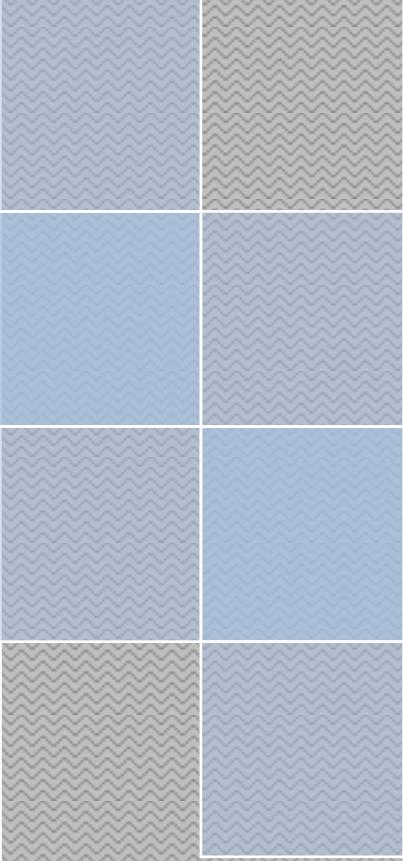


EstimaXpro



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SAMPLE PROJECT31

COMPARISONS50

1. Introduction

In preparing an estimate, the quantities of different items of work are calculated by simple mensuration method and from these quantities the cost is calculated. Manual method of estimation is time consuming and therefore quantity estimation by software reduces the wastage of time.

Existing different types of estimation softwares, uses quantities which can be only calculated manually from 2D drawings. This is the major weakness of the system. By adding a scanning method to calculate the quantities automatically from drawings, Estimax attempts to reduce the time for estimation drastically.

Rate Analysis can be easily done with the sub functions like Rate Master, Analysis type, Conveyance, and Work Sub Group. The whole Reports can be easily prepared with the help of Estimax. More customizable facilities are the main attraction of this user friendly software.

Estimax works with CAD applications like ZWCAD/AutoCAD. Users can extract quantities directly from cad drawing with a single scan or pick function. Another major advantage is that users can create their own formulas and definitions to calculate the item quantities. The template option adopted in Estimax helps the re usage of formulas and definitions in other projects; hence reduces the time and increases the accuracy of estimation.

Estimax has a Rate analysis creation module which helps to calculate the Rate Analysis with- in minutes with conveyance calculation. The work items can be grouped, sorted and listed with the user's preference .The estimation output can be exported to MS Excel so that it can be edited easily. The formulas in Estimax and excel reports are connected, hence when a user edits any quantity in excel sheet, it reflects in the total results also.

ID	Work Name	Unit	Quantity	Rate	Total
1	85 Graped Slabs	sqm	.00	.00	8972.25
2	100 Scaffolding	sqm	.00	.00	6122.25
3	128 Sills	sqm	.00	.00	6122.25
4	130 Drop Sills	sqm	.00	.00	3972.25
5	38 Scaffolding (opening only)	sqm	.00	.00	6122.25
6	816 Lintels	sqm	.00	.00	6122.25
7	120 Beams	sqm	.00	.00	6122.25
8	124 Rectangular Columns	sqm	.00	.00	7294.25
9	126 Circular Columns	sqm	.00	.00	8279.25
10	140 Earth Work and Excavation	sqm	.00	.00	225.00
11	138 Flooring Ceramic Tile	sqm	.00	.00	195.38
12	151 p.c.	sqm	.00	.00	2368.32
13	125 Outer Plastering	sqm	.00	.00	2441
14	126 Inner Plastering	sqm	.00	.00	2441
15	127 Applying Water cement	sqm	.00	.00	25.62
16	121 Ceiling Plastering	sqm	.00	.00	2441
17	132 Door Plastering	sqm	.00	.00	2441
18	133 Window Plastering	sqm	.00	.00	2441
19	135 Gips Chasing	sqm	.00	.00	119.00
20	31 Staircase	sqm	.00	.00	105.00
21	122 Brick work	sqm	.00	.00	5222.79
22	122 Outer Plastering	sqm	.00	.00	154.67
23	123 Inner Plastering	sqm	.00	.00	154.67
24	124 Ceiling Plastering	sqm	.00	.00	128.76
25	129 Scaffolding System Plastering	sqm	.00	.00	128.76
26	18 Panelled Windows	sqm	.00	.00	1855.49
27	118 Panelled Ventilators	sqm	.00	.00	1855.49
28	18 Panelled Doors	sqm	.00	.00	2185.74
29	136 Panelled wood Doors	sqm	.00	.00	2185.87
30	33 Steel Quantity	MT	.00	.00	41272.00
31	164 Paving	sqm	.00	.00	2942.45
32	87 Bit	sqm	.00	.00	2629.89

Advantages

- Scan quantities directly from CAD drawings
- Works with full versions of ZWCAD/AutoCAD
- Tabulate the details in one single scan of the CAD drawing.
- Estimation within minutes in detailed and abstract format.
- Scans slab details, architectural details and structural details.
- Joinery schedule can be scanned from cad drawing.
- Quantities of items are calculated as per definitions given by the user.
- Prepare detailed and abstract Estimate Reports.
- Provision for changing Rates and Specifications for each Project.
- Flexibility in adding new works.
- Gives detailed Estimate with dimensions of each work in a project.
- Steel Quantity preparation.
- Calculates Material, Labour and Machinery requirements for each work and its rate.
- Works with standard specifications.

Requirements

Operating System: Windows 98 / XP / 2003 / VISTA / W7/ W8

CAD - Application: Full version of ZWCAD/AutoCAD

Spread Sheet Application: Microsoft Excel

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2. Masters

2.1 Project Details

Project details holds the basic information of the estimation project such as Project Name, client details, drawing units used and some other parameters.

1. Project Name: Name of the estimation project.

2. Client Name: Name of the client.

3. Address: Address of the client.

4. Allowance: Allowance given to the total cost of the estimation project.

5. Lintel: The lintel volume calculated in the project is throughout the brick or in the opening only. Users can also calculate the lintel volume by creating a formula.

6. Drop Slab: Option for Drop slab volume calculation.

7. Electrification %: The percentage of cost to be added for Electrification.

8. Plumbing %: The percentage of cost to be added for Plumbing.

9. Rate used: This option helps the user to use the PWD rate, CPWD rate or the company rate for rate analysis.

After entering the above values, click save button to save the project, in this time a window will appear to select the desired template. Select any one of the template from the folder and click open. Estimax will create a new project having properties of the selected template which opens in the Estimax main window.

Project Details	
Defaults	
Drawing Unit	Centimeter
Project Details	
Projectname	Sample
ClientName	
Address	Location Cochin Postal Code =
Allowance	0
Lintel	Thoroughout
Sunshade	ThroughOut
DropSlab	False
Electrification %	5
Plumbing %	1
Rate Used	Rate

Projectname

Save Close

2.2 Storey Details

In 'Storey Master', user can add new stories and also set the percentage of Labour cost increment for a particular storey based on Rate Analysis.

Steps to be followed:

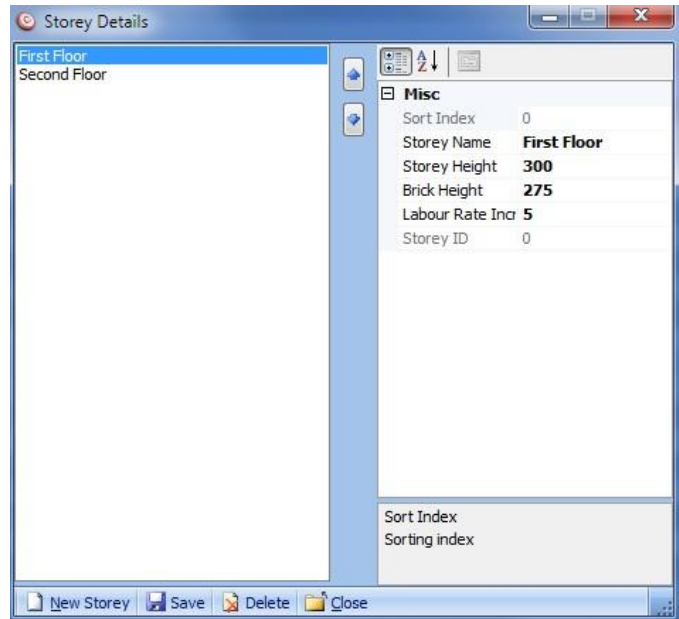
- From Masters Menu choose 'Storey Master'.
- Click on 'New storey'.
- Enter the storey name.
- Set labour cost increment in percentage.
- Use 'Save' option to save the details.

Storey Name: Name of the storey created.

Storey Height: Current storey Height.

Brick Height: It is the Height of Brick Work in current storey.

Labor Rate Increment: The percentage of increment in the cost of Labor in the Rate.



2.3 Joinery Details

In 'joinery details' window, user can give the details of joineries in the project. By giving these details the program finds out the joinery numbers from the architectural details while scanning. User must give the Joinery name, Type of joinery, Width, length, lintel height and Notation of the joinery that represents joinery in the drawing.

User can either enter the values in the grid one by one or can extract the details from the drawing by a scan process in a table format. The Table format must be in a specified format (Fig 1.2). User must create the table using the table command in the CAD application.

Joinery Name	Joinery Type	Length	Height	Lintel Height	CAD Notation
1 Window	Window	60	150	10	W1
2 Window	Window	180	150	10	W3
3 Window	Window	170	100	10	W3A
4 Main Door	Door	110	215	10	D
5 Door	Door	90	215	10	D1
6 SlidingDoor	Door	240	215	10	D2
7 Ventilator	Ventilator	75	60	10	V1
8 Fixed Glass	Window	100	120	10	FG
9 Window	Window	240	150	10	W4
* null					

Fig 1.2

After scanning all data in the table, the same is extracted to the joinery window. Users can change the type of joinery (window, Door, Ventilator etc.) by selecting the desired type in the grid. User can delete any joinery data by selecting any row in the grid and pressing the delete key in the key board.

2.4 Rate types

In rate types, the items created in the 'rate' can be categorized into different groups. The user can group the items as, for example material, labor, machinery, etc., based on their similarities in the function.

Description: Description of the item to create a rate detail

Rate type: Type of the rate created (i.e. if it is material rate or labor rate or machinery rate)

Unit: unit of the rate created (Kg, No's, Square feet, etc...)

Rate: rate of that particular item

Conveyance: If this value is set to true, user can create the conveyance details of this item and the calculated conveyance value is added to rate analysis.

Escalation: The increase in the rate of the item if any, can be mentioned here.

User can save the rate details after clicking the 'new' items button and entering the details. The 'delete' button helps to delete any rate details from here. Any rate item linked to rate analysis cannot be deleted.

2.5 Rates

Rate master helps to calculate the cost of work in Rate Analysis. User can give details of different items (cement, brick, paints etc.) in rate master. User can give three rate details PWD, CPWD and a company rate (their own rate). By using these rates, users can prepare the Rate analysis for calculating the cost of any work item.

Details

1 Description: Description of the item to create a rate detail.

2 Rate Type: Type of the Rate created (i.e. if it is material rate or labor rate or machinery rate)

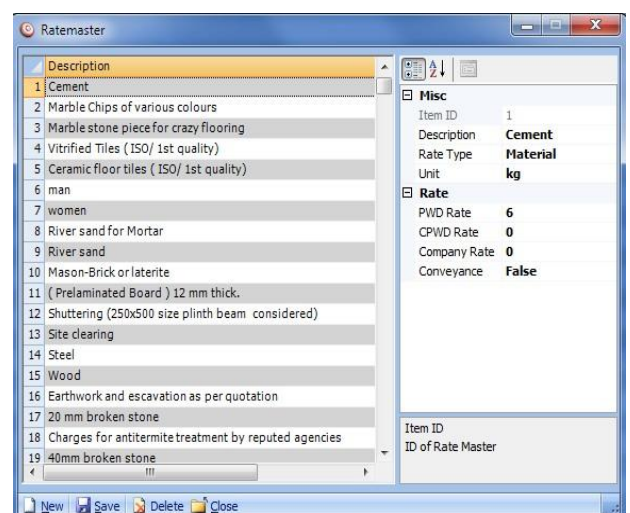
3 Unit: Unit of the rate created (Kg, No's, square feet etc...)

