

DigiPro for Windows

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Introduction

- Read This**
- Even if you hate manuals, it is important that you read this introduction and the Quick Tour pages.
 - If you have DigiPro version 1.26 or earlier on your computer, we suggest that you remove it before installing later versions. This will not affect your data files or your unlocking key.
 - If you are working on an NTFS system (Windows NT 4, 2000, XP, or later), you may find that administrator rights are required to install DigiPro. See your IT person for help.

What is DigiPro? DigiPro software is used to process and plot inclinometer data. It creates high-resolution graphs and provides advanced routines for identifying and correcting systematic errors.

DigiPro works with the project databases created by DMM for Windows. If your inclinometer readings are not in this format, see Appendix A.

DigiPro is not free software. It must be purchased. However, when you first install DigiPro, purchased or not, it will run 45 times, so you can get some work done without worrying about licensing. Read “About Unlocking Keys” on the next page.

Installing DigiPro from a Resource CD

1. Remove any earlier version of DigiPro first. Doing this will not affect your data or your unlocking key.
2. Insert the Resource CD in your CD-ROM drive. The CD will start automatically on some computers. On other computers, you have to open and close the CD-ROM drive a second time to make Autostart work.
3. The browser window appears: click on Software.
4. The software page appears: click on DigiPro for Windows.
5. The DigiPro page appears: click on “Download DigiPro.”
6. The File-Download dialog appears: choose “Run this program from its current location” and click OK. You may see a security warning. Click Yes to continue the install.
7. Follow on-screen instructions. You may be asked to restart your computer more than once.

Installing DigiPro from a Setup File.

If you downloaded DigiPro from www.slopeindicator.com, you have a setup file named “setupdpwin.exe” on your hard disk.

1. Remove any earlier version of DigiPro first. Doing this will not affect your data or your unlocking key.
2. Click the Start button and choose Run.
3. The Run dialog appears: click the Browse button to navigate to the setup file that you downloaded.
4. Select the setup file (setupdpwin.exe) and click Open.
5. Click OK when the Run dialog reappears.
6. Follow on-screen instructions. You may be asked to restart your computer more than once.

About Unlocking Keys

After DigiPro is installed, it will run 45 times. After that, it will stop running. To remove the run-limitation, you must purchase DigiPro and request an unlocking key (a coded number). If you have already purchased DigiPro, we have your company and city in our database, but you must contact us for the key. Follow the steps below:

To obtain a key

1. Find your DigiPro serial number. Start DigiPro. When the start screen appears, click on the "License" button. A dialog appears with the serial number.
2. Use one of the methods below to contact us. We need your serial number, name, company, and city.
 - Visit www.slopeindicator.com. Click on “Support,” then click on “Get a DigiPro Key” and fill out the form.
 - Call Slope Indicator or your local distributor.
 - Fax Slope Indicator or your local distributor.
3. We will generate a key to match your serial number and give it to you.

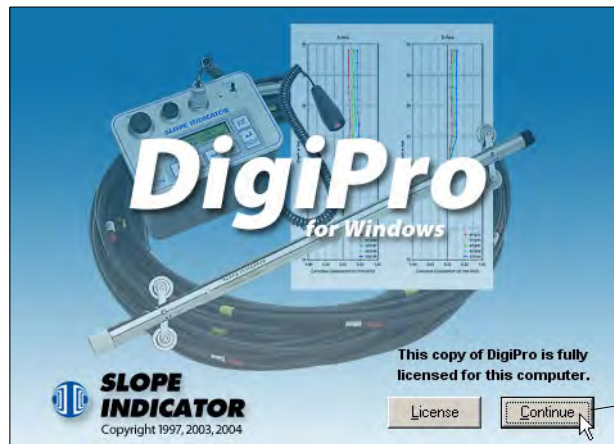
To enter the key

1. Start DigiPro. The start screen appears. Click on License.
2. Check that your serial number is the one that you sent us, then click on Modify.
3. Enter your the unlocking key, and click OK.
4. You should see the message: “This copy of DigiPro is fully licensed for this computer.”

Quick Tour

Start DigiPro

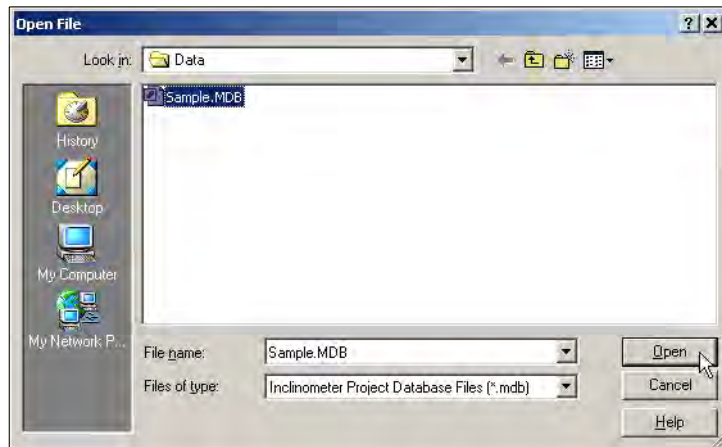
Click on the DigiPro shortcut, or go to:
Start > Programs > DigiPro > DigiPro.exe. Click Continue.



Click on the Continue button.

Open a Database

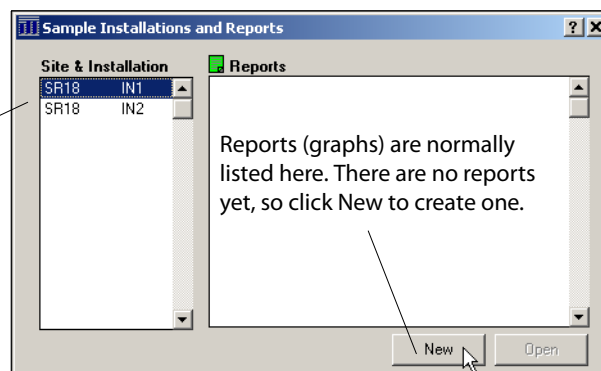
DigiPro displays the Open File dialog. Choose “Sample.MDB”
If you don't see it, navigate to C:\Program Files\DigiPro\Data.



Choose an Installation and Create a Report

DigiPro displays a list of the installations in the database.
Select the top one, SR18 IN1, and click New to create a report.

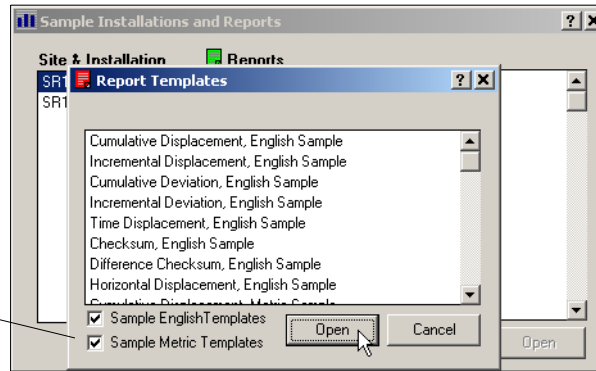
Installation List



Choose a Report Template

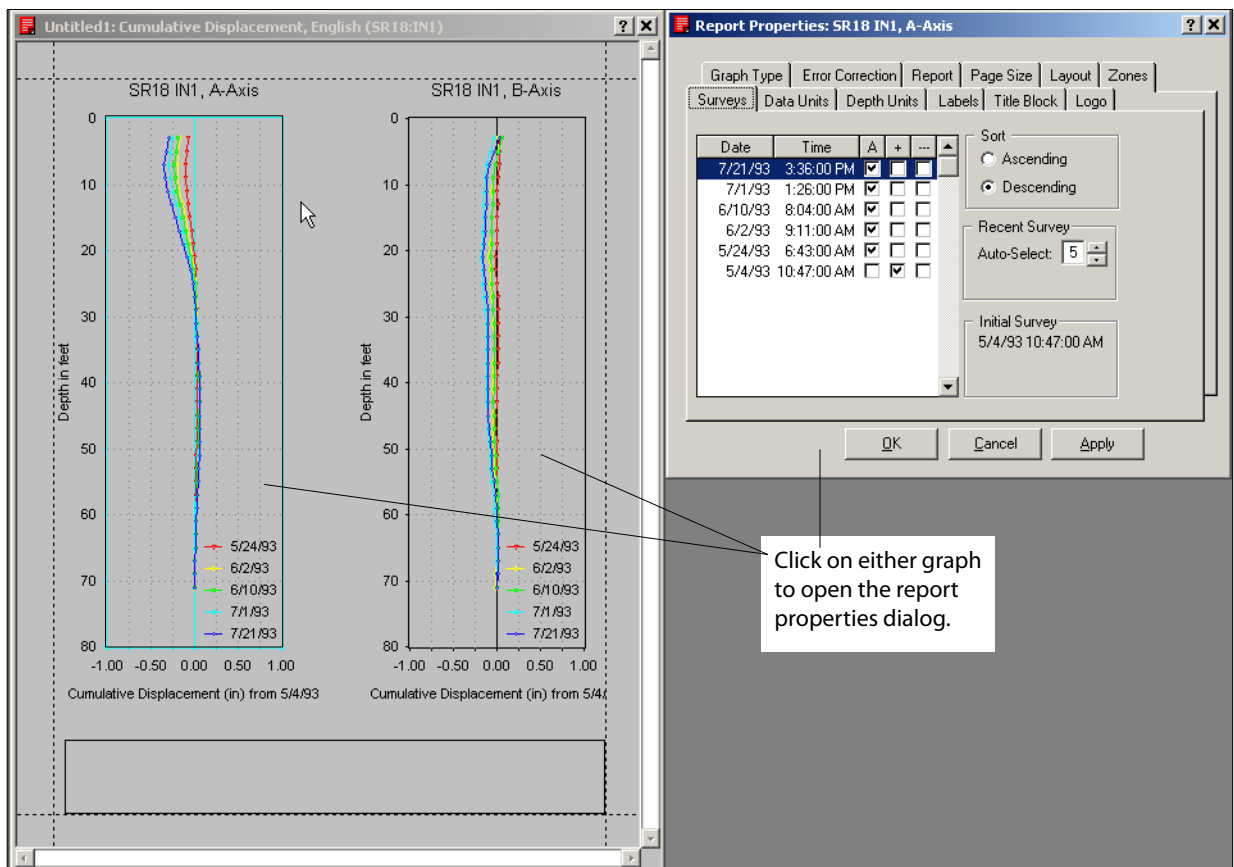
DigiPro displays a list of report templates. Each template offers a different type of graph. Choose “Cumulative Displacement, English Sample.” Click Open.

