LECTURE # 1

In this lecture you will learn about:

Surveying.

It's Objectives and Use.

Primary Divisions of Surveying

- Plain.
- Geodetic.

Fundamental Principles of Surveying.

Course Name:

"Surveying I"

Course Code: CT-123

Credit Hours: 2

Semester: Summer 2020

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Surveying

“Surveying is the art of and science of determining the relative positions of various points or stations on the surface of the earth by measuring the horizontal and vertical distances, angles, and taking the details of these points and by preparing a map or plan to any suitable scale.”

Surveying

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Objective of Surveying

- The object of surveying is to prepare a map or plan to show the relative positions of the objects on the surface of the earth. The map or plan is drawn to some suitable scale. It also shows boundaries of districts, states, and countries too. It also includes details of different engineering features such as buildings, roads, railways, dams, canals etc.

Objective of Surveying

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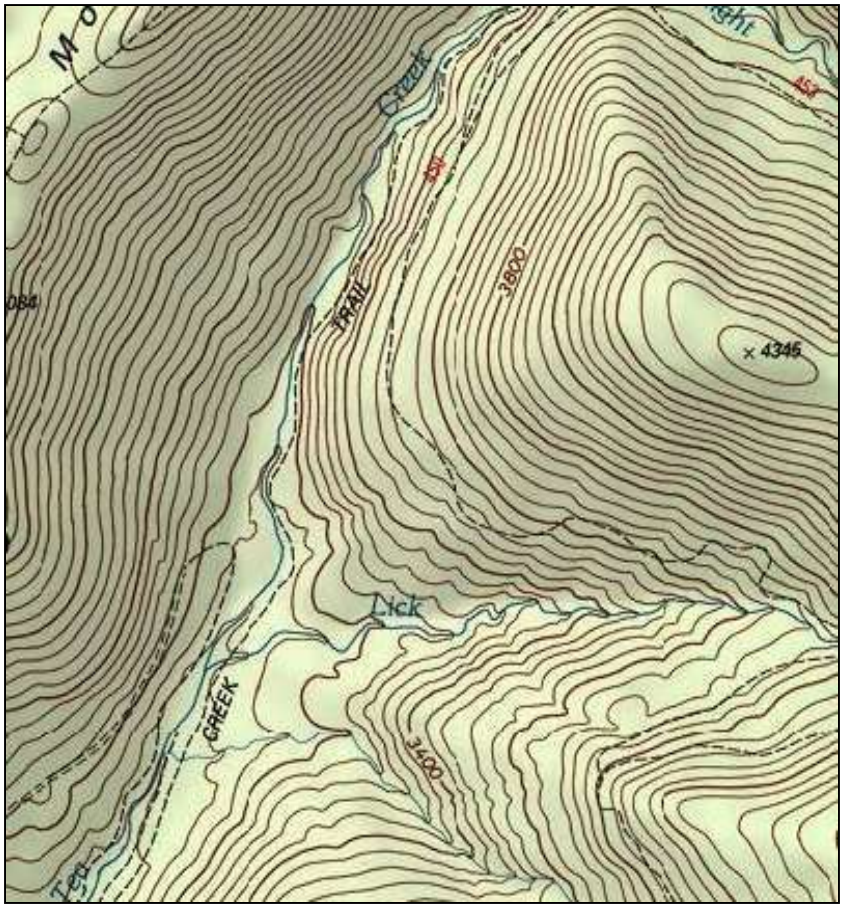
Uses of Surveying

The surveying may be used for following purposes:

- To prepare a topographical map which shows hills, valleys, rivers, forests, villages, towns etc.
- To prepare a cadastral map which shows the boundaries of fields, plots, houses and other properties.
- To prepare an engineering map which shows the position of engineering works such as buildings, roads, railways, dams, canals.