4 Rate: Rate of the item selected.

3 Unit: Unit of the rate created (Kg, No's, square feet etc...)

7 Conveyance: If this value is set to true, user can create the conveyance details of this items. And the calculated conveyance value is added to rate analysis.

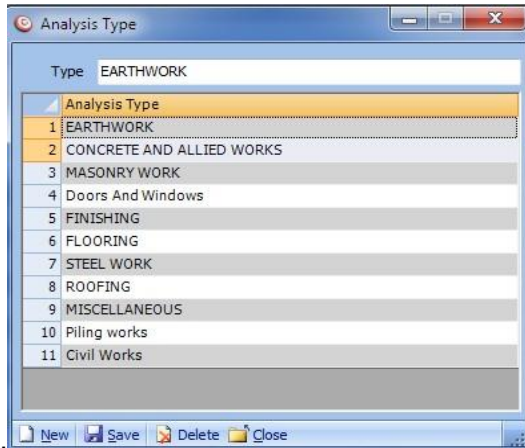
8 Escalation: escalation in rate of the selected item, if any.



Users can save the rate details after clicking the new items button and enter the details. The delete button helps to delete any rate details from here. Any rate item linked to rate analysis cannot be deleted.

2.6 Rate Analysis Type

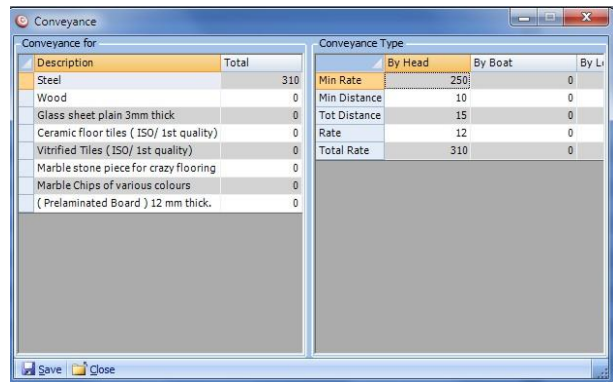
This window is used for grouping items in Rate Analysis. User can create Rate analysis groups by clicking new button, entering the details and then clicking save button. Deletion can be done by using the delete button.



2.7 Conveyance

Materials are carried to the site either by head or by boat or lorry. Different materials have different conveyances which depend on mode of transport. Estimax can calculate the conveyance based on the distance and the rate per unit distance.

User should give the minimum rate, minimum distance, total Distance and the rate of unit distance. To set the conveyance of a material, first of all the user should set the material ' conveyance ' in Rate master as true. Then only the user will get a particular material in 'Conveyance' window. These details in the conveyance will pass to the 'Rate Analysis'. This conveyance amount will be displayed in Rate Analysis whenever this particular material is used.



$$\text{Conveyance} = [(\text{Total Distance} - \text{Minimum Distance}) * (\text{Rate per Unit Distance})] + \text{Minimum Rate}$$

Conveyance varies from site to site depending upon the work. So user can set the conveyances for each project. In this, Minimum rate is the rate for Minimum Distance. Total distance is the distance of site from material site, and rate is the rate per unit distance.

The conveyance is calculated with respect to the rate of the item but only for the item mentioned in the Rate Analysis

2.8 Rate Analysis

The determination of rate per unit of a particular item of work, from the cost of quantities of materials, the cost of laborers and other miscellaneous petty expenses required for its completion is known as the analysis of rate. A reasonable profit, usually 10% for the contractor is also included in the rate analysis.

Using 'Rate Analysis', user can create the new rate Analysis. The Rate analysis can be grouped in to several categories by selecting the 'Analysis Type'. Select the 'Unit' in which the Rate Analysis has to be done. The 'Total Cost' is calculated by adding these rates. The 'Rate' is the sum of Total Cost, the Contractors profit (OH & CP – Amount), Extra machinery, sundries, water and electricity.

Note: - If 'Labour Increment' has to be considered for different floors, it depends upon the % given in the 'Storey Master' for a particular storey.

To create a new rate analysis, enter the short name of the item in the short description text box and enter the description about the item in the description box. Select the below table and select the description column and press any key. These will list all the items in the Rate master and you can select one from those. Then enter the quantity and press 'Enter'. Unit, Rate, Cost, Type and Conveyance will come automatically. Conveyance amount will be there only if the conveyance amount is saved in the Conveyance Master. Otherwise it will be zero. At the same time the total cost will be updated. We need to set the analysis type, data book ID (PWD Data book id), sundries, water and electricity, machinery, OH & CP percentage etc. After entering these entire data click the save button to save the Rate Analysis.

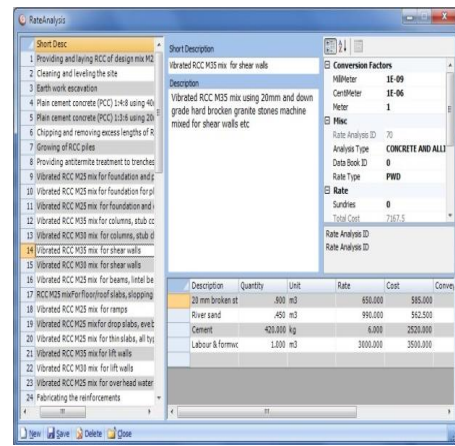


Fig 1.1

2.8.1 Properties

Conversion Factors

The conversion factors convert the extracted values to the rate analysis units. That is, if the user set the drawing unit to 'Centimeter' in Project master, all the data extracted from the drawing and values created using the property builder is in centimeter format (cm, square centimeter and centimeter cube etc.). At the time of total quantity calculation this conversion factor acts on the values and converts these values to the Rate Analysis unit.

Rate Analysis ID

It's an ID given to the rate analysis item; it can't be edited by the user.

Analysis Type

This option helps to group the Rate Analysis. All the Rate Analysis Types created in Rate Analysis Type Master is listed here.

Data Book ID

It provided the ID number in the PWD Data book.

Sundries

Here enter the amount of Sundries.

Total Cost

It is the sum of cost of items entered in the table. It's automatically calculated by EstimaX.

Conveyance

It gives the total conveyance of the selected items.

Unit

This is the unit of the Rate analysis item.

Conversion Factors	
MilliMeter	1E-09
CentiMeter	1E-06
Meter	1
Misc	
Rate Analysis ID	70
Analysis Type	CONCRETE AND ALLIED WORK
Data Book ID	0
Rate Type	PWD
Rate	
Sundries	0
Total Cost	7167.5
Conveyance	0
Unit	cum
Water & Electricity	0
Machinery	0
Net Cost	7167.5
OH&CP Percentage	10
OH&CP Amount	716.75
Rate	7884.25

Rate Analysis ID
Rate Analysis ID

Fig 1.2

Water and Electricity

Here the water and electricity rates for the item should be given.

Machinery

This is the Machinery rate of the Rate analysis item.

Net Cost

It is the sum of cost of Sundries, Total Cost, Conveyance, Water and Electricity and Machinery. Its automatically done by EstimaX.

OH & CP percentage

This is Over Head & Contractors Profit percentage. This will be calculated from the Net Cost.

OH & CP amount

This is the OH & CP percentage amount of Net Cost.

Rate

It is the sum of Net cost And OH & CP amount. This is the final rate of the item. Note: ' Short description' and ' Description ' are mandatory. Quantity and Cost should not be zero.

In the case of editing of the rates of a particular item, just double click on the item in the 'Rate analysis' input table (Fig 1.3). The 'Rate master' window for the particular item will appear and there we can edit the rates. And the corresponding change will reflects in the items in the ' Rate Analysis ' also.

Description	Quantity	Unit	Rate	Cost	Conveyance	Type
20 mm broken st	.900	m3	650.000	585.000	.000	Material
River sand	.450	m3	990.000	562.500	.000	Material
Cement	420.000	kg	6.000	2520.000	.000	Material
Labour & formwc	1.000	m3	3000.000	3500.000	.000	LABOUR

Fig 1.3

In case of deleting the Rate analysis it is not possible if the particular item is used in any of the works. For deleting any item, first of all we need to remove this item from all work sub groups.

Example

Let's create a rate analysis for half brick masonry.

- Entries>>Rate analysis
- New
- Short description
 - Type "Half brick masonry work"
- Description

Type "Half brick masonry work is"

- Conversion factor

Edit conversion factor

2.9 Steel requirement Details

This window sets the approximate quantity of steel used per unit of work item. User can set the value (in kilogram), and the distribution percentage of each diameter of this value in the total quantity. The items listed here are the items that are marked in 'Calc steel quantity' to ' True' in 'Work sub groups'.

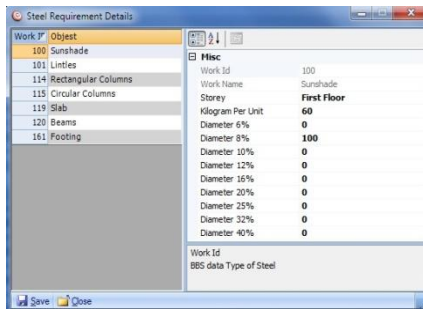


Fig 1.1

2.10 Steel Quantity

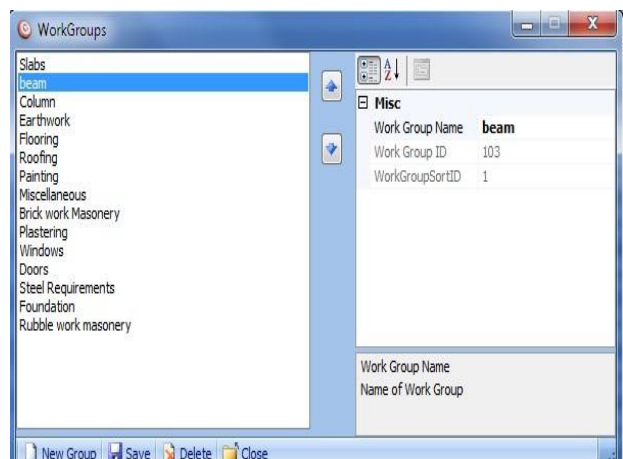
The steel Quantity Details window displays the list of the quantity of steel for each diameter, after calculation of quantity from estimation details. User can derive more properties by right clicking on it

Fig 1.2

Work ID	Work Name	Net Quantit	KG/Unit	Net Steel	Dia_6	Dia_8	Dia_10	Dia_12	Dia_16	Dia_20	Dia_25	Dia_32	Dia_40	Storey
100	Sunshade	4.20	60.00	251.79	.00	251.79	.00	.00	.00	.00	.00	.00	.00	0
101	Lintles	1.91	90.00	172.30	.00	51.69	17.23	103.38	.00	.00	.00	.00	.00	0
114	Rectangular Columns	2.88	180.00	518.40	.00	129.60	.00	129.60	259.20	.00	.00	.00	.00	0
119	Slab	21.98	60.00	1318.60	.00	1318.60	.00	.00	.00	.00	.00	.00	.00	0
120	Beams	5.11	130.00	663.67	.00	.00	331.84	.00	331.84	.00	.00	.00	.00	0

2.11 Work Group Master

Work group act as grouping option for the work items created in the estimation project. Work items can be created in, Work sub group master as sub of the work groups. By creating different work groups, users



can easily calculate the total cost of any group item while producing the abstract report.

Another usage of work group is, it act as a sorting option of different work items, such as if a user wants to make a report like earth work should come first and r.c.c details second and then flooring ,painting etc., user can sort the list as they want it in the report. The sorting option is provided here.