If you use metric data, you can hide the english-unit templates, and vice versa. You can also make your own templates.



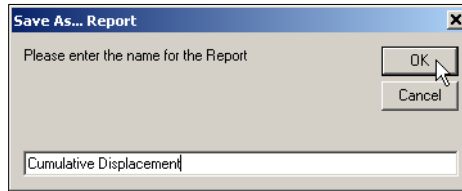
View and Modify the Report

The report appears with two graphs. Click on either graph to open the report properties dialog. Using the report properties dialog, you can select different surveys, modify scales and labels, add text to the title block, and make other changes.



Save the Report

Click the disk icon or choose File > Save As > Report. Enter a name, and click OK. DigiPro stores the graph type and all the settings for the graphs.



Close the Report

Click the X in the upper right corner of the graph. Close the report properties dialog too.

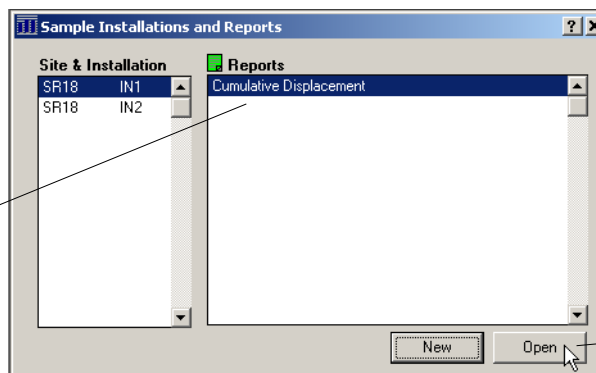


To close the dialog or graph, click the X box.

Open the Report to Recreate the Graphs

Select the report and click Open. DigiPro recreates your graphs. In addition, DigiPro automatically includes any new surveys that were added to the database, so the graphs are updated too.

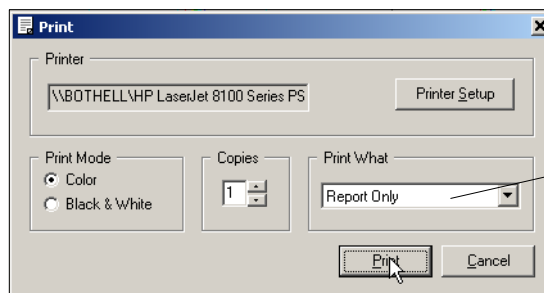
Reports are listed in the reports window. To recreate a graph, select a report and click Open.



Click Open to open a report.

Print the Report

When the graph appears on screen, click on the printer icon, or choose Print from the File menu.



This prints just the graph. You can also print a listing of the current survey.

Creating Reports

Overview of Reports

- It's easy to make reports: simply open a report template and save the resulting graph.
- Reports save time. You can reproduce or update a graph with just two mouse clicks.
- Reports can be customized. For example, you can specify two different types of graph for the report.
- You can create as many reports as you need.
- You can save the report as a template.

Creating a Report

These basic steps are explained in detail on the following pages.

1. Open a database.
2. Select an installation.
3. Choose a report template.
4. Save the report.

Open a Database

1. Start DigiPro, and click the Continue button.
2. The Open File dialog appears. DigiPro displays the most recently opened folder.
3. Select your database, and click Open.

How to find your database

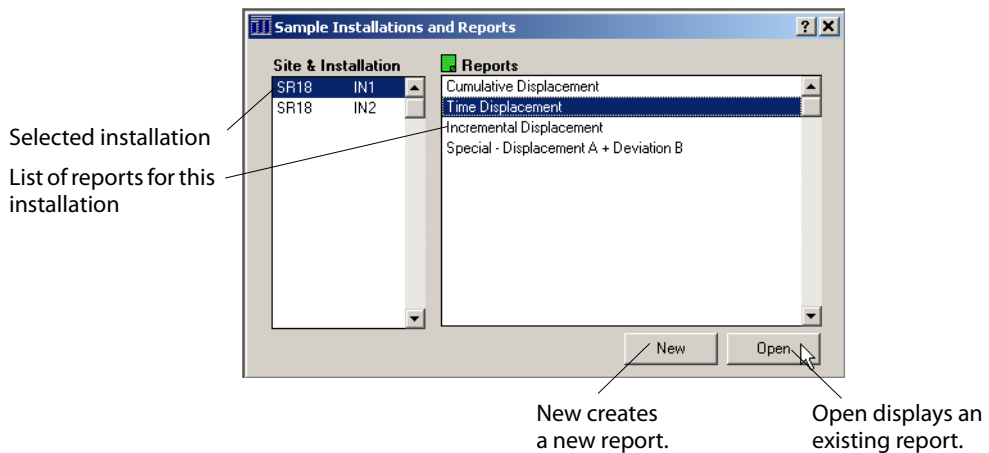
- If you can't see your database, click in the "Look-in" field to navigate to a different folder or drive.
- The default location used by DMM for Windows is:
C:\Program Files\ DMMWin\Projects.
- DigiPro keeps a list of the last five databases that you opened. To see this list, click on the File menu (Close the Open File dialog first). The databases are listed at the bottom of the menu.

How to create a database

If you don't have a database, you must create one with DMM for Windows. DMM can also convert and import data. DMM is a free download from www.slopeindicator.com. See Appendix A for more information.

Select an Installation

After you open a project database, DigiPro displays the "Installations and Reports" dialog. The left side of this dialog shows a list of installations. Click on the installation of interest.



New vs Open

After you select an installation, you can choose to create a new report or open an existing report.

- To create a new report, click New.
- To open an existing report, select it and click Open.

Choose a Report Template

If you clicked New in the previous step, DigiPro displays a list of report templates. Each template offers a different type of graph. Graph types are explained on the following page.

English-Units or Metric-Units?

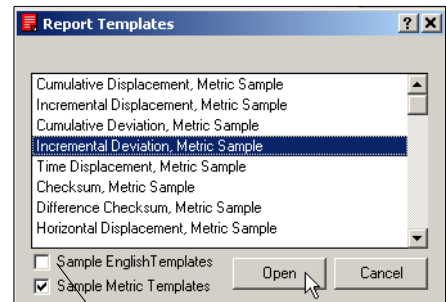
1. Select a template. Note that there are English-unit templates and metric-unit templates.

It is important to choose correctly because this controls how readings are processed.

- Choose English if you use an English-unit probe.
- Choose metric if you use a metric-unit probe.

2. Click Open.

Note: DigiPro allows you to change the displayed units later, if necessary, but at this point, you must choose according to your probe units.



If your data is metric, you don't need English unit templates. Remove the checkmark to hide them.

Creating Templates

You may find it convenient to make your own templates. For example, you may want templates that have:

- A title block with your company's name and logo.
- Standard depths.
- Different types of graph in the same report.

To Create a Custom Template

1. Open a report. Modify it as needed.
2. Choose File > Save As > Template.
3. The new template will appear in the Report Templates dialog.

Note: DigiPro's templates are stored in the "templates.mdb" file in the DigiPro\System folder. You can copy this file to other computers.

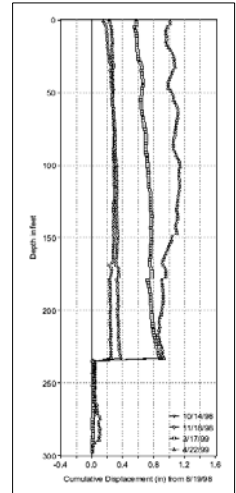
Graphs for Analyzing Movement

These graphs are the standard graphs used to analyze the behavior of the ground.

