

**Quail User Guide** 



Division of Engineering Services/Geotechnical Services California Department of Transportation



December 2023 Sacramento, California

Email: Quail@dot.ca.gov

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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

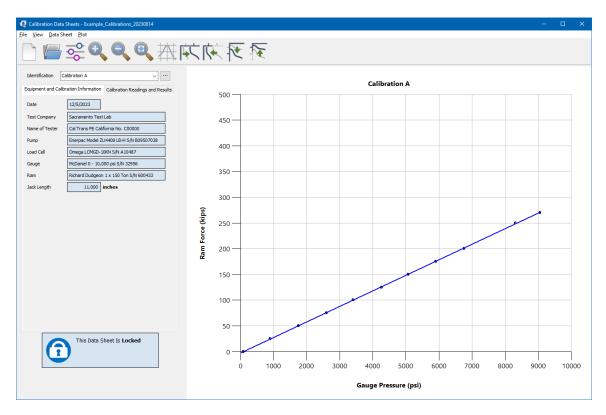
To get started with Quail, open the example calibration file and the example data file.

To open the example calibration file (.quailc), click on the *Calibration Data Sheets* (1) 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.

Q	Example	e_20230814	Quail					
File	View	Help						
		-		(®)	D	<b>D</b>	<u> </u>	RW 549 A_001

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  $View \rightarrow All Data$ *Panels* or use the *F6* key.

Example_20230814 - Quail	
File View Help	
	RW 549 B_075
	🚺 Test Summary 🛛 🕹
Q PI	
Q Measurements	X
Settings	x
View Project Wall Test	ject Test Equipment
Project	ter 1.128 Inches - #9 Equipment and Calibrations Information Calibration Readings and Results
12 0000 0180 V ····	75 ksi Identification Calibration-5
OC I-405 Widening	Pressure 125 psi Date 2023-03-13
Wall	ength 12.00 feet Test Company Sacramento Testing Labs
53£ 3524 V ···	ngth Lb 10.60 feet Name of Tester John J. Schmidt
RW 549	sistance Qb 4.20 klf Pump Pump 2
Post Mile: 07 LA 405 R044.30	
Latitude * Longitude *	
Beg RW: +34.031562 -118.433584	Gauge Gauge 2
End RW: +34.031055 -118.433208	Ram Ram2
* Optional	Jack Length 18.000 inches
Test	
ID Subject Type Date Pullout Creep Elongation Conclusion	
A_001 Soil Nail Verification 2020-06-19 OK OK Accept	
A_002 Soil Nail Verification 2020-06-29 OK OK OK Accept	
C_026 Soil Nail Proof 2020-06-19 OK OK Accept	
D_002 Soil Nail Proof 2021-06-29 OK OK NG Reject	
E_010 Soil Nail Proof 2020-06-29 OK OK OK Accept	
F_017 Soil Nail Proof 2020-06-29 OK OK NG Reject G_064 Soil Nail Proof 2020-06-19 OK OK NG Reject	
×	

# 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).

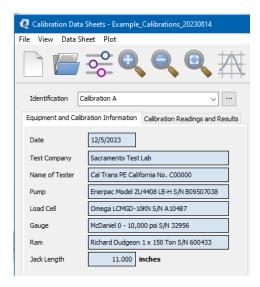
Enter certified calibration data using the *Calibration Data Sheets* panel. You may save the data in the calibration data file. The calibration data file with valid certified calibration data can be shared and used for subsequent projects using the same test equipment.

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.

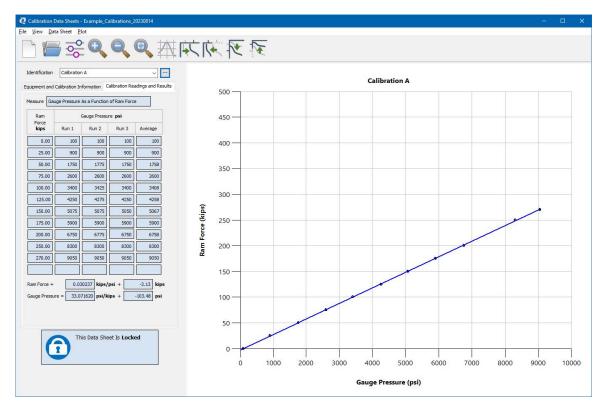


Step 3. Click on the *Calibration Readings and Results* tab. Step 4. Select the *Measure* option:

- 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).

