Department of ……

Experiment No. : ---------- Date of Performance: ----------

Name of the student: ----------

Division: ---------- Roll No. :----------

Title of the Experiment - Study of Any Four Types of Maps

Aim: Study of any four maps & writes their uses.

Description:-

1. Write name & type of Map.
2. Write scale of map.
3. Write description of map.

Map No.1.

Map No.2

Map No. 3

Map No. 4

Department of ……

Experiment No. : ---------- Date of Performance : ----------

Name of the student : ----------

Division : ---------- Roll No. :----------

Title of the Experiment - Measurement of area of irregular shape by Digital Planimeter

Aim: 1. To Study the Digital Planimeter

2. To find out area of irregular figures using Digital Planimeter.

Instruments: Digital Planimeter, Drawing Paper, Pins etc.

Diagram:

Description of Digital Planimeter:-

A digital Planimeter can be used to find the area of irregular surfaces quickly. The Planimeter works on built in nickel cadmium storage battery. The Fig. shows different Parts of digital Planimeter, PLACOM KP 90N manufactured by Koizomi Sokki Co of Japan. There is rotary encoder, which has replaced the integrating wheel of Mechanical Planimeter. An electronic circuit measures the pulses of rotary encoder and area is displayed in digital form.

Function Keys:-

ON	Power Supply on Key.
OFF	Power Supply off key.
C/AC Start	Clear & all clear Key. It is a Start key for starting measurement, when the key is pressed buzzer sounds.
HOLD	By pressing the key measured value is held in memory.
MEMO	It is a key for holding on intermediate measurement in memory.
AVER	It is a key for calculating average value.
UNIT- I	It is a key for selecting unit system i.e. metric or foot system.
UNIT- II	It is a shift key of the unit within each unit system such as Km^2- m2- cm^2/ acre-ft^2- $inch^2$
SCALE	Pressing of these key causes the setting of reduced scale.
R-S	Pressing of this key confirms the setting of reduced scale.
.	Decimal point Key.
0-9	Numerical key.

Measurement Method

Preparation

Paste or fix the drawing paper containing the area on drawing board. Place the roller at the position, this will make right angle with the main body. By tracing the outline of the figure, if any inconvenient movement of the roller is found then the position of the roller is adjusted. Press ON Key to switch on the power supply. Select the appropriate unit by using 2 keys of UNIT, UNIT -I & II. Put a mark line A on the outer periphery of figure to use it as a starting point. Put a mark like A on the outer periphery of figure to use it as a starting point. Press the start key, the buzzer sounds lightly, confirm that display shows zero, and trace the figure by moving tracing point clockwise round the circumference of the figure and close at starting point. The area of figure will be displayed on display pad By the use of MEMO & AVER keys the same area can be measured number of times and its mean value can be obtained for increased measuring accuracy.

Planimeter Reading:-

Sr. No.	Name of Shape	Area by Digital Planimeter	Area by calculation	Percentage Error
1				
2				
3				

Diagram's of regular shapes

Department of ……

Experiment No. : ---------- Date of Performance : ----------

Name of the student : ----------

Division : ---------- Roll No. :----------

Title of the Experiment –Study of Dumpy Level and Laser Level

Part: (A) Study of Dumpy Level

Aim: - 1. To study the dumpy level and metric staff.

2. To Compute R.L's by Collimation Plane Method and Rise & Fall Method.

Instruments:-

Dumpy Level, Leveling Staff etc.

Diagram:-

Description of Dumpy level & leveling Staff

Dumpy level is one of the most common used for measurement in vertical plane.

