

# Building Estimation and Costing

## Reference Guide



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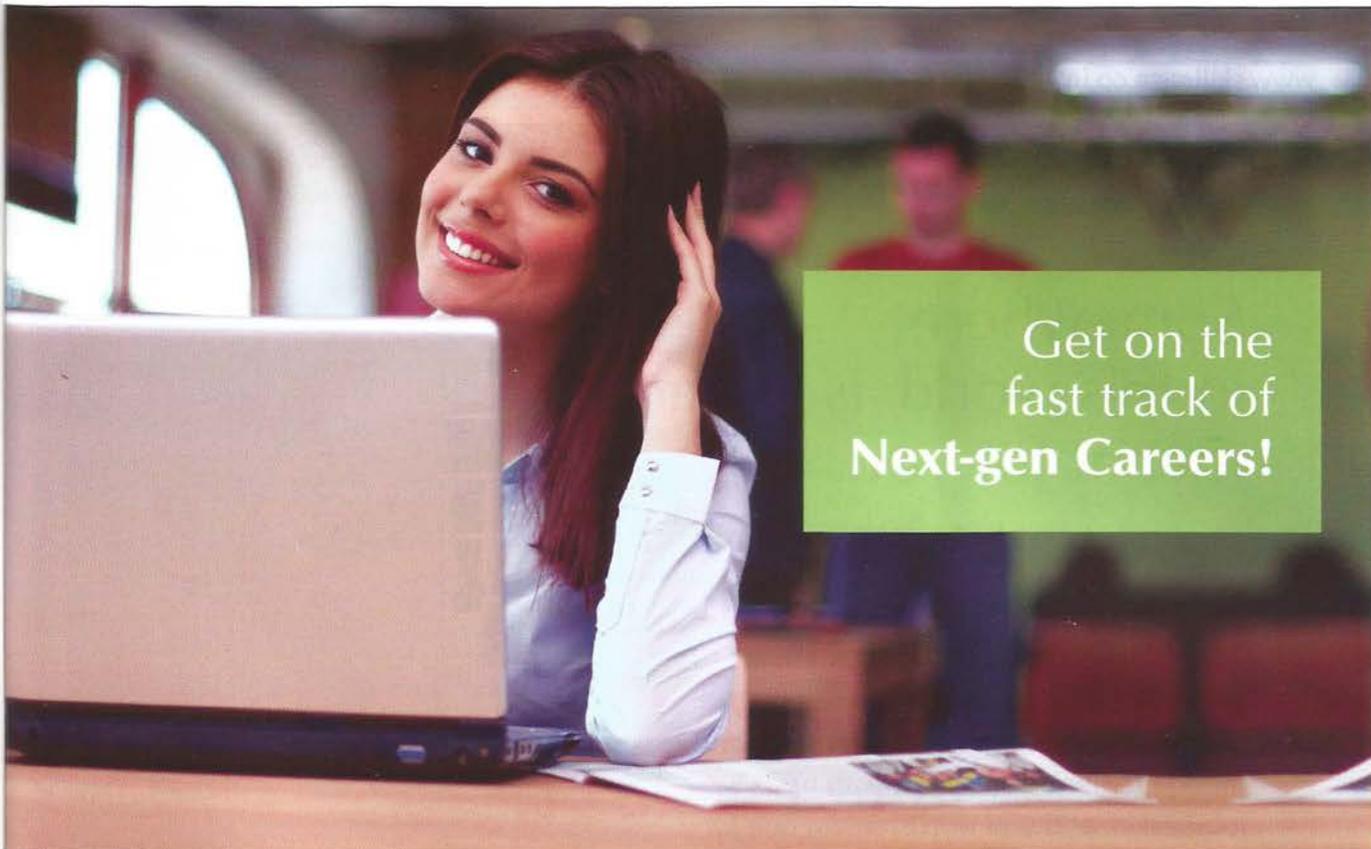
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**BUILDING ESTIMATION  
AND COSTING**

**using**

**Autodesk Quantity Takeoff**

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# PREFACE

DEAR PROFESSIONAL,

Welcome to the world of Computer Aided Building Estimation and Costing. Most important role of Quantity Surveyors is to estimate the cost of the proposed building; enabling the contractor to evaluate and determine the feasibility of the project. Hence accuracy of forecasting the cost of future projects is vital to the success of the business or organization involving in future construction projects.

A Professional Quantity Surveyor has a comprehensive knowledge of construction, construction methods, local laws relating to construction projects and accounting, in order to provide cost and financial advice.

The foundation for a successful cost estimate relies upon reliable identification of the quantities (takeoff) of the various materials involved in the project. Cost estimators develop the cost information based on the design developed by the design team members which will help the team to make budgetary and feasibility determinations.

Course on Computer Aided Building Estimation and Costing lets you use the Autodesk Quantity Takeoff software in a more systematic way and improve your productivity accuracy. We truly believe this course would be beneficial to every professional planning to build a career as a professional Quantity Surveyor as well as, making an experienced Quantity Surveyor learn the software tools that could compliment their profession.

The systematically organized courseware explains the method to perform a takeoff of a building based on non-intelligent image formats such as JPG, TIF and PDF and also from Building Information Models (BIM). It also covers the interactive examination of 3D models, dynamic counting and quantifying the design data and the way of creating summaries and detailed quantity surveying reports.

We wish you the most and more and assuring of World Class Learning Experience with us!



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Managing Director,  
CADD Centre Training Services Pvt. Ltd.

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This Reference Guide is intended solely for the use of individual who has registered for a course at CADD Centre. This guide covers most of the prescribed industry specific curriculum. You are welcome to refer other manuals and books to gain wider knowledge on the subject. This guide contains additional portions and topics for your self—learning after gaining required expertise on the curriculum covered during the instructor led training by CADD Centre.

Do not assume that all the topics included in the book will be covered during the instructor led training program at CADD Centre as it is a reference guide meant for your use even after the course with us. This Reference Guide is a life time ready reference material for the respective application too. Changes may be made and enforced time to time at company's discretion.

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# 1 CHAPTER

## 1 INTRODUCTION

### 1.1 Estimation

For all engineering works it is recommended to know the probable cost of construction i.e. Estimated Cost. If estimated cost is more than the available, then some modifications in design will be made to reduce the cost. In preparing an estimate, the quantities of different items of work are calculated. One who is able to read a drawing and understand the dimensions from the same, may calculate the quantities. Then these quantities are used to calculate the cost.

#### *Methods*

**Estimate:** The estimate is the probable cost of a work and is determined theoretically by mathematical calculations based on the plans and drawing and current rates. Approximate estimate may be prepared by various methods but accurate estimate is prepared by Detailed Estimate Method.

**Actual Cost:** The actual cost of a work is known at the completion of the work. Account of all expenditure is maintained on daily basis which will sum up at the end to get the Actual Cost.

**Detailed Estimate:** Preparation of detailed estimate consists of working out the quantities of different items of work and then working out the cost.

### 1.2 Autodesk Quantity Takeoff

The process of measuring quantities of materials from drawings and specifications prepared by architects, engineers, and other designers is known as quantity takeoff. Traditionally, construction cost estimators have used paper-based methods to perform quantity takeoff. Autodesk Quantity Takeoff (QTO) gives estimators the tools to perform digital quantity takeoff, which is faster, easier, and more accurate than paper-based methods.

Using QTO, you can combine multiple sources of two-dimensional and three-dimensional design data and generate quantity takeoff to create a cost estimate. You can bring information from applications such as AutoCAD, Autodesk Revit Architecture, and AutoCAD Civil 3D software, as well as 'non-intelligent' CAD data and image formats. Both DWF and non-DWF files can be used as source files. All data associated with a given estimate is stored in a QTO project.

### 1.2.1 DWF

DWF stands for Design Web Format, which is an open, secure file format developed by Autodesk. Using DWF, you can combine rich 2D and 3D design data, as well as other project-related files, into a single, highly compressed file. Each DWF file contains one or more pages called sheets. Usually, the content of each sheet can be viewed, marked up, measured, and printed. However, in some cases, this is limited by the person who originally created, or published, the DWF file.

In QTO, the source of the 2D or 3D DWF file determines the level of automatic quantity takeoff functionality that is available. You can use DWF files (and DWFX files) that are published from several design applications. Because of variations in publishing methods, the source application of the DWF file determines the level of automatic takeoff functionality that will be available when you import the file into QTO.

Publisher	Automatic Takeoff
AutoCAD	No
AutoCAD Architecture	Yes
AutoCAD MEP	Yes
AutoCAD Civil 3D	Yes
Autodesk Inventor	No
Revit	Yes

Much like Adobe PDF files, the contents of a DWF file cannot be altered. Unlike PDF files, however, DWF files retain design information (scale, measurements, assemblies), which makes them more suitable for architects, engineers, and designers. Also, DWF files are typically much smaller than PDF files.

### 1.2.2 Non-DWF

Non-DWF files that can be used in QTO include PDF files, DWG files, and image files, such as JPG, TIF, and GIF. Optimize PDF files for use in QTO by using the image settings within the PDF print driver to down sample all images to below 150 ppi. The default setting of 300 ppi is optimized for printer output, not on-screen display, so it will not deliver optimal performance for importing and displaying PDF images in QTO.

QTO provides a comprehensive set of takeoff tools for use with 3D DWF models, 2D DWF sheets, and non-DWF files. Tool availability is determined by the types of files you use. If you work with model-based 2D and 3D DWF files, you can use either automatic takeoff tools or manual takeoff tools. If you work with DWG and image files, such as PDFs and TIFs, only manual tools are available.

- **Automatic takeoff tools:** For use with 3D DWF models and 2D DWF sheets. Using the design data embedded in the DWF files by publishing applications, these tools create takeoff data automatically.
- **Manual takeoff tools:** For use with 2D DWF sheets and non-DWF files (DWGs, PDFs, TIFs, GIFs, and JPGs). These tools create takeoff data by measuring drawing geometry that you select or manually trace on a sheet.

**Note:** To have the DWG format as an import option, you must have DWG TrueView™ installed.

The following table shows the types of files you can use in QTO and the level of takeoff functionality available for each file type.

Document Type	Automatic Takeoff	Manual Takeoff
3D DWF models	Yes (all automatic tools)	No
2D DWF sheets	Yes (Search Takeoff and Single-Click Auto Takeoff)	Yes
DWG sheets	No	Yes
PDF files (without password protection)	No	Yes
Image files (TIF, GIF, JPG)	No	Yes

### 1.2.3 Project

In QTO, a project is a collection of files and takeoff items that yield the material quantities needed for a construction or renovation job. Project files can include DWF files (2D sheets and 3D models), DWG files, and image files (TIFs, GIFs, and JPGs).

The typical workflow in QTO involves these steps:

- Create a project.
- Import and organize documents (DWF and non-DWF files).
- Set up the structure that will hold the takeoff data you create.
- Specify sheet scale and units (for non-DWF files).
- Create takeoff data.
- Validate takeoff data.
- Output takeoff data to reports, export files, or DWF files.

### 1.2.4 Graphical User Interface

By default, the toolbar is docked at the top of the QTO window, the Workbook is docked at the bottom, and frequently used palettes display as tabs at the left of the window (Figure 1).



Fig 1: Autodesk Quantity Takeoff

**Menu Bar**

The menu bar at the top of the QTO window gives you access to all available actions. Clicking a menu bar item displays a set of related commands (Figure 2).

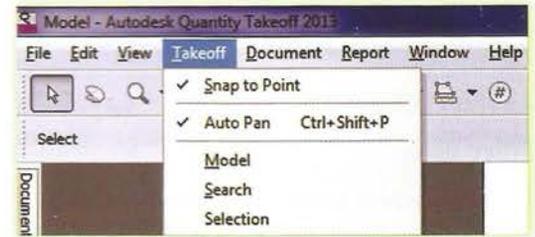


Fig 2: Menu Bar

**Toolbar**

Directly below the menu bar, the toolbar provides all the tools you need to navigate sheets and models, create takeoff data, and add markup. Using the takeoff tools, you can measure lengths and area, as well as count objects in project drawings (Figure 3).



Fig 3: Toolbar



Fig 4: Tool bar with Contextual Tool Palette

When you select a tool, tool options are displayed below the tool on the Contextual Tools palette. The Contextual Tools palette identifies the currently selected tool and provides access to tool options, such as line or fill color, opacity, hatch pattern, text color, and font size (Figure 4).

**Canvas**

The canvas is the large area in the middle of the QTO window, which displays the sheet or 3D model selected on the Documents palette. On the canvas, you create takeoff from sheets and models, annotate sheets using markup tools, and validate the completed takeoff data.

When displaying a 3D model, the canvas contains an additional screen element, ViewCube. Click the ViewCube to switch between standard and isometric views of your model. Use the compass ring on the ViewCube to orbit the model in any direction.

**Palettes**

The menu bar at the top of the QTO window gives you access to all available actions. Clicking a Project documents, takeoff data, and the tools you use to organize and view documents and data are arranged on palettes that display as tabs on the left side of the QTO window by default. Put the cursor on a tab to display the palette. If a palette is not shown in the QTO window, you can access it on the Window menu (Figure 5).

**Documents Palette**

The Documents palette is where you store and organize all sheets, models, and images for your project. The document you select on the Documents palette displays on the canvas. Project documents are organized in a folder structure that is similar to the navigation tree in Windows Explorer. You can add, rename, and delete folders to organize project documents.

Takeoff indicators display on document icons to identify sheets and models that contain takeoff data. The amount of takeoff contained in each document is displayed in the Takeoff column on the Documents palette. The values in the Takeoff column represent the sum of manual takeoff and visible automatic takeoff for each sheet and model. Automatic takeoff that is present in multiple views is counted for each document in which it is visible. The check box in the Legend column controls the visibility of sheet legends.



Fig 5: Window Menu

A legend is a reference table on a drawing sheet that lists and defines the colors used for takeoff markup on the sheet. You can add a legend to any 2D sheet in a QTO project.

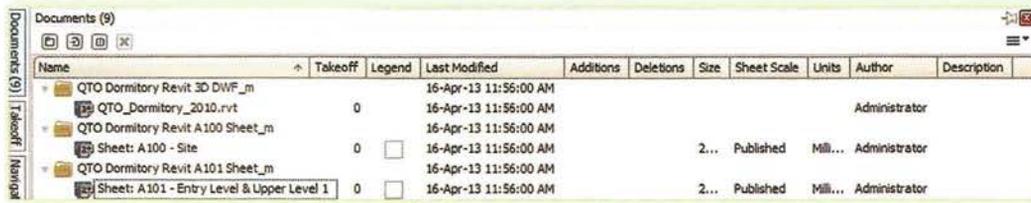


Fig 6: Document Palette

**Takeoff Palette**

The Takeoff palette is where you store and manage all takeoff data for a project. The data is organized in the following hierarchy, which forms the organizational structure of your project:

Like folders and subfolders, groups store takeoff data. In a typical construction takeoff, the information is organized by discipline, division, trade, or view type (such as plans, sections/elevations, and details). In QTO, this highest level of organization is represented by groups. You can create multiple levels of groups and subgroups.

Groups contain items, which are families of objects, such as interior walls and plumbing fixtures, to be measured and counted. Items contain objects, which are individual instances of the takeoff items in the sheets and models in your project. This hierarchy of groups, items, and objects is graphically represented in an expandable and collapsible navigation tree (Figure 7).

The left side of the Takeoff palette contains check boxes that you use to control whether takeoff graphics are shown or hidden on the canvas and whether takeoff data can be edited. Use the Takeoff palette context (right-click) menu to access another view option: The Views command locates and zooms in to a selected takeoff object.

**Navigator Palette**

When you are viewing a 2D sheet on the canvas, the blue frame on the Navigator palette outlines the area of the sheet that is currently in view. This can be helpful when you are working with a very large detailed sheet. The blue rectangle acts as a magnifying glass on the sheet. Drag it to reposition the view location on the canvas. At the bottom of the Navigator palette is a zoom control toolbar. Use the controls to zoom in or out by small or large increments (Figure 8).

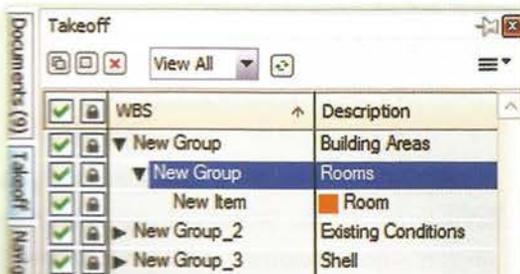


Fig 7: Takeoff Palette

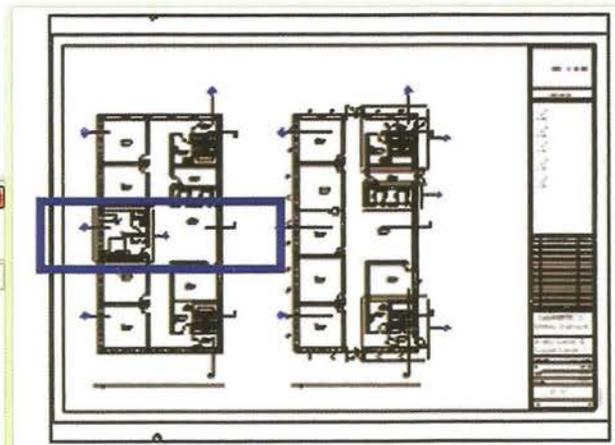


Fig 8: Navigator

### *Model Palette*

When you are viewing a 3D DWF file, the objects that are published from the design application display on the Model palette in a navigation tree.

You can make a selection at any level of the tree, and then right-click to access commands for filtering the display of the model on the canvas and for creating takeoff for the selected group, item, or object:

- **Hide:** Hides the selected object(s) from view
- **Hide Others:** Hides all objects from view except the selected object(s)
- **Show All:** Restores the default view of the model, with all objects shown on the canvas
- **Transparent:** Toggles the object display between transparent and opaque
- **Invert Selection:** Selects all objects except the object(s) selected on the Model palette
- **Takeoff:** Creates takeoff for a selected group, item, or object and places the results on the Takeoff palette
- **Takeoff to Item:** Adds takeoff results for selected items or objects to a specified item on the Takeoff palette

### *Bookmarks Palette*

The Bookmarks palette displays any bookmarks that were created in the drawing file by the design application from which the drawing file was published. Use bookmarks to navigate to published or user-specified locations in the sheet or model.

### *Layers Palette*

Use the Layers palette to show or hide layers that were created in the design application from which the drawing file was published.

### *Search Palette*

Use the keyword search feature on the Search palette to locate all occurrences of a word or phrase in sheets, models, takeoff groups, items, and objects. Use the navigational links in the search results to navigate to an item and view its takeoff data.

### *Workbook*

The Workbook palette is located at the bottom of the QTO window by default. Like other palettes in QTO, you can move the Workbook so that it displays as a tab on the side of the QTO window. Use the Workbook to view detailed takeoff data for the active sheet or the entire project.

The Workbook is organized by tabs that match the top-level groups (for example, disciplines, divisions, or trades) on the Takeoff palette. It contains one additional tab: the Summary tab, which is a compilation of all takeoff information for all categories.

**Note:** The units of measure that display in the Workbook are typically specified when you create takeoff items; however, you can modify them directly in the Workbook.

## **1.2.5** Cross-Selection of Objects

When you select takeoff geometry on the canvas, the corresponding object is selected both on the Takeoff palette and in the Workbook. Similarly, when you select an object on the Takeoff palette or in the Workbook, the takeoff geometry is selected on the canvas. This 3-way visual cross-referencing of objects—on the canvas, at the project level (Takeoff palette), and at the sheet or project level (Workbook)—can help you manage and validate takeoff data.

These are the rules that govern the visual cross-referencing of objects:

- A selected object is always highlighted in blue on the Takeoff palette and in the detail view of the Workbook.

- When the item that contains a selected object is collapsed, the item is highlighted in gray, indicating that it contains the currently selected object. On the Takeoff palette, expand the item to see the selected object. In the summary view of the Workbook, double-click the item to see the selected object.
- When the takeoff group that contains a selected object is collapsed, the group is not highlighted. Expand the group to see the highlighted item; expand the item to see the selected object.
- When an object is selected on the canvas, right-click, and click Locate Object to quickly find the corresponding item and object on the Takeoff palette. QTO expands groups and subgroups on the Takeoff palette, as needed, to expose and highlight the selected object. The object is also highlighted in the Workbook, but QTO does not expose it automatically as it does on the Takeoff palette.
- Cross-selection also works on DWF files published from QTO.

## 2.6 Modifying the Column Layout on Palettes

You can show/hide, resize, and sort columns on the Documents palette, on the Takeoff palette, and in the Workbook to manage the display of data. You can move columns on the Documents palette and in the Workbook. The column settings you specify persist from session to session.

### Hide or show a column:

- Right-click any column heading, and click the name of the column you want to hide or show.

### Change the width of a column:

- Put the cursor over the boundary on the right side of the column heading. The cursor changes to a double-headed arrow when the boundary is selected.
- Drag the boundary until the column is the width you want.

### Optimize the width of a column:

- Double-click a column boundary to change the column width to fit the contents.

### Sort columns:

By default, columns are sorted alphanumerically in ascending order.

- Click a column header to sort the values in the column alphanumerically in descending order.
- Click the column header again to sort it in ascending order.

### Change the column order:

On the Documents palette and in the Workbook, move any column (except the Description column) by selecting it and dragging it to a new position on the palette.

### Change the tab order in the Workbook:

Move any tab by selecting it and dragging it to a new position in the Workbook.

## 2.7 Adding additional Currencies

By default Autodesk Quantity Takeoff comes with the following currencies.



Fig 9: Currencies

To add additional currencies, you need to modify the 'Currencies.xml' file located at C:\Program Files\Autodesk\Quantity Takeoff 2013.

- Open the 'Currencies.xml' in a text editor (Figure 10).
- Add one more currency as follows.