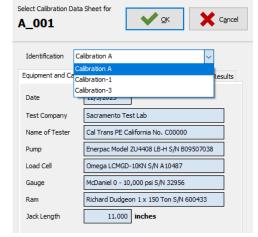


Only data sheets that are locked will be saved in the calibration file (.quailc) and the calibration formula can be use by Quail for test data conversion from ramp force to pump pressure gauge.



ntification	Calibration	n A		~										
ment and	d Calibration In	nformation C	Calibration Rei	adings and Results			500 <del>-</del>		Calibration	n A				
isure Ga	auge Pressure	As a Function	of Ram Force	2										
Ram		Gauge Pressu	re <b>psi</b>			4	150							
Force kips	Run 1	Run 2	Run 3	Average										
0.00	100	100	100	100		4	100							
25.00	900	900	900	900										
50.00	1750	1775	1750	1758		3	50							
75.00	2600	2600	2600	2600										
100.00	3400	3425	3400	3408			00							
125.00	4250	4275	4250	4258										
150.00	5075	5075	5050	5067	1	kipi.	50					~	•	
175.00	5900	5900	5900	5900		Ram Force (kips)	.50							
200.00	6750	6775	6750	6758		<u>ይ</u> .								
250.00	8300 9050	8300 9050	8300 9050	8300 9050		, Ran	200							
270.00	9050	9050	9050	9050										
-						1	50							
Force =		30237 kips/ 71620 psi/k		-3.13 kips -103.48 psi					-					
ge Press	ure = 33.0	/1620 psi/k	ips +	-103.48 psi		1	00							
							50	_						
	ิ "	nis Data She	et Is Lock	ed			_							

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.



### Quail User Guide

File View Help

New

Open

Save As

Exit

Open Recent

Ctrl+N

Ctrl+O

Ctrl+S

Ctrl+A

#### 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  $20 \times 20 \times 20$  in the Quail toolbar.

View	Help	
(®)	Calibration Data Sheets	Ctrl+C
<b>5</b>	ID	F1
	Settings	F2
Q	Measurements	F3
$\square$	Plot	F4
2	Test Summary	F5
	All Test Panels	F6
	Button Size	•

🙋 id

View Project Wall

Test

#### > 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.

OC I-405	Widening		$\sim$						
Nall									
53E 3524			~						
RW 549									
Post Mile	=: 07LA 405 R0	44.30							
	Latitude								
			tude *						
Beg RW	+34.031	.562 -1	18.433584						
End RW	+34.031	.055 -1	18.433208						
* Option									
* Option	181								
Test									
ID	Reinforcement	Type	Date	Pullout	Creep	Elongation	Conclusion	^	
A_001	Soil Nail	Verification	2020-06-19	OK	OK	OK	Accept		1
	Soil Nail	Verification	2020-06-29	OK	OK	ОК	Accept		•
A_002									
B_075	Soil Nail	Proof	2020-06-19	NG	NG	NG	Reject		
B_075 C_026	Soil Nail Soil Nail	Proof	2020-06-19 2020-06-19	OK	NG OK	ОК	Reject Accept		
B_075 C_026 D_002	Soil Nail Soil Nail Soil Nail	Proof Proof	2020-06-19 2021-06-29	OK OK		OK NG	Accept Reject		
B_075 C_026 D_002 E_010	Soil Nail Soil Nail Soil Nail Soil Nail	Proof	2020-06-19	OK	ОК	ОК	Accept		
B_075 C_026 D_002	Soil Nail Soil Nail Soil Nail Soil Nail Soil Nail	Proof Proof	2020-06-19 2021-06-29	OK OK	ОК ОК	OK NG	Accept Reject		

View
Project
Wall
Test

•
Normal
Compact
Image: Compact and the second and th

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

Q ID ×	Q 10 ×	Q io	×
View Project Wall Test	View Project Wall Test Project Wall Test	<u>View Project Wall</u> <u>Test</u> Project Wall <u>Test</u>	
12 0000 030 v (r) OC L-455 Wellering Butters 1	SX 3524   v   m     Bit \$56   (a)1.4, 455 8044.30   ionglude *     Big GWN   -i-34.43383   -i-14.43384     Big GWN   -i-34.43383   -i-14.43384     Big GWN   -i-34.63383   -i-14.43388     Softward   -i-14.43388   -i-14.43388	D   Benforoment   Type   Date   Aduat   Corr     A 405   Softad   Wenfustorn   22354-56   CX   CX   CX     A 505   Softad   Wenfustorn   22354-56   CX   CX <td>OK Accept NG Reject OK Accept NG Reject OK Accept NG Reject</td>	OK Accept NG Reject OK Accept NG Reject OK Accept NG Reject

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

Alt+Ins

Shift+Alt+Ins

Alt+Enter

Alt+Del

### Create, Edit, Delete Records

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

🙋 ID

New

= Edit Shift+Enter

📑 Delete Shift+Del

Shift+Ins

🙋 ID

Wall Test

New

= Edit

= Delete

Ctrl+Ins

Ctrl+Enter

Ctrl+Del

- Option 1. On the ID toolbar, click on Project, Wall, or Test to create new, edit, or delete a project, wall, or test record.
- Click on the three-dots icon 📃 at the upper-right corner of each Option 2. of the section to create new, edit, or delete the Project, Wall, and Test record.
- Right click on the selected record Option 3.

