**DURHAM GEO SLOPE INDICATOR**

# WinSAS™ Software Program

# Operator's Manual

Version 1.17

# Table of Contents

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**SOFTWARE CODE**

The software code is copyrighted 2003 by Durham Geo Slope Indicator. All rights reserved.

**SOFTWARE LICENSE AND REGISTRATION**

The purchase of one WinSAS™ software program gives the purchaser the right to install the

program on one PC. If additional copies are needed, the purchaser will be required to purchase

an additional software key.

**Chapter**

**1**

# INTRODUCTION

WINSAS™ is a serial acquisition system used in conjunctions with the E-405 Smart Digital Indicators that are modified for serial port communication.  The software is formulated for common laboratory tests such as shear strength, consolidation and penetration.  However, the user can use the software to collect data from a wide range of tests limited only by the communication speed of the E-405 digital indicators.

The WINSAS™ software gives the user the convenience of digital indicators at the test stand with the ability of transferring the test data to a standard ASCII file.  One to 31 E-405 Smart Digital Indicators are link together via a communication card added to each indicator and the end most E-405 connected to the user's computer via a RS-485 _ RS-232 converter.  No internal cards to the user's computer are needed.

WINSAS™ software includes a library of common soil tests from which the user can select the type of test to be performed (such as a CBR or Triaxial). The user can also create a "test machine" by grouping sensors from a user defined library to perform a specific test.  The system provides up to five different time intervals for logging the data.  The user has the ability to change these suggested intervals on the fly.  The user can create custom logging profiles with up to five time intervals and each interval containing up to 9999 data points.  The sensor library contains the sensor type, maximum range, calibration factors, and serial number for each transducer (sensor).

Output of each sensor assigned to the select test is displayed with the elapsed time and reading.   Also any sensor can be graphically displayed with the value plotted on the ordinate and the elapsed time on the abscissa. Depending on the type of test being performed, special graphical outputs are available, for example, the load versus penetration for CBR tests.

## SYSTEM REQUIREMENTS

‣ Microsoft's Operating systems Windows 98, 2000,NT or XP
*Note: This software is not compatible with Windows 95, Windows ME, and XP-Home is not recommended.*

‣ 500 MHz processor --- (Faster processor recommended)
‣ 64 MB RAM     --- (128 MB(+) recommended)
‣ Approximately 12 MB free disk space
‣ CD drive to load program
‣ VGA display

## INSTALLATION INSTRUCTIONS

1. Insert CD into computer's CD drive, open the WinSAS folder, and double click setup.exe  -or-

2. Select Start/Run/(CD Drive letter):/installer/Setup.exe
   -or-
   Double click on (CD Drive letter):/installer/Setup.exe in Windows Explorer

3. Follow instructions. Default installation is on C: drive, but the user can define the installation directory.

**Note:** If an older version of WinSAS is currently on your system, see **"upgrading to a new version"**. It is important to follow the instructions; otherwise your current setup Parameters will be lost. The uninstall program does not effect the data files from any previous tests.

Installation on WinNT, Win2000, or WinXP requires **Administrator privileges**.

Meters are connected via our RS-485 / RS-232 converter and connected to the computer's Com1 or Com2 port in the back of the computer. **See figure 1** for details

## Security Key:

A security Key should have been included with your WinSAS software package. This key should be installed in the Parallel  (Printer) port on the back of the computer where WinSAS is to be installed. The software will not operate without this key.  If a printer is installed, simply install the key and then install the printer cable into the key.

**Chapter**

# 2

# INITIAL SET-UP
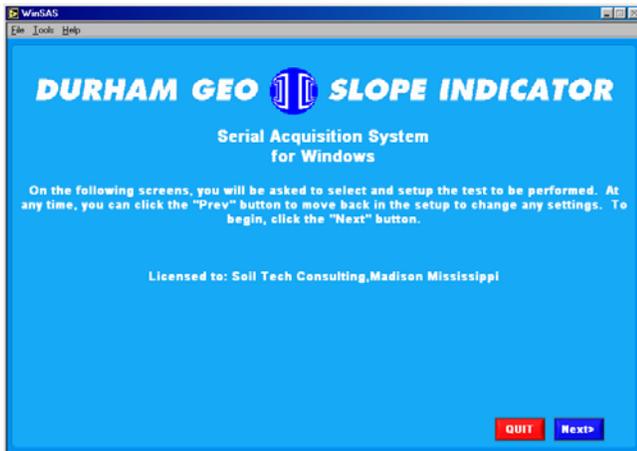


## ENTRY SCREEN

Three pull down tabs are at the upper left corner:

## FILE TAB

Exit (only option)

## TOOLS TAB

Options – presents the upper level selections: Tests, Sensor Library, Meter Library and WinSAS Setup.

**NOTE:** The "Tools" Tab is only available on the first screen (Seen here).

## HELP TAB

About – provides contact information and version number of WinSAS

Two tabs are located in the lower right corner

## QUIT

 Closes WinSAS.  Choosing FILE and Exit can also close WinSAS.

## Next>
Moves to the next screen after the test setups have been completed

**Selecting TOOLS and Options gives a screen with four major tabs:**

> **Tests** – Allows the user to select individual test set up parameters with a pull down menu and allows the user to select the sensor types to be used, i.e., displacement, load or pressure. Allows the user to change the collecting interval, choose the preload, failure and several graphics options.

> **Sensor Library** – Allows the user to add, remove or modify sensor information.

> **Meter Library** – Allows the user to add, remove, modify, and choose the sensor associated with each meter.

> **WinSAS Setup** – A listing of directories for various files. WARNING this information should be modified only by the user's System Specialist.

Sensor and Meter Library should be current and correct before proceeding. If your software has been purchased from Durham Geo Enterprises a testing setup with the required information may have been entered at our factory.
If calibration is performed at Durham Geo-Slope Indicator all necessary information should be on the supplied calibration certificate.
The following pages are taken directly from the WinSAS program with a brief narrative at the bottom of each page to help the user understand how to use WinSAS correctly and efficiently.



⮎ Please click on **File** then **Options** for the next page

This screen allows the user to enter pertinent data for each sensor used in their laboratory.
To add a new sensor select Add from the menu

**Serial Numbe**r: enter the serial number provided on the body of the sensor

**Transducer Type:** Select from the choices provided with the pull down menu

### SENSOR LIBRARY

**Maximum Range:**  Units of force, displacement or pressure as provided by the manufacturer's literature or the Calibration certificate.