Topographical Maps



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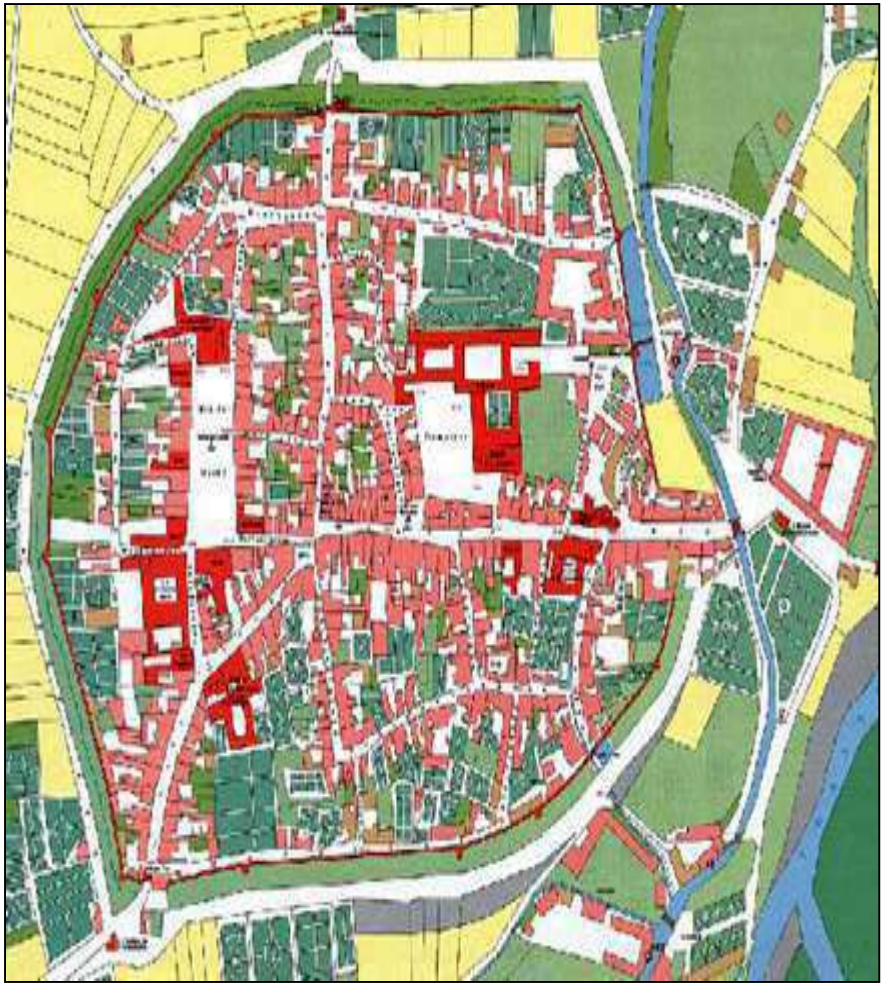
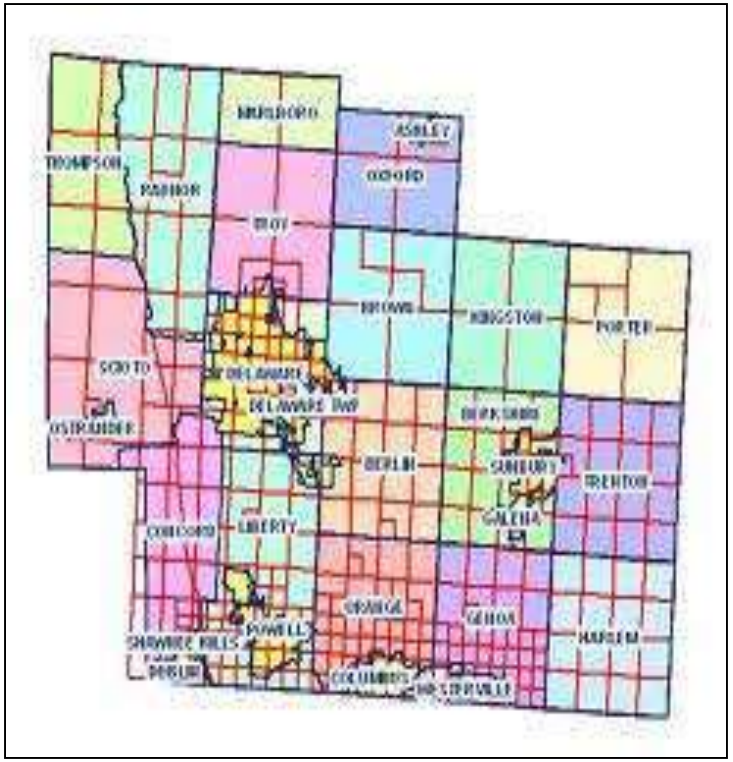
Cadastral Map





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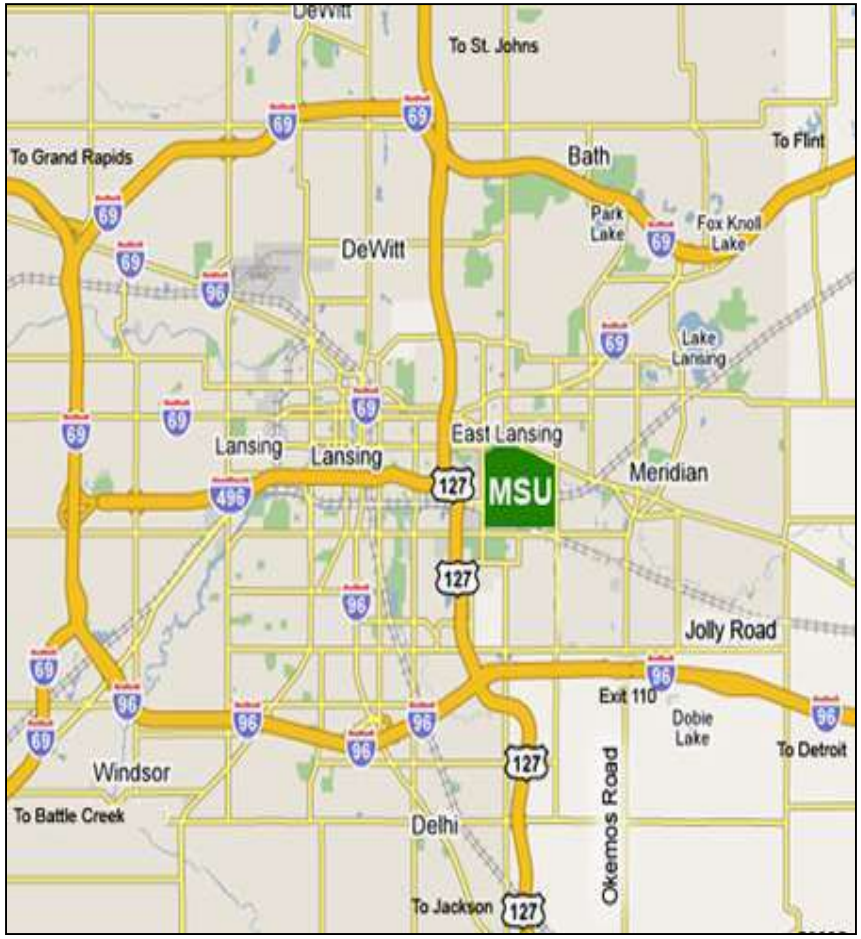
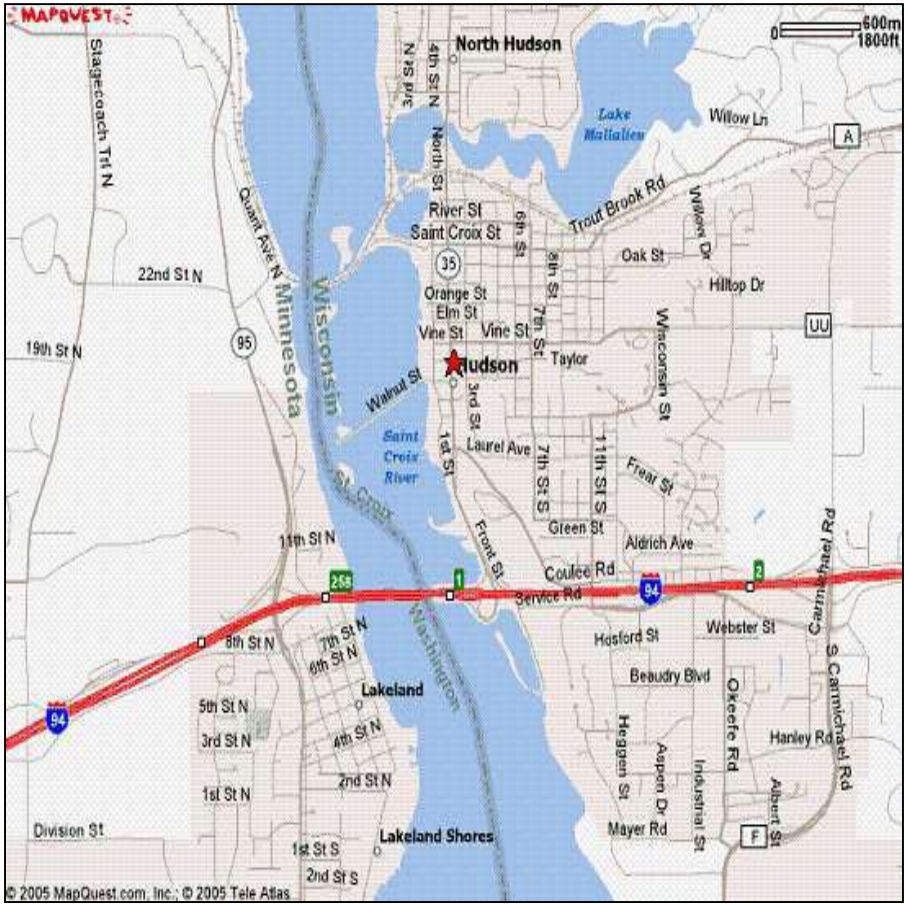
Engineering Map