<currency prefix="Rs." suffix="Indian Rupees" unit="" language="">Indian Rupees</currency> (Figure 11)

```
<?xml version="1.0" encoding="utf-8"?>
<qto>
  <definitions>
    <default currency="" unit="" />
    <currencies>
      <currency prefix="$" suffix="USD" unit="Imperial" language="ENU">US Dollar</currency>
      <currency prefix="€" suffix="EUR" unit="Metric" language="DEU">Euro</currency>
      <currency prefix="€" suffix="EUR" unit="Metric" language="FRA">Euro</currency>
      <currency prefix="¥" suffix="JPY" unit="Metric" language="JPN">Japanese Yen</currency>
      <currency prefix="R$" suffix="BRL" unit="Metric" language="PTB">Brazilian Real</currency>
      <currency prefix="£" suffix="GBP" unit="" language="">Pound Sterling</currency>
      <currency prefix="SFr." suffix="CHF" unit="" language="">Swiss Franc</currency>
      <currency prefix="NZ$" suffix="NZD" unit="Metric" language="">New Zealand Dollar</currency>
      <currency prefix="AUS" suffix="AUD" unit="Metric" language="">Australian Dollar</currency>
    </currencies>
  </definitions>
</qto>
```

Fig 10: Currencies.xml

```
<?xml version="1.0" encoding="utf-8"?>
<qto>
  <definitions>
    <default currency="" unit="" />
    <currencies>
      <currency prefix="$" suffix="USD" unit="Imperial" language="ENU">US Dollar</currency>
      <currency prefix="€" suffix="EUR" unit="Metric" language="DEU">Euro</currency>
      <currency prefix="€" suffix="EUR" unit="Metric" language="FRA">Euro</currency>
      <currency prefix="¥" suffix="JPY" unit="Metric" language="JPN">Japanese Yen</currency>
      <currency prefix="R$" suffix="BRL" unit="Metric" language="PTB">Brazilian Real</currency>
      <currency prefix="£" suffix="GBP" unit="" language="">Pound Sterling</currency>
      <currency prefix="SFr." suffix="CHF" unit="" language="">Swiss Franc</currency>
      <currency prefix="NZ$" suffix="NZD" unit="Metric" language="">New Zealand Dollar</currency>
      <currency prefix="AUS" suffix="AUD" unit="Metric" language="">Australian Dollar</currency>
      <currency prefix="Rs." suffix="Indian Rupees" unit="" language="">Indian Rupees</currency>
    </currencies>
  </definitions>
</qto>
```

Fig 11: Modified Currencies.xml

- Save and Close.

Note: It's advisable to make a backup copy of the Currencies.xml file prior to making any modifications

### 1.3 Preferences

Use the Preferences dialog to control the display and behavior of the following application components: user data, dialogs and alerts, models, property mapping, item types and assignments, and automatic project file backups. Use the controls on the tabs in the Preferences dialog to select options for each component.

To specify preferences:

1. Click Edit menu » Preferences.
2. On the User Data tab, enter your name and company name (Figure 12).
3. On the Model tab, specify the following view settings:
  - a. **Enable Hardware Acceleration:** Select if you want to take advantage of any performance enhancement that is possible with your graphics processor. The new setting will take effect when you navigate back to the current sheet after navigating to a different one.
  - b. **Enable Takeoff Model Color:** Selected by default, this option enables the takeoff color-coding of 2D views in 3D views. Autodesk Quantity Takeoff must be restarted if you clear this option.
4. On the Mapping tab:
  - a. For Publisher, select either AutoCAD-based or Revit-based to identify the source of the design documents.
  - b. For Language, select the language to use for the property names.
  - c. If you want to modify any property names, double-click the current value, and enter a new name.
5. On the Item Type tab, after you have run model takeoffs, you can review the item types you specified for design items when defining model takeoff data, and delete any item preferences that you do not want applied to future model takeoffs. To delete an item preference:
  - a. Select the item preference, and click Delete.
  - b. When prompted to confirm the deletion, click Yes.
6. On the Auto Save tab, if you want your QTO project to be saved automatically, select Enable Auto Save, and specify the frequency for saves by selecting a number of minutes. Automatically saving your project can minimize

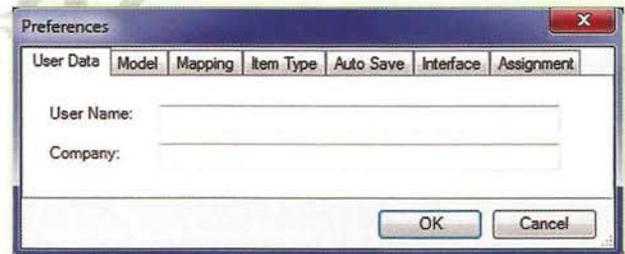


Fig 12: Preferences

data loss if you experience a hardware or software crash while the project is open. When you enable auto saves, the timer starts as soon as you click OK. After the specified number of minutes has elapsed, the current project is saved to the backup copy of the project file, which is in the same folder as the original project file.

7. On the Interface tab, select the check boxes next to the dialogs and alerts you want the application to display. For example, if you want the Quick Start dialog to display each time you launch QTO, select Quick Start.
8. On the Assignment tab, if you have created assignments, you can review these relationships between model takeoff items and catalog items (shown in the Assigned To column), and delete any assignment preferences that you do not want applied to future model takeoff results. Items are listed in ascending alphabetical order, based on the label style you specify (either Item Only, Item and Parent Group, or Item and Root Group). To delete an assignment preference:
  - a. Select the assignment preference, and click Delete.
  - b. When prompted to confirm the deletion, click Yes.

## 4 Creating a New Project

A QTO project is a collection of drawing files and takeoff items that yield the material quantities needed for a construction renovation job. Drawing files can include both DWF and non-DWF files. Takeoff items are typically organized in a catalog, grouped by disciplines, divisions, trades, or other categories.

- Start Autodesk Quantity Takeoff.
- Select 'New Project' in the 'Quick Start' Dialog (or) File menu » New (Figure 13).
- In the Project Setup Wizard dialog » Name Project page, assign the working directory and project name. Click Next (Figure 14).

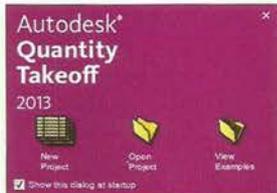


Fig 13: Quick Start Dialog



Fig 14: Name Project

- In the Project Settings, select the unit system and the currency. Select 'Set as default,' if you want to save this settings as default for new projects (Figure 15).
- On the Select Catalog page, browse to C:\Program Files\Autodesk\Autodesk Quantity Takeoff 2012\Help\Getting Started (Metric)\Getting Started\_metric.att and Import. Click Next (Figure 16).

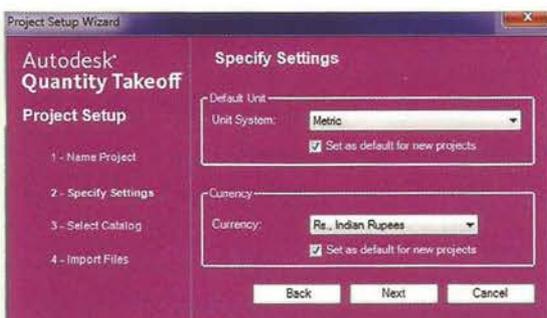


Fig 15: Unit System and Currency Settings

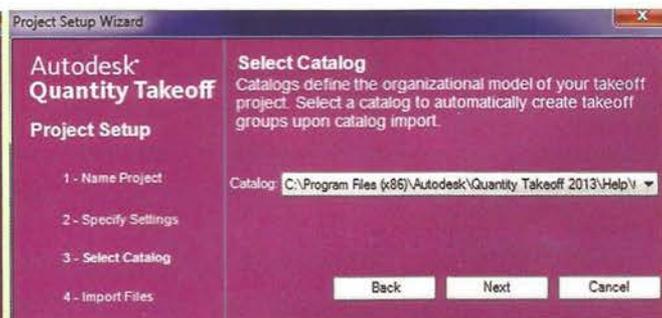


Fig 16: Catalog

- In the Import Files dialog, Add the given \*.dwf file.
- Finish
- The project is created, and a message notifies you that the project is ready to use. Click Close.
- The project opens. Because you selected a catalog to import, QTO now gives you the opportunity to specify the exact catalog content to import (Figure 17).
- Select the required content and click OK (Figure 18).

### 1.4.1 Project Settings

The Project Settings dialog contains separate tabs where you can specify the security, units, takeoff, and time settings for a project, as well as view the currency system you specified for the project when you created it (Figure 19)



Fig 17: Catalog Content to Import

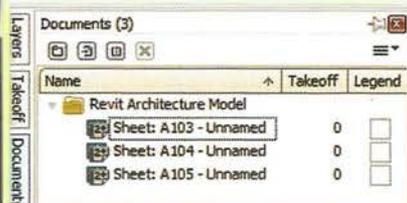


Fig 18: Imported Documents



Fig 19: Project Settings

#### Security

You can add or remove password protection for a project at any time. When you add password protection to a project, any user attempting to open the project must first enter the designated password. To add password protection to a project:

1. Open the project.
2. Click File menu » Settings.
3. In the Project Settings dialog, click the Security tab.
4. Select Password Protect this File.
5. For Password, enter a password.
6. For Re-Enter Password, enter the same password you entered above.
7. Click OK.

To remove password protection from a project:

1. Open the project.
2. Click File menu » Settings.
3. In the Project Settings dialog, on the Security tab, clear Password Protect this File.
4. Click OK.

#### Units

These rules govern changes to project units on the Units tab of the Project Settings dialog:

- **Unit System:** You cannot change the unit system (imperial or metric) that was specified when the project was created.
- **Quantity Units:** These are the default measurement units that are used for new items and items with an Undefined item type. Changing the Quantity Units values has no effect on existing, defined takeoff items. Therefore, if you change the Quantity Units values after takeoff data has been created, existing measurements for defined items

on the Takeoff palette and in the Workbook will not be converted to the new units. To change the measurement units for defined items, use the Takeoff Item Properties dialog.

- **Canvas Display Unit:** You can change the display unit at any time, and the units that are displayed for existing takeoff measurements on drawings will reflect the new unit (Figure 20).

**Currency**

These rules govern changes to currency settings on the Currency tab of the Project Settings dialog:

- **Currency:** You cannot change the currency system that was specified when the project was created.
- **Use Long Format:** You can change the currency format (short or long) at any time.

**Takeoff**

Use the Takeoff tab of the Project Settings dialog to control the default linear thickness and label size for the current takeoff project.

1. Click File menu » Settings.
2. In the Project Settings dialog, click the Takeoff tab.
3. Specify the default thickness for linear takeoff. To use the specified lineweight for all linear takeoff, select Always use default thickness.
4. Under Label Defaults, specify the default settings for label font size and color. Also specify the contents of the label which can be a combination of WBS information and quantities, or neither.
5. Click OK (Figure 21).

Note: When you change the takeoff defaults, any new takeoff that you create will reflect the new default settings. Existing takeoff measurements on drawings are not updated to reflect new lineweight and label size settings.



Fig 20: Units

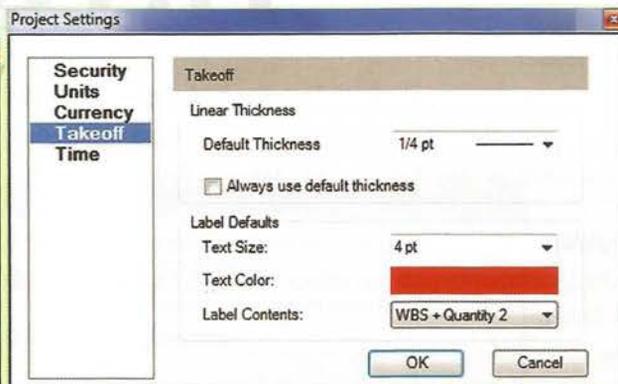


Fig 21: Takeoff

**Time**

The values entered on the Time tab of the Project Settings dialog are used to calculate time-based costs associated with items. By default, time calculations are based on 8 work hours in a day, 40 in a week, and 160 in a month. However, you can edit these values and, thereby, change the multipliers in cost calculations that involve time. For example, if you specify a work day of 7 hours instead of 8, your work week will be calculated as 35 hours, and your month as 140 hours.

1. Click File menu » Settings.
2. In the Project Settings dialog, click the Time tab.
3. On the Time tab, specify the number of hours in a standard work day, week, and month for the current project.
4. Click OK.

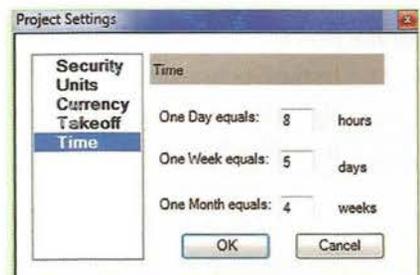


Fig 22: Time

Note: When you change the time defaults, items with hourly costs in the **current project** are recalculated, and the updated costs display in the Workbook.

### 1.4.2 Organizing Your Project

When you create a project, the documents you import are organized in folders on the Documents palette. After creating the project, you can import additional documents. You can also move, rename, and delete documents and folders at any time during the project life cycle, but it is generally best to organize project documents before you start the takeoff process.

#### To add a top-level folder

- On the Documents palette, click New Folder. You can also right-click an empty area of the palette, and click New Folder.
- Enter a folder name, and press ENTER.

#### To add a subfolder

- On the Documents palette, select the folder where you want to create a subfolder, and click New Folder. You can also right-click the folder where you want to create a subfolder, and click New Folder.
- Enter a folder name, and press ENTER.

#### To move documents to a folder

- On the Documents palette, expand the folders that contain the documents you want to move.
- While pressing CTRL, select all the documents to move to a folder.
- Drag and drop the selected documents into the folder.

#### To rename a folder

- On the Documents palette, select the folder to rename, right-click, and click Rename. You can also select the folder, and click in the Name column to enter editing mode.
- Enter a name for the folder, and press ENTER.

#### To delete a folder

- On the Documents palette, select the folder to delete, and click Delete. You can also right-click the folder, and click Delete.
- In the alert dialog, click Yes.

#### To delete a document

- On the Documents palette, select the document to delete, and click Delete. You can also right-click the document or folder, and click Delete.
- In the alert dialog, click Yes.

#### In the previously created project;

- In the Document palette, select the folder and right click. Select the 'Rename' tool to rename it as 'Plan Views'.

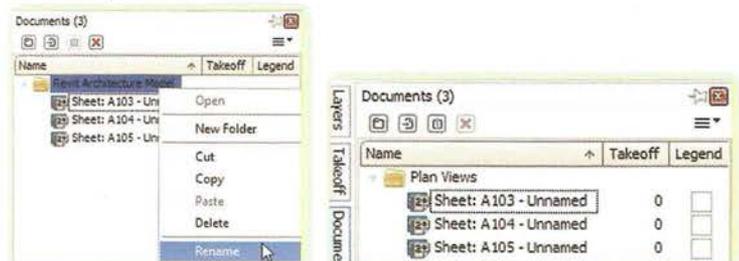


Fig 23: Folder Rename

- Right Click on the Document palette and create two more new folders with the name of 'Elevation Views' and 'Section Views' (Figure 24).
- Select and Drag the sheets to the respective folders (Figure 25).
- Rename the sheets as follows (Figure 26).

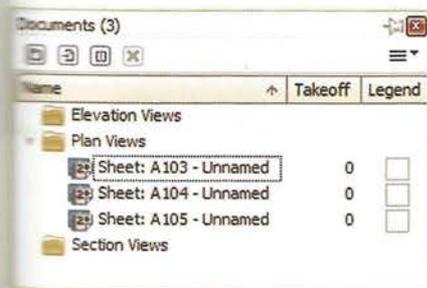


Fig 24: New Folders

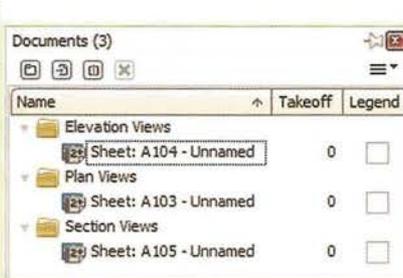


Fig 25: Organizing the Folders

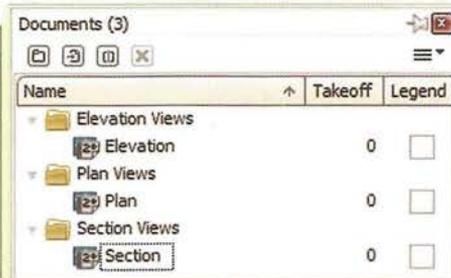


Fig 26: Sheet Rename

## 3 Creating a Catalog

When you created your project, you based it on the Getting Started catalog, which populated the Takeoff palette with takeoff groups and items. You can add, delete, and rename groups and items to customize the Takeoff palette for your project. After you customize the Takeoff palette, you export it as a catalog, which can be used in other projects. In the previously created project;

### Delete unneeded takeoff groups:

- On the Takeoff palette, click the 'Unlock all' icon in the column header next to Description, and click 'Yes' when prompted to confirm the unlocking. This unlocks the catalog, allowing you to make changes. You can also lock/unlock takeoff groups and items individually.

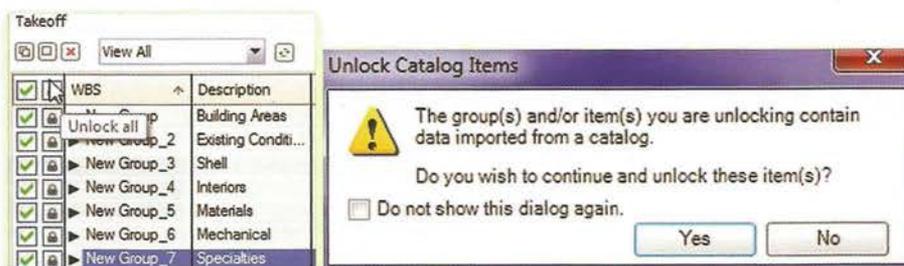


Fig 27: Unlock Catalog Items

- Select and Delete the following Catalog Items.
  - Specialties
  - Mechanical
  - Existing Conditions

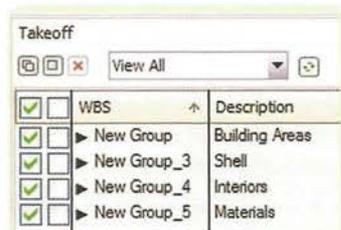


Fig 28: Catalog Items

Note: As you saw in an earlier exercise when importing a catalog, you can exclude groups from your project catalog by clearing check boxes in the Select Items to Import dialog. Takeoff groups, whether created through the catalog import process or with tools on the Takeoff palette, can be deleted at any time. If you attempt to delete a group or item that contains takeoff data, QTO alerts you that your selection contains takeoff data and prompts you to confirm the deletion.

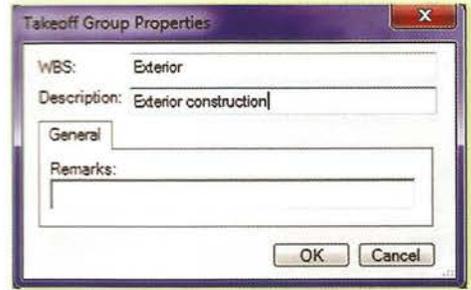


Fig 29: Group Rename

**Rename a takeoff group:**

- To rename a group, right click on that and select properties. For this practice, click on 'Shell'.
- Enter the following.
  - WBS = Exterior
  - Description = Exterior Construction (Figure 29)

**Add takeoff groups:**

- On the Takeoff palette, click an empty area of the palette and click New Group (Figure 30).
- Assign a Name and press Enter (Figure 31).
- Select the created Group and click New Group (Figure 32).
- Assign a name for the created sub-group (Figure 33).



Fig 30: New Group



Fig 31: New Group



Fig 32: New Group



Fig 33: New Subgroup

- Repeat the steps to create some other groups and sub-groups.

**Export a takeoff catalog:**

- Select File menu » Export Catalog (Figure 34).
- In the Save as Catalog dialog, navigate to a location to save the created Catalog.
- Enter a File name and click Save.

The hierarchical structure of the groups and item data displayed on the Takeoff palette is saved in the catalog. Modifying a standard catalog and saving it with a new name is an efficient way of creating catalogs to meet the requirements of your project or office standard. Use catalogs to ensure a consistent data structure across QTO projects within your organization.

**Import a Catalog:**

You can import takeoff groups and item names into the Takeoff palette from a catalog or a spreadsheet. If any imported group or item name is the same as a name that is already on the Takeoff palette, a numerical suffix is added to the name of the imported group or item to prevent duplicate names.

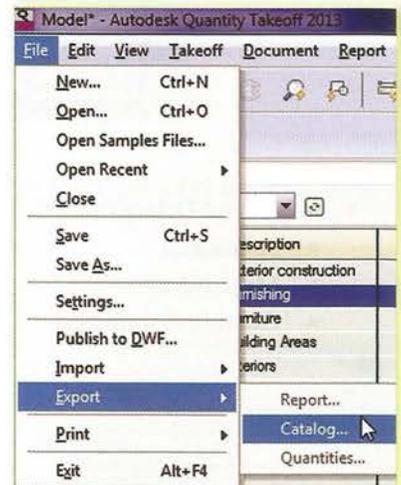


Fig 34: Export Catalog

1. Click File menu » Import » Catalog.
2. In the Import Catalog dialog, navigate to the ATT, CSV, or TXT file, and click Import. If you have installed a supported estimating application, you may also see a file extension that is specific to that application.
3. In the Select Items to Import dialog:
  - a. Expand groups to see any items they contain. Clear the check boxes for groups and items you want to exclude from your project.
  - b. To save your selections as catalog preferences that can be used when you import the same catalog in the future, select Save selection with catalog (\*.att option). If you do not save your selections with the catalog, during future imports, all categories will be selected by default; however, you can still choose to include or exclude them as needed.
  - c. Click OK.

Upon import, the selected groups become top-level groups on the Takeoff palette, and they contain the items you selected. If the Takeoff palette was empty before you imported this catalog, all groups are locked by default. Otherwise, only the newly imported groups are locked.

On the Takeoff palette, unlock the groups or items that you want to modify. If all groups are locked, you can unlock all groups and their associated items by selecting Unlock All next to the Description column header and clicking Yes to confirm the unlock operation.

#### **To import spreadsheet data:**

1. Verify that the data is in a comma-separated format and saved as a CSV file.
2. Click File menu » Import » Catalog.
3. In the Import Catalog dialog, navigate to the CSV file, and click Import.

## **1.6 Creating and Organizing Work Breakdown Structure Takeoff Groups**

Customize the Takeoff palette to suit your project requirements or office standard by adding, moving, merging, renaming, and deleting Work Breakdown Structure (WBS) groups for your takeoff items. WBS groups are shown on the Takeoff palette and in the workbook as an alphabetized organizational column. The information is also listed on the Properties palette when an item is selected. Create subgroups within WBS groups to refine the organizational structure you need.

**Note:** After you have customized the Takeoff palette, you can export it as a catalog for use in other projects.

#### **To create a top-level WBS group**

1. On the Takeoff palette, click an empty area of the palette so that nothing is selected, and click New Group. You can also click palette menu » New Group, or right-click and click New Group.
2. Enter a name for the WBS group, and press ENTER. The WBS group is created at the root of the Takeoff palette and displays in the far left column.