**Units:**  Engineering units of measure (lbf, in., Psi)

**Calibration Offset:**  See calibration data provided by manufacturer (user information, Not required)

**Calibration Rise:**  See calibration data provided by manufacturer (user information, Not required)

**Calibration Date:**  The date that the transducer was last calibrated (user information, Not required)

To modify a sensor, select Modify from the menu and enter the affected modifications. Select Apply to permanently save any additions or modifications made to the data.

### METER LIBRARY



➲ **Click on the Meter Library Tab**
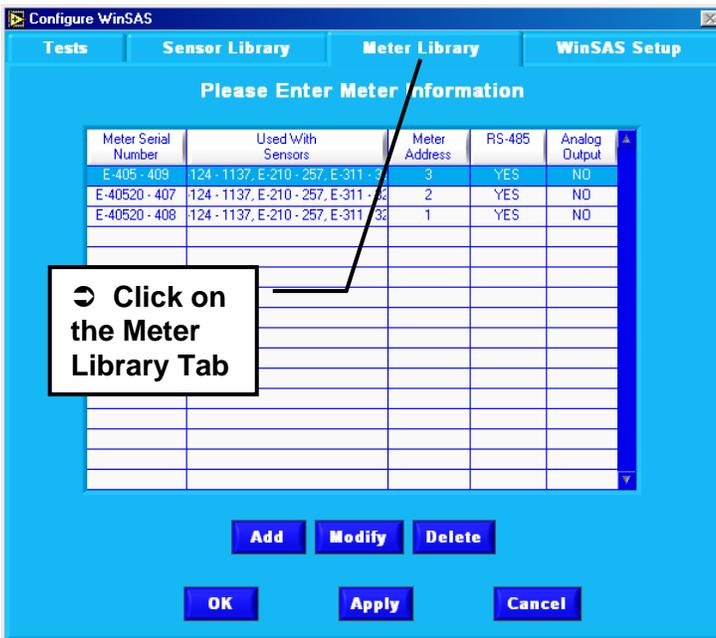
This screen allows the user to enter pertinent data for each digital readout (or meter) used in their laboratory. To add a new meter, select Add from the menu.

**Meter Serial Number:** enter the serial number provided on the case of the meter or from the manufacturer's literature.

**Used with Sensor:**  Each meter is matched with a sensor from the sensor library Double click on a sensor to add it to the meter or double click to remove from the meter

**RS-485:** The E-405 meter uses RS-485 protocol to communicate with the computer. This box should be turned on when using WinSAS.

**Meter Address:**  A unique number (meter address) is assigned to each meter using RS-485. See the calibration certificate for that sensor to acquire the correct meter address #.

**Analog Output:**  Does the meter have an analog output circuit board.
After adding meters and sensor combinations press **"OK"**
Then press "**APPLY"**

⊃ **Click on the WinSAS**
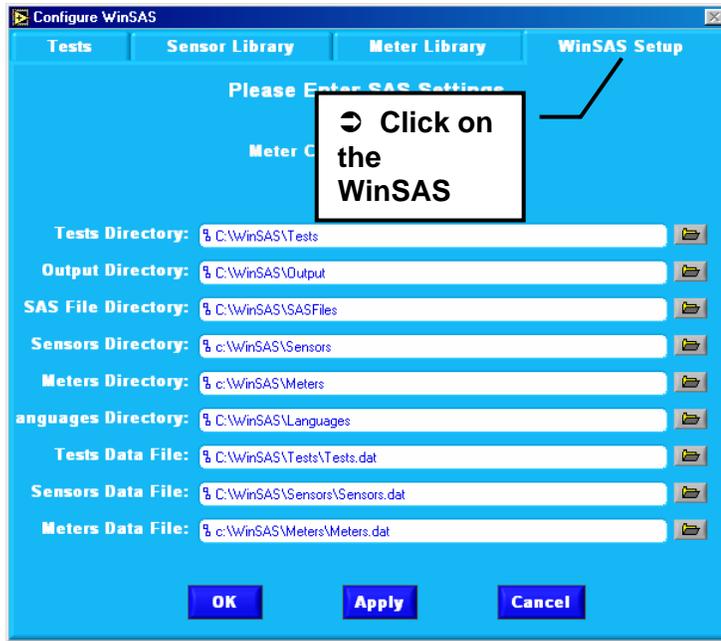
## WinSAS™ SETUP TAB

Here you will find the default directory's for all the files needed for WinSAS.

The Sensor and meter information is stored in separate .dat files. The information on test setup is stored in the test.dat files. The data you have collected will be placed in two folders, one with complete setup information called output files. The SAS files folder will be the location you will need to use for report software retrieval. A new folder will be created each new working day in the SAS folder.

We recommend leaving all the directory structures as the defaults, If these structures need to be changed please contact your system administrator or Durham Geo Slope Indicator for details on changing the root drive or directories

After selecting the Com port that you will be using, please click on **"Apply"** to save this as the default, then **"OK"** to return to the main page.

The **"Tests"** tab is described in the next chapter

# INDIVIDUAL TEST SET-UP

The heart of WinSAS™ is the Tests screen, which allows the user to select the test to be performed and the associated sensor(s). The following will set up the default settings for individual tests. These values can be changed in the normal operating sequence without effecting default settings.

The user first selects the type of test to be performed with the pull down menu. (LBR is shown here)

The 6 tabs in the middle of the screen are now used to define each test.