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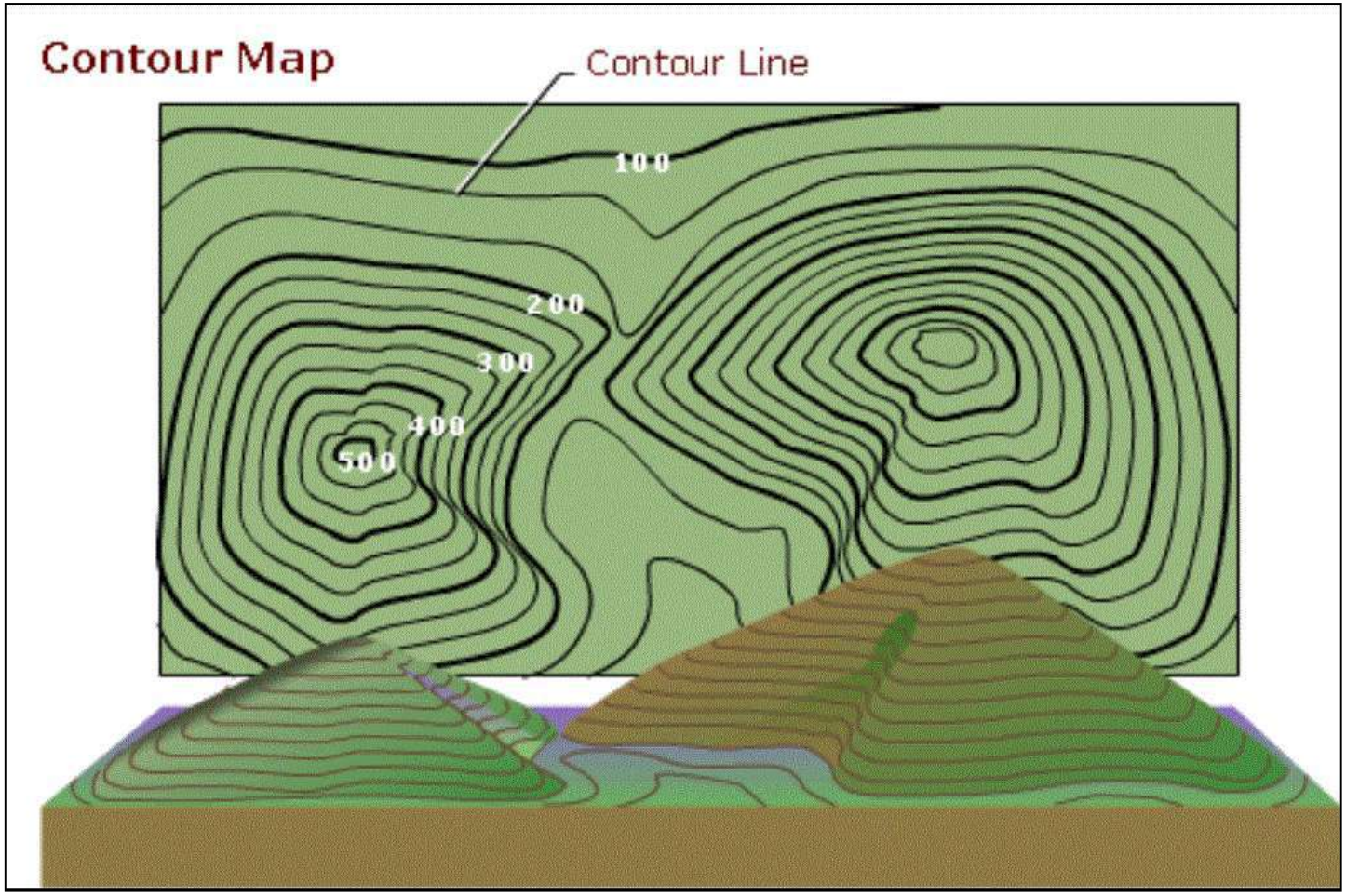
Uses of Surveying

- To prepare a contour map to know the topography of the area to find out the best possible site for roads, railways, bridges, reservoirs, canals, etc.
- Surveying is also used to prepare military map, geological map, archaeological map etc.
- For setting out work and transferring details from the map on the ground.

