

The Geopacks Gradometer

COMPONENTS:

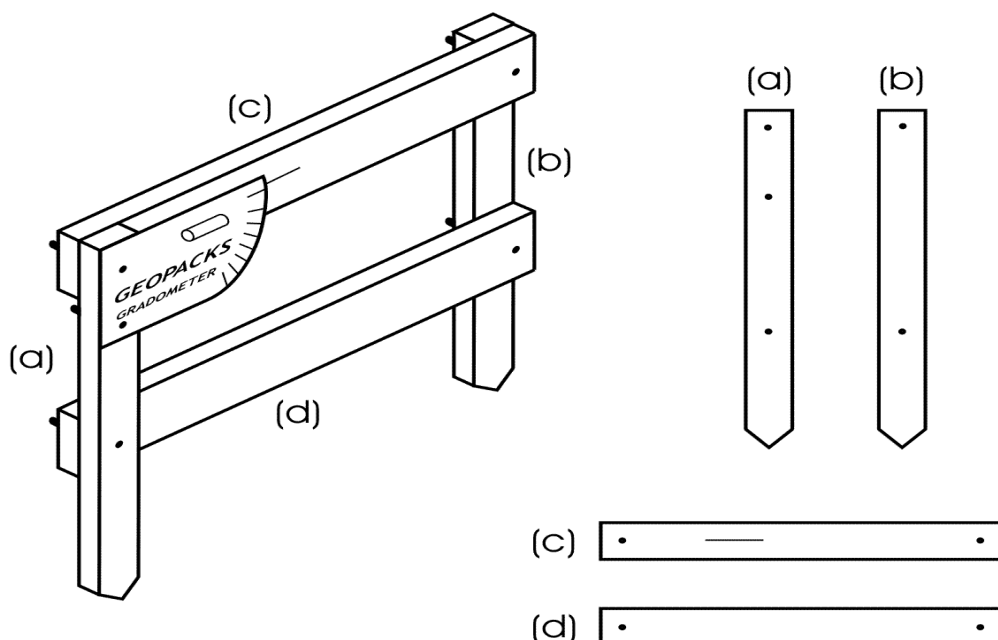
- 5 Bolt Screws
- 5 Wing nuts
- 1 Gradometer protractor complete with spirit vial
- 1 Metal Pointer with 2 small screws
- 4 lengths of polypropylene
- 1 set of instructions and user manual

ASSEMBLY INSTRUCTIONS

To assemble, carefully follow these step by step instructions:

1. Identify the two upright sections of the Gradometer (a) and (b) - (a) has three drilled holes; two near one end (top) and one in a central position. (b) has two drilled holes; one near one end (top) and one in the middle of the length
2. Fix the Gradometer protractor scale to (a) as shown in the sketches below using the bolt-screws and wing nuts supplied
3. Identify the top horizontal section (c) by the additional presence of two small holes drilled to receive the metal pointer; with the end which has the small holes and the larger hole to your left, fix to each of the two upright sections (a) & (b) using one bolt-screw and wing nut at each end
4. Finally fix the lower horizontal section (d) in a similar way using the screws and wing nuts supplied

If assembled in this manner, by removing only the lower horizontal section (d), the Gradometer can be folded shut without totally dismantling the unit.



WARNING

We urge teachers, lecturers and anyone else involved in field work to caution students about the dangers of working on slopes which are STEEP, UNSTABLE, CONVEX (i.e. get steeper toward the bottom) or in potentially serious or hazardous environments (e.g. above sea-cliffs or quarry faces). Even gentle grassy slopes can become treacherous when wet. Users of the Gradometer should wear suitable shoes or boots with a good deep tread.

Be Aware - Be Alive

We can accept no responsibility for accidents occurring during the collection of data through the use of the Geopacks Gradometer.

Using the Gradometer

The Geopacks Gradometer offers a simple way to collect reasonably accurate and detailed slope gradient measurements. The Gradometer is best used over relatively short sections - up to 200 m in length where there are definite, maybe numerous, changes in slope. On longer sections, and especially where gradient changes are few or gradual, surveys involving tapes and clinometers would be much quicker.

Up-slope or Down?

Once selected, the section to be surveyed with the Gradometer should be marked with a stake or Ranging Pole at either end. Choose which end is to be the start of the survey. If moving from the low end to the high, the predominant tendency will be for POSITIVE slope angles (except where, locally, there will be dips in the slope). If moving from the high end to the low, most slope angles will be NEGATIVE. It is important to accurately record the Positive or Negative tendency.

