SNS COLLEGE OF TECHNOLOGY

AN AUTONOMOUS INSTITUTION

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COIMBATORE

DEPARTMENT OF CIVIL ENGINEERING

23GET102 – BASIC CIVIL AND MECHANICAL ENGINEERING

I YEAR / I SEMESTER

Unit 1 : Civil Engineering Materials and Surveying

Topic : Surveying

SURVEYING

Surveying is the science and art of making measurements, necessary to determine relative positions of points above, on beneath the surface of the earth by means of direct or indirect measurement of distance and direction or elevation.

PLAN AND MAP

PLAN

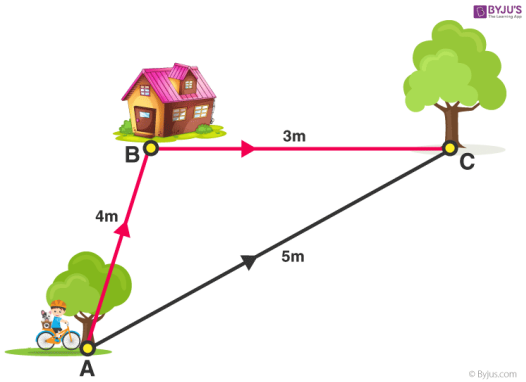
- Projection of the ground
- Representation of an area on some scale

MAP

- Minimized adopted version of sketch

EX: Map of India

OBJECTIVES OF SURVEYING



CLASSIFICATION OF SURVEY

- **Classification based on the nature of field**

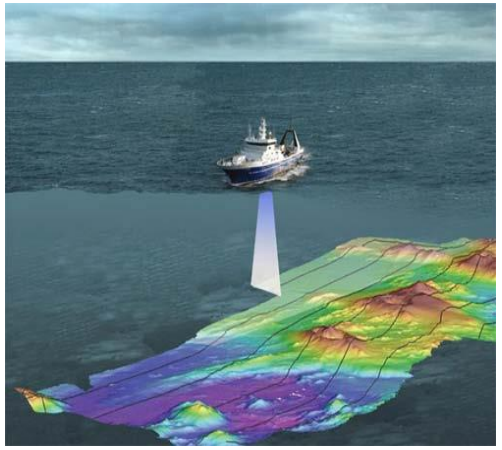
✓ Land surveys

✓ Marine and navigation surveys

✓ Astronomical surveys

✓ Underground surveys

✓ Aerial surveys



- **Classification based on objective of survey**
  - ✓ Engineering surveys
  - ✓ Military surveys
  - ✓ Geological surveys
- **Classification based on objective of survey**
  - ✓ Mine surveys
  - ✓ Archeological surveys
  - ✓ Route surveys
  - ✓ Construction surveys

➢ Classification based on methods employed

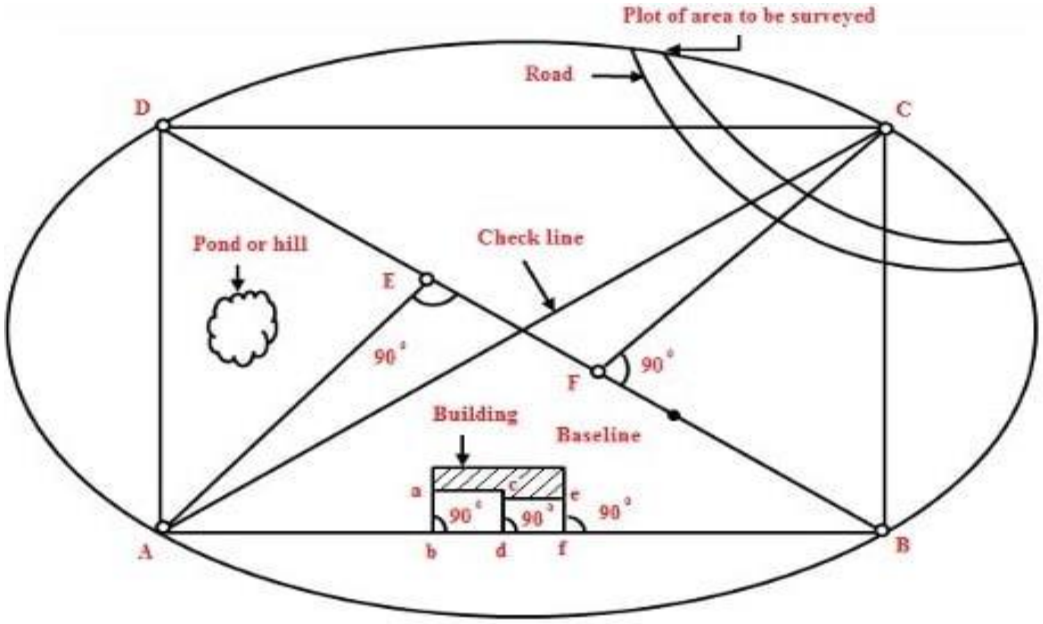
- ✓ Triangulation survey
- ✓ Traverse survey : Closed traverse and Open traverse