Cumulative Displacement

Displacements are changes in the position of the casing and are assumed to be equivalent to ground movement. A displacement graph requires at least two surveys: an initial survey and a current survey. The initial survey does not appear on the graph.

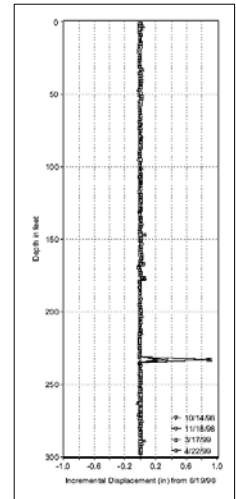
In a cumulative displacement graph, the plotted point at any depth is the sum of incremental displacements from the reference point (typically the bottom). The graph shows how subsurface movement relates to movement at the surface. Shear movements are easily seen.



Incremental Displacement

This graph shows displacements at discrete depths. A growing “spike” indicates movement. The graph at right uses the same data as the cumulative displacement plot above.

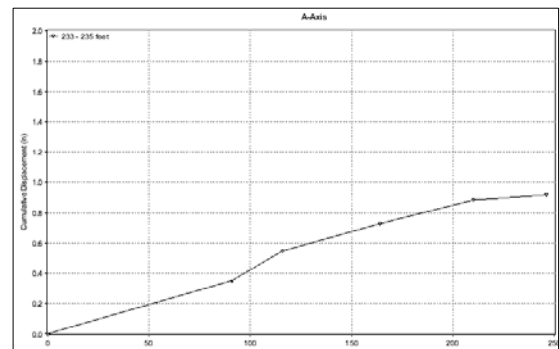
No summing is involved, so systematic error is minimized.



Time Displacement:

This graph shows the rate of movement at one or more zones. A steepening slope represents accelerating movements.

The plotted value for each zone is the difference between the displacement value at the top of the zone and the displacement value at the bottom of the zone. Zones are set in the “zone” tab of the report properties dialog.



Graphs for Diagnosing Systematic Error

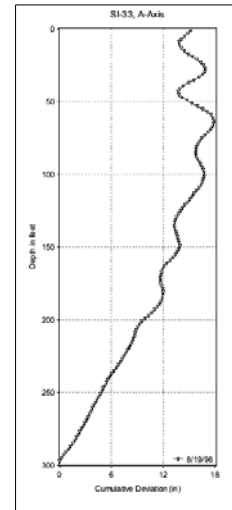
These graphs are generally used for troubleshooting or verifying that graphs represent movements accurately.

Cumulative Deviation

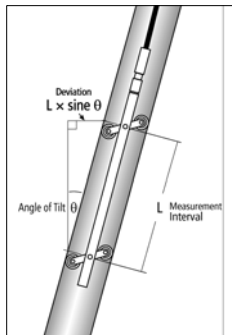
This graph shows the profile of the casing relative to vertical. Drillers can use this graph to see borehole drift.

The plotted point at any depth is the sum of incremental deviations up to and including that depth. (Deviations are defined below).

In error analysis, this graph is used to show the potential for systematic error due to cross-axis tilt and a rotation of the sensitive axis of the inclinometer probe.

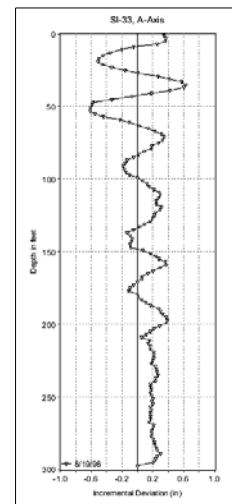


Incremental Deviation



This graph shows the deviation at each depth. This represents the curvature of the casing. The drawing at left shows deviation. The angle of tilt is measured by the inclinometer, the hypotenuse is the measurement interval (typically the distance between the wheels) and the side opposite the angle is the deviation.

In error analysis, this graph is used to show the potential for systematic error due to casing curvature and settlements or inaccurate depth control.

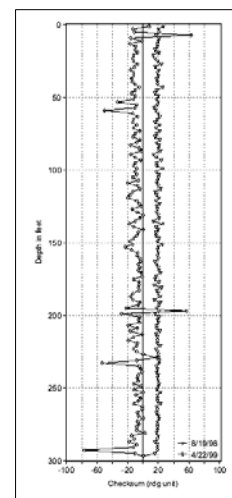


Checksum and Difference Checksum

Checksums are the sum of the “0” and “180” readings at each depth.

In error analysis, this graph provides an indication of the potential for systematic error due to bias shift. A tilted plot may indicate problems with the electronics of the sensor.

The difference-checksum graph shows changes in checksum, and removes variations that are due solely to characteristics of the installed casing.



Save the Report

After you have selected a template and clicked Open, DigiPro displays the new report.

1. Choose File>Save from the menu or click the disk icon.
2. The Save As dialog appears. Enter a name for the report and click OK.

Naming a Report

- A simple name, such as “Cumulative Displacement” is sufficient, since it indicates the kind of graph that the report will produce.
- There is no need to make unique names for reports. Each installation has its own list of reports. For example, you can have a report named “cumulative displacement” for each of your installations. In fact, this is recommended.
- To rename a report, right-click on the report name and choose “Rename” from the pop-up menu.

Modifying Reports

Overview

The basic steps required to modify a report are:

1. Open the report.
2. Open the Report Properties dialog.
3. Modify the properties for each graph.
4. The settings that you have changed are saved with the report and are automatically retrieved the next time you open the report.

Open a Report

1. Start DigiPro.
2. Open a project database.
3. Choose an installation.
4. Click on the report that you want to modify.
5. Click on the Open button.

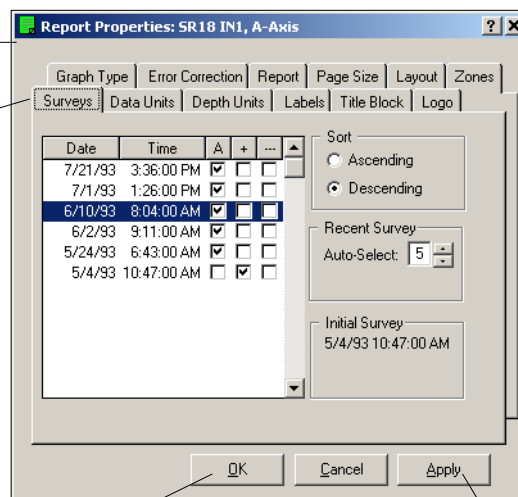
Open the Report Properties Dialog

1. Click on either graph. The report properties dialog appears.
2. The title bar shows which graph is active. To make the other graph active, just click on it.

The title bar shows which graph is active and can be modified.

Report properties are organized by tabs. Click on a tab to display its properties.

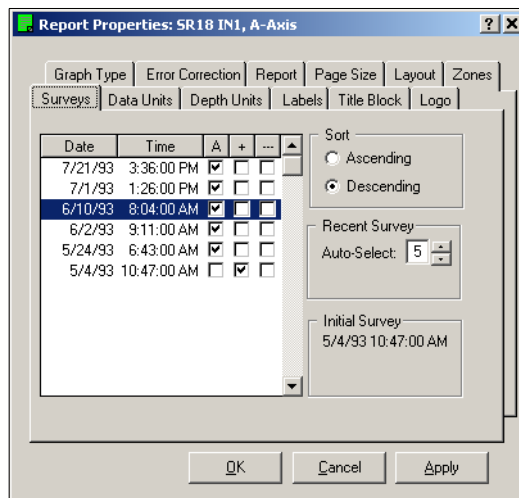
When you change a property, click Apply to see the effect.



Click OK to close the dialog. OK applies any remaining changes.

Click Apply to see the effect of your changes. The dialog stays open so that you can make more changes.

Surveys



What is a Survey?

A survey is the data from one inclinometer survey. Each survey is identified by date and time.

Survey Selection

DigiPro graphs only surveys that have been selected. Check boxes for each survey indicate its selection status.

- A check mark in the A column indicates that the survey is auto-selected. New surveys are auto-selected so that DigiPro can update graphs automatically. The Recent Surveys field controls the number of auto-selected surveys.
- A check mark in the + column indicates that the survey is selected permanently. It will be used every time you run a report. Click the box to check or uncheck.
- A check mark in the – column indicates that the survey is excluded permanently. Click the box to check or uncheck.
- Surveys with no checkmark are not selected. When you have many surveys, most of them will have this status.

Sort

Sorts the order of the surveys in the Selection window.

- Ascending displays oldest survey first.
- Descending displays newest survey first.

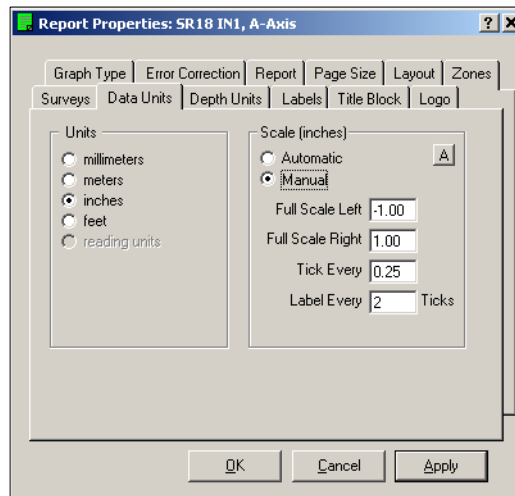
Recent Survey Auto-Select

Specifies the number of new surveys to be automatically selected for the report. To change the number, click the up and down arrows next to the number. Then click apply.

