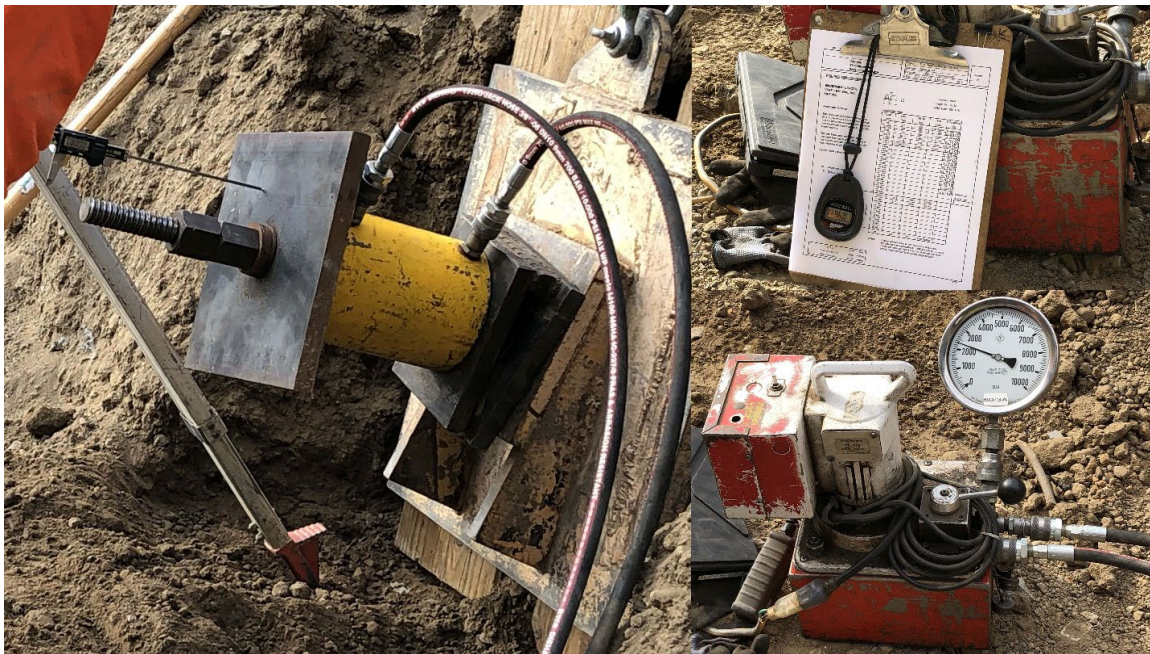




Quail User Guide



Division of Engineering Services/Geotechnical Services
California Department of Transportation



December 2023
Sacramento, California

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1. Introduction

The Quail Windows app is a 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 test data in digital format and assist in evaluating the test results.



Quail includes the following features:

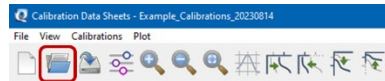
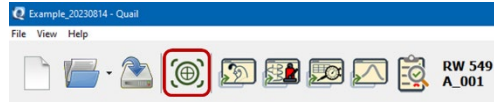
- Allow consistent data entry.
- Provide options for all load schedules under Caltrans Standard Specifications.
- Display graphs of the test.
- Provide test summary with evaluations of pullout, elongation, and creep.
- Save data in a database format so that the data can be transmitted and upload into Caltrans Quail database server.
- Save certified calibration data of multiple test equipment in the Quail calibration data file. The file can be shared with your colleagues so that calibration data of the test equipment used for a subsequent project can be retrieved and used.

The software runs under the Windows native operating system. The software will not function on a computer running Windows through virtual machine software. You may download Quail installation file from the link provided below.