➢ Classification based on instruments used

- ✓ Chain survey
- ✓ Compass survey
- ✓ Plane table survey
- ✓ Theodolite survey
- ✓ Tachometric survey
- ✓ Photographic and Aerial survey

PRINCIPLES OF SURVEYING

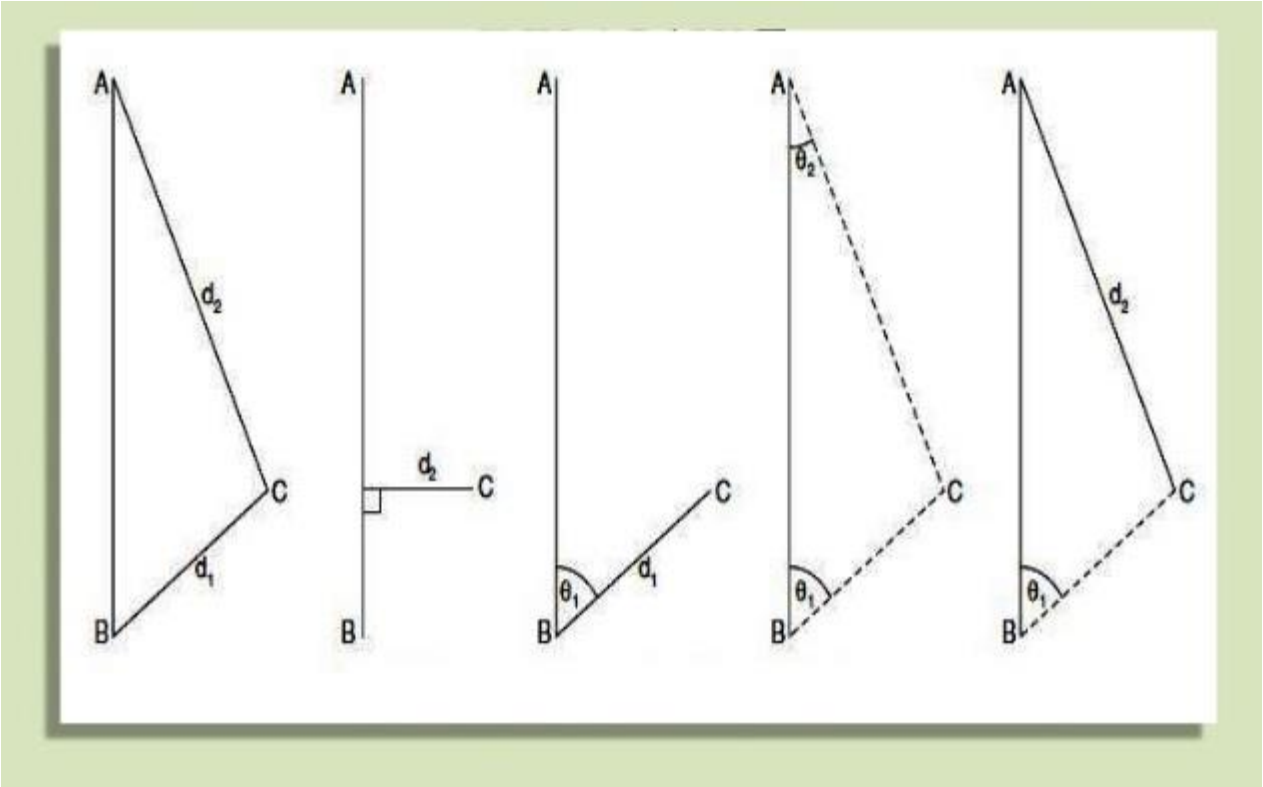
- **Work from whole to part**