Initial Survey

Shows which survey is used as the initial. DigiPro automatically selects the oldest survey as the initial and puts a check mark in the + column. To choose a different initial survey, scroll the window until you can see it. Then right click on the + box and choose “Mark as Initial Survey” from the pop-up menu. Note that earlier surveys are ignored.

Data Units



Unit Conversion

The Unit conversion setting is provided for US users who need metric-unit reports from their English-unit inclinometer systems. These users should use the standard English-unit templates and make the conversion here by clicking the radio button for mm.

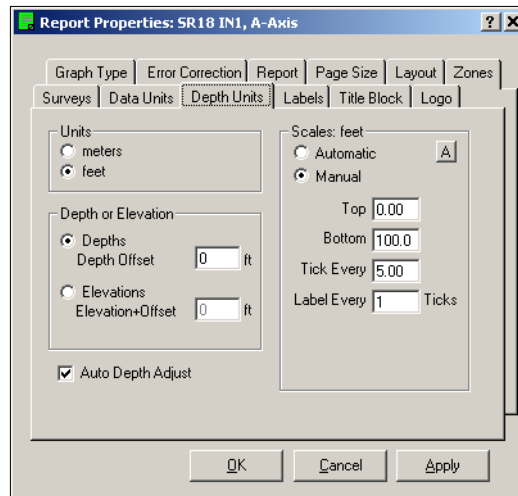
Other users will probably not need this setting because templates provide appropriate units automatically. Be sure to choose metric templates for metric inclinometer systems and English templates for English-unit inclinometer systems.

Troubleshooting Note: If you have used the correct templates but your units and values appear strange, don't try to correct the problem with the units conversion setting. Instead, go back to the Installation and Reports dialog, right-click on the installation, and choose "properties" from the pop up menu. Check that Units is properly set to English or Metric (the same units as your inclinometer system).

Scales

- Automatic: Sets full scale left and right to accommodate the maximum values found in the surveys.
- Manual: Allows manual control over the settings. Click on the Manual button to show the fields below:
- Full Scale Left: Enter a value to be used for full scale left.
- Full Scale Right: Enter the value to be used for full scale right.
- Tick every: Ticks are graduations on the data scale. For example, if you want a graduation every 10 mm, enter 10.
- Label every nth tick: DigiPro will label every nth tick. For example, enter a 2 to label every second tick. For example, if ticks are 10 mm apart, labels will appear every 20 mm.

Depth Units



Unit Conversion

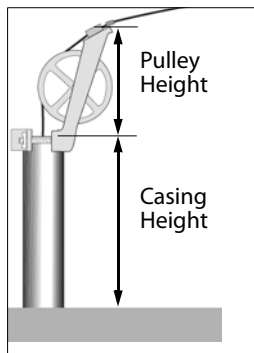
The Unit conversion setting is provided for US users who need metric-unit reports from their English-unit inclinometer systems. These users should use the standard English-unit templates and make the conversion here by clicking the radio button for m.

Other users will probably not need this setting because templates provide appropriate units automatically. Be sure to choose metric templates for metric inclinometer systems and English templates for English-unit inclinometer systems.

Depth or Elevation

You can show depth-axis labels as depths or elevations. Click the appropriate radio button. If you choose elevations, you must also enter the elevation at the top of the casing. See depth offset and elevation offset below.

Depth Offset



During a survey, depths are read from the control cable, which is referenced to the top of the casing or (preferably) to the top of the pulley assembly. If you want the depth-axis labels referenced to ground level, enter an offset:

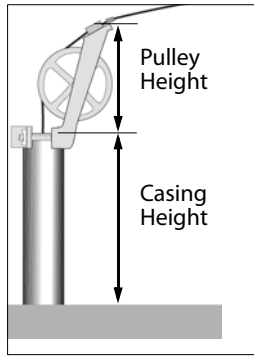
Depth Offset = casing height + pulley height

Casing height is the height of the casing above ground level.
Pulley height is 1 foot or 0.3 meters.

Metric Example: The top of the casing is 0.5 meters above ground level. The pulley assembly adds 0.3 meters. Enter 0.8 meters for the depth offset. Now the depth-axis label scale will be referenced to ground level.

English Example: The top of the casing is 14 inches (1.17 ft.) above ground level. The pulley assembly adds 1 foot. Enter 2.17 feet for the depth offset.

Elevation + Offset



If you want the depth-axis label referenced to elevations, first click the radio button for elevations, then enter an offset:

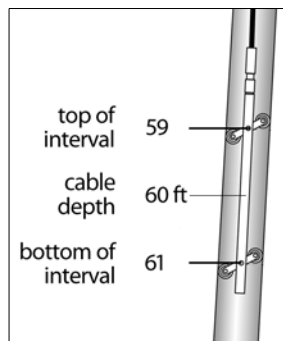
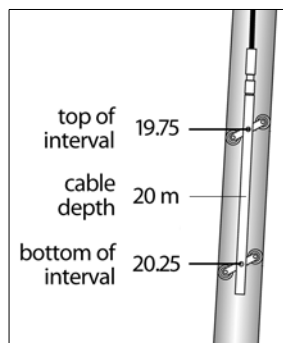
Elevation Offset = ground elevation + casing height + pulley height

Casing height is the height of the casing above ground level. The pulley assembly adds 0.3 meters (1 foot).

Metric Example: Ground elevation is 200 meters above sea level. The top of the casing is 0.4 meters above ground level. The pulley assembly adds 0.3 meters. Enter 200.7 meters for the elevation offset. Labels will be referenced to ground elevation.

English Example: Ground elevation is 1200 feet above sea level. The top of the casing is 1.5 feet above ground level. The pulley assembly adds 1 foot. Enter 1202.5 feet for the elevation offset.

Auto Depth Adjustment



With auto-depth adjustment turned on, DigiPro correctly plot data points at the top (or bottom) of the measurement interval. Auto-depth is turned on by default.

Why is an adjustment provided? Depth marks on Digitilt control cable are measured from the middle of the inclinometer probe, but deviations and displacements are calculated for the top (or bottom) of an interval.

Metric example: The depth stored with the inclinometer reading is the cable depth of 20 meters, but the top of the interval is actually at 19.75 meters. With auto-depth adjust turned on, the plotted point will be placed correctly on the graph at 19.75 meters, not at the cable depth of 20 meters.

English example: The depth stored with the inclinometer reading is the cable depth of 60 feet, but the top of the interval is actually at 59 feet. With auto-depth adjust turned on, the plotted point will be placed on the graph at 59 feet, not at the cable depth of 60 feet.

On the graph, these adjustments are visually quite small, but if you print out the data, you will see the adjusted depths.

Scales DigiPro sets the depth axis scales automatically, or lets you specify values for the top and bottom of the depth-axis scale.

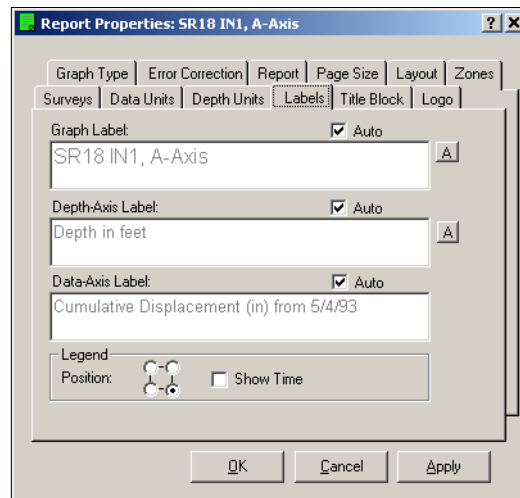
Automatic: Automatically displays the entire depth-axis and applies labels and ticks at multiples of 10.

Manual: Allows manual control of scales. Click on the Manual button and enter the desired values in each field. If your report shows elevations rather than depths, be sure to enter elevations for top and bottom. Click Apply when finished.

- **Top:** Enter a value for the top of the depth-axis scale.
- **Bottom:** Enter a value for the bottom of the depth-axis scale.
- **Tick every:** Ticks are graduations on the depth-axis scale. If you want a graduation every 5 meters, enter 5.
- **Label every nth tick:** DigiPro will label every nth tick. For example, enter 2 to label every second tick. For example, if ticks are 5 meters apart, labels will appear every 10 meters.

Tip: If you frequently zoom in to inspect a particular zone, you might find it useful to make a report that shows only that zone. Use manual scales to specify the top and bottom of the zone, then save the result as a new report.

Labels Tab



Editing a Label

DigiPro creates graph labels and legends automatically. This dialog lets you change the automatic labels. If you want these labels changed for all subsequent reports, save the report as a template (See page 8).