2. Getting Started

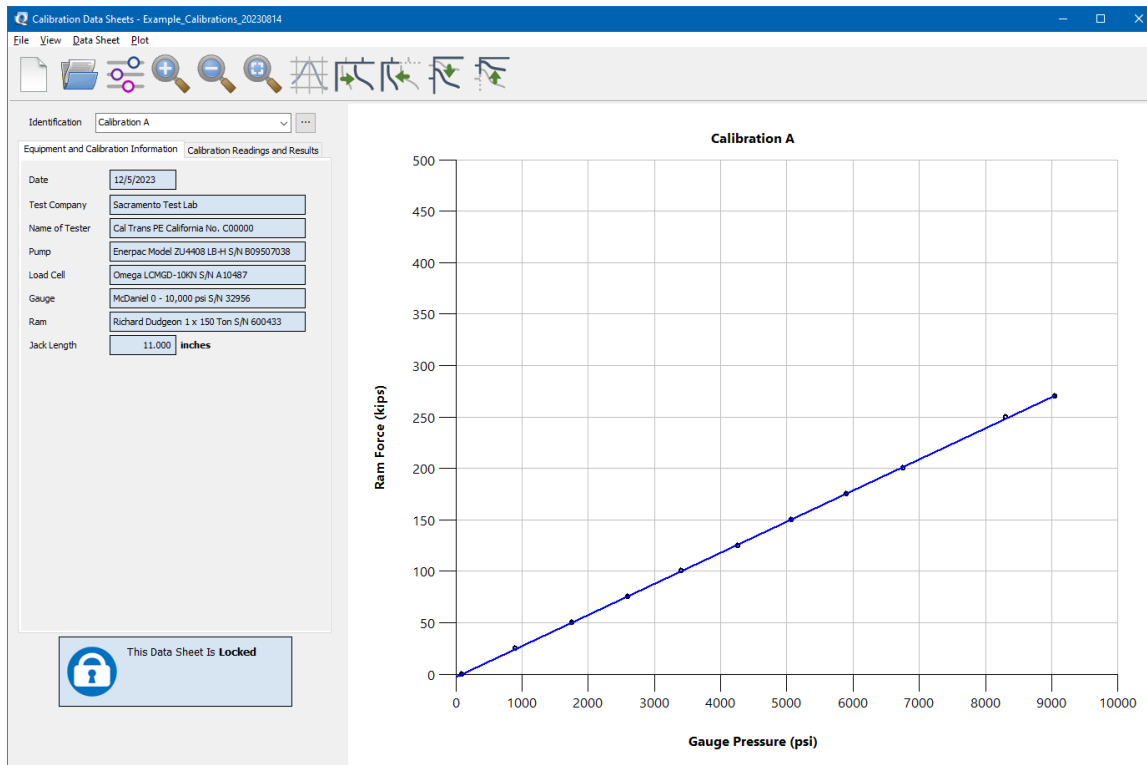
To get started with Quail, open the example calibration file and the example data file.


To open the example calibration file (.quailc), click on the **Calibration Data Sheets**  icon in the first screenshot below, and the **Open**  icon in the second screenshot below.

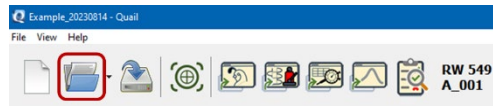


After you open the example calibration data file or a file with data properly entered and locked, Quail will display the following **Calibration Data Sheets** panel, which includes two tabs:

- **Equipment and Calibration Information**, and
- **Calibration Readings and Results**.

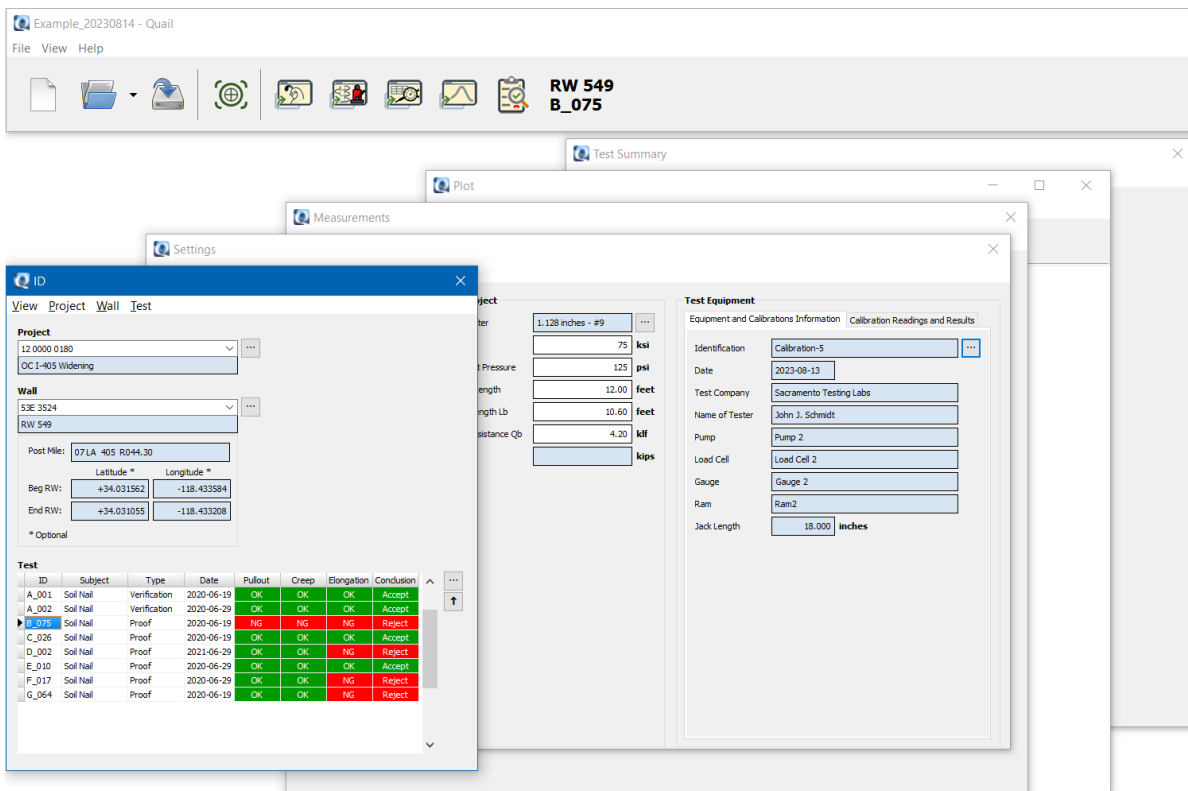


To open the example data file (.quail), click on the **Open**  icon in the following screenshot.