Contour Map



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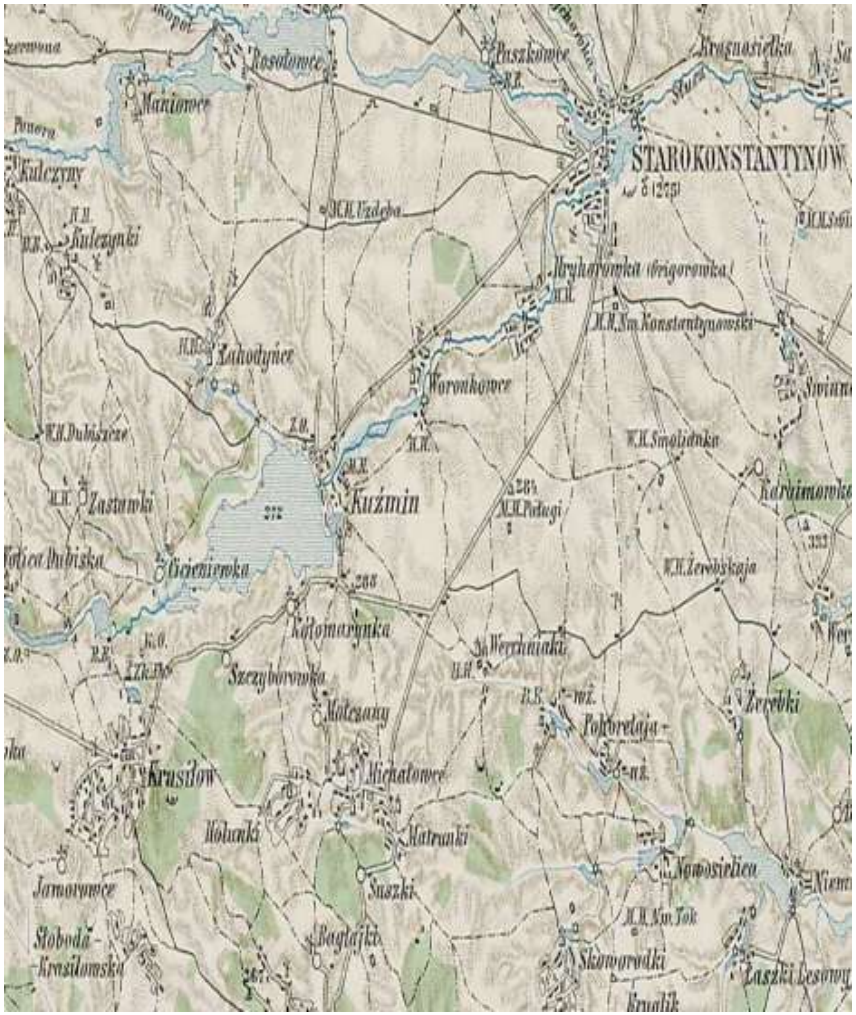
Military Map



SIZE SYMBOLS

•	Squad
••	Section
•••	Platoon
I	Company or Battery
II	Battalion of Squadron
III	Regiment or Air Group
X	Brigade
XX	Division or Wing

UNIT SYMBOLS

	Basic Unit
∞	Air
LVT	Amphibian Tractor
	Antiaircraft
• DB	Defense Battalion
E	Engineer
•	Field Artillery
	Infantry
Para	Parachute
Prcht	
P	Pioneer
Rdr	Raider
	Tank

MISC. SYMBOLS

	Command Post
	Observation Post
	Boundary (battalion)
	Aid Station (battalion)

EXAMPLES

•• 1L • 1DB	1st Sec, L Btry, 1st Def Bn
I B 5	Co B, 5th Mar Regt
II 1Rdr	1st Rdr Bn
III • 11	11th Mar Regt
II 2 7	OP, 2d Bn, 7th Mar Regt
XX 1	CP, 1st Mar Div