Making a Start

- Position the upright of the Gradometer without the Protractor and Level (the “Proximal Upright”) at the starting point. The upright with the Protractor and Level, will be pointing away from the start point (i.e. either up or down the slope as the case may be). We call this the “Distal Upright”.
- Ensure that the points of the uprights rest firmly, but do not dig into the surface of the slope. Very rocky sections should be avoided unless the surveyors can agree a disciplined convention for dealing with rocks lying across the survey route. The same applies to densely vegetated slopes.
- Once satisfied that the Gradometer is correctly positioned, adjust the tile of the upright sections by ensuring that the bubble lies in the centre of the spirit vial. Now, simply read off the angle indicated by the metal pointer to the nearest degree or half degree.

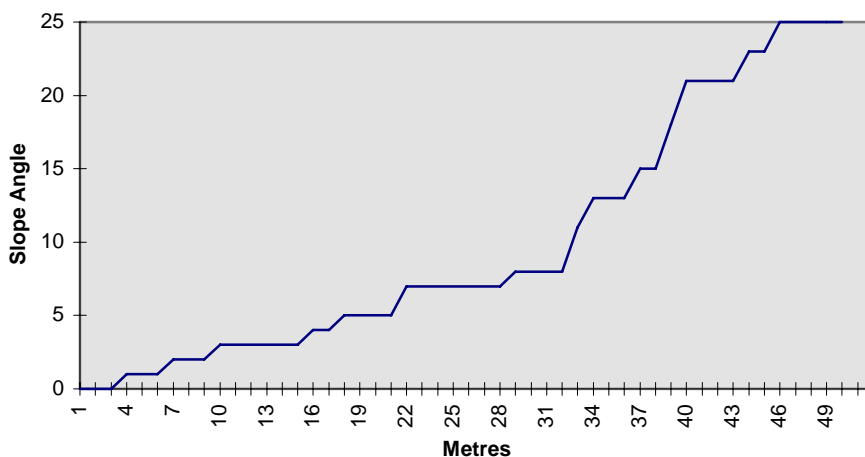
The figure should be recorded on a copy of the Data Collection Sheet provided. It is **IMPORTANT** to note the **NEGATIVE** or **POSITIVE** tendency of the reading - **POSITIVE** if going **UP**; **NEGATIVE** if going **DOWN**.

- Mark the position of the Distal Upright (DU) on the ground - usually with the toe of one's boot! Move the Proximal Upright (PU) to this position, level the spirit bubble and read and record the angle, again noting the Positive or Negative Tendency. Thus, two slope angles will have been measured and two meters of the survey line covered because since the distance between the uprights is 1 meter, the survey moves forward 1 meter every time the Gradometer is moved along the survey route.
- Repeat this process, moving the PU to the previous DU position until the end of the survey line is reached.

Using the Data

The wealth of data collected during the slope survey needs to be processed so that it can be studied in graphical rather than digital form. Ideally, use a dedicated computer software package to draw graphs and present other information. Geopacks publishes the package called "Slope Profile and Variable Analysis" by Rick Cope. Contact our customer services department for details of this program. Otherwise, try using a spreadsheet package as illustrated below. The data shown was entered into Microsoft Excel from the Data Sample Sheet attached.

Valley Side Slope - Shady Valley (West)



Suggested Types of Survey

Cross Valley Profiles - especially looking for river terraces

River Channel Surveys - take care in moving water. In dry or very shallow course, consider using the Geopacks Mini Gradometer for extra detail - call our Customer Services team on 08705 133 168 for details.

Long Valley Profiles - great fun working IN streams but make sure the water is shallow and gradients gentle! Good for detecting knick points and other long profile irregularities.

Beach Profiles - the Gradometer is an ideal tool for drawing beach berms, cusps, shingle bars and much more.

Sand Dune Surveys - accurately draw dune face and lee slope profiles (but, beware, this is hard work and there may be conservation issues concerning work in fragile dune environments).

Composite Surveys - combine a detailed slope profile survey with other variable data. For example, note vegetation species along the survey line if there is a suggestion that plant life may be related to slope angle. Also, measure and record other variables like soil depth, Infiltration Rates and soil pH along the transect line. Call Geopacks Customer Services team on: 08705 133 168 for details of Soil Augers, pH Testers and Infiltrimeters.

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