1. Click to remove the check mark from the Auto box above the Label field. When the check is removed, you can edit the text.
2. Enter text in the Label field. The Graph Label field accepts up two lines of text. The Depth-Axis and Data-Axis fields accept one line of text. The A button lets you choose a font.
3. Click Apply to see your changes.

Note: If your Windows display is set for Large Fonts, text appears larger on-screen than it prints on paper. Print the report to see the true effect, then modify as needed.

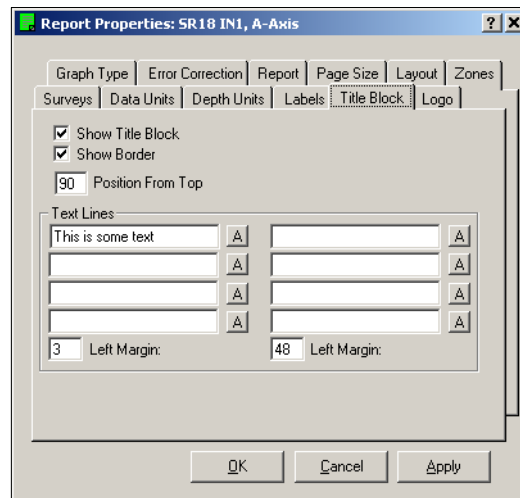
Legend Position

DigiPro can place the legend in one of the four corners of the graph. For example, if you click the upper right button in the square, the legend will appear in the upper right corner of the graph when you click Apply.

Show Time

DigiPro can append time to the date in the legend. Normally time is not required, but if you need it, click in the checkbox.

Title Block



Function The title block provides a place to enter information about the graph. You can also include a company name, address, and company logo in the title block. If you want to add a logo to the title block, use the Logo tab before setting the title block text.

Text Lines DigiPro provides eight cells for text arranged into two columns. Click in one of the eight fields to enter text. When finished, tab to the next field. Click Apply to see the result on screen.

Note: The screen display of text is not accurate, especially if your display is set for Large Fonts. Print the report to see the true appearance of the text.

Tip: Save the report as a template so you can base future reports on the same style with very little additional work. (See page 8).

Left Margin There are two left margin fields, one for each column of text. Enter a percentage value, estimated from the left side of the page. Then click Apply.

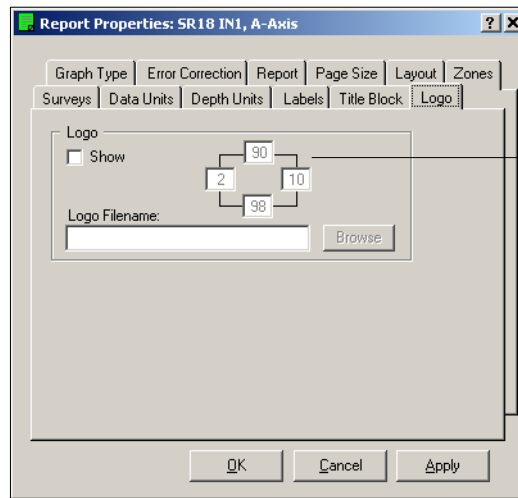
Show Title Block When the box is unchecked, DigiPro shows the title block. If you hide the title block, you can enlarge your graphs using the Layout tab.

Show Border When the box is checked, DigiPro draws a line around the title block. You may find that hiding the rule provides a neater result.

Position from Top Enter an estimated percentage value. By default, the title block appears at the bottom of the page. However, if you set the value to zero, it will print at the top of the page.

Note: If you change the position of the title block, you must move the graphs down using the Layout tab.

Logo



Position settings

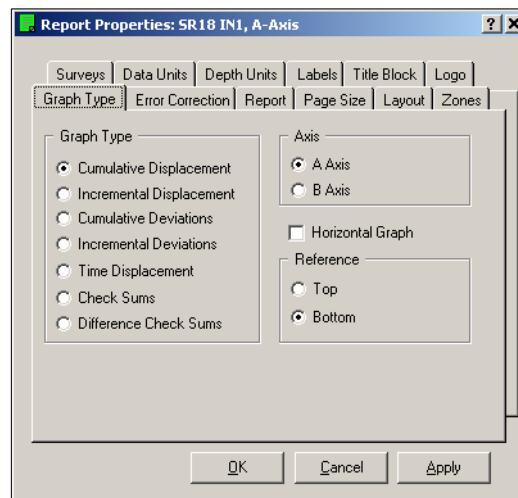
Displaying a Logo

DigiPro has a simple facility to print a bitmap (.bmp) image of your logo on the report.

1. Click (check) the Show check box.
2. Enter the path and file name of your logo. You can use the browse button to do this for you.
3. The position settings are percentages. They change the boundaries of the logo box and also the position of the logo box. You will probably need to make several adjustments to find the right setting.

Note: We recommend that you place the logo file in DigiPro's BMP folder so that it will not be accidentally lost during routine disk cleanups. The path will appear like this: C:\Program Files\DigiPro\BMP\myLogo.bmp.

Graph Type



Overview This useful feature lets you change the type of graphs shown in the report. For example, you could place a graph of time displacement next to a graph of cumulative displacement. You could also show two versions of the same graph, one with error correction turned on and one with error correction turned off.

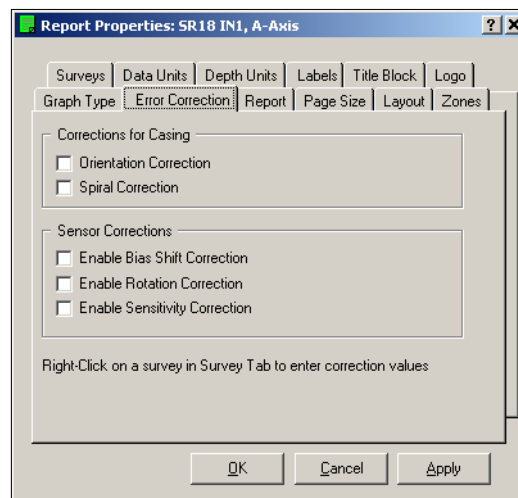
Graph Type Graph types are explained in “Creating a Report.” The radio button shows the type of graph currently displayed. To change, click a different radio button. When you click Apply, the graph is redrawn.

Axis The sample templates use A-axis data for the left graph and B-axis data for the right graph, but you are not limited by this. You can show two A axis graphs or two B axis graphs, etc.

Horizontal It is easier to use the Horizontal template to create a horizontal graph, but this checkbox is here for completeness.

Reference Select top or bottom of the casing as the starting point for calculations of cumulative displacement and cumulative deviation. Bottom reference is the default.

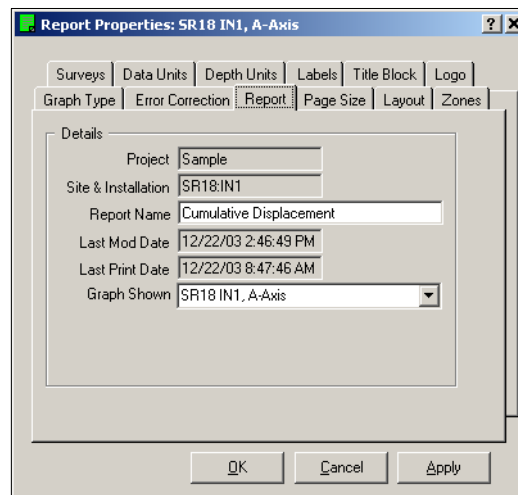
Error Correction



Overview This dialog lets you enable and disable correction routines. Except for the orientation correction, values used by the routines are entered elsewhere. For information on corrections, see the chapter on error correction.

- To enable a correction routine, put a check in its checkbox.
- To disable a correction routine, remove the checkmark.

Report

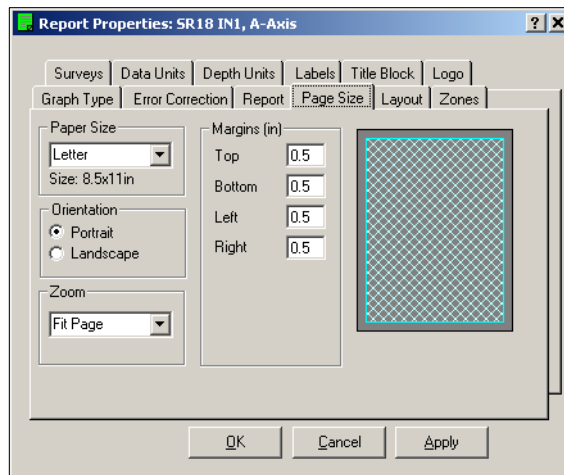


Overview This dialog is generally not used. Only two fields can be manipulated: report name and graph shown.

Report Name: You can rename a report here. Note that you can also rename a report by right clicking on the report in the installations and reports dialog.

