Insert Introduction Here

SPSU Mechanical Engineering Simulation Overview

Overview

The SPSU Mechanical Engineering Simulation Manual will provide you with the following:

- A tour of the simulation as a whole
- Details regarding the specifics of three strength of material labs:
  1. The tension lab
  2. The torsion lab
  3. The Poisson's Test lab
- A step-by-step guide detailing how to complete each lab

Consult the table below for an illustration of the manual's chapters.

NOTE: At this point in time only material concerning Tension has been written. Future chapters will include information and step-by-step instructions regarding the torsion test and Poisson's test.

In This Manual

Chapter One: Getting to Know the Simulation

Overview

Chapter one deals with getting to know the simulation, its components, and getting ready to perform a test. It is divided into the two sections shown below. Section one details the various portions of the simulation encountered before beginning one of your three tests. Section two discusses the tension test in detail.

In This Chapter

Section One: The Pretest Menu

Overview

No matter which of the simulation's three tests you are performing, you will be asked to enter some general information first. The following section discusses this material in detail, and is divided into four sections listed below.

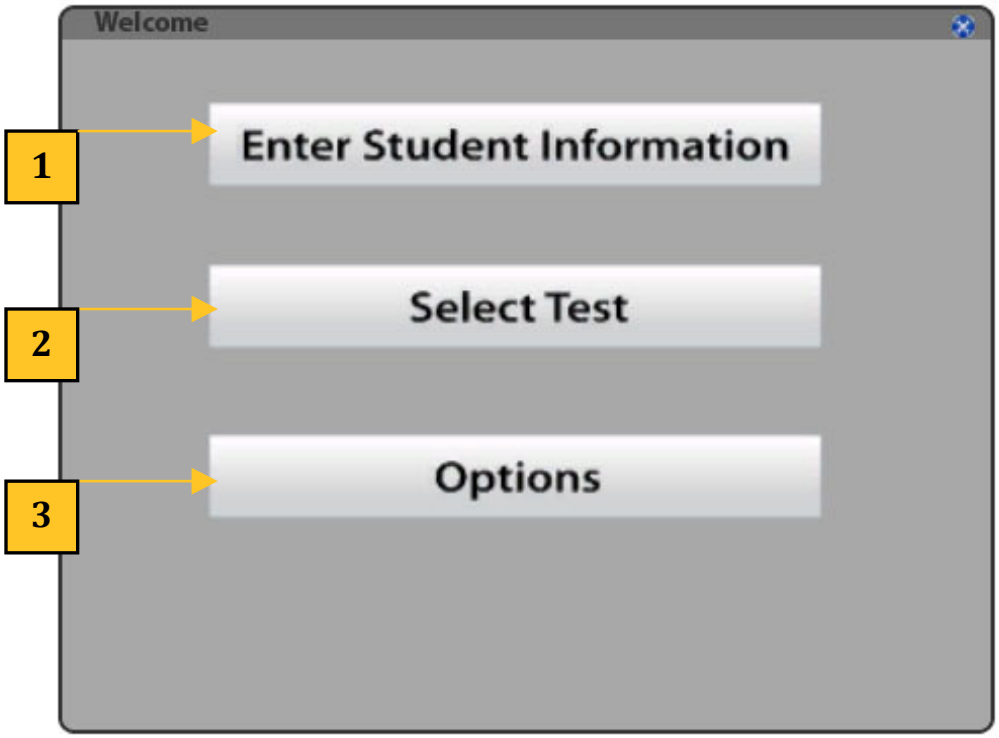
In This Chapter

The Pre-Test Menu

Description

The Pre-Test menu will be the first screen you encounter in the simulation. The following pages describe each section of the pre-test menu in detail. It will be during the pre-test portion of the simulation that you will record your personal information, make changes to the overall settings of the simulation, and finally select your test.

The Pre-Test Menu



Important Aspects

Aspect	Description	Page #
1	Enter Student Information	5
2	Select Test	6
3	Options Button	7

Enter Student Information Window

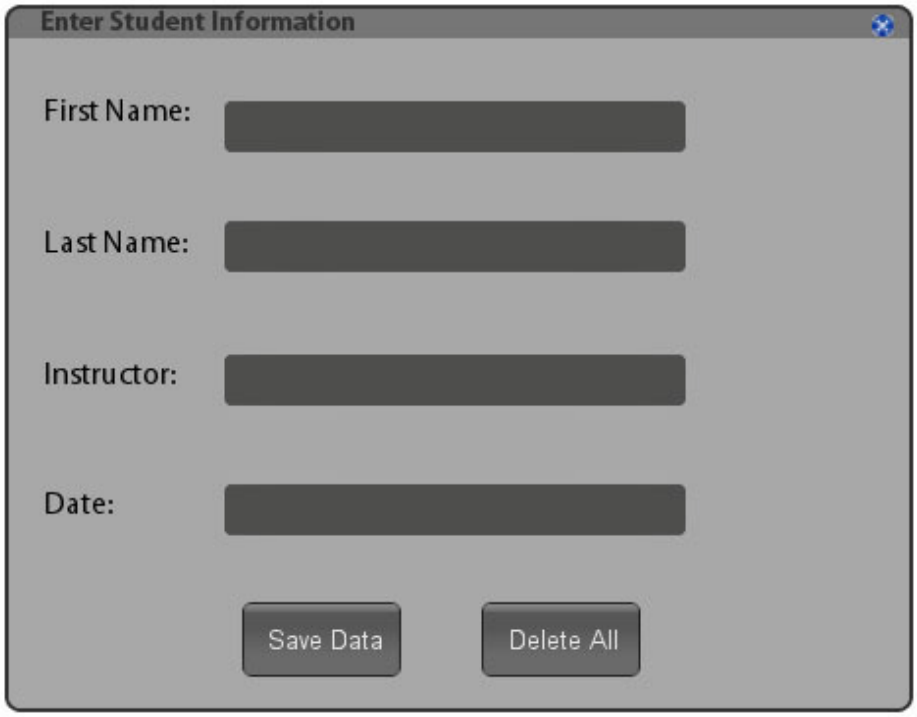
Definition

The student information window is where you enter your identifying information for your professor.

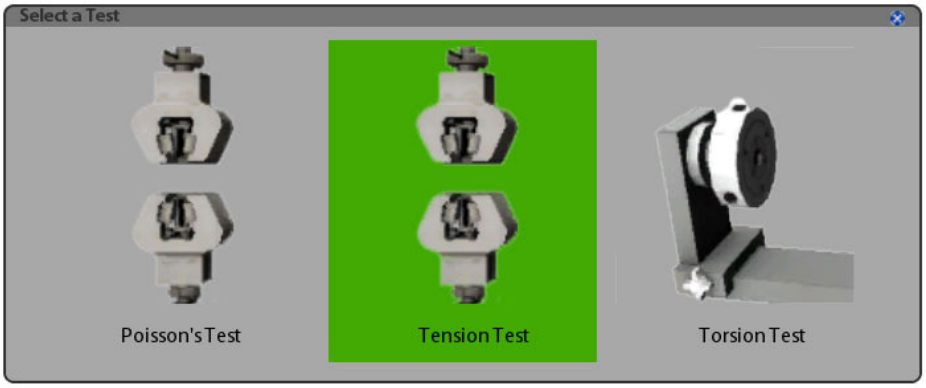
Background

Much as in any assignment, your professor will need to be able to track your progress, and be able to identify your work from that of your peers. This window gives you the ability to do that.

The Student Information Window



Select Test Window

Definition	The simulation is able to run three labs found within your course: tension, torsion, and Poisson's test.
Background	Use this menu to select which lab you will be running in your simulation. Simply hover your mouse over and click the lab you wish to perform.
The Select Test Window	

Options Window

Definition	Every student is different, and so the option to personalize your simulation experience exists.
Background	This menu is used to adjust the simulation's sound, brightness, and other variables. Currently, this window is not active.
The Options Window	THERE IS NOTHING IN THE SIMULATION YET TO SUPPORT A SCREEN SHOT.

Section Two: The Tension Test

Overview

This section gives you a tour of the various components of the tension lab in detail. Use this section as a reference as you walk through the simulation for the first time.

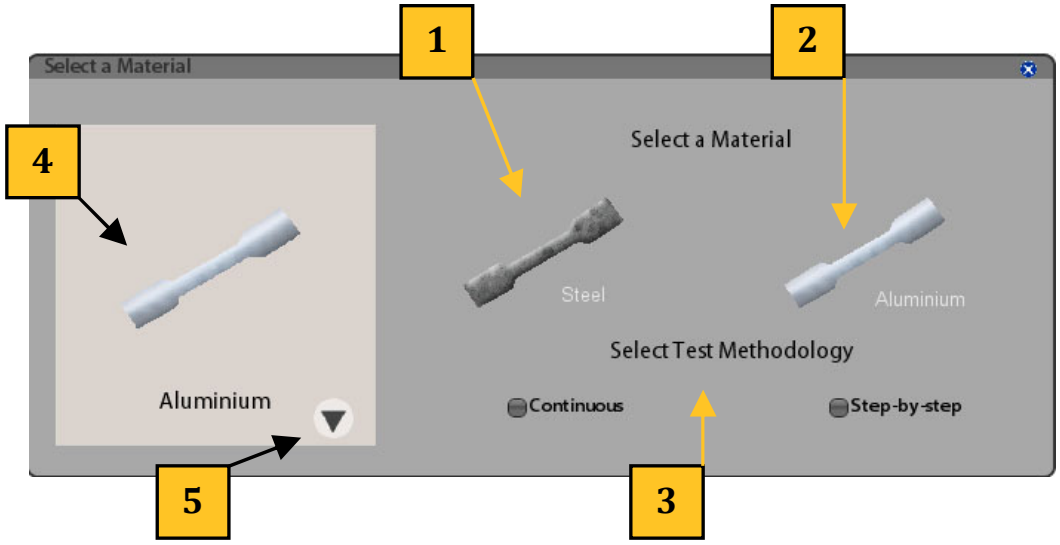
In This Section

The Material Selection Screen

Description

The material selection screen is the first step in your simulation that must be completed. Options in this screen include the ability to select your material, the ability to determine your test's methodology, and the ability to choose the diameter of your chosen material.