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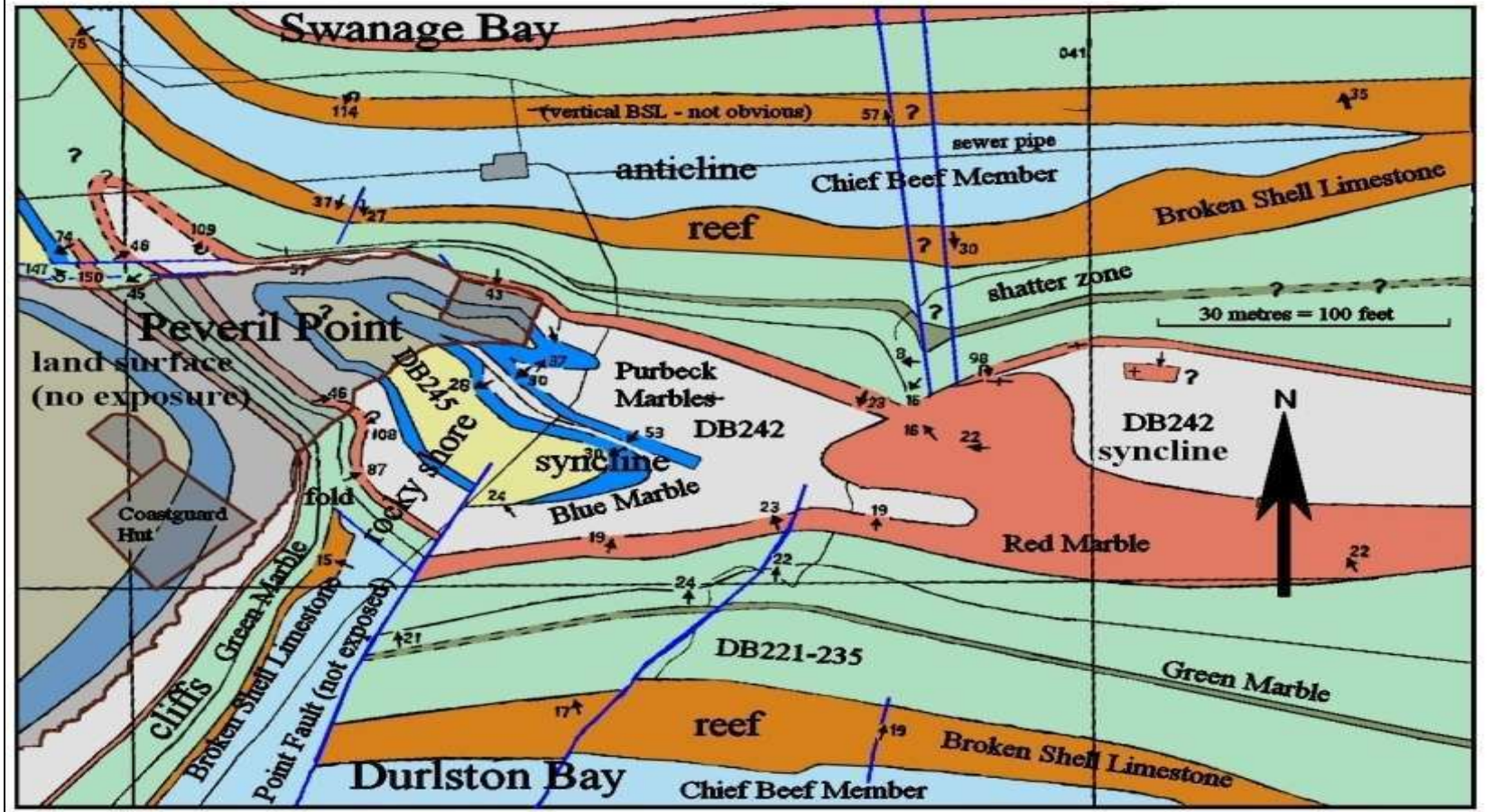
Geological Map



Geological map of Peveril Point, Swanage. Simplified and with some generalisations.
Based mainly on Cosgrove and Hearn (1966) and with some personal observations. Refer to Cosgrove and Hearn for details.
Ian West & Tonya West (c) 2007.

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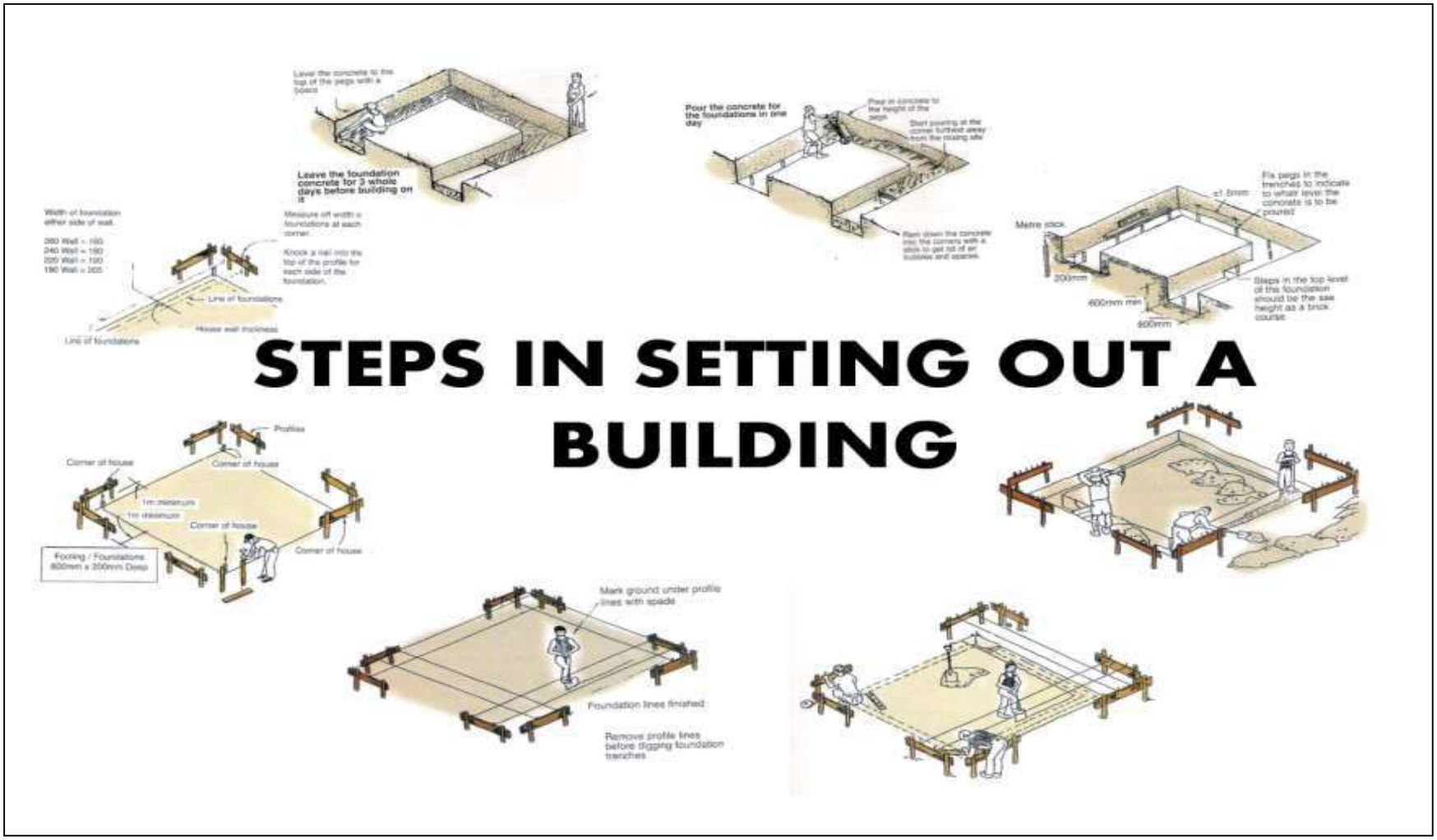
Setting Out Work