#### **To create a subgroup with the New Group command**

1. On the Takeoff palette, select the WBS takeoff group or subgroup for which you want to create a subgroup, and click New Group. You can also click palette menu » New Group, or right-click and click New Group.
2. Enter a name for the subgroup, and press ENTER. The subgroup displays below the group. It is indented to show that it is contained within the higher-level group.

**To create a subgroup by moving one group into another**

1. On the Takeoff palette, select the group you want to become a subgroup.
2. Drag and drop the selected group on top of the group you want to contain it. The subgroup is contained within the group. Expand the higher-level group to see the subgroup.

**To duplicate groups or subgroups**

1. On the Takeoff palette, right-click the group or item you want to duplicate.
2. Select one of the following.
  - a. To duplicate a group, its items, and its objects, select Duplicate.
  - b. To duplicate just the group and its items, select Duplicate Without Objects.

**To merge groups or subgroups**

1. On the Takeoff palette, select the takeoff groups or subgroups to merge. You can merge a set of groups or a set of subgroups, but you cannot merge a mixed set of groups and subgroups.
2. To select a set of consecutive groups, press and hold SHIFT while selecting the groups. To select a set of non-consecutive groups, press and hold CTRL while selecting the groups.
3. Right-click, and click Merge. You can also click palette menu » Merge. The selected groups are merged into a single group, which is selected on the Takeoff palette.

Note: All selected groups are merged into the last group you select.

**To rename groups or subgroups**

1. On the Takeoff palette, select the takeoff group or subgroup to rename.
2. Select one of the following methods.
  - a. Click in the Description column of the selected group or subgroup to enter editing mode.
  - b. Double-click the group or subgroup to open the Takeoff Group Properties dialog, where you can enter a new name as well as remarks.
  - c. Right-click the group or subgroup and select a new label from Relabel Descriptions. You can choose Same Label for All, Label + Numbers, or Numbers only.

**To delete a group**

1. Determine whether the group contains takeoff data that you want to retain.
2. On the Takeoff palette, select the group to delete, and click Delete. You can also right-click the group, and click Delete.
3. To delete multiple takeoff groups, press and hold CTRL, select the groups, and click Delete.

Note: If you delete a group that contains takeoff data, the data is deleted from the project.

## 1.7 Takeoff Items

QTO uses a takeoff item to represent a specific material or unit summarized in a materials list or catalog. Takeoff items can be simple, such as a door, or more complex, such as a wall assembly, which is made up of several component items. The manner in which takeoff is calculated for each item is determined by the item type you specify when you create the item. The following item types are available:

- **Linear:** A linear takeoff item yields a linear measurement. Examples of this item type include trim and beams.
- **Area:** An area takeoff item yields an area calculation. Examples of this item type include flooring and carpet.

- **Volume:** A volume takeoff item yields a volume calculation. Examples of this item type include concrete slabs and rooms. Objects with this item type can be created only by automatic takeoff tools.
- **Count:** A count takeoff item yields a total number. Examples of this item type include doors, windows, and furnishings.
- **Undefined:** This is the default type for a newly created takeoff item. Undefined items are not counted or measured when you use takeoff tools. Change the item type to create a valid takeoff item that can be counted or measured.

**To create a takeoff item**

1. On the Takeoff palette, select the group or subgroup in which to create the item, and click New item. You can also click palette menu » New Item, or right-click and click New Item.
2. Enter a descriptive name for the item, and press ENTER. The new item is added to the selected group or subgroup.
3. For Type, select the calculation to use for the item.
4. Double-click the new item to open the Takeoff Item Properties dialog (Figure 35).

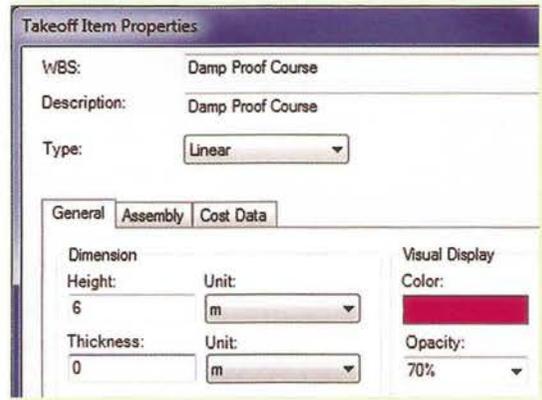


Fig 35: Takeoff Items Properties

- a. Under Dimension, enter values for all applicable dimensions, and select corresponding units of measure. The Dimension section of the General tab is populated with dimensions that are appropriate for the item type you selected when you created the item. If you change the item type, the dimension fields update dynamically.
  - b. Under Visual Display, modify the default values as necessary. When you click the default color, the Color dialog opens, where you can select a different standard color or create a custom color for the display of the takeoff item. The Opacity percentage controls the depth of color applied to the color block that is displayed on the Takeoff palette (and optional sheet legend) for the item. The higher the opacity percentage, the darker the color block. For items with an Area item type, you can assign hatch patterns (area fill motifs) and control hatch angle and scale. For Count items, you can specify the size and shape of count symbols that display on drawings when you create takeoff for the item.
  - c. Under Remarks, add any additional information that is helpful in defining the item. Remarks can be included in custom reports, which you can export to several common file formats.
6. On the Assembly tab, you can specify existing items that are component parts of the item you are defining.
  7. On the Cost Data tab, specify the per unit or lump sum costs (and optional time values) that will be used to calculate the Material Cost, Labor Cost, Subcontractor Cost, and Equipment Cost associated with the item (Figure 36).



Fig 36: Cost Data

- a. Under Cost Quantities, Quantity 1 is the primary quantity for the item. The Quantity 1 value is fixed, based on the item type you selected. Quantity 2 is the secondary quantity, which you can use to produce quantities based on the dimensions specified on the General tab. If you enter a value for Quantity 2, select a corresponding unit of measure.

- b. For Time, enter the amount of time needed to construct the item. Time can be computed on either a per unit or lump sum basis. To compute time on a per unit basis, enter a time value, and then select a QTO quantity as a multiplier: To compute time on a lump sum basis, enter a time value (such as 5 days), and then select 1 as the multiplier.
- c. For Material Cost, enter the cost of raw materials for the item, either on a per unit or lump sum basis.
- d. For Labor Cost, enter the labor cost for installation, either on a per unit, lump sum, or hourly basis.
- e. For Subcontractor Cost, enter the cost of subcontracted labor, either on a per unit, lump sum, or hourly basis.
- f. For Equipment Cost, enter the cost of purchased or rented equipment needed for installation. As with the other costs, Equipment Cost may be entered either on a per unit, lump sum, or hourly.

Calculation Type	Cost	Value
Per Unit	Cost per unit of measure (for example, if the item cost is 12 per sq ft, enter 12)	Qty 1 or Qty 2 (whichever unit of measure matches the cost you entered)
Lump Sum	Total cost of item	1
Hourly	Cost per hour (for installer or equipment)	Hours

## 1.8 Creating an Assembly

Takeoff items that contain component items are called assemblies. For example, if an interior wall item is created as an assembly, you can expand the wall item in the Workbook and view the component items that make up the wall, such as gypsum wallboard, wood studs, and insulation. Before creating an assembly item, make sure all of the assembly components have been added to the Takeoff palette.

### HANDS-ON

Create a takeoff item and an assembly on the Takeoff palette (Figure 37).

- On the Takeoff palette, select Interiors » Floor Finishes, and click 'New item'.
- Rename the item as follows. And press Enter.
  - WBS = Floor
  - Description = Carpet
- The carpet item is added to the Floor Finishes subgroup. For Type, select Area (Figure 38).



Fig 37: New Item



Fig 38: New Item Type

- Double-click the new item. In the Takeoff Item Properties dialog, select a color shade, hatch pattern, angle and scale (Figure 39).
- On the Cost Data tab, enter the following.
  - Material Cost = 5.00; Multiplier = Qty 1 (Area)
  - Labor Cost = 2.00; Multiplier = Qty 1 (Area)
  - Equipment Cost = 20.00; Multiplier = 1 (Figure 40)

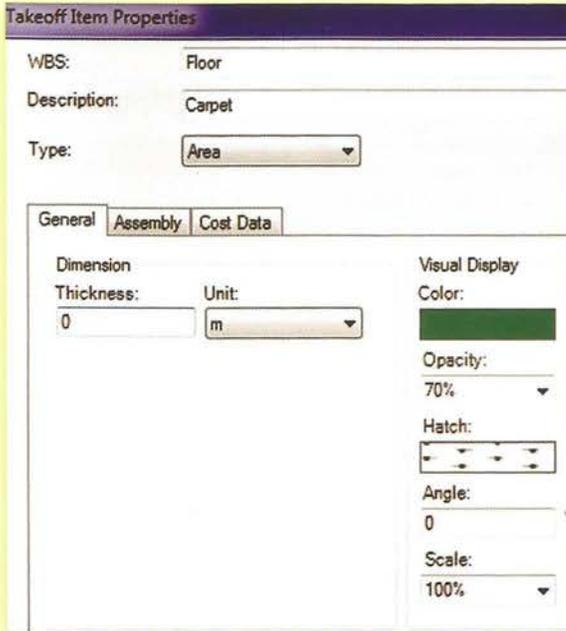


Fig 39: Takeoff Item Properties

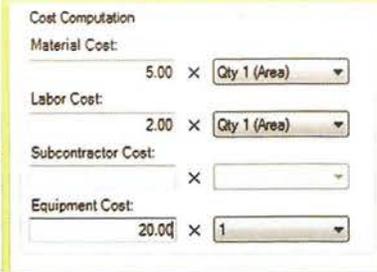


Fig 40: Cost

- Click OK.

**Create an item by copying a similar item:**

- On the Takeoff palette, expand Materials Woods, Plastics and Composites (Figure 41).
- Select 2440mm Wood Studs 50 x 100mm, right-click, and click Duplicate. Copy of 2440mm Wood Studs 50 x 100mm is added to the Takeoff palette (Figure 42).

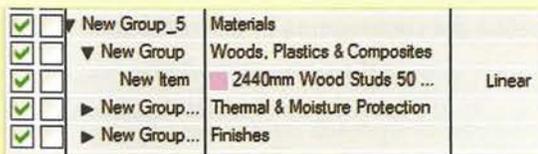


Fig 41: Materials



Fig 42: Duplicate

- Double-click Copy of 2440mm Wood Studs 50 x 100mm. In the Takeoff Item Properties dialog, enter the following.
  - Description = 2440mm Wood Studs 50 x 150mm
  - Type = Count
  - Height = 2440; Unit = mm
  - Thickness = 50, Unit = mm
  - Material Cost = 4.00, Multiplier = Qty 1 (Count)
  - Labor Cost = 5.00, Multiplier = Qty 1 (Count)

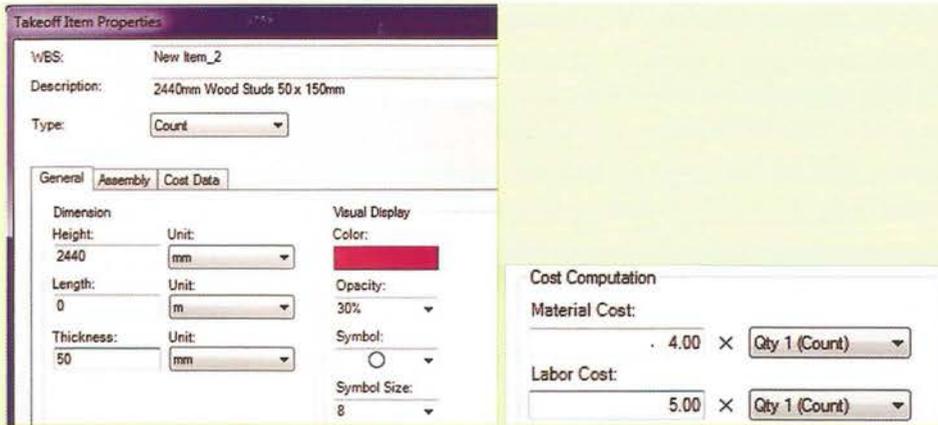


Fig 43: Takeoff Items Properties

- Click OK.

**Create an interior wall assembly:**

- On the Takeoff palette, under Interiors, select Partitions, and click New item (Figure 44).



Fig 44: Interiors-Partitions

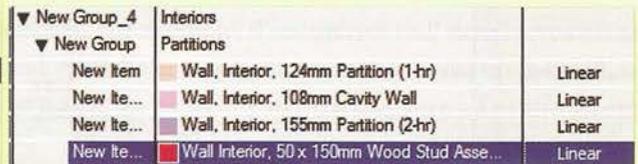


Fig 45: New Item

- In the Takeoff Item Properties dialog, enter the following.
  - General tab:
    - Height = 2440; Unit = mm
    - Thickness = 150; Unit = mm
    - Color = <select a color>
  - On the Assembly tab:
    - Create a New Unit. In the Browse dialog, select the components by doing the following:
      - Expand Materials, and expand the subgroups to display the component items.
      - While pressing CTRL, select the following: Gypsum Board, 16mm; Insulation Fiberglass, Blanket, R-19; and 2440mm Wood Studs 50 x 150mm.
      - Click Select (Figure 46).
- In the Takeoff Item Properties dialog, click Apply (Figure 47).



Fig 46: Assembly

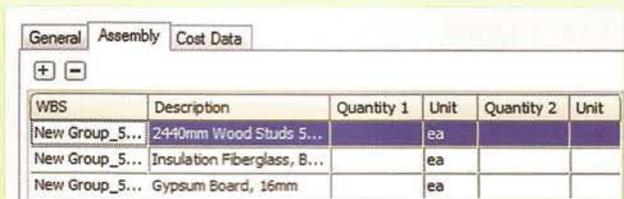


Fig 47: Assembly

The interior wall assembly is created. Next, you add formulas for the components, which will allow the software to calculate item quantities and costs. The costs you specify for the components of an assembly supersede any costs you specify for the assembly item itself.

- For Gypsum Board, 16mm, click in the Quantity 1 column. In the Formula Editor: For Quantity Values, select Area. The value is displayed in the fx field, and the formula is displayed below it. All formulas begin with an equal sign (=).
- For Operators, select /.
- In the fx field, after Area/, enter 2.88.
- Finish (Figure 48).

Note: For a standard 1220 x 2440 mm sheet of gypsum wallboard (2.88 square meters), the formula to determine the number of sheets needed for one side of a wall is  $\text{Area}/2.88$ . If you want to calculate the number of sheets needed for both sides of a wall, you would enter  $(\text{Area}/2.88) \times 2$ .

- In the Takeoff Item Properties dialog, for Gypsum Board, 16mm, click in the Unit column, and select ea. This is the unit of measure that the software will use when calculating the count formula.
- Using the same method, specify formulas for the other components:
  - Insulation: For Formula, specify  $\text{Area}/.702$ , and for Unit, select ea. (This is the area of a standard 2340 x 300mm batt of insulation, converted to square meters.)
  - 2440mm Wood Studs 50 x 150mm: For Formula, specify  $\text{Length}/.406$ , and for Unit, select ea. (This calculation allows for a stud every .406 m.) (Figure 49)

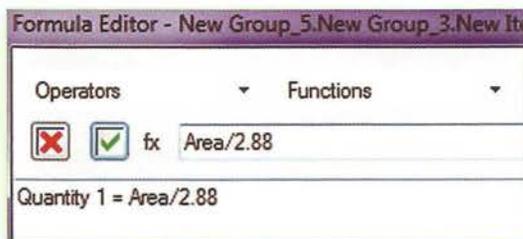


Fig 48: Formula

WBS	Description	Quantity 1	Unit
New Group_5...	2440mm Wood Studs 5...	Length/.406	ea
New Group_5...	Insulation Fiberglass, B...	Area/.702	ea
New Group_5...	Gypsum Board, 16mm	Area/2.88	ea

Fig 49: Formulas

- Click OK.

## 19 Quantity Takeoff

QTO provides a comprehensive set of takeoff tools for use with 3D DWF models, 2D DWF sheets, DWG sheets, PDFs, and image files (TIFs, GIFs, and JPGs). The type of document you select on the Documents palette determines the tools that are available for automatic and manual takeoff (or) on-screen takeoff.

Document Type	Automatic Takeoff	Manual Takeoff
3D DWF model	Yes	No
2D DWF sheet	Yes (except Model Takeoff)	Yes
DWG sheet (from DWG TrueView™)	No	Yes
PDF or image file (TIF, GIF, JPG)	No	Yes (except Single-Click Linear Takeoff)

QTO generates quantities for model objects by extracting their embedded design data and mapping it to dimensions in the catalog. As you work, notice that some dimensions are mapped automatically, based on item type. The item type defines the primary dimension of the item; for example, by default, Linear items are mapped to Length. Each dimension is also mapped to a default object property, which is the property that is measured during takeoff. Default object properties are specified on the Mapping tab of the Preferences dialog. By default, linear objects are mapped to the Length property. Therefore, if a linear object contains a Length property; the length of the object is measured and reported during takeoff.

Some Linear objects, such as interior walls, have additional linear properties, such as Width and Unconnected Height. When additional properties are available for an object, they display in the dimension columns. You can select a different property to change the property that is measured during takeoff.

Some objects do not contain the default property. In this case, the primary dimension value is Undefined on the Takeoff palette and no measurement can be generated for the object. By specifying a property for the primary dimension, you can generate a takeoff measurement for the object. If an object does not contain a mappable property, you must enter an override in the Workbook to create a measurement for the object.

### 1.9.1 Automatic Takeoff Tools

Use automatic takeoff tools with 3D DWF models and 2D DWF sheets. These tools create takeoff data using the design data embedded in the DWF files by publishing applications. These tools are:

- **Model Takeoff:** This tool, which can be used only with 3D DWF files, extracts the object tree from the model and adds it to the Takeoff palette. The items that are created by the Model Takeoff tool are placed in a takeoff group whose name is based on the model name. You create valid takeoff for these items by dragging them to a defined area (root, group, or item) on the Takeoff palette.
- **Search Takeoff:** This tool, which can be used with 3D models and 2D sheets, creates takeoff data for multiple items based on search criteria you define. Using the tool, you select a piece of geometry on a sheet and specify search criteria based on the object's design data. The software finds all objects in the project that match the search criteria. The geometry and properties for the objects are loaded into the Takeoff palette item. Select an item on the Takeoff palette prior to starting a search takeoff to have the results added to that item and named based on the item's family or style.
- **Single-Click Auto Takeoff:** This tool, which can be used with 3D models and 2D sheets, lets you create a takeoff measurement with a single click on a piece of geometry.

### 1.9.2 Manual Takeoff Tools

Manual takeoff tools can be used with 2D DWF sheets and non-DWF files, such as PDF and TIF files. They measure drawing geometry to create takeoff data. These tools are:

- **Linear Takeoff:** This group of tools lets you record linear measurements by tracing lines on a floor plan. Using the Single-Click Linear Takeoff tool, you can create a linear measurement by clicking on a line.
- **Area Takeoff:** This group of tools lets you record area measurements by tracing geometry on a floor plan.
- **Count Takeoff.** Use this tool to tally and record occurrences of objects, such as windows and doors, that you want to quantify on a floor plan.
- **Backout Takeoff.** This group of tools lets you refine takeoff data by subtracting from previously recorded counts or measurements.

### 19.3 Specifying Sheet Scale

DWF files have a scale that is set when the file is published. That scale is reflected in the measurements that are calculated and displayed in QTO. You cannot change the scale of a drawing when the scale is set by the authoring application.

For PDFs and image files (TIF, GIF, JPG), you must specify the sheet scale before you can use the manual takeoff tools for linear or area measurements. Without a sheet scale, only the Count Takeoff tool is available. You can select a predefined scale, if known, or set the precision manually by plotting points in a drawing.

For both DWF and non-DWF files, you can specify drawing units.

#### Predefined scale for an image file

You can select a predefined scale for an image file, if the scale of the original drawing is known to you.

- On the Documents palette, select the image file, right-click, and click Properties.
- In the Document Properties dialog, click the Units and Scale tab and select the following.
  - Scale Style = Engineering.
  - Drawing Units = Millimeters.
  - Sheet Scale = <select the suitable scale> and click OK (Figure 50).

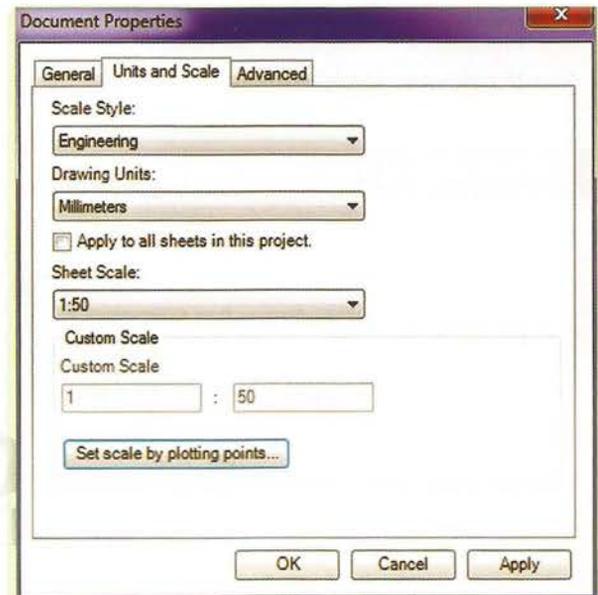


Fig 50: Units and Scale for an Image file

#### Manual Scale

When you do not know the scale of the original drawing, set the scale of the image file manually by plotting points in the drawing. Specifying the scale calibrates the manual takeoff tools to resolve distortions in scanned image files.

1. On the Units and Scale tab of the Document Properties dialog:
  - a. For Drawing Units, select a unit.
  - b. In the Sheet Scale select 'Custom'.
  - c. To make this drawing unit the default for the project, select Apply to all sheets in this project.
  - d. Click Set scale by plotting points (Figure 51).
2. In the Set Scale by Plotting Points dialog, for Baseline Segment Length, enter the known dimension of an object.
3. On the canvas, trace the size of the object as the baseline segment. QTO records the measured length of the segment, and calculates the scale of the drawing. If you change the length or unit of measure of the baseline segment, the scale calculation updates dynamically.

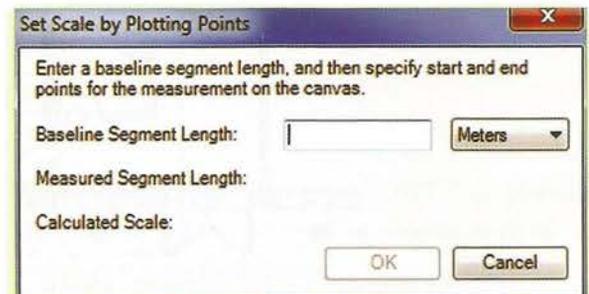


Fig 51: Set Scale by Plotting Points

### 19.4 Specifying Drawing Units

A drawing has both drawing units and display units. Drawing units are specified at the sheet level, as explained in this section. Display units, which are the units displayed in takeoff measurements on drawings, are specified at the project level.