After you open the example data file or a file with data properly entered, Quail will display the Quail toolbar and a cascade of 5 viewing panels, **ID**, **Settings**, **Measurements**, **Plot**, and **Test Summary**. You may navigate through the panels by clicking on each panel.

If you want the display to return to default cascaded-panels arrangement, select **View → All Data Panels** or use the **F6** key.






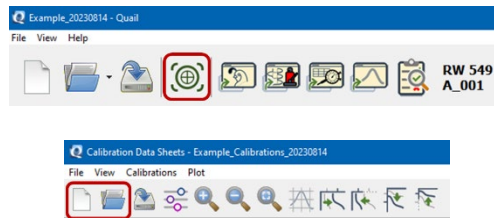
3. Features

Calibration Data Sheets

At beginning of a construction project, you must enter certified calibration data of the test equipment to be used for the project into the Quail Calibration Data Sheets or retrieve the calibration data from the Quail calibration data file (.quailc).

Enter certified calibration data using the **Calibration Data Sheets** panel. You may save the data in the 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.

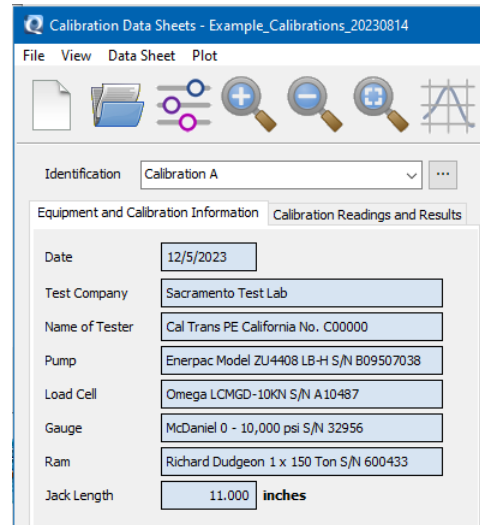
To enter or select a calibration data sheet click on the **Calibration Data Sheets**  icon in the first screenshot below, and the **New**  or **Open**  icon in the second screenshot below.



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

Step 1. Click on the **Equipment and Calibration Information** tab.

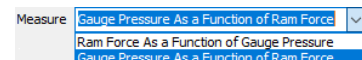
Step 2. Enter data in the fields.



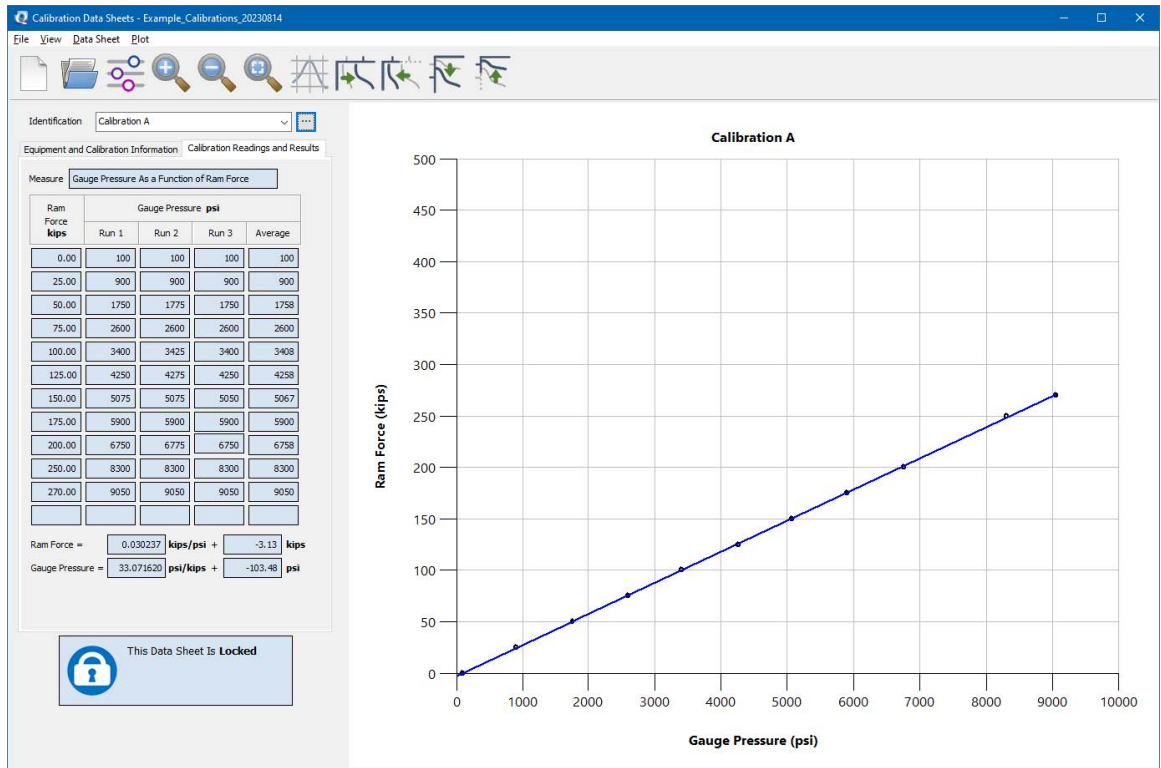
Step 3. Click on the **Calibration Readings and Results** tab.

