

Developer's Tips

Tips for using Dips with a hand-held computer

This document will outline a number of ways that a hand-held computer can be used for entering orientation data into Dips. Depending on alternative picked, the costs involved range from \$30 to \$1800.

Although this document will focus on the application of hand-held computers to Dips, a lot of the arguments presented here could be applied to other geotechnical software (eg. borehole logging software).

Motivation

The two main reasons for using a hand-held computer are to minimize data entry errors and to minimize time spent entering data. The former is the more significant of the two reasons.

Data entry errors

A potential for data entry errors occur when copying data from hand notes. Errors of this type are especially common when the person performing the data entry is not the person who took the original notes. If the notes are dirty, or the author doesn't have neat handwriting, the chance of an error increases. Common transcription errors include:

- 0, 6 and 9 can be confused
- 1 and 7 can be confused
- rows can be duplicated or left out, especially when reading long columns of data

These errors do not necessarily occur very frequently, but once this kind of error has been introduced, it can be very difficult to detect, and the error can propagate to cause errors in subsequent analyses. For example, a joint mapping that included an error like this could be put into a report. At some point in the future, a stability analysis (using software such as Swedge could be performed, using the data from the report. The stability analysis would contain an error, but it would be almost impossible to detect.

If the data is entered into a computer at the time of measurement, this potential source of error is eliminated and the entire analysis process will benefit.

Time spent entering data

When you consider two jobs, one where notes are taken on paper and then later entered into a computer from field notes, and another where the data is entered directly into the computer, the potential for saving time is easy to imagine. Just as it is now typical for engineers to write reports directly in a word processing program, instead of on paper, it will become increasingly common for people to enter data directly into computers in the field.

The time that will be saved each day (5 - 30 minutes) may not be significant by itself, but over time the cumulative savings will be substantial.

Palm OS / Windows CE devices

One alternative is to use a Palm OS, or Windows CE hand-held computer for data entry. This alternative is attractive because of the low price of these computers, compared to desktop computers. In addition, many people already use one of these computers as a personal organizer, and they are small enough that it is not a burden to carry them to the site.

Although there isn't a version of Dips available for the Palm OS, or Windows CE, it is a straightforward process to use a spreadsheet on a hand-held computer (while on-site) and then transfer the data into Dips (back in the office). This alternative involves the purchase of additional spreadsheet software for the hand-held computer, but this software is inexpensive, and the companies offer free trials, if you want to evaluate the software for a few weeks.

When picking a hand-held computer for field work, often the choice is to pick one of the cheaper devices, owing to the possibility that the device may get damaged or destroyed if there are harsh conditions encountered on site.

Sony Clie PEG-S360 (hand-held Palm OS computer)

<http://www.sonymstyle.com/>

\$180 (U.S.)

Weight: 4.27 oz

Dimensions: 4.63x 2.88x 0.59 inches (HxWxD)

Quicksheet (spreadsheet for Palm OS computers)

<http://www.cesinc.com/quicksheet/index.html>

\$30 (U.S.)

Works on: Most Palm OS computers (Palm®, Handspring®, Sony®, etc)

<http://www.cesinc.com/quicksheet/details.html>

TinySheet (spreadsheet for Palm OS computers)

\$30 (U.S.)

works on: Most Palm OS computer (Palm®, Handspring®, Sony®, etc)

<http://www.iambic.com/tinysheet/palmos/>

When the PalmOS software is installed on your desktop computer, an extra menu is added to Excel, so transferring the spreadsheets from Excel to the Palm is as simple as picking "Save to Palm" from the menu in Excel.

Data can then be entered into the spreadsheet on your hand-held computer. Entering data in the palm spreadsheet will be straightforward for anyone familiar with Excel.

After you have modified the spreadsheet on the hand-held computer, you synchronize the hand-held computer with your desktop computer, and the spreadsheet data will be transferred back into Excel.

Entering data on the Palm OS (screen capture of Quicksheet on a Sony CLIE PEG-S320)

	A	B	C
1	Strike	Dip Right	Type
2	66	29	joint
3	253	89	joint
4	335	54	joint
5	272	85	joint
6	48	81	joint
7	140	54	bedding
8	4	39	joint
9	86	90	joint

Once the data is in Excel, you can simply select the data and press *copy*. Then you can start Dips, select the top-left cell in the grid, and press *paste*. The only additional work is to make sure the appropriate columns are setup in Dips before the data is pasted in (eg. In the pictures shown below, an extra column "TYPE" was added in Dips before the data was pasted).

Select cells in Excel, select copy...

	A	B	C	D
1	Strike	Dip Right	Type	
2	66	29	joint	
3	253	89	joint	
4	335	54	joint	
5	272	85	joint	
6	48	81	joint	
7	140	54	bedding	
8	4	39	joint	
9	86	90	joint	
10	86	90	joint	
11	46	44	joint	
12	274	87	joint	
13	342	51	joint	
14	29	53	joint	
15	246	75	joint	
16	358	46	joint	
17	346	51	joint	
18	66	34	joint	
19	344	41	joint	
20	336	19	joint	
21	175	50	bedding	

Open Dips, select paste...

ID	Strike	Dip Right	TYPE
1	66	29	joint
2	253	89	joint
3	335	54	joint
4	272	85	joint
5	48	81	joint
6	140	54	bedding
7	4	39	joint
8	86	90	joint
9	86	90	joint
10	46	44	joint
11	274	87	joint
12	342	51	joint
13	29	53	joint
14	246	75	joint
15	358	46	joint
16	346	51	joint
17	66	34	joint
18	344	41	joint
19	336	19	joint
20 *	175	50	bedding
21			
22			

The main disadvantage of using Palm OS or Windows CE computers, is that these computers require different software from desktop computers. This usually means that different file-formats are used, and conversion may be required. This does not usually present a problem for simple tasks (such as copying a few columns in a spreadsheet), but more complex files (such as those with charts or complex macros) may present difficulties.

Sub-notebooks

Another alternative is to use a sub-notebook computer. A sub-notebook differs from a standard laptop, in that the sub-notebooks are significantly smaller and lighter. Although this alternative is more expensive, they may be preferable because of the wider variety of software that is available.

Since these computers run Windows XP (instead of Windows CE, or the Palm OS), they can run the same software that you use on your desktop computer, so you won't have any trouble finding programs or converting file formats. You could also use your standard word processor to write part of a report, or to compose an email, while on site.

Sony VAIO C1 PictureBook

<http://www.sonystyle.com/>

\$1800 (U.S.)

Weight: 2.2 lbs

Dimensions: 1.2"x9.9"x6.0" inches (HxWxD)

With this type of computer you will be able to run the full version of Dips, so you will be able to perform your data entry right into the grid in Dips, and use all of the various other features of the program (eg. creating pole plots or contour plots)

You could also install Slide or Swedge on this computer, and perform a preliminary analysis while you are still on site. After performing this analysis, you might realize that it would be beneficial to collect some additional data. Previously, this would have required a trip to the office, and a return visit to the site. Now it can be done during the same site visit.