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.

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				Nev	w - Copy Set	tings
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			=×	Del	ete	
Т	est					
	ID	Rei	nforcen	nent	Type	Date
1	A_001	Soil N	Vail		Verification	2020-06
	A_002	Soil N	Vail		Verification	2020-06
۲	B_075	Soil 1	a - 4		~ ^	
	C_026	Soil	Ξ+ .	New		
	D_002	Soil	<b>A</b>	New	C	
	E_010	Soil		New	- Copy Setti	ngs

New - Copy Settings

🙋 ID

Tes A A ► B

F\_017

G\_064 Soil

Soil 🏹 Edit

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Wall Test Rew New

= Edit

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New Test	×
Identification Number:	
Reinforcement Type:	
Soil Nail 🗸	
Test Type:	
Verification ~	
Load Schedule: Soil Nail Verification Test Load to 3xT (Failure)	
✓ OK X Cancel	

# Quail User Guide

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  $\square$  icon  $\rightarrow$  New – Copy Settings.

roject											
12 0000 0			~								
OC I-405	Widening			J							
Vall											
53E 3524			~								
RW 549											
Post Mil	e: 07LA 405	R044.30									
	Latitu	de * Lon	gitude *								
Beg RW			gitude * •118.433584								
-	/: +34.0		118.433584								
Beg RW End RW	/: +34.0	031562									
-	/: +34.0 /: +34.0		118.433584								
End RW	/: +34.0 /: +34.0		118.433584								
End RW * Optio	/: +34.0 /: +34.0 nal	031562	-118.433584 -118.433208								
End RW * Optio 'est ID	/: +34.0 /: +34.0 nal	031562	-118.433584 -118.433208 Date	Pullout	Creep	-	Conclusion	^			
End RW * Optio est ID A_001	/: +34.0 /: +34.0 nal Subject Soil Nail	031562 031055 Type Verification	Date 2020-06-19	OK	OK	OK	Accept	^			Maur
End RW * Optio est ID A_001 A_002	/: +34.0 /: +34.0 nal Subject Soil Nail Soil Nail	Type Verification Verification	Date 2020-06-19 2020-06-29	ОК ОК	OK OK	OK OK	Accept Accept	^	···· 1	=+	New
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End RW * Optio Test ID A_001 A_002 B_075 C_026	/: +34.0 /: +34.0 nal Subject Sol Nai Sol Nai Sol Nai Sol Nai	Type Verification Verification Proof Proof	Date 2020-06-19 2020-06-19 2020-06-19 2020-06-19 2020-06-19	OK OK NG OK	OK OK NG OK	OK OK NG OK	Accept Accept Reject Accept	^		5	New - Copy Settings
End RW * Optio Test ID A_001 A_002 B_075 C_026 D_002	/: +34.0 /: +34.0 nal Subject Sol Nal Sol Nal Sol Nal Sol Nal Sol Nal	Type Verification Verification Proof Proof	Date 2020-06-19 2020-06-19 2020-06-19 2020-06-19 2020-06-19 2020-06-19 2020-06-19	OK OK NG OK OK	OK OK NG OK OK	OK OK NG OK NG	Accept Accept Reject Accept Reject	^		뎡	New - Copy Settings
End RW * Optio est ID A_001 A_002 B_075 C_026 D_002 E_010	/: +34.0 /: +34.0 nal Subject Soil Nail Soil Nail Soil Nail Soil Nail Soil Nail	Type Verification Verification Proof Proof Proof	Date 2020-06-19 2020-06-19 2020-06-19 2020-06-19 2020-06-19 2020-06-19 2020-06-19 2020-06-19 2020-06-19	OK OK NG OK OK OK	OK OK NG OK OK OK	OK OK NG OK NG OK	Accept Accept Reject Accept Reject Accept	^		- 5	New - Copy Settings Edit
End RW * Optio Test ID A_001 A_002 B_075 C_026 D_002	/: +34.0 /: +34.0 nal Subject Sol Nal Sol Nal Sol Nal Sol Nal Sol Nal	Type Verification Verification Proof Proof	Date 2020-06-19 2020-06-19 2020-06-19 2020-06-19 2020-06-19 2020-06-19 2020-06-19	OK OK NG OK OK	OK OK NG OK OK	OK OK NG OK NG	Accept Accept Reject Accept Reject	^		- 5	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.