Details of important parts of dumpy level can be classified broadly in to four categories:

a) Leveling head
b) Telescope
c) Level Tubes
d) Clamp & Slow motion screws.

a) Leveling Head:-

It consists of two triangular plates with threading in lower plate for fixing level on tripod. There are three screws provided between the triangular plates. They are called leveling screws or foot screws. Screws have ball and socket arrangement at the bottom.

b) Telescope:-

Telescope of dumpy level is of internal focusing type with one eyepiece and object glass (Lens) each. Diaphragm in front of the eyepiece has cross wires, sometimes called horse-hair. Focusing screw is provided midway along the length of telescope. Ray shade is used to protect the inner side of telescope. Main bubble is provided on the top of the telescope.

c) Spirit Level or Level tubes:-

These are of two types. One is of large size provided on the telescope called longitudinal or main bubble and smaller one is at right angle to it is called cross bubble.

d) Clamp and slow motion Screw:-

For perfect bisection clamp screw and slow motion screws are essential. Image of staff should be at the center of vision without parallax. When clamp screw is tightened, motion of telescope arrested. Now if slow motion screw is slowly rotated as required, very small or minute motion or rotation of telescope is possible. Apart from above parts, a reflecting hinged mirror is provided on top of longitudinal bubble to see image of bubble in case bubble is not visible to short person.

Leveling staff:-

1) Vertical member, graduated in meters for taking readings of vertical distances with respect to horizontal line of collimation is called leveling staff.
2) For durability Aluminum staff is preferred over wooden staff.

3) Telescopic Staff has 4m height & three pieces of gradually decreasing cross sections lower most large piece is up to 1.5m height, middle piece is up to 2.8m & smallest top piece up to 4m height. Automatic locking device is provided for pieces.
4) It has two folding handles & small circular bubble to ascertain verticality of staff.

1. (a) Computation of R.L's by Collimation Plane Method

Sr. No	Distance	Staff Readings			Collimation Plane or Height of Instrument	R.L.	Remark
		Back Sight	Inter sight	Fore sight			
1							
2							
3							
4							
5							
6							
7							
8							
						Last RL.- First R.L. =	Arithmetic Check
	∑B.S. – ∑ F. S. =						

Sample Calculation:-

Gradient = R.L. difference/Distance

1. (b) Computation of R.L's by Rise and Fall Method

Sr. No.	Distance	Staff Readings			Rise	Fall	R.L.	Remark
		Back sight	Inter sight	Fore sight				
1								
2								
3								
4								
5								
6								
7								
8								
							Last RL. – First R.L.	Arithmetic Ch
	∑B.S. – ∑F. S. =				∑Rise- ∑Fall =		=	

Sample Calculation:-

Gradient = R.L. difference/Distance

PART: (B) Study of Laser Level

Aim: - 1) To Study the Laser level.

2) To compute the RL's by using Laser level.

Instruments:-

JP6 Laser Level, Staffs etc.

