



Quail User Guide



*Division of Engineering Services/Geotechnical Services
California Department of Transportation*



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1. Introduction

The Quail Windows app is geotechnical engineering software developed and maintained by Geotechnical Services, Division of Engineering Services, California Department of Transportation (Caltrans). This software is developed to facilitate and ensure consistent collection of Caltrans geotechnical construction quality assurance data for ground anchor and soil nail tests in a digital format, and to assist in evaluating the test results.

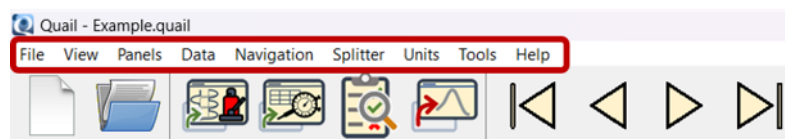
Quail includes the following features:

- Allow consistent data entry.
- Provide load schedules based on Caltrans Standard Specifications.
- Display graphs of the test.
- Provide test summary with evaluations of pullout, elongation, and creep.
- Save data in a database format so that the data can be transmitted and uploaded into Caltrans Quail database server.
- Save calibration data of multiple certified test equipment in the Quail data file. Equipment calibration data can be easily retrieved and applied to next projects.

The software runs under the Windows native operating system. The software will not function on a computer running Windows through virtual machine software. For installation instructions, refer to: <https://dot.ca.gov/programs/engineering-services/quail-software>.

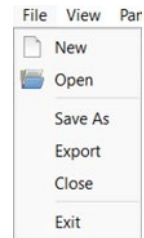
2. Menu and Functions

Quail has 9 menu options: ***File, View, Panels, Data, Navigation, Splitter, Units, Tools, and Help.***



2.1. File

The **File** tab provides options for creating, opening, saving, and exporting project files.



Create a new project file by selecting **New** from the **File**

menu or clicking the **New** icon  in the toolbar.

Open an existing project file by selecting Open from the

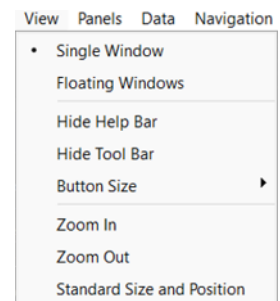
File menu or clicking the **Open** icon  in the toolbar.



Note: Since Quail is a database application, files do not need to be manually saved. Data entered by the user is automatically saved. The application can be closed at any time and reopened later to continue from where you left off.

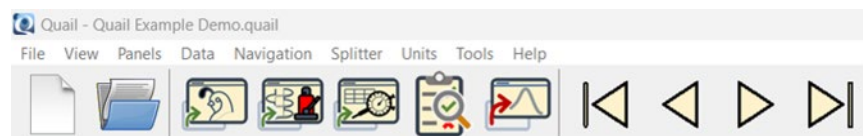
2.2. View

The **View** tab provides options to customize the application's appearance and display settings.



The **Floating Windows** option separates the interface into two windows:

- The main window, which contains the menus, toolbar, and the added ID icon  .



- The **ID** window, which includes only Project, Wall, and Test information.

ID

View Data

Project

01-0P180

Bridgeville Emergency Slip Repair

01 2400 0183

Wall

04E-0059

Larabee Creek Ground Anchor Wall

026.40

Beg RW

End RW

Northing:

0.00

0.00

feet

Easting:

0.00

0.00

feet

Latitude:

+32.649607

+32.649607

degs

Longitude:

-143.321156

-143.321156

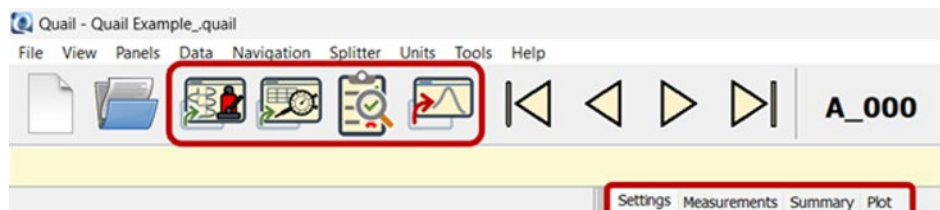
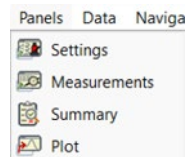
degs

Test

ID	Subject	Type	Pullout	Creep	Elongation	Summary
A_001	Ground Anchor	Proof	OK	OK	OK	OK
A_002	Ground Anchor	Performance	OK	OK	NG	NG
A_003	Ground Anchor	Proof	OK	OK	OK	OK
A_004	Ground Anchor	Proof	OK	NG	WARNING	NG
A_005	Ground Anchor	Proof	OK	OK	OK	OK
A_006	Ground Anchor	Proof	OK	OK	OK	OK
A_007	Ground Anchor	Proof	OK	NG	OK	NG
A_008	Ground Anchor	Proof	OK	OK	OK	OK
A_009	Ground Anchor	Proof	OK	OK	NG	NG
A_010	Ground Anchor	Proof	OK	OK	OK	OK
A_011	Ground Anchor	Proof	OK	OK	OK	OK
A_012	Ground Anchor	Proof	NG			NG
A_013	Ground Anchor	Proof	OK	OK	OK	OK
A_014	Ground Anchor	Proof	OK	OK	OK	OK
A_015	Ground Anchor	Proof	OK	OK	OK	OK
A_016	Ground Anchor	Proof	OK	OK	OK	OK
A_017	Ground Anchor	Proof	OK	OK	OK	OK
A_018	Ground Anchor	Proof	OK	OK	OK	OK
A_019	Ground Anchor	Proof	OK	NG	OK	NG
A_020	Ground Anchor	Proof	OK	OK	OK	OK
A_021	Ground Anchor	Proof	OK	OK	OK	OK
A_022	Ground Anchor	Proof	OK	OK	OK	OK

2.3. Panels

The **Panels** tab provides access to different panels. The panels can be accessed from the **Panels** menu or by clicking on the corresponding icons on the toolbar.



2.3.1. Setting



This panel allows users to view and enter information for the test setup.

The panel includes settings fields for **Test**, **Location**, **Construction**, **Soil Nail or Ground Anchor**, and **Equipment**.

Settings Measurements Summary Plot

Test

Subject:

Type:

Date:

Tester's Given Name:

Tester's Surname:

Location

RW LOL Station:

Elevation: **feet**

Northing: **feet**

Easting: **feet**

Latitude: **degs**

Longitude: **degs**

Row:

Construction

Drilling Method:

Water in Hole:

Inclination: **degs**

Drilled Hole Diameter: **inches**

Shotcrete Thickness: **inches**

Ground Anchor

Number of Strands:

Area of One Strand: **in²**

Initial Grout Pressure: **psi**

Post Grout Pressure: **psi**

Unbonded Length: **feet**

Bonded Length: **feet**

Skew: **degs**

PTL: **kips**

Equipment

Data Sheet:

Equipment and Calibration Information Calibration Readings and Results

Measure:

Gauge Pressure psi	Ram Force kips			
	Run 1	Run 2	Run 3	Average
420	12.50			12.50
840	25.00			25.00
1680	50.00			50.00
2520	75.00			75.00
3360	100.00			100.00
4200	125.00			125.00

Ram Force = **kips/psi** + **kips**

Gauge Pressure = **psi/kips** + **psi**

Note: The performance tests are applicable only to ground anchors.

2.3.2. Measurements



This panel allows users to view and enter test measurements for ground anchor tests (Performance, Proof, or Verification tests) and soil nail tests (Verification, or Proof tests).

Settings

Measurements

Summary

Plot

Ground Anchor Proof Test

California DOT

2024 Standard Specification 46-2.01D(2)(b)(ii)(Proof)

...

