

**Lecture (6):**

**Setting up an Optical Level:**

**Aim:**

Introducing optical level and function of its parts and installing it on tripods and reading of staff numbers.

**Principle:**

Before using of optical level , we must be adjust tripod according of surveyor length and fixed its pods in earth without any slope on the its base and installing telescope on base of tripods by centering screw. So adjust telescope horizontally without any slope by circular level and taking number of staff by optical level.

**Requirement Tools:**

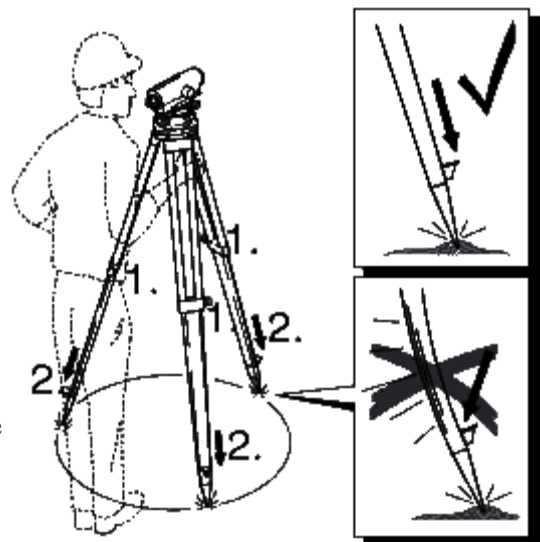
- 1- Leveling telescope
- 2- tripod
- 3- staff

**Procedures:**

- 1- Setting up tripod
- 2- Setting up optical level on tripod
- 3- Staff Reading by optical level

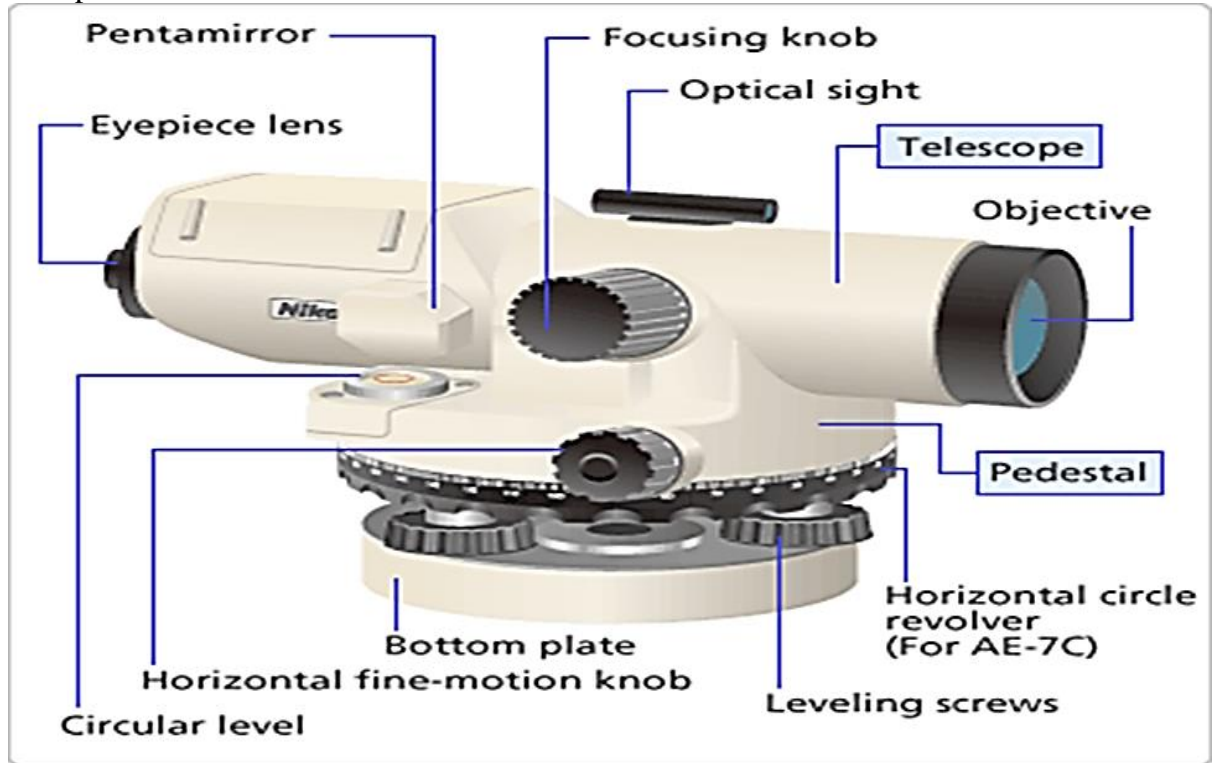
**Procedure (1): Setting up tripod**

- Loosen screws of tripod legs, pull out to required length and tighten screws.
- In order to guarantee a firm foothold sufficiently press the tripod legs into the ground. When pressing the legs into the ground note that the force must be applied along the legs.
- Check all screws and bolts for correct fit.
- When setting up the tripod pay attention to a horizontal position of the tripod plate. Minor inclinations of the tripod can be corrected with the foots crews of the tribrach.