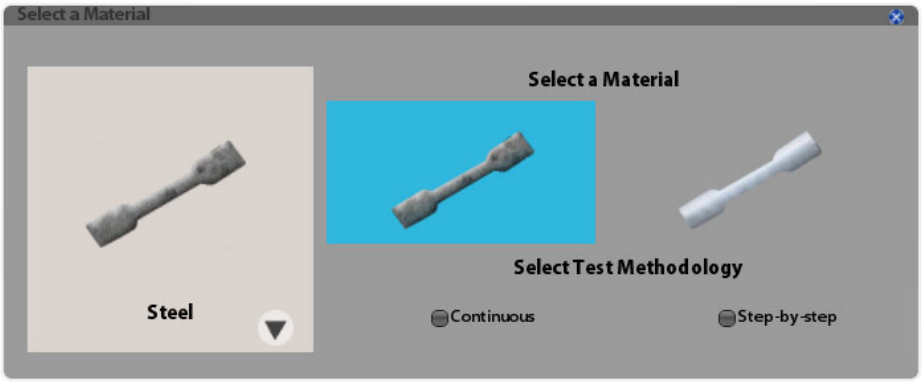
The Material Selection Screen



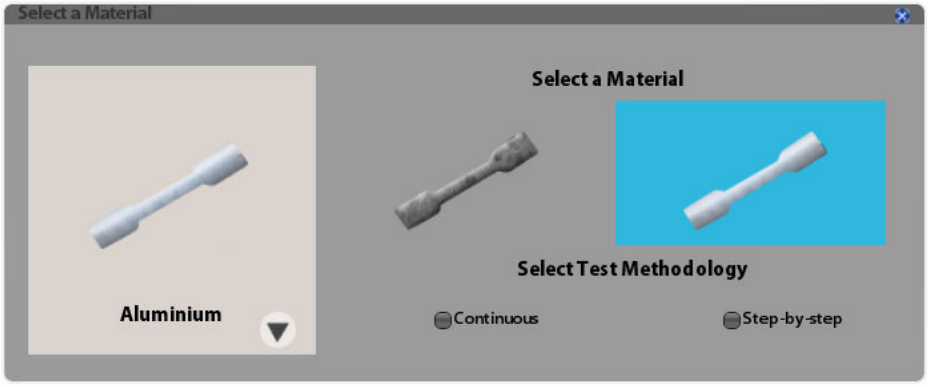
Important Aspects

Aspect	Description	Page #
1	Selecting Structured Steel	10
2	Selecting Aluminum	11
3	Selecting Test Methodology	12
4	Selected Material	13
5	Selecting Material Diameter	14

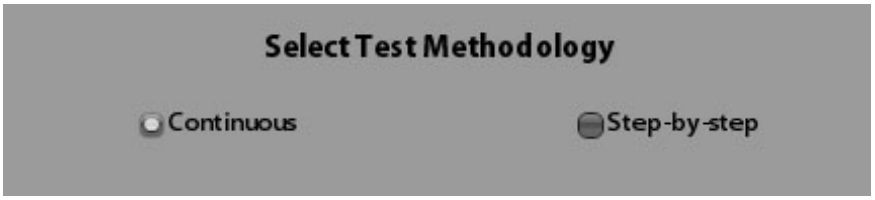
Selecting Structured Steel

Definition	The tension simulation allows you to select structured steel as a material. Your selection will be highlighted in light blue before you click.
Background	Structured steel is considered a stronger material, and will produce different results when compared to aluminum.
Structured Steel	

Selecting Aluminium

Definition	The tension simulation allows you to select aluminum as a material. Your selection will be highlighted in light blue before you click.
Background	Aluminum is considered a weaker material, and will produce different results when compared to structured steel.
Aluminum	

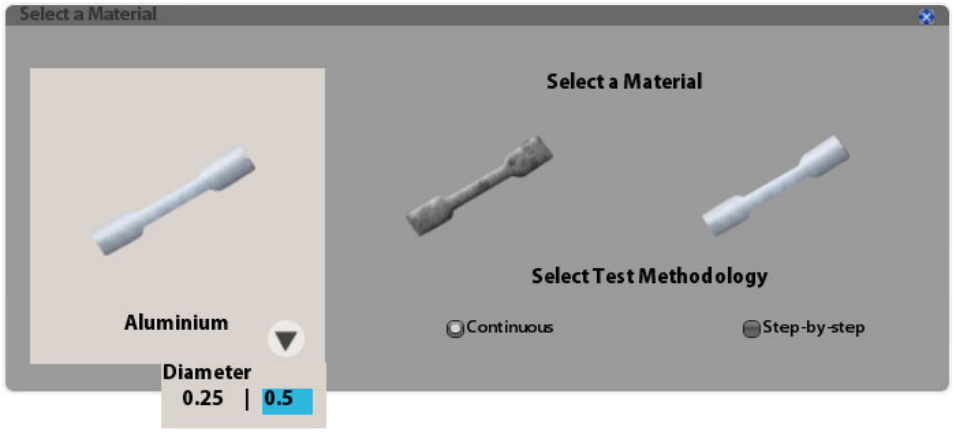
Test Methodology Selection

Definition	The simulation will allow you to determine whether you wish to continue using a continuous or step-by-step methodology.
Background	Each methodology has its purpose, and will directly affect the manner by which you collect your data once the test has begun.
Test Methodology Selection	

Selected Material

Definition	The simulation will show the final material that has been selected in this enlarged view. This material will be either aluminum or structured steel.
Background	Knowing what material you plan to work with is important. Make sure to note the differences between each material.
Selected Material	 

Specimen Diameter Selection

Definition	The simulation allows you to select one of two diameters for your material. You may select a diameter of .25 inches or .5 inches.
Background	The ability to select a different diameter for your specimen is important. This will allow you to be able to see how diameter affects the tension of a given material.
Diameter Being Selected	

The Lab View: Tension

Overview

The lab view is where the majority of your simulation experience will take place. The following pages will give you a tour of this important portion of your lab experience.

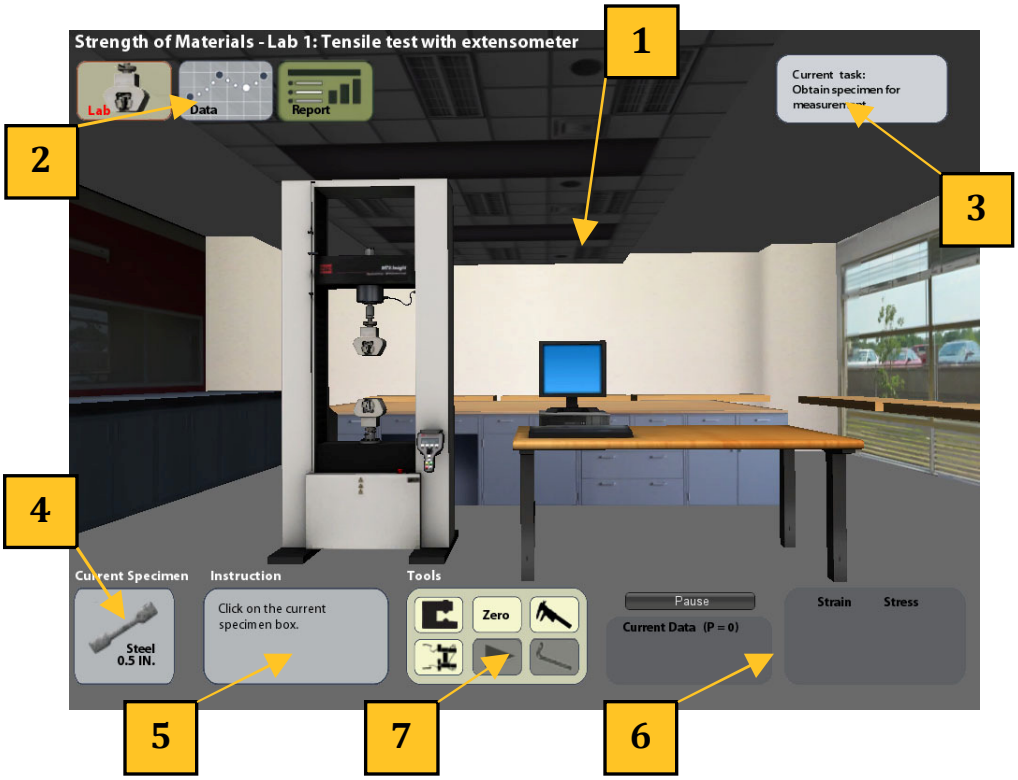
In This Chapter

Lab View

Description

Below you will find a picture of the simulation's lab view. The following pages go into each section in greater detail.

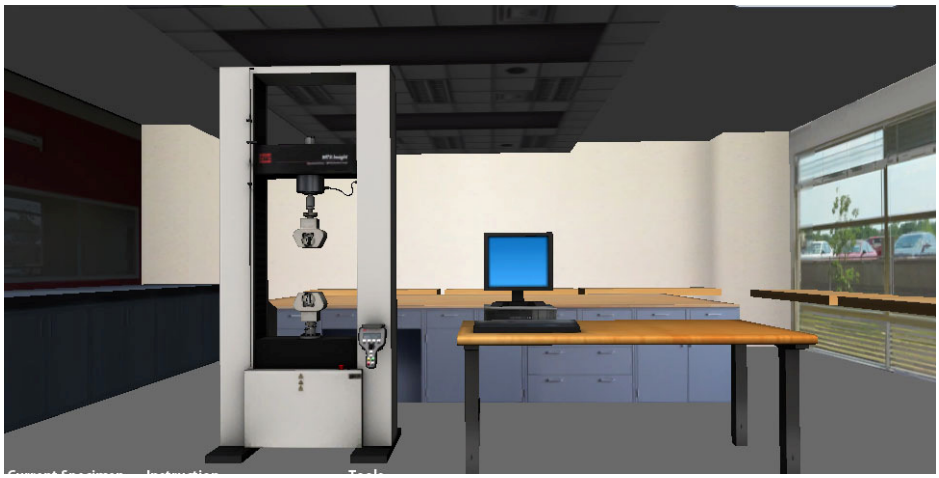
The Lab View



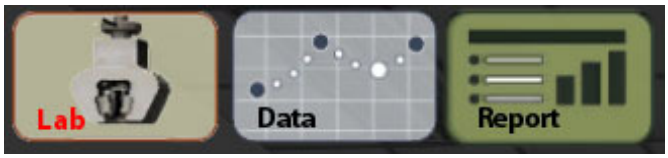
Important Aspects

Aspect	Description	Page #
1	The Simulation Window	17
2	Simulation View Tabs	18
3	The Current Task Box	19
4	The Current Specimen Box	20
5	The Instruction Box	21
6	The Data Widows	22
7	The Tool Box	23

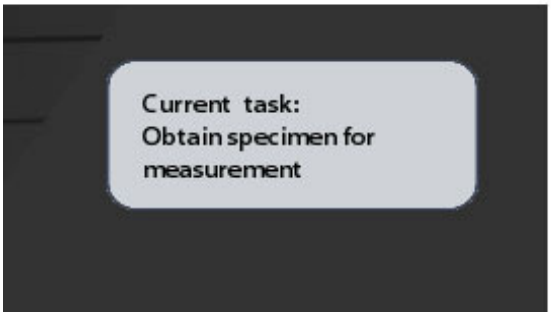
The Simulation Window

Definition	This is where the action happens. The majority of all animation and simulation activity will occur here.
Background	The simulation window is made to be completely interactive. It is set in a 3D space, and we encourage you to navigate your camera and explore.
The Simulation Window	

Simulation View Tabs

Definition	Use these three tabs to get around the main components of the simulation.
Background	The lab view is used to navigate to the portion of the simulation responsible for conducting your tensile test. The data view is where all automatic data from the test will be stored. The report view is the portion of the simulation where you store your final data to submit to your professor.
Simulation View Tabs	

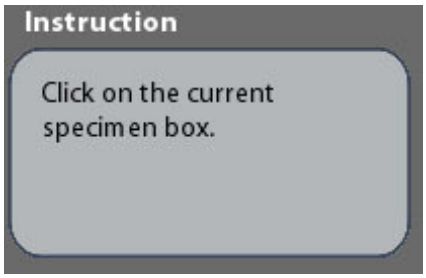
Current Task Window

Definition	This window displays the current task that you are working on in your tensile test.
Background	The window is designed to help guide you through your simulation. It will flash red when you have performed an error, and it will flash green when you have successfully accomplished your task.
Current Task Window	

Current Specimen Window

Definition	This window displays your tension lab's current specimen.
Background	This is where the information for the material you chose pre-test will constantly be displayed. This window will also be where you initially interact with your specimen for testing.
Current Specimen Window	