STEPS IN SETTING OUT A BUILDING

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Primary Divisions of Surveying

We know that the shape of the earth is spheroidal. Thus the surface is obviously curved. Surveying is primarily divided into two types considering the curvature of the earth's surface.

- Plane Surveying
- Geodetic Surveying

Plain Surveying

- The plain surveying is that type of surveying in which earth surface is considered as a plane and the curvature of the earth is ignored. In such surveying a line joining any two stations is considered to be straight. The triangle formed by any three points is considered as a plane triangle, and the angles of the triangle are considered as plain angles.

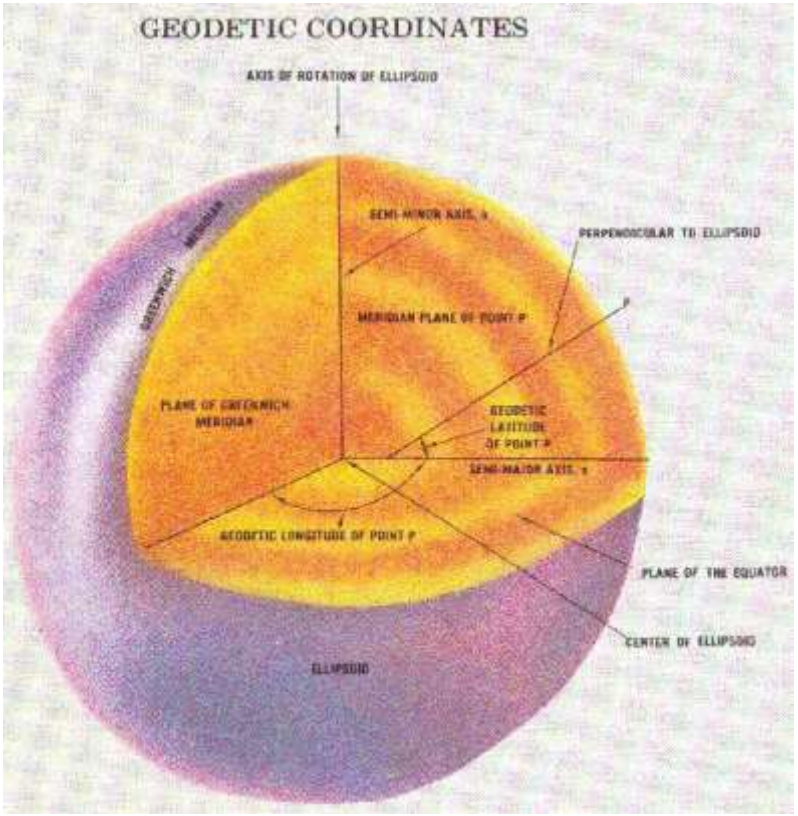
Plain Surveying

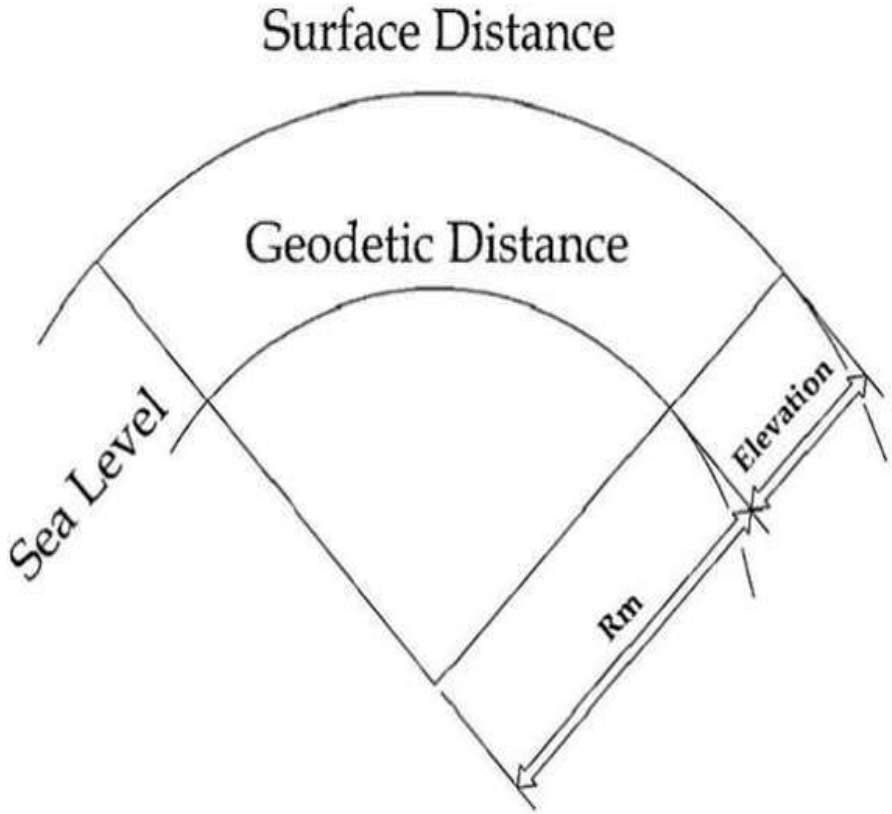
- Surveying is carried out for a small area of less than 250 Km^2 . It is carried out by local or state agencies like R & B department, Irrigation department, Railway department.