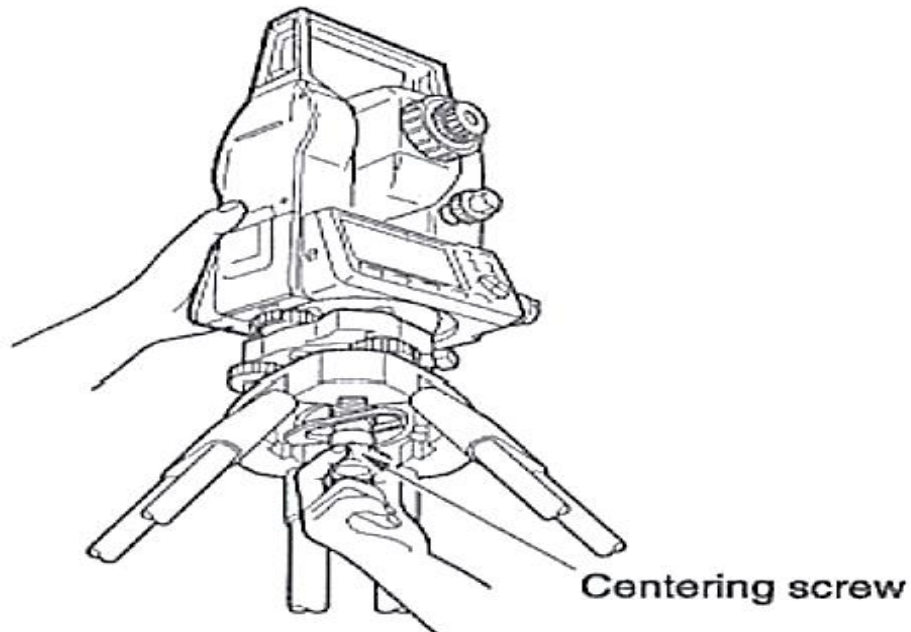


**Procedure (2): Setting up optical level on tripod**

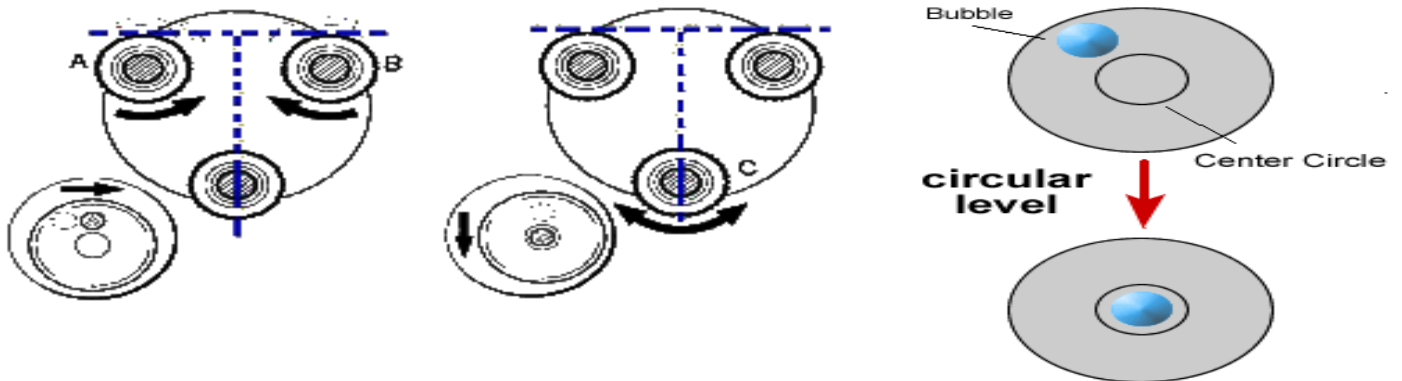
- Parts of optical level



- Place Instrument on Tripod
- Secure with centering screw while bracing the instrument with the other hand.

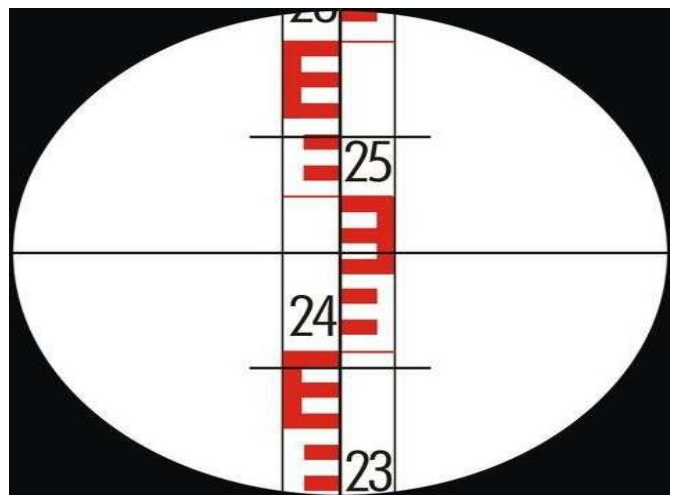


- Center the bubble in the circular level by adjusting the leveling screws
- Turn foot screws A and B simultaneously in opposite directions until bubble is in the centre (on the imaginary "T").
- Turn the instrument 90° and then turn the foot screw C until bubble is centered.



**Procedure (3): Staff Reading by optical level**

- Sight onto the leveling staff.
- Focus the telescope on the staff.
- Always ensure the bubble is central
- Take the reading of height.
- Each square is 1cm (10mm)
- First meter is black and second mere is red
- Each E is 100mm (0.1m) apart



The figure below shows three different staff readings:

It is easy to read (b) and (c) because the cross-hair is exactly on a mark division. The reading for (a) is between 1.630 and 1.640. To assess the mm reading you have to estimate where the position of the cross-

hair is. For (a) the reading is 1.636. The millimeter reading is to be estimated and can vary between  $\pm 1$  mm.

reading (a) is 1.636

(b) is exactly 1.500

and (c) is 1.580