**TEST TAB**
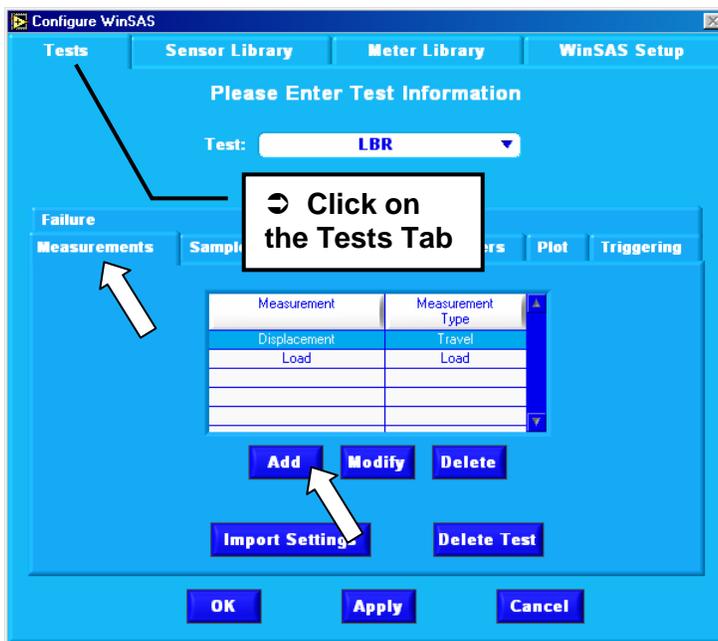


**Measurements:** Establishes what type of measurements will be made for each test.

**Sample Intervals:** User defined sampling rate for ten intervals.

**Sensors:** Select the sensors from the sensor library to be used with each measurement type for the selected test.
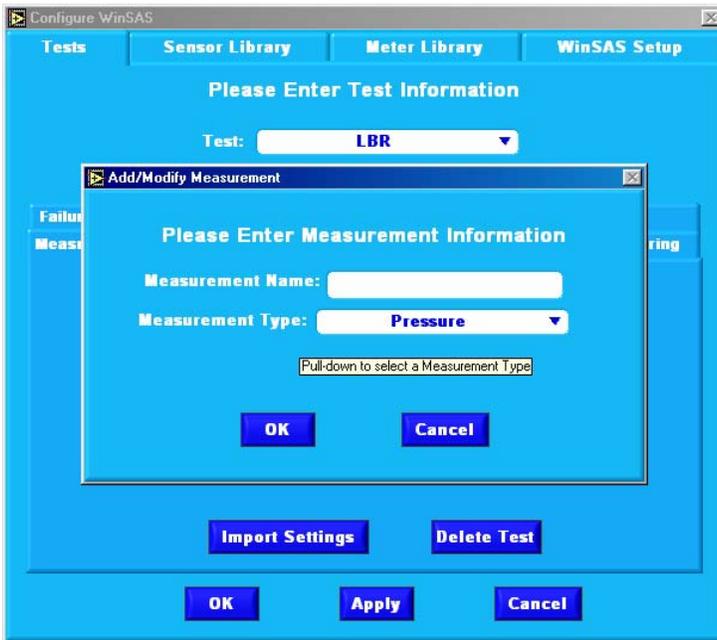
**Meters:** To select the digital meters from the meter library to be used with each sensor.

**Plot:** Allows the user to select collected values to be plotted as the test progresses

**Triggering:** User to select the method and increment to trigger the start of test.

**Failure:** User to select method and increment to stop the collection of data.

➲ Click on **"Measurements"**, then Add.

the main page

**Measurements:**

For the test selected, LBR,CBR etc. the user adds or modifies the name of the pressure type such as axial displacement, pore pressure, axial load, etc. Select the Measurement Type from add/modify pull down menu.  Press OK to complete the selection.

In summary, the user is free to enter any name desired for the measurement name, but the measurement type must be selected from the pull down menu. Now Press **"Modify"**. Check to make sure Measurement and Measurement type are correct. For example "displacement" should be linked to "travel" not load.

Press **"APPLY"** to save or "Cancel" to exit without saving.  OK will return you back to
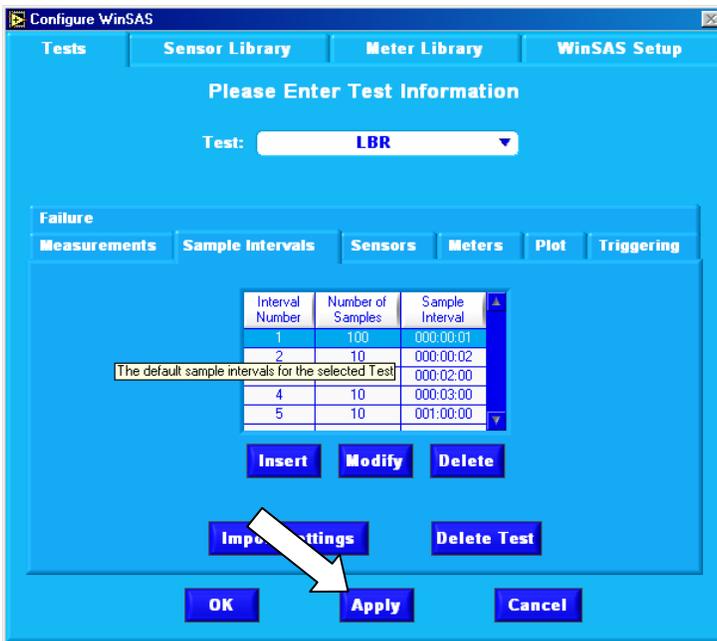
**SAMPLE INTERVALS TAB**

This screen is used to define up to ten different reading intervals. Each interval can record up to 9999 data points. DGE recommends the sample interval be

▪ not less than 1 second for one sensor,
▪ not less than 2 seconds for  to 4 sensors
▪ not less than 4 seconds for 5 sensors.

To change the entries, highlight the desired interval and select **"Modify".**

An overlay screen appears allowing the user to enter the number of samples and the time interval in units of hours, minutes and seconds.

Press **"OK"** to accept entries and return to the Sample Screen. Select **"Apply"** to save your changes.



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Use "**Insert**" to enter a new entry into the table. The new entry will be placed in the first position. Check all intervals after inserting a new entry.

Select **"Delete"** if you wish to delete the highlighted entry.

➔ *Remember to always select Apply to permanently save changes*.

**Import Settings:** User can import all or portions of test setups from other tests. Select the test options (CBR, Triaxial etc.) to import. Deselect the options you do not want to import and select **"import".**
Example: Importing all information from the LBR test (already set up) to CBR. You will be using the same meters and sensors, and all setup parameters are the same. This will eliminate the effort of reentering the data for CBR .
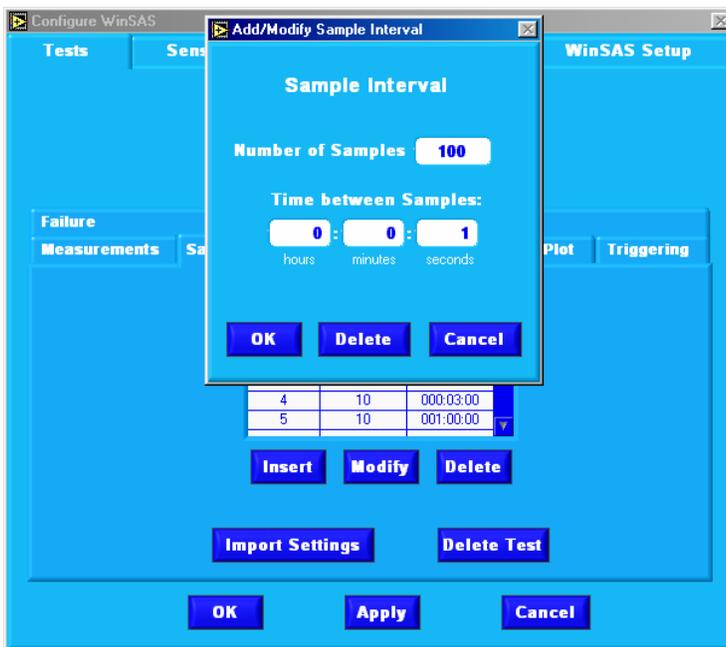