Drawing units are the units of measurement for a sheet. The value you specify for drawing units is based on paper size. Typical values are inches, centimeters, and millimeters. For example, an 8-inch by 10-inch drawing uses inches for drawing units. For scanned drawings, the drawing units are determined by the size of the original sheet. The ratio of paper size to real-world units represents the scale of the drawing. For example, a one-inch object on a sheet with a scale of 1"=100' represents a real-world object that is 100 feet long. When you specify drawing units for a sheet, you can apply the units to all sheets in the project.

**To specify drawing units**

1. On the Documents palette, select a drawing.
2. Click Document menu » Units and Scale. You can also select the drawing, right-click, and click Properties to open the Document Properties dialog.
3. On the Units and Scale tab of the Document Properties dialog, for Drawing Units, select a unit of measure.
4. If you want the drawing unit applied to the entire project, select Apply to all sheets in this project.

**HANDS-ON**

- File menu » Import » Sheets & Models.
- Select 'A101-Entry Level & Upper Level 1\_m.pdf' from 'C:\Program Files (x86)\Autodesk\Quantity Takeoff 2013\Help\Getting Started (Metric)' and import.
- On the Documents palette, select the image file.
- On the canvas, zoom in to the south entry door (Figure 52).
- Click Document menu Units and Scale.
- In the Document Properties dialog, set the following:
  - Drawing Units = Millimeters
  - Select 'Scale by plotting points'
  - In the Set Scale by Plotting Points dialog, for Baseline Segment Length, enter 1830, and select Millimeters.
  - On the canvas, trace the width of the south entry door as the baseline segment by clicking to specify the start point and clicking again to specify the end point (Figure 53).

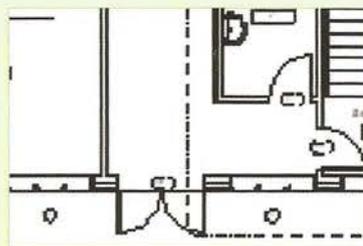


Fig 52: PDF file

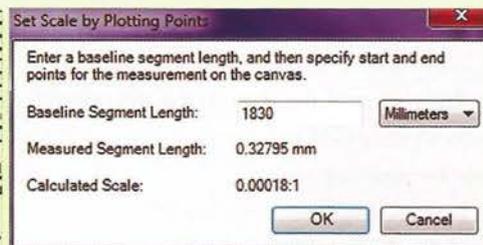


Fig 53: Scale by Plotting Points

QTO records the measured length of the segment and calculates the scale of the drawing. If you change the length or unit of measure of the baseline segment, the scale calculation updates dynamically.

- Click OK. In the Document Properties dialog, the calculated scale displays as the value for Custom Scale (Figure 54).
- Click OK.

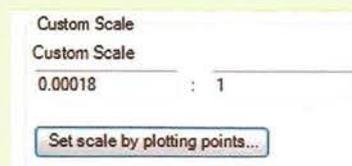


Fig 54: Scale

# 2 CHAPTER

## 2. MANUAL TAKEOFF TOOLS

Manual takeoff tools can be used with 2D DWF sheets and non-DWF files, which include DWGs, PDFs, TIFs, GIFs, and JPGs. This takeoff method is sometimes called on-screen takeoff. They measure drawing geometry to create takeoff data. These tools are:

- **Linear Takeoff:** This group of tools lets you record linear measurements by tracing lines on a floor plan or, in the case of the Single-Click Linear Takeoff tool, by clicking on a line.
- **Area Takeoff:** This group of tools lets you record area measurements by tracing geometry on a floor plan.
- **Count Takeoff:** This tool lets you tally and record occurrences of objects, such as windows and doors, that you want to quantify on a floor plan.
- **Backout Takeoff:** This group of tools lets you refine takeoff data by subtracting from previously recorded counts or measurements.

Note: All sheets require a scale in order for takeoff tools to be used. DWF files contain a scale that is set when the file is published. For PDFs, TIFs, and other image files, you must specify the sheet scale before you can use manual takeoff tools for linear or area measurements. Without a sheet scale, only the Count Takeoff tool is available.

### 2.1 Count Takeoff Tool

The Count Takeoff tool tallies the occurrences of a particular object on a DWF or non-DWF floor plan and creates takeoff for each occurrence of the object. Use this tool to create takeoff for objects, such as windows and doors, that have a Count item type. If you select a non-Count item, a message displays to notify you of the mismatch between the tool and item type, and any takeoff objects you create are placed in a Count item at the root of the Takeoff palette. To perform a count takeoff

1. Open the floor plan that contains the objects you want to count, and zoom in if necessary.
2. On the Takeoff palette, select the corresponding Count takeoff item.
3. On the toolbar, click Count Takeoff.
4. On the Contextual Tools palette, modify the color, opacity, count symbol, and symbol size, as needed. The Color and Opacity values you specify are applied both to the color block on the Takeoff palette and the count symbol that is added to the canvas.
5. On the canvas, select each object to include in the takeoff item. Each time you select an object, a count symbol is placed on the sheet, and a takeoff object is recorded both on the Takeoff palette and in the Workbook.

The new takeoff objects inherit the item type and name of the selected item. As the objects are created, a numerical suffix is added to prevent duplicate names.

Note: To make it easier to select objects, turn off the visibility of any existing takeoff markup using the Show/Hide functionality on the Takeoff palette.

Note: If the item you selected on the Takeoff palette does not have a Count item type, a message displays when you select the first object on the floor plan. In the message box, click OK. The Count takeoff object cannot be added to the non-Count item you selected; therefore, QTO adds the object to a Count item at the root of the Takeoff palette. You can continue selecting objects on the floor plan, and they will be added to the newly created Count item. On the Takeoff palette, this item is listed in the Description column as Count. Either rename the item and define its properties as needed, or drag the objects to the appropriate item and delete the empty Count item.

To rename takeoff objects for easier identification, do one of the following:

- On the Takeoff palette, select an object, and then click the Description value to enter editing mode. Enter a new name, and press ENTER.
- On the Takeoff palette, double-click a takeoff object. In the Takeoff Object Properties dialog, enter a descriptive name for the object, and click OK.

## HANDS-ON: JOINERY DETAIL PREPARATION FROM A PDF

- Create a new project in Autodesk Quantity Takeoff as follows.
  - Name = Count Takeoff
  - Unit System = Imperial
  - Currency = Rs.
  - Catalog = None
  - Import Files = Select the given file '2D Plan.PDF'

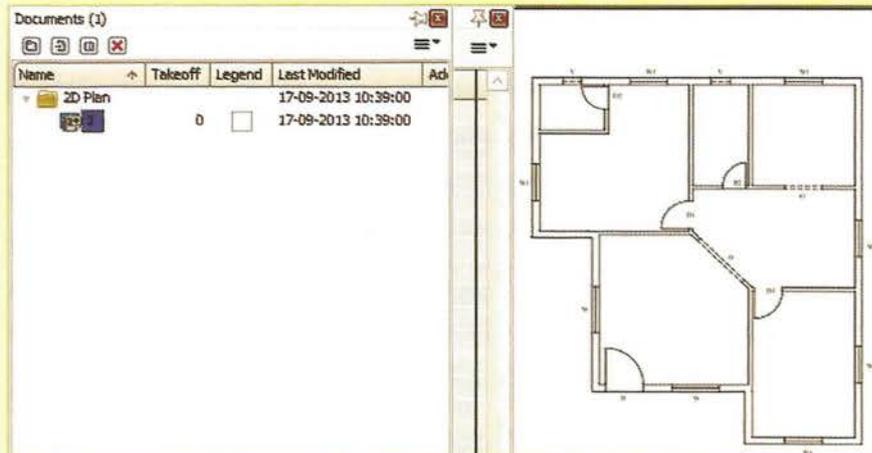


Fig 1: 2D Plan

- Set the 'Scale' for the document as follows.
  - Document menu » Units and Scale
    - Scale Style = Engineering
    - Drawing Units = Feet
    - Sheet Scale = Custom (Figure 2)
  - Select 'Set Scale by Plotting Points' option and select two points on the canvas to measure the width of the Hall (room inside dimension) and set the Baseline Segment Length as 16' (Figure 3).

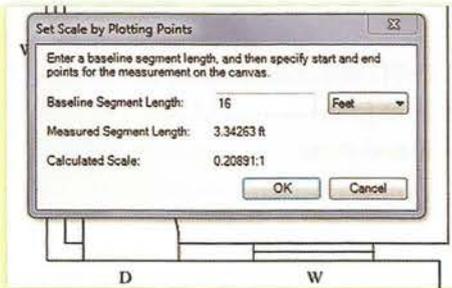


Fig 2: Set Scale

WBS	Description	Type
▼ Joinery Details	Joinery Details	
D	Door 4' X 7'	Count
D1	Door 3' X 7'	Count
D2	Door 2'6" X 7'	Count
V	Ventilator 2' X 2'	Count
W	Window 5' X 4'	Count
W1	Window 4' X 4'	Count

Fig 3: WBS

- Select the item 'D' and activate the 'Count Takeoff' tool. Set the Symbol (shape, Color and Size) as per the requirements and pick a point near the 'D' door.

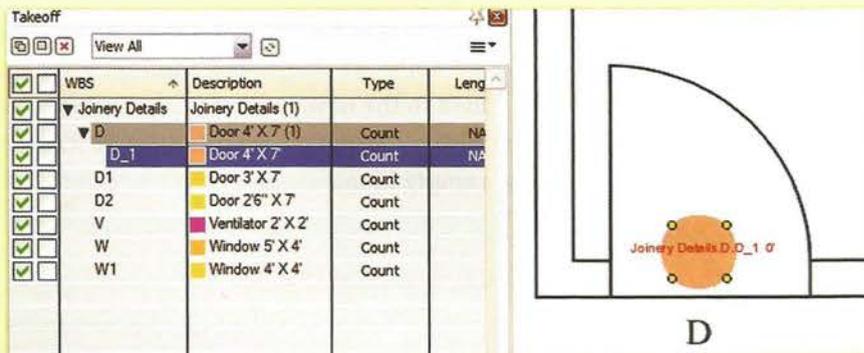


Fig 4: Count Takeoff

- In the 'Takeoff Items Properties' of the 'D' group, enter the values for the material and labor costs (Figure 5).
- Customize the Workbook columns to get the following report (Figure 6).

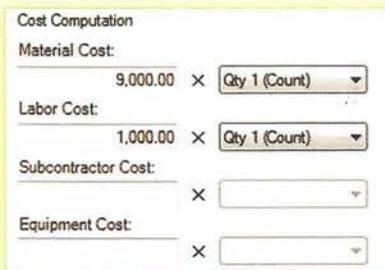


Fig 5: Cost

WBS	Description	Quantity 1	Total Cost
Joinery Details			10,000.00
Joinery Details.D	Door 4' X 7'	1.000 ea	10,000.00

Fig 6: Workbook

- In the same way complete the counting for other doors, windows and ventilators.

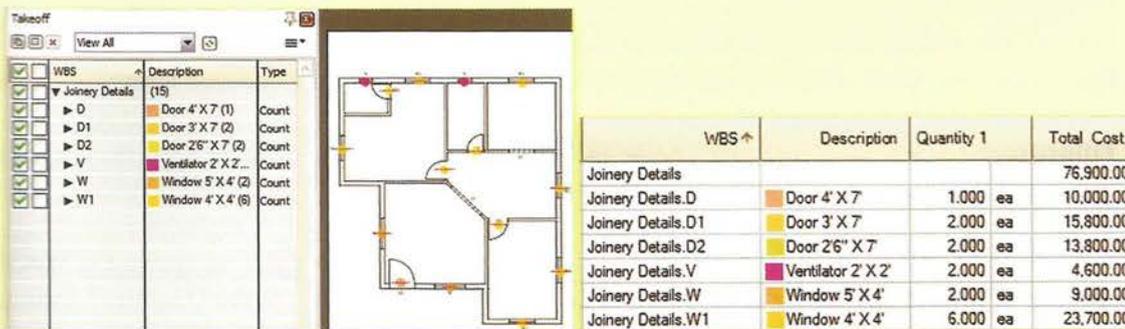


Fig 7: Count Takeoff & Workbook

### 2.1.1 Single-Click Linear Takeoff Tool

You can use the Single-Click Linear Takeoff tool on DWF and DWG files, but not on PDF and image files.

1. Open the floor plan that contains the linear objects you want to measure, and zoom in if necessary.
2. On the Takeoff palette, select the corresponding Linear takeoff item.
3. On the toolbar, click Single-Click Linear Takeoff.
4. On the Contextual Tools palette, modify the Color and Opacity values, if desired.
5. On the canvas, select each object to include in the takeoff item.

Each time you select an object, a takeoff object is recorded both in the Takeoff palette and in the Workbook. In the summary view of the Workbook, the total length of the takeoff objects displays in the Quantity 1 column for the item. In the detail view of the Workbook, the Length column displays the length of each object below the item total. If the item you selected on the Takeoff palette does not have a Linear item type, a message displays when you select the first object on the floor plan. In the message box, click OK. The Linear takeoff object cannot be added to the non-Linear item you selected; therefore, QTO adds the object to a Linear item at the root of the Takeoff palette. You can continue selecting objects on the floor plan, and they will be added to the newly created Linear item. On the Takeoff palette, this item is listed in the Description column as Linear. Either rename the item and define its properties as needed, or drag the objects to the appropriate item and delete the empty Linear item.

### 2.2 Using Linear Takeoff Tools to Trace Geometry

For PDFs and image files, such as TIFs, you must specify the sheet scale before you can use linear takeoff tools to trace drawing geometry.

1. Open the floor plan that contains the linear objects you want to measure, and zoom in if necessary.
2. On the Takeoff palette, select the corresponding Linear takeoff item.
3. On the toolbar, click the linear takeoff tool that is appropriate for the geometry you need to trace:
  - a. Polyline Linear Takeoff Tool (for lines and arcs)
  - b. Rectangle Linear Takeoff Tool
  - c. Ellipse Linear Takeoff Tool
4. On the Contextual Tools palette, modify the tool options, if desired.
5. If turning off Snaps would make it easier to trace geometry, click Takeoff menu » Snap to Point.

Note: To pan the drawing when you are in the process of tracing geometry: Press and hold the SPACEBAR to switch the takeoff tool to Pan mode, and pan the drawing until the geometry you need is in view. Release the SPACEBAR to return the takeoff tool to its original state, and complete the takeoff measurement.

6. On the canvas, trace the linear object:
  - a. **Polyline tool:** Draw line segments, arc segments, or a combination of line and arc segments. You can switch between line and arc mode while drawing a continuous polyline.
  - b. **Rectangle tool:** Click to specify the start point, move the cursor to the opposite corner of the rectangle, and click to specify the end point.
  - c. **Ellipse tool:** Click to specify the start point, move the cursor to the opposite extent of the ellipse, and click to specify the end point.

Each time you create an object, the takeoff object is recorded both in the Takeoff palette and in the Workbook. In the summary view of the Workbook, the total length of the takeoff objects displays in the Quantity 1 column for the item. In the detail view of the Workbook, the Length column displays the length of each object below the item total.

## Area Takeoff Tool

QTO provides you with several area takeoff tools, all of which create area measurements from geometry on a floor plan. Use these tools to create takeoff for items, such as rooms and flooring that have an Area item type. If you select a non-Area item, a message displays to notify you of the mismatch between the tool and item type, and any takeoff objects you create are placed in an Area item at the root of the Takeoff palette.

For PDFs and image files, such as TIFs, you must specify the sheet scale before you can use area takeoff tools to trace drawing geometry.

### To use an area takeoff tool

1. Open the floor plan that contains the area objects you want to measure, and zoom in if necessary.
2. On the Takeoff palette, select the corresponding Area takeoff item.
3. On the toolbar, click the area takeoff tool that is appropriate for the geometry you need to trace:
  - a. Polyline Area Takeoff Tool
  - b. Rectangle Area Takeoff Tool
  - c. Ellipse Area Takeoff Tool
4. On the canvas, trace the area object:
  - a. **Polyline tool:** Draw line segments, arc segments, or a combination of line and arc segments. You can switch between line and arc mode while drawing a continuous polyline.
  - b. **Rectangle tool:** Click to specify the start point, move the cursor to the opposite corner of the rectangle, and click to specify the end point.
  - c. **Ellipse tool:** Click to specify the start point, move the cursor to the opposite extent of the ellipse, and click to specify the end point.

## HANDS-ON

Prepare a detailed estimate of part of a wall of a building from the given section view. Assume the length as 6m (Figure 8).

### General Specifications:

- Foundation concrete shall be of Lime Concrete. Cost = Rs. 1000/m<sup>3</sup>.
- Foundation and Plinth shall be of 1<sup>st</sup> class brick work in lime mortar. Cost = Rs. 900/m<sup>3</sup>.
- Damp Proof Course: 3mm c.c. with water proofing compound. Cost = Rs. 100/m<sup>2</sup>.
- Superstructure: 1<sup>st</sup> class brick work in lime mortar. Cost = Rs. 320/m<sup>3</sup>.
- Wall finishing: 12cc cement plastered. Cost = Rs. 50/m<sup>2</sup>.

### Manual Calculation:

Cost of Foundation Concrete = Volume X Cost

$$= 6 \times 0.8 \times 0.3 \times 1000$$

$$= \text{Rs. } 1,440/-$$

Cost of Foundation and Plinth = Volume X Cost

$$= 6 \times ((0.6 \times 0.2) + (0.5 \times 0.2) + (0.4 \times 0.8)) \times 900$$

$$= \text{Rs. } 2,916/-$$

Cost of Damp Proof Course = Area (Length X Breadth) X Cost

$$= 6 \times 0.4 \times 100$$

$$= \text{Rs. } 240/-$$

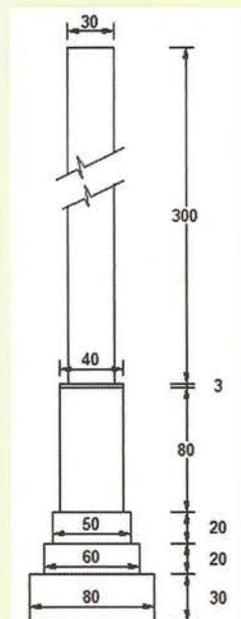


Fig 8

### 2.1.1 Single-Click Linear Takeoff Tool

You can use the Single-Click Linear Takeoff tool on DWF and DWG files, **but not on PDF and image files.**

1. Open the floor plan that contains the linear objects you want to measure, and zoom in if necessary.
2. On the Takeoff palette, select the corresponding Linear takeoff item.
3. On the toolbar, click Single-Click Linear Takeoff.
4. On the Contextual Tools palette, modify the Color and Opacity values, if desired.
5. On the canvas, select each object to include in the takeoff item.

Each time you select an object, a takeoff object is recorded both in the Takeoff palette and in the Workbook. In the summary view of the Workbook, the total length of the takeoff objects displays in the Quantity 1 column for the item. In the detail view of the Workbook, the Length column displays the length of each object below the item total. If the item you selected on the Takeoff palette does not have a Linear item type, a message displays when you select the first object on the floor plan. In the message box, click OK. The Linear takeoff object cannot be added to the non-Linear item you selected; therefore, QTO adds the object to a Linear item at the root of the Takeoff palette. You can continue selecting objects on the floor plan, and they will be added to the newly created Linear item. On the Takeoff palette, this item is listed in the Description column as Linear. Either rename the item and define its properties as needed, or drag the objects to the appropriate item and delete the empty Linear item.

## 2.2 Using Linear Takeoff Tools to Trace Geometry

For PDFs and image files, such as TIFs, you must specify the sheet scale before you can use linear takeoff tools to trace drawing geometry.

1. Open the floor plan that contains the linear objects you want to measure, and zoom in if necessary.
2. On the Takeoff palette, select the corresponding Linear takeoff item.
3. On the toolbar, click the linear takeoff tool that is appropriate for the geometry you need to trace:
  - a. Polyline Linear Takeoff Tool (for lines and arcs)
  - b. Rectangle Linear Takeoff Tool
  - c. Ellipse Linear Takeoff Tool
4. On the Contextual Tools palette, modify the tool options, if desired.
5. If turning off Snaps would make it easier to trace geometry, click Takeoff menu » Snap to Point.

Note: To pan the drawing when you are in the process of tracing geometry: Press and hold the SPACEBAR to switch the takeoff tool to Pan mode, and pan the drawing until the geometry you need is in view. Release the SPACEBAR to return the takeoff tool to its original state, and complete the takeoff measurement.

6. On the canvas, trace the linear object:
  - a. **Polyline tool:** Draw line segments, arc segments, or a combination of line and arc segments. You can switch between line and arc mode while drawing a continuous polyline.
  - b. **Rectangle tool:** Click to specify the start point, move the cursor to the opposite corner of the rectangle, and click to specify the end point.
  - c. **Ellipse tool:** Click to specify the start point, move the cursor to the opposite extent of the ellipse, and click to specify the end point.

Each time you create an object, the takeoff object is recorded both in the Takeoff palette and in the Workbook. In the summary view of the Workbook, the total length of the takeoff objects displays in the Quantity 1 column for the item. In the detail view of the Workbook, the Length column displays the length of each object below the item total.

2.2.1 Area Takeoff Tool

QTO provides you with several area takeoff tools, all of which create area measurements from geometry on a floor plan. Use these tools to create takeoff for items, such as rooms and flooring that have an Area item type. If you select a non-Area item, a message displays to notify you of the mismatch between the tool and item type, and any takeoff objects you create are placed in an Area item at the root of the Takeoff palette.

For PDFs and image files, such as TIFs, you must specify the sheet scale before you can use area takeoff tools to trace drawing geometry.

To use an area takeoff tool

1. Open the floor plan that contains the area objects you want to measure, and zoom in if necessary.
2. On the Takeoff palette, select the corresponding Area takeoff item.
3. On the toolbar, click the area takeoff tool that is appropriate for the geometry you need to trace:
  - a. Polyline Area Takeoff Tool
  - b. Rectangle Area Takeoff Tool
  - c. Ellipse Area Takeoff Tool
4. On the canvas, trace the area object:
  - a. **Polyline tool:** Draw line segments, arc segments, or a combination of line and arc segments. You can switch between line and arc mode while drawing a continuous polyline.
  - b. **Rectangle tool:** Click to specify the start point, move the cursor to the opposite corner of the rectangle, and click to specify the end point.
  - c. **Ellipse tool:** Click to specify the start point, move the cursor to the opposite extent of the ellipse, and click to specify the end point.