Diagram:-

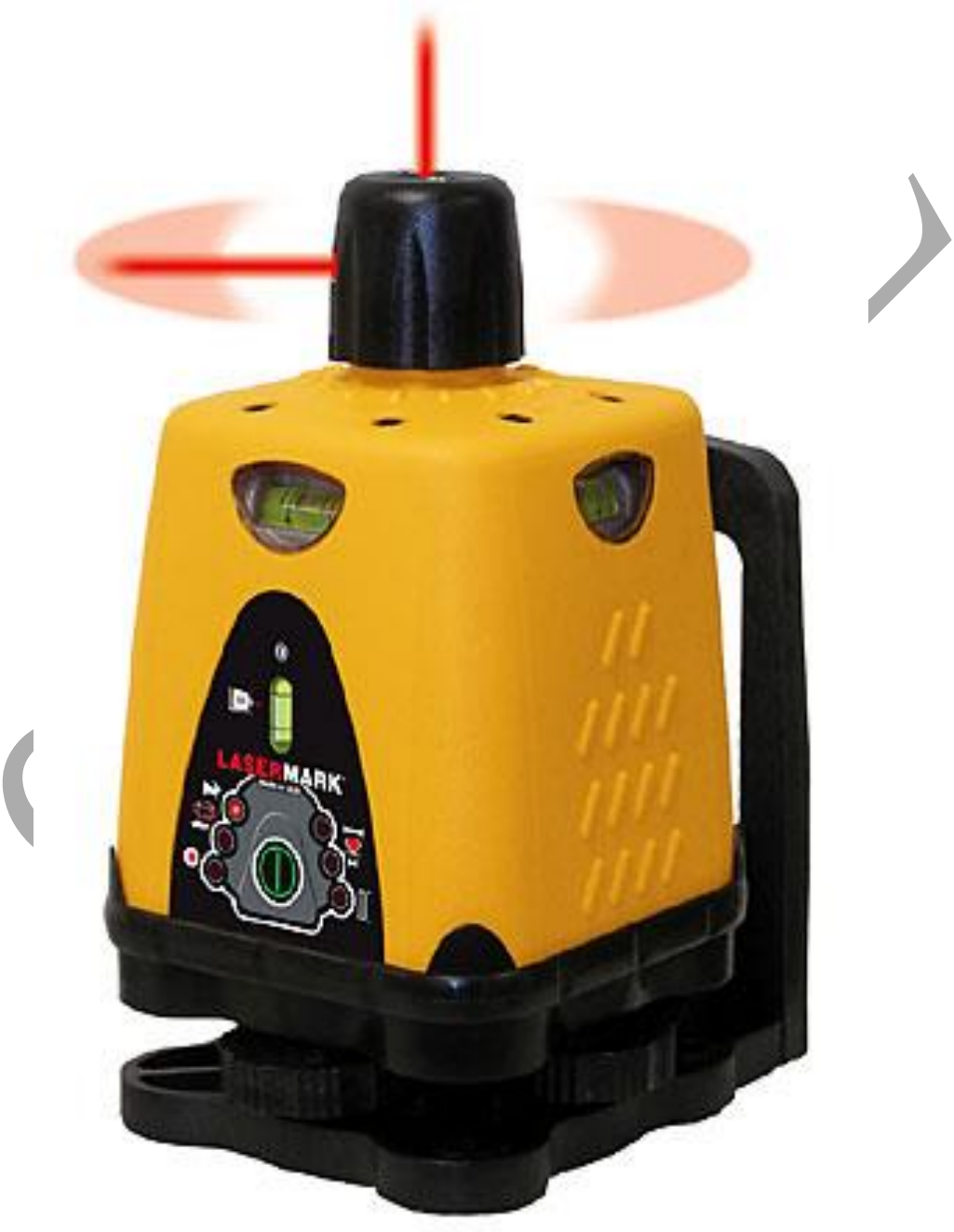

Diagram of Laser Level

Description of Laser level:-

Laser means light amplification by stimulated emissions of radiation. It is packed in an extremely narrow beam projection in single direction hence it is preferably used in construction industries for various applications. In construction, the laser is used primarily as leveling devices. It may be set up to indicate elevation, direction or both.

Key features of Laser level:-

2) Accuracy - 1mm/5m
3) Compensation range - 3^0
4) Working Radius - < 10m
5) Laser class – class II
6) Instrument dimension – dia.140mm x 210mm
7) Net Weight -1.7 Kg

Measurement Method:-

1. Battery installation first, screws off two batteries.
2. Laser can be put on the ground or mounted to the elevating tripod. Turn the upper part of the main body to fix the laser on to the elevating tripod, for that you should dismantle the three foot screws and fix the laser to the tripod.
3. Turn the three foot screws to make the circular bubble in center.
4. Move selection key to choose the laser line combination 2VH, VH, H.
5. Make the laser plummet beam aim at the object point at ground. Turn the laser, make the laser plummet beam aim at the object point and turn the fine adjustment knob slightly too precisely aim at the object point.

1. Computation of RL's on ground by Laser level

Reading Table

Sr. No.	Staff Readings			Collimation Plane or Height of Instrument	R.L.	Remark
	Back sight	Inter sight	Fore sight			
1						
2						
3						
4						
5						
6						
	∑B.S. – ∑F. S. =				Last RL.- FirstR.L. =	Arithmetic Check

Sample Calculation:-

2. To check the sill level of windows in civil lab by laser level.

Reading Table

Sr. No.	Window	Window sill level	Remark
	W1		
	W2		
	W3		
	W4		

Department of ……

Experiment No. : ---------- Date of Performance: ----------

Name of the student: ----------

Division: ---------- Roll No. :----------

Title of the Experiment - Study of Global Positioning System (GPS)

Aim: - 1. Study's of Global Positioning System.