**Add/Modify Sample Interval**

This screen allows the user to enter the number of samples and the time interval in units of hours, minutes and seconds. Click on each interval 1-10 and modify each time separately.
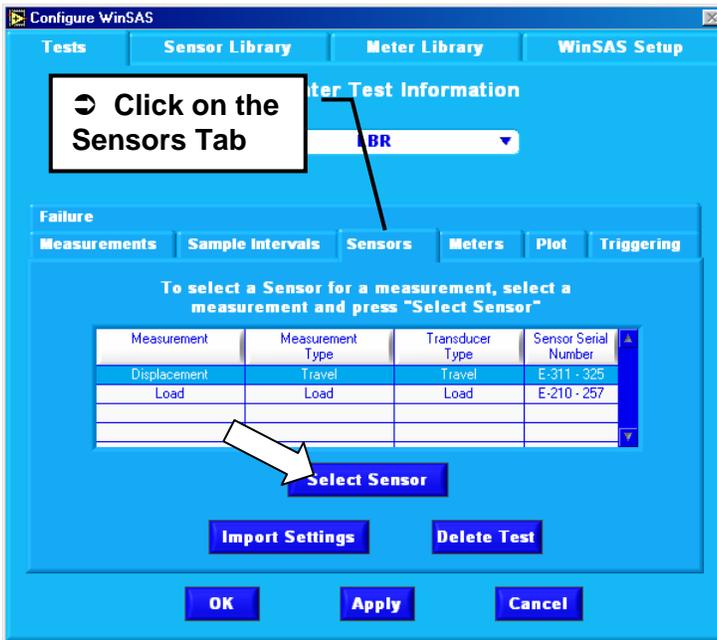
## SENSORS TAB

This screen allows the user to select the sensors (or transducer) from the sensor library that will be used with the test selected. In other words you are joining a sensor to a particular measurement type (for example, sensor E-311 is a Displacement transducer, E-210 is a load-measuring device.)

Highlight the measurements types and choose **"Select Sensor"** an overview screen appears that list the sensors in the library available for selection. Highlight the sensor desired and select **"Use Sensor".** The overview screen will disappear and the sensor selected will now appear on the Sensor screen.
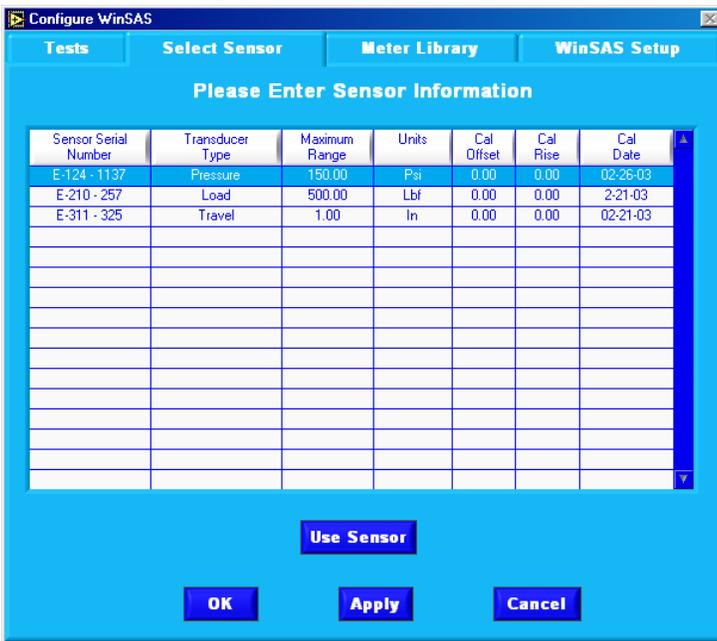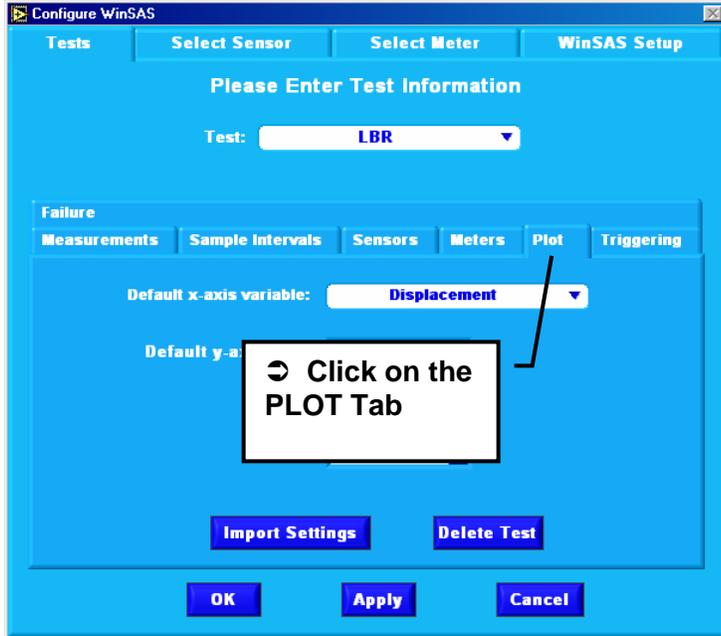
Care should be taken that the Measurement Type agrees with the transducer type.

Repeat process for all the sensors listed.

Select **"Apply"** to preserve the selections.

Please press the **"Meter"** tab in the middle of the screen for the next page.

## METERS TAB

Highlight the measurement and sensor type. Choose **"Select Meter"**, highlight the meter that is calibrated to the sensor selected and choose **"Use Meter"**. The program will save this configuration and return to the Meter menu.

Repeat this process for each sensor.

Each sensor is matched in the database with a digital readout meter.  If the user attempts to select a meter that is not matched in the Library file, an error message will appear.



