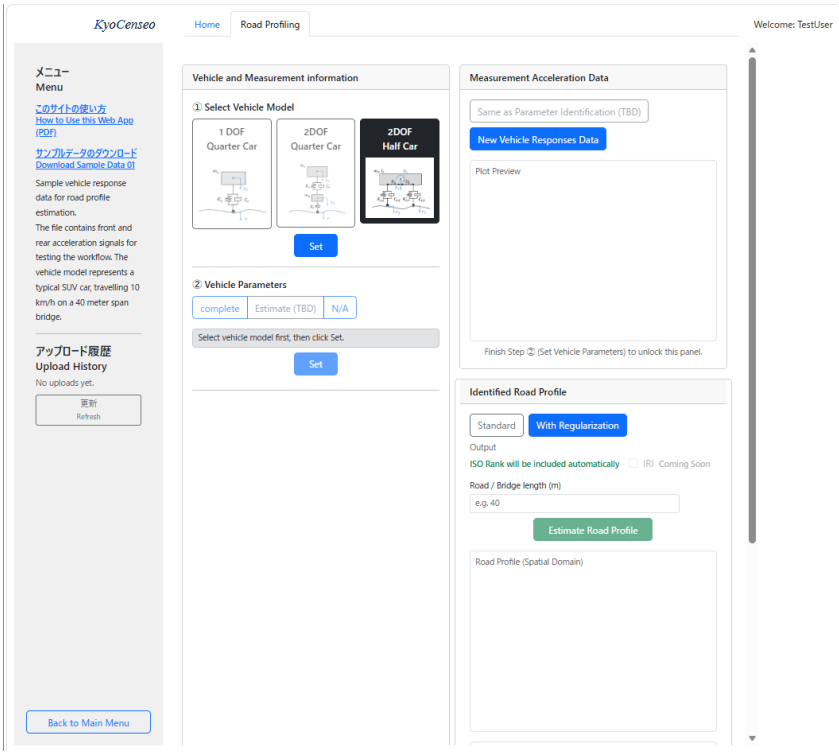
How to use Road Profiling Web Application

This road profiling web application is designed to estimate road roughness profiles — an essential parameter closely related to ride comfort and overall road quality — using vehicle acceleration data and our proprietary algorithm. The application supports data sampled at frequencies up to 1 kHz. Input data should include vehicle axle acceleration measurements.

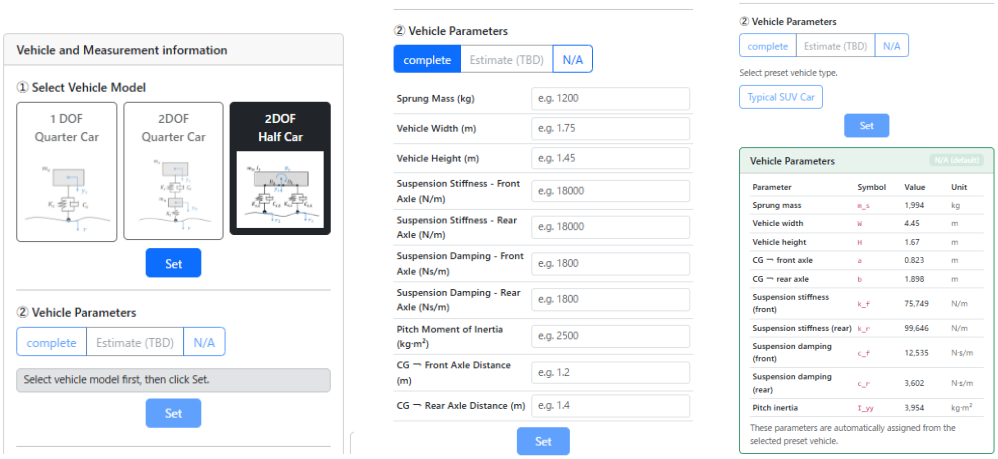
Choosing the right vehicle model

Currently, the web application supports only these three models, depending on the data availability.

1. **1DOF Quarter-Car**
   Suitable when only a single axle acceleration measurement is available and **no** tire properties are known.
2. **2DOF Quarter-Car**
   Suitable when a single axle acceleration measurement is available along **with** tire properties.
3. **2DOF Half-Car**
   Suitable when acceleration measurements from two axles are available, even **without** tire property data.



Vehicle Parameters Input



The web application provides three options for selecting vehicle parameters:

1. **Complete**

   The user must input all required vehicle parameters based on the selected vehicle model. This option assumes that the user has full knowledge of the vehicle's properties.

2. **Estimated**

   The user provides general vehicle information according to the selected model.
   In addition, vehicle acceleration data must be uploaded to estimate the remaining parameters.

   The parameters are then identified using our in-house algorithms. Two types of acceleration data can be used:

   - Free vibration data of the vehicle
   - Acceleration data under running conditions

   This feature will be available in the future.