HANDS-ON

Prepare a detailed estimate of part of a wall of a building from the given section view. Assume the length as 6m (Figure 8).

General Specifications:

- Foundation concrete shall be of Lime Concrete. Cost = Rs. 1000/m<sup>3</sup>.
- Foundation and Plinth shall be of 1<sup>st</sup> class brick work in lime mortar. Cost = Rs. 900/m<sup>3</sup>.
- Damp Proof Course: 3mm c.c. with water proofing compound. Cost = Rs. 100/m<sup>2</sup>.
- Superstructure: 1<sup>st</sup> class brick work in lime mortar. Cost = Rs. 320/m<sup>3</sup>.
- Wall finishing: 12cc cement plastered. Cost = Rs. 50/m<sup>2</sup>.

Manual Calculation:

Cost of Foundation Concrete= Volume X Cost  
 = 6 X 0.8 X 0.3 X 1000  
 = Rs. 1,440/-

Cost of Foundation and Plinth = Volume X Cost  
 = 6 X ((0.6 X 0.2) + (0.5 X 0.2) + (0.4 X 0.8)) X 900  
 = Rs. 2,916/-

Cost of Damp Proof Course = Area (Length X Breadth) X Cost  
 = 6 X 0.4 X 100  
 = Rs. 240/-

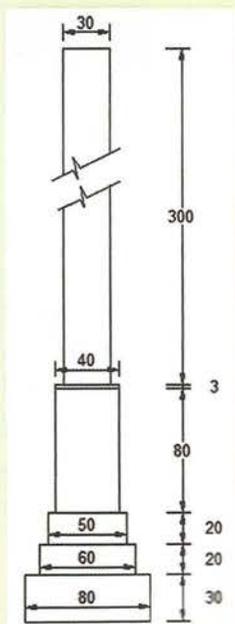


Fig 8

Cost of Superstructure = Volume X Cost  
 = 6 X 0.3 X 3.5 X 320  
 = Rs. 2,016/-

Cost of Cement Plaster = Wall Area (2 sides) X Cost  
 = 6 X 3.5 X 2 X 50  
 = Rs. 2,100/-

Total Cost = Rs. 8,712/-

### Autodesk Quantity Takeoff

- Create a new project in Autodesk Quantity Takeoff as follows.
  - Name = Wall Section 2D DWF
  - Unit System = Metric
  - Currency = Rs.
  - Catalog = None
  - Import Files = Select the given file 'Wall Section.dwf' (Figure 9).
- Goto 'Document menu » Units and Scale' and set the following.
  - Scale Style = Engineering
  - Drawing Units = Centimeters
  - Sheet Scale = Published
- Switch to 'Takeoff' palette and create an item called as 'Foundation Concrete'. Set the type as 'Area' (Figure 10).



Fig 9: Wall Section



Fig 10: Takeoff

- Select the created item and use the 'Rectangle Area Takeoff' tool to select the foundation concrete area as follows (Figure 11).
- In the 'Takeoff Properties' dialog box of the foundation concrete item do the following.
  - General tab
    - Thickness = 6 m
  - Cost Data tab
    - Quantity 2 = Volume
    - Material Cost = Rs. 1,000 X Qty 2 (Vol) (Figure 12).

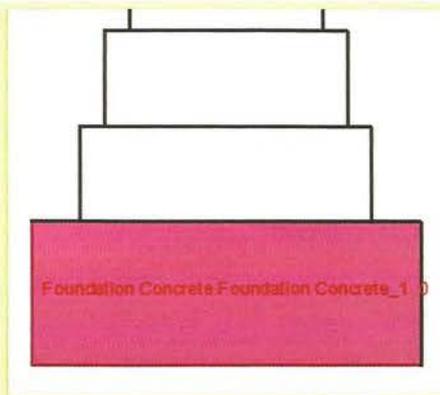


Fig 11: Foundation Concrete Area Takeoff

General		Assembly		Cost Data	
Cost Quantities					
Quantity 1 (Qty 1):	Unit:	Area	m <sup>2</sup>		
Quantity 2 (Qty 2):	Unit:	Volume	m <sup>3</sup>		
Time					
Time:					
Cost Computation					
Material Cost:		1,000.00		×	Qty 2 (Volume)

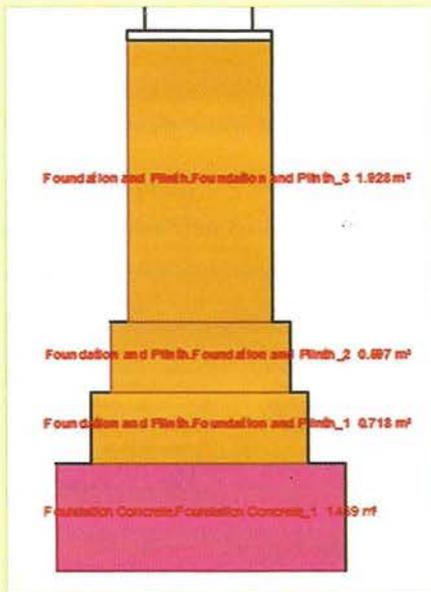
Fig 12: Cost Data

- In the workbook, remove the unwanted fields and add the Quantity 2 and Total Cost fields. Cross check the result with the manual calculation results.

Workbook				
Wall Section-Model				
£				
	WBS	Description	Quantity 2	Total Cost
	Foundation Concrete	Foundation concrete	1,439 m <sup>2</sup>	1,439.35

Fig 13: Workbook

- In the same way create the item for 'Foundation and Plinth'.



Takeoff			
View All			
<input checked="" type="checkbox"/>	WBS	Description	Type
<input checked="" type="checkbox"/>	▼ Foundation and Plinth	Foundation...	Area
<input checked="" type="checkbox"/>		Foundation and Pli...	Area
<input checked="" type="checkbox"/>		Foundation and Pli...	Area
<input checked="" type="checkbox"/>		Foundation and Pli...	Area
<input checked="" type="checkbox"/>		Foundation and Pli...	Area
<input checked="" type="checkbox"/>	▼ Foundation Concrete	Foundation...	Area
<input checked="" type="checkbox"/>		Foundation Concre...	Area

Fig 14&15: Foundation and Plinth Area Takeoff

Workbook				
Wall Section-Model				
£				
	WBS	Description	Quantity 2	Total Cost
	Foundation Concrete	Foundation concrete	1,439 m <sup>2</sup>	1,439.35
	Foundation and Plinth	Foundation and Plinth	3,242 m <sup>2</sup>	2,918.00

Fig 16: Foundation and Plinth Cost

- In the 'Takeoff' palette, create a new item for 'Damp Proof Course' and set the type as 'Linear'.
  - Select the item and select the damp proof course's width with the help of 'Single Click Linear Takeoff' tool as shown in the below image.

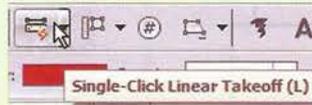


Fig 17: Single Click Linear Takeoff



Fig 18&19: Damp Proof Course

- In the 'Takeoff Item Properties' of the damp proof course item, set the following.
  - General tab
    - Height = 6 m
  - Cost Data tab
    - Quantity 2 = Area
    - Material Cost = Rs. 100/Qty 2 (Area) (Figure 20)
- Like the 'Foundation Concrete', find the Quantity and Cost for the Super Structure (Figure 21&22).

Workbook

Wall Section-Model

	WBS	Description	Quantity 2	Total Cost
	Foundation Concrete	Foundation concrete	1.439 m <sup>2</sup>	1,439.35
	Foundation and Plinth	Foundation and Plinth	3.242 m <sup>2</sup>	2,918.00
	Damp Proof Course	Damp Proof Course	2.401 m <sup>2</sup>	240.09

Fig 20: Workbook

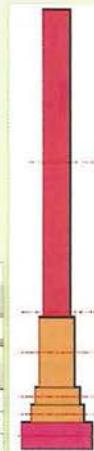


Fig 21: Super Structure Area Takeoff

Workbook

Wall Section-Model

	WBS	Description	Quantity 2	Total Cost
	Foundation Concrete	Foundation concrete	1.439 m <sup>2</sup>	1,439.35
	Foundation and Plinth	Foundation and Plinth	3.242 m <sup>2</sup>	2,918.00
	Damp Proof Course	Damp Proof Course	2.401 m <sup>2</sup>	240.09
	Super Structure	Super Structure	6.317 m <sup>2</sup>	2,021.55

Fig 22: Super Structure

- In the 'Takeoff' palette, create an item called as 'Plastering' and set the type as 'Linear'.
  - Select the item and select both sides of the Super Structure with the help of 'Single Click Linear Takeoff' tool.

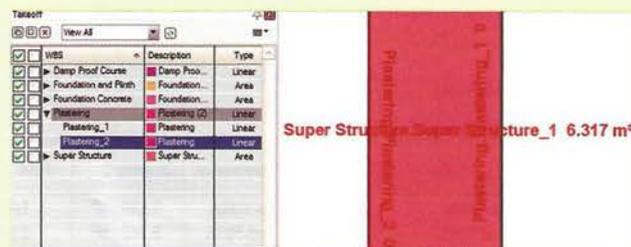


Fig 23: Plastering

- In the 'Takeoff Item Properties' of the plastering item, set the following.
  - General tab
    - Height = 6 m
  - Cost Data tab
    - Quantity 2 = Area
    - Material Cost = Rs. 50/Qty 2 (Area)
- Create a group and add all the items into the group.

The screenshot shows two windows from a software application. The 'Takeoff' window on the left displays a tree view of items under 'WBS'. The 'Workbook' window on the right displays a table with columns for 'WBS', 'Description', 'Quantity 2', and 'Total Cost'.

WBS	Description	Quantity 2	Total Cost
Estimation and Costing	Cost		8,719.32
Estimation and Costing.Plastering	Plastering	42,007 m <sup>2</sup>	2,100.34
Estimation and Costing.Super Structure	Super Structure	6,317 m <sup>2</sup>	2,021.55
Estimation and Costing.Foundation Co...	Foundation concrete	1,439 m <sup>2</sup>	1,439.35
Estimation and Costing.Foundation an...	Foundation and Plinth	3,242 m <sup>2</sup>	2,918.00
Estimation and Costing.Damp Proof Co...	Damp Proof Course	2,401 m <sup>2</sup>	240.09

Fig 24: Group

## 2.3 Backout Takeoff Tool

Use the backout tools in QTO to refine takeoff data by subtracting from a previously calculated measurement or count. For example, after using a linear takeoff tool to calculate the length of a wall, you could use a backout tool to trace a door opening in the wall, which would subtract the opening from the wall measurement.

Note: As an alternative to using a backout tool, you can use grips to manipulate the shape of a takeoff area, adding or removing points along the takeoff boundary as needed. While pressing CTRL, click on a line to add a new point, or click on a point to remove it. Then, click the Select tool, and use the grips to manipulate the takeoff area shape.

To use a backout takeoff tool

1. Open the floor plan that contains the object you want to measure, and zoom in if necessary.
2. If the backout you create will cut an object into 2 or more pieces (such as subtracting a door opening from a wall measurement), on the Takeoff palette, select the object to modify.
3. On the toolbar, click the backout takeoff tool that is appropriate for the subtraction you want to make:
  - a. Polyline Backout Takeoff Tool
  - b. Rectangle Backout Takeoff Tool
  - c. Ellipse Backout Takeoff Tool
  - d. Count Backout Takeoff Tool
4. On the canvas, trace backout geometry, or select a count symbol:
  - a. **Polyline tool:** Draw line segments, arc segments, or a combination of line and arc segments. You can switch between line and arc mode while drawing a continuous polyline.
  - b. **Rectangle tool:** Click to specify the start point, move the cursor to the opposite corner of the rectangle, and click to specify the end point.
  - c. **Ellipse tool:** Click to specify the start point, move the cursor to the opposite extent of the ellipse, and click to specify the end point.
  - d. **Count tool:** Select the count symbol for an object to subtract the object from the item total.

## HANDS-ON: ESTIMATION AND COSTING OF A WALL BY USING 2D DWF

Prepare cost estimation for the wall as shown in the following figure (units are in mm). Assume that the wall has 12mm plastering on both the sides (Figure 25).

- Openings
  - Door = 1.2m X 2.1m
  - Window = 1.2m X 1.2m
- Material Cost
  - Masonry = Rs.320/m<sup>3</sup>
  - Plastering = Rs. 30/m<sup>2</sup>
- Labor Cost
  - Masonry = Rs. 60/m<sup>3</sup>
  - Plastering = Rs. 20/m<sup>2</sup>

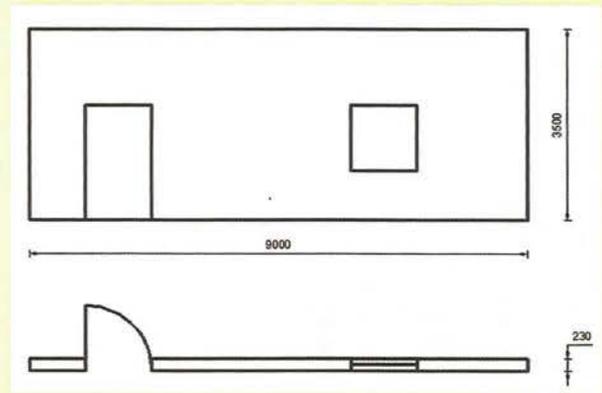


Fig 25

### Manual Calculation

Wall Volume	= 6.334 m <sup>3</sup>
Volume of Masonry	= 5.727 m <sup>3</sup>
Cost of Masonry	= Rs. 2,176.33/-
Area of Plastering	= 55.08 m <sup>2</sup>
Cost of Plastering	= Rs. 2,754/-
<b>Total Cost</b>	<b>= Rs. 4,930.33/-</b>

### Autodesk Quantity Takeoff

- Create a new project in Autodesk Quantity Takeoff as follows.
  - Name = Wall 2D DWF
  - Unit System = Metric
  - Currency = Rs.
  - Catalog = None
  - Import Files = Select the given file '2D Wall Elevation View Scale1\_50.dwf' (Figure 26).
- In the Document Palette, select and change the Items name as 'Elevation' (Figure 26).



Fig 26: Import Files

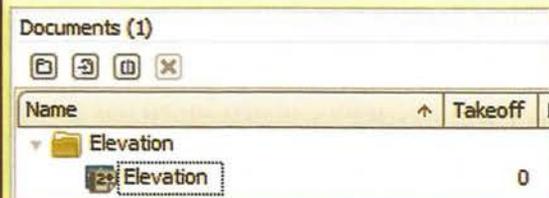


Fig 27: Document

- Double click on the 'Elevation' sheet to open the same in the canvas.
- Goto 'Document menu » Units and Scale' and set the following.
  - Scale Style = Engineering
  - Drawing Units = Millimeters
  - Sheet Scale = Published (Figure 28)

Switch to 'Takeoff' palette.

- File menu » Import » Catalog
  - Select and import the 'Wall' catalog which was created in the previous hands-on.
- Change the cost of Masonry and Plaster items as given in this problem.
- Change the 'Standard Wall' item type from 'Volume' to 'Area' (As we have the 2D DWF, we able to measure the area takeoff from the given model).
  - Select 'Yes' in the Alert dialog box (Figure 29).
- Open the 'Standard Wall' takeoff item properties and set the formula to calculate the Masonry and Plaster as follows.
  - Masonry = Volume X 0.904
  - Plaster = Area X 2 (Figure 30)



Fig 28: Units and Scale



Fig 29: Alert

WBS	Description	Quantity 1
Mateiral.Brick	New Item Description	Volume*0.904
Mateiral.Plaster	New Item Description	Area*2

Fig 30: Assembly

- Select the 'Standard Wall' item in the Takeoff palette. In the tool bar, select 'Rectangle Area Takeoff' tool and pick two points diagonally in the canvas to select the wall.

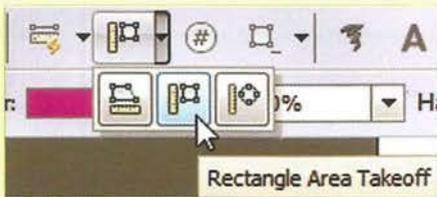


Fig 31: Area Takeoff

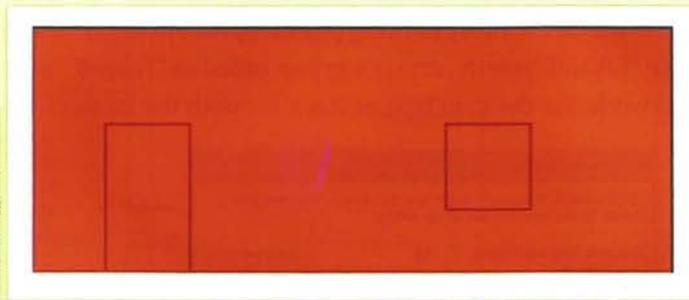


Fig 32: Area Takeoff

- In the toolbar, select 'Rectangle Backout' and draw rectangles to remove Door and Window from the Area calculation.

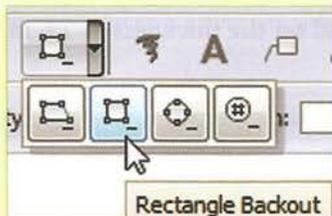


Fig 33: Backout Tools

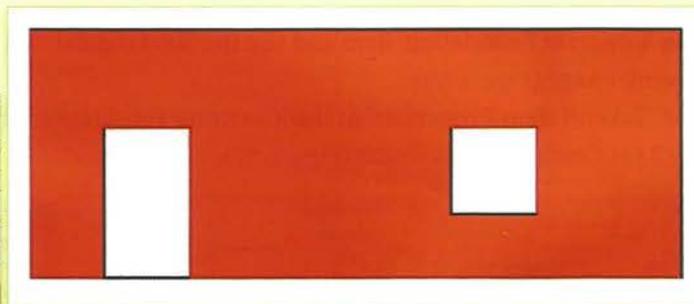


Fig 34: Area Calculation

- Open the 'Takeoff Object Properties' of the created object and set the following values (Figure 35).
- Check the 'Workbook' for the results (Figure 36).

General Views Properties		
Dimensions	Values	Mapping
Thickness:	0.230 m	NA
Perimeter:	29.201 m	NA
Area:	27.544 m <sup>2</sup>	NA
Volume:	6.335 m <sup>3</sup>	NA

Fig 35: Thickness

WBS	Description	Quantity 1	Material Cost		Labor Cost		Total Cost
			Unit cost	Total	Unit cost	Total	
Wall	New Group Description		3,485.52		1,445.48		4,931.00
Wall Standard Wall	New Item Description	27.546 m <sup>2</sup>	3,485.52		1,445.48		4,931.00
Material Brick	New Item Description	5.727 m <sup>3</sup>	320.00	1,832.76	60.00	343.64	2,176.40
Material Plaster	New Item Description	55.082 m <sup>2</sup>	30.00	1,652.76	20.00	1,101.84	2,754.60

Fig 36: Cost Estimation

**HANDS-ON: CALCULATE THE TAKEOFF FOR THE GIVEN SIMPLE STEP.**

- Create a new project as follows.
  - Name: Simple Step
  - Unit System: Metric
  - Currency: Rs.
  - Catalog: None
  - Import Files: Stair.DWF
- Set the scale for the project.
  - Documents menu » Units and Scale
    - Scale Style = Engineering
    - Drawing Units = Centimeters
    - Sheet Scale = Custom
  - Use the 'Set scale by plotting points' option to set the scale (Figure 37).
- In the 'Takeoff' palette, create a group called as 'Takeoff' with two items called as 'Concrete Foundation' and 'Brickwork'. Set the item type as 'Area' for both the items (Figure 38).

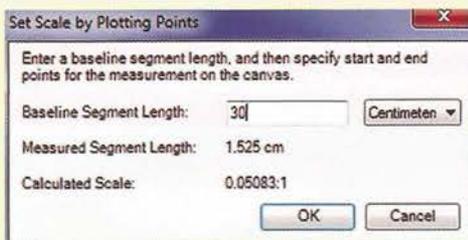
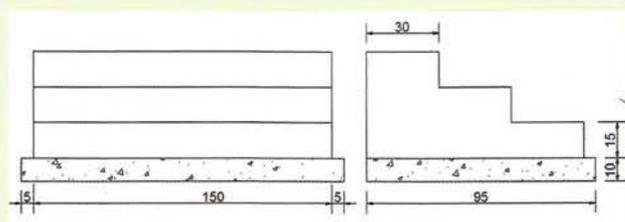


Fig 37: Scale

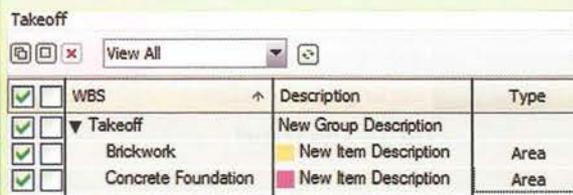


Fig 38: Group with Items

- Select the 'Concrete Foundation' item and use the 'Rectangular Takeoff' tool to measure the area as shown in the following image (Figure 39).
- Open the 'Takeoff Item Properties' of the 'Concrete Foundation' and set the thickness as 1.6 m. And set the Quantity 2 (in Cost Data) as Volume (Figure 40).

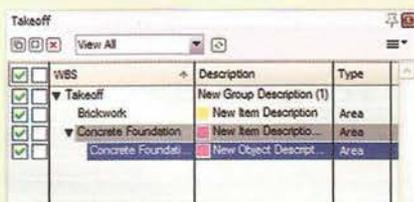


Fig 39: Concrete Foundation Area



Fig 40: Takeoff Item Properties

- Select the 'Brickwork' item and measure the step area with the help of 'Polyline Area Takeoff' tool.

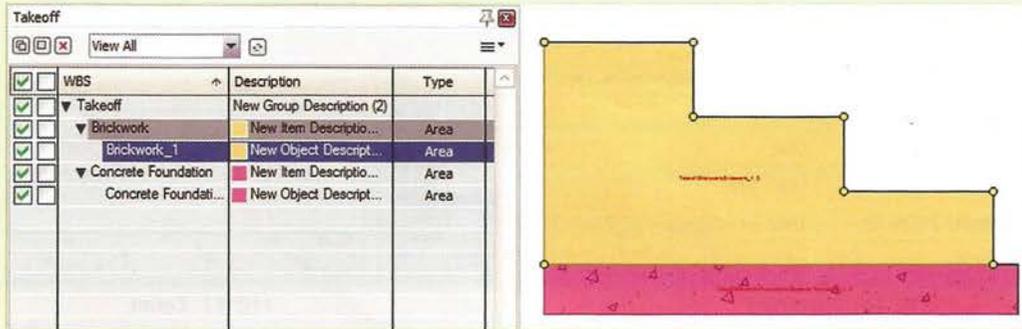


Fig 41: Brickwork Area

- Open the 'Takeoff Item Properties' of the 'Brickwork' and set the thickness as 1.5 m. And set the Quantity 2 (in Cost Data) as Volume.
- Customize the workbook to show both the quantities.