Press on the **"Plot"** tab for the next page

## PLOT TAB

WinSAS™ allows one or two run-time graphs.  The user first selects load, displacement or time as the independent variable (x-axis).  Next double click on the y-axis variable to turn the plot routine on or off.  A check to the left of the measurement name means that that y variable is on.

Press **"Triggering"** for the next page.
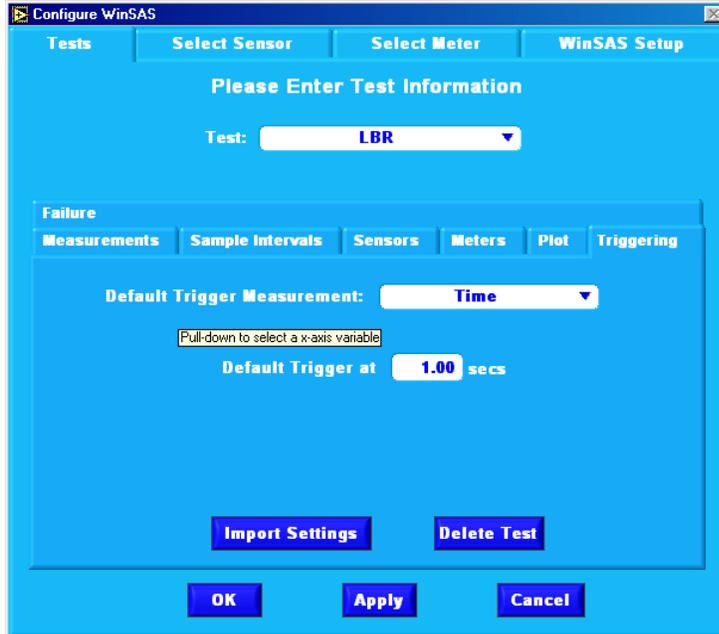


## TRIGGERING TAB

This screen is used to set up the triggering mechanism for starting the test.  The user can select one of three defaults:

**"Selecting Time"** as the default and enter the number of seconds that you wish from the triggering (start) event until the time the system begins to collect data.  If the user's computer is equipped with a sound card an audible sound will be made when the time setting has elapsed.  The system will zero the displacement reading at zero time.

**"Selecting Load"** as the default and enter the number of units (e.g., lbs.) that will trigger the system to begin collecting data.  The user can tare this value so that the output load will be zeroed at the start of data collection or turn

the tare option off and the trigger load will appear as the load at zero time.  The system will zero the displacement whether the tare is on or off.
**Selecting Displacement** as the default and entering a value (e.g., inches or mm) This will trigger the system to begin collecting data as soon as that displacement  value has been reached.

Select **"Apply"** to save all changes.

**Failure Tab**:

The Failure screen gives the user the ability to stop the data collection at a set point or for set failure criteria for a particular sample.
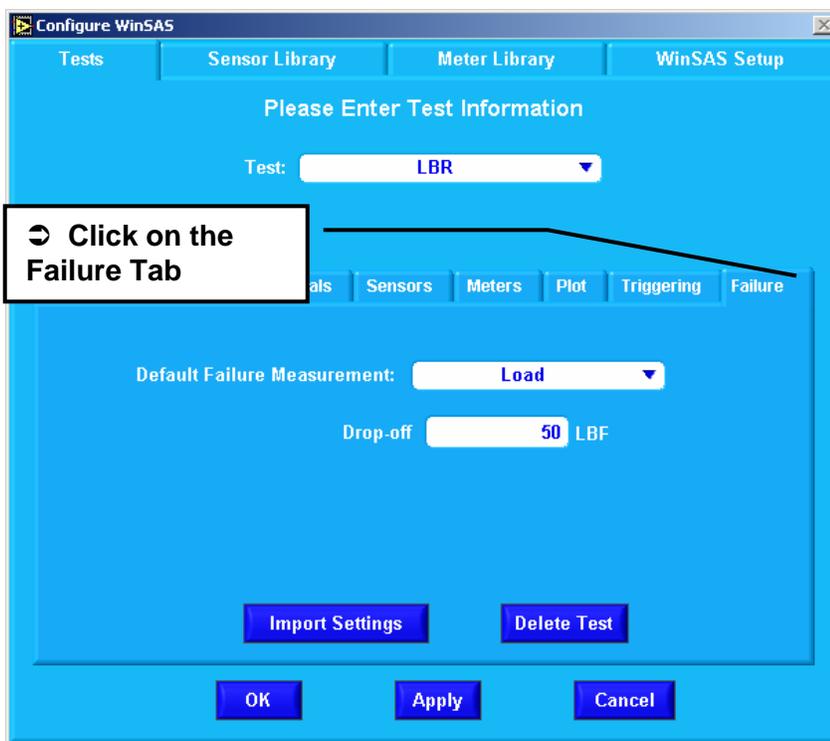


**"Selecting Load"** as the default for failure. This will set the criteria for the data collection to stop when five samples are collected at or below the value set by the user, below the peak value.  Example: Failure set to Load 50 lbf. Peak load for this example is 2000 lbf. When the software collects 5 samples at 1950 lbf or below the software will stop collecting.

**"Selecting None"** as the Default for failure, the software will continue to collect data until the operator selects the stop button or the time interval is complete.

**Chapter**

**4**

# ROUTINE TESTING
# PROCEDURES

The following screen shots provide the user with a rapid way to:

- select a test.

- verify the assignment of sensors, data sampling intervals, readout meters.

- accept or change the output file name and directory.

- accept or change the plotting routines.

- accept or change the triggers and end of test criteria.

- start and stop the data collection.

➔ *During this sequence the "**Next>**" button located in the lower right corner is used to move to subsequent screens. At any time you can revert to a previous screen using the "**<Prev**" button in the low left corner.*
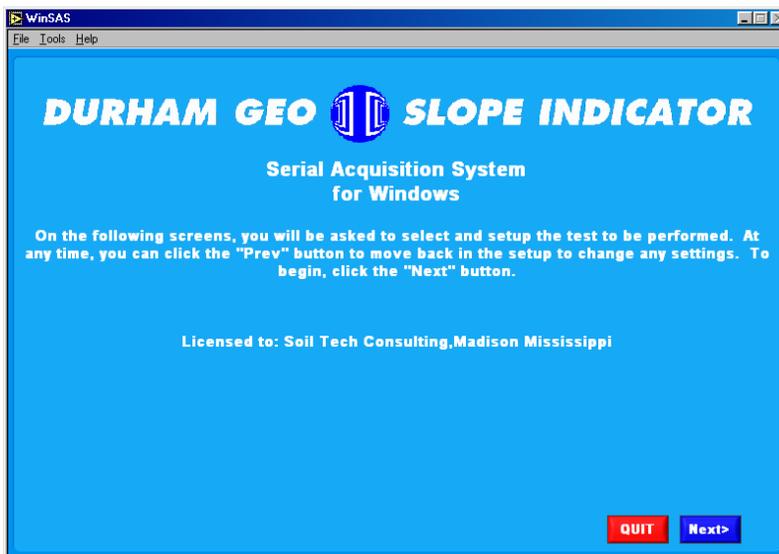


Once the sensors and meters have been entered in the options page.