3. **Given (N/A)**

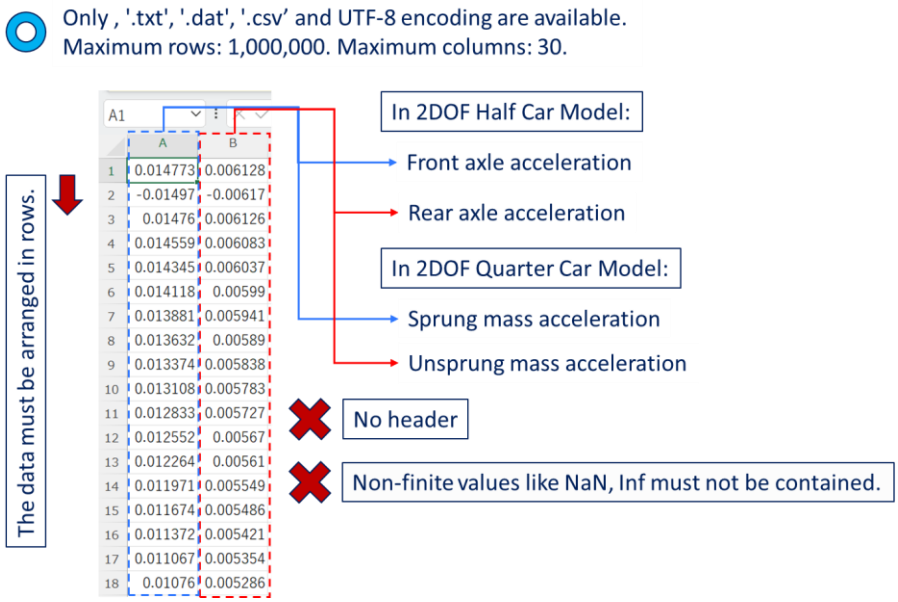
   If no vehicle parameter information is available, the user can select a general vehicle category (e.g., SUV, truck, etc.).
   Representative parameters will be assigned automatically and used for road profile estimation.

   Note: The accuracy may be limited when using generalized parameters.

After selecting the type of vehicle parameters selection, the user has to press “Set” to save the vehicle parameters. This allows the user to run the estimation algorithm later without having to refresh and update the vehicle parameter’s part.

Points to note regarding uploaded data.

- Only .txt, .dat, and .csv file formats are supported.
- The data must not contain a header row and time-series data arranged in rows is supported.
- Timestamps must be removed prior to upload.
- Only UTF-8 encoding is supported.
- The maximum allowed size is **1,000,000 rows** and **30 columns**.
- The uploaded data must not contain NaN, Inf, or any non-finite values.
- The sign convention adopts the right-hand coordinate system as defined in the model picture.
- The data column should represent axle acceleration.



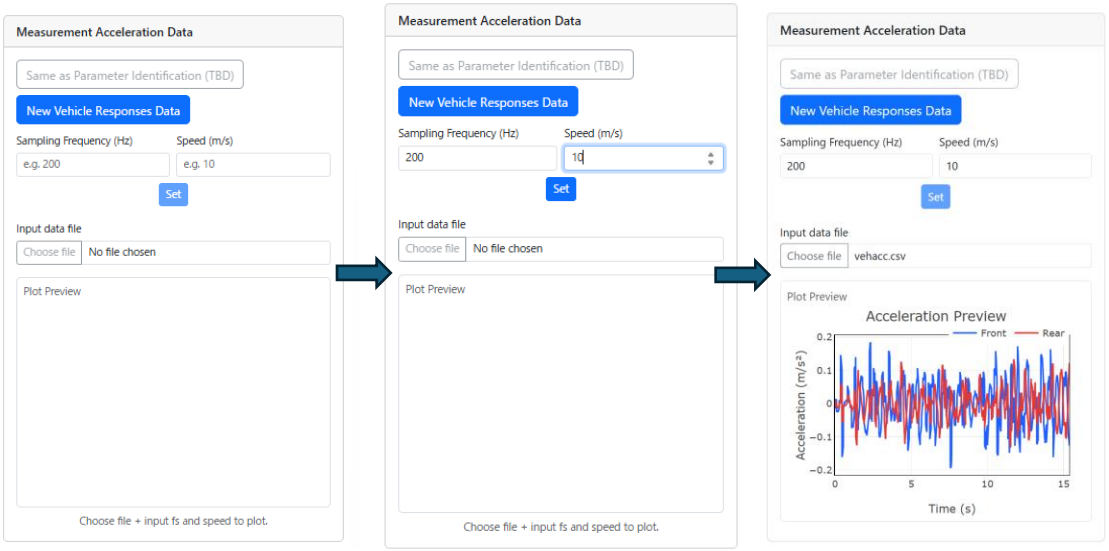
Uploading Vehicle Acceleration Data

The web application provides two types of uploading:

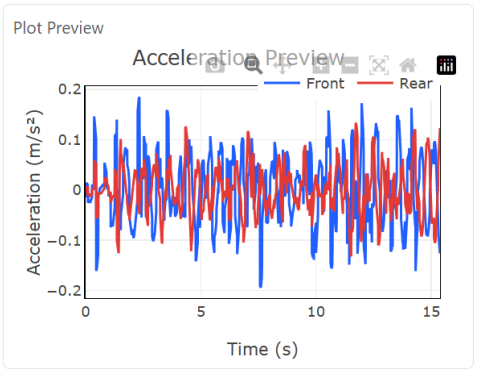
1. **Same,** If the user uses the same data that was used to estimate vehicle parameters

2. **Different,** If the user wants to use another acceleration data for the road profiling estimation. The user is required to input the sampling frequency and the vehicle speed (scalar, in m/s). Following that, the user can choose the data to be uploaded following the note mentioned in page 1. [*This feature will be available in the future*]

After uploading, the acceleration will automatically be shown.