Step 4. Select the **Measure** option:

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

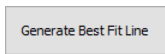


Step 5. Enter data in the fields.

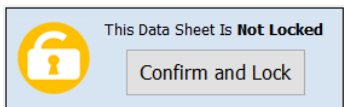


Step 6. Check and ensure entered information and data are consistent with the certified calibration sheet.

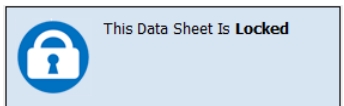
Step 7. Click on the **Generate Best Fit Line** button.

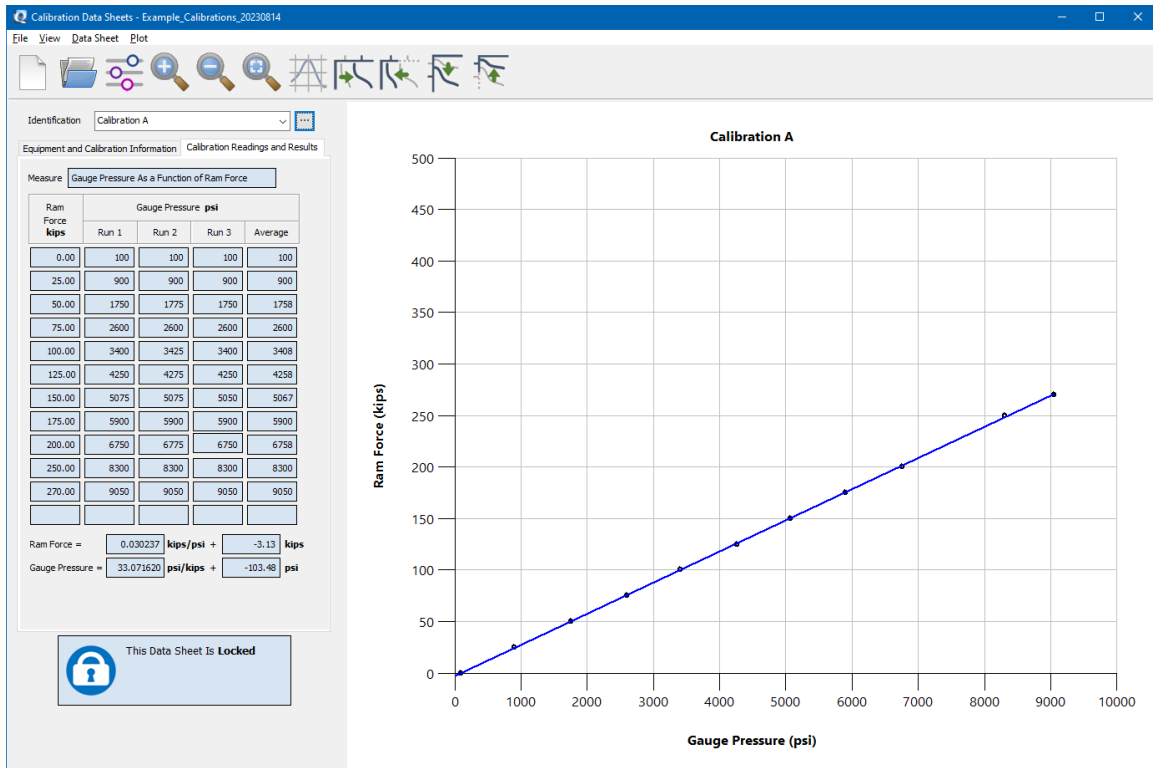


Step 8. Click on the "Confirm and Lock" button to lock the data sheet. A data sheet that is not locked will not be saved in the calibration file (.quailc).



Only data sheets that are locked will be saved in the calibration file (.quailc) and the calibration formula can be use by Quail for test data conversion from ramp force to pump pressure gauge.