Load Test						Creep Test 1 at 1.00 PTL				Creep Test 2 at 1.00 PTL					
Load Increment	Hold Time minutes	Ram Force kips	Gauge Pressure psi	Movement		Hold Time minutes	Movement			Rate inches per minute	Hold Time minute	Movement			Rate inches per minute
				From Start inches	From First AL inches		From Start inches	From First AL inches	Delta inches			From Start inches	From First AL inches	Delta inches	
AL	Until Stable	17.50	588	0.000	0.000	0	3.500	3.500			0	3.500	3.500		
0.20 PTL	1-2	35.00	1176	0.500	0.500	1	8.000	8.000	4.500	4.500E+0	15	5.000	5.000	1.500	1.000E-1
0.40 PTL	1-2	70.00	2352	2.000	2.000	2	5.000	5.000	1.500	-3.000E+0	20	6.000	6.000	2.500	2.000E-1
0.60 PTL	1-2	105.00	3528	2.500	2.500	3	6.000	6.000	2.500	1.000E+0	25	7.000	7.000	3.500	2.000E-1
0.80 PTL	1-2	140.00	4704	3.000	3.000	4	7.000	7.000	3.500	1.000E+0	30	8.000	8.000	4.500	2.000E-1
1.00 PTL a	10 or 60	175.00	5880	3.500	3.500	5	8.000	8.000	4.500	1.000E+0	45	9.000	9.000	5.500	6.667E-2
AL	Until Stable	17.50	588	1.000	1.000	6	9.000	9.000	5.500	1.000E+0	60	10.000	10.000	6.500	6.667E-2
						10	10.000	10.000	6.500	2.500E-1					

NOTES: PTL = Test load shown
AL = Alignment load = 0.10 PTL
a Maximum test load

If failure occurs record the measured Gauge Pressure: psi

Step 1. Click on , then click **OK** in the prompt.

Settings

Measurements

Summary

Plot

Ground Anchor Proof Test

California DOT

2024 Standard Specification 46-2.01D(2)(b)(ii)(Proof)

...

Load Schedules Available for Ground Anchor Proof Tests

Locked Load Schedules:

Source	Name
California DOT	2024 Standard Specification 46-2.01D(2)(b)(ii)(Proof)

OK

Cancel

Note: If a load schedule other than those provided in the Standard Specifications is needed, a custom load schedule may be imported. For more details refer to section **“2.8.2. Load Schedule Entry”**.

Note: To view the load schedule for all test types, go to the **Tools** menu and select **Load Schedules Editor**.

Step 2. Enter data in the fields.

Note: If the test fails before the completion of a load test, enter the gauge pressure reading in the designated field at the bottom of the window.

If failure occurs record the measured Gauge Pressure: psi

2.3.3. Summary



This panel displays a summary of the test results, including **Pullout Resistance**, **Creep**, and **Elastic Elongation**.

Settings Measurements Summary Plot

Pullout Resistance
Record the failure load if pullout occurs.
Failure Gauge Pressure not recorded OK

Creep
Measured creep from 1 minutes to 10 minutes < 0.040 inches.
(6,500 - 4,500) = 2,000 in NG
Measured creep from 6 minutes to 60 minutes < 0.080 inches.
(6,500 - 5,500) = 1,000 in NG NG

Reinforcement Elastic Elongation
Total measured movement at the maximum test load minus the measured residual movement at the ending alignment load must be between 80 percent and 140 percent of the theoretical elastic elongation of the sum of the unbonded length and the jacking length.

Measured elastic elongation	=	(3,500 - 1,000) = 2,500 in	
Theoretical elastic elongation	=	$\frac{(175.00 \text{ kips} - 17.50 \text{ kips})[(5.00 \text{ ft})(12 \text{ in/ft}) + 18.000 \text{ in} + 4.000 \text{ in}]}{(29000 \text{ ksi})(0.217 \text{ inches}^2)(1)}$	= 2.052 in
Measured elastic elongation	=	2,500	
Theoretical elastic elongation	=	2.052	= 122% exceeds 120%

WARNING

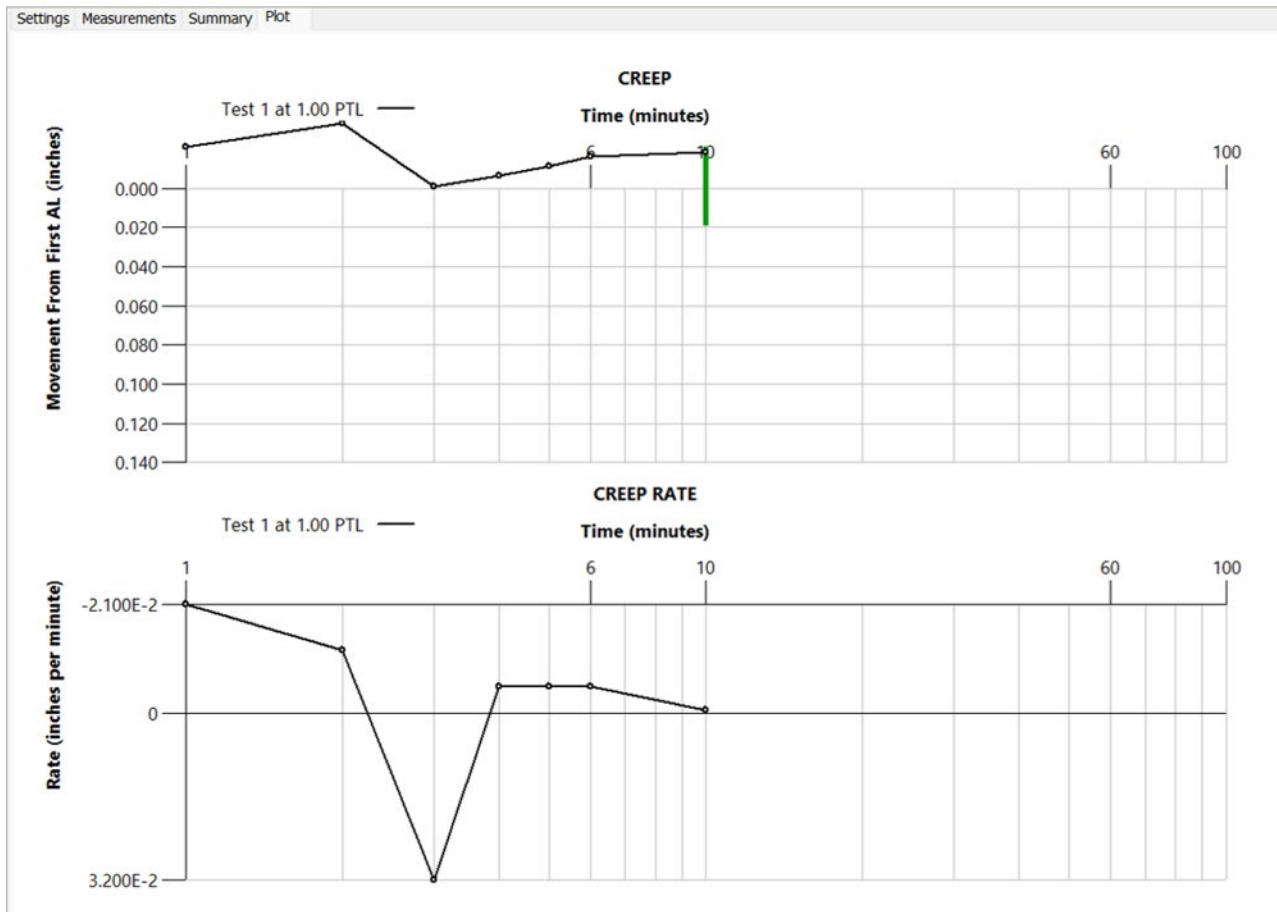
Summary and Comments
NG

Note: You can check the **Test** pane in the lower-left corner of the window to view all test results and summaries in one place. The results are displayed as **OK** (pass) highlighted in green, **NG** (fail) highlighted in red, or **WARNING** (marginal pass or fail conditions) highlighted in yellow, based on the criteria specified in the Standard Specifications. The **WARNING** status indicates that the test data requires further evaluation; however, the test may still be accepted according to the contract.

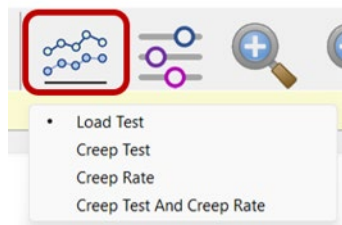
If there are any comments related to the test, enter them in the **Comments** field.

2.3.4. Plot

This panel displays plots of load test and creep test.



The plot type can be selected by clicking the  icon and choosing to display the elongation plot, the creep plot, or both.



The plot display can be adjusted by clicking the  icon.