Please press **"Next>".**
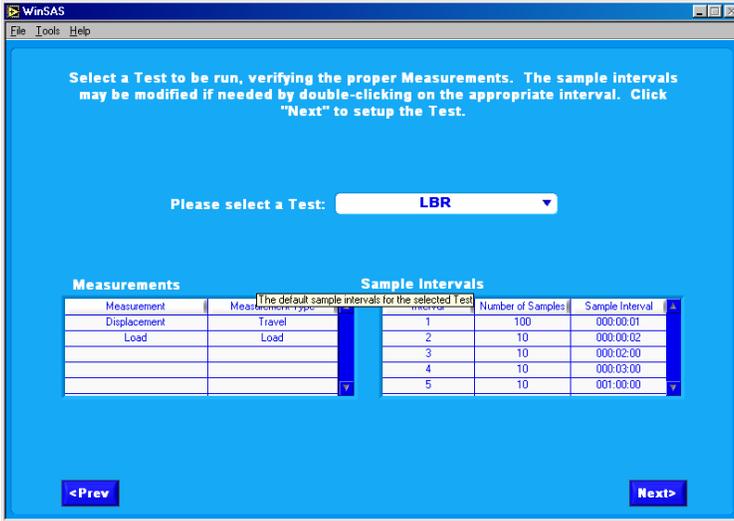
**Note:** The next three screens can be hidden by simply selecting Tools \ Options \ WinSAS setup and clicking the "operator can modify test set up" check box.
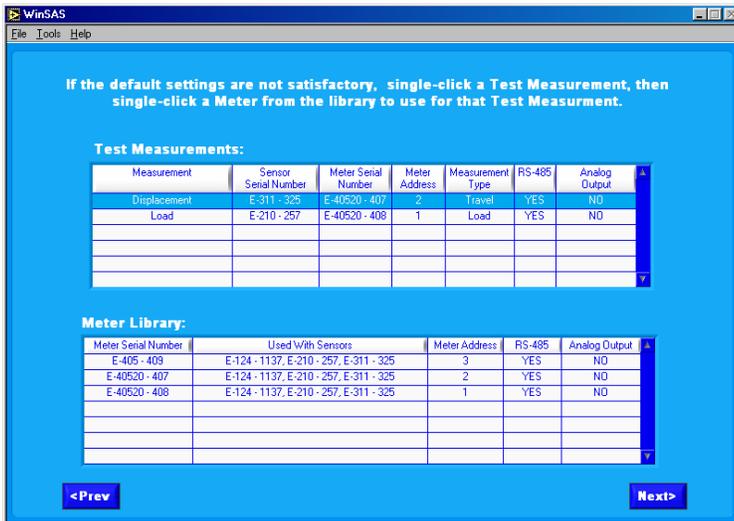
After all sensors have been set up with their meters in the options. Select the test you wish to perform from the drop down box. Verify your sample intervals and measurement type.
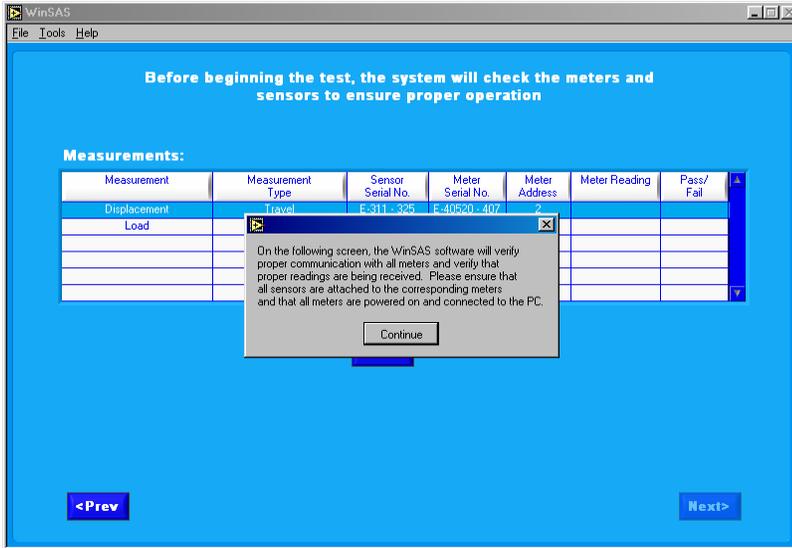
Please press **"Next>"**
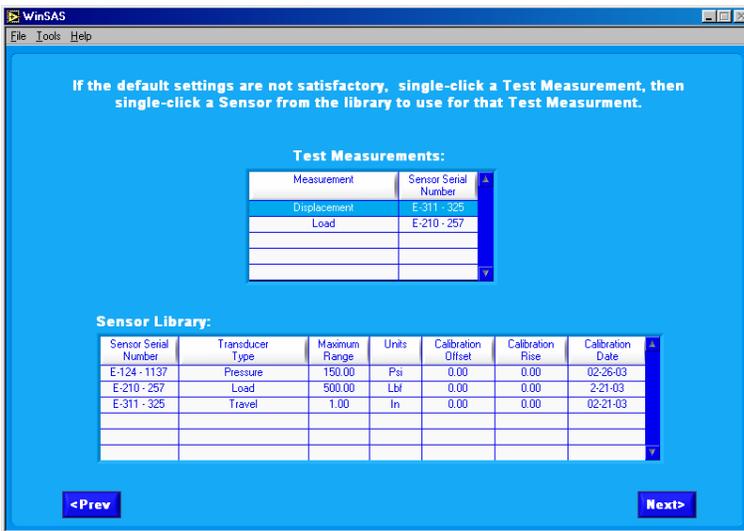


Verify the Sensor-measurement type is done on this screen, or can be set up in the options page.