Step 9. To apply an existing calibration data sheet from a calibration data file, select the Calibration Data Sheet from the calibration **Identification** pulldown menu.

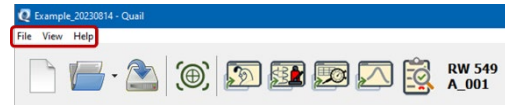
The dialog box 'Select Calibration Data Sheet for A_001' is shown. The 'Identification' dropdown menu is open, displaying options: 'Calibration A', 'Calibration-1', and 'Calibration-3'. The 'Calibration A' option is currently selected. Below the dropdown, various equipment and calibration details are listed in a form.

Select Calibration Data Sheet for **A_001** [OK] [Cancel]
 Identification: Calibration A
 Equipment and Calibration Information: Calibration Readings and Results
 Date: 12/15/2023
 Test Company: Sacramento Test Lab
 Name of Tester: Cal Trans PE California No. C00000
 Pump: Enerpac Model ZU4408 LB-H S/N B09507038
 Load Cell: Omega LCMGD-10KN S/N A10487
 Gauge: McDaniel 0 - 10,000 psi S/N 32956
 Ram: Richard Dudgeon 1 x 150 Ton S/N 600433
 Jack Length: 11.000 inches

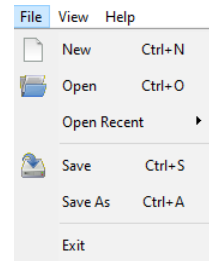
Quail Test Data

Quail has three main menus: **File**, **View**, and **Help**.

➤ **File**



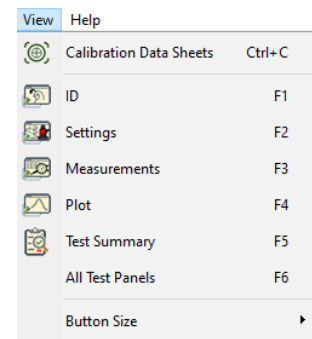
The **File** menu includes **New**, **Open**, **Open Recent**, **Save**, **Save As**, and **Exit** (Figure 2).



➤ **View**

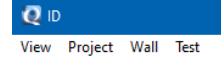
The **View** includes options of viewing **ID**, **Settings**, **Measurements**, **Plot**, **Test Summary**, **All Test Panels**, and selecting **Calibrations Manager**, and **Button Size**.

You may open a panel by clicking on the selection in the **View** menu or clicking one of the icons  in the Quail toolbar.



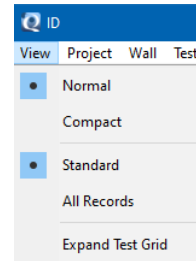
➤ **ID**

The **ID** panel includes **View**, **Project**, **Wall**, and **Test** tabs.