User can create a new work group by clicking the new button, entering the details of the work group and then clicking the save button. The Up and down button helps to sort the work group name order. The delete button can delete work groups having no work sub groups. The work group which is linked to the project can't be deleted.

2.12 Work Sub Group Master

In Work sub group master, the actual work details are created and linked to the rate analysis. User can create any work details here that they want to include in the estimation. The work Sub group will contain all work groups that are created in the work group master. For creating a new 'works sub group', first click on the new work button, this time all the details selected will be cleared and the user can enter the new sub work detail.

To create a Work sub group, user must give different details explained below;

Work name:

The name of the Work sub group (It will be shown in the abstract estimate.)

Work Group:

Select the work group under which this sub work has to come.

Analysis Type:

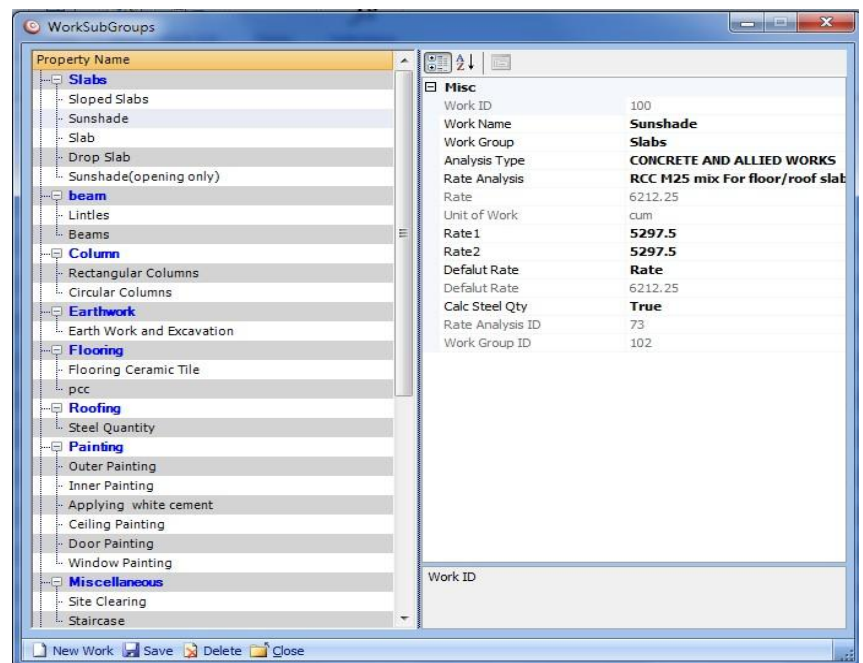
The Analysis type displays, the 'Rate Analysis type' created in 'masters'.

Rate analysis:

It displays the works mentioned in the 'rate analysis' in masters.

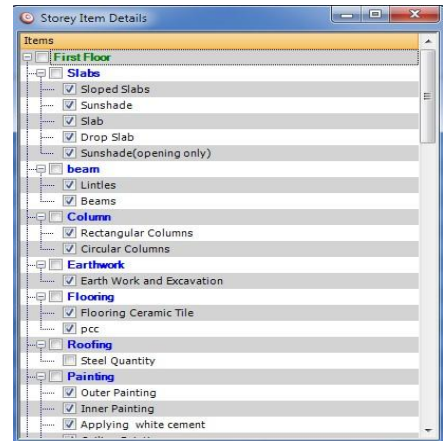
Default Rate:

This option helps the user to use different rate of items in estimation (Rate/Rate1/Rate2). When user selects any one of three rates, the selected rate will be the default rate. User can select Rate, Rate 1 Rate 2 and the default by changing the option ' Rate Used ' in 'Project Master'.



2.13 Storey Item details

Storey item details, helps to add or remove work items in estimation. User can select or remove by clicking the item. After selection or removing the work sub group items, click 'Refresh' button or press F5 to display the selected items in the estimation project.



2.14 Definitions

The main and powerful tool in Estimax is the definition creation window. It gives flexibility and easiness in calculation of the derived quantity such as plastering, painting etc. The Definition window is the assembly unit of the estimation project. It helps to assemble the quantity prepared using the property builder. The properties created using the property builder is listed in the right side and all sub work groups created in work sub group is listed the left side.

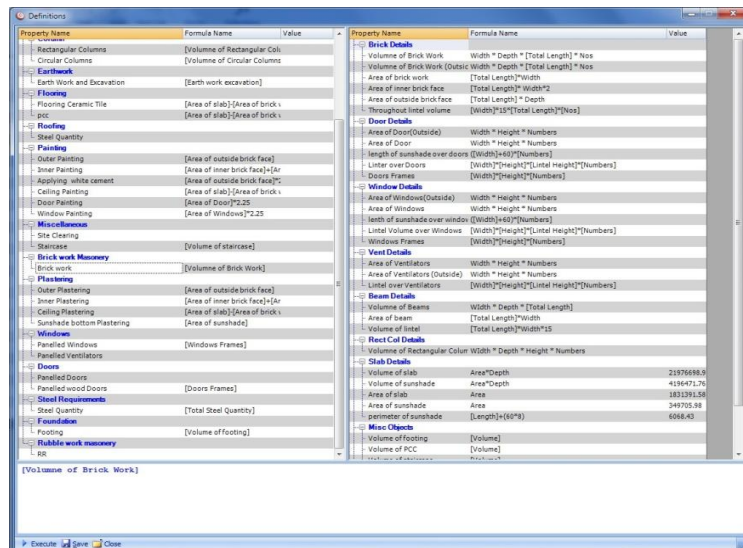


Fig 1.1

User can make the definition formula by selecting the desired work sub group. After selecting the work sub group, select the desired property that the user wants to use with the definition by double clicking in the grid. This time the selected property is added to the definition box (Fig 1.1). User can use multiple properties and other parameters in it with desired operators.

User can check the syntax of the equation created, using the 'Execute' button. Any error in the syntax will be displayed with message. If the syntax is correct, the definition can be saved using the 'Save' button. By clicking the refresh button (or F5) displays the results with newly added definition in estimation window.



2.15 Property Builder

EstimaX introduces a powerful method for calculating the quantities for estimation. By this method user can make their own properties for each values that they scan from the CAD drawing. By these derived properties, user can make formulas for each work to obtain the quantity of the item. For creating these formulas user first create a property of the work.

User can go to Property builder only through data input windows (Entries or Tools) by right clicking on it. The property builder utility will derive new property, based on the basic properties of each work item. Go to Entries >> Scan slab/Arc /Structural Drawings; now you can see the window of property builder.

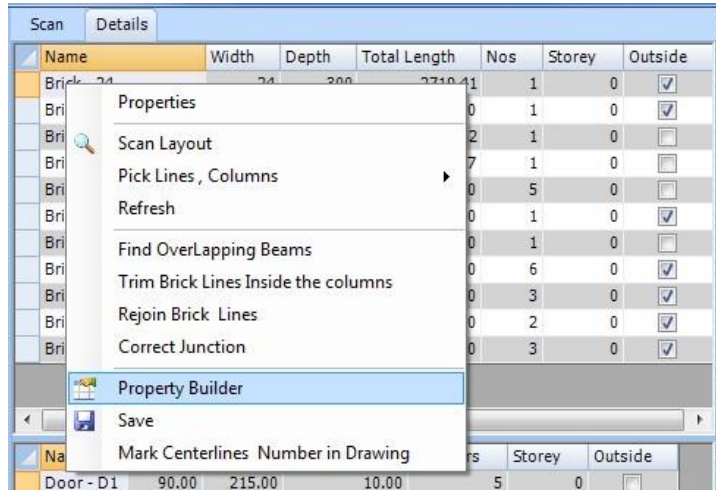


Fig 1.1

(Note: The details should be scanned before going to property builder)

You will get only input data of any one item in Entries menu at a time. There is separate name for property builder according to the entry window like "Slab Details Properties", "Brick Details Properties", "Beam Details Properties" etc.

The bottom portion is the working Area while formulae creation. There are three parts named as Property Name, Formula and Filter.

Property Name: Type the name you want to give the new property e.g. :(Volume of Brick)

Formula: This is the area to set formula.

Filter: The special provision to filter specific item from input data.

Name	Width	Depth	Total Length	Nos	Storey	Outside
1 Brick - 24	24	300	2719.41	1	0	<input checked="" type="checkbox"/>
2 Brick - 26	26	300	269.00	1	0	<input checked="" type="checkbox"/>
3 Brick - 24	24	300	3950.52	1	0	<input type="checkbox"/>
4 Brick - 12	12	300	511.47	1	0	<input type="checkbox"/>
5 Brik work over - D1	24	60	90.00	5	0	<input type="checkbox"/>
6 Brik work over - D2	24	60	240.00	1	0	<input checked="" type="checkbox"/>
7 Brik work over - D2	24	60	240.00	1	0	<input type="checkbox"/>
8 Brik work over - W4	24	125	240.00	6	0	<input checked="" type="checkbox"/>
9 Brik work over - W3	24	125	180.00	3	0	<input checked="" type="checkbox"/>
10 Brik work over - W1	24	125	60.00	2	0	<input checked="" type="checkbox"/>
11 Brik work over - V1	24	215	75.00	3	0	<input checked="" type="checkbox"/>

Fig 1.3

Let's create formula to get the volume of brick work having 24cm width. Data table shown in (Fig1.3)

For calculating volume we need Width, Depth, Length, and. Numbers (for 24cm wide brick.)

Click on New button to add new property, write the name of property (Volume of 24 wide brick work). Creating formula is the important step. We know the variables. For adding variables go and double click on them in the table. You can see the selected variable. Now it will be seen like this [Width][Depth][Total Length][No's]. Add the operator (*) in between them and complete the formula [Width]*[Depth]*[Total Length]*[No's].

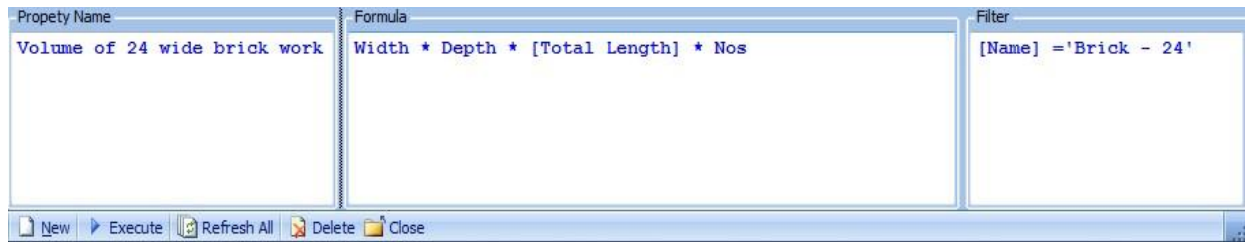


Fig 1.4

Now we have to filter for 24cm Brick work .Click on filter bar and select by double Click the Cell or Row you want to specify. Double click on the cell named ' Brick - 24 '. Now the formula creation is completed. Execute it to the list and refresh the property builder. The new item is added to property builder. See Fig 1.4.

3. Entries

3.1 Slab Details

'Slab Details' option is used for extracting the area of slab and sunshade from CAD drawing. There are different options to extract values from drawing.

Slab area:

True/False. If it is in true condition, user can extract the slab measurements like area and perimeter of the picked slab.

Slab depth: Provide the depth of slab.

Sunshade depth: Provide the depth of sunshade.

Sloped slab area: If it is true, EstimaX user can easily extract the length, depth and area of a slope surface from 2D plan in CAD drawing. If this option is set to true user can only pick the sloping area details.

Sloped slab point height: This option is used with sloped slab area extraction. This value is the height of a point in the plan. At the time of picking slab area, it takes given height at the given point and calculated the area according to the sloping surfaces. When sloped slab option is selected, a button named 'Set Height' will be visible. User can set the point height in the drawing using this button.

Deduction area:

True/False. If it is true, the selected values are considered as a deduction part from the main slab details.