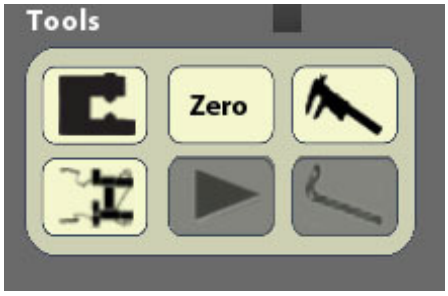
Instruction Window

Definition	This window informs you what steps are needed to complete the current task you are working on in your test.
Background	As you complete each task, you will be given a new set of instructions to follow. Refer to your quick reference guide and your manual for additional help.
Instruction Window	

Data Windows

Definition	These two windows display data once the test has begun.
Background	Refer to these windows as your test runs should you need to record data while in the lab view **during** your test. The pause button allows you to stop the test should you need to completely step away from the simulation at any time.
Data Windows	

The Tool Box

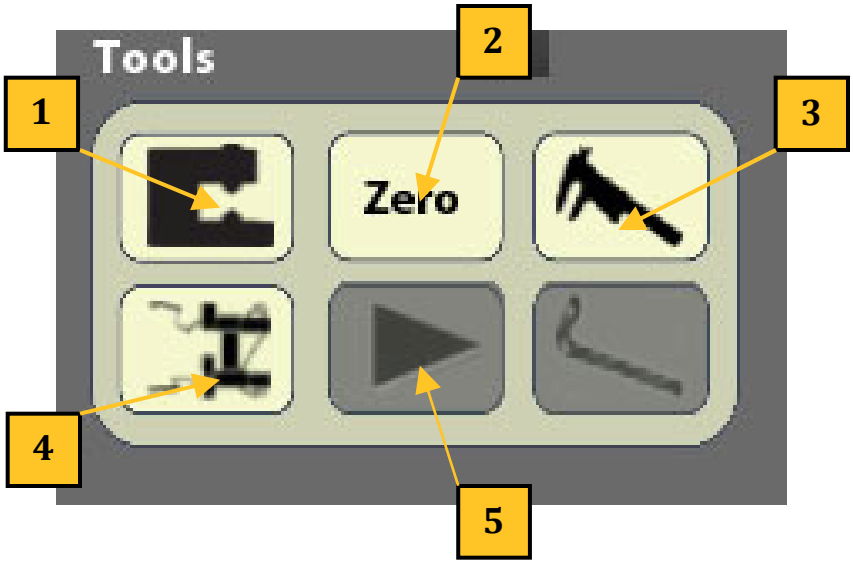
Definition	The tool box is where you will find all relevant tools necessary to complete your tension test. You will also find operational buttons designed to engage with the simulation.
Background	Included in the tool box are the punch tool, caliper tool, and extensometer tool. The tool box also contains buttons used to zero out the tension machine and to start your tensile test.
The Tool Box	

Tool Box Overview

Description

The tool box will be constantly used throughout your simulation experience. You will want to pay careful note below where each tool is located, and refer to the following pages concerning their use and need.

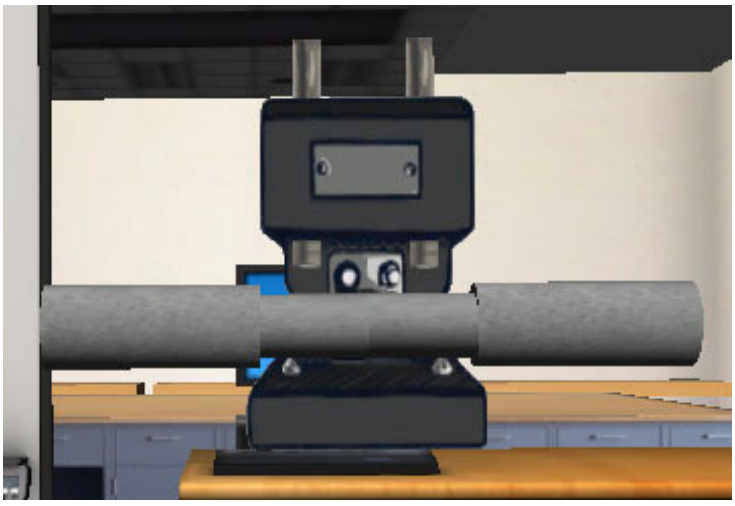
The Tool Box



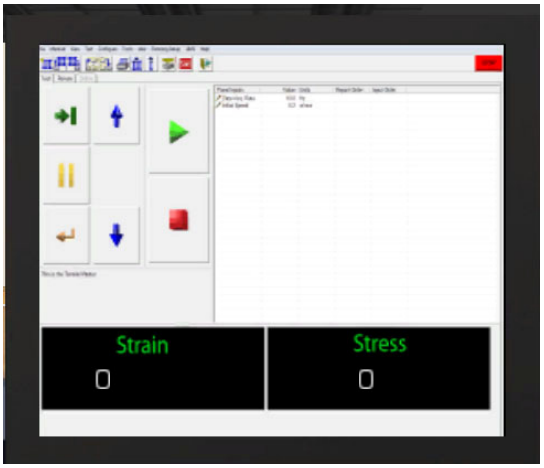
Important Aspects

Aspect	Description	Page #
1	The Punch Tool Icon	25
2	The Zero Calibration Button	26
3	The Caliper Tool Icon	27
4	The Extensometer Icon	28
5	The Test Play/Pause Button	29

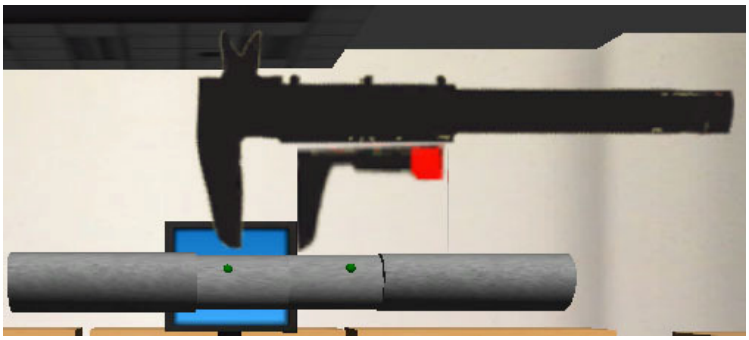
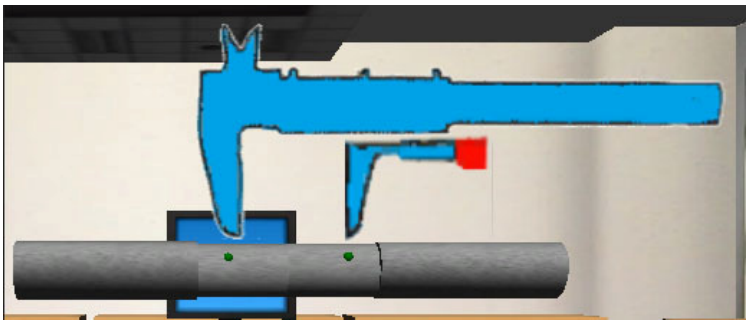
The Punch Tool

Definition	The punch tool places two marks in order for the test to measure an area for your specimen's pre-test gauge length and diameter.
Background	The punch tool can be manipulated with the mouse through dragging and punches the specimen when its left and right punch bars are clicked. The tool is selected by clicking on its icon in the tool box, and is returned in the same manner
The Punch Tool Icon	
The Punch Tool	

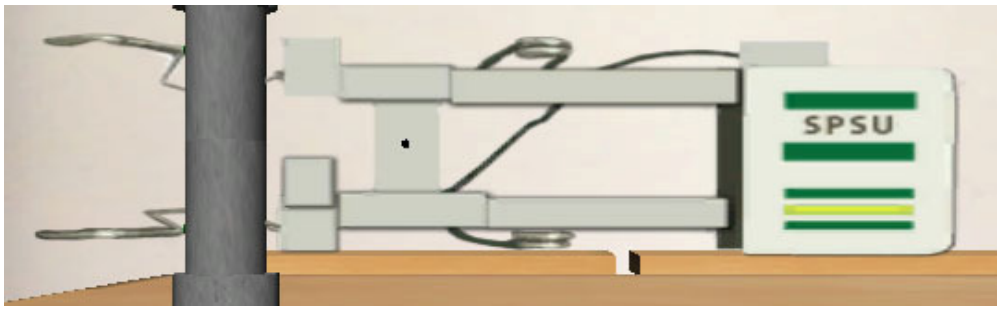
Zero Button

Definition	The zero button is used to zero out the tension machine before testing begins.
Background	You must zero out the tension machine in order to make sure that the readings gathered during the test are not corrupted by previous stored data in the machine's memory.
The Zero Button	
The Tension Machine Being Zeroed	

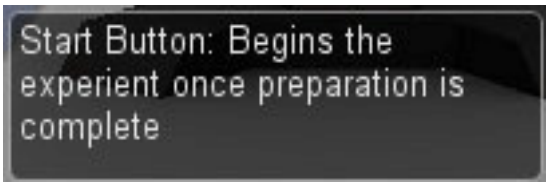
The Caliper Tool

Definition	The caliper measures the gauge length and diameter of the specimen using the marks punched earlier in the lab.
Background	The caliper can be manipulated with the mouse through dragging. The tool is selected by clicking on its icon in the tool box, and is returned in the same manner. The tool will turn blue when it is measuring your specimen's correct dimensions.
The Caliper Tool Icon	
The Caliper Tool	 

The Extensometer Tool

Definition	The extensometer measures the change in tension and stretch as the test progresses. Readings are sent to the computer allowing you to record data.
Background	The extensometer can be manipulated with your mouse through dragging. The tool is only used during the set up of your material in the tension machine. It is automatically removed once your test is complete. The tool is selected by clicking its icon in the tool box.
The Extensometer Tool Icon	
The Extensometer Tool	

Test Start Button

Definition	The test start button is used to begin your test.
Background	Once you have measured your material, secured your material, and calibrated the tension machine you will be ready to start your tension test. This button becomes available to press once all prior steps are complete.
The Play Button Icon	
The Play Button	 

The Data View: Tension

Overview

In this section you will be given a tour of the simulation's data view. This will be where your data will be recorded throughout the tension test's progress. Look here to watch your data curve take shape as more tension is applied to your selected material during the test's progress.