Workbook				
Stair-Model				
	WBS	Description	Quantity 1	Quantity 2
▼	Takeoff	New Group Description (2)		
	Takeoff.Brickwork	New Item Description	0.270 m <sup>2</sup>	0.404 m <sup>3</sup>
	Takeoff.Concrete Foundation	New Item Description	0.095 m <sup>2</sup>	0.152 m <sup>3</sup>

Fig 42: Workbook

- Hide the Takeoff group display by uncheck the 'Show/Hide' box in the takeoff palette.

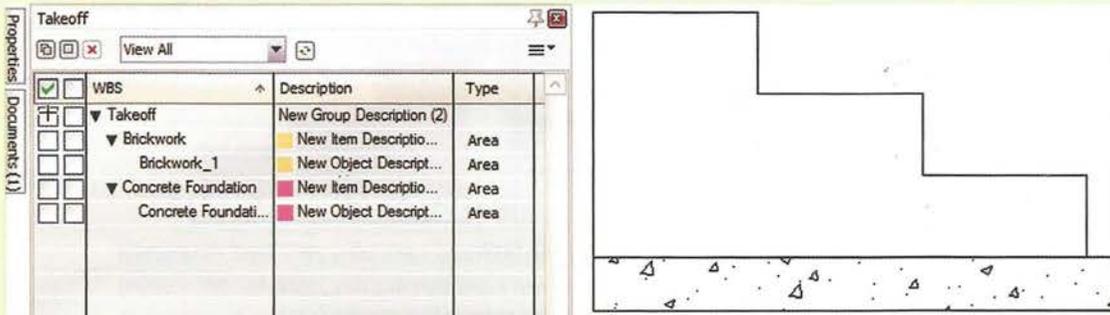


Fig 43: Show / Hide

- Create a group called as 'Plaster' with three items (Riser, Tread and Side) as shown in the following image (Figure 44).
- In the 'Takeoff Item Properties' of the Riser;
  - In the general tab, enter the dimensions of the plaster (Figure 45).

Takeoff			
	WBS	Description	Type
▼	Plaster	New Group Description	
	Riser	Plaster: Riser	Count
	Side face	Plaster: Side face	Area
	Tread	Plaster: Tread	Count

Fig 44: Group: Plaster

General		Assembly	Cost Data
Dimension			
Height:	0.15	Unit:	m
Length:	1.5	Unit:	m
Thickness:	0.02	Unit:	m

Fig 45: Riser Plaster Dimensions

- b. In the Cost Data tab, set the Quantity 2 as 'Volume' (Figure 46).
- Select the 'Riser' item and use the 'Count' tool to select all the three risers (Figure 47).

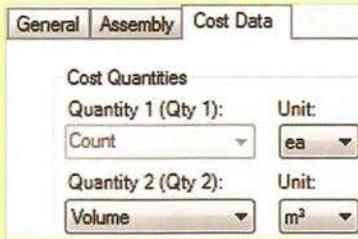


Fig 46: Quantity 2

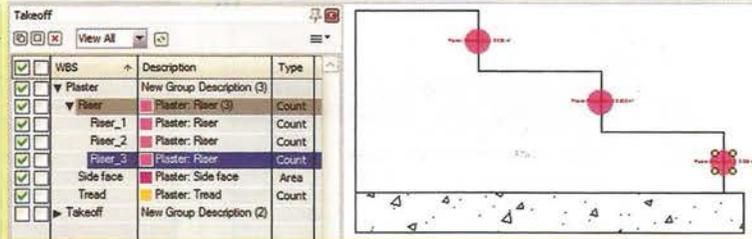


Fig 47: Count

- 12. Repeat the above step for the tread also.

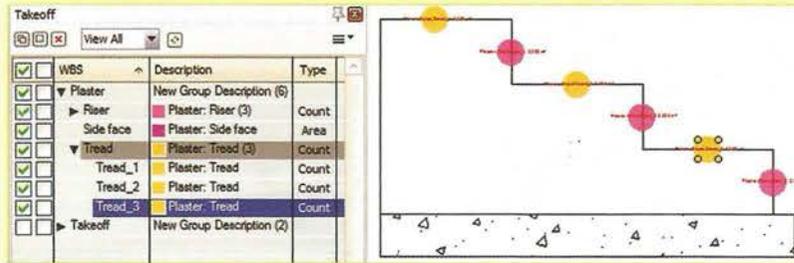


Fig 48: Tread

- 13. Select the side face item and measure the area with the help of 'Polyline Area Takeoff' tool.

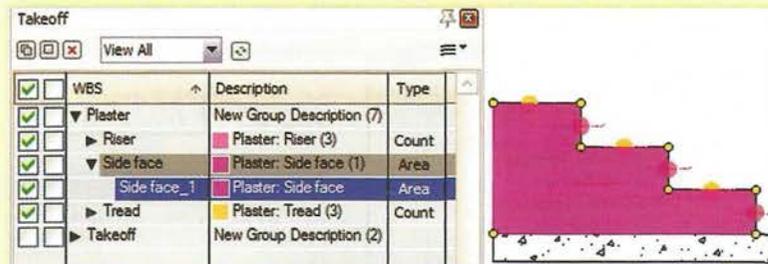


Fig 49: Side Face

- 14. Select the created 'Side face\_1' object and duplicate the same (Figure 50&51).
- 15. Switch on the Takeoff group display and check the results in workbook (Figure 52).



Fig 50&51: Duplicate



WBS	Description	Quantity 1	Quantity 2
Plaster	New Group Description		
Plaster.Riser	Plaster: Riser	3.000 ea	0.014 m³
Plaster.Side face	Plaster: Side face	0.540 m²	0.000
Plaster.Tread	Plaster: Tread	3.000 ea	0.027 m³
Takeoff	New Group Description		
Takeoff.Brickwork	New Item Description	0.270 m²	0.404 m³
Takeoff.Concrete Foundation	New Item Description	0.095 m²	0.152 m³

Fig 52: Workbook

# 3 CHAPTER

## 3. USING AUTOMATIC TAKEOFF TOOLS

Use automatic takeoff tools to create takeoff for objects in 3D models and 2D sheets. Automatic takeoff tools use the design data from the publishing application to create takeoff, rather than measuring drawing geometry as manual takeoff tools do.

### 3.1 Model Takeoff Tool

Using the Model Takeoff tool, you can use the object tree from a 3D model to create valid takeoff for a project. When you perform a model takeoff, QTO recognizes the objects in the model and places them in a group on the Takeoff palette, with a group name derived from the name of the model. The first time you use this tool, all items in the group have 'Undefined' as their item type. When you define the item types, you create valid takeoff for those items and objects, and your selections are used to predictively assign item types during subsequent uses of the tool.

You can perform model takeoffs on multiple models in a project. If the project contains matching 2D sheets, these sheets are marked up and cross-referenced.

**Note:** With DWF files published from supported AutoCAD-based and Revit-based design applications (version 2010 or later), you can perform a model takeoff using only a 3D model. DWF files published from earlier releases of these applications require the use of both a 3D model and the supporting 2D sheet set.

#### 3.1.1 To perform a model takeoff

1. On the Documents palette, select a 3D model.
2. On the toolbar, click Model Takeoff.
3. Click the model on the canvas to start the takeoff. You can also perform a model takeoff by clicking Takeoff menu » Model to start the takeoff immediately.
4. When a dialog prompts you that the takeoff is complete, you can select Do not display again.
5. Click Close.
6. Open the Takeoff palette, and view the items in the takeoff group whose name is derived from the model.

**Note:** If you have already run a model takeoff for the selected model, a numerical suffix is added to the name of the new group to prevent duplicate names.

## HANDS-ON: ESTIMATION AND COSTING FOR A SINGLE WALL

Prepare a cost estimation of a single brick wall as follows. Assume that the wall has 12mm plastering on both the sides.

- Length = 4 m
- Height = 3 m
- Thickness = 0.3 m
- Material Cost
  - Brick work = Rs.300/m<sup>3</sup>
  - Plastering = Rs. 15/m<sup>2</sup>
- Labor Cost
  - Brick work = Rs. 50/m<sup>3</sup>
  - Plastering = Rs. 7/m<sup>2</sup>

### Manual Calculation

Quantity of Brick work =  $4 \times 3 \times 0.3 = 3.6 \text{ m}^3$

Cost of Brick work = Quantity of Brick Work X (Material Cost + Labor Cost)  
= Rs. 1,260/-

Quantity of Plastering = Length X Height X 2  
= 24 m<sup>2</sup>

Cost of Plastering = Quantity of Plastering X (Material Cost + Labor Cost)  
= Rs. 528/-

**Total Cost = Rs. 1,788/-**

### Autodesk Quantity Takeoff (using a 3D DWF from a BIM tool)

- Create a new project in Autodesk Quantity Takeoff as follows.
  - Name = Wall
  - Unit System = Metric
  - Currency = Rs.
  - Catalog = None
  - Import Files = Select the given file 'Wall Quantity Takeoff.dwf' (Figure 1)
- Switch to 'Takeoff' palette and create a group called as 'Material'.
- Create two items within the group called as 'Brick' and 'Plaster' (Figure 2).

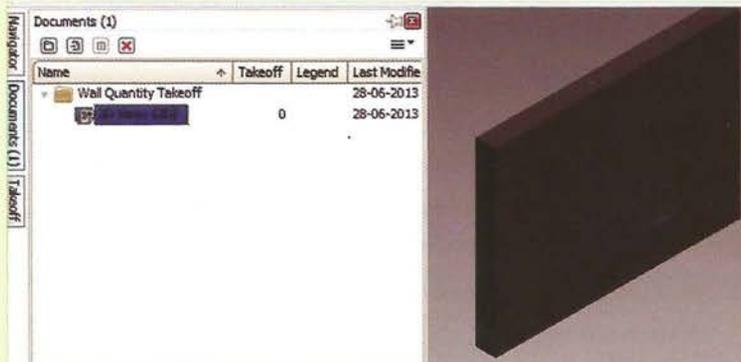


Fig 1: Document Palette

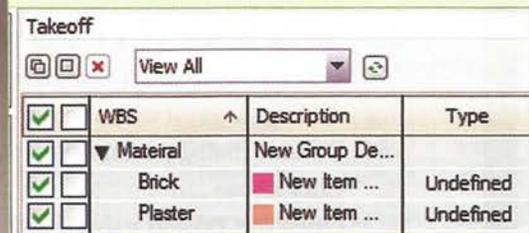


Fig 2: Material

- Double click on the 'Brick' material and set the properties as follows.
  - Type = Volume
  - Material Cost = Rs. 300/-
  - Labor Cost = Rs. 50/- (Figure 3)
- In the same way set the properties for 'Plaster' as follows.
  - Type = Volume
  - Material Cost = Rs. 15/-
  - Labor Cost = Rs. 7/-
- Create one more group 'Wall' with an item 'Standard Wall' (Figure 4).
- In the 'Takeoff Item Properties' of the 'Standard Wall' item;
  - Set the type to 'Volume'.
  - Switch to Assembly tab and Click on the '+' icon.
  - Select both the materials and add the same (Figure 5).

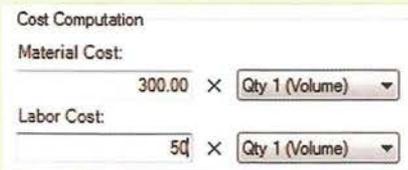


Fig 3: Cost Computation

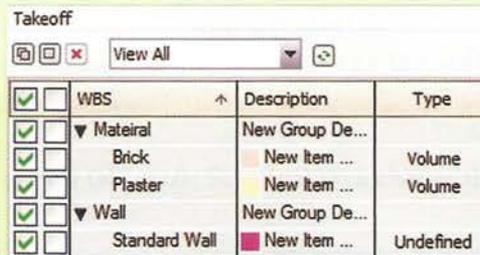


Fig 4: Wall



Fig 5: Wall Materials

- In the 'Material Plaster' click on Quantity 1 and enter the formula as 'Area\*2'. And set the unit as 'm<sup>2</sup>'.
- In the same way enter the formula 'Volume\*0.926' for the 'Material Brick' and set the unit as 'm<sup>3</sup>' (In the 3D model; Wall thickness = Brick work + Plastering) (Figure 6).
- Save these settings as a Catalog for future reference.
  - File menu » Export » Catalog
  - Enter a name as 'Wall Quantity Takeoff' and save
  - Select the imported model in the 'Document' palette and activate 'Model Takeoff' tool. And select on the wall model in the canvas. Close the confirmation dialog box (Figure 7).

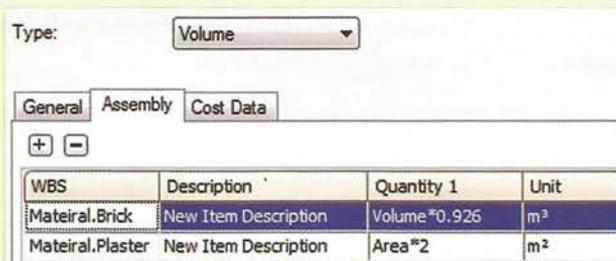


Fig 6: Assembly

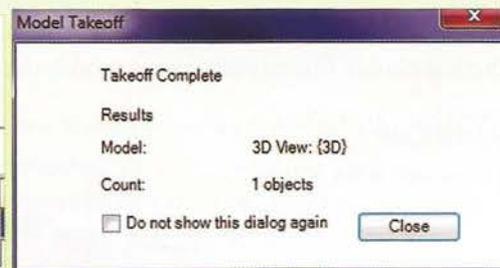


Fig 7: Model Takeoff

- Switch to 'Takeoff' palette. Drag the 'New item 1' wall into 'Standard Wall' (Figure 8).
- In the 'Workbook' expand the wall and check the quantities. Compare the results with manual calculation (Figure 9).

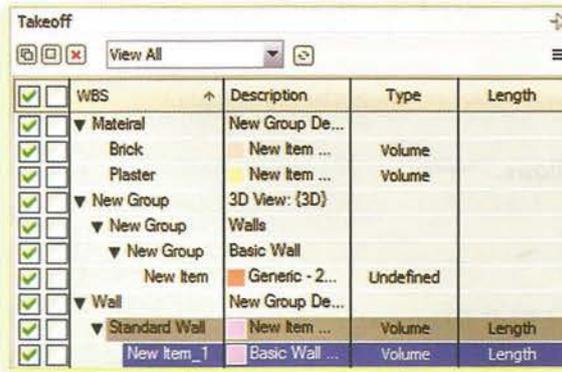


Fig 8: Drag Items

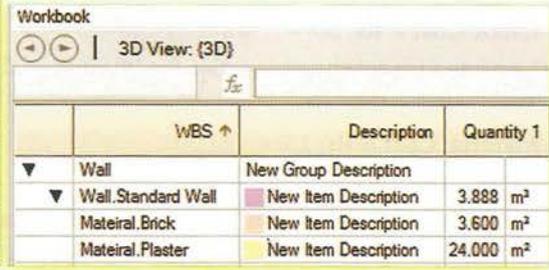


Fig 9: Wall Quantities

- Right click on the column headers of the Workbook; remove 'Remarks' column and add 'Material Cost', 'Labor Cost' and 'Total Cost'. Compare the results with manual calculation (Figure 10).
- Open the "Takeoff Item Properties" of the materials (Brick and Plaster) and change the cost as follows and check the updated result in workbook.
  - Material Cost
    - Brick work = Rs.350/m<sup>3</sup>
    - Plastering = Rs. 20/m<sup>2</sup>
  - Labor Cost
    - Brick work = Rs. 60/m<sup>3</sup>
    - Plastering = Rs. 10/m<sup>2</sup> (Figure 11)

WBS	Description	Quantity 1	Material Cost		Labor Cost		Total Cost
			Unit cost	Total	Unit cost	Total	
▼ Wall	New Group Description			1,440.09		348.01	1,788.10
▼ Wall.Standard Wall	New Item Description	3.888 m <sup>2</sup>		1,440.09		348.01	1,788.10
Material.Brick	New Item Description	3.600 m <sup>3</sup>	300.00	1,080.09	50.00	180.01	1,260.10
Material.Plaster	New Item Description	24.000 m <sup>2</sup>	15.00	360.00	7.00	168.00	528.00

Fig 10: Costing

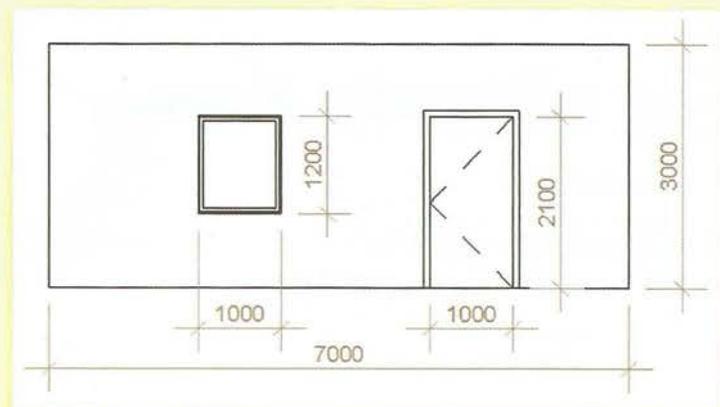
WBS	Description	Quantity 1	Material Cost		Labor Cost		Total Cost
			Unit cost	Total	Unit cost	Total	
▼ Wall	New Group Description			1,740.10		456.02	2,196.12
▼ Wall.Standard Wall	New Item Description	3.888 m <sup>2</sup>		1,740.10		456.02	2,196.12
Material.Brick	New Item Description	3.600 m <sup>3</sup>	350.00	1,260.10	60.00	216.02	1,476.12
Material.Plaster	New Item Description	24.000 m <sup>2</sup>	20.00	480.00	10.00	240.00	720.00

Fig 11: Updated Costing

## HANDS-ON: ESTIMATION AND COSTING OF A SINGLE WALL WITH OPENINGS

Prepare cost estimation for the wall as shown in the following figure (units are in mm). Assume the wall thickness as 230mm which includes 12mm plastering on both the sides.

- Material Cost
  - Masonry = Rs.350/m<sup>3</sup>
  - Plastering = Rs. 25/m<sup>2</sup>
- Labor Cost
  - Masonry = Rs. 60/m<sup>3</sup>
  - Plastering = Rs. 15/m<sup>2</sup>



**Manual Calculation**

Wall Volume = 4.071 m<sup>3</sup>  
 Volume of Masonry = 3.681 m<sup>3</sup>  
 Cost of Masonry = Rs. 1509.21/-  
 Area of Plastering = 35.4 m<sup>2</sup>  
 Cost of Plastering = Rs. 1,416/-  
**Total Cost = Rs. 2,925.21/-**

**Autodesk Quantity Takeoff**

- Create a new project in Autodesk Quantity Takeoff as follows.
  - Name = Wall with Openings
  - Unit System = Metric
  - Currency = Rs.
  - Catalog = Wall Quantity Takeoff (Created in the previous hands-on)
  - Import Files = Select the given file 'Wall with Openings.dwf'
  - In the 'Select Items to Import' dialog check all the items and Import (Figure 12).
- Switch to 'Takeoff' palette. Unlock the WBS structure and change the Masonry and Plaster materials costs as given in the problem.
- In the 'Takeoff Properties » Assembly tab' of the Standard Wall change the 'Quantity 1' of the Material.Wall to 'Volume\* 0.9041'.
- Select the imported model in the 'Document' palette and activate 'Model Takeoff' tool. And select on the wall model in the canvas. Close the confirmation dialog box.
- Switch to 'Takeoff' palette. Drag the 'New item 1' wall into 'Standard Wall'.
- In the 'Workbook' expand the wall and check the quantities. Compare the results with manual calculation (Figure 13).



Fig 12: Import Items

	WBS ↑	Description	Quantity 1
▼	Wall	New Group Description	
▼	Wall.Standard Wall	New Item Description	4.071 m <sup>3</sup>
	Material.Brick	New Item Description	3.681 m <sup>3</sup>
	Material.Plaster	New Item Description	35.400 m <sup>2</sup>

Fig 13: Wall Quantities

- Right click on the column headers of the Workbook; remove 'Remarks' column and add 'Material Cost', 'Labor Cost' and 'Total Cost'. Compare the results with manual calculation.

	WBS ↑	Description	Quantity 1	Material Cost		Labor Cost		Total Cost
				Unit cost	Total	Unit cost	Total	
▼	Wall	New Group Description			2,173.21		751.84	2,925.04
▼	Wall.Standard Wall	New Item Description	4.071 m <sup>3</sup>		2,173.21		751.84	2,925.04
	Material.Brick	New Item Description	3.681 m <sup>3</sup>	350.00	1,288.21	60.00	220.84	1,509.04
	Material.Plaster	New Item Description	35.400 m <sup>2</sup>	25.00	885.00	15.00	531.00	1,416.00

Fig 14: Costing

- In the 'Takeoff' palette, change the 'Door' and 'Window' type to 'Count'. As well as add the 'Cost' information also (Figure 15).
- If required, change the group name and check the 'Workbook' for the updates (Figure 16).

Fig 15: Door Type

WBS	Description	Quantity 1	Material Cost		Labor Cost		Total Cost	
			Unit cost	Total	Unit c.	Total		
Wall	New Group Description			18,17...		1,75...	19,925.04	
Wall_Doors & Windows	3D View: {3D}			16,00...		1,00...	17,000.00	
Wall_Doors & Windows.Doors	Doors			10,00...		500.00	10,500.00	
Wall_Doors & Windows.Windows	Windows			6,000...		500.00	6,500.00	
Wall.Standard Wall	New Item Description	4.071	m <sup>2</sup>	2,173....		751.84	2,925.04	
Material.Brick	New Item Description	3.681	m <sup>2</sup>	350.00	1,288....	60.00	220.84	1,509.04
Material.Plaster	New Item Description	35.400	m <sup>2</sup>	25.00	885.00	15.00	531.00	1,416.00

Fig 16: Cost

### 3.2 Search Takeoff Tool

Using the Search Takeoff tool, you can create takeoff using design data as search criteria. Object dimensions, family names, types, and other property data make it easy to quantify similar objects. For example, you can create takeoff objects for all rooms in a project that have a specific Room Type property. Search Takeoff is performed on the entire project.