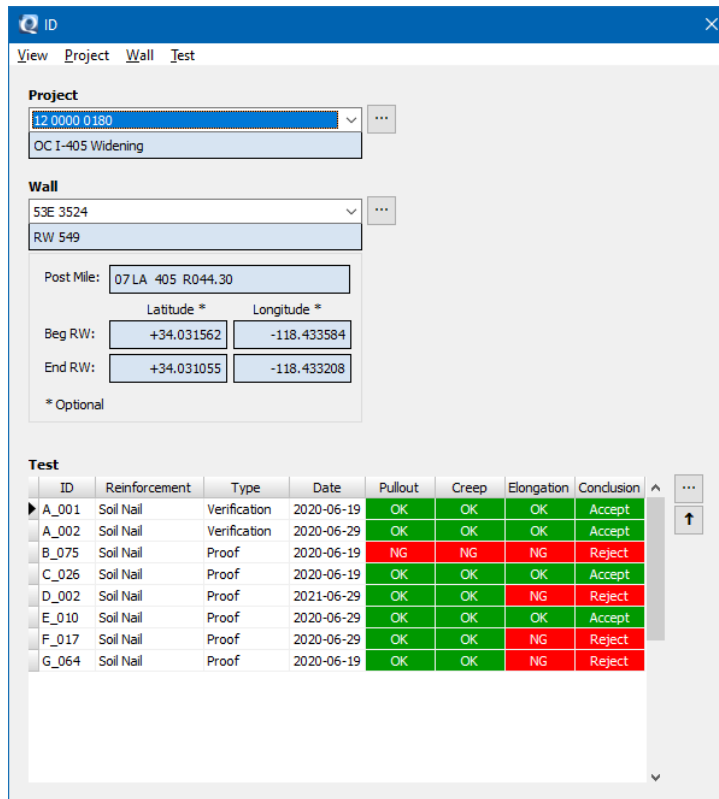


View

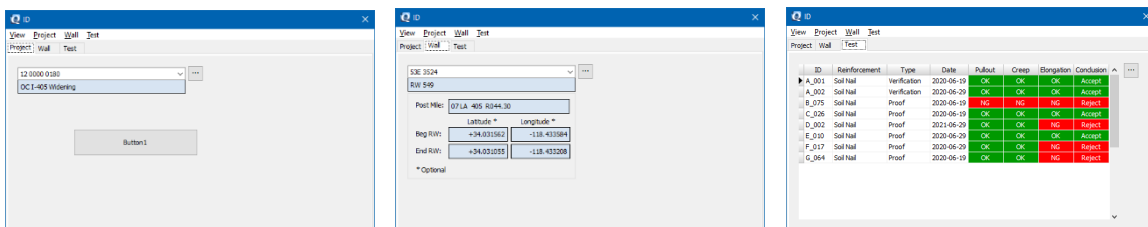
The **View** tab includes **Normal**, **Compact**, **Standard**, **All Records**, and **Expand Test Grid** options.



With **Normal** view, you can view all the three sections, Project, Wall, and Test, in a single panel.



To save screen real estate, you may select **Compact** view mode, which display only one section at a time, either Project, Wall, or Test.

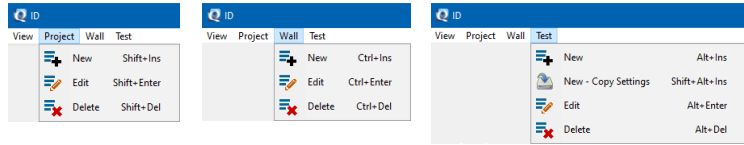



Select **Standard** to view test records of the project you are in. Select **All Records** to view wall test records in the file.

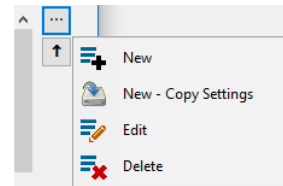
Create, Edit, Delete Records

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

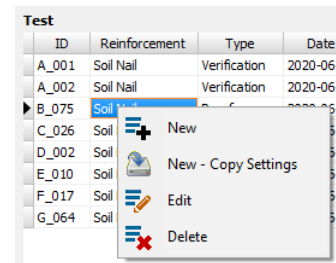
Option 1. On the **ID** toolbar, click on **Project, Wall, or Test** to create new, edit, or delete a project, wall, or test record.



Option 2. Click on the three-dots icon  at the upper-right corner of each of the section to create new, edit, or delete the Project, Wall, and Test record.

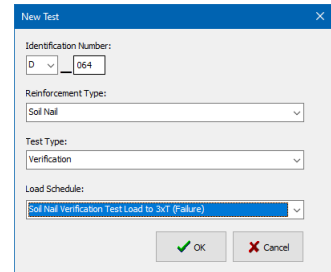


Option 3. Right click on the selected record




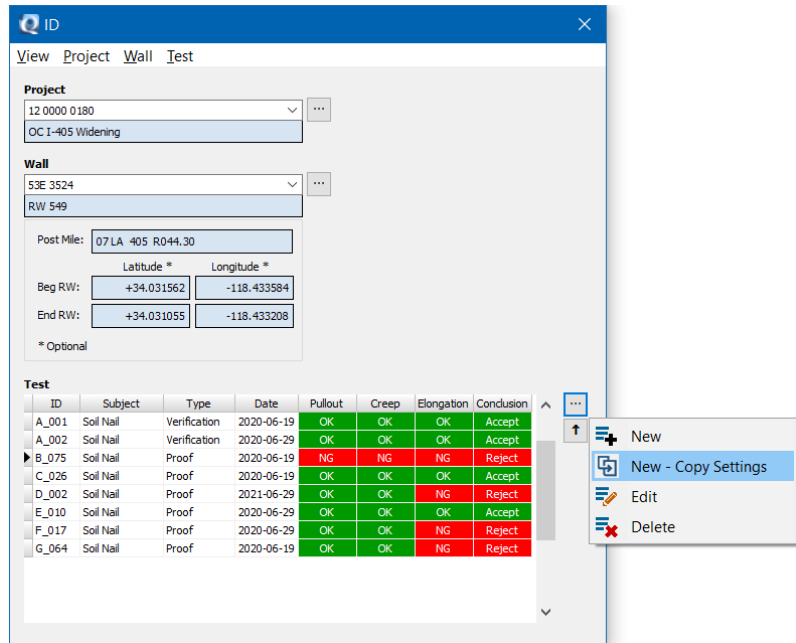
To enter a new test record, select **New** tab and enter **Test ID, Test Subject** (Soil Nail or Ground Anchor), **Test Type** (Verification, Proof for soil nail, and Verification, Proof, Performance for ground anchor), and **Load Schedule**.

Please note that Custom option of Load Schedule is currently not available.



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

From the test ID list, select the test that you want to copy the settings from. In the example shown, test *B_075* was selected. Then, right-click or click the  icon → *New – Copy Settings*.

