

## 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.

The screenshot displays the KyoCenseo Road Profiling web application interface. The page is titled "KyoCenseo" and "Road Profiling". The user is logged in as "TestUser".

**Vehicle and Measurement information**

① Select Vehicle Model

Three vehicle models are shown: 1 DOF Quarter Car, 2 DOF Quarter Car, and 2 DOF Half Car. The 2 DOF Half Car model is selected.

② Vehicle Parameters

Buttons: complete, Estimate (TBD), N/A. A "Set" button is visible below the parameters.

Measurement Acceleration Data

Same as Parameter Identification (TBD). A "New Vehicle Responses Data" button is present.

Plot Preview

Finish Step: (Set Vehicle Parameters) to unlock this panel.

Identified Road Profile

Standard | With Regularization (selected)

Output

ISO Rank will be included automatically  IRI Coming Soon

Road / Bridge length (m)

e.g. 40

Estimate Road Profile button

Road Profile (Spatial Domain)

Left sidebar menu:

- メニュー Menu
- このサイトの使い方 How to Use this Web App (PDF)
- サンプルデータのダウンロード Download Sample Data 01
- Sample vehicle response data for road profile estimation.
- The file contains front and rear acceleration signals for testing the workflow. The vehicle model represents a typical SUV car, travelling 10 km/h on a 40 meter span bridge.
- アップロード履歴 Upload History
- No uploads yet.
- 更新 Refresh
- Back to Main Menu

## Vehicle Parameters Input

**Vehicle and Measurement information**

① Select Vehicle Model

1 DOF Quarter Car    2 DOF Quarter Car    2 DOF Half Car

Set

② Vehicle Parameters

complete Estimate (TBD) N/A

Select vehicle model first, then click Set.

Set

② Vehicle Parameters

complete Estimate (TBD) N/A

Select preset vehicle type.

Typical SUV Car

Set

Parameter	Symbol	Value	Unit
Sprung mass	$m_s$	1,994	kg
Vehicle width	$w$	4.45	m
Vehicle height	$H$	1.67	m
CG → front axle	$a$	0.823	m
CG → rear axle	$b$	1.898	m
Suspension stiffness (front)	$k_{s-f}$	75,749	N/m
Suspension stiffness (rear)	$k_{s-r}$	99,646	N/m
Suspension damping (front)	$c_{s-f}$	12,535	Ns/m
Suspension damping (rear)	$c_{s-r}$	3,602	Ns/m
Pitch inertia	$I_{yy}$	3,954	kg·m <sup>2</sup>

These parameters are automatically assigned from the selected preset vehicle.

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.

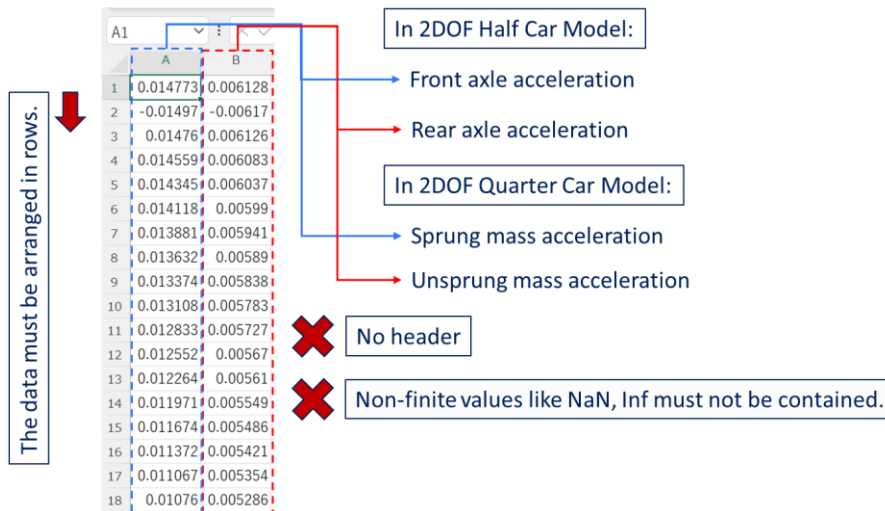
**Note:** The accuracy may be limited when using generalized parameters.

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.

 Only, '.txt', '.dat', '.csv' and UTF-8 encoding are available.  
Maximum rows: 1,000,000. Maximum columns: 30.



	A	B
1	0.014773	0.006128
2	-0.01497	-0.00617
3	0.01476	0.006126
4	0.014559	0.006083
5	0.014345	0.006037
6	0.014118	0.00599
7	0.013881	0.005941
8	0.013632	0.00589
9	0.013374	0.005838
10	0.013108	0.005783
11	0.012833	0.005727
12	0.012552	0.00567
13	0.012264	0.00561
14	0.011971	0.005549
15	0.011674	0.005486
16	0.011372	0.005421
17	0.011067	0.005354
18	0.01076	0.005286

The data must be arranged in rows.