Press **"Next>"**



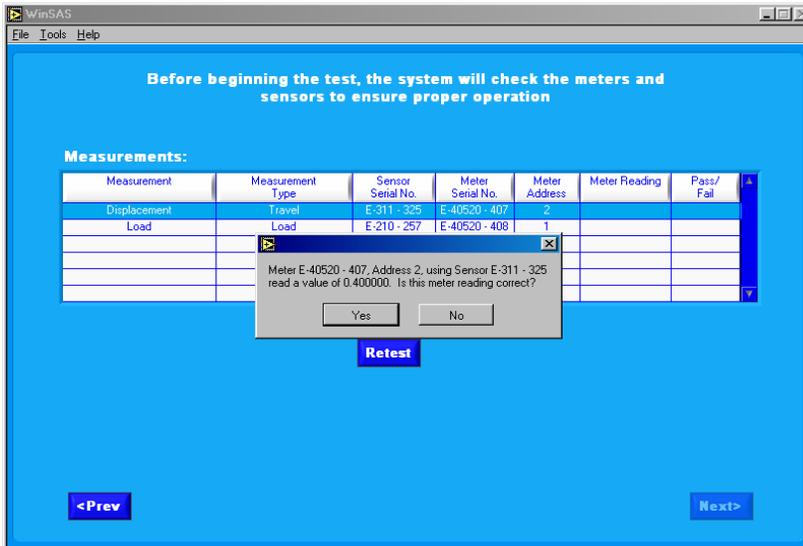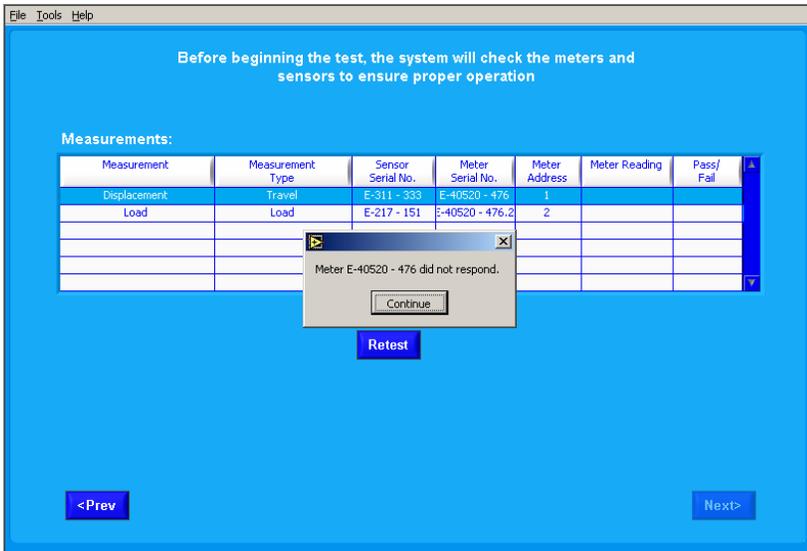Verify Meter-sensor combinations.

Press **"Next>"**

This screen shows the meters being tested for communication on the RS-485 connection.

Select **"Continue"**



This screen shows the first meter communicating correctly with the software.

Select **"Yes"**

This screen shows the first meter NOT communicating correctly. In this case you will need to trouble shoot the communications between the meter and computer.

After all meters have successfully communicated with WinSAS, you can continue. If any meter does not pass, the software will not let you continue

Press **"Next>"**

This screen gives the user the option of predefining when the collection of data should start and stop.

The Durham Geo-Slope Indicator  S-611 Load Frame will start and rapid reverse using this software. No other equipment can be controlled with WinSAS. See warning below
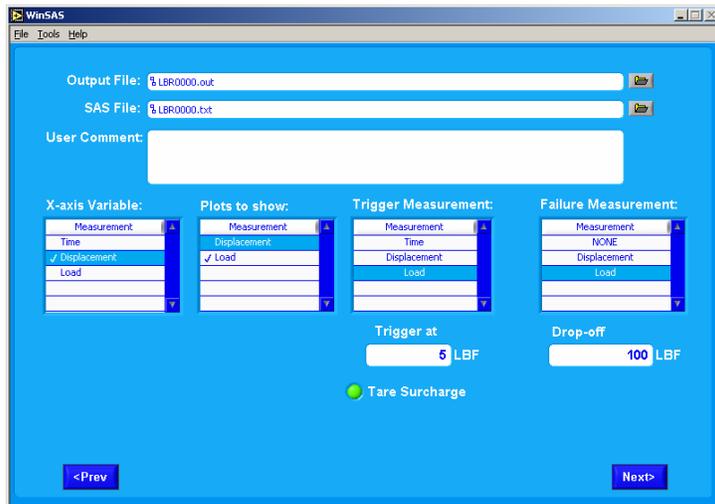


> **WARNING:**
> **THE SELECTED EVENT WILL NOT STOP THE USER'S TEST MACHINE.** It will only stop the data collection by this program

The **"Failure"** selections are: (failure is the point at which WinSAS will stop collecting data).

**NONE:** Collection of data will continue until the **"STOP"** button is selected or the total number of readings have occurred as defined by the sample Intervals table (see section ?).

**DISPLACEMENT:** A specific displacement has occurred

**LOAD REDUCTION:** – The load has peaked and has begun to lessen by the amount entered in the **"Drop-off"** and 5 sequential readings are

taken at or below the Drop-off amount entered. Example: 50 lbf set as drop off, Peak Load was 5,000 lbf. Load drops to 4950 lbf or below and 5 readings are taken at or below 4950 lbf.

**CHANGING FILE NAMES:** The screen above gives the user the ability to verify and change the SAS file and Output File names. The user can change the Output file and SAS file names as long as they are 15 characters or less and within the windows acceptable characters.