The icons shown below can be used to zoom in, zoom out, move, and adjust the plot location.



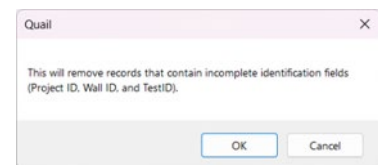
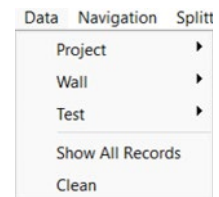
Note: The navigation icons can be used to move between tests and access the corresponding **Panels**.



2.4. Data

The **Data** menu is used to manage and view project data, including creating new entries, entering detailed information, reviewing records, and cleaning up incomplete data.

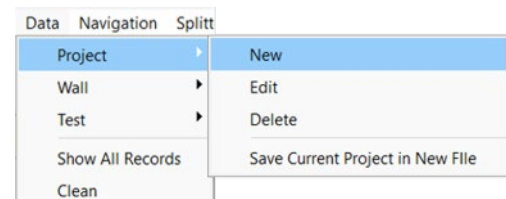
- **Project:** Displays project-level information.
- **Wall:** Displays wall-specific information.
- **Test:** Displays test information.
- **Show All Records:** Displays all available data entries.
- **Clean:** Removes records with incomplete identification fields (Project ID, Wall ID, or Test ID). A prompt will ask for confirmation for the removal of selected records.

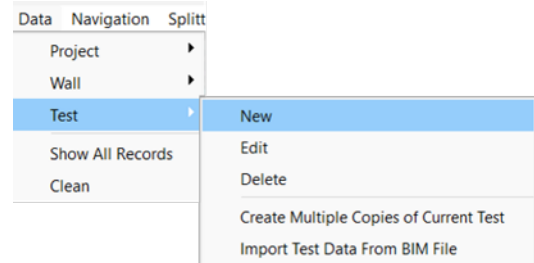
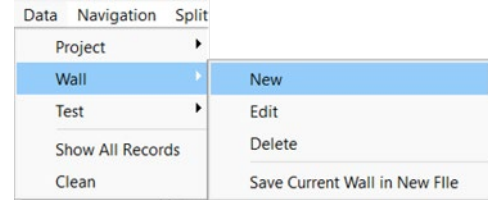


2.4.1. Create, Edit, Delete Records

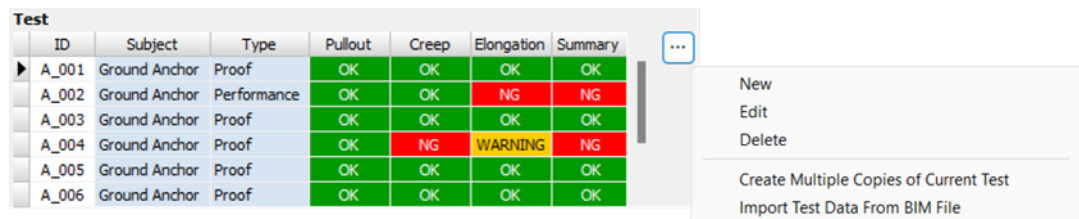
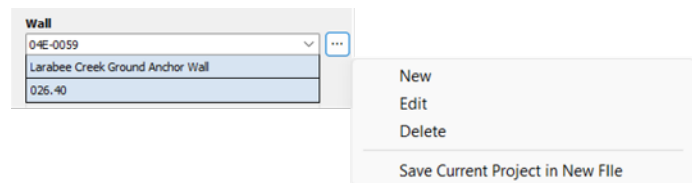
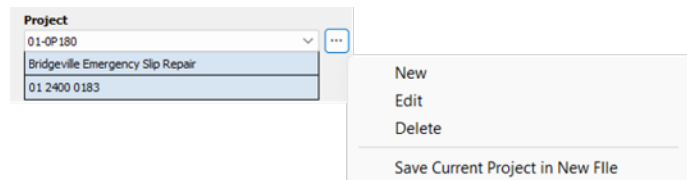
There are three options to create, edit, and delete a project, wall, or test record.

- Option 1. From the **Data** menu, select Project, then choose **New**, **Edit**, or **Delete** as needed.





- Option 2. Click on the three-dot icon  at the upper-right corner of each of the sections.



Option 3. This is only for the **Test** records. Right click on the selected record in the Test section.

Note: If a BIM file in the standard format is available, it can be imported by selecting **Import Test Data From BIM File** to populate the corresponding design information fields. This would reduce manual data entry and improve accuracy by minimizing the risk of input errors.

Test						
ID	Subject	Type	Pullout	Creep	Elongation	Summary
A_001	Ground Anchor	Proof	OK	OK	OK	OK
A_002	Ground Anchor	Performance	OK	OK	NG	NG
A_003	Ground Anchor	Proof	OK	OK	OK	OK
A_004	Ground Anchor	Proof	OK	OK	OK	OK
A_005	Ground Anchor	Proof	OK	OK	OK	OK
A_006	Ground Anchor	Proof	OK	OK	OK	OK
A_007	Ground Anchor	Proof	OK	OK	OK	OK
A_008	Ground Anchor	Proof	OK	OK	OK	OK
A_009	Ground Anchor	Proof	OK	OK	OK	OK
A_010	Ground Anchor	Proof	OK	OK	OK	OK
A_011	Ground Anchor	Proof	OK	OK	OK	OK
A_012	Ground Anchor	Proof	NG	OK	OK	NG
A_013	Ground Anchor	Proof	OK	OK	OK	OK

After creating a new project, wall, or test using any of the methods described above, the corresponding input prompts will appear for data entry.

New Project

Expenditure Authorization (EA):
District: Short Name:
[] - []

Description:
[]

Project ID:
[]

OK Cancel

New Wall

County: [] Route: [] Begin Wall Post Mile: []

Wall ID: [] Name: []

Beg RW: [] End RW: []

Northing: [] feet
Easting: [] feet

OK Cancel

New Test

Identification Number:
[] - []

OK Cancel

2.4.2. Copy a Test Setting

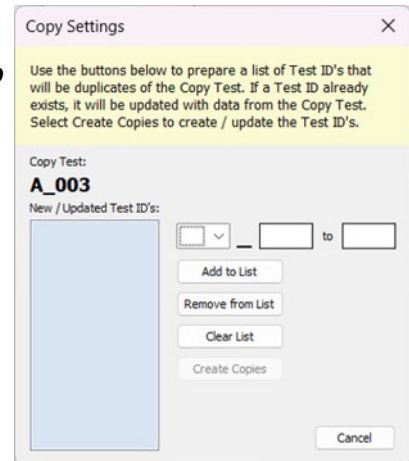
Most of the information required in the **Settings** panel may be the same for a structure. To avoid unnecessarily repeated data entries, you may copy settings from a test already performed or entered and create copies to the new tests.

To do this, from the test **ID** list, select the test that you want to copy the settings from. For example, test A_003 was selected. Then, right-click on the test row or click the  icon in the **Test** section, then select **Create Multiple Copies of Current Test**.

Test						
ID	Subject	Type	Pullout	Creep	Elongation	Summary
A_001	Ground Anchor	Proof	OK	OK	OK	OK
A_002	Ground Anchor	Performance	OK	OK	NG	NG
A_003	Ground Anchor	Proof	OK	OK	OK	OK
A_004	Ground Anchor	Proof	OK	NG	WARNING	NG

The Copy Settings panel will appear. Enter the list of new test IDs for the copies of the selected test (e.g., A_003), then click **Add to List**. The new tests will be added to the Test list, and the fields in the **Settings** panel will be populated with the copied settings.

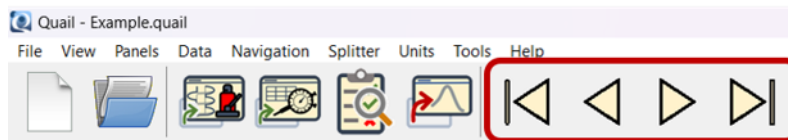
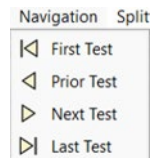
Warning: Double check the values in the **Settings** fields for each test that has been pre-populated using this feature. Some tests may have some settings different from the test you copied from.