Polyline: Users can scan slab area by using Polyline option, i.e. If the slab area in CAD drawing is represented by a Polyline (consists of line, Arch etc.), user can scan the slab area by picking this Polyline.

Outer Brick: User can pick Outer Brick length by using this option. If the user does not use the outer brick option while picking slab area, the outer brick details will not be shown after the scanning of the architectural drawing.

Sunshade: EstimaX automatically calculates the sunshade area by taking the values from slab area (Sunshade Throughout).

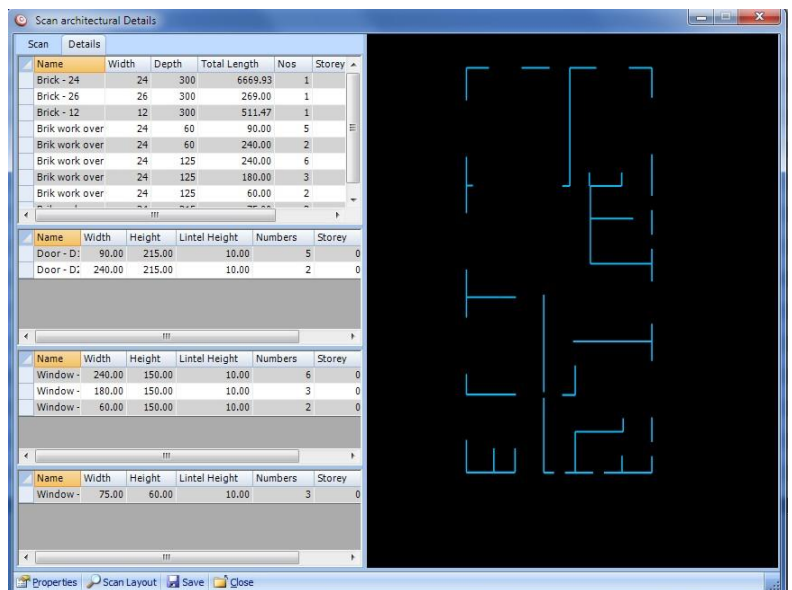
After picking the value, user can create their own properties (such as volume of slab, volume of sunshade etc.) using the Property builder by right clicking on the grid.

3.2 Scan Architectural Details

This window helps to derive, the quantities of Architectural details like brick work, windows, doors, ventilators, etc., from CAD drawings. At the time of scanning, EstimaX creates the centerline of brickworks and count the number of windows, doors and ventilators. For the creation of centerline, the drawing has to be in the following formats;

1. The brick wall should be in a layer
2. Columns should be in a specified Layer.
3. The joinery notation should be in the drawing.
4. Drawing has to be scaled.

User can set the layers by clicking the property button.



1 Brick Layer:

Layer of the bricks in the architectural drawing.

2 Column Layer:

The column layer in the drawing.

3 Maximum width:

It indicates the maximum width of the brick work in the drawing. When the user gives the maximum width to 24 cm, the program only finds out the brick wall having width up to 24 cm.

After the scanning process, the brick wall center line is created. All the center lines will be in the "SRC_CENTERLINE_" wall layer width (eg:SRC_CLINE_Wall_24,SRC_CLINE_Wall_12 etc...).There are several option to correct the created center lines (Fig 1.1). User can further add brick centerlines by going to the 'Pick lines , Columns' menu. Here some utilities help's the user to add another brick lines from the CAD and also an option to pick the columns.

After scanning process is completed all the brick center lines length and width is listed in the Scan window. User can edit these details or can delete. This window will show the outside joinery details. If the outside columns are ' Ticked ' it tells that is an outside brick wall.

The Joinery section displays the list of all joinery data in the drawing. The width and length information details are from the Joinery details window. User can see the outside joinery details also. User can correct the centerline details using the several options in (fig 1.1) they are,

1 Find overlapping centerlines: It finds out the overlapping centerlines created (it is marked with a circle in the drawing).

2Trim Brick lines inside the column: This option will trim the lines inside the columns and correct the centerline distance.

3 Rejoin brick lines: Rejoin brick lines, will join the broken centerlines created for accurate results.

4 Correct Junctions: This option is the junction correction mechanism. The ' T ' junctions and Cross section created after the centerline creation, is corrected with the actual brick dimensions.

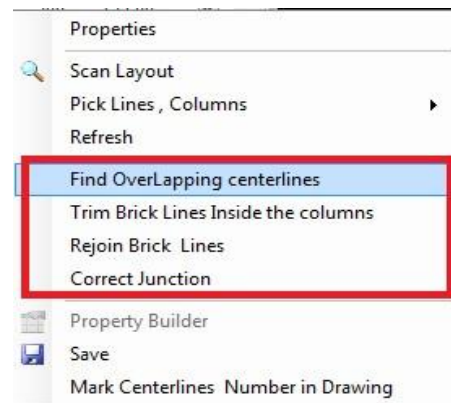


Fig 1.1

5 Property Builder: By using the property builder, user can create another property from the current scanned values of architectural details.

6 Save: This option will group and save the scanned details and add it to the estimation data.

7 Mark Centerline number in Drawing: This option marks a number in the drawing with respect to the centerline created in the details window.

3.3 Scan Structural Details

This window helps to scan the structural details like beams, Columns (Rectangular and Circular) from the CAD drawings. User must give the Layer of the beam and columns in the properties window (Fig 1.2).

After the scanning process, user can see the details of centerline of each beam's in the details window and also displays the number of columns in the joinery details with their dimensions. User can edit these values if they want.

The scanning process is done through the Scan Layout button. After clicking the Scan Layout button, a selection icon is displayed telling the user to select the desired layout in CAD application. For creation of the centerline, the drawing has to be in the following formats;

1 The Beam Lines should be in a layer

2 Columns should be in another Layer.

3 Drawings has to be scaled.

User can set some properties by clicking the 'Properties' Button.

1 Beam Layer

Layer of the beam Lines drawn in layout drawing.

2 Column Layer

Layer of the Column drawn in Layout drawing.

3 Default Beam size

It is the default size of the beam in layout. This size is used when a beam cannot get any details when scanning process is done.

4 Maximum width

It indicates the maximum width of the beam in the drawing. When the user gives the maximum width as 30 cm, the program will only find out beams having width up to 30 cm.

After the scanning process, the beam center line is created. All the center lines will be in the "SRC_CENTERLINE_" beam layer width (eg:SRC_CLINE_BEAM_30, SRC_CLINE_BEAM_24 etc.). There are several option to correct the created center lines (Fig 1.1). User can edit or delete the details.

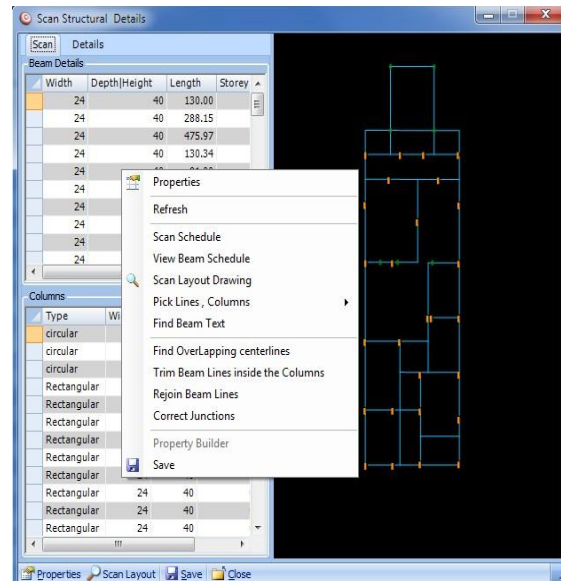


Fig 1.1

User can further add beam centerlines by going to the ' Pick lines, Columns ' menu. Here some utilities help the user to add another beam lines from the CAD and also an option to pick the columns.

After the scanning process, all the beam and column centerlines are listed in the Scan window. User can edit these values and click on the ' save ' button to save and transfer these data to the details window. User can create new properties from these grouped values, by selecting the property builder by right clicking in the details window.

Scan Schedule

Scan schedule scans a beam schedule from the drawing, which helps in finding out the beam details of the drawing. If the beam name is marked in the layout and the details in the schedule, EstimaX searches the details from the schedule and finds out the size from the schedule, and provide the size after the ' Find beam text ' option is selected. The beam schedule can be in text format or in CAD table format. User can select any of the option by changing the option in the property window.

View Beam Schedule

Displays the scanned beam schedule.

Find overlapping

It finds out the overlapping centerlines created (marked with a circle in the drawing).

Trim Beam lines inside the column

This option will trim the lines inside the columns and correct the centerline distance.

Rejoin Beam lines

Rejoin brick lines, will join the Broken centerlines created for accurate results.

Correct Junction

This option is junction correction mechanism. The ' T ' junctions and Cross section created after the centerline creation, is corrected with the actual brick dimensions.

Property Builder

By using the property builder, user can create another property from the current scanned values of architectural details.

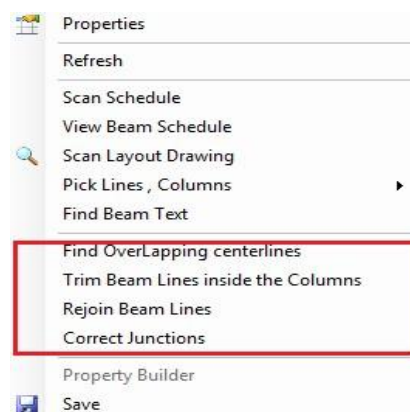


Fig 1.1

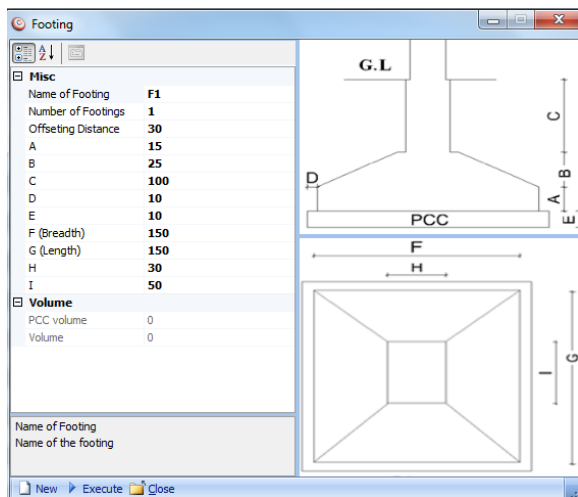
Save

This option will group and save the scanned details and add it to the estimation data.

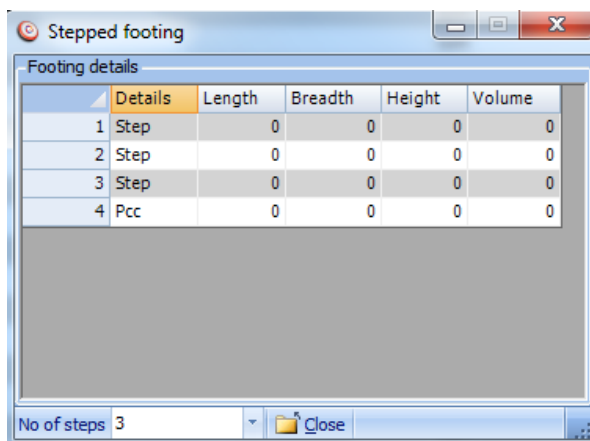
3.4 Footing volume

This utility helps the user in creating footings of desired volume. Volume of stepped and sloped footing can be calculated using this function.

Sloped footing: In the sloped footing window the notations for the dimensions are shown in the pictorial representation of the sloped footing. Enter the required details of the footing in the adjacent grid and click 'execute' to get the desired volume. User can also right click on the grid and use the scan footing options to scan the footing from the drawing and calculate the volume. The 'multiple footings' option helps in calculating the volume and grouping footings of different dimensions.