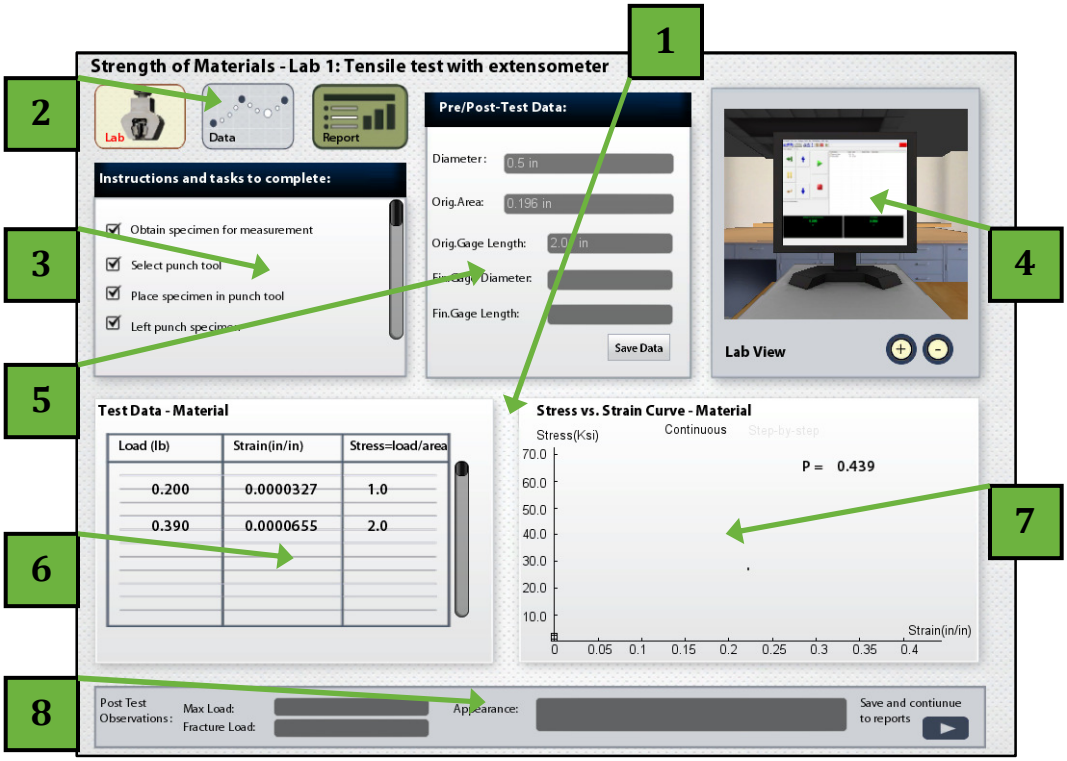
In This Chapter

Data View

Description

This is the data view screen for your simulation. All data is recorded here throughout your tension test. Here, you are able to see the lab in the lab view box, watch your stress vs. strain curve take shape, and make general observations throughout the tension test.

The Data View



Important Aspects

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1	Data View Screen	31
2	Simulation View Tabs	32
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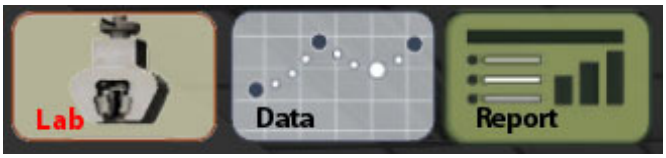
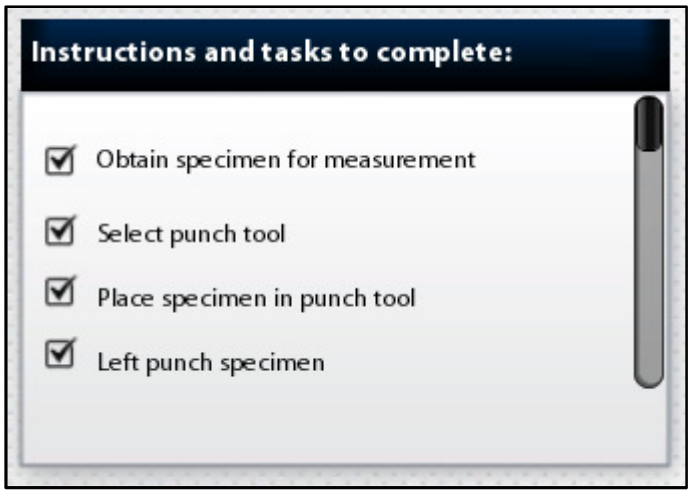
4	Lab View Box	34
5	Pre/Post-Test Data Box	35
6	Test Data Box	36
7	Stress vs. Strain Curve	37
8	Final Calculations Box	38

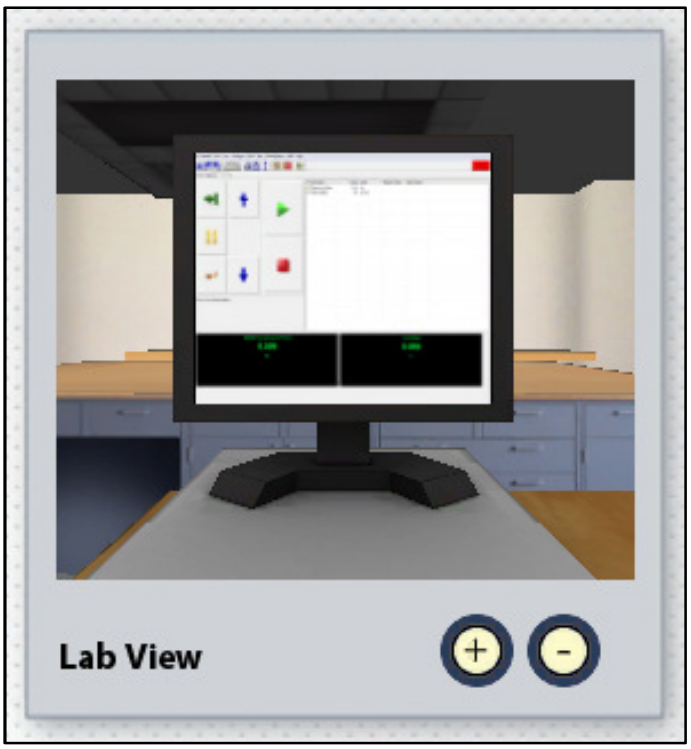
Simulation View Tabs

Definition	Use these three tabs to get around the main components of the simulation.
Background	The lab view is used to navigate to the portion of the simulation responsible for conducting your tensile test. The data view is where all automatic data from the test will be stored. The report view is the portion of the simulation where you store your final data to submit to your professor.
Simulation View Tabs	

Task Instruction Box

Definition	The task instruction box records your progress as you complete your tension test.
Background	This box will automatically check off each task as you complete it. This is helpful if you toggle from lab view to data view while making recordings. If you forget which task you are on, this box is here to remind you where you left off.
Task Instruction Box	

Lab View Box

Definition	The lab view box allows you to view the lab through a small window.
Background	Use the directional keys to navigate the lab through the lab view box and the + or – buttons to zoom in and out with your camera.
Lab View Box	

Pre/Post-Test Data Box

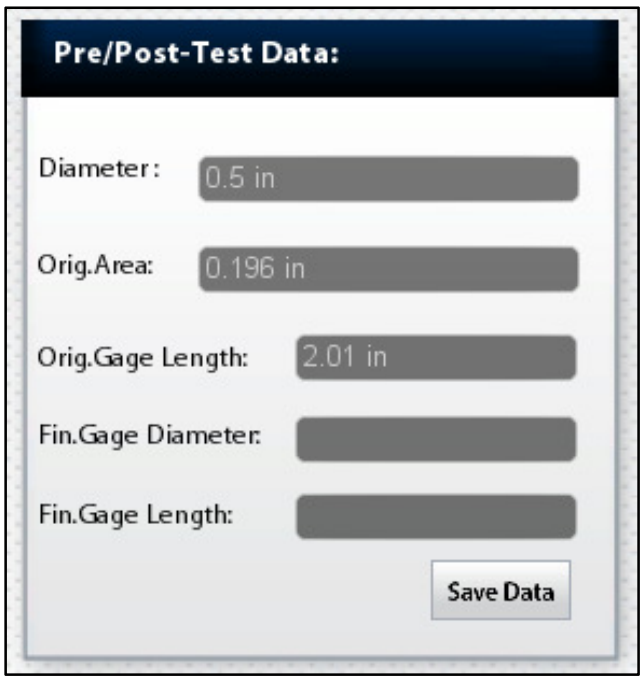
Definition

The Pre/Post-Test Data Box records your data from both sets of gauge measurements taken in the lab.

Background

Your data will appear automatically as you measure in the lab. Make sure you save this data in order to perform your final calculations later.

Pre/Post-Test Data Box



Test Data Box

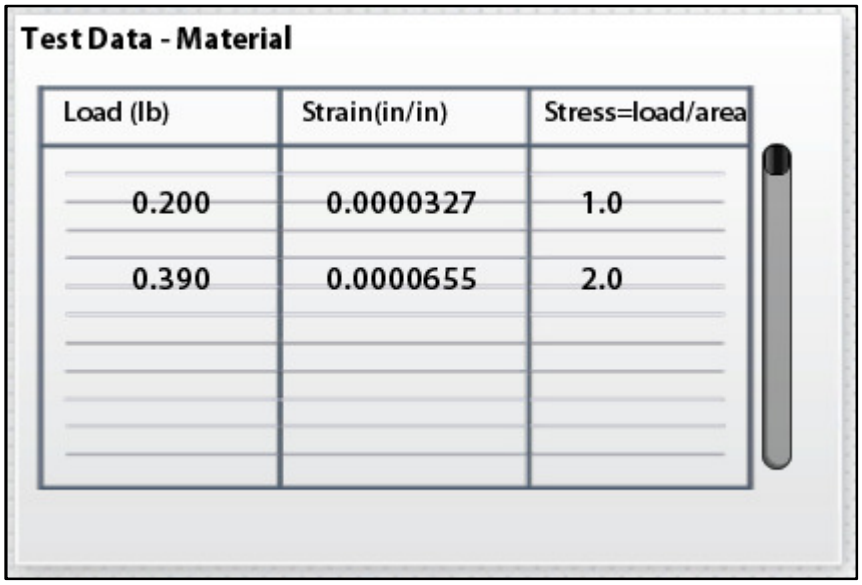
Definition

The Test Data Box will record each step of strain added to your material in the tension machine.

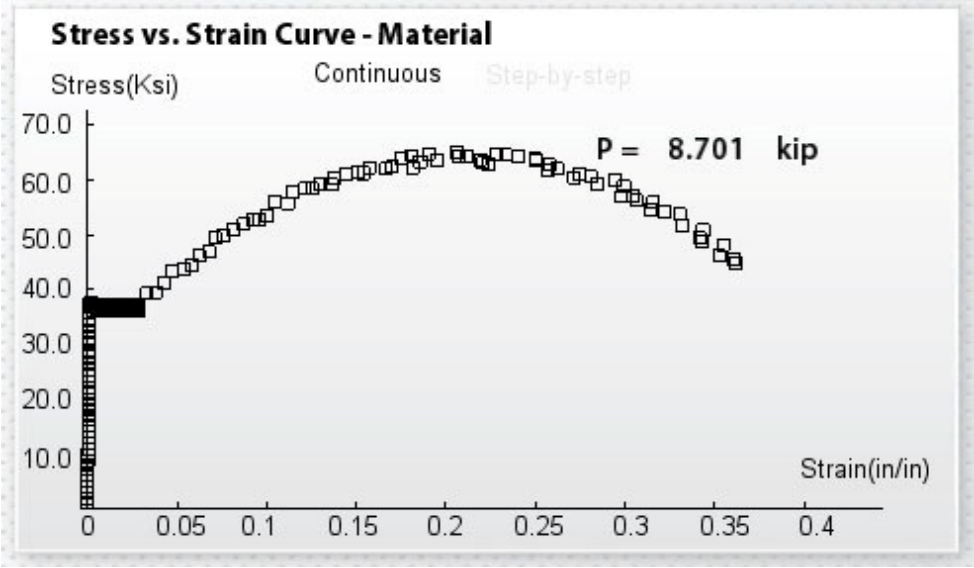
Background

This data is automatically recorded in the Test Data Box, and can be viewed in real time by staying within data view while your test is in process.

Test Data Box



Stress vs. Strain Curve

Definition	The stress vs. strain curve demonstrates, in graphical form, the tension applied to your material.
Background	Each data plot is automatically generated, and each curve will vary from test to test.
Stress vs. Strain Curve	

Final Calculations Box

Definition	This is where you record your final calculations before finalizing your data.
Background	This box will be where you enter your simulation test's max load, fracture load, and appearance of material.
Final Calculations Box	

The Reports View: Tension

Overview

This section will give you a tour of the reports tab of the simulation.