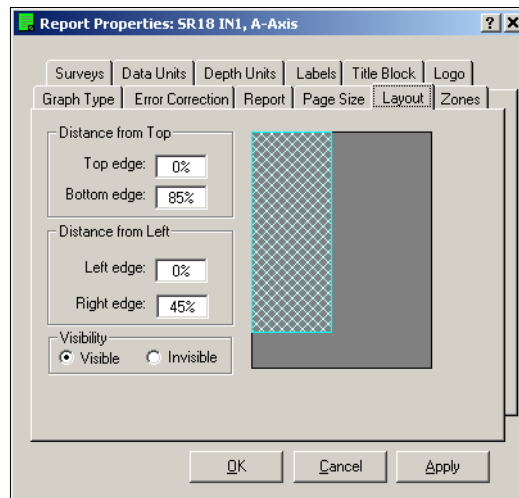
Graph Shown: This can be used to show a graph that was previously hidden.

Page Size



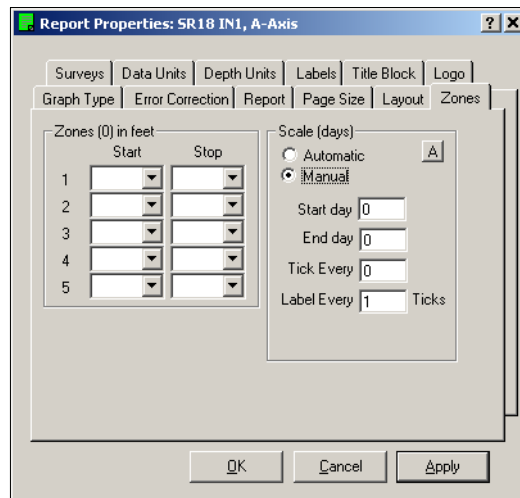
- Overview** Page size and orientation are generally set by report templates. Global defaults are controlled by settings in the File > Options and Defaults dialog. The settings here affect only the current report.
- Paper Size** Controls paper size.
- Orientation** Controls the page orientation for the report. Choices are portrait (long side is vertical) or landscape (long side is horizontal).
- Margins** Controls the page margins for the report. The default margin values are in inches. If you select the A4 or B4 paper sizes, the margin values automatically convert to centimeters.
- Zoom** Controls the screen size of the report. The default is “Fit Page,” which allows the report and report properties to be displayed on-screen simultaneously (with no overlap) on a monitor set to a resolution of 800x600 or better.

Layout



- Overview** Layout settings determine the placement and size of each graph.
- Distance from Top** This controls the vertical size and placement of a graph.
1. Click on a graph. An image of the graph appears in the dialog box.
 2. Enter values for the top and bottom edges of the graph in percent from top of page.
- Distance from Left** This controls the horizontal size and placement of the graph.
1. Click on a graph. An image of the graph appears in the dialog box.
 2. Enter values for the left and right edges of the graph in percent from left side of page.
- Visibility** This controls whether a graph is visible or not. For example, if you want only one graph on the page, you can hide the other graph and then adjust size and placement of the visible graph as needed.

Zones



Overview The zone tab is used to select zones for time-displacement graphs.

Zones You can graph up to five zones by specifying a start and stop depth for each zone. Click the drop list to choose a valid depth or elevation. The stop depth must be deeper than the start depth.

The value that DigiPro plots is the difference between cumulative displacement at the start depth and cumulative displacement value at the stop depth.

Scales The automatic setting shows the number of days from the initial survey. The manual setting lets you choose a start and an end day to show only a portion of the available time span. You can also set the frequency of tick marks (in days) and labels (numbers). The current version of DigiPro does not allow display of dates.

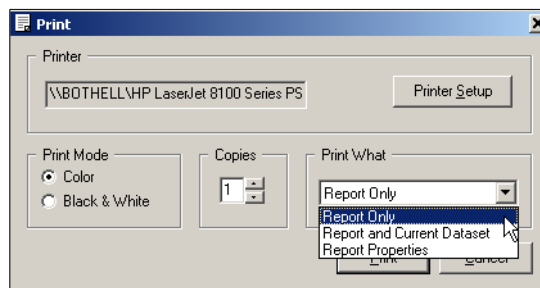
Printing a Report

Overview DigiPro offers the following options

- Print report only or report with current survey data.
- Print plotted data
- Write plotted data to a file

Printing a Report

1. Open a report.
2. Choose File>Print from the file menu, or click on the printer icon located on the tool bar. The Print dialog appears.



3. Click in the “Print What” field. Choose Report Only or Report with Current Survey.
4. Check the Printer window to be sure it displays the printer you want. To change printers or adjust the printer setup, click on the Printer Setup button.

Note: If you change the printer in DigiPro’s Print dialog, the new printer becomes the Windows default printer.

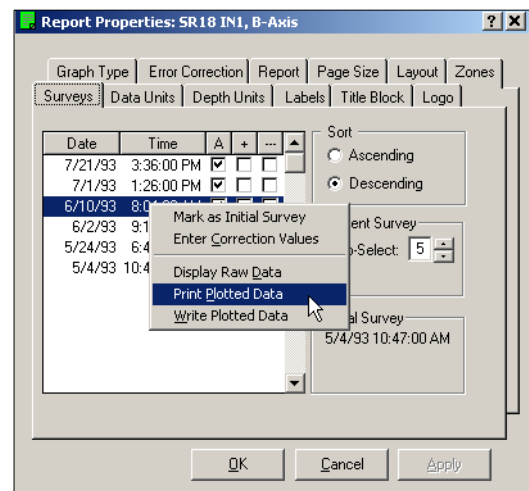
5. Click in the Copies field and enter the number of copies you want.
6. Select a print mode: color or black and white. (If you are using a black and white printer but choose the color print mode, the report will print in grayscale.)
7. Click Print to print the report.

Note: You can change the colors that DigiPro uses, if some plots are hard to see. Choose File>Options and Defaults>Preferences. You will see a band of eight colors. click on the color that you want to change and choose a different color from the pop up menu.

Printing Plotted Data

Plotted data are the data points plotted on the graph. DigiPro can print a maximum of 8 columns of data.

1. Open a report and click to open the report properties dialog.
2. Place the pointer in the Survey window and right click.

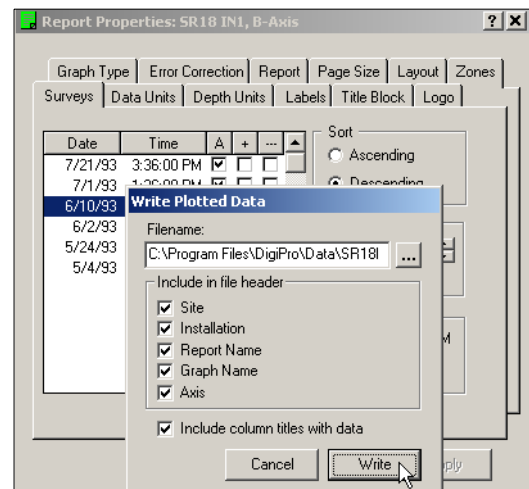


3. Choose Print Plotted Data from the pop-up menu.

Writing Plotted Data

You can write plotted data to a file for use in a spreadsheet. You can write a maximum of 8 columns of data

1. Open a report and click to open the report properties dialog
2. When the Report Properties dialog appears, click in the survey window.



3. A menu appears. Choose Write Plotted Data.
4. A submenu appears. Choose the items that you want to appear in the file header. You can also specify a filename and location if the default filename is not suitable.
5. Click Write to write the data to the file. The file is placed in the same folder as your project database. It has a .txt extension.

Error Correction

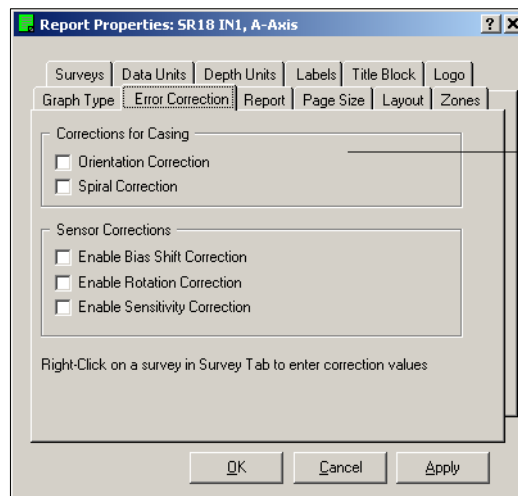
Introduction

The error correction routines that are built into DigiPro were requested by expert users. Error correction is not a simple subject, and applying corrections appropriately requires knowledge and experience.

In this chapter, we provide an brief introduction to some aspects of error correction. Those who need to know more should consider attending Slope Indicator's short course on Data Reduction and Error Correction. The course schedule is listed in the Training section at www.slopeindicator.com.

Enable or Disable Corrections

Correction values are stored separately from readings and are applied on-the-fly when the graphs are generated. Thus corrections can be enabled and disabled at any time



Use the report properties dialog to enable or disable corrections.

- Correction routines are disabled by default.
- If you want to use correction routines, use the report properties dialog to enable them.
- Correction routines apply at the graph level. Thus a report can show one graph with corrections turned on and another graph with corrections turned off.
- Corrections values for casing are entered once for each installation and are applied to any survey selected for the graph.
- Corrections values for sensors (inclinometer probes) are entered for each survey that requires them. A special dialog is used for this.