When you select a piece of geometry on a sheet or model using the Search Takeoff tool, its properties are displayed in the Search dialog. You then select one or more properties to use as search criteria, and the Search Takeoff function queries the project and records all matching objects both on the Takeoff palette and in the Workbook. Select an item on the Takeoff palette prior to starting a search takeoff to have the results added to that item and named based on the item's family or style.

Note: In some cases, design objects are missing key identifiers (IDs) in the DWF files that are published from design applications. The Search Takeoff tool cannot create takeoff for design items that are missing IDs.

#### 3.2.1 To Perform a Search Takeoff

1. On the Documents palette, select a DWF sheet or model.
2. To add the takeoff objects to a group or item, select the group or item on the Takeoff palette. If no group or item is selected, the objects will be added to the root of the Takeoff palette.
3. On the toolbar, click Search Takeoff.
4. On the canvas, select the object you want to search for in the project. You can also perform a search takeoff by clicking Takeoff menu » Search, after you select an object on the canvas (Figure 17).
5. In the Search Takeoff dialog;
  - a. For Name, the item name from the model is displayed. If you selected an item on the Takeoff palette before clicking Search Takeoff, the name cannot be modified. If you selected a group or no entity on the Takeoff palette, you may modify the name.
  - b. For Item Type, if you selected an item on the Takeoff palette before clicking Search Takeoff, the Item Type value cannot be modified. If you selected a group or no entity on the Takeoff palette, select an item type for this takeoff, or select Undefined if you want to specify the item type later.
  - c. For Destination, the default value shows the location where the takeoff objects will be created. This value is either the path of the item or group you selected, or the root of the Takeoff

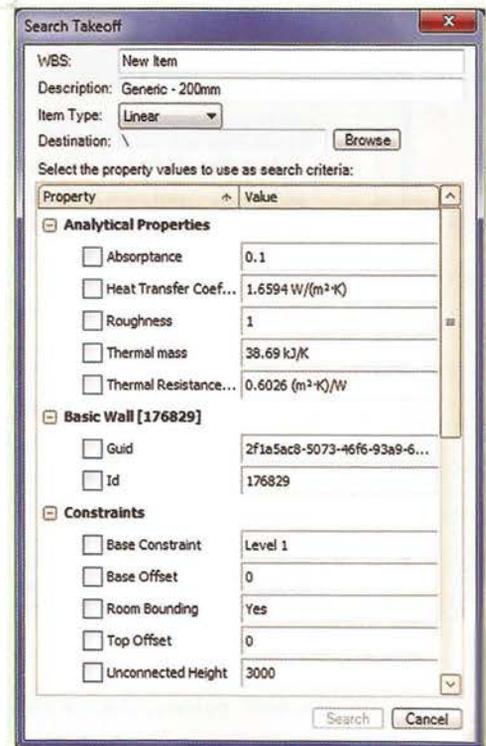


Fig 17: Search Takeoff Tool

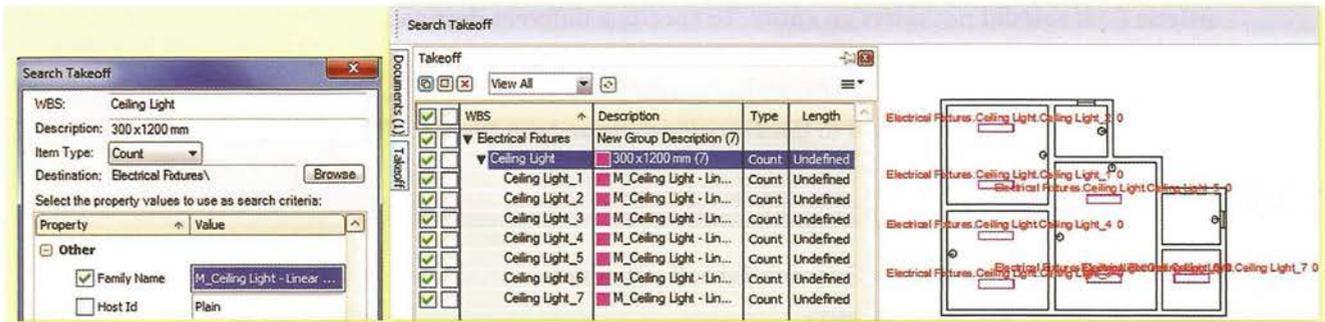


Fig 22: Search Takeoff

Fig 23: Search Takeoff

- Repeat the step numbers 4 and 5 to create the wall lamp schedule as follows (Figure 24).
- Expand and check the takeoff. As a total it has 13 Electrical Fixtures (Figure 25).
- Open the 'Ceiling Light–Takeoff Item Properties' and add the following cost values.
  - Material Cost = Rs. 1000/unit
  - Labor Cost = Rs. 100/unit (Figure 26)

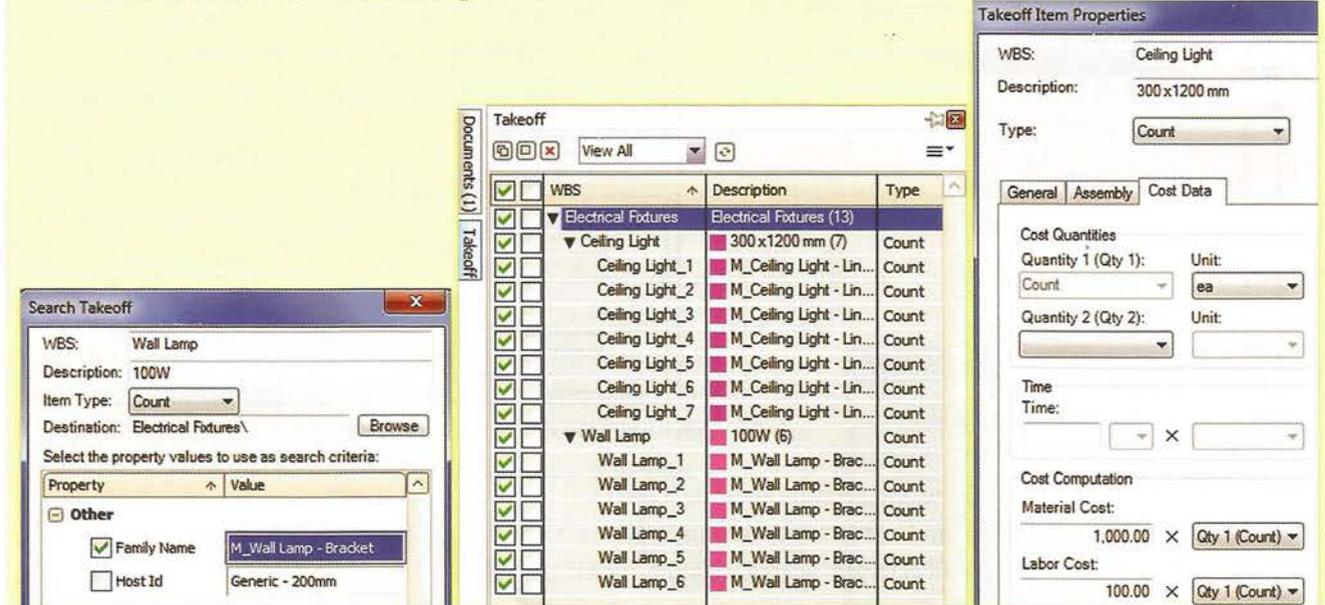


Fig 24: Search Takeoff

Fig 25: Takeoff

Fig 26: Cost data

- In the same way add the cost data for the wall lamp as follows.
  - Material Cost = Rs. 1450/unit
  - Labor Cost = Rs. 70/unit
- Customize the workbook columns to get the following report (Figure 27).

Workbook								
Electrical Fixtures								
	WBS	Description	Quantity 1	Material Cost		Labor Cost		Total Cost
				Unit cost	Total	Unit cost	Total	
▼	Electrical Fixtures	Electrical Fixtures			15,700.00		1,120.00	16,820.00
	Electrical Fixtures.Ceiling Light	300 x1200 mm	7.000 ea	1,000.00	7,000.00	100.00	700.00	7,700.00
	Electrical Fixtures.Wall Lamp	100W	6.000 ea	1,450.00	8,700.00	70.00	420.00	9,120.00

Fig 27: Workbook

- Change the Material and Labor cost and check the report.

### 3.3 Single-Click Auto Takeoff Tool

Using the Single-Click Auto Takeoff tool, you can create a takeoff measurement with a single click on a piece of geometry in a 3D model or 2D sheet. By default, the takeoff data you create with the Single-Click Auto Takeoff tool is grouped according to the family (or style) defined in the object's properties. However, on the Contextual Tools palette, you have the option of grouping the takeoff data by selection instead. When you group by selection, the takeoff is added to the group or item that is selected on the Takeoff palette. If you add the takeoff to an item, the object(s) display below the item, using the name from the object properties. If you add the takeoff to a group, an Auto item is created within the group, and the object(s) are added to that item. The grouping option you select becomes the default selection.

#### 3.3.1 To Perform a Single-Click Auto Takeoff

1. If the Contextual Tools palette is not displayed, click Window menu » Contextual Tools. This palette contains options for grouping the takeoff data you create with the Single-Click Auto Takeoff tool.
2. On the Documents palette, select a DWF sheet or model.
3. On the toolbar, click Single-Click Auto Takeoff.
4. On the Contextual Tools palette, select one of the grouping options.
  - a. **Family:** The takeoff data will be added to the group that matches the family (or style) of the object.
  - b. **Selection:** The takeoff data will be added to the group that is currently selected on the Takeoff palette.
5. If you are grouping by Selection, on the Takeoff palette, select the corresponding takeoff item.
6. On the canvas, select the object you want to measure. The geometry is marked up on the canvas, and the takeoff data is added to the Takeoff palette, based on your grouping option.
7. On the Takeoff palette, if the Type value for the object is Undefined, select the appropriate value for the item that contains the object. Type refers to the manner in which takeoff is calculated for that item.

Note: The first time you use this tool to group by family; all items in the group have 'Undefined' as their item type. When you define the item types, you create valid takeoff for those items and objects, and your selections are used to predictively assign item types during subsequent uses of the tool. You can specify whether last-used item types are used for subsequent automatic takeoffs.

## HANDS-ON

- Create a new project in Autodesk Quantity Takeoff as follows.
  - Name = Residential Building
  - Unit System = Imperial
  - Currency = Rs.
  - Catalog = None
  - Import Files = Select the given file 'Residential Building.dwf'

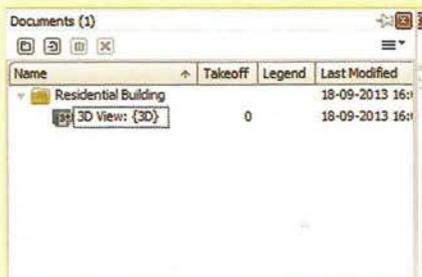


Fig 28: Residential Building

- Activate the 'Single Click Auto Takeoff' tool with 'Family' as the group option.



Fig 29: Single Click Auto Takeoff Tool

- Select the Parapet Walls of the model.

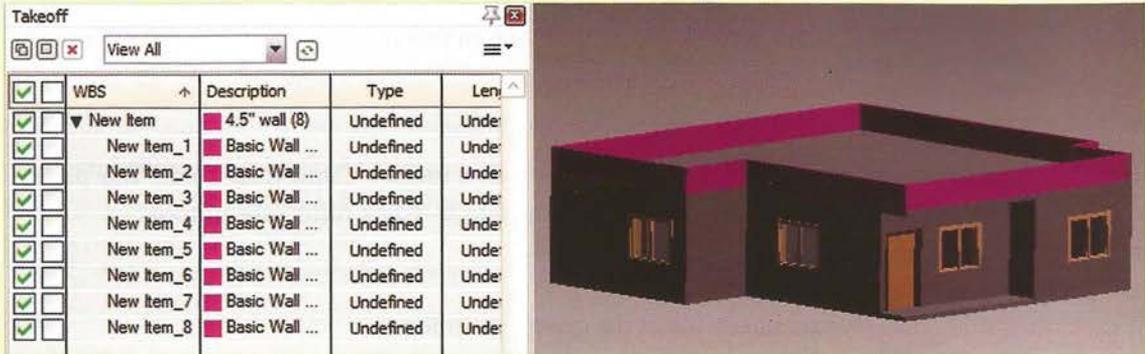


Fig 30: Takeoff

- In the 'Takeoff' palette Change the item properties as follows.
- WBS = Partition Wall
- Type = Volume
- In the 'Takeoff Item Properties' enter the Cost values.

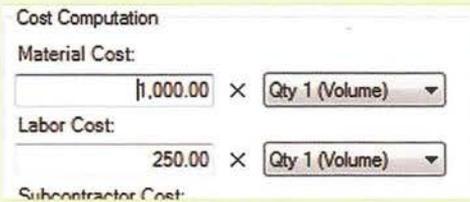


Fig 31: Cost

- Customize the 'Workbook' to get the following output.

WBS	Description	Quantity 1	Material Cost		Labor Cost		Total Cost
			Unit cost	Total	Unit cost	Total	
Partition Wall	4.5" wall	143.705 ft <sup>2</sup>	1,000.00	1,43,704.72	250.00	35,926.18	1,79,630.89

Fig 32: Workbook

- Repeat the above steps for the main walls, Slab, Windows and Ventilators.

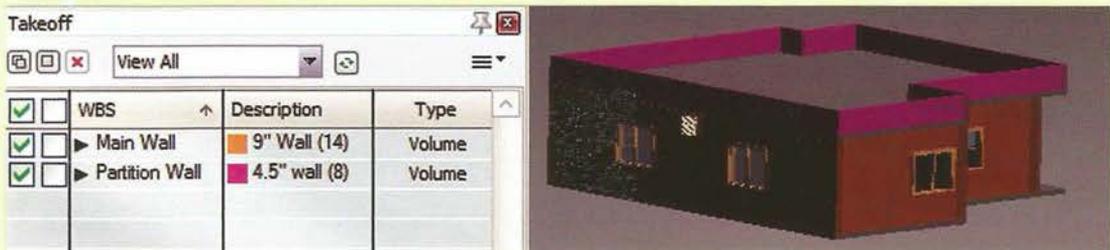


Fig 33: Main and Partition Walls

WBS	Description	Quantity 1	Material Cost		Labor Cost		Total Cost
			Unit cost	Total	Unit cost	Total	
Main Wall	9" Wall	1,231.652 ft <sup>2</sup>	1,000.00	12,31,652.23	250.00	3,07,913.06	15,39,565.29
Partition Wall	4.5" wall	143.705 ft <sup>2</sup>	1,000.00	1,43,704.72	250.00	35,926.18	1,79,630.89

Fig 34: Main and Partition Walls

Takeoff

View All

WBS	Description	Type
▶ Floor Slab	Floor Slab - 6" ...	Volume
▶ Main Wall	9" Wall (14)	Volume
▶ Partition Wall	4.5" wall (8)	Volume
▶ Roof Slab	Roof Slab - 6" ...	Volume
▶ Ventilators	2' X 2' (2)	Count
▶ Window	5' X 4' (3)	Count
▶ Window 1	4' X 4' (4)	Count

WBS	Description	Quantity 1	Material Cost		Labor Cost		Total Cost
			Unit cost	Total	Unit cost	Total	
Floor Slab	Floor Slab - 6"	650.695 ft <sup>2</sup>	600.00	3,90,416.99	200.00	1,30,139.00	5,20,555.99
Main Wall	9" Wall	1,231.652 ft <sup>2</sup>	1,000.00	12,31,652.23	250.00	3,07,913.06	15,39,565.29
Partition Wall	4.5" wall	143.705 ft <sup>2</sup>	1,000.00	1,43,704.72	250.00	35,926.18	1,79,630.89
Roof Slab	Roof Slab - 6"	650.695 ft <sup>2</sup>	600.00	3,90,416.99	250.00	1,62,673.75	5,55,090.74
Ventilators	2' X 2'	2.000 ea	900.00	1,800.00	150.00	300.00	2,100.00
Window	5' X 4'	3.000 ea	2,500.00	7,500.00	200.00	600.00	8,100.00
Window 1	4' X 4'	4.000 ea	2,000.00	8,000.00	200.00	800.00	8,800.00

Fig 35: Slab, Window, Ventilator

# 4 CHAPTER

## 4 VIEWING AND VALIDATING TAKEOFF DATA

After you create takeoff data using automatic or manual takeoff tools, it is important to review and validate the data to ensure the quality of the information.

When you create takeoff data in QTO, takeoff markup is displayed on the canvas, each measurement is recorded as an object on the Takeoff palette, and quantity and cost data is aggregated in the Workbook. All of this data is linked in a 3-way cross-reference. Therefore, when you select takeoff geometry on the canvas, the corresponding object is selected both on the Takeoff palette and in the Workbook. Similarly, when you select an object on the Takeoff palette or in the Workbook, the takeoff geometry is selected on the canvas. This 3-way visual cross-referencing of objects—on the canvas, at the project level (Takeoff palette), and at the sheet or project level (Workbook)—is designed to help you validate takeoff data.

Only items that have a measurable value display in the Workbook. Items are measurable when they have both a defined Type value (either Linear, Area, Volume, or Count) and a defined property for at least one dimension.

### Methods to validate takeoff data

- Verify that when you select an object on the Takeoff palette, the same object is selected in the Workbook and on the canvas.
- Right-click the object on the Takeoff palette, click Views, and click a view drawing on the list that displays. QTO zooms in to that object on the canvas.
- Right-click the object on the canvas, and click Locate Object. The corresponding object is selected on the Takeoff palette.
- Use the Search feature to locate all occurrences of a word or phrase, and select a specific search result to view the related takeoff data.

### 4.1 Compare

Use the Compare feature to compare a 2D DWF sheet (base sheet) from your current takeoff project with another 2D DWF sheet (target sheet), either in the same project or in an external location. The Compare feature detects any differences between the two sheets and displays the results in two ways: As numeric values in the Additions and Deletions columns on the Documents palette, and as a color-coded visual representation of additions and deletions on the canvas. This visual representation, called the comparison result, is saved on the Documents palette as a subdocument of the base sheet.

Sheet comparisons are an essential tool for managing sheet versions. When you receive updated sheets from a designer after you have completed takeoff on the original sheets, use the Compare feature to see the extent of the sheet modifications. Based on the comparison results, you can determine whether to modify the takeoff on the original sheets or, if the changes are extensive, whether it is better to abandon the original takeoff and create takeoff for the updated sheets. Alternatively, you can run the sheet comparison, mark up the updated sheets, and then send the comparison results and markups to the designer.

**Note:** Comparisons run faster when your target sheet is in an external location rather than imported into the current project. Generally, it is advantageous to evaluate the percentage of change on an updated sheet before importing it into a project.

**Note:** Although models are available for selection, the Compare feature cannot be run on models. Attempting to do so results in an error message.

### ***To Compare Sheets***

- On the Documents palette, select a 2D DWF sheet to use as the basis for your comparison (base sheet).
- If takeoff graphics are displayed on the canvas, on the Takeoff palette, click the Show all/Hide all check box, located to the left of the column headers. This check box controls the visibility of all takeoff graphics on the canvas. Turning off takeoff graphics improves the view of the color-coded additions and deletions that are displayed in the comparison results.
- Click Compare on the palette toolbar. You can also click Document menu » Compare, or right-click the document and click Compare.
- In the Compare dialog, under Select File, do one of the following:
  - Select Current Project if you want to compare the base sheet with a target sheet in the same (current) project.
  - Select External File if you want to compare the base sheet with a target sheet in another project or in a non-project folder on your computer or network.
- Based on the location of the target sheet, do one of the following:
  - If you selected Current Project, select a 2D DWF sheet from those displayed in the Compare dialog.
  - If you selected External File, click Browse, navigate to and select a 2D DWF sheet, and then click Open.

When you select a target sheet, the title bar of the Compare dialog is updated with the name of the sheet.

- To modify the on-canvas display of additions (green, by default) and deletions (red, by default), click Options, and modify the default values in the Compare Options dialog as needed:
  - When you click a default color, the Color dialog opens. Select a different standard color or create a custom color, and click OK.
  - The Opacity percentage controls the depth of color applied to the additions and deletions on the canvas. The higher the opacity percentage, the darker the color.
- In the Compare dialog, click OK.

### ***Review the Comparison Results***

- When differences are detected, markups are visible on the canvas. Additions (green, by default) identify any graphics in the target sheet that are not in the base sheet. Deletions (red, by default) identify any graphics in the base sheet that are not in the target sheet.
  - To toggle additions off and on, click Document menu » Display » Additions.
  - To toggle deletions off and on, click Document menu » Display » Deletions.
- On the Documents palette, scroll to the Additions and Deletions columns to see the number of additions and deletions found by the comparison operation.

- If no differences are found by the comparison operation, the Comparison Result message box reports this result, and no comparison document is added to the Documents palette.
- If the comparison cannot be performed (for example, if you have selected a model for comparison), the Comparison Result message box displays. Review the message, and click OK.

The comparison result is saved on the Documents palette as a subdocument of the base sheet, using a VS Target Project:Target Sheet naming convention. Rename the comparison result if you want, using a descriptive name to maintain the usefulness of the comparison as a reference document.

## HANDS-ON

- Create a new project as follows.
  - Name: Compare
  - Unit System: Imperial
  - Currency: Rs.
  - Catalog: None
  - Import Files: Base Plan.DWF

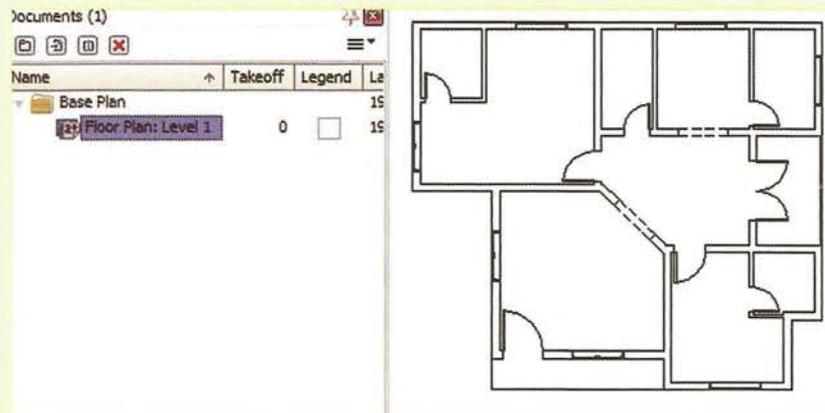


Fig 1: Base Plan

- Document menu » Compare
  - Select 'External File' option and browse to the given 'Target Plan.DWF' (Figure 2)
  - Set the colors for the display by activation 'Options' (Figure 3).