Plot Preview / Acceleration Preview



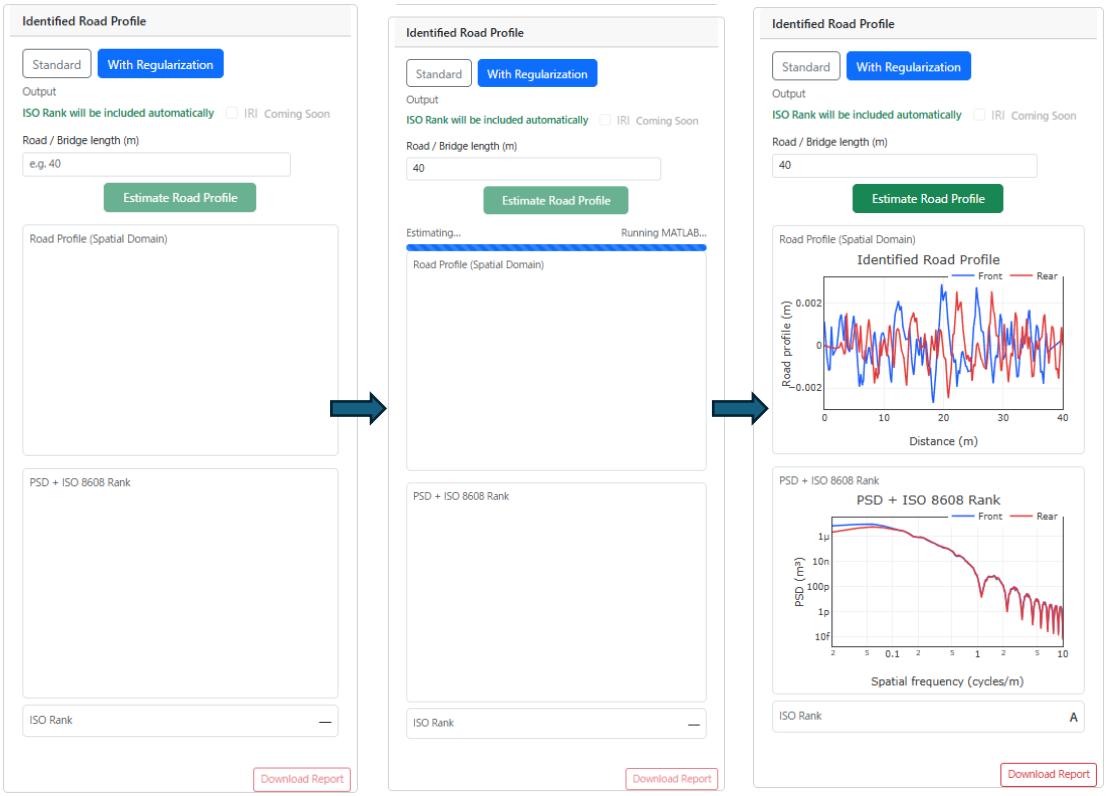
The Plot Preview area displays the uploaded acceleration data before road profile estimation. Users can interact with the graph directly in the browser. Users can use the plot to confirm that the uploaded data has been read correctly before continuing.

Plotly provides several interactive functions:

- Drag on the plot to zoom into a specific time range.
- Double-click the plot to reset the zoom.
- Hover over the lines to see the exact time and acceleration value.
- Click legend items such as Front or Rear to show or hide each signal.
- Use the toolbar in the upper-right corner to zoom, pan, reset the view, or download the plot image.

Before clicking Estimate Road Profile, please confirm that both front and rear acceleration signals are displayed correctly.

Road Profiling Estimation and Optional Outputs



The user is required to select the estimation algorithm option. Two options are available:

1. **Standard** : Conventional physics-based road profile identification algorithm.
2. **With Regularization** : Our in-house improved road profile identification algorithm with special regularization.

Before running the road profiling estimation algorithm, the user requires to input the road length in meter. The user then can select the International Roughness Index (IRI) as the optional output. **This feature will be coming soon**.

After choosing the selected output, click the Estimate button and wait for the estimation algorithm. The web application provides the time series road profile, PSD, and the ISO Rank as the default outputs. The user can then optionally download all the output as csv by clicking the download report button

If an Error Occurs

Please reload Chrome or Edge, then start again by uploading the data.

If possible, please take a screenshot of the screen where the error message appears and send it to the email address below:

kawabe.daigo.2r★kyocenseo.co.jp
(Please replace the ★ with @.)

Use the subject line: **[Road Profiling Site Error]**.