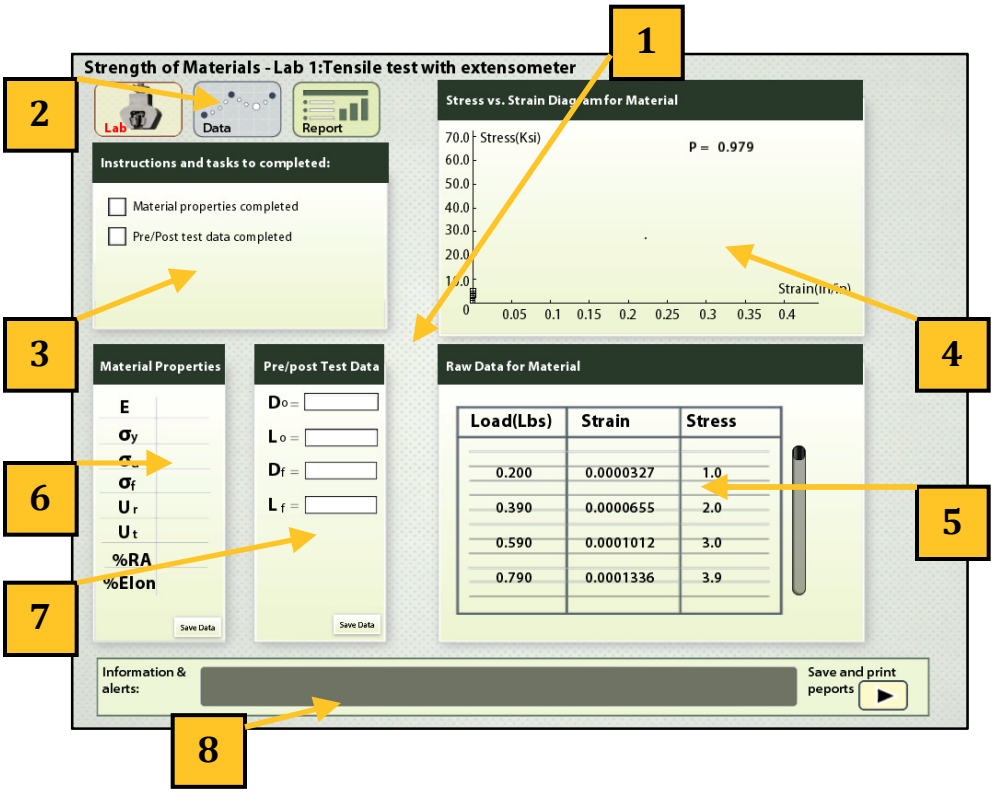
In This Chapter

Reports View

Description

The reports view opens up once your test has been completed and all measurements have been recorded. This view will be where you log your final calculations and prepare your simulation report.

Reports View



Important Aspects

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4	Stress vs. Strain Diagram	43
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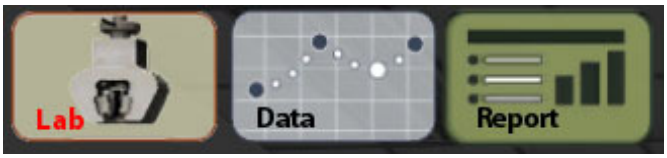
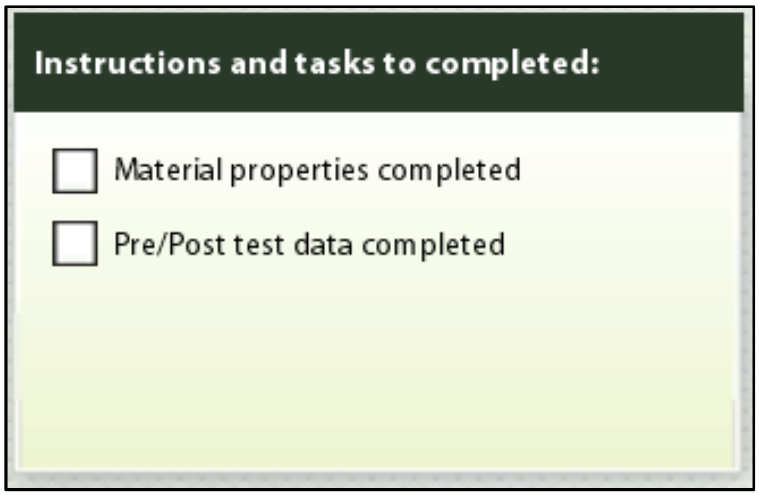
6	Material Properties Box	45
7	Pre/Post-Test Data Box	46
8	Simulation Notes Box	47

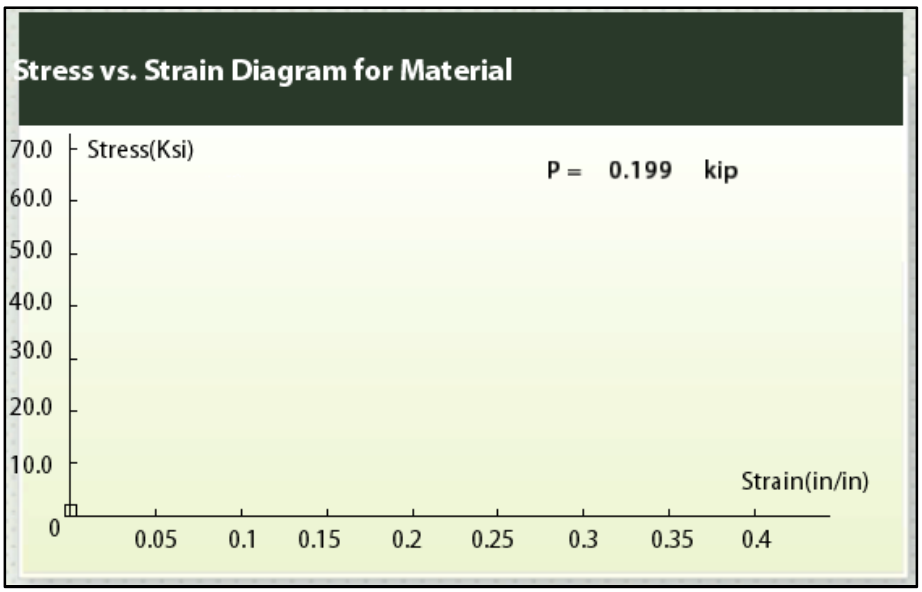
Simulation View Tabs

Definition	Use these three tabs to get around the main components of the simulation.
Background	The lab view is used to navigate to the portion of the simulation responsible for conducting your tensile test. The data view is where all automatic data from the test will be stored. The report view is the portion of the simulation where you store your final data to submit to your professor.
Simulation View Tabs	

Task Instruction Box

Definition	The task instruction box records your progress as you complete your tension test tasks.
Background	The task instruction box automatically checks off each task as you complete it. This is helpful if you toggle from lab view to data view in order to make recordings. If you forget a task you are on this box is here to remind you where you left off.
Task Instruction Box	

Stress vs. Strain Diagram

Definition	The stress vs. strain curve demonstrates in graphical form the tension applied to your material.
Background	Each data plot is automatically generated, and each test is different.
Stress vs. Strain Diagram	

Raw Data Box

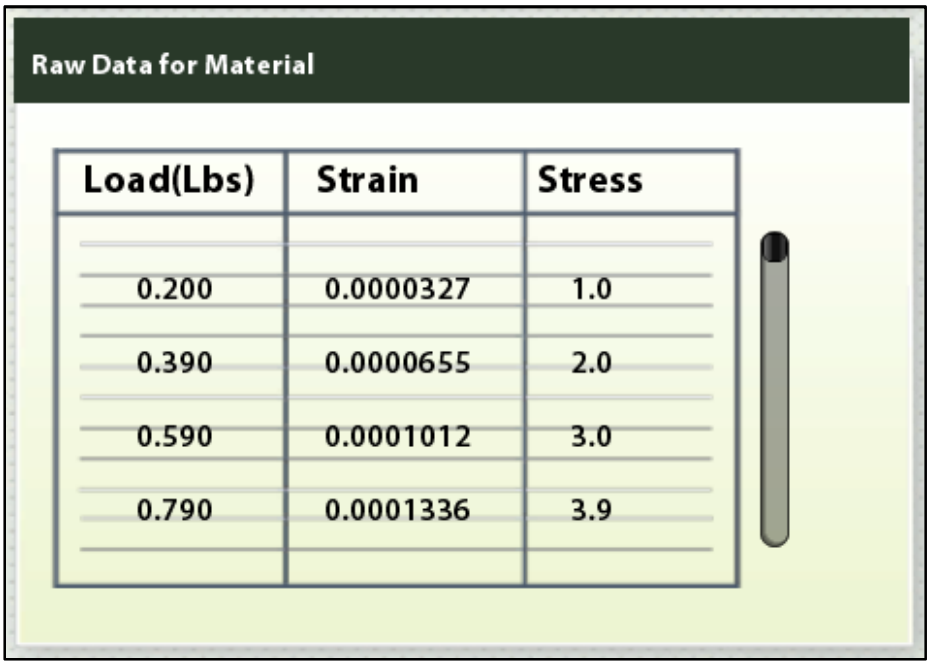
Definition

The test data box will record each step of strain added to your material in the tension machine.

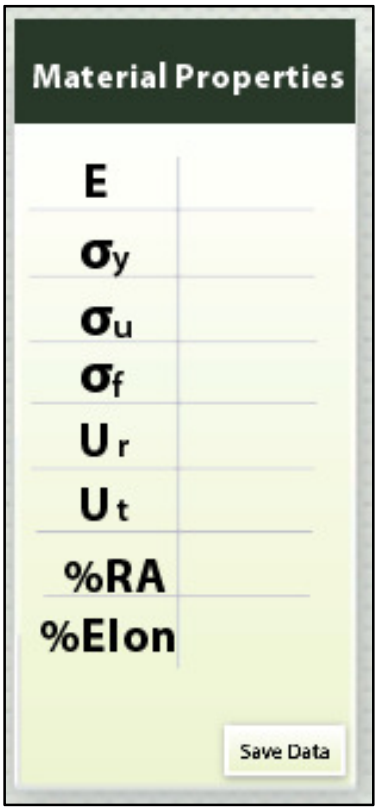
Background

This data is automatically recorded in the test data box, and can be viewed in real time by staying within data view while your test is in process.

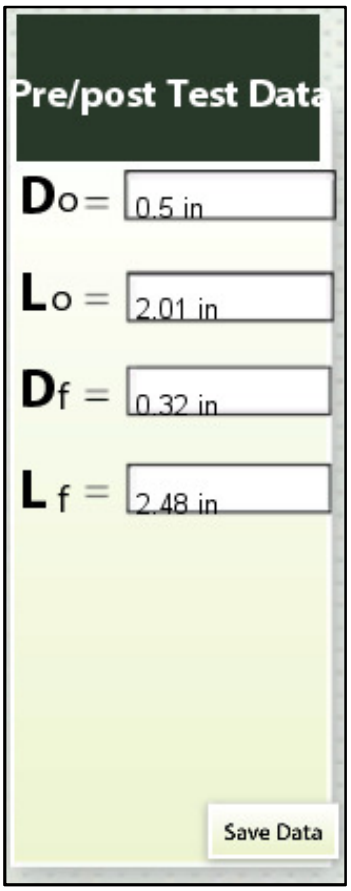
Raw Data Box



Material Properties Box

Definition	This box serves as the data entry point for each material property that you calculate.
Background	Enter each material property into the blank box beside its symbol.
Material Properties Box	

Pre/Post-Data Test Box

Definition	This box will be where you enter your final report calculations for D & L
Background	Enter each data point into the blank box beside its symbol.
Pre/Post-Test Data Box	

Simulation Notes Box

Definition	This box is where you record any notes or observations you encountered throughout your simulation. You professor will send this notes and observations to the simulation's creators who will incorporate your findings in future versions.
Background	Simply type your notes and observations in the blank field provided and click save.
Simulation Notes Box	

Chapter Two: The Tension Test

Overview

This chapter details step-by-step how to complete a tension test using the simulation. Use the table below to navigate by section or page number.