Geodetic Surveying

- The geodetic Surveying is that type of surveying in which the curvature of the earth is taken into account. It is generally extended over larger areas. The line joining any two stations is considered as curved line. The triangle formed by any three points is considered to be spherical and the angles of the triangle are considered to be spherical angles. Geodetic surveying is carried out for a larger area exceeding 250 Km^2

Geodetic Surveying





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Plain Surveying Vs. Geodetic Surveying

No.	Plain Surveying	Geodetic Surveying
1	The earth surface is considered as plain Surface.	The earth surface is considered as Curved Surface.
2.	The Curvature of the earth is ignored	The curvature of earth is taken into account.
3	Line joining any two stations is considered to be straight	The line joining any two stations is considered as spherical.
4.	The triangle formed by any three points is considered as plain	The Triangle formed by any three points is considered as spherical.
5.	The angles of triangle are considered as plain angles.	The angles of the triangle are considered as spherical angles.
6.	Carried out for a small area < 250 km^2	Carried out for a small area > 250 km^2

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Fundamental Principles of Surveying

Two basic principles of surveying are:

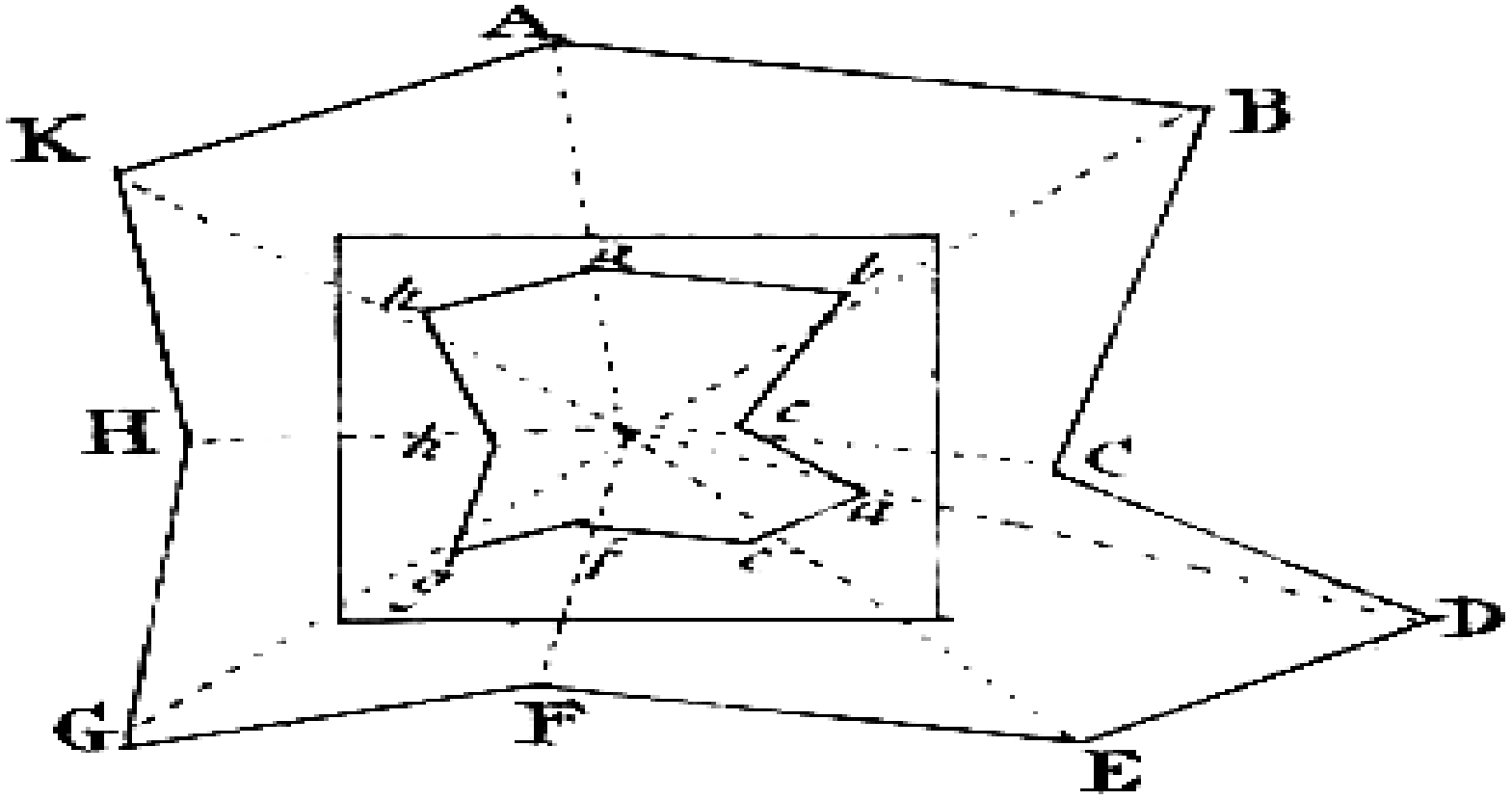
- Always work from whole to the part, and
- To locate a new station by at least two measurements (Linear or angular) from fixed reference points.