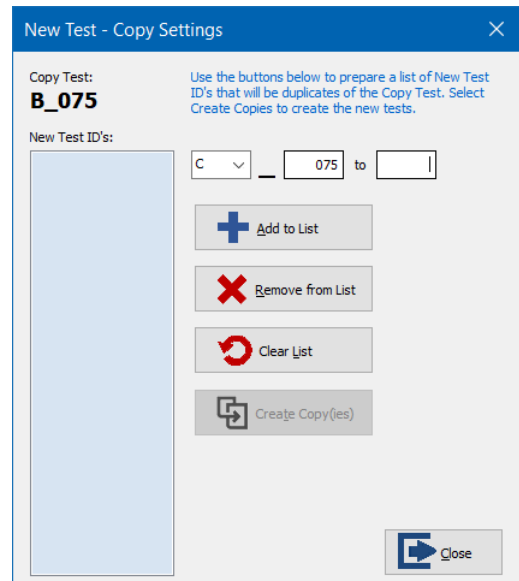


The **New Test – Copy Settings** panel will appear.

Enter the list of new test IDs that you want to have the settings from *B_075* to be copied to and click *Add to List*. You may select and *Remove* the tests from the list. You may also *Clear* the list.

When you finish entering the New Test IDs, click on the *Create Copies* button. The new tests will be populated in the *Test* list and the fields in the **Settings** panel will also be populated.

Warning: Double check the values in the **Settings** fields of each test that have been pre-populated using this feature. Some tests may have some settings different from the test you copied from. Be diligent. Correct the settings values when needed.



➤ **Setting**

Enter information in the fields in the **Setting** panel. The panel is divided into *General*, *Test Subject*, and *Test Equipment* sections.

The screenshot shows a 'Settings' window with three main sections:

- General:**
 - Test Date: 2020-06-19
 - Tester's First Name: Jeremiah
 - Tester's Last Name: Johnson
 - Row: 1
 - RW LOL Station: 13+75.00
 - Elevation *: 65.00 feet
 - Latitude *: +34.031162 degs
 - Longitude *: -118.433255 degs
 - Drilled Hole Diameter: 8 inches
 - Drilling Method: Drag Bit/Air Flush
 - Water in Hole: No
 - Shotcrete Thickness: 10.000 inches
 - * Optional
- Test Subject:**
 - Bar Diameter: 1.128 inches - #9
 - Bar Grade: 75 ksi
 - Post Grout Pressure: 100 psi
 - Test Nail Length: 12.00 feet
 - Bonded Length Lb: 10.00 feet
 - Pullout Resistance Qb: 4.20 klf
 - Test Load: 42.00 kips
- Test Equipment:**
 - Equipment and Calibrations Information: Calibration-4
 - Date: 2023-08-13
 - Test Company: Sacramento Testing Labs
 - Name of Tester: John J. Schmidt
 - Pump: Pump 1
 - Load Cell: Load Cell 1
 - Gauge: Gauge 1
 - Ram: Ram 1
 - Jack Length: 6.300 inches

The *General* section records information such as the test date, tester, geospatial information, and preparation of the test. This information can be used to reference to geotechnical condition of the location provide by the geotechnical reports.

The *Test Subject* section records data of the test subject.

The *Test Equipment* section records test equipment used. The information is transferred from the Calibration Data Sheet.

➤ **Measurements**

Enter test readings in the **Measurements** panel.

The panel display the load schedule and measurement fields that require data entry according to the load schedule selected in the **ID** panel.

If the test failed before the completion of a load test, enter the gauge pressure reading in the **Failure** field.