In This Chapter

Section One: How to Perform Pre-Test Configuration

Overview

This section will guide you through the process of entering your general information and selecting a tension test.

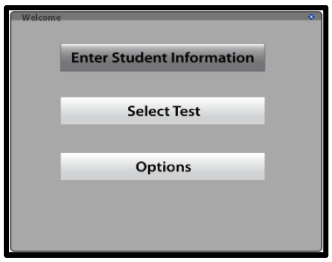
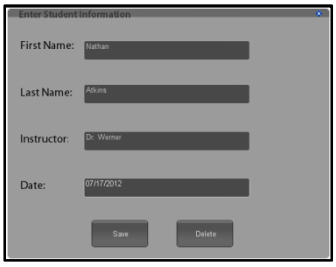
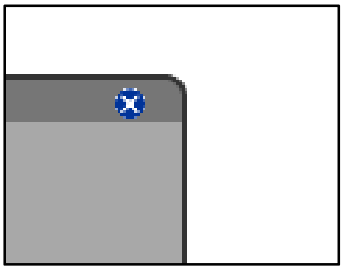
In This Section

How to Enter Your Student Information

Introduction

Follow these instructions to enter your student information into the simulation. This information is automatically copied into your final report.

How to Enter Your Student Information

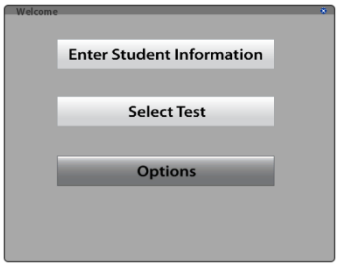
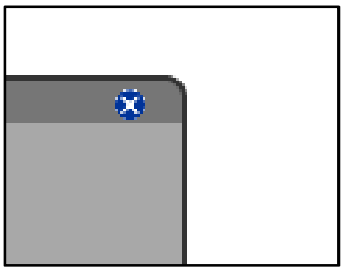
Step	Action	Illustration
1	Click on **Enter Student Information** in the simulation welcome screen.	
2	Enter your student information.	
3	Click **Save** to store your student information.	
4	Click the **Close Icon** in the upper right hand corner.	

How to Enter Simulation Options

Introduction

Follow these instructions to adjust settings for your simulation experience. Once set, options are not able to be changed without restarting the simulation.

How to Enter Simulation Options

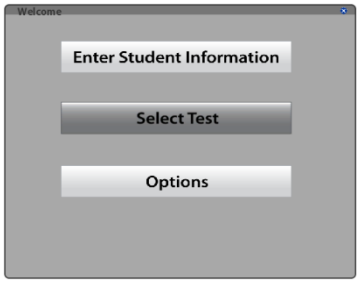
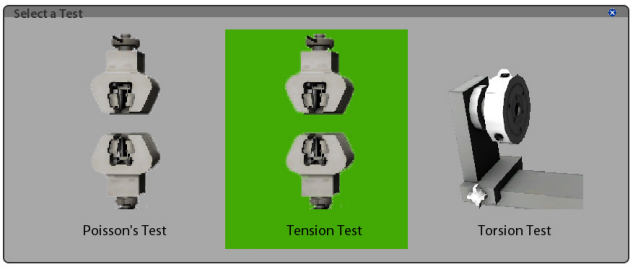
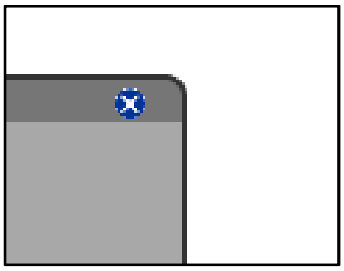
Step	Action	Illustration
1	Click on **Options** in the simulation welcome screen.	
2	Adjust any settings you wish.	NO OPTION IN SIMULATION YET AVAILABLE
3	Click **Save** to store your adjustments.	
4	Click the **Close Icon** in the upper right hand corner.	

How to Select Tension as Your Simulation Test

Introduction

Follow these steps to have the simulation create a tension test.

How to Select Tension as Your Simulation Test

Step	Action	Illustration
1	Click **Select Test** in the simulation welcome screen.	
2	Click **Tension Test** in the select a test menu. The test will highlight green before it is selected.	
NOTE	You may return to the simulation welcome screen by clicking the **Close Icon** in the upper right hand of the screen	

Section Two: How to Perform Lab Functions

Introduction

Your tension test begins in the lab. This will be where you will manipulate your specimen, take measurements, and interact with the tension machine. The bulk of your simulation will occur in the following steps. Use the table below to navigate this section as needed.

How to Perform Lab Functions

How to Navigate the Simulation Using the Camera

Introduction

While in lab view the entirety of the environment is able to be explored. Exploration takes place from a first person camera angle, and may be done during any step of your tension test. Navigation is accomplished through the use of the keyboard. Use the keys below to explore and navigate the simulation's lab view.

How to Navigate the Simulation Using the Camera

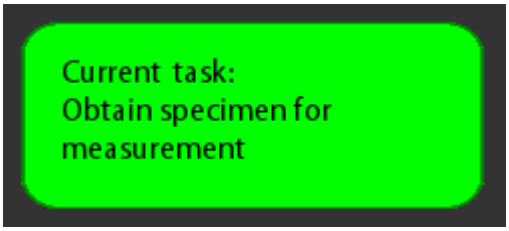
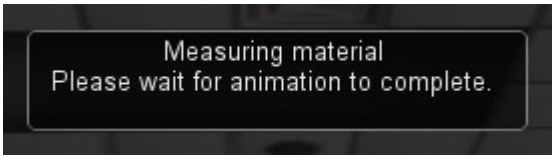
Key	Action
Q	Press and hold this key to move the camera upwards.
W	Press and hold this key to move the camera forwards.
A	Press and hold this key to move the camera left.
S	Press and hold this key to move the camera backwards.
D	Press and hold this key to move the camera right.
Z	Press and hold this key to move the camera downwards.
SHIFT	Pressing this key while holding one of the above keys will slow the speed of movement.

How to Tell When a Simulation Step is Complete

Introduction

The tension test is completed by following a series of steps. These steps are outlined on the following pages. Take note of the following in order to tell when a step is complete.

How to Tell When a Simulation Step is Complete

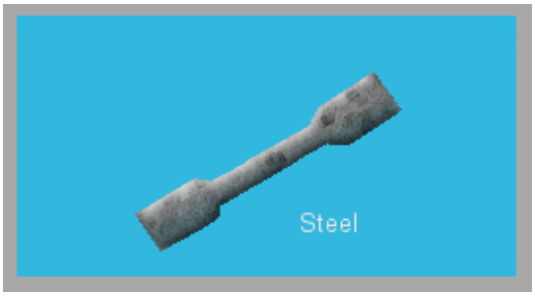
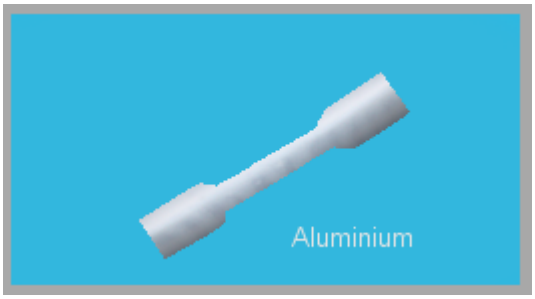
Action	Illustration
After a step is completed the **Current Task Box** will flash green.	
NOTE: After a step is completed both the instruction box and the current step box will advance to the next task.	
NOTE: You cannot move to the next step until the **Current Task Box** has finished flashing green.	
NOTE: You cannot interact with the simulation when any animation is in process.	

How to Select Your Material

Introduction

Once you have selected your test – in this case a tension test – you are taken to the Material Selection Screen. Follow the steps below to select from your choice of two materials.

How to Select Your Material

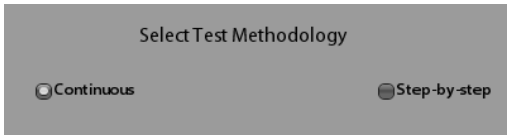
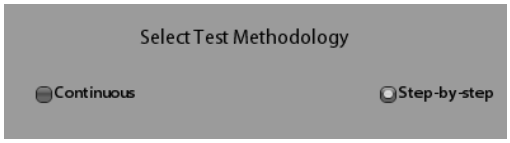
Step	Action	Illustration
1	Click on either: Steel **OR** Aluminum **NOTE**: When hovering over your selection, its background will turn light blue.	 

How to Select Your Test Methodology

Introduction

Depending on whether you wish to have your tension test occur in a continuous fashion, or step-by-step as you command, is an option you are provided with. Test methodology is found in the Material Selection Screen in the lower left-hand corner. Follow the step below to select your test methodology.

How to Select Your Test Method

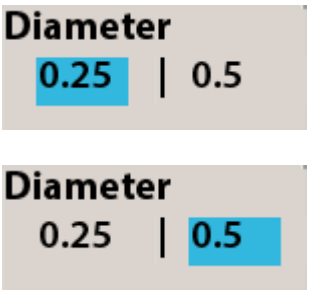
Step	Action	Illustration
1	Click on either: Continuous **OR** Step-by-step **NOTE**: The box to the left of your selection will turn white once clicked.	 

How to Select Your Material's Starting Gauge

Introduction

The final step found in the Material Selection Screen allows you to select your specimen's starting gauge. You are given the choice between .25" and .50". Follow the steps below to select your material's starting gauge.

How to Select Your Material's Starting Gauge

Step	Action	Illustration
1	Click on the down arrow located in the lower left hand corner of the material box. This reveals the diameter selection window.	
2	Click on either: 0.25" OR 0.5" **NOTE**: When hovering over your selection, its background will turn light blue.	
NOTE	You will be immediately directed to Lab View upon selecting your material's starting diameter.	

How to Obtain Your Specimen

Introduction

Begin work in the lab by obtaining your specimen for punching and pre-test gauge measurements.

How to Obtain Your Specimen

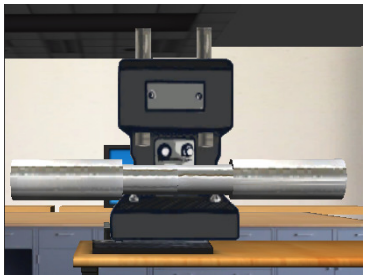
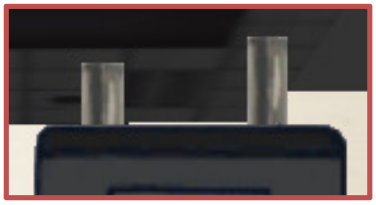
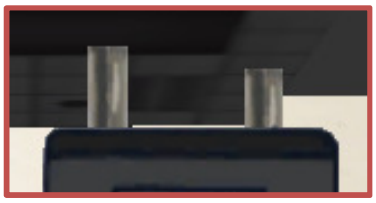
Step	Action	Illustration
1	Locate the Current Specimen Box in the lower right-hand corner of your lab view.	
2	Click on the light gray box showing your specimen and its diameter. NOTE: When your mouse hovers over the box it will turn a darker shade of gray.	
NOTE	When your step is complete the current task box – located in the upper right-hand corner of your lab view – will flash green.	