2.5. Navigation

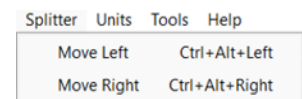
You can use the **Navigation** tab to navigate through test records, including the First Test, Previous Test, Next Test, and Last Test.

Alternatively, you can use the navigation shortcuts in the toolbar shown below.



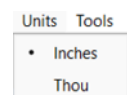
2.6. Splitter

The **Splitter** tab allows users to adjust the panel layout and rearrange panels. The **Move Left** and **Move Right** options shift panels using the keyboard shortcuts *Ctrl+Alt+Left* and *Ctrl+Alt+Right*, respectively.



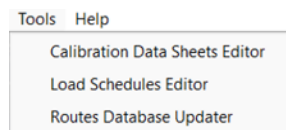
2.7. Units

The **Unit** tab allows users to set measurement units by selecting between **Inches** and Thousandths of an Inch (**Thou**).



2.8. Tools

The **Tools** tab provides tools for creating and managing the equipment calibration files, and the load schedules.

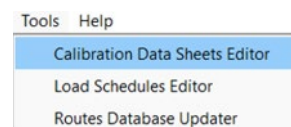


2.8.1. Equipment Calibration Data Entry

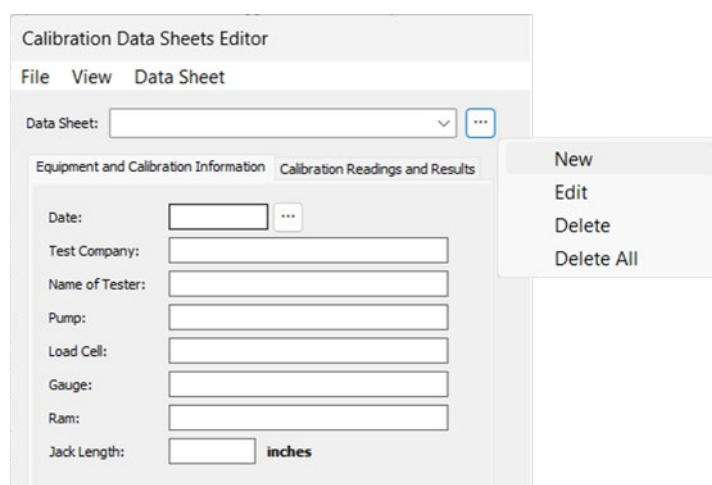
Allows users to create, edit, and delete test equipment calibration data file. The calibration data file with valid certified calibration data can be shared and used for subsequent projects using the same test equipment.

To enter a new set of calibration data, proceed with the following steps:

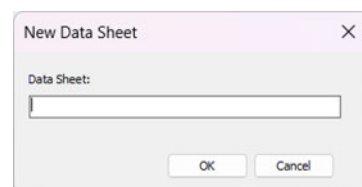
Step 1. Under the **Tools** menu, click on **Calibration Data Sheets Editor**.



Step 2. Click the three-dot icon  in the opened window, then select **New** to create a new calibration file.



Step 3. Enter a name for the calibration data sheet in the prompt window.



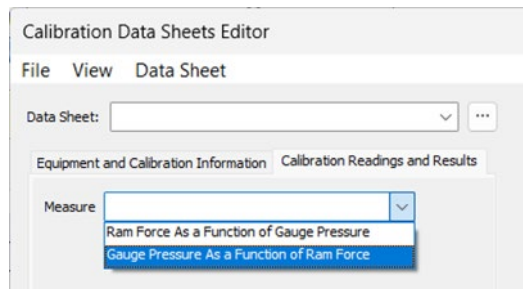
Step 4. In the newly opened window, click the **Equipment and Calibration Information** tab.

Step 5. Enter data in the fields.

Step 6. Click on the **Calibration Readings and Results** tab.

Step 7. Select either Measure option from the pull-down menu:

- **Ram Force as a Function of Gauge Pressure**, or
- **Gauge Pressure as a Function of Ram Force**



Step 8. Enter data in the fields.

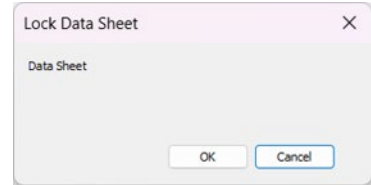
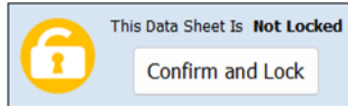
A screenshot of the 'Calibration Data Sheets Editor' window. The 'Data Sheet' dropdown is set to an empty state. The 'Equipment and Calibration Information' tab is active, and the 'Measure' dropdown menu is set to 'Ram Force As a Function of Gauge Pressure'. Below the dropdown is a table with 13 rows and 5 columns. The first column is labeled 'Gauge Pressure psi'. The next four columns are labeled 'Ram Force kips' with sub-headers 'Run 1', 'Run 2', 'Run 3', and 'Average'. Below the table are two formula fields: 'Ram Force = [] kips/psi + [] kips' and 'Gauge Pressure = [] psi/kips + [] psi'. At the bottom is a 'Generate Best Fit Line' button and two labels 'r1:' and 'r2:'.

Warning: Check and ensure entered information and data are consistent with the certified calibration sheet.

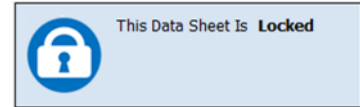
Note: Quail uses the calibration formula for test data conversion from ramp force to pump pressure gauge.

Step 9. Click on the **Generate Best Fit Line** button.

Step 10. Click on the “**Confirm and Lock**” button to lock the data sheet, then then click **OK** to confirm the action in the prompt.



The button will change to “**The Data Sheet is Locked**”.



Warning: A data sheet that is not locked will not be saved.

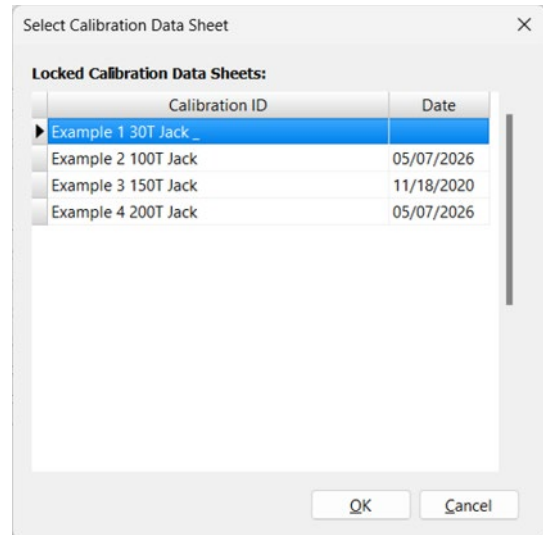
Note: Upon completion of data entry, a calibration plot will be displayed in the right section of the window.

Step 11. Close the **Calibration Data Sheets Editor** window.

Step 12. Click the three-dot icon [...] next to the **Equipment** section in the **Settings** panel.



Step 13. The prompt will display a list of all created and locked data sheets. Select the applicable calibration data sheet from the list then click **OK**.



The corresponding fields will be automatically populated.

Equipment

Data Sheet: ...

Equipment and Calibration Information Calibration Readings and Results

Date:

Test Company:

Name of Tester:

Pump:

Load Cell:

Gauge:

Ram:

Jack Length: inches

Equipment

Data Sheet: ...

Equipment and Calibration Information Calibration Readings and Results

Measure:

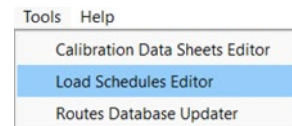
Gauge Pressure psi	Ram Force kips			
	Run 1	Run 2	Run 3	Average
0	0.00	0.00	0.00	0.00
1000	6.93	6.93	6.93	6.93
2000	14.18	13.76	14.14	14.03
3000	21.45			21.45
4000				
5000				
6000				
7000				
8000				
8325				

Ram Force = kips/psi + kips

Gauge Pressure = psi/kips + psi

2.8.2. Load Schedules Entry

By selecting **Load Schedules Editor** from the **Tools** menu, you can view the load increments and corresponding hold times based on the test type (soil nail or ground anchor) and category (proof, verification, or performance), in accordance with the Caltrans Standard Specifications.



Note: The load schedule is for viewing only.

Select the test type and test category to view the corresponding load schedule on the right side of the window.