A simple networks of triangle in a plot of land to be surveyed

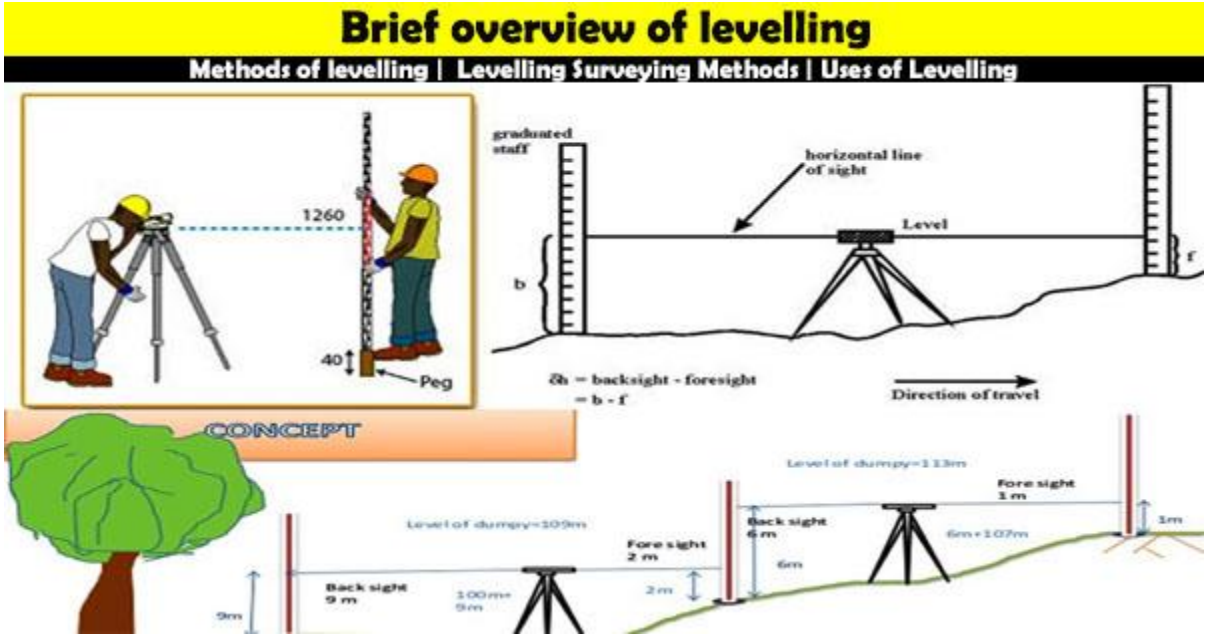
PRINCIPLES OF SURVEYING

- **Fix new points by at least two independent processes**



LEVELLING

It is the art of determining the relative heights of points on earths surface. It deals with the measurements in vertical planes.