Copy Test:	Use the buttons below to prepare a list of New Te
B_075	ID's that will be duplicates of the Copy Test. Sele
-	Create Copies to create the new tests.
New Test ID's:	C ~ _ 075 to _
	Add to List
	Remove from List
	Clear List
	Create Copy(ies)
	Close

### > Setting

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

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

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.

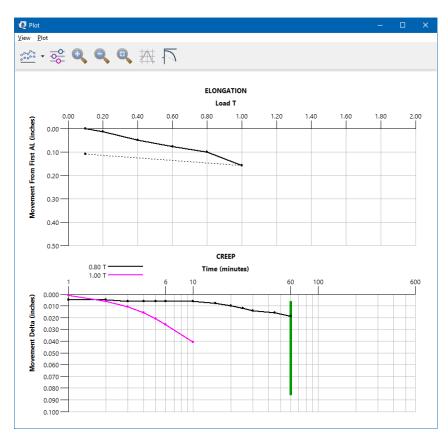
The panel display the load schedule and measurement fields that require data entry according to the load schedule selected in the *ID* panel.

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

N	ements											
d Sched	ule Using	Test Loa	d									
		Lo	oad Test						Creep Test	s		
	Hold	Ram	Gauge	Move	ment	Hold	Mover	ment at 0.80 T		Moven	nent at 1.00 T	
Load	Time	Force	Pressure	From Start	From First AL	Time	From Start	From First AL	Delta	From Start	From First AL	Delta
	mins	kips	psi	inches	inches	mins	inches	inches	inches	inches	inches	inches
AL	Stable	4.35	28	0.003	0.000	0	0.104	0.101	0.000	0.162	0.159	0.00
). 20 T	1-2	8.69	102	0.016	0.013	1	0.109	0.106	0.005	0.163	0.160	0.00
).40 T	1-2	17.39	250	0.054	0.051	2	0.109	0.106	0.005	0.168	0.165	0.006
.60 T	1-2	26.08	398	0.080	0.077	3	0.110	0.107	0.006	0.173	0.170	0.01
.80 T *	1-2	34.78	546	0.104	0.101	4	0.110	0.107	0.006	0.178	0.175	0.01
1.00 T *	1-2	43.47	694	0.162	0.159	5	0.110	0.107	0.006	0.183	0.180	0.02
AL	Stable	4.35	28	0.113	0.110	6	0.110	0.107	0.006	0.188	0.185	0.02
	Failure **					10	0.110	0.107	0.006	0.203	0.200	0.04
						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			

# > 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**  $\approx$  icon to adjust the display.

oad Test			
Load Display Format	0.00	~	
Load Maximum Value	2.00	~ T	
Load Step	0.20	~ T	
Movement Display Format	0.00	$\sim$	
Movement Maximum Value	0.50	→ incl	ies
Movement Step	0.10	~ incl	ies
Line Thickness	2	√ pixe	els
Creep Test			
Time Maximum Value	600	→ min	utes
Movement Display Format	0.000	~	
Movement Maximum Value	0.100	→ incl	ies
Movement Step	0.010	~ incl	ies
Line Thickness	2	√ pixe	els

# > 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		×
<u>/</u> iew		
Pullout Resistance		
Measured failure load = not rec	orded	ОК
Creep		
Measured creep from 1 minute to	o 10 minutes ≤ 0.080 inches.	
		ок
	ation e maximum test load minus the measured residual movement at the ending alignment load must be crent of the theoretical elastic elongation of the sum of the unbonded length and the jacking = (0.588 in - 0.531 in) = 0.057 in	
Theoretical elastic elongation	$=\frac{(44.52 \text{ kips} - 4.45 \text{ kips})[(12.00 \text{ ft} - 10.60 \text{ ft})(12 \text{ in/ft}) + 6.000 \text{ in} + 12.000 \text{ in}]}{(29000 \text{ ksi})(1/4)(pi)(0.625 \text{ in})^2} = 0.157 \text{ in}$	
Measured elastic elongation	0.057	
Theoretical elastic elongation	-= <u>-</u> = 36.4% < 80%	NG
Comments		
	^ ~	
	Conclusion:	Reject