**NOTE: Do Not delete or change** the extensions for these files (.out and .txt)

**Tare Surcharge:** Certain tests will give the user the ability to tare the load when data collection starts. If the Tare Surcharge light is green the load will be zeroed (in the software only) at time "0". If the Surcharge is required in the data table turn the Surcharge light off.
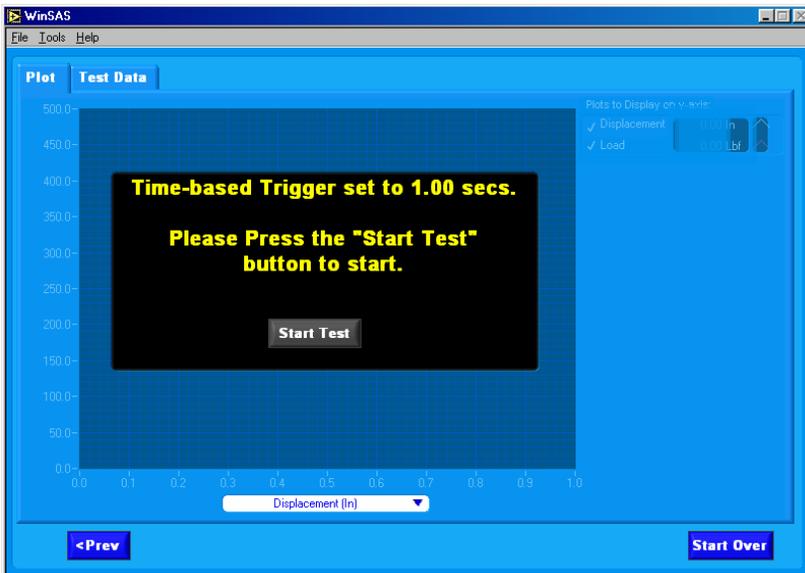
Press **"Next>"**

**GRAPHING PAGE**

The real time graphing page is shown here ready to begin.

Insure the testing apparatus is ready to begin and start the test, then click "Start Test" to begin. The time based Trigger in this example is set to 1.00 secs. Once the Trigger criterion has been met (1.00 second) WinSAS will begin collecting data. If the trigger is set to Load, the software will start collecting when the load trigger is met.
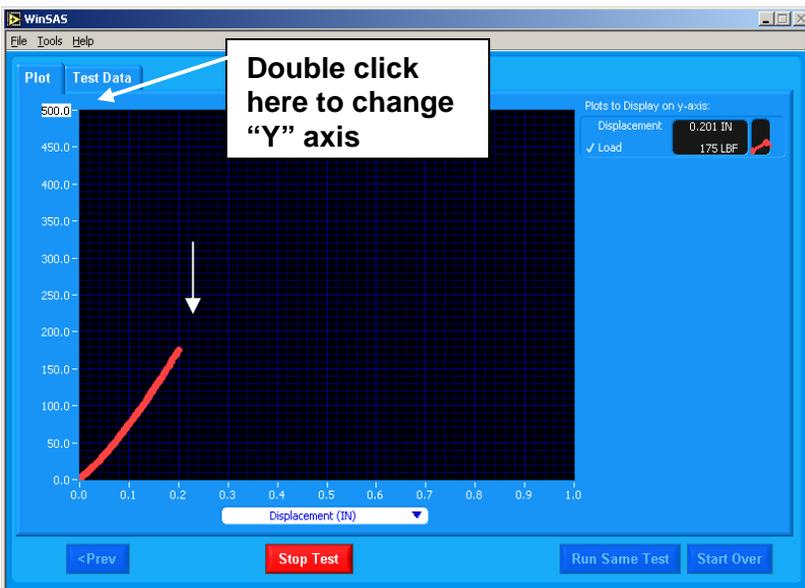
This image shows the real time graph after a test has begun. The user can change the "X" and "Y" axis values by double clicking on the highest value and entering the value required and pressing enter.

(This graph is not printable. The user has several options to reproduce the graph if necessary. Durham Geo has several reporting software packages that will reproduce the end results, contact Durham Geo to find out more. Excel can be used to import the data

Real time graph.

Double Click here to change "X" axis

and a graph can be ge_____ata, or by pressing ALT and Print Screen at the same time, and then pasting the image into Microsoft Word or Notepad.)

This screen shows the graphing options. Click just to the right of the "Plots to display" box. There are several options in this area to change the visual display of the plot.

Click here to see options for the graph



TEST DATA

At any time the user can select the Test Data Tab to view the data being collected. To return to the Plot screen simply select the Plot tab.

**<Prev** backs through the screen menus

File "OPTIONS" can only be selected on the initial start page.

ck here to urn to the t Screen.

There are several ways to stop the software from collect. The failure criteria have been reached, or the user selects "STOP TEST".  At this point the

This concludes our tutorial.

Thank you for choosing DURHAM GEO SLOPE INDICATOR for your software and soil testing needs.

We appreciate your business!
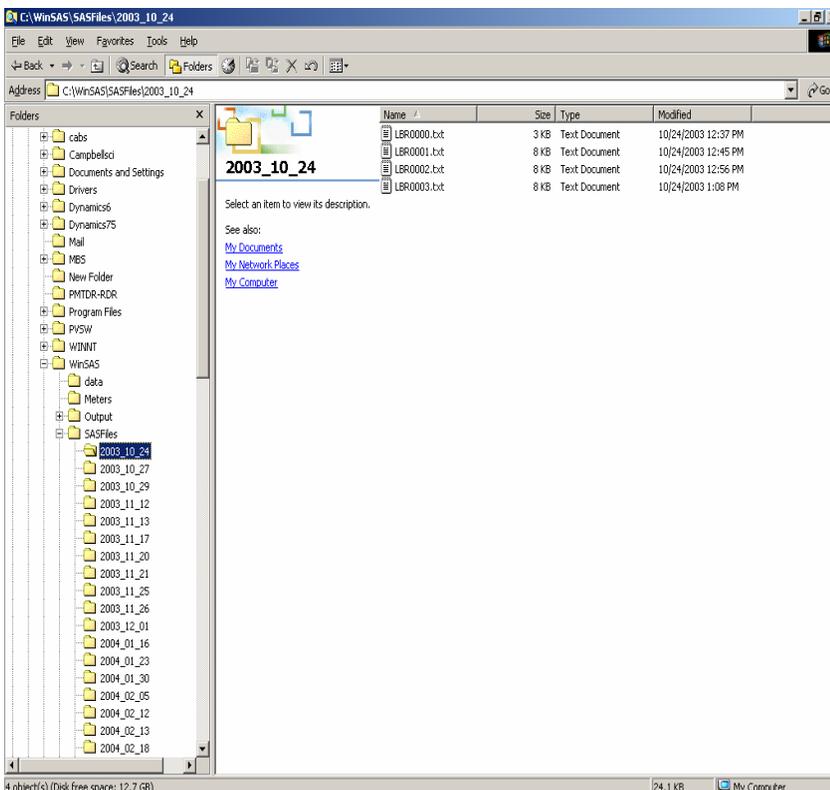
Note:
**Output files** contain all setup parameters for the test being collected along with the data.

**SAS files** contain basic sensor configurations and the data collected.

Each folder, (SAS files and Output files) will create a new folder each day and will store the data from all tests for that day in the respective folder.