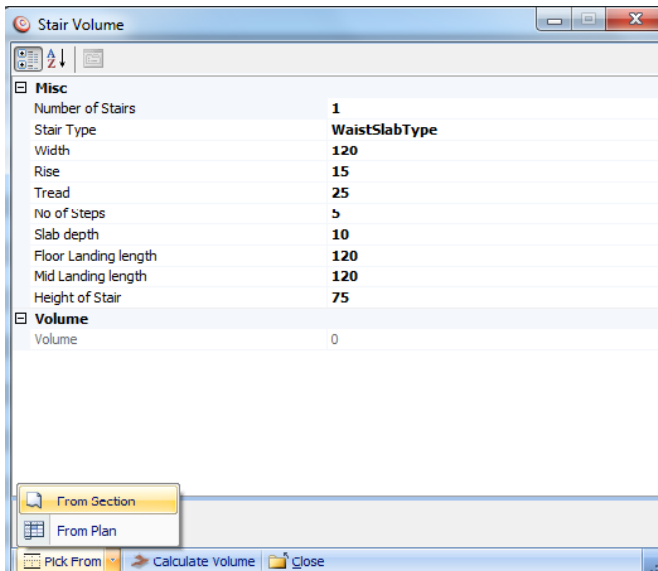


Stepped footing: In stepped footing window, the number of steps in the footing is first entered. After which the dimension of each step is entered in the grid and simultaneously the calculated volume of each step and plain cement concrete is shown.



3.5 Stair volume

The volume of a concrete stair can be calculated using this function. In the stair volume window enter the desired values in the grid (i.e., rise, tread, etc.) and then click 'calculate volume' to get the volume of the stair. User can also calculate the volume of a stair in the CAD drawing by using the 'pick from' option where the user can use the 'from section' option to calculate the volume of a stair from the section of the stair or the 'from plan' option to calculate the volume of the stair from the plan of the stair.



3.6 User defined quantity

This function helps the user in directly entering the quantities and rates, which has already been calculated manually and then find the total cost. After entering the values and calculating the total cost, click the 'save' option to save the file and to obtain its abstract in the reports.

ID	Work ID	Work Name	Unit	Quantity	Rate	Total
	140	Earth Work and Excavation	cum	.00	220.00	.00
	114	Rectangular Columns	cum	.00	7484.25	.00
	115	Circular Columns	cum	.00	8370.25	.00
	101	Linties	cum	.00	6447.25	.00
	120	Beams	cum	.00	6447.25	.00
	96	Sloped Slabs	cum	.00	7022.25	.00
	100	Sunshade	cum	.00	6332.25	.00
	119	Slab	cum	.00	6332.25	.00
	99	Panelled Doors	sqm	.00	2256.34	.00
	155	Brick work	cum	.00	5167.70	.00
	98	Panelled Windows	sqm	.00	5825.63	.00
	118	Panelled Ventilators	sqm	.00	2095.47	.00
	122	Outer Plastering	sqm	.00	161.17	.00
	123	Inner Plastering	sqm	.00	161.17	.00
	124	Ceiling Plastering	sqm	.00	132.76	.00
	129	Sunshade botom Plastering	sqm	.00	132.76	.00
	128	Flooring Ceramic Tile	sqm	.00	365.86	.00
	151	pcc	sqm	.00	2366.32	.00
	125	Outer Painting	sqm	.00	24.95	.00
	126	Inner Painting	sqm	.00	24.95	.00
	127	Applying white cement	sqm	.00	20.52	.00
	131	Ceiling Painting	sqm	.00	24.95	.00

4. Tools

4.1 Cad Utility

The CAD utility helps to extract some quantities from the CAD drawing. Here users can scan polylines, Lines, Arch, Dimension and text from the cad drawing by selecting the desired type from the 'Type' box.

If a user selects polyline for the 'Type' box, this utility will scan only polylines from the CAD drawing and displays the sum of length and area to the details grid.

If a layer is selected, the scanning will take only the items of that layer. Users can use 'multiple' option to extract the quantities by changing different options. There are options like polyline, text, arc, dimension, line etc. User can create their own properties by right clicking on the grid. (Fig 1.1)

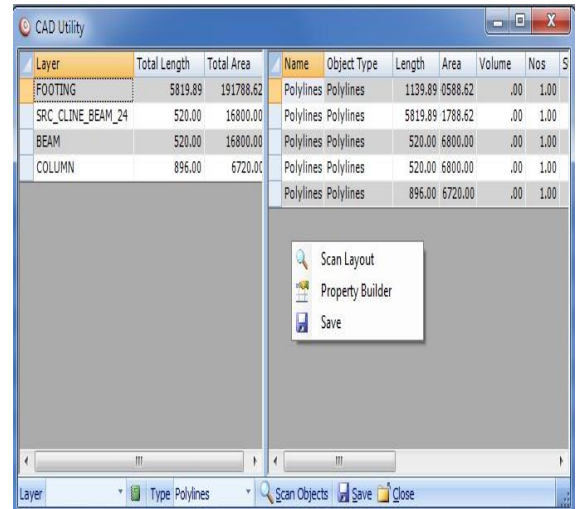
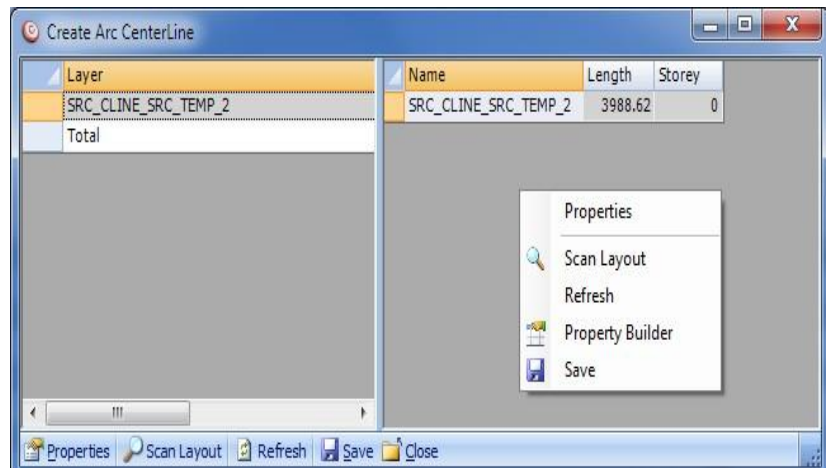


Fig 1.1

4.2 Arc Centerline

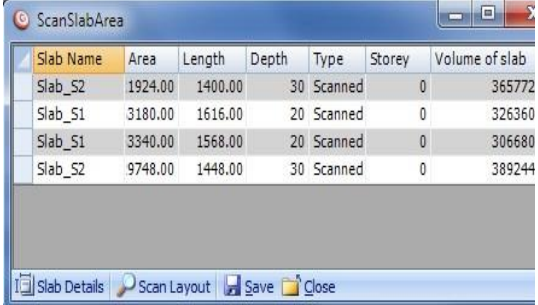
Arc centerline helps the user to create the centerlines of Arc in the CAD drawing. User must give the layer of the arc and maximum width of the arc in the properties, by clicking on the 'properties' button. User can create several properties using the property builder by right clicking on the grid and can use these quantities for the preparation of the estimate.



4.3 Scan slab

Scan slab helps the user to extract the slab details which have various depths. For this, user must give a depth details schedule with the notation of the slab area. User can give beam depth and width details by clicking the slab details button. By clicking the scan layout button, EstimaX will search the notation in drawing and create a Polyline in the slab region by considering the beam width and assigning corresponding depth to it.

(Note: The beam line around the notation must be closely joined to create an exact boundary)(Fig 1.3)



Slab Name	Area	Length	Depth	Type	Storey	Volume of slab
Slab_S2	1924.00	1400.00	30	Scanned	0	365772
Slab_S1	3180.00	1616.00	20	Scanned	0	326360
Slab_S1	3340.00	1568.00	20	Scanned	0	306680
Slab_S2	9748.00	1448.00	30	Scanned	0	389244

Fig 1.3

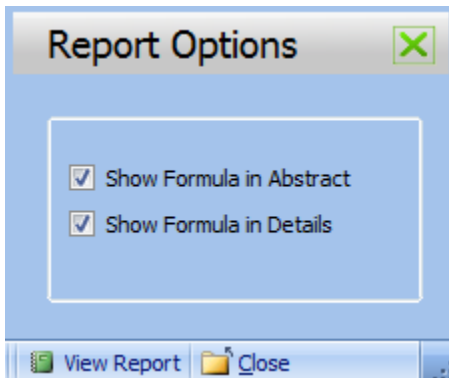
4.4 Centerline

This utility helps in creating centerline of the layer mentioned in the 'layer' option in the 'centerline' window. After the layer is selected and 'maximum width' is given, click 'scan layout' to create centerline for shape of that particular layer and width. Centerline option is used for drawing centerline for definite shapes only.

5. Reports

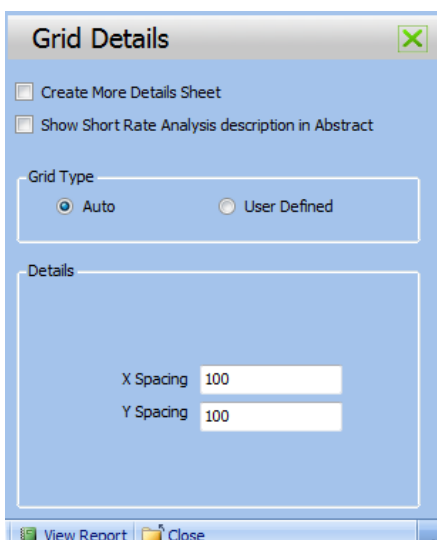
5.1 Abstract (story wise)

This option gives an abstract report and detailed report of the story wise estimation of a project. When the options 'show formula in abstract' and 'show formula in details' is selected and then 'view report' is clicked, formulas used in the project will also be shown in the abstract and detailed report.



5.2 Abstract with split up details

This utility helps the user in creating a grid for the report. A grid can be made automatically by selecting the 'auto' option in the Windsor manually by selecting the 'user defined' option. When auto option is used, the grid spacing can be changed along the X and Y direction by making changes in the options 'X spacing' and 'Y spacing'. When user defined option is used, the user has to enter the storey details, drawing type and 'x' and 'y' grid details. After assigning the properties of the grid click 'view report' to obtain the report of the estimation.

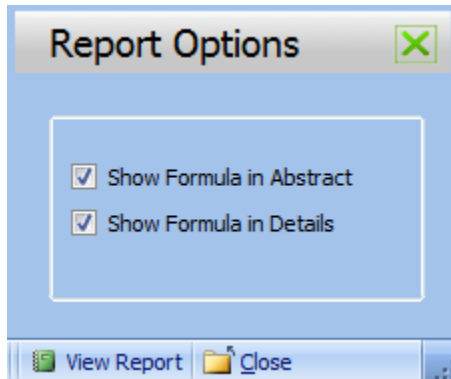


5.3 Tendering

This option gives a report of the Bill of Quantities (BOQ) of the project for tender submissions and other estimation related purposes.

5.4 Abstract (work wise)

This option shows the detailed and abstract report of the work wise estimation of the project. If the 'show formula in abstract' and 'show formula in detail' options are clicked, formulas used for calculation will also be shown.



5.5 Work details

This utility provides a detailed report of the quantities of item used in each work.

5.6 Grouped

Grouped option provides a report of the items which has been grouped by its work.

5.7 Detailed

This function provides a detailed report of the quantities of items used for the entire project.

5.8 Graph

The graph option creates a Graphical representation of the quantity of items used in the estimation project.

5.9 Rate details

Rate details will provide a report on the rates of different items used in the project and the total cost of all the items used.

5.10 Conveyance details

This function gives a report on the conveyance details of each items of the project which will include the mode of conveyance, distance of conveyance and unit rate per distance. Finally the total cost of conveyance will also be mentioned in conveyance details.

