, but for comparing grouped part loads.
- **Time Domain Rep. (Frequency Data Only):** A special tab to reconstruct a time-domain signal from your frequency data at a specific frequency point.
- **Settings:** Customize the look and feel of all your plots.

Now that you're familiar with the layout, let's move on to the most important first step: loading your data.

Chapter 2: Loading and Managing Your Data

2.1 Your Data's Format: The Golden Rules

The application is designed to work with a specific data format. For the program to read your

files correctly, your data folder **must** contain two types of files:

1. **full.pld file(s):** This is the main data file. It should be a pipe-delimited (|) text file containing the raw numerical data. The first columns should be the index and either TIME or FREQ.
2. **max.pld file:** This is the header file. It's also a pipe-delimited file, but it contains the names (or labels) for each data column in the full.pld file.

Analogy: Think of it like a spreadsheet. The full.pld is all the cells filled with numbers, and the max.pld is the header row at the top that tells you what each column of numbers represents. The application needs both to make sense of the data.

2.2 Loading Your First Dataset

Let's walk through loading your first set of data.

1. Start the application. You will see the main window.
2. Go to the **Menu Bar** at the top and click on **File**.
3. From the dropdown menu, select **Open New Data**.
4. A standard file dialog will appear, asking you to "Please select a directory...".
5. Navigate to the folder that contains your full.pld and max.pld files and click "**Select Folder**".

What happens next?

The application will now read and process your data. Once it's done (which should be very quick for most datasets), a few things will happen automatically:

- The **window title** will update to show the name of the folder you've loaded.
- The **Directory Tree** on the left will populate, showing the parent directory and the specific data folder you selected.
- The **dropdown menus** in all the tabs will be filled with the column headers from your max.pld file.
- A **default plot** will appear in the "Single Data" tab.

Congratulations, your data is now loaded and ready for analysis!

2.3 The Power of the Directory Tree: Loading Multiple Datasets

The most common task in engineering analysis is comparison. You might want to compare:

- Simulation results vs. physical test data.
- Load data from an old design vs. a new design.
- A "normal" load case vs. an "extreme" load case.

The Directory Tree makes this incredibly easy. Once you have loaded your initial dataset, the tree shows the directory structure.

To load additional datasets for comparison:

1. Ensure your other datasets are in sibling folders (i.e., in the same parent directory).
2. Simply **click the checkbox** next to another folder in the Directory Tree.

The application will immediately load this second dataset and overlay it on your current plots. The lines on the plots will be colored differently, and the legend will update to show which line corresponds to which data folder.

You can check and uncheck as many folders as you need to quickly compare different scenarios. This is one of the most powerful features of the viewer.

2.4 Time Domain vs. Frequency Domain Data

The application automatically detects what kind of data you've loaded by looking for a **TIME** column or a **FREQ** column in your full.pld file. This is important because the application will behave slightly differently depending on the data type.

- **If TIME data is detected:**
 - The horizontal axis of all plots will be "Time (s)".
 - Special time-domain analysis tools will become available in the "Single Data" and "Part Loads" tabs, such as the ability to apply a low-pass filter or a Tukey window.
 - The "Time Domain Rep." tab will be hidden, as it's not needed.
- **If FREQ data is detected:**
 - The horizontal axis of all plots will be "Frequency (Hz)".
 - The "Single Data" tab will show an additional plot for the **Phase** of the signal.
 - The "Time Domain Rep." tab will become visible, allowing you to reconstruct what the time signal would look like at a specific frequency.

You don't need to do anything to switch between these modes; the application handles it all for you based on the data you load.