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# ASSIGNMENT 4: What are the latest techniques used for surveying?

# WHAT IS SURVEYING?

* Surveying is defined as the science of making measurements especially of the earth surface. This is being done by finding out the spatial location(relative/absolute) of points on or near the earth surface.
* Different method and instrument are being used to facilitate the work of surveying.

# OBJECTIVE OF SURVEYING:

1. To collect field data.
2. To prepare plan or map of the area surveyed.
3. To analyze and calculate the field parameters for setting out operation of actual engineering work.

Surveyors work with elements geometry , trigonometry, physics, engineering metrology ,programming languages and regression analysis.

# MODRN SURVEYING EQUIPMENT:

## DIGITAL LEVEL

## EDMI – ELECTRO MAGNETIC

## TOTAL STATION

## REMOTE SENSING

# DIGITAL LEVEL:

Digital level use electronic image processing to evaluate the special bar- coded staff reading.

* This bar –coded pattern is converted into elevation and distance values using a digital image matching procedure within the instrument.

# Uses:

For measuring elevation, height difference , leveling of ceiling.

# SILIENT FEATURES OF DIGITAL LEVEL

* Fatigue-free observation as visual staff reading by the observer is not required.
* Ser friendly menus with easy to read, digital display of results.
* Measurement of consistent precision and reliability due to automatiom.
* Autamatic data storage eliminates booking and its associated errors.

# WORKABILITY:

* The purpose of electronic staff reading , a beam splitter is incorporated which transfers the bar code image to a detector diode array.
* The light, reflected from the white element only of the bar code, is divided into infrared and visible light components by the beam splitter.
* The visible light passes on to the observer.
* The acquire bar code image is converted into an analogous video signal , which is then compared with a stored reference codes.

# 2.EDMI : ELECTO MAGNETIC

EDMI measure slopes distance between transmitter and receiver by modulating the continuous carrier wave at different frequencies, and then measuring the phase difference at the master station between the outgoing and the incoming signals.

# OPERATION WITH EDMI

It involve four basic steps:

* Set up
* Aim
* Measure
* Record

# Setting up:

The instrument is centered over a station by means of tribrach. Reflector prism are set over the remote station on tribrach.

# Aiming :

The instrument is aimed at prisms by using sighting devices or theodolite telescope . Slow motion screws are used to intersect the prism centre. Some kind of electronic sound or beeping signal help the user to indicate the status of centering.

# Measurment:

The operator presses the measure button to record the scope distance which is displayed on LCD panel.

# Recording :

The information on LCD panel can be recorded manually or automatically.

# ERROR IN MEASUREMENT WITH EDMI

1. Instrument error
2. Atmospheric
3. Instrumental error

# 3.TOTAL STATION

This instruments can record horizontal and vertical angles together with slope distance and can be considered as combined EDM plus electronic theodolite.

# SALIENT FEATURE OF TS

1. TS captures the spatial data for a three –dimensional position fix.
2. The angles and distances are displayed on a digital readout and can be recorded.

# FIELD OPERATION WITH TS

The programs need at least one identified reference station so that all subsequent station can be identified in term of (x,y,z).

It include the following functions

1. Point location
2. Missing line measurement
3. Resection
4. Remote distance and elevation measurement
5. Offset measurements
6. Layout or setting out operation
7. Area computation

# 4.REMOTE SENSING:

1. Science and art of obtaining information about an object, area, or phenomenon through the analysis if data acquired by a device that is not in contact with the object , area, or phenomenon under investigation.

Remote sensing system consists of the following sub-systems:

1. Scene
2. Sensor
3. Processing(ground) segment

How  remotely sensed data gets converted into useful information:

1. Source of EM energy (sun/self emission: transmitter onboard sensor).

2. Transmission of energy from the source to the surface of the earth and its interaction with the atmosphere (absorption/scattering).

3. Interaction of EMR with the earth surface (reflection, absorption, transmission) or re-emission/self emission. 4. Transmission of reflected/emitted energy from the surface to the remote sensor through the intervening atmosphere.

. 5. Recording of EMR at the sensor and transmission of the recorded information (sensor data output) to the ground.

6. Preprocessing, processing, analysis and interpretation of sensor data.

7. Integration of interpreted data with other data sources for deriving management alternatives and applications.