In 2DOF Half Car Model:  
 Front axle acceleration  
 Rear axle acceleration

In 2DOF Quarter Car Model:  
 Sprung mass acceleration  
 Unsprung mass acceleration

❌ No header

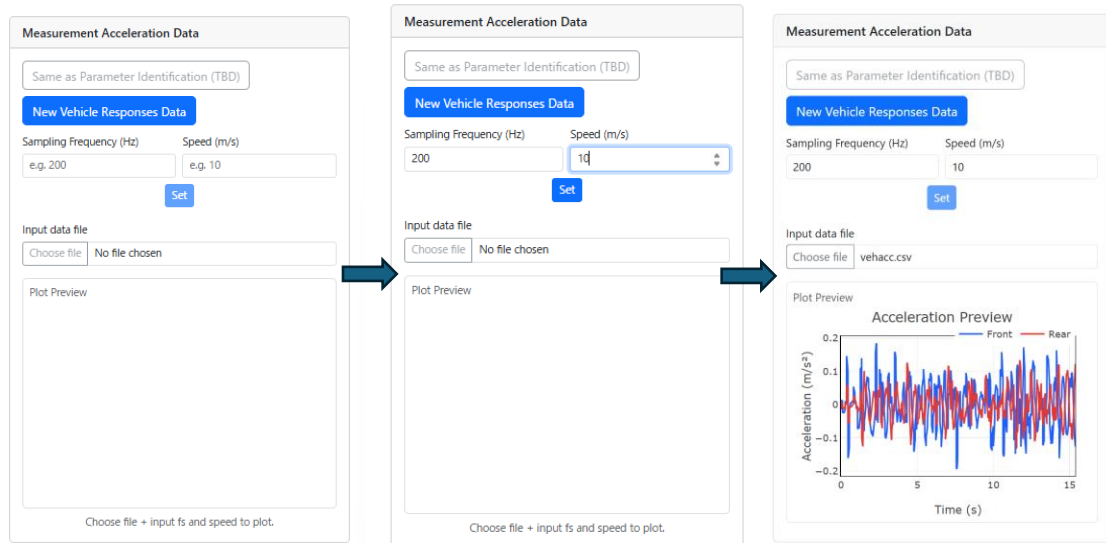
❌ Non-finite values like NaN, Inf must not be contained.

### Uploading Vehicle Acceleration Data

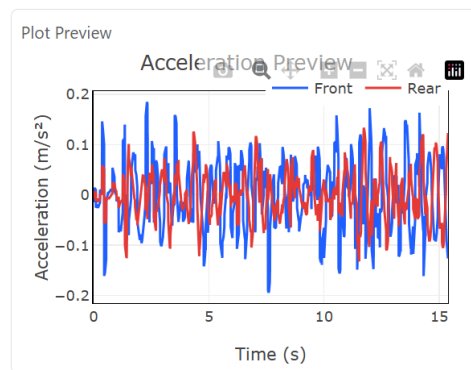
The web application provides two types of uploading:

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



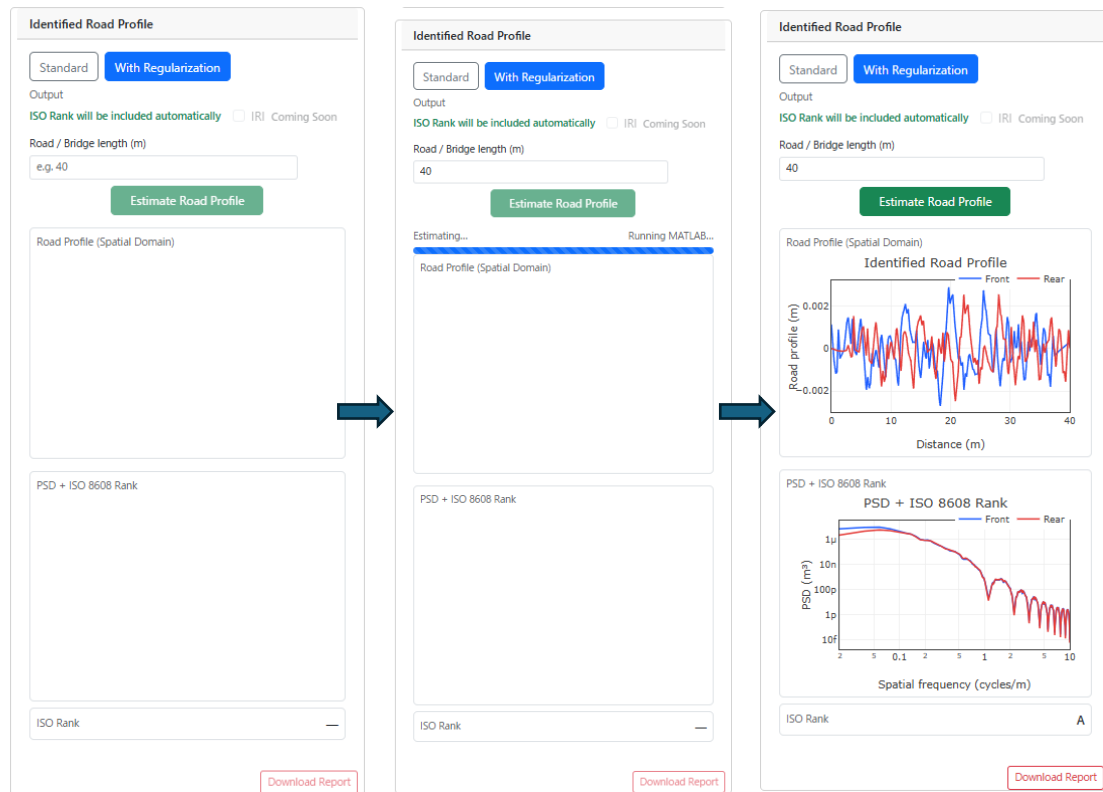
The Plot Preview area displays the uploaded acceleration data before road profile estimation. Users can interact with the graph directly in the browser. Users can use the plot to confirm that the uploaded data has been read correctly before continuing.

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:

[EN]

日本構造分析舎 KyoCenseo Inc.

2026/4/27 更新

[kawabe.daigo.2r★kyocenseo.co.jp](mailto:kawabe.daigo.2r★kyocenseo.co.jp)

(Please replace the ★ with @.)

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