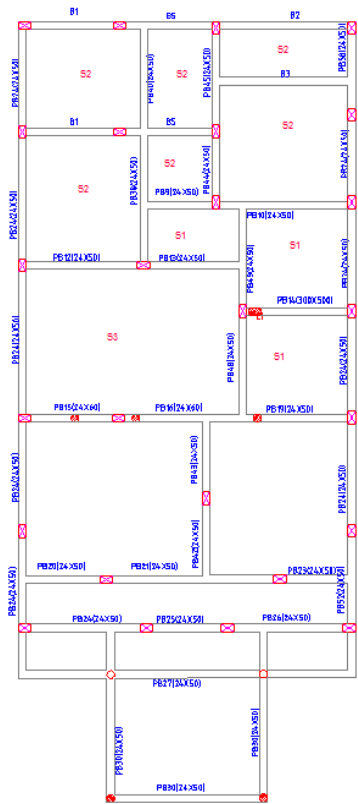
5.11 Rate analysis

Rate analysis provides a detailed report of the rate analysis details entered in the 'rate analysis' option in 'masters'.

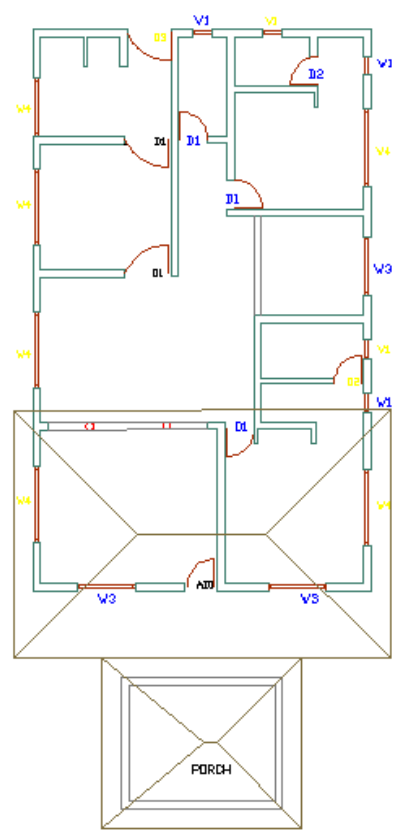
SAMPLE PROJECT

Project No.1.

Structural Drawing



Architectural Drawing



Steps to be used:

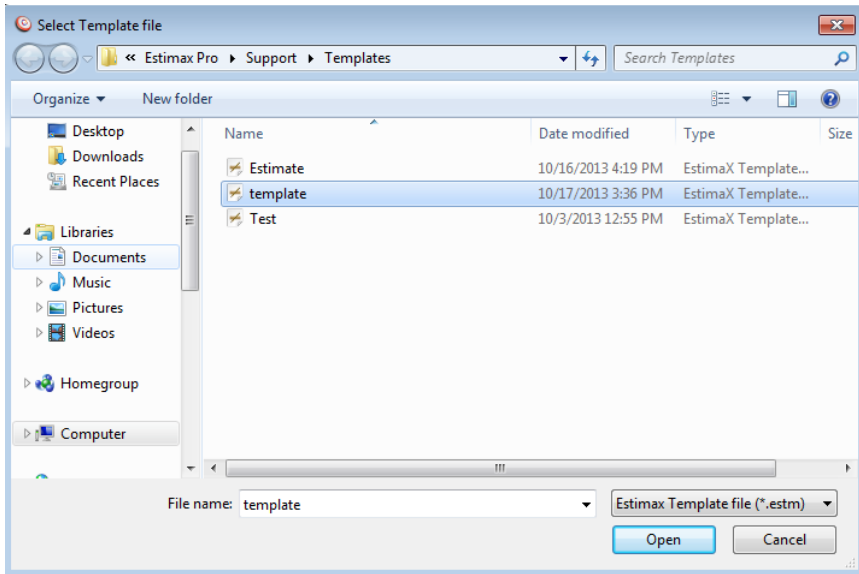
- Open EstimaX.
- From File Menu choose 'New Project'.
- Enter the details of a new project.
- Change the unit.
- Electrification and plumbing can be entered in percentage of total cost of project.
- Option button for lintels and sunshade is to be set. If the sunshade is throughout, provide that option.
If this option is selected the same will be drawn in the drawing in CAD drawing, else the outline of the slabs will be the building out line.
- Save, and close the window.

Project Details	
Defaults	
Drawing Unit	Centimeter
Project Details	
Projectname	Sample project
ClientName	
Address	Location Test Postal Code = Test
Allowance	0
Lintel	Thoroughout
Sunshade	ThroughOut
DropSlab	False
Electrification %	5
Plumbing %:	5
Rate Used	Rate

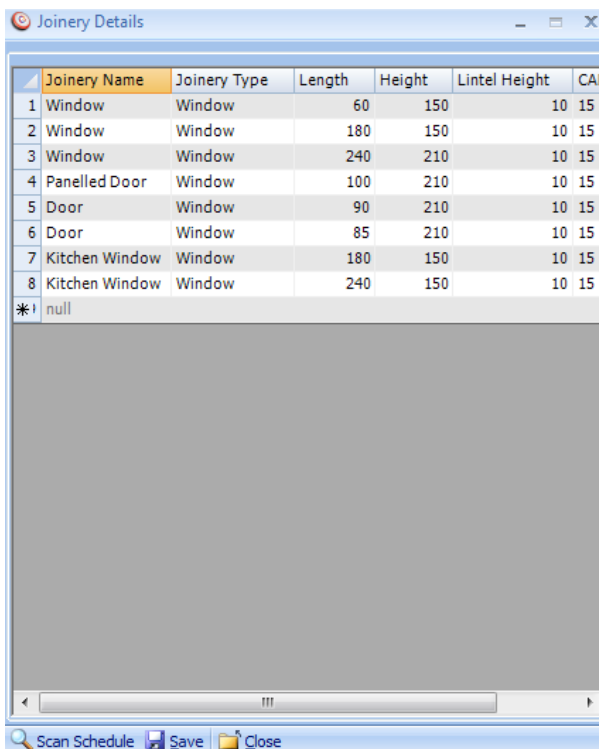
Project Details

Save Close

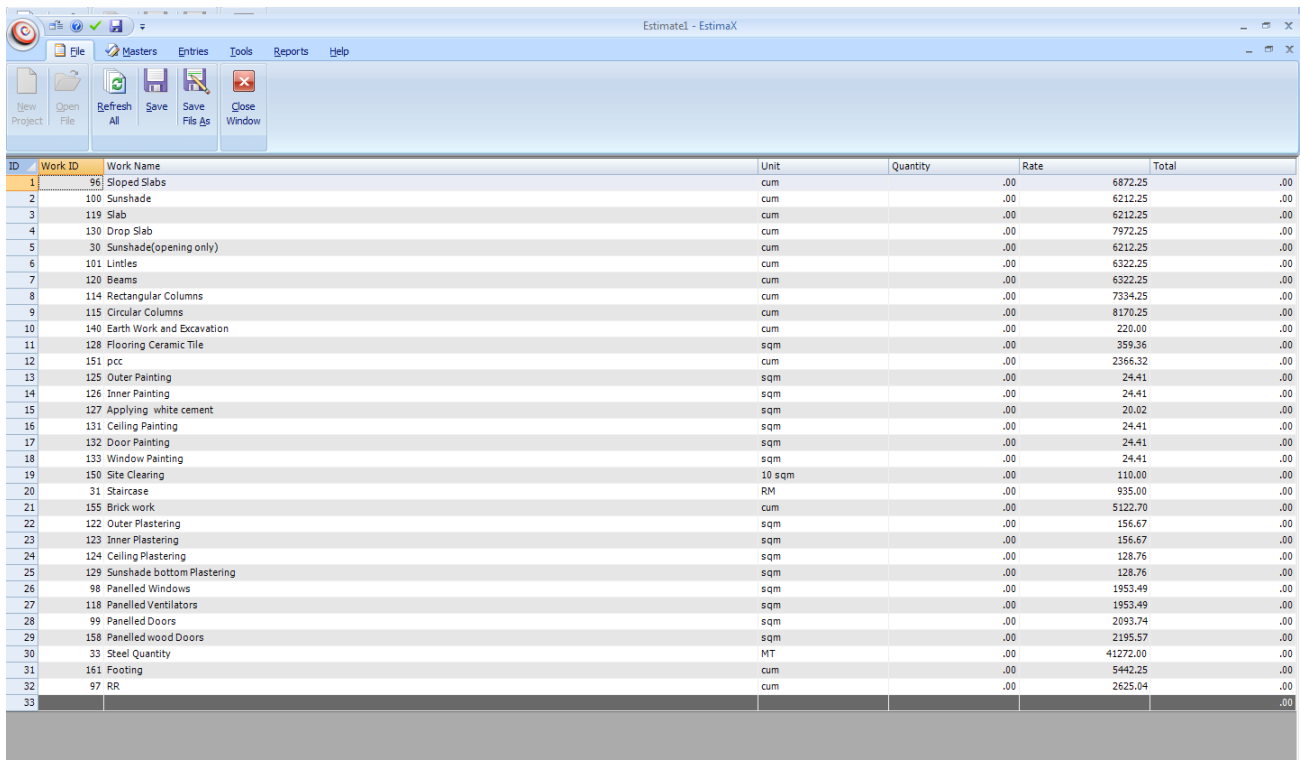
- Select particular template and click on open.



- Enter joinery details by scanning joinery details in table format from Auto cad drawing.
- After scanning all data in the table, values will extract to the joinery window. Users can change the type of joinery (window, Door, Ventilator etc.).
- After entering all data, just Save the details.



Details of measurement and calculation of Quantities and cost' Window.



ID	Work ID	Work Name	Unit	Quantity	Rate	Total
1	96	Sloped Slabs	cum		.00	6872.25
2	100	Sunshade	cum		.00	6212.25
3	119	Slab	cum		.00	6212.25
4	130	Drop Slab	cum		.00	7972.25
5	30	Sunshade(opening only)	cum		.00	6212.25
6	101	Lintles	cum		.00	6322.25
7	120	Beams	cum		.00	6322.25
8	114	Rectangular Columns	cum		.00	7334.25
9	115	Circular Columns	cum		.00	8178.25
10	140	Earth Work and Excavation	cum		.00	220.00
11	128	Flooring Ceramic Tile	sqm		.00	359.36
12	151	pcc	cum		.00	2366.32
13	125	Outer Painting	sqm		.00	24.41
14	126	Inner Painting	sqm		.00	24.41
15	127	Applying white cement	sqm		.00	20.02
16	131	Ceiling Painting	sqm		.00	24.41
17	132	Door Painting	sqm		.00	24.41
18	133	Window Painting	sqm		.00	24.41
19	150	Site Clearing	10 sqm		.00	110.00
20	31	Staircase	RM		.00	935.00
21	155	Brick work	cum		.00	5122.70
22	122	Outer Plastering	sqm		.00	156.67
23	123	Inner Plastering	sqm		.00	156.67
24	124	Ceiling Plastering	sqm		.00	128.76
25	129	Sunshade bottom Plastering	sqm		.00	128.76
26	98	Panelled Windows	sqm		.00	1953.49
27	118	Panelled Ventilators	sqm		.00	1953.49
28	99	Panelled Doors	sqm		.00	2093.74
29	158	Panelled wood Doors	sqm		.00	2195.57
30	33	Steel Quantity	MT		.00	41272.00
31	161	Footing	cum		.00	5442.25
32	97	RR	cum		.00	2625.04
33						.00

Slab scanning

Steps to be used

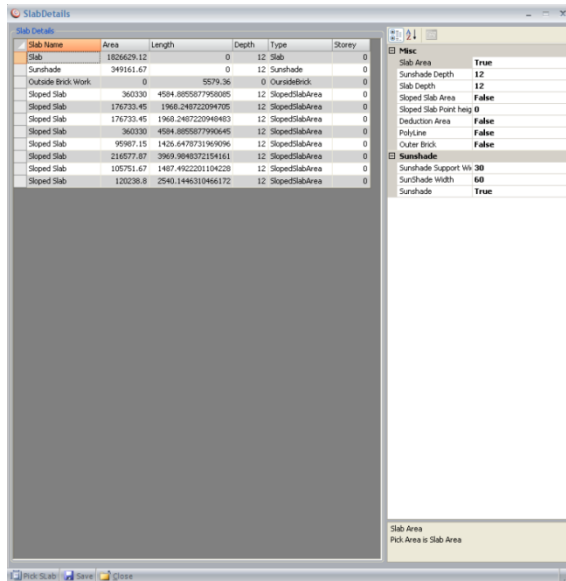
- Go to entries and then slab details.
- Check the layers in the drawing and properties are same.
- Click on pick slab.
- Pick the corner points of slab from CAD drawing. After picking the corners press Right button of mouse or press Enter key to complete the procedure.
- Then save and close.
- Refresh the main window ('Details of measurement and calculation of Quantities and cost' window) for viewing scanned values.