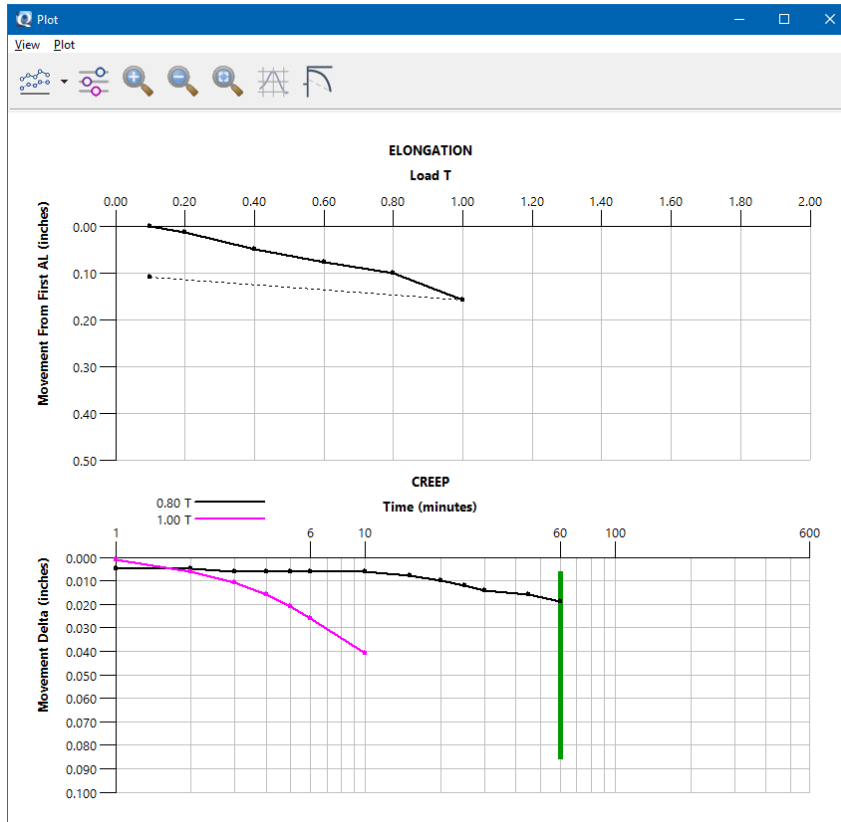
Measurements													
View													
Load Schedule Using Test Load													
Load Test						Creep Tests							
Load	Hold Time mins	Ram Force kips	Gauge Pressure psi	Movement		Hold Time mins	Movement at 0.80 T			Movement at 1.00 T			
				From Start inches	From First AL inches		From Start inches	From First AL inches	Delta inches	From Start inches	From First AL inches	Delta inches	
AL	Stable	4.35	28	0.003	0.000	0	0.104	0.101	0.000	0.162	0.159	0.000	
0.20 T	1-2	8.69	102	0.016	0.013	1	0.109	0.106	0.005	0.163	0.160	0.001	
0.40 T	1-2	17.39	250	0.054	0.051	2	0.109	0.106	0.005	0.168	0.165	0.006	
0.60 T	1-2	26.08	398	0.080	0.077	3	0.110	0.107	0.006	0.173	0.170	0.011	
0.80 T *	1-2	34.78	546	0.104	0.101	4	0.110	0.107	0.006	0.178	0.175	0.016	
1.00 T *	1-2	43.47	694	0.162	0.159	5	0.110	0.107	0.006	0.183	0.180	0.021	
AL	Stable	4.35	28	0.113	0.110	6	0.110	0.107	0.006	0.188	0.185	0.026	
	Failure **					10	0.110	0.107	0.006	0.203	0.200	0.041	
						15	0.112	0.109	0.008				
						20	0.114	0.111	0.010				
						25	0.116	0.113	0.012				
						30	0.118	0.115	0.014				
						45	0.120	0.117	0.016				
						60	0.123	0.120	0.019				

* Creep Test. The Load Test Movement must be recorded within the specified Hold Time before the Creep Test is started.

** If failure occurs record the measured Gauge Pressure.

➤ **Plot**

The Plot panel display plots of load test and creep test. You may select display options of elongation, creep, or both elongation and creep plots.



Select **Options** from the pull-down menu or the **Option** icon to adjust the display.

The 'Plot Options' dialog box is divided into two sections: 'Load Test' and 'Creep Test'.
Load Test Settings:
 - Load Display Format: 0.00
 - Load Maximum Value: 2.00 T
 - Load Step: 0.20 T
 - Movement Display Format: 0.00
 - Movement Maximum Value: 0.50 inches
 - Movement Step: 0.10 inches
 - Line Thickness: 2 pixels
Creep Test Settings:
 - Time Maximum Value: 600 minutes
 - Movement Display Format: 0.000
 - Movement Maximum Value: 0.100 inches
 - Movement Step: 0.010 inches
 - Line Thickness: 2 pixels
 A 'Close' button is located at the bottom right of the dialog.

➤ **Test Summary**

Test Summary panel displays the summary of the test, including pullout resistance, creep, and elastic elongation.

The summary may show color coded **OK**, **NG**, or **Warning**. The evaluation of **OK** and **NG** are based on the criteria described in the Standard Specifications.

The display of **Warning** suggests the test and test data need detailed evaluation even though the test may not be rejected according to the contract.

You may enter comments on the test in the *Comments* field.

Test Summary

View

Pullout Resistance
 Measured failure load = not recorded **OK**

Creep
 Measured creep from 1 minute to 10 minutes ≤ 0.080 inches.
 Measured creep = (0.055 in - 0.000 in) = 0.055 ≤ 0.080 in **OK**

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 = (0.588 in - 0.531 in) = 0.057 in

Theoretical elastic elongation = $\frac{(44.52 \text{ kips} - 4.45 \text{ kips})[(12.00 \text{ ft} - 10.60 \text{ ft})(12 \text{ in/ft}) + 6.000 \text{ in} + 12.000 \text{ in}]}{(29000 \text{ ksi})(1/4)(\pi)(0.625 \text{ in})^2}$ = 0.157 in

Measured elastic elongation / Theoretical elastic elongation = $\frac{0.057}{0.157} = 36.4\% < 80\%$ **NG**

Comments

Conclusion: **Reject**