How to Punch Your Material

Introduction

Once you have obtained your specimen, it is time to punch your material for measurement. Follow the steps below to successfully punch your material.

How to Punch Your Material

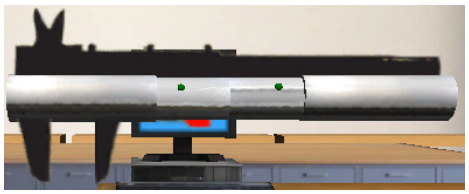
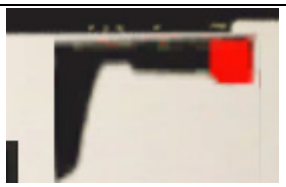
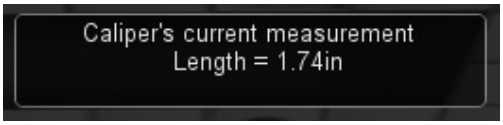
Step	Action	Illustration
1	Click the punch tool icon in the tool box to display your instrument. **NOTE**: The icon will turn dark gray when the mouse comes into contact.	
2	Drag the punch tool with your mouse and click the center of your material to lock in place.	
3	Click the left pole followed by the right pole to punch your material.	 
NOTE: Your material will animate at this point, rotating to face you. You will notice your material has two punched, green spots.		
4	Click the punch tool icon in the tool box to put away the instrument.	

How to Take Pre-Test Measurements

Introduction

Once your material has been punched you are able to take your pre-test gauge measurements. Follow the steps below to do so.

How to Take Pre-Test Measurements

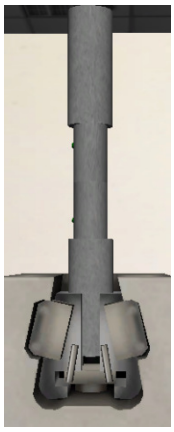
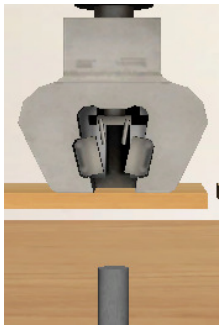
Step	Action	Illustration
1	Click the Caliper tool icon in the tool box to display your instrument. **NOTE**: The icon will turn dark gray when the mouse comes into contact.	
2	Drag the caliper tool with your mouse and click the center of your material to lock in place.	
3	Measure the gauge length by dragging the caliper's red jaw spot.	
NOTE: A constantly adjusting measurement window will appear.		
4	When you reach the correct measurement your caliper will turn blue.	
5	Click the center of your material to begin measuring your gauge width.	
6	Repeat steps 2 - 5	
7	Click the caliper tool icon in the tool box to put away the instrument.	

How to Secure Material in the Tension Machine

Introduction

Now it is time to secure your material in the tension machine.

How to Secure Material in the Tension Machine

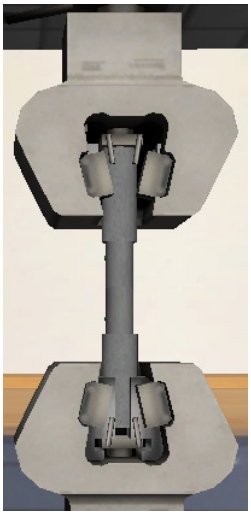
Step	Action	Illustration
1	Navigate the camera – using the keyboard -- closer to the tension machine. The material will travel with you.	
2	Open the bottom clamp of the machine by pressing →.	
3	Place material in the bottom clamp using the keyboard. The material will jump into place when set.	
4	Secure the bottom clamp of the machine by pressing ←.	
5	Move the camera upwards to view the machine's top clamp.	
6	Open the top clamp of the machine by pressing ↑.	

How to Secure Material in the Tension Machine Continued

Introduction

These are steps to secure your material in the tension machine that are continued from page 62.

How to Secure Material in the Tension Machine Continued

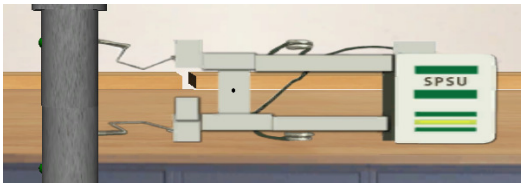
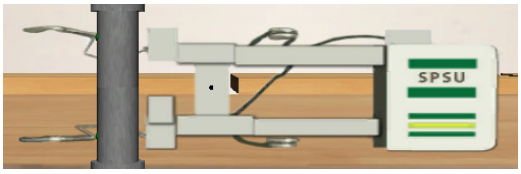
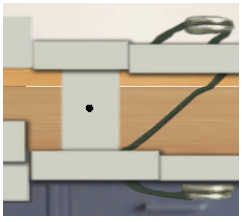
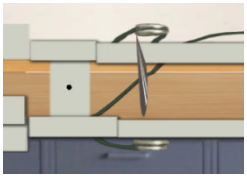
Step	Action	Illustration
7	Pick up the machine's controller by pressing **C**.	
8	Press the controller's down arrow with the mouse to lower the machine's top clamp.	
9	Secure the top clamp of the machine by pressing ↓.	

How to Attach the Extensometer

Introduction

Now that you have secured your material in the tension machine it is time to attach the extensometer.

How to Attach the Extensometer

Step	Action	Illustration
1	Navigate the camera close to your secured material.	
2	Click the **Extensometer Icon** in the Tool Box	
3	Hover your mouse over the center of your secured material and left click. **NOTE**: Your extensometer will be attached per the bottom picture to the right.	 
4	Locate the extensometer Pin. **NOTE**: It is the black dot in the center of the instrument.	
5	Click the extensometer pin to remove it.	

How to Zero the Tension Machine

Introduction

Now you are ready to zero out the tension machine. This will provide an accurate and clean base for readings.

How to Zero the Tension Machine

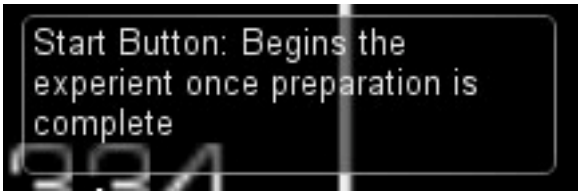
Step	Action	Illustration
1	Press the **Zero Icon** in the tool box.	
NOTE	You will be navigated to the tensions machine's computer terminal	

How to Start Your Tension Test

Introduction

Once you have zeroed out the tension machine you are now ready to begin your tension test. Simply click on the play button in the tool box, and your test will begin.

How to Start Your Tension Test

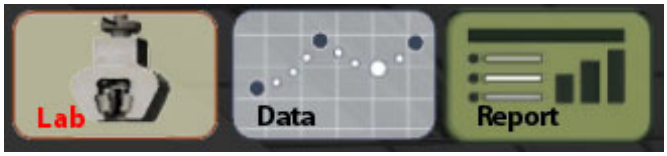
Step	Action	Illustration
1	Click the **Play** button located in the tool box.	
NOTE	You will be shown a window asking you to switch to data view.	

How to Switch to Data View

Introduction

When your tension test has begun you are ready to switch to data view.

How to Switch Data View

Step	Action	Illustration
1	Click the **Data View** button located in the lab view selection window.	
NOTE	This window is located in the upper left hand corner of the simulation.	

How to Record Data during Your Test

Introduction

Data is automatically recorded by the simulation as it conducts the tension test. Take note of your stress vs. strain curve and other data recordings. These will be important when you begin your final calculations.

How to Record Data During Your Test

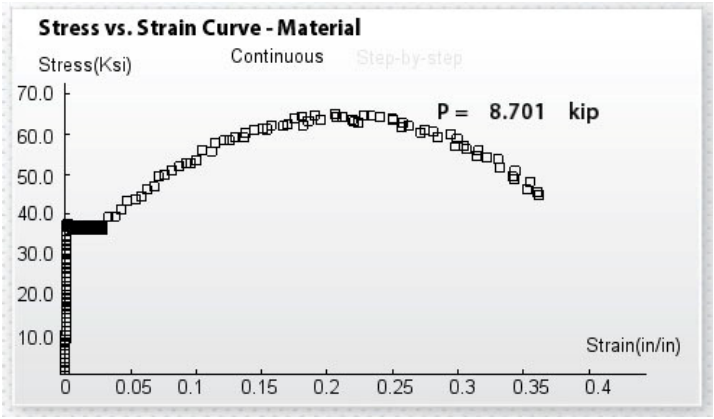
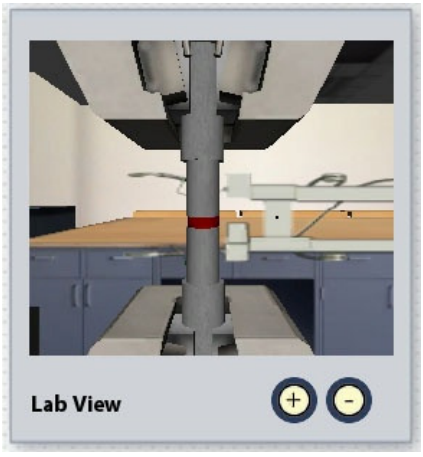
Step	Action	Illustration
1	Wait for your tension test to be completed.	
NOTE	All data is recorded by the simulation automatically.	

How to Determine Your Test Is Complete

Introduction

Your test is complete when no new data is added to the stress vs., strain curve, and when your lab specimen has been broken. You will be able to tell this has occurred as the specimen will be separated into two pieces each a red, heated end.

How to Determine Your Test Is Complete

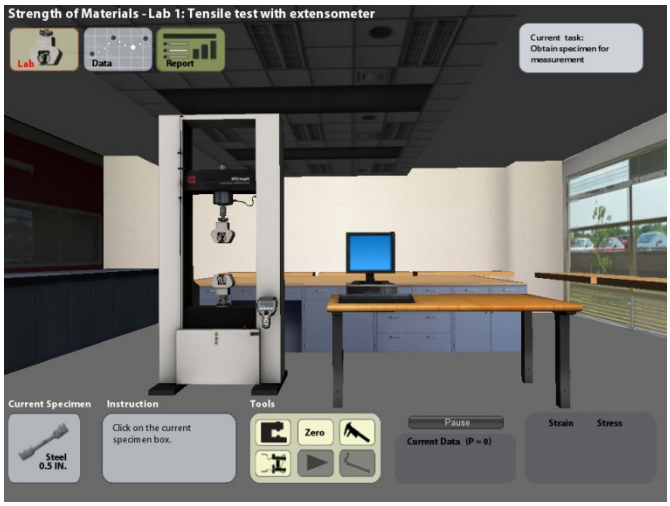
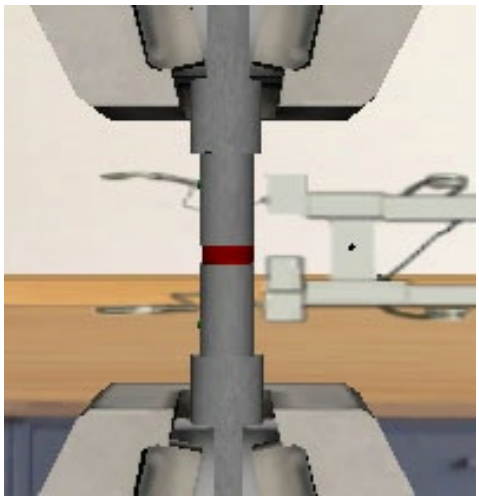
Step	Action	Illustration
1	Look for a completed stress vs. strain curve	
2	Observe the **Lab View Box** to watch your specimen throughout the test.	
NOTE	Your specimen will show itself in two pieces -- each with its own heated, red end -- once the test is completed.	