Corrections for Casing

Corrections for casing are accessed with the report properties dialog.

Orientation Correction

If casing grooves are not oriented to the direction of movement, you can use DigiPro to mathematically rotate the orientation of the measurement axes into the direction of interest.

1. Enable the Orientation Correction. An entry field appears.
2. Enter an orientation correction in degrees. For example, enter 10 to rotate the orientation 10 degrees clockwise.
Enter -10 to rotate orientation 10 degrees counterclockwise.

Spiral Correction

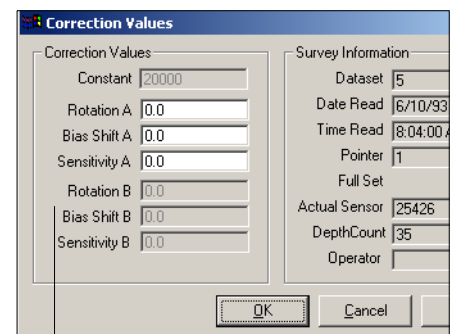
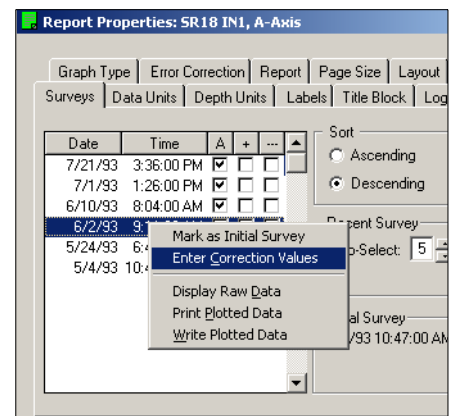
A spiral survey, obtained with a spiral sensor, provides measurements that can be used to correct for spiraled (twisted) casing. The spiral survey is processed and placed in the database by DMM for Windows. DigiPro has no entry fields for spiral data.

DigiPro automatically recognizes the spiral survey if it is present. If DigiPro cannot find a spiral survey, the checkbox is grayed out and cannot be enabled.

Corrections for Sensors

These corrections must be entered for each survey.

1. Enable the correction.
2. Click on the Surveys tab.
3. Right click on the survey that requires correction.
A dialog appears.
4. Choose Enter Correction Values. The Correction Values dialog appears.
5. Enter a value in the appropriate field.
6. Click Apply to see the effect on the graph.
7. Repeat steps 5 and 6 until the correction value is correct.



To enter values for the B axis, you must click on the B-axis graph.

Bias-Shift Error

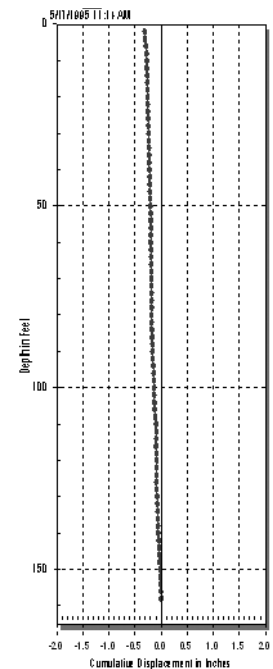
Bias shift values are entered in reading units. Here is a simple introduction to bias shift error. More information can be found in the “Training” section of www.slopeindicator.com.

What is Bias Shift

Bias: If you hold your inclinometer probe absolutely vertical and check the reading, you will typically see a non-zero value. This is the probe’s bias. The bias value is normally eliminated in the data reduction process when the 0 readings are combined with the 180 readings.

Bias-Shift Error: If the bias value changes during a survey, the data reduction process cannot eliminate all of the bias. The remaining value is error that is embedded in the reduced data.

The straight, but leaning plot at right is the result of bias-shift error.



Identifying Bias Shift Error

Appearance: A straightened, but leaning cumulative displacement plot is a signature of bias shift error. The embedded error grows larger at each interval, so the plot leans to the left or right.

Unlikely Behavior: The graph above shows rotation of the entire 150 foot span of soil or rock. This unlikely behavior suggests error in the data.

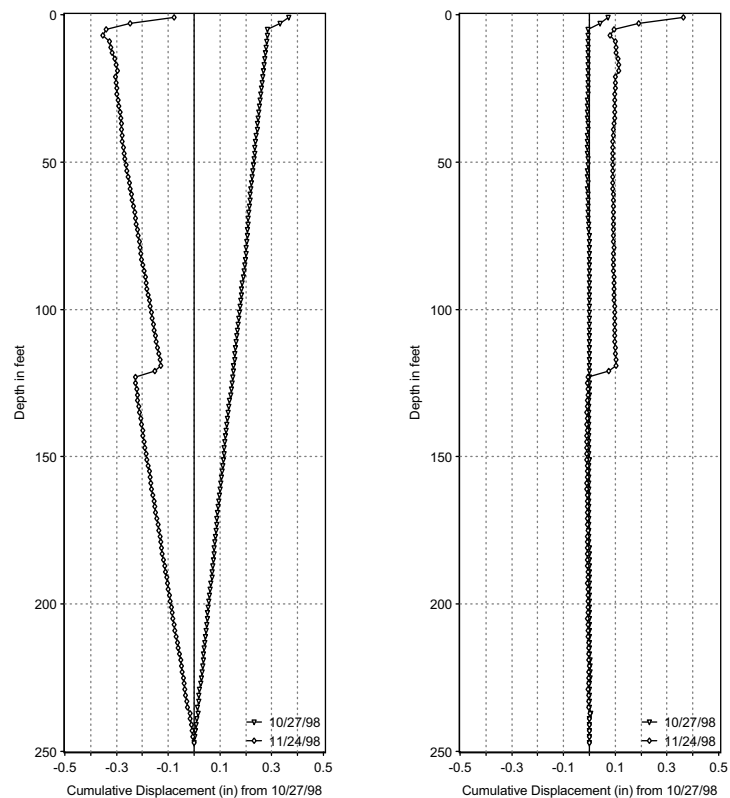
Site Knowledge: The plot shows movement where there should be no movement. Typically, the bottom 5 depths (or more) of the casing are anchored in stable ground. Any movement appearing there is generally error. In our example, we know that the casing entered rock below 80 feet, and that no movement has occurred from 80 feet downwards. This again suggests error in the data.

Quantifying Bias Shift Error

DMM for Windows has a routine for quantifying bias shift error. It suggests an value that you can enter in DigiPro’s correction routine. Refer to the DMM manual for details.

Visual Correction You can also arrive at a correction value visually.

1. Display a cumulative displacement graph.
2. Identify displacements that are produced by bias-shift error. For example, if you know that the bottom 20 feet of the casing are installed in rock, then any displacement seen there is probably error. If the error appears as a straight line tilted away from vertical, then it is probably due to bias-shift.
3. Enable bias-shift corrections. Then right click on one of the surveys, and choose Enter Correction Values.
4. In the Corrections Value dialog, enter a value, typically less than 20. If the tilt is to the right, enter a positive value. If the tilt is to the left, enter a negative value.
5. Click Apply and observe the graph. The tilted line should be vertical when the error has been corrected. Experiment with different values until you have found the correct one.



This example shows uncorrected and corrected graphs. You can see the typical linear pattern of bias-shift error. The second survey was obtained on the same day as the initial survey, so any movement is certainly false. The second survey was taken a month later and apparent displacement is in the wrong direction. When corrected, both surveys make sense and we can see that some real movement has occurred at about 125 feet.

Rotation

Rotation corrections are entered in radians. Here is a simple introduction to “rotation” error. More information can be found in the “Training” section of www.slopeindicator.com.

What is Rotation Error?

Rotation is a small change in the alignment of the measurement axis of the inclinometer probe. The change is usually less than one degree.

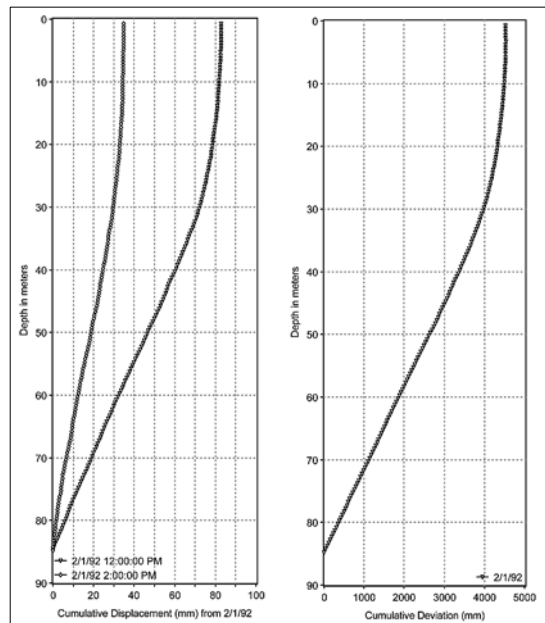
Ideally, the mechanicals of the probe are aligned so that the A-axis accelerometer measures tilt only in the A-plane. If the mechanicals of the probe are rotated slightly towards the B-plane, the A-axis accelerometer becomes slightly sensitive to tilts in the B-plane, too.