2**.** To determine the of coordinates of traverse by GPS

Instruments:-

Global Positioning System (GPS) Hand Held Instrument (72 Personal navigator)

Diagram:-

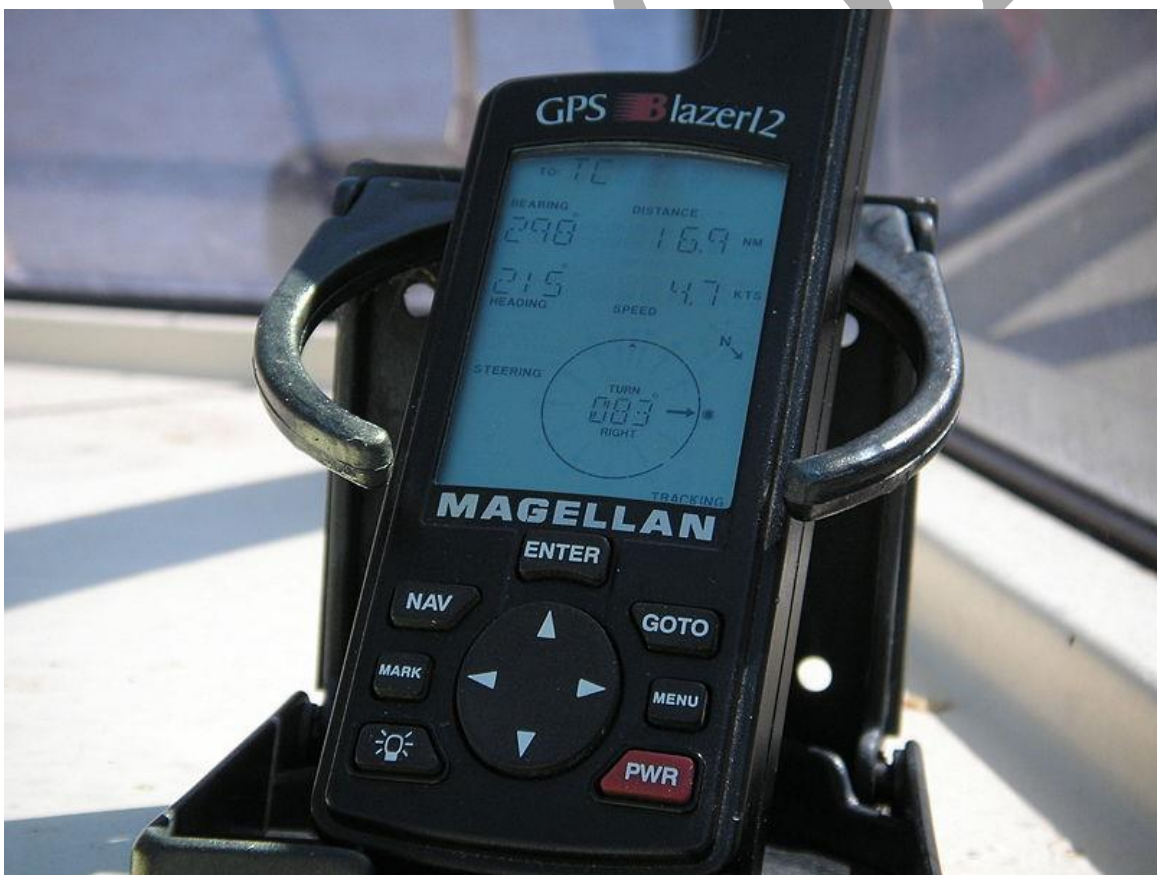

Diagram of Global Positioning System

Description of GPS:-

Global Positioning System (GPS) technology is fast & accurate method of determining the locations of any point of interest anywhere on the face of earth of any time during day or night.

The technology collects and processes signals from satellites in orbit around the earth to determine the location of points of interest on the ground.

Types of GPS: -

1) Single Frequency: - This type of Surveying with a single frequency system is called as static mode GPS surveying.
2) Dual frequency systems only require post processing when operating in static or fast static.

Key features of the GPS 72:-

1) Map source data for 1 MB internal memory
2) Stores 500 waypoints and 50 routes
3) Compact size 2.7”x 6.2”x 1.2”
4) Weighs only 7.6 ounces
5) 1.6”W x 2.2”H display (120x160 pixels)
6) Up to 16 hours use on 2AA batteries.