OBJECTIVES OF LEVELLING

- For execution of many engineering projects of railways, canals, dams, etc.
- To plan for good network of levels keeping the economy and safety
- To give an excellent terrain mapping for project design.
- For improving the accuracy of alignments
- To give proper topography of heights

- **Level surface:**

  The surface that is normal to the direction of gravity

- **Level line:**

  It is line lying in level surface

- **Horizontal Plane:**

  The plane tangential to the level surface at any point

- **Vertical plane:**

  The plane that contains vertical line at a place is called vertical plane. The vertical line at any point will be perpendicular to the level surface at that point.

❖ **Datum Surface:**

This is an arbitrary surface with reference to which the heights (elevation) are measured and compared.

❖ **Reduced level(R.L.)**

It is the level which is above (or) below the datum

❖ **Back Sight (B.S.):**

It is the first staff reading taken after installing the instrument in any position. This will always be a point of known height.

❖ **Fore Sight (F.S.):**

It is the last staff reading taken on a point before shifting the instrument. This is a point whose height has to be determined.

❖ Intermediate Sight (IS):

It is the intermediate staff reading taken after back sight and before the fore sight. It is done, only when we require two readings for the same position.

❖ Change point(CP):

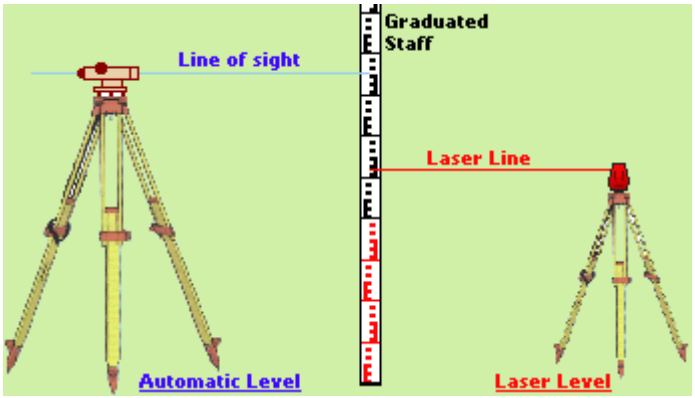
It indicates the shifting of the instrument. Both B.S. and F.S. are taken on a change point.

❖ Bench mark:

It is fixed point of reference known elevation.

INSTRUMENTS FOR LEVELLING

- Dumpy Levels
- Levelling staff



DUMPY LEVEL

LEVELLING STAFF

PRINCIPLES OF LEVELLING

For accurate work, the distance of BS and FS should be nearly equal. This reduce the error of non-parallelism

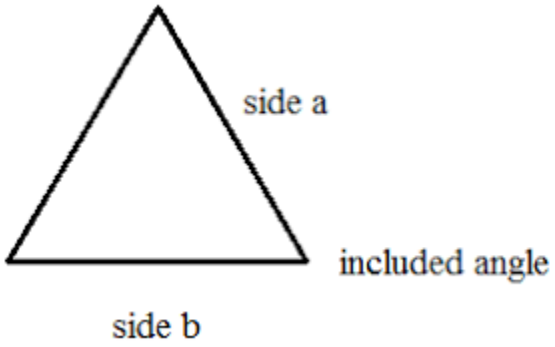
MEASUREMENT OF ANGLES

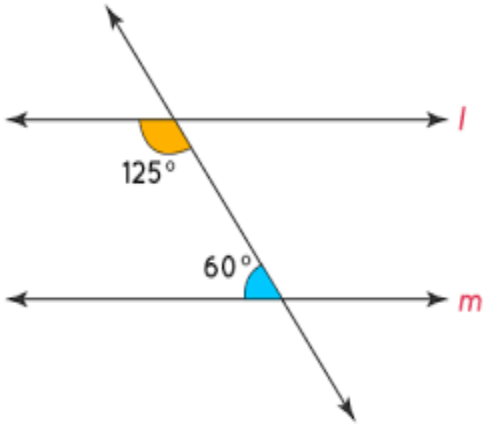
Instruments used for measurements of angles are

- Compass
- Theodolite
- Box Sextant

Methods of measurement:

- ✓ Included angle measurement
- ✓ Successive angle measurement





THANK YOU…