Load Schedules Editor

File

Load Schedules ** Read Only **

Drag column headings to sort

Source	Subject	Type	Name
California DOT	Ground Anchor	Performance	2024 Standard Specification 46-2.0 ID(2)(b)(i)(Performance)
California DOT	Ground Anchor	Proof	2024 Standard Specification 46-2.0 ID(2)(b)(i)(Proof)
California DOT	Ground Anchor	Verification	2024 Non-Standard Special Provision 46-2.0 ID(2)(c)(i)

Acceptance Criteria

- Total measured movement at the maximum test load minus the measured residual movement at the ending alignment load exceeds percent of the theoretical elastic elongation of the sum of the unbonded length and the jacking length.
- Creep movement complies with one of the following:
 - For a minute load hold, the creep movement measured from to 10 minutes is less than inch.
 - For a minute load hold, the creep movement measured from to 60 minutes is less than inch and the creep rate is linear or decreasing in time logarithmic scale from the 6 to the 60 minute reading.
- Pullout failure does not occur.

Conduct the performance test as follows:

- Incrementally load and unload the anchor as shown in the table and using the following Notes:
TL = Test load shown
AL = Alignment load = FTL
a Maximum test load at load number:
- Apply each load increment in less than 1 minute and hold for the length of time shown in the table.
- Measure and record the applied test load and the anchor end movement at each load increment.
- When applying the maximum test load:
 - Hold the load constant for 1 minutes
 - Start the observation period for the load hold when the pump starts to apply the last load increment
 - Measure and record the anchor end movement at:

and 10 minutes
 - Plot a creep curve as a function of the logarithm of time, showing the nail head movement from 1 to 6 minutes
- If the movement measured from 1 to 10 minutes is greater than 0.04 inch:
 - Hold the load constant for an additional 50 minutes
 - Measure and record the anchor end movement at:

and 60 minutes
 - Plot a creep curve as a function of the logarithm of time, showing the anchor end movement from 6 to 60 minutes
- Reduce the load to the ending alignment load and record the residual movement

Ground Anchor

Performance Test Loading Schedule

	Load Increment	Hold Time (minutes)
1	AL	Until Stable
2	0.20 PTL	1-2
3	AL	Until Stable
4	0.20 PTL	1-2
5	0.40 PTL	1-2
6	AL	Until Stable
7	0.20 PTL	1-2
8	0.40 PTL	1-2
9	0.60 PTL	1-2
10	AL	Until Stable
11	0.20 PTL	1-2
12	0.40 PTL	1-2
13	0.60 PTL	1-2
14	0.80 PTL	1-2
15	AL	Until Stable
16	0.20 PTL	1-2
17	0.40 PTL	1-2
18	0.60 PTL	1-2
19	0.80 PTL	1-2
20	1.00 PTL a	10 or 60
21	AL	Until Stable

Note: A load schedule can be imported by selecting **Tools → Load Schedule Editor**. Then in the **Load Schedule Editor** window, select **File → Import Load Schedule**.

Load Schedules Editor

File

Import Load Schedules

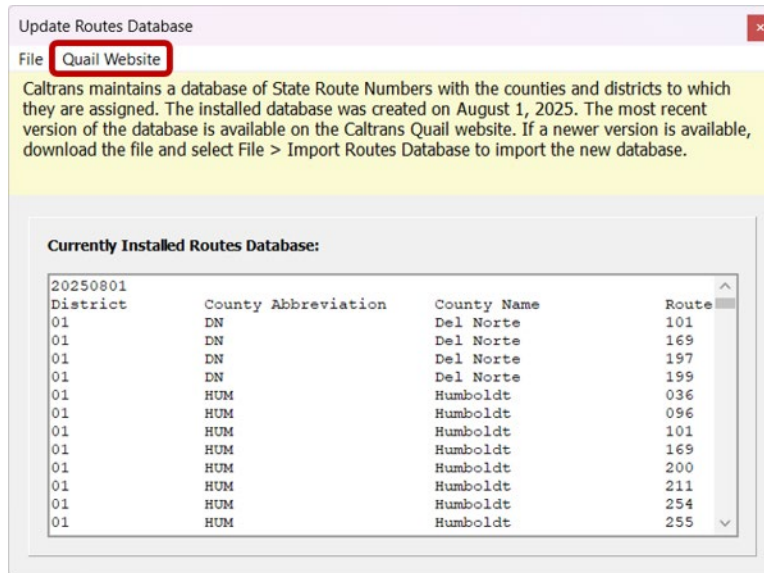
Export Load Schedules

Exit

2.8.3. Routes/Counties Data

By selecting **Routes Database Updater** from the **Tools** menu, the Districts, state route numbers, and corresponding counties will be displayed.

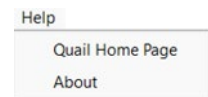
The displayed window also provides a direct link to the **Quail website**.



2.9. Help

The **Help** tab includes support resources and application information.

- **Quail Home Page:** Provides access to the main help page.
- **About:** Displays application information.

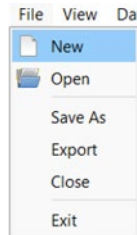


Attachment:

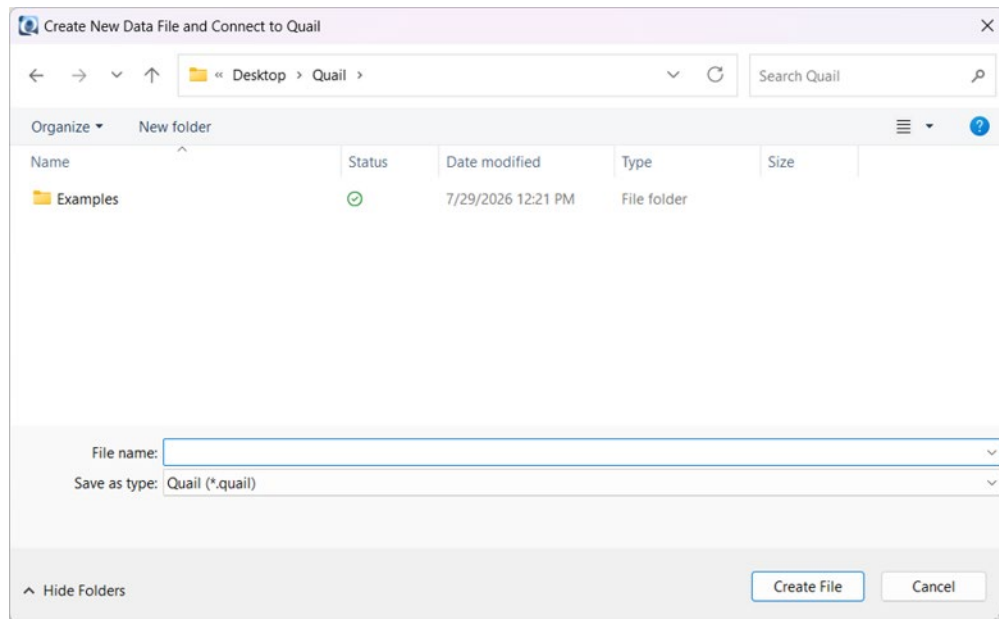
Step-by-Step Guide Example

Step 1. Open the **.exe** file.  Quail.exe

Step2. Select **File** → **New** to create a new Quail project file.



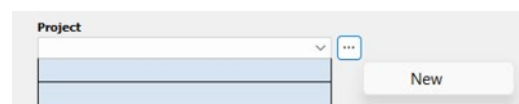
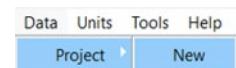
Step 3. Enter the file name and select the folder for the file. Then click on **Create File**.



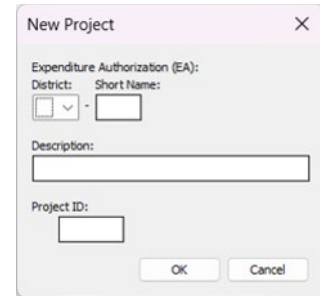
Note: Since **Quail** is a database-based application, files do not need to be manually saved. Data entered by the user is automatically saved. The application can be closed at any time and reopened later to continue from where you left off.

Note: Units are set to inches by default. To change the unit setting, select the Unit tab.

Step 4. Add a new project by selecting **Data** → **Project** → **New** or by clicking  next to the **Project** section in the left pane then select **New**.