Applications of GPS

1) Determining the borders, making existing utilities like highway, municipal amenities photogram metric and private site specific projects make then more dense or compact.
2) GIS data acquisition.
3) Monitoring, well soil bring and other types of sampling locations.
4) Establishing state plane coordinates or geodetic coordinates
5) Used in As- Built survey and Topographic survey.
6) Used for Mine exploration
7) Used in Base line Survey & Traverse Control Survey or Traverse verification survey.
8) Used in natural resource mapping
9) Used in communication tower site survey & certifications.

Q.1 Write the Reduced level of Dnyanganga college of Engineering & Research by using GPS.

Q.2 Write the different types of GPS.

Q.3 Write working Principle of GPS.

Department of ……

Experiment No. : ---------- Date of Performance: ----------

Name of the student: ----------

Division: ---------- Roll No. :----------

Title of the Experiment - Measurement of Distance by Total Station and Comparing It with the Distance Measured Using Tape

Aim: - 1. To study the EDM

2. To measure distances with EDM and tape.

Instruments:-

EDM, reflector, and Tape etc

Electronic distance measurement consists of two basic instruments:-

1) Electronic distance meter (Master Station).
2) A reflector (Remote station).

1) E.D.M.

a) The EDM has to perform the functions of transmission of waves, modulation and de- modulation of wave, including calculation of distance & display the results.

b) It is mounted and centered on tripod, leveled manually or automatically just like a level.

c) It is worked on external source of power (that is battery of specified voltage).

2) REFLECTOR: -

a) It consists of one or more cube – corner prisms.

b) These prisms are manufactured by cutting off the corners of solid glass prisms of high quality.

c) They have property of reflecting a beam or ray parallel to incident ray with deviation of ± 20° from axis of symmetry.

d) It is also placed & leveled on a tripod.

TOTAL STATION: -

a) It is combination of EDM and a digital theodolite built as one unit.

b) Field survey data includes angles, distance and related information, which is stored in electronic field book.

c) The range of the total station varies from few Km to couple of hundreds of Km.

d) Measuring time 2.5 seconds for fine mode & 0.6 seconds for tracing mode.

e) Display unit consists of 2-side graphic LCD display or alpha numeric with built-in illumination.

f) Total station has an auto power cut – off after a fixed time.

g) Facility for applying correction for earth's curvature and reflection is also provided.

h) It has data communication port for directly storing, analyzing the data with PC using suitable soft wares.

Field Measurements by Using a Total Station and Tape

Observation Table

Station	**R_1 (H1or L1) Total Station / EDM**	**R_2 (H2 or L2) By Tape**	**Remark**
1			
2			
3			
4			
5			
6			

Department of ……

Experiment No. : ---------- Date of Performance: ----------

Name of the student: ----------

Division: ---------- Roll No. :----------

Title of the Experiment - Site Visit Report

Aim:-To study type of foundations, structure and details of building component.

SITE VISIT REPORT

1. What is name of construction site?
2. Write address of construction site?
3. Write name of construction firm and site engineer?
4. Write name of owner?
5. Write type of construction?
6. Write plot area & built up area of project?
7. Write foundation type?
8. Write plinth details?
9. Write no. of stories & room size details?
10. Write masonry work?
11. Write beams & columns details?
12. Write painting, flooring details?
13. Write doors & windows details?
14. Which amenities are provided?
15. Write duration of project work & total cost of work?
16. Attach photos of project work?

Answers of above questions.

Department of ……

Experiment No. : ---------- Date of Performance: ----------

Name of the student: ----------

Division: ---------- Roll No. :----------

Title of the Experiment - Demonstration on any four Civil Engineering Soft wares

Aim:-To study different civil engineering soft wares.

1) Name of Software: STRUDS 2007

Introduction

STRUDS 2005 is an ideal software solution for the usage of structural engineers for the analysis of 2D & 3D structures and the design of different R.C.C. / Steel components such as Slabs, Beams, Columns, Footings and Trusses with design sketches running on Windows 95/98/2000/XP/NT platforms.