Sloped Slab Scanning

Steps to be used

- Slab area option is set to true, user can pick the sloping area details.
- When sloped slab option is selected, a button named 'Set Height' will be visible. User can set the point height in the drawing using this button.
- Pick height from CAD drawing, then right click.

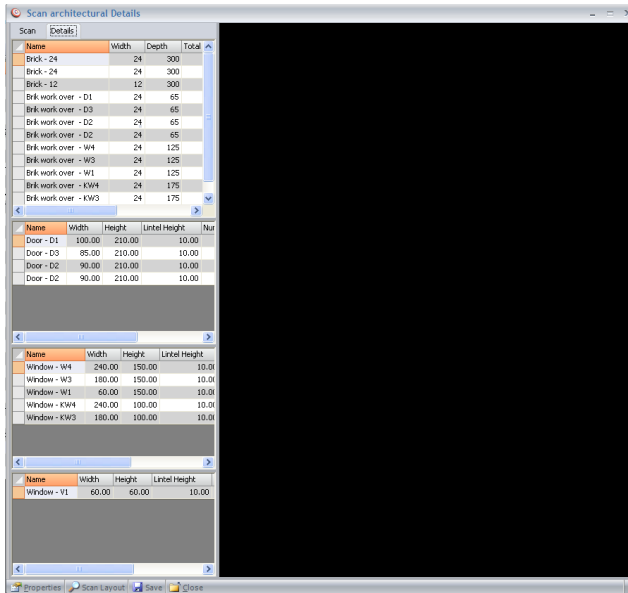
- Pick the sloping area from CAD drawing.
- If deduction area is true the selected values are considered as a deduction part from the main slab details.
- User can scan slab area by using polyline option.



Scan Architectural drawing

Steps to be used

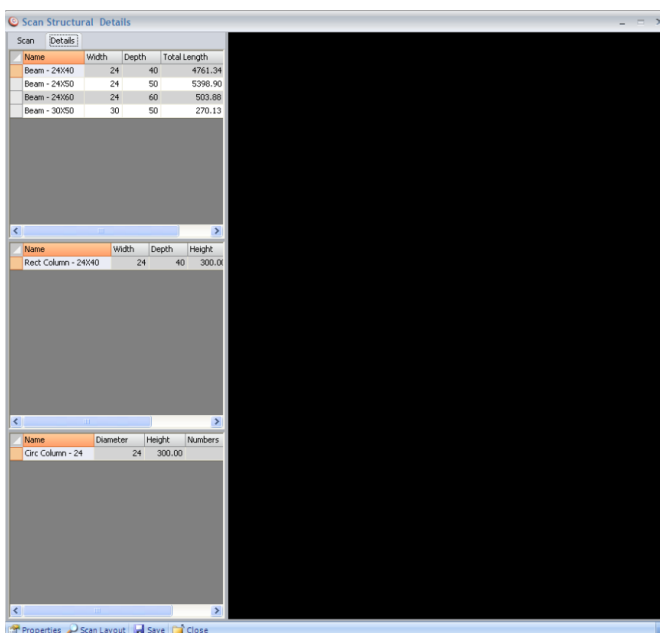
- Go to entries, select scan arch drawing.
- Check the layers in the drawing and properties are same.
- Click on scan layout.
- Scan the drawing, and then right click to complete the scanning.
- Save and close.
- Refresh main window.



Scan Structural drawing

Steps to be used

- Go to entries, select scan structural drawing.
- Check the layers in the drawing and properties are same.
- Click on scan layout.
- Scan the drawing, completion of scanning is to be done with a right click.
- Then Save and close.
- Refresh the main window after all scanning process.



Steel quantity

Steps to be used

- Users can add new work items through 'Storey Item Details'.
- Users can set 'Steel Requirement' by double clicking on steel item.
- Users can add steel in percentage by clicking on Steel Distribution button.
- After clicking on steel distribution users can see the next window shown below. In this, users can enter steel distribution for this project.
- Enter weight of steel per unit weight of concrete and also enter the percentage of steel for a particular diameter. Then Save the details.
- Click on Refresh button for taking the steel distribution corresponding to the project.
- After that close the window.
- 'Save' the details.

REPORTS

ABSTRACT

Abstract report creates report of all the quantities in the estimation project with the grouping option given in the work group master and stories to MS excel. It has two sheets. The abstract sheet displays the abstract quantity details of the project. Details sheet list out all the quantities extracted from the drawing with details of each item.

1	Abstract of Estimate sd					
2	Client Name					
3	SL No	Description Of Work	Unit	Quantity	Rate	Total
4						
5	First Floor					
6	1 Slabs					
7	1.1	Vibrated RCC M25 mix using 20mm and down grade hard brocken granite stones machine mixed for slopping slabs, staircase slabs				
8		Sloped Slabs	cum	19.35	6872.25	132993.08
9	1.2	Vibrated RCC M25 mix using 20mm and down grade hard brocken granite stones machine mixed for floor/roof slabs, slopping slabs, staircase slabs with folding, sunshade slabs, chajjas etc				
10		Sunshade	cum	4.19	6212.25	26028.96
11	1.3	Vibrated RCC M25 mix using 20mm and down grade hard brocken granite stones machine mixed for floor/roof slabs, slopping slabs, staircase slabs with folding, sunshade slabs, chajjas etc				
12		Slab	cum	21.92	6212.25	136169.72
13	1.4	Vibrated RCC M25 mix using 20mm and down grade hard brocken granite stones machine mixed for drop slabs, eve boards, etc				
14		Drop Slab	cum	3.03	7972.25	24153.37
15	1.5	Vibrated RCC M25 mix using 20mm and down grade hard brocken granite stones machine mixed for floor/roof slabs, slopping slabs, staircase slabs with folding, sunshade slabs, chajjas etc				

Steps to be used

- From report menu choose abstract.
- Click on preview report.

WORK DETAILS

Displays the list of all quintiles extracted from the drawing with formulas.

Quantity Details sd								
Volume of Brick Work (Outside)								
Name	Width	Depth	Total Leng	Nos	Storey	Outside	Volume of Brick Work (Outside)	
1 Brick - 24	24	300	4109.232	1	1	0 TRUE	29586469.09	
2 Brik work	24	65	85	1	1	0 TRUE	132600.00	
3 Brik work	24	65	90	1	1	0 TRUE	140400.00	
4 Brik work	24	125	240	4	1	0 TRUE	2880000.00	
5 Brik work	24	125	180	3	1	0 TRUE	1620000.00	
6 Brik work	24	125	60	2	1	0 TRUE	360000.00	
7 Brik work	24	175	240	1	1	0 TRUE	1008000.00	
8 Brik work	24	175	180	1	1	0 TRUE	756000.00	
9 Brik work	24	215	60	3	1	0 TRUE	928800.00	
Total							37412269.09	
Area of Door(Outside)								
Name	Width	Height	Lintel Hei	Numbers	Storey	Outside	Area of Door(Outside)	
1 Door - D3	85	210	10	1	1	0 TRUE	17850.00	
2 Door - D2	90	210	10	1	1	0 TRUE	18900.00	
Total							36750.00	
Area of Windows(Outside)								
Name	Width	Height	Lintel Hei	Numbers	Storey	Outside	Area of Windows(Outside)	
1 Window -	240	150	10	4	1	0 TRUE	144000.00	
2 Window -	180	150	10	3	1	0 TRUE	81000.00	
3 Window -	60	150	10	2	1	0 TRUE	18000.00	
4 Window -	240	100	10	1	1	0 TRUE	24000.00	
5 Window -	180	100	10	1	1	0 TRUE	18000.00	
Total							285000.00	
Area of Ventilators (Outside)								
Name	Width	Height	Lintel Hei	Numbers	Storey	Outside	Area of Ventilators (Outside)	
1 Window -	60	60	10	3	1	0 TRUE	10800.00	
Total							10800.00	

Steps to be used

- From report menu choose work details.
- Click on preview report.

RATE ANALYSIS

Report of all Rate Analysis details in the project.

Rate Analysis Details for the project sd						
Rate analysis Details						
SL No	Description	Unit	Qunatity	Rate	Cost	Type
1 Sloped Slabs						
	Vibrated RCC M25 mix using 20mm and down grade hard brocken granite stones machine mixed for slopping slabs, staircase slabs					
	20 mm broken stone	m3	0.9	650	585	Material
	River sand	m3	0.45	990	562.5	Material
	Cement	kg	350	6	2100	Material
	Labour & formwork charges	m3	1.25	1400	3000	LABOUR
2 Sunshade						
	Vibrated RCC M25 mix using 20mm and down grade hard brocken granite stones machine mixed for floor/roof slabs, slopping slabs, staircase slabs with folding, sunshade slabs, chajjas etc					
	20 mm broken stone	m3	0.9	650	585	Material
	River sand	m3	0.45	990	562.5	Material
	Cement	kg	350	6	2100	Material
	Labour & formwork charges	m3	1	1400	2400	LABOUR
3 Slab						
	Vibrated RCC M25 mix using 20mm and down grade hard brocken granite stones machine mixed for floor/roof slabs, slopping slabs, staircase slabs with folding, sunshade slabs, chajjas etc					
	20 mm broken stone	m3	0.9	650	585	Material
	River sand	m3	0.45	990	562.5	Material
	Cement	kg	350	6	2100	Material
	Labour & formwork charges	m3	1	1400	2400	LABOUR

Steps to be used

- From report menu choose Rate Analysis.
- Click on preview report.

RATE DETAILS

Details of all rates in the project.

Rate Details for the project sd					
Rate Details					
SL No	Description	Unit	PWD Rate	CPWD Rat	Company
Type : Material					
1	Cement	kg	6	0	0
2	Marble Chips of various colours	Qtl	200	0	0
3	Marble stone piece for crazy flooring	Qtl	200	0	0
4	Vitrified Tiles (ISO/ 1st quality)	m2	570	0	0
5	Ceramic floor tiles (ISO/ 1st quality)	m2	322	0	0
6	River sand for Mortar	m3	990	0	0
7	River sand	m3	990	0	0
8	(Prelaminated Board) 12 mm thick.	m2	642	0	0
9	Steel	Tonne	35000	0	0
10	Wood	m3	20000	0	1250
11	20 mm broken stone	m3	650	650	380
12	40mm broken stone	m3	650	650	650
13	Mirror polished granite	FALSE	830	0	0
14	Coarse sand	m3	1250	1250	1250
15	Fully vitrified tiles 60x60 cms	FALSE	570	0	0
16	Ceramic tiles	m2	0	0	0
17	Anti skid ceramic tiles	FALSE	322	0	0
18	Ceramic wall tiles	FALSE	340	0	0
19	Paving tiles, Eurocon, Duracrete or equivalent	FALSE	1	0	0
20	Granite tiles 10mm thick	FALSE	1	0	0
21	Fully vitrified tiles 600x600 mm for lift cladding	m2	0	0	0
22	Terra-Cota tiles including 15% wastage	FALSE	1	0	0
23	White cement	kg	14	0	0
24	Binding wire for tying grill	kg	70	70	70
25	Glass sheet plain 3mm thick	m2	205	205	205
26	Synthetic Enamel Paint	ltr	162	162	162
27	Brick traditional 22.9 x 11.2 x7	1000 nos	3000	3000	3000

Steps to be used

- From report menu choose rate details.
- Click on preview report.