Rotation error is the cross-axis component in a reading, for example, the B-axis tilt in the A-axis reading. Rotation error becomes noticeable when two conditions combine:

- There is significant inclination in the cross axis.
- The change in the alignment of the probe occurs after the initial set was taken.

Identifying Rotation Error

- The cumulative displacement plot shows a curved line, when the line should really be straight.
- The cumulative deviation plot shows significant tilt in the cross axis.
- The two plots have a similar shape, as shown below.

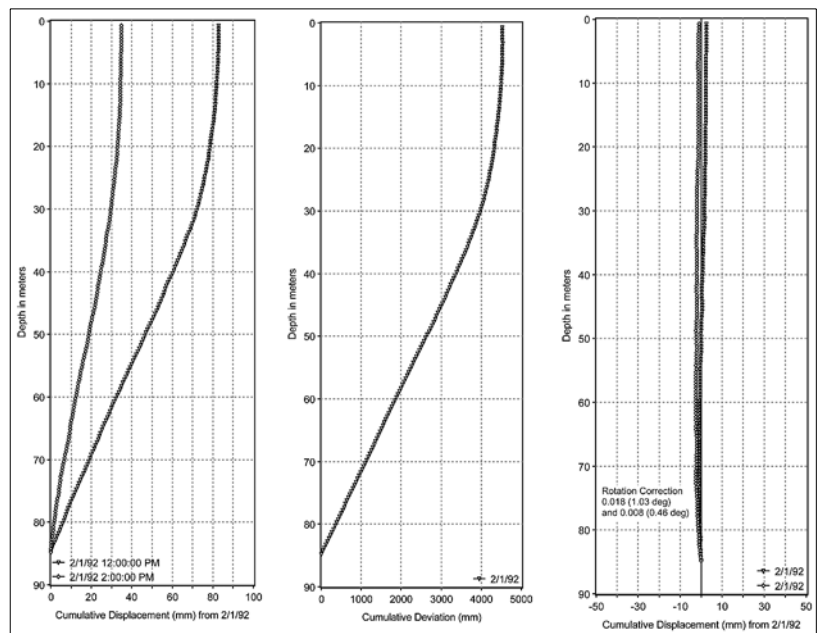


Cumulative
Displacement
A-Axis

Cumulative
Deviation
B-Axis

Correcting Rotation Error

1. Display a cumulative displacement graph. Use surveys that contain the error.
2. Identify displacements that are produced by rotation error. Find the depth of the maximum error.
3. Display a cumulative deviation plot of the cross axis. Find the deviation value at the same depth noted above.
4. Divide the displacement value by the deviation value. The result is a starting value for correcting rotation.
5. In DigiPro, enable rotation corrections and enter the rotation value.
6. Apply the correction and inspect the redrawn plot. The curve in the line should straighten..



Cumulative
Displacement
A-Axis

Cumulative
Deviation
B-Axis

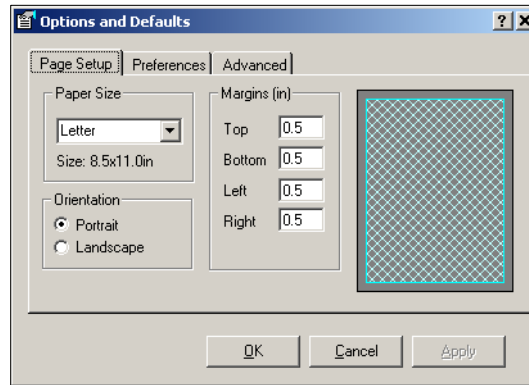
Cumulative
Displacement
Corrected

This example was a comparison test of three inclinometer probes. Readings from two probes are plotted against the third probe. All readings were taken on the same day. The casing was tilted about 4 degrees in the B-axis. The similarity between the A displacements and the B profile signals rotation error. The corrected displacement are shown at right.

Options and Defaults

Overview Some of DigiPro's default settings can be changed by using options and defaults dialog: File > Options and Defaults.

Page Setup

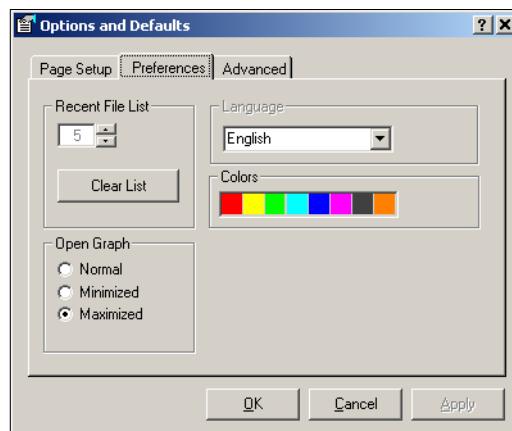


Paper Size Set the default paper size for all new reports.

Orientation Normally, you will allow report templates to take care of this.

Margins Set page margins. Choose paper size first.

Preferences



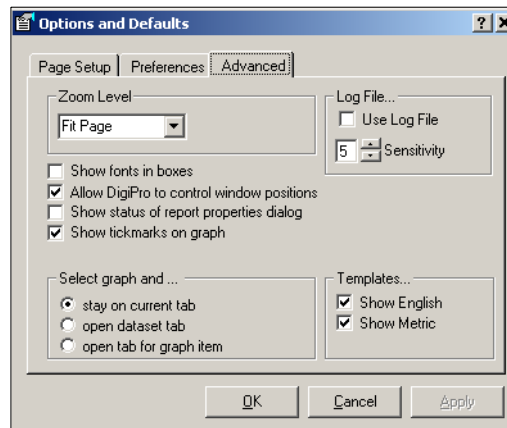
Recent File List Sets the number of recent files displayed on the File menu.

Language Currently, the only choice is English. Sorry.

Colors Set colors for DigiPro graphs by clicking on a color patch and choosing a different color from the pop-up pallet.

Open Graph Sets DigiPro's window: normal is resizable, minimized is a task on the task bar, maximized is full screen.

Advanced Tab



- Zoom Level** Sets the initial size of all displayed reports. We recommend using the default “Fit Page.”
- Show Fonts in Boxes** If unchecked, the text fields in the Title Block and Labels tabs will display text in DigiPro’s default display font (Arial 10). If the box is checked, the text fields will display text in the font you select using the A button.
- Allow DigiPro to Control Window Positions** Starts the report window in the upper left corner of the screen and the Report Properties dialog to the top edge of the screen. If the box is not checked, the Windows system controls placement. This may be the preferred setting if you open multiple windows.
- Show Status of Report Properties** If this box is checked, a grid appears at the bottom of the Report Properties dialog. The grid lists the tabs in which changes have been made. When you click Apply, the grid resets.
- Show Tickmarks on Graph** When this box is checked, DigiPro displays tick marks on the borders of the graphs. When the box is unchecked, the tick marks do not appear. You can set the tick mark positions in the Data Units and Depth Units tabs of the Report Properties dialog.
- Select Graph and...** Sets what happens when report properties dialog is closed and then reopened.
- **Stay on Current Tab:** This is the default. Report Properties displays the same tab as you switch back and forth between graphs.
 - **Open Survey Tab:** Report Properties shows the Survey tab each time you switch between graphs.
 - **Open Tab for Graph Item:** Report Properties opens to the tab that corresponds to the part of the graph that you clicked on.

Appendix A: Project Databases

What is a Project Database?	<p>Slope Indicator's project databases contain:</p> <ul style="list-style-type: none">• Information about inclinometer installations, such as their ID and depth. The database can contain any number of installations.• Surveys of the installations above. The database can contain any number of surveys.• Reports created by DigiPro. A report is a collection of parameters that tell DigiPro how to create a graph. The database can contain any number of reports.
Use DMM to Create the Database	<p>Project databases are created by DMM for Windows. DMM also imports or converts older data formats. DigiPro simply uses the data in the database.</p> <p>If you don't have DMM for Windows, you can download it from Slope Indicator's website: www.slopeindicator.com or install it from Slope Indicator's Resource CD. DMM for Windows is free.</p>
Use DMM to Convert or Import Data	<p>Project databases created by DMM for Windows have a ".mdb" extension. If you have been using the Windows version of DMM, your data are already in this format, so no conversion is necessary.</p>
Converting .hdr Databases	<p>Project databases created by DMM for DOS consisted of a number of files. The main file had an ".hdr" extension. DMM for Windows provides a utility to quickly convert any of your old .hdr files to the .mdb Windows format. See Appendix 3 of the DMM manual: "Converting DOS DMM databases."</p>
Importing GTilt, RPP, and PCSLIN Files	<p>DMM for Windows can import RPP, PCSLIN, or GTilt files. It will also accept manually-entered data. See Appendix 5 and 6, "Importing Data" and "Manual Entry of Data."</p> <p>If you are switching from some other inclinometer system to Slope Indicator's system, you can usually export your data in one of these formats.</p> <p>Note: DMM does not import spreadsheet files.</p>