

**MEASURING BEACH PROFILES**  
**USING THE DUMPY LEVEL SURVEYING METHOD**

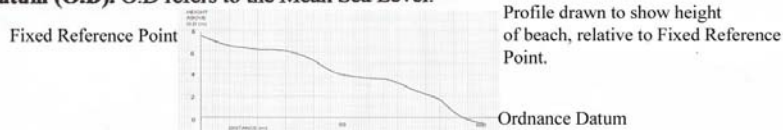
The aim is to draw a beach profile line, which can then be used to accurately describe the shape and to measure the dimensions of the beach.

Two sets of data are required from the Fieldwork:

**A. Horizontal Distance** from a fixed reference point, measured along a tape measure laid-out at right angles to the sea.

**B. Height of the beach**, relative to a fixed reference point. The height is measured at selected intervals along the horizontal distance.

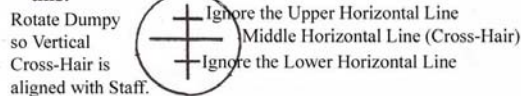
The **Fixed Reference Point** is at a known, pre-surveyed height above **Ordnance Datum (O.D)**. O.D refers to the Mean Sea Level.



To measure the height of the beach relative to the fixed reference point, we use a **Dumpy Level** bolted onto a **Tripod**, and take readings from a **Survey Staff**.

The procedure is as follows:

1. Set up the Tripod somewhere near to the top of the beach, but several metres to one side of where the profile will be measured. Make sure that the platform on the top of the Tripod is approximately level (by eye) and is just above the level of the highest point of the beach.
2. Attach the Dumpy level to the Tripod, and adjust the levelling screws to make sure that it is level i.e. Bubble of spirit level is within the circle, whatever the direction that the Dumpy Level is pointed.
3. Hold the Survey Staff so that the base is resting on the Fixed Reference Point. (The reference points are all marked and numbered). Make sure that the Staff is held vertical and fully extended to its 4m maximum.
4. Rotate the Dumpy Level so that it is sighted onto the Staff. Focus the Dumpy Level so that you can clearly see the numbers/divisions on the Staff. As you look through the Dumpy Level viewfinder, you should see cross-hairs like this:



(If you cannot clearly see the cross-hairs, simply twiddle the eyepiece.)

5. Take a reading where the middle horizontal line (cross hair) 'hits' the scale on the Survey Staff. This is your relative height reading i.e. the height of the line of vision from the Dumpy Level, above the Fixed Reference Point. We shall call this the **First Dumpy Level Reference Line**.

Note that the scale on the Survey Staff is in Metres. Each of the smallest divisions is 0.01m (i.e. 1cm). Hence your readings should be made to 2 decimal places e.g. 1.07m. The maximum reading that you can possibly record is 4.00m.

6. Enter your data into the Beach Profile Data Recording Sheet.  
There are 4 columns for data entry: In the 1<sup>st</sup> column, enter the horizontal distance from the Fixed Reference Point, i.e the distance along the tape measure from zero (note that the first reading will always be zero); in the 2<sup>nd</sup> column enter the readings as you look through the Dumpy Level at the Survey Staff. The 1<sup>st</sup> reading in the 2<sup>nd</sup> column will be taken with the Survey Staff being held on the Fixed Reference Point (0m horizontal distance).  
Don't move the position of the Tripod and Dumpy Level....yet.  
To get the 2<sup>nd</sup> and subsequent readings, it is up to you to select the appropriate horizontal distance intervals. Move the Survey Staff to the selected distance, sight the Dumpy Level onto the Staff, and take the reading through the Dumpy Level.  
It will not be long before you have turned the Dumpy Level so that you are looking towards the sea, rather than towards the land.
7. Keep moving the Staff at intervals down the beach, until the top of the Survey Staff is below the line of vision from the Dumpy Level. i.e Below the First Dumpy Level Reference Line. You can no longer take readings from the First Tripod Position, because the beach is too low.
8. Bring the Survey Staff back to where you took the previous reading, i.e the last point along the tape where you could still get a reading on the Staff from the first Tripod position. Then, pick-up the Tripod and the attached Dumpy Level, and carry them down the beach. Re-locate and set-up the Tripod and Dumpy level, just below the Survey Staff position, using the same procedure as at the beginning of the profile.  
This is now your Second Tripod Position.  
The first reading using the Second Tripod Position will be entered into the third column on the recording table. N.B. When you change Tripod positions, you must have 2 readings at the same horizontal distance, 1 reading in the 2<sup>nd</sup> column of results and another reading on the same row in the 3<sup>rd</sup> column. You can now carry-on down the beach with your profile.  
For Example:

Horizontal Distance From Reference point. (Metres)	Reading on Survey Staff From 1 <sup>st</sup> Tripod Position. (Metres)	Reading on Survey Staff From 2 <sup>nd</sup> Tripod Position. (Metres)
0	0.89	
10	0.83	
12	1.45	
18	2.87	
26	3.92	0.76
30		1.12
35		1.93
Etc.	Etc.	Etc.

9. You may need to move the Tripod to a 3<sup>rd</sup> position, if so, repeat the procedure and use the 4<sup>th</sup> column in the recording table. Keep going until you reach the furthest extent of the swash. TAKE EXTREME CARE. REMEMBER THE SAFETY WARNINGS GIVEN BY YOUR TUTOR.