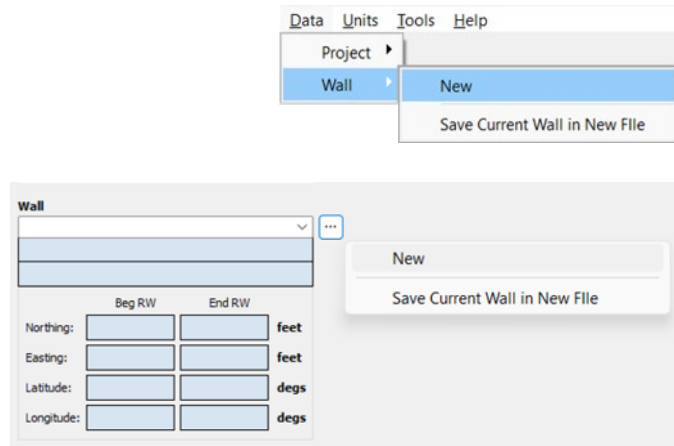
Step 5. Enter project information in the prompt window, then click **OK**.



The 'New Project' dialog box contains the following fields:

- Expenditure Authorization (EA):**
 - District: A dropdown menu.
 - Short Name: A text input field.
- Description:** A large text input area.
- Project ID:** A text input field.
- Buttons:** 'OK' and 'Cancel' at the bottom right.

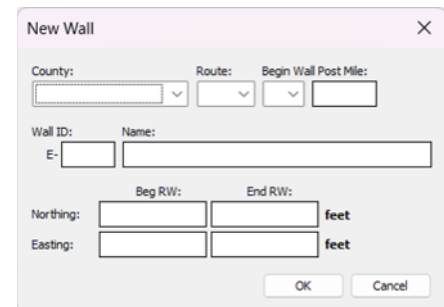
Step 6. Add a new wall for the project by selecting **Data** → **Wall** → **New** or by clicking [...] next to the **Wall** section in the left pane then select **New**.



This block shows two parts of the interface:

- Menu Navigation:** A screenshot of the 'Data' menu with 'Wall' selected, and a sub-menu showing 'New' as the chosen option.
- Wall Section Interface:** A panel titled 'Wall' with a dropdown menu and a [...] button. Below it are input fields for 'Beg RW' and 'End RW' for 'Northing', 'Easting', 'Latitude', and 'Longitude', each followed by a unit label ('feet' or 'degs'). To the right is a 'New' button and a 'Save Current Wall in New File' option.

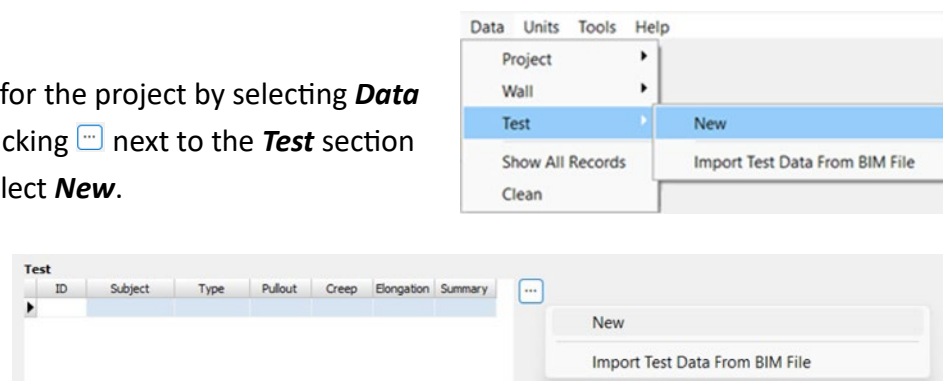
Step 7. Enter the wall information in the prompt window. Then click **OK**.



The 'New Wall' dialog box contains the following fields:

- County:** A dropdown menu.
- Route:** A dropdown menu.
- Begin Wall Post Mile:** A text input field.
- Wall ID:** A text input field.
- Name:** A text input field.
- Beg RW:** A text input field.
- End RW:** A text input field.
- Northing:** A text input field.
- Easting:** A text input field.
- Buttons:** 'OK' and 'Cancel' at the bottom right.

Step 8. Add a new test for the project by selecting **Data** → **Test** → **New** or by clicking [...] next to the **Test** section in the left pane then select **New**.

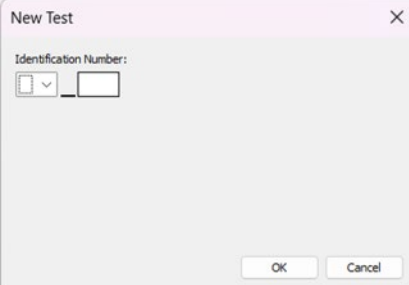


This block shows two parts of the interface:

- Menu Navigation:** A screenshot of the 'Data' menu with 'Test' selected, and a sub-menu showing 'New' as the chosen option.
- Test Section Interface:** A panel titled 'Test' with a table containing columns: ID, Subject, Type, Pullout, Creep, Elongation, and Summary. To the right of the table is a [...] button. Below it is a 'New' button and an 'Import Test Data From BIM File' option.

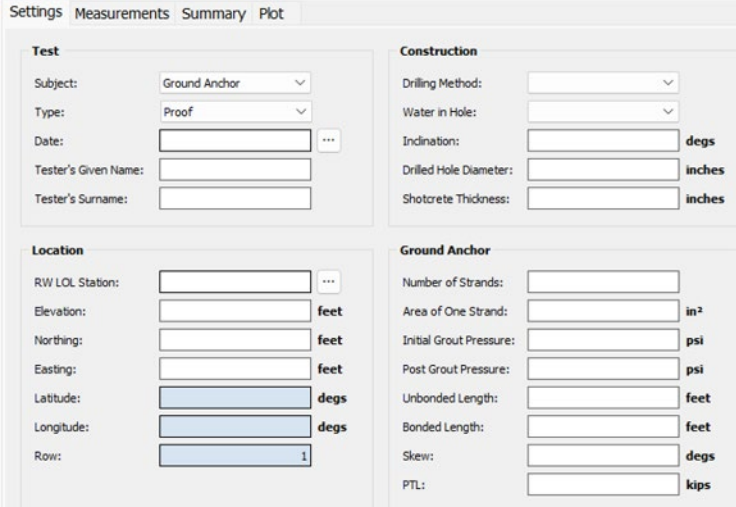
Note: If a BIM file in the standard format is available, it can be imported by selecting **Import Test Data From BIM File** to populate the corresponding design information fields.

Step 9. Enter the test ID in the prompt window, then click **OK**.



A dialog box titled "New Test" with a close button (X) in the top right corner. It contains a label "Identification Number:" followed by a small icon of a document with a checkmark and a text input field. At the bottom right, there are two buttons: "OK" and "Cancel".

Step 10. Click the **Setting** tab. Select the test type as **Ground Anchor** or **Soil Nail** and the corresponding test category (**Performance**, **Proof**, or **Verification**). Then enter the remaining test information (**Test**, **Location**, **Construction**, and **Design**) in the **Settings** tab. Refer to the next step for information on the **Equipment** section.

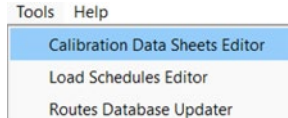


The "Settings" tab of the main application window, showing four sections: "Test", "Construction", "Location", and "Ground Anchor". Each section contains various input fields and dropdown menus for configuring test parameters.