STRUDS has an in-built graphical data generator to model the geometry of building structure. The basic approach is to create two-dimensional floor plans (Plane Grids) and provide column locations with the help of which the program automatically generates 2D Plane Frames and 3D Space Frame. Appropriate material and section properties can be created or assigned from STRUDS libraries. Standard boundary conditions and different types of loads can then be applied.

At every step of the modeling process, you will receive graphical verification of your progress. You never have to worry about making a mistake as the deleting or editing of any part of the geometry is possible using available menu commands. Immediate visual feedback provides an extra level of assurance that the model you have constructed agrees with your intentions.

When your structure geometry is complete, STRUDS performs analysis using Stiffness Matrix Method and Finite Element Method for maximum solution, accuracy, speed and reliability.

After the analysis, the Post Processor mode of STRUDS provides powerful visualization tools that let you quickly interpret your analysis results and numerical tools to search, report and understand the behavior of the structure. Herein, the analysis results for different load combinations for a part of structure or the whole geometry can be seen in the graphical as well as the text form. STRUDS then performs the integrated design by Limit State Method of all R.C.C. components of the structure by

directly reading the analysis results. All the relevant Indian Standard codes & British standard codes are followed to confirm to the design parameters and checks. If any component fails, the program gives you warning messages and suggests you the possible alternatives for design. STRUDS prepares graphical outputs in the form of drawings and diagrams. Design results in the text form of Schedules, Quantities and Details are also produced. The design process is highly interactive and extremely user-friendly. You can change the design parameters anywhere in between the design process and redesign the structure. These changes are automatically reflected in graphical and numerical output form. STRUDS also enables you to produce the working drawings in AUTOCAD.

Documentation is always an important part of analysis and design and the Windows user interface enhances the results and simplifies the effort. STRUDS provides direct high quality printing and plotting of both text and graphics data to document your model and results.

2) Name of the Software: ENGILAB. 2D v 1.20

Introduction

EngiLab Beam.2D ML is the multilingual edition of EngiLab Beam.2D. It is an easy-to-use yet powerful engineering tool for the linear static analysis of plane (2D) frames for Windows that works in 19 languages. Based on EngiLab Beam.2D v1.81, it features a **Full Graphical User Interface (GUI)** for pre-processing or post-processing and uses the **Finite Element Method (FEM)** for plane frames for its analysis purposes.

System of units (IMPORTANT, Please read)

Specific units are not currently supported in EngiLab Beam.2D ML. Despite that fact, the user can use **any consistent system of units**. The results will then also comply with that system of units.

Practically, **ANY system of units can be used** (Metric, English, Imperial, etc). The user can choose the one he prefers. If, for example, the user chooses to use the S.I. system (Distance in meters and force in Newton) then all data must be given as:

Quantity	**Unit used**
x, y node coordinates	m
Young's modulus E	$Pa = N/m^2$
Cross section area A	m^2
Cross section moment of inertia I	m^4

Quantity	**Unit used**
Nodal force F	N
Nodal moment M	N*m
Elemental load f	N/m
Elastic constants Kx, Ky	N/m
Elastic constant Kz	N*m (/RAD)

The results will also comply with that system, thus they will be given as:

Quantity	**Unit used**
Node displacement	m
Node z-rotation	RAD (**See note**)
Axial, shear force at element end i, j	N
Moment at element end i, j	Nm
Constraint reaction x, y (force)	N
Constraint reaction (moment)	N*m
Spring reaction x, y (force)	N
Spring reaction (moment)	N*m

In the above example, **N and m can be replaced with any other appropriate unit** (for example, pounds and inches for the English system).

Note: Node rotations are ALWAYS given in RADIANS.

Setting up a model

The user can set-up a model using the following simple steps:

1. Click to: Create one or more **E, A, I Element Groups**. Each element must belong to an E, A, I element group which describes the material (E) and cross section (A, I) properties of the element.

2. Click and to: Create **nodes and elements**. Also, define the constrained DOFs (Degrees Of Freedom), fixed [xxx], pinned [xxo], roller [xoo] or [oxo], etc.