How to Remove Your Material from the Tension Machine

Introduction

To remove your finished specimen from the machine, simply click the center of the material secured in the tension machine.

How to Remove Your Material From the Tension Machine

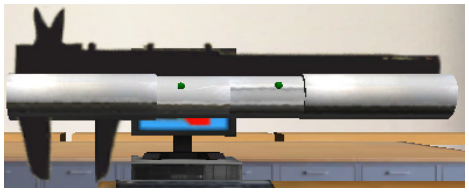
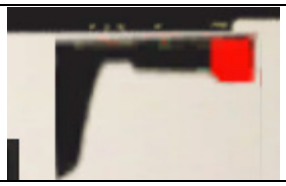
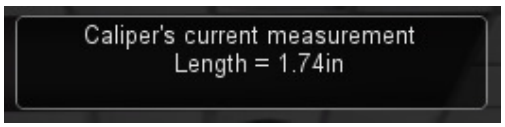
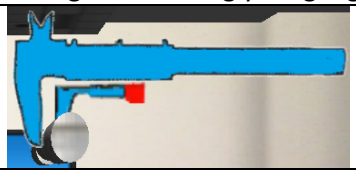
Step	Action	Illustration
1	Return to the lab view screen.	
2	Click the red center of the material in the tension machine.	

How to Perform Post-Test Measurements

Introduction

Once your material has been removed from the machine, you are able to take your post-test gauge measurements. Follow the steps below to do so.

How to Perform Post-Test Measurements

Step	Action	Illustration
1	Click the Caliper tool icon in the tool box to display your instrument. **NOTE**: The icon will turn dark gray when the mouse comes into contact.	
2	Drag the caliper tool with your mouse and click the center of your material to lock in place.	
3	Measure the gauge length by dragging the caliper's red jaw spot.	
	NOTE: A constantly adjusting measurement window will appear.	
4	When you reach the correct measurement your caliper will turn blue.	
5	Click the center of your material to begin measuring your gauge width.	
6	Repeat steps 2 - 5	
7	Click the caliper tool icon in the tool box to put away the instrument.	

Section Two: How to Perform Data Functions

Introduction

Once your lab is complete it is time to enter and save all data collected from the completed tension test.

How to Perform Data Functions

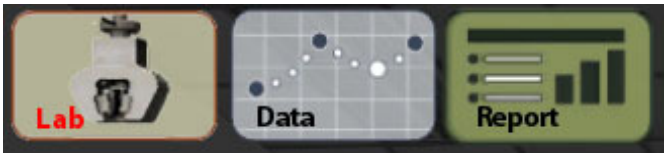
Step	Action
1	Switch to data view after completing your tension test
2	Save your data in the Pre/Post-Test Data Box
3	Enter your post-test observations
4	Save your post-test observations
5	Continue to the Reports View

How to Switch to Data View

Introduction

In order to save your data you need to switch to data view. In order to do this click on the data option in the screen selection box. This box is located in the upper left hand portion of your simulation screen.

How to Switch to Data View

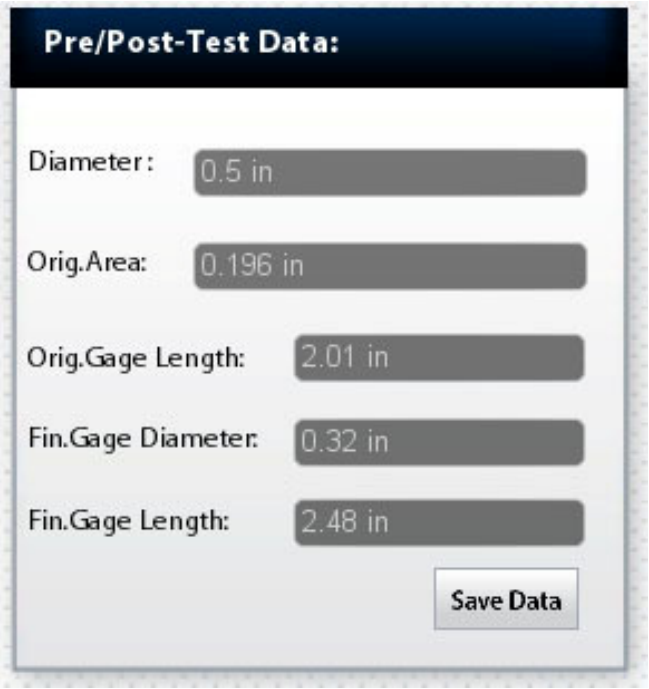
Step	Action	Illustration
1	Click the **Data View** button located in the lab view selection window.	
NOTE	This window is located in the upper left hand corner of the simulation.	

How to Save Your Pre/Post-Test Data

Introduction

In the pre/post-test data box will be recorded all gauge measurements. In order to complete an accurate report this data must be saved. Follow the steps below to ensure this is done correctly.

How to Save Your Pre/Post-Test Data

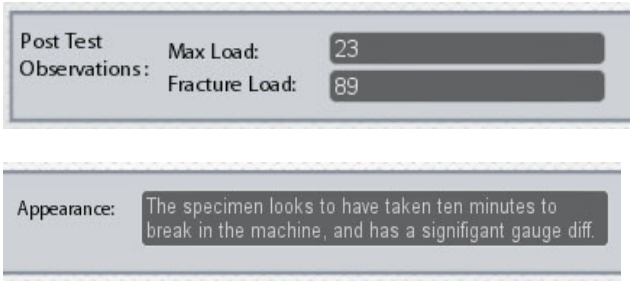
Step	Action	Illustration
1	Verify your data in the pre/post-test box is correct.	
2	Click the **Save Data** button.	

How to Enter Your Post-Test Observations

Introduction

Any observations that you personally took during the simulation regarding your data need to be entered at this time.

How to Enter Your Post-Test Observations

Step	Action	Illustration
1	Record any observations in the post-test observation box located at the bottom of the data view screen.	

How to Save Your Post-Test Observations

Introduction

Once you have entered in any post-test observations, follow the step below to save your observations.

How to Save Your Post-Test Observations

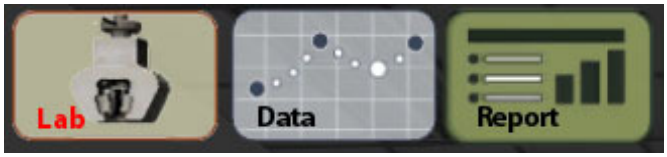
Step	Action	Illustration
1	Click Save Data next to the post-test observation box.	

How to Switch to Reports View

Introduction

Once you have recorded and saved all your data, you are ready to finalize your lab report.

How to Switch to Reports View

Step	Action	Illustration
1	Click the **Report View** button located in the lab view selection window.	
NOTE	This window is located in the upper left hand corner of the simulation.	

Section Four: How to Perform Report Functions

Introduction

Your lab is completed and your data has been entered and recorded. To finish your simulation you will need to finalize your reports. The following section will walk you through the steps that will do so.

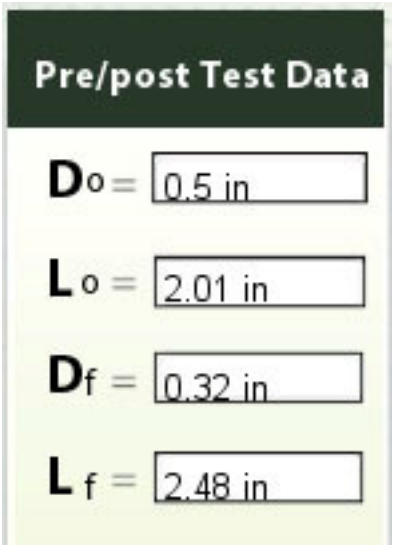
How to Perform Report Functions

How to Save Your Pre/Post-Test Data

Introduction

In the pre/post-test data box will be recorded all gauge measurements. In order to complete an accurate report this data must be saved. Follow the steps below to ensure this is done correctly.

How to Save Your Pre/Post-Test Data

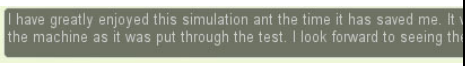
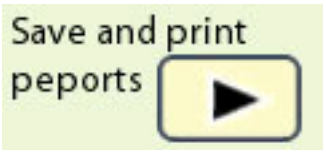
Step	Action	Illustration
1	Verify your data in the pre/post-test box is correct.	
2	Click the **Save Data** button.	

How to Save and View Reports

Introduction

You may take the opportunity to record any thoughts, suggestions, or comments for the simulation's creation team at this time. If you do not have comments at this time simply click save.

How to Save and View Reports

Step	Action	Illustration
1	Enter your thoughts, suggestions, or comments into the simulation notes box.	
2	Click the **Save and View Reports** button to continue.	

How to Verify Your Information in the Tension Data Summary

Introduction

Once you have clicked the **Save and View Reports** button in reports view, you are taken to the tension data summary. Follow the steps below to verify your information.

How to Verify Your Information in the Tension Data Summary

Step	Action	Illustration
1	Verify that all pre-recorded information is correct.	
2	Change any information that is incorrect by re-typing into the respective data fields.	
3	Perform your personal calculations to determine missing lab data and properties.	
4	Enter your property calculations in their respective fields.	

How to Enter Comments in the Tension Data Summary

Introduction

Use the following information to input data into your tension test summary.

How to Enter Comments in the Tension Data Summary

Step	Action	Illustration
1	Navigate to your desired data field by clicking your mouse in the field.	
2	Erase any incorrect data by pressing the delete key.	
3	Type or re-type any information into the field you desire.	

How to Calculate Your Material Properties

Introduction

Make sure to enter your data for your material properties into the tension data summary.

How to Calculate Your Material Properties

Step	Action	Illustration
1	Perform your calculations on a separate sheet of paper using your notes from class.	
2	Enter each material property into its field in the tension data summary as you compute them.	

How to Return to the Reports View

Introduction

Follow the steps below to return to your reports view.

How to Return to the Reports View

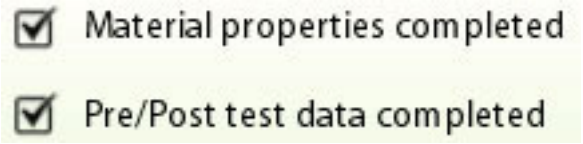
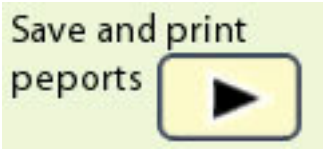
Step	Action	Illustration
1	Verify all information is correct in each field.	
2	Click the **Go Back to Reports View** button.	

How to Save Your Final Report Calculations

Introduction

Complete the steps below to make sure your final calculations are saved correctly for your printed report.

How to Save Your Final Report Calculations

Step	Action	Illustration
1	Verify your information in the Reports view is correct.	
2	Click the Save Data next to the Material Properties Box.	
3	Click the Save Data Button next to the pre/post-test data box.	
4	Verify both check marks are checked off in the instructions and tasks completed box.	
5	Enter any final thoughts, suggestions, or comments in the Information & comments box. NOTE: This step is accomplished exactly as step one on page 80.	
6	Click the Save and Print Reports button.	

Congratulations

Introduction

You have now finished your Tension Test. Please make sure to check with your instructor regarding the manner by which you should turn in your final printed reports.