Fundamental Principles of Surveying

Always Work From Whole To The Part:

- According to the first principle, the whole survey area is first enclosed by main stations (i.e.. Control stations) and main survey lines. The area is then divided into a number of divisions by forming well conditioned triangles.

Work From Whole to the Part



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Fundamental Principles of Surveying

- The main survey lines are measured very accurately with precise survey instruments. The remaining sides of the triangle are measured. The purpose of this method of working is to control accumulation of errors. During measurement, if there is any error, then it will not affect the whole work, but if the reverse process is followed then the minor error in measurement will be magnified.

Fundamental Principles of Surveying

To locate a new station by at least two measurements (Linear or angular) from fixed reference points:

- According to the second principle the points are located by linear or angular measurement or by both in surveying. If two control points are established first, then a new station can be located by linear measurement. Let A & B are control points, a new point C can be established.

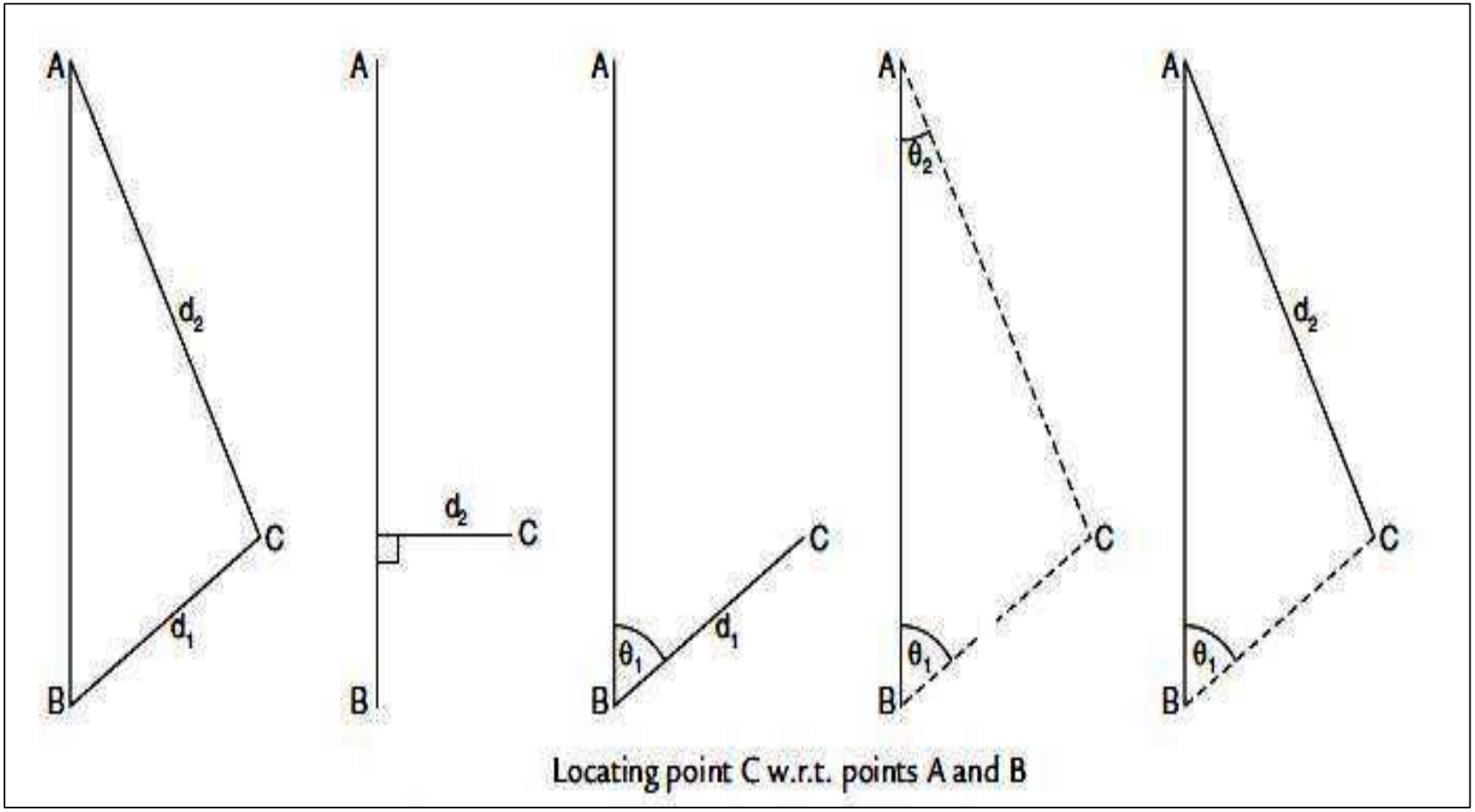
Fundamental Principles of Surveying

- Following are the methods of locating point C from such reference points A & B. The distance AB can be measured accurately and the relative positions of the point can be then plotted on the sheet to some scale.
- Taking linear measurement from A and B for C.
- (b) Taking linear measurement of perpendicular from D to C.
- (c) Taking one linear measurement from B and one angular measurement as ∠ABC

Fundamental Principles of Surveying

- Taking two angular measurement at A & B as angles / CAB and / ABC.
- Taking one angle at B as / ABC and one linear measurement from A as AC.

Fundamental Principles of Surveying



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THANK
YOU
GRACIAS
BOLZÏN
MERCI
BÏYAN
SHUKRIA
TINGKI
DANKSCHEEN
YAQHANYELAY
TASHAKKUR
ATU
SUKSAMA
EKHMET
ARIGATO
SHUKURIA
GOZAIMASHITA
EFCHARISTO
JUSPAXAR
KOMAPSUMINDA
MAAKE
GRAZIE
MEHRBANI
PALDIES