Section	Field	Unit/Value
Test	Subject:	Ground Anchor
	Type:	Proof
	Date:	[Empty] ...
	Tester's Given Name:	[Empty]
	Tester's Surname:	[Empty]
Construction	Drilling Method:	[Empty]
	Water in Hole:	[Empty]
	Inclination:	[Empty] degs
	Drilled Hole Diameter:	[Empty] inches
	Shotcrete Thickness:	[Empty] inches
Location	RW LOL Station:	[Empty] ...
	Elevation:	[Empty] feet
	Northing:	[Empty] feet
	Easting:	[Empty] feet
	Latitude:	[Empty] degs
	Longitude:	[Empty] degs
Ground Anchor	Number of Strands:	[Empty]
	Area of One Strand:	[Empty] in ²
	Initial Grout Pressure:	[Empty] psi
	Post Grout Pressure:	[Empty] psi
	Unbonded Length:	[Empty] feet
	Bonded Length:	[Empty] feet
Skew:	[Empty] degs	
PTL:	[Empty] kips	

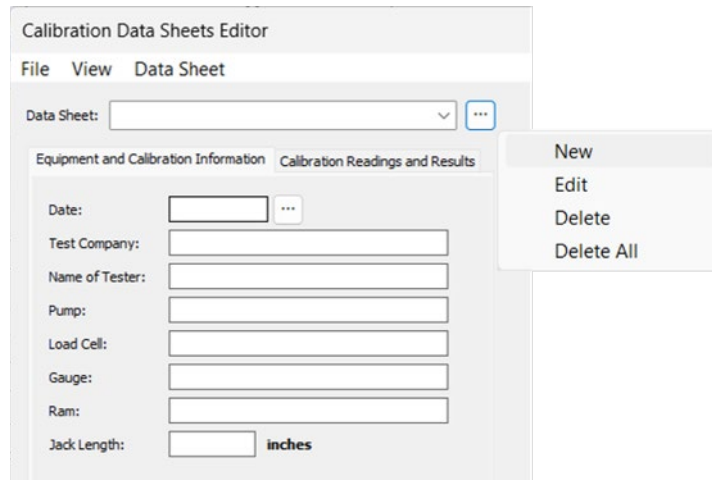
Step 11. Equipment Calibration Data Sheet File

Step 11-1. Click **Tools** → **Calibration Data Sheet Editor**.

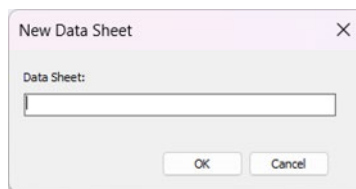


A menu titled "Tools" with a "Help" option. The "Tools" menu is open, showing three options: "Calibration Data Sheets Editor" (highlighted), "Load Schedules Editor", and "Routes Database Updater".

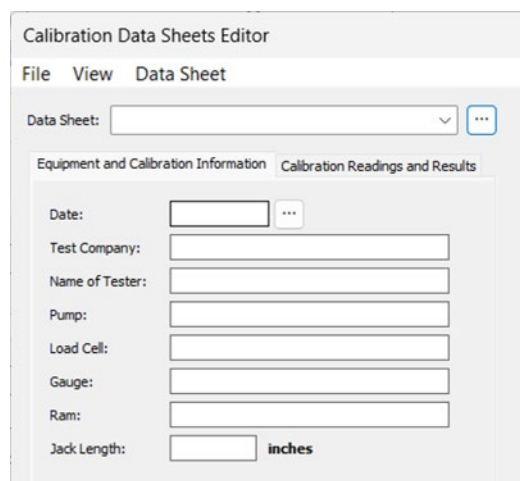
Step 11-2. Click [Icon] in the opened window, then select **New** to create a new calibration file.



Step 11-3. Enter a name for the calibration data sheet.

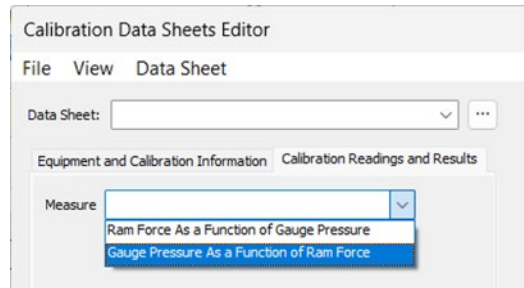


Step 11-4. Click the **Equipment and Calibration Information** tab. Enter data in the fields.



Step 11-5. Click on the **Calibration Readings and Results** tab.

Step 11-6. Select either **Measure** option from the pull-down menu: **Ram Force as a Function of Gauge Pressure**, or **Gauge Pressure as a Function of Ram Force**.



Step 11-7. Enter calibration data in the fields.

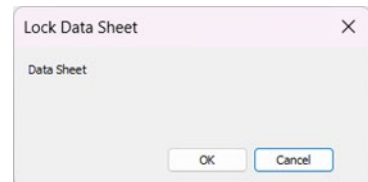
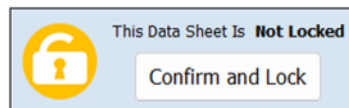
Gauge Pressure psi	Ram Force kips			
	Run 1	Run 2	Run 3	Average

Ram Force = kips/psi + kips
 Gauge Pressure = psi/kips + psi

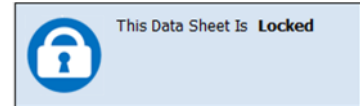
r^2 :

Step 11-8. Click on the **Generate Best Fit Line** button.

Step 11-9. Click on the “**Confirm and Lock**” button to lock the data sheet, then click **OK** to confirm the action in the prompt.



The button will change to “**The Data Sheet is Locked**”.



Warning: A data sheet that is not locked will not be saved.

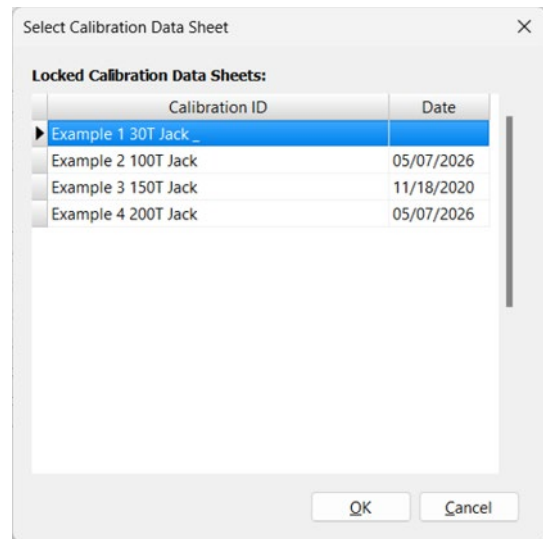
Note: Upon completion of data entry, a calibration plot will be displayed in the right section of the window.

Step 11-10. Close the **Calibration Data Sheets Editor** window.

Step 11-11. Click  next to the **Equipment** section in the **Settings** panel.



Step 11-12. The prompt will display a list of all created and locked data sheets. Select the applicable calibration data sheet from the list then click **OK**.



The corresponding fields will be automatically populated in the **Equipment** section.

Equipment

Data Sheet: ...

Equipment and Calibration Information Calibration Readings and Results

Date:

Test Company:

Name of Tester:

Pump:

Load Cell:

Gauge:

Ram:

Jack Length: inches

Equipment

Data Sheet: ...

Equipment and Calibration Information Calibration Readings and Results

Measure:

Gauge Pressure psi	Ram Force kips			
	Run 1	Run 2	Run 3	Average
0	0.00	0.00	0.00	0.00
1000	6.93	6.93	6.93	6.93
2000	14.18	13.76	14.14	14.03
3000	21.45			21.45
4000				
5000				
6000				
7000				
8000				
8325				

Ram Force = kips/psi + kips

Gauge Pressure = psi/kips + psi

Note: Most of the information required in the **Settings** panel may be the same for a structure. To avoid unnecessarily repeated data entries, you may copy settings from a test already performed or entered and create copies to the new tests. For more details refer to section **“2.4.2. Copy a Test Setting”**.

Step 12. Click the **Measurement** tab. Click , then click **OK** to populate the pre-selected load schedule in accordance with Caltrans Standard Specifications.

Settings Measurements Summary Plot

Ground Anchor Proof Test

...

Load Schedules Available for Ground Anchor Proof Tests

Locked Load Schedules:

Source	Name
▶ California DOT	2024 Standard Specification 46-2.01D(2)(b)(i)(Proof)

OK Cancel

Note: If a load schedule other than those provided in the Standard Specifications is needed, a custom load schedule may be imported. For more details refer to section “**2.8.2. Load Schedule Entry**”.

Step 13. Enter the data in the fields.