3. Click and to: Define the **nodal and elemental loads**.

Once the model is set-up:

4. Click to: **Analyze** the model.

5. Click , , to: **Draw the M, Q, N diagrams** (bending moment, shear force and axial force diagrams).

6. Click to: **Draw the deformed model**

7. Click to: **View the analytical results** (node displacements, element forces and constraint reactions).

Setting up a model graphically

A model can be set-up analytically using the procedure described above, or graphically using the mouse pointer and the mouse buttons on screen:

- Left-clicking on screen you can define a free node.
- If you left-click on screen, hold down the button and then release it at another location, you can define an element and two nodes at ends i, j.
- Double-clicking on a node or near it, you can change the restraints of the node (Node must be located on grid).

Note: The E, A, I element groups as well as the loads (nodal or elemental) and the element releases can be defined **only analytically**. **E, A, I Element groups**

Each element belongs to an E, A, I element group which describes the material and cross section properties of the element. Each group consists of a Young's Modulus E, a cross section area A and a cross section moment of inertia I.

The user can define up to **300 E, A, I Element groups** (each element of the model can belong to its own group, for registered version).

Note: You cannot delete an E, A, I Element group if there are elements belonging to it.

3) Name of the Software: West Point Bridge Designer 2007

Introduction

The West Point Bridge Designer 2007 is intended for educational purposes only.

When you use the West Point Bridge Designer 2007, you will experience the engineering design process in simplified form. You will design a highway bridge in much the same way that practicing civil engineers design real highway bridges.

You will be presented with a requirement to design a steel truss bridge to carry a two-lane highway across a river.

You may choose from a wide variety of different site configurations for your bridge. Each will cause your bridge to carry loads in a different way, and each has a different site cost.You will develop a design for your bridge by drawing a picture of it on your computer screen.

Once your first design attempt is complete, the West Point Bridge Designer 2007 will test your bridge, to see if it is strong enough to carry the specified highway loads. This test includes a full-color animation showing a truck crossing your bridge. If your design is strong enough, the truck will be able to cross it successfully; if not, the structure will collapse.

If your bridge collapses, you can strengthen it by changing the properties of the structural components that make up the bridge, or by changing the configuration of the bridge itself.

Once your bridge can successfully carry the highway loading without collapsing, you can continue to refine your design, with the objective of minimizing its cost while still ensuring that it is strong enough to carry the specified loads.

The West Point Bridge Designer 2007 gives you complete flexibility to create designs using any shape or configuration you want. Creating the design is fast and easy, so you can experiment with many different alternative configurations as you work toward the best possible solution. The process you will use is quite similar to the process used by practicing civil engineers as they design real structures. Indeed, the West Point Bridge Designer 2007 itself is quite similar to the computer-aided design (CAD) software used by practicing engineers, and it will help you in the same way that CAD software helps them--by taking care of the heavy-duty mathematical calculations, so that you can concentrate on the creative part of the design process.

The West Point Bridge Designer 2007 was developed by Colonel Stephen Ressler, Department of Civil and Mechanical Engineering, U.S. Military Academy, West Point, New York. It is public domain software, intended solely for educational use.

4) Name of the software: AutoCAD 2000

Introduction

This software is very simple to use, operate & user friendly. Basically it is drawing software so very much popular in Civil Engineers & Architects.

With the help of this software we can draw any type of building plans, elevations & sections. There are various commands which we can give through command window or using curser by clicking on command button.

The drawing can be drawn in SI & British units as per requirement. There are various commands such as line, offsets, trim, extend. Parallel, square, circle ellipse, break, hatch, erase etc.

We can draw the plan in different layers. This helps us when we required only a particular detail on the drawing. Example: when we want to see only electrical details, or only dimensions of rooms etc.

How to draw:

1) Select the drawing units.
2) Select the drawing limits i.e. your plot area.
3) Use Zoom Extent command.
4) Use line command to draw the line diagram.
5) Use offset command to show wall thickness.
6) To remove unnecessary lines use trim command or erase command.
7) After completion of drawing use text command for designating the rooms
8) Use dimension command to show the internal & external dimensions.
9) Use the layer command to show the different floors.