CONVEYANCE DETAILS

Conveyance details of items

Steps to be used

- From report menu choose conveyance details.
- Click on preview report conveyance details.

QUANTITY DETAILS

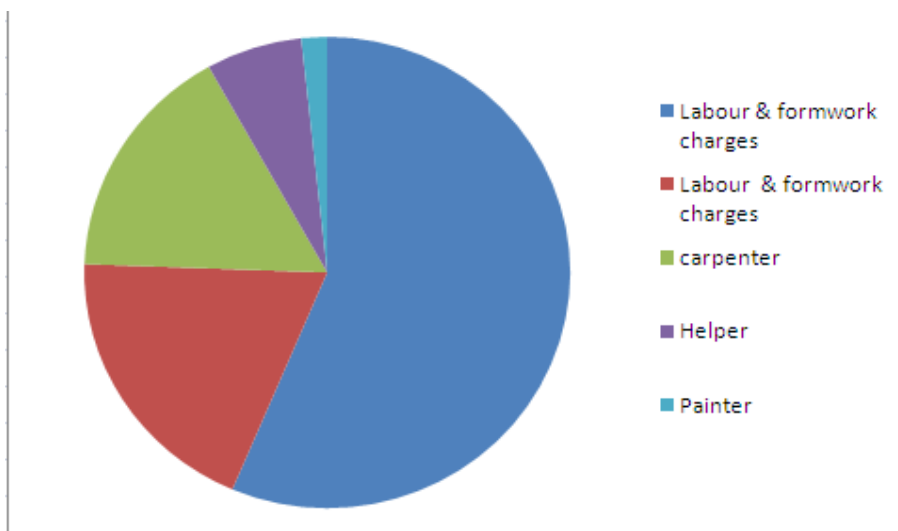
This report generates the details of quantity of items used in estimation project.

Steps to be used

- From report menu choose quantity details.
- Click on preview report conveyance details.

GRAPH

Create a Graphical representation of quantity of items used in the estimation project.



Steps to be used

- From report menu choose graph.
- Click on preview report conveyance details.

COMPARISONS OF A SAMPLE PROJECT

Manual method of estimation is time consuming over than EstimaX method. EstimaX gives the estimation of a project within a few instants by using Scanning method. EstimaX gives accurate values for each project.

Sample calculation for manual method:

Project Name : Sample
Storey : Ground floor.

1. Sunshade:

In this project, sunshade is provided through out, therefore Area for sunshade is taken as total length of slab multiplied by width of sunshade (0.6m).

Area for sunshade : 33.52 m²

Thickness for sunshade : 0.12 m

I.e. Quantity of sunshade: **4.02m³**

2. Slabs:

Flat slabs

Area of slab : 183.12

Thickness for slab : 0.12

I.e. Quantity for slab : **21.97 m³**

Sloped slabs

Area of Sloped slab : 90 m²

Area of Sloped slab(porch) : 33.39 m²

Total Slope area : 120.39 m²

Thickness of the slab : 0.12m

i.e. Quantity for slab : **14.44 m³**

3. Beams.

Width of beams : 0.24 m

Length of beams (Depth 0.4) : 24.9 m

Length of beams (Depth0.5) : 89.15 m

Length of beams (Depth0.6) : 4.34 m

Then , quantity for beams : length x width x depth
: **13.708 m³**

4. Lintels

In this project lintel is provided through out therefore total length is considered as the total length of bricks.

Length of lintels,

For outer : 55.36m

For inner : [5.0 +.24+.40+ (3.54x2) + (.9x2)

+7.44+5.34 + (1.5x2) +2.6+.45

4.24+3.4+3.99+3.16+1.67+.4]

: 50.41m

Total length of lintel : 105.77m

Length of 0.12m breadth lintel : 5.41m

Length of 0.24m breadth lintel : 100.36m

Height for lintel : 0.15m

Therefore total qty for 0.12 m lintel : 0.097m³

Total qty for 0.12 m lintel : 3.61m³

Total qty for lintels : **3.71m³**

5. Circular Columns:

Number of columns : 7

Height of columns : 3m

Diameter of column : 0.24m

Therefore Total quantity for columns : **0.95m³**

6. Brick work:

Length of 0.12m thick wall : 4.51m

Length of 0.24m thick wall : 101.1 m

Height of wall : 2.75 m

Qty for 0.12m thick wall : 1.48 m³

Qty for 0.24m thick wall : 66.72 m³

Total qty for brick : **68.2 m³**

Deduction for doors, windows and Ventilators:

Qty for Door AD1 : $1 \times 1 \times 2.1 \times 0.24 = 0.504 \text{ m}^3$

Qty for Door D2 : $5 \times 0.9 \times 2.1 \times 0.24 = 2.26 \text{ m}^3$

Qty for Door D3 : $3 \times 1.4 \times 2.1 \times 0.24 = 2.116 \text{ m}^3$

Qty for Window w3 : $4 \times 1.8 \times 1.5 \times 0.24 = 2.59 \text{ m}^3$

Qty for Window w4 : $5 \times 2.4 \times 1.5 \times 0.24 = 4.32 \text{ m}^3$

Qty for Ventilator V1 : $4 \times 0.6 \times 0.9 \times 0.24 = 0.518 \text{ m}^3$

Total deduction for Doors and Windows : **12.316 m³**

After deduction total qty for brick : **55.9 m³**

7. Flooring with ceramic Tile:

Area for Drawing : $4.76 \times 4.98 = 23.70 \text{ m}^2$

Area for Dining : $4.50 \times 6.12 = 27.54 \text{ m}^2$

Area for Kitchen : $3.54 \times 3.90 = 13.81 \text{ m}^2$

Area for W/A : $3.54 \times 3.06 = 10.83 \text{ m}^2$

Area for Store : $1.50 \times 3.06 = 4.59 \text{ m}^2$

Area for Toilet1 : $2.35 \times 1.5 = 3.52 \text{ m}^2$

Area for Toilet2 : $3.16 \times 1.74 = 5.49 \text{ m}^2$

Area for Dressing Room : $2.19 \times 1.41 = 3.08 \text{ m}^2$

Area for Bed Room : $4.00 \times 3.6 = 14.4 \text{ m}^2$

Area for Living : $1.86 \times 2.34 = 4.35 \text{ m}^2$

Area for passage1: $1.5 \times 2.28 = 3.42 \text{ m}^2$

Area for Master Bed : $4.76 \times 4.3 = 20.468 \text{ m}^2$

Area for Veranda : 14.8 m^2

Therefore Total area for flooring : **150m²**

8. Panelled Ventilators;

Total area for Ventilator V1: $0.6 \times 0.9 \times 4 = 2.16 \text{ m}^2$

9. Panelled Doors:

Area for Panelled Doors AD1: $1 \times 2.1 \times 1 = 2.1 \text{ m}^2$

Area for Doors D2: $0.9 \times 2.1 \times 5 = 9.45 \text{ m}^2$

Area for Doors D3: $1.4 \times 2.1 \times 3 = 8.82 \text{ m}^2$

Total area for Doors: **20.37 m²**

10. Panelled Windows:

Area for Window W3: $1.8 \times 1.5 \times 4 = 10.8 \text{ m}^2$

Area for Window W4: $2.4 \times 1.5 \times 5 = 18 \text{ m}^2$

Total area of windows: **28.8 m²**

11. Outer plastering:

Outer length for plastering : 55.36 m

Height for plastering : 3.0m

Total qty for plastering : 166.08 m²

Deduction for outer plastering:

Panelled Doors D1 : 2.1m²

Doors D3 : 1.79m²

Kitchen Window KW3 : 1.8m²

Window W1 : 1.8m²

Window W3 : 8.1m²

Window W4 : 14.4m²

Kitchen Window KW4 : 2.4m²

Ventilator V1 : 1.08m²

Total qty for deductions : 33.47m²

Total qty for Outer Plastering : **166.08-33.47 =132.61m²**

12. Inner Plastering:

Total length for inner plastering : [(Inner length of brick x2) +Outer length of brick]

: 94.64+53.92

: 148.54 m

Height for plastering : 2.75 m

Qty for plastering : 148.54 x2.75= 323.2m²

Deductions for inner plastering:

Doors AD1 : 1 x 2.1x1 = 2.1 m²

Doors D2 : 0.9x2.1x5 = 9.45 m²

Doors D3 : 1.4x2.1x3 = 8.82 m²

Window W3 : 1.8x1.5x4 = 10.8 m²

Window W4 : 2.4x1.5x5 = 18 m²

Ventilator V1 : .6x.9x4 = 2.16 m

Qty for deduction : 51.33 m²

Total qty for Inner Plastering : 323.2-14.28 =**308.9m²**

13. Ceiling Plastering:

Area for ceiling plastering :188.90m²

Deductions for ceiling plastering:

Total Brick work area : 4.74x.12 + 113.18x0.24

: 27.70m²

Column areas : 2.902m²

Total deduction : 30.6m²

Therefore total qty for Ceiling Plastering : 188.90-30.6

: 158.3 m²

14. Outer Painting:

Qty for Outer Painting : **138.84m²**

15. Inner Painting:

Qty for Inner painting : **308.91m²**

16. Ceiling Painting:

Qty for ceiling Painting **:157.69m²**

17. Applying White Cement:

Qty for white cement : 138.84+ 308.91

: 447.75m²

18. Door Painting:

Doors AD1 : 1x1.0x2.1x2.25

: 4.725 m²

Doors D2 : 5x0.9x2.1x2.25

: 21.26 m²

Doors D3 : 3x1.4x2.1x2.25

: 19.84 m²

Total qty for door Painting : **45.82m²**

19. Window Painting:

Area for sliding Window W3	:	$4 \times 1.8 \times 1.5 \times 2.25 = 24.3 \text{ m}^2$
Area for sliding Window W4	:	$5 \times 2.4 \times 1.5 \times 2.25 = 40.5 \text{ m}^2$
Total area for Window painting	:	$28.5 \times 2.25 = 64.8 \text{ m}^2$

20. Sunshade bottom plastering:

Qty for sunshade bottom plastering	:	33.52 m^2
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COMPARISONS

A comparison of estimation of a project through manual method and through EstimaX as shown below;

Sl. no	Work Items	Qty by	Qty by EstimaX
		Manual	
1.	Sunshade	4.023 m ³	4.19 m ³
2.	Slab	21.97 m ³	21.98 m ³
3.	Beams	13.708 m ³	13.97 m ³
4.	Lintel	3.89 m ³	3.81 m ³
5.	Circular columns	0.95 m ³	0.95m ³
6.	Brick work	55.9 m ³	56.9 m ³
7.	Flooring ceramic tile	167.63 m ²	165.82 m ²
8.	Panelled ventilators	2.16 m ²	2.16 m ²
9.	Panelled doors	20.37 m ²	20.37 m ²
10.	Panelled windows	4.68 m ²	4.68 m ²
11.	Outer painting	138.84 m ²	139.05m ²
12.	Inner painting	375.3 m ²	375.5 m ²
13.	Panelled ventilator	4.86 m ²	4.86 m ²
14.	Ceiling painting	157.69m ²	159.75m ²
15.	Door painting	45.82 m ²	45.82 m ²
16.	Window painting	64.8 m ²	64.8 m ²
17.	Inner plastering	375.3m ²	375.5 m ²
18.	Ceiling plastering	157.69 m ²	159.75m ²
19.	Sunshade bottom plastering	33.52 m ²	34.92 m ²
20.	Outer plastering	138.84 m ²	139.05m ²