Settings
Measurements
Summary
Plot

Ground Anchor Proof Test

California DOT
2024 Standard Specification 46-2.0.1D(2)(b)(i)(Proof)

Load Test						Creep Test 1 at 1.00 PTL				Creep Test 2 at 1.00 PTL					
Load Increment	Hold Time minutes	Ram Force kips	Gauge Pressure psi	Movement		Hold Time minutes	Movement			Rate inches per minute	Hold Time minute	Movement			Rate inches per minute
				From Start inches	From First AL inches		From Start inches	From First AL inches	Delta inches			From Start inches	From First AL inches	Delta inches	
AL	Until Stable	17.50	588	0.000	0.000	0	3.500	3.500			0	3.500	3.500		
0.20 PTL	1-2	35.00	1176	0.500	0.500	1	8.000	8.000	4.500	4.500E+0	15	5.000	5.000	1.500	1.000E-1
0.40 PTL	1-2	70.00	2352	2.000	2.000	2	5.000	5.000	1.500	-3.000E+0	20	6.000	6.000	2.500	2.000E-1
0.60 PTL	1-2	105.00	3528	2.500	2.500	3	6.000	6.000	2.500	1.000E+0	25	7.000	7.000	3.500	2.000E-1
0.80 PTL	1-2	140.00	4704	3.000	3.000	4	7.000	7.000	3.500	1.000E+0	30	8.000	8.000	4.500	2.000E-1
1.00 PTL a	10 or 60	175.00	5880	3.500	3.500	5	8.000	8.000	4.500	1.000E+0	45	9.000	9.000	5.500	6.667E-2
AL	Until Stable	17.50	588	1.000	1.000	6	9.000	9.000	5.500	1.000E+0	60	10.000	10.000	6.500	6.667E-2
						10	10.000	10.000	6.500	2.500E-1					

NOTES: PTL = Test load shown
AL = Alignment load = 0.10 PTL
a Maximum test load

If failure occurs record the measured Gauge Pressure:
psi

Note: If the test fails before the completion of a load test, enter the gauge pressure reading in the designated field at the bottom of the window.

Step14. Click the **Summary** tab to view a summary of the test results, including **Pullout Resistance**, **Creep**, and **Elastic Elongation**.

Settings Measurements Summary Plot

Pullout Resistance
Record the failure load if pullout occurs.
Failure Gauge Pressure not recorded

OK

Creep
Measured creep from 1 minutes to 10 minutes < 0.040 inches.
(6,500 - 4,500) = 2,000 in **NG**
Measured creep from 6 minutes to 60 minutes < 0.080 inches.
(6,500 - 5,500) = 1,000 in **NG**

NG

Reinforcement Elastic Elongation
Total measured movement at the maximum test load minus the measured residual movement at the ending alignment load must be between 80 percent and 140 percent of the theoretical elastic elongation of the sum of the unbonded length and the jacking length.
Measured elastic elongation = (3,500 - 1,000) = 2,500 in
Theoretical elastic elongation = $\frac{(175.00 \text{ kips} - 17.50 \text{ kips})[(5.00 \text{ ft})(12 \text{ in/ft}) + 18.000 \text{ in} + 4.000 \text{ in}]}{(29000 \text{ ksi})(0.217 \text{ inches}^2)(1)}$ = 2.052 in
Measured elastic elongation = 2,500
Theoretical elastic elongation = 2.052 = 122% exceeds 120%

WARNING

Summary and Comments

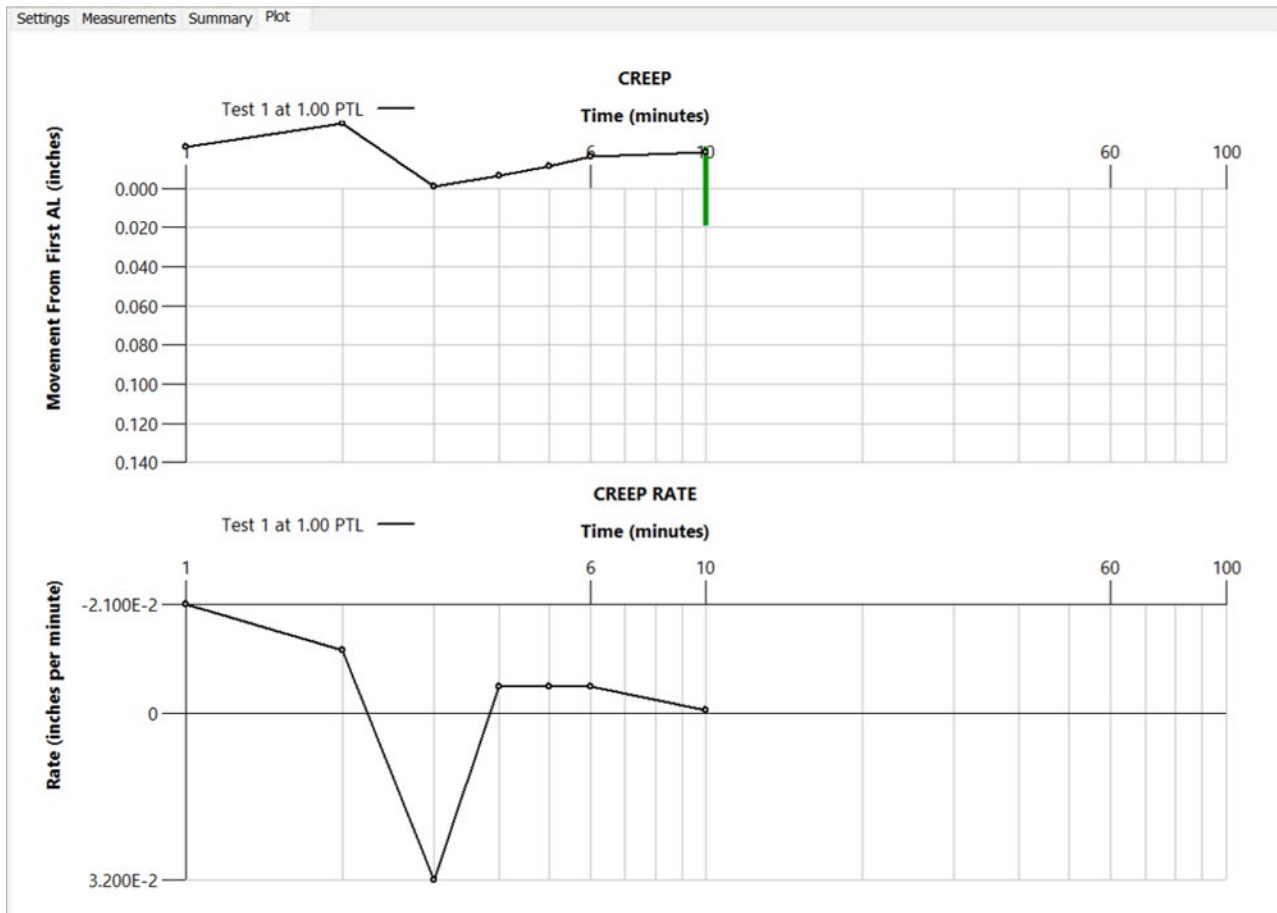
NG

Note: You can check the **Test** pane in the lower-left corner of the window to view all test results and summaries in one place. The results are displayed as **OK** (pass) highlighted in green, **NG** (fail) highlighted in red, or **WARNING** (marginal pass or fail conditions) highlighted in yellow, based on the criteria specified in the Standard Specifications. The **WARNING** status indicates that the test data requires further evaluation; however, the test may still be accepted according to the contract.

Test							
ID	Subject	Type	Pullout	Creep	Elongation	Summary	...
A_001	Ground Anchor	Proof	OK	OK	OK	OK	
A_002	Ground Anchor	Performance	OK	OK	NG	NG	
A_003	Ground Anchor	Proof	OK	OK	OK	OK	
A_004	Ground Anchor	Proof	OK	NG	WARNING	NG	

If there are any comments related to the test, enter them in the **Comments** field.

Step 15. Click the **Plot** tab to view the plots of load and creep test.



The plot type can be selected by clicking the  icon and choosing to display the elongation plot, the creep plot, or both.

The plot display can be adjusted by clicking the  icon.

The icons shown below can be used to zoom in, zoom out, move, and adjust the plot location.



The navigation icons can be used to move between tests and access the corresponding **Panels**. For more details, refer to section “2.5.



Navigation”.

Step 16. Open the folder where the file is saved. The file with the .**quail** extension is the Quail file required for submission in Caltrans Standard Specifications (section 46-1.01C(3)).