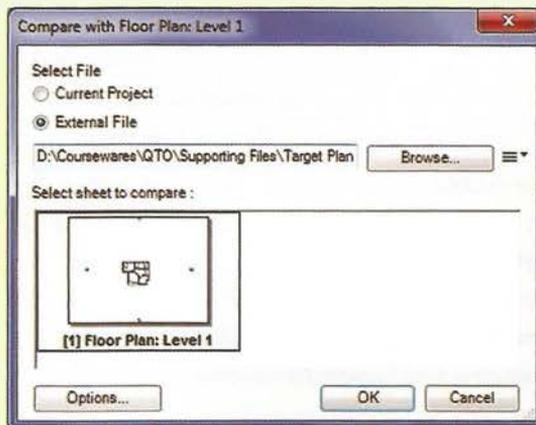


Fig 2: Compare

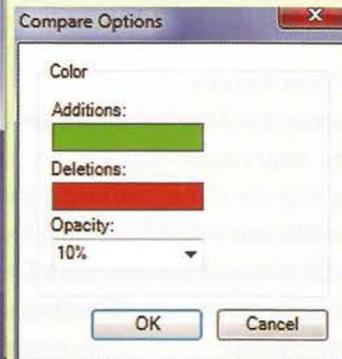
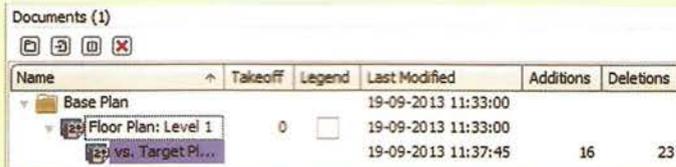


Fig 3: Compare Options

- Select 'OK' in the compare dialog and check the reports (Figure 4&5).
- Use the 'Document menu » Display' to change the colour for the additions and deletions display and toggle the same (Figure 6).



Name	Takeoff	Legend	Last Modified	Additions	Deletions
Base Plan			19-09-2013 11:33:00		
Floor Plan: Level 1	0	<input type="checkbox"/>	19-09-2013 11:33:00		
vs. Target Pl...			19-09-2013 11:37:45	16	23

Fig 4: Document Palette

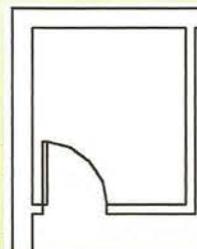


Fig 5: Additions



Fig 6: Display

## 4.2 Reports

Create reports to see summarized or detailed takeoff data for your entire project or a selected portion of it. QTO provides the following report types that you customize by making selections in the Report dialog:

- **Summary:** A cost report that can include quantities and cost information for each takeoff group that contains takeoff data.
- **Group (Items Only):** A detail report that can include quantity and cost information for each item in your project.
- **Group (Items and Objects):** A detail report that can include quantity and cost information, object properties and dimensions, and sheet location for each item and object in your project.
- **Material (Items Only):** A bill of materials that can include quantities and cost information for each item in your project.
- **Material (Items and Objects):** A bill of materials that can include quantity and cost information, object properties and dimensions, and sheet location for each item and object in your project.

To generate a report, specify the report type, content, and layout elements that suit your needs. The report is displayed on the canvas and added to the Documents palette for future reference. In addition, the report name is added to the Recent Reports list on the Report menu, where you can select it to generate future reports, using the previously saved report settings. The Recent Reports list displays the last 10 reports generated from the current project.

When you select a report from the Recent Reports list, QTO uses the predefined settings as a report template, gathering the specified takeoff data from the current project and generating a new report. Predefined reports provide single-click reporting. Each time you run a report from the Recent Reports list, the newly generated report includes any modifications you have made to the takeoff data since the report was last run.

Any reports you generate are displayed on the Documents palette as documents, which can be viewed, printed, and exported. Report documents and predefined reports (that is, Recent Report menu items) are saved within their respective projects.

When you select a report from the Recent Reports list, QTO uses the predefined settings as a report template, gathering the specified takeoff data from the current project and generating a new report. Predefined reports provide single-click reporting.

**Note:** If you publish a takeoff project to a DWF file, reports are not included.

### 4.2.1 Reports Dialog

#### General Tab

- Name:** By default, the project name is used as the report name. Give reports descriptive names based on report type and content which helps to easily distinguish among various reports listed on the Documents palette and the Recent Reports menu.
- Report Type:** The Report Type value controls the content that can be specified for the report. Material reports can include quantity and cost information, object properties and dimensions, and sheet location for each item and object in your project. The actual content of the report is determined by your selections on the General tab and Columns tab. For example, to generate a report that shows only cost by item (excluding object data and quantities), you would select the Material (Items Only) report type and specify only cost-related columns.
- Level of Hierarchy:** Takeoff entities are the takeoff groups and items that are defined on the Takeoff palette for the current project. The Level of Hierarchy value controls how many levels of groups are displayed in the entities tree that makes up the Available list. For example, if you specify 1, the entities tree includes only top-level groups. If you specify 0, the entities tree includes no groups, only items.

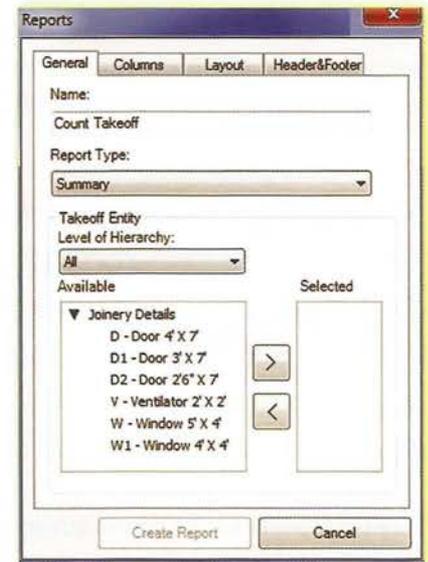


Fig 7: Reports-General tab

#### Column Tab

The report type you selected determines the columns that are available. The Description column is included for all report types. You can rearrange columns using the and buttons (Figure 8).

#### Layout Tab

The settings you specify on the Layout tab determine how the report will look on the screen or on paper. The 'Include page breaks after each group' helps you to split the takeoff table based on the groups. If you want to show the table border lines, use the 'Show Grid' option. You can control the report width with the help of Orientations (Figure 9).

#### Header & Footer

On the Header & Footer tab, you can select predefined information, such as page numbers, your company name, the date, and the author. You may also specify a logo or other graphic image file to include in the header or footer (Figure 10).

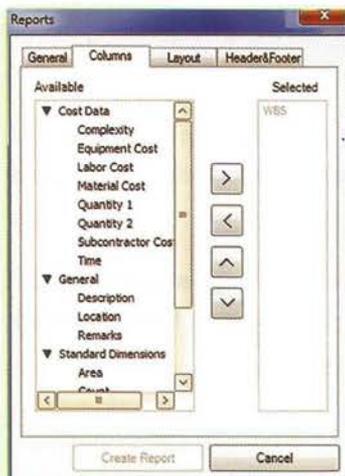


Fig 8: Reports-Column Tab



Fig 9: Reports-Layout Tab

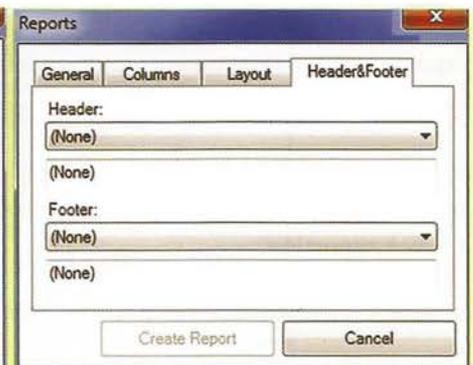


Fig 10: Reports-Header & Footer Tab

## HANDS-ON: CREATING CUSTOM REPORTS

- Open the saved project 'Residential Building.ato'
- Report Menu » Custom Reports (Figure 11)
- In the 'General' Tab of the Reports dialog set the following;
  - Name = Model Report
  - Report Type = Material (Items Only)
  - Level of Hierarchy = All
  - In the Available list, select all items and move to the Selected list (Figure 12).



Fig 11: Report Menu

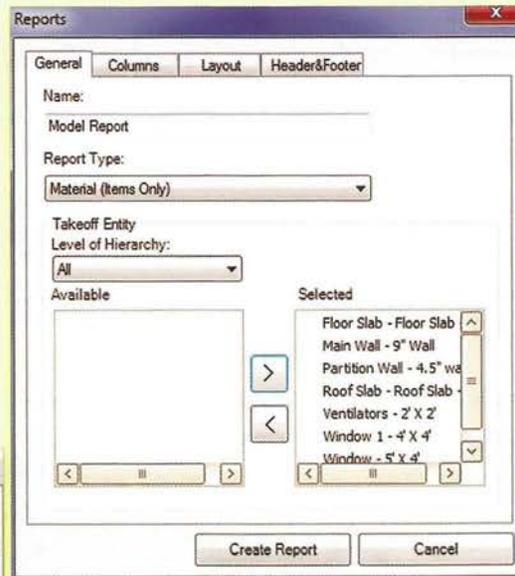


Fig 12: Reports-General tab

- In the 'Columns' tab' move Description, Quantity 1, Material Cost and Labor Cost from Available list to Selected List. Use the  $\uparrow$  and  $\downarrow$  button to rearrange the columns (Figure 13).
- In the 'Layout' tab;
  - Select 'Show Grid' under Options
  - Select 'Landscape' under Orientation (Figure 14)
- In the Header & Footer tab set the header as shown in the following image (Figure 15).



Fig 13: Reports-Columns tab

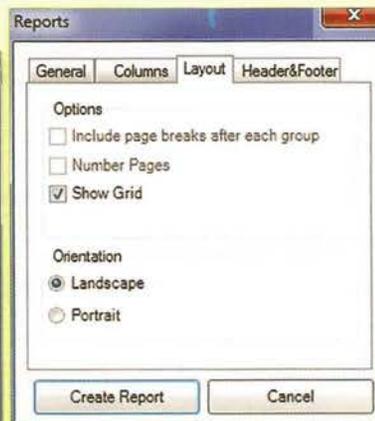


Fig 14: Reports-Layout tab

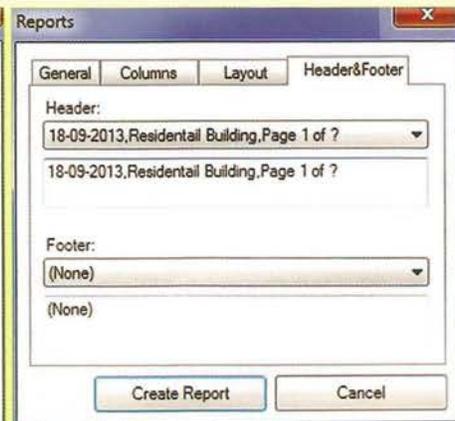


Fig 15: Reports-Header & Footer tab

■ Create the Report.

18-09-2013 Model Report Page 1 of 1

Material (Items Only)

WBS	Description	Quantity 1		Material Cost		Labor Cost		Total Cost
				Unit Cost	Total Cost	Unit Cost	Total Cost	
<b>Materials</b>								
								<b>Rs.2,813,842.92</b>
FloorSlab	FloorSlab - 6"	650.695	ff	600.00	390,416.99	200.00	130,139.00	520,555.99
Main Wall	9" Wall	1,231.652	ff	1,000.00	1,231,652.23	250.00	307,913.06	1,539,565.29
Partition Wall	4.5" wall	143.705	ff	1,000.00	143,704.72	250.00	35,926.18	179,630.89
RoofSlab	RoofSlab - 6"	650.695	ff	600.00	390,416.99	250.00	162,673.75	555,090.74
Ventilator	2' X 2'	2.000	ea	900.00	1,800.00	150.00	300.00	2,100.00
Window	5' X 4'	3.000	ea	2,500.00	7,500.00	200.00	600.00	8,100.00
Window 1	4' X 4'	4.000	ea	2,000.00	8,000.00	200.00	800.00	8,800.00
<b>Total Cost</b>								<b>Rs.2,813,842.92</b>

Fig 16: Report

Note: The report is added to the Documents palette and displayed on the canvas.

### 4.3 Exporting Takeoff Data

There are several methods for exporting QTO data: from the Workbook, as a catalog, or from a report. When you export data, you transfer it from QTO to another format, such as XML (a format widely supported by applications such as Microsoft Excel and Microsoft Word), TXT, or Comma Separated Variable (CSV) format, which is a text file. Although exporting can be used as a secondary reporting method, it is primarily used to transfer data to another application.

#### To Export Workbook data

1. Open a Sheet which contains the takeoff data.
2. Click File menu » Export » Quantities (Figure 17).
3. In the Export Quantity Options dialog select the suitable options (Figure 18).



Fig 17: Export » Quantities



Fig 18: Export Quantity

- The 'All Sheets' option exports takeoff data from all sheets in the project where the 'Current Sheet Only' option exports takeoff data from the current sheet.
- Select Export Hidden Takeoff to include data from takeoff groups, items, and objects that are currently hidden.

4. In the Export Quantities dialog:

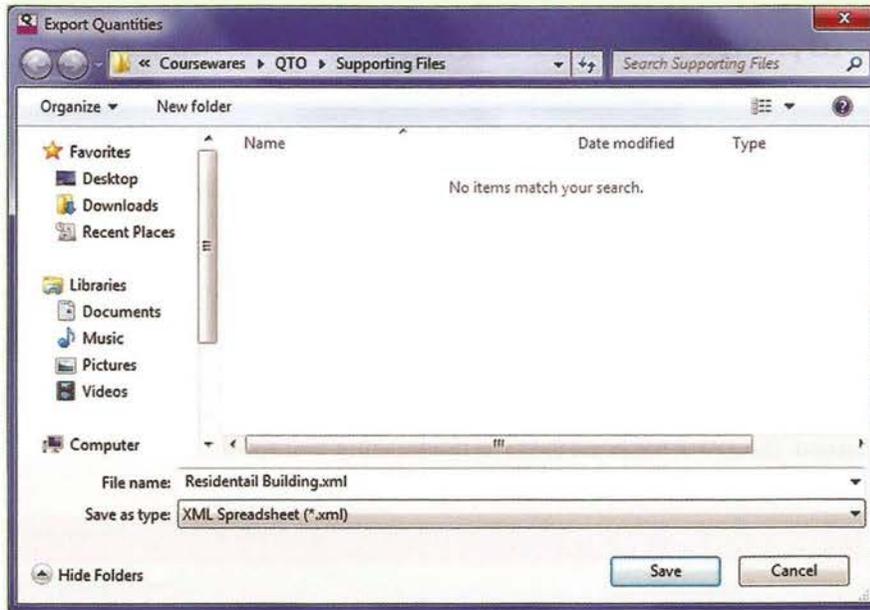


Fig 19: Exports Quantities

- Navigate to the desired export location.
  - For File name, enter a descriptive name.
  - For Save as type, select either XML Spreadsheet (\*.xml) or GAEB Data Exchange XML v3.0 (\*.x81).
  - Click Save.
5. Open the export file to view the takeoff data.

#### To Export a takeoff catalog

1. Click File menu » Export » Catalog, or click Takeoff palette menu » Save as Catalog.
2. In the Save as Catalog dialog:
  - a. Navigate to the desired export location.
  - b. For File name, enter a descriptive name.
  - c. For Save as type, select either Takeoff Catalog (\*.att), CSV (Comma delimited) (\*.csv), or Tab Separated Variable (\*.txt).
  - d. Click Save.

#### To Export report data

1. At the top of the report preview, click Export (Figure 20).
2. In the Export Report dialog:
  - a. Navigate to the desired export location.
  - b. For File name, enter a descriptive name.
  - c. For Save as type, select either Crystal Reports (\*.rpt), Adobe Acrobat (\*.pdf), Microsoft Excel (\*.xls), Microsoft Excel Data Only (\*.xls), Microsoft Word (\*.doc), or Rich Text Format (\*.rtf).
  - d. Click Save.
3. In the Export Report message box, click OK.
4. Open the export file to view the data.

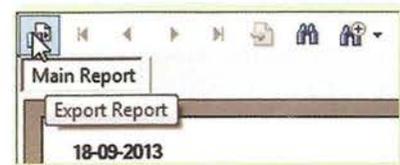


Fig 20: Export Report



4. Expand the groups in the 'Takeoff' palette and check the extracted items.

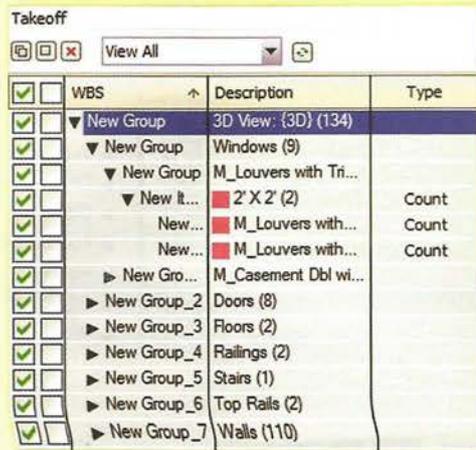


Fig 23: Takeoff Palette

5. Rename the Groups, Sub-groups and items as follows. Wherever required duplicate (or) delete the g

▼ Windows & Ventilators	Windows (9)		
▼ Windows	M_Casement Dbl wi...		
▼ W1	4' X 4' (4)	Count	
W1-1	M_Casement D...	Count	
W1-2	M_Casement D...	Count	
W1-3	M_Casement D...	Count	
W1-4	M_Casement D...	Count	
▼ W	5' X 4' (3)	Count	
W-1	M_Casement D...	Count	
W-2	M_Casement D...	Count	
W-3	M_Casement D...	Count	
▼ Ventilators	M_Louvers with Tri...		
▼ V	2' X 2' (2)	Count	
V-1	M_Louvers with...	Count	
V-2	M_Louvers with...	Count	

Fig 24: Renamed Windows Group

▼ Doors	Doors (8)		
▼ D3	2.5' X 7' (4)	Count	
D3-1	M_Single-Flush ...	Count	
D3-2	M_Single-Flush ...	Count	
D3-3	M_Single-Flush ...	Count	
D3-4	M_Single-Flush ...	Count	
▼ D2	3' X 7' (2)	Count	
D2-1	M_Single-Flush ...	Count	
D2-2	M_Single-Flush ...	Count	
▼ D	4' X 7' (1)	Count	
D	M_Single-Flush ...	Count	
▼ D1	Door (1)	Count	
D1	M_Double-Glas...	Count	

Fig 25: Renamed Doors Groups

▼ Slab	Floors (2)		
▼ Floor Slab	Floor Slab - 6" (1)	Volume	
Floor Slab	Floor [185474]	Volume	
▼ Roof Slab	Roof Slab - 6" (1)	Volume	
Roof Slab	Floor [185975]	Volume	

Fig 26: Renamed Slab Groups

▼ Railing	Railings (4)		
▼ Railing	1100mm (2)	Count	
Rear Railing	Railing [186594]	Count	
Front Railing	Railing [188451]	Count	
▼ Hand Rail	Rectangular - 5...	Count	
Rear Back Rail	Top Rail Type [...]	Count	
Front Hand Rail	Top Rail Type [...]	Count	

Fig 27: Renamed Railing Groups

▼ Staircase	Stair (1)		
▼ Staircase	190mm max rise...	Volume	
Staircase	Stair [188354]	Volume	

Fig 28: Renamed Stair Group

6. Create a new group called as 'Foundation' and move the items related to foundation from the wall group to the created foundation group (Figure 29).

7. Rename the items as per the requirement (Figure 30).

▼ Foundation	New Group Description (...)		
▶ New Item_2	Damp Proof Course (...)	Volume	
▶ New Item_3	Foundation Brick (20)	Volume	
▶ New Item_4	Foundation Concrete...	Volume	
▶ New Item_5	Plinth (20)	Volume	

Fig 29: Foundation Group

▼ Foundation	New Group Description (...)		
▶ Damp Proof Course	Damp Proof Course (...)	Volume	
▶ Foundation Brick W...	Foundation Brick (20)	Volume	
▶ Foundation Concrete	Foundation Concrete...	Volume	
▶ Plinth	Plinth (20)	Volume	

Fig 30: Renamed Foundation Items

8. Rearrange the wall group.

▼ Wall	Basic Wall (30)	
▶ Partition Wall	4.5" wall (14)	Volume
▶ Main Wall	9" Wall (16)	Volume

Fig 31: Wall Group

Takeoff		
View All		
<input checked="" type="checkbox"/>	WBS	Description
<input checked="" type="checkbox"/>	▼ BIM Project	(134)
<input checked="" type="checkbox"/>	▶ Wall	Basic Wall (30)
<input checked="" type="checkbox"/>	▶ Doors	Doors (8)
<input checked="" type="checkbox"/>	▶ Slab	Floors (2)
<input checked="" type="checkbox"/>	▶ Foundation	Foundation (80)
<input checked="" type="checkbox"/>	▶ Railing	Railings (4)
<input checked="" type="checkbox"/>	▶ Staircase	Stair (1)
<input checked="" type="checkbox"/>	▶ Windows & Ventilators	Windows (9)

Fig 32: Final Group Structure

9. Add the cost value for all the items.

Workbook							
3D View: {3D}							
	WBS	Description	Material Cost		Labor Cost		Total Cost
			Unit cost	Total	Unit cost	Total	
▼	BIM Project			28,16,235.29		4,89,951.83	33,06,187.12
▶	BIM Project.Door	Doors		22,500.00		2,250.00	24,750.00
▶	BIM Project.Foundation	Foundation		11,54,034.91		2,43,086.78	13,97,121.69
▶	BIM Project.Railing	Railings		5,600.00		400.00	6,000.00
▶	BIM Project.Slab	Floors		7,80,833.98		1,17,125.10	8,97,959.08
▶	BIM Project.Staircase	Stair		1,500.00		300.00	1,800.00
▶	BIM Project.Wall	Basic Wall		8,34,266.40		1,25,139.96	9,59,406.36
▶	BIM Project.Windows & Ventilators	Windows		17,500.00		1,650.00	19,150.00

Fig 33: Workbook

10. Follow the below given steps to create the Abstract Estimation.

- a. Reports menu » Custom Reports
  - i. In General tab;
    - Name = Abstract Estimation
    - Report Type = Groups (items only)
    - Level of Hierarchy = All
    - Select the 'BIM Project' in the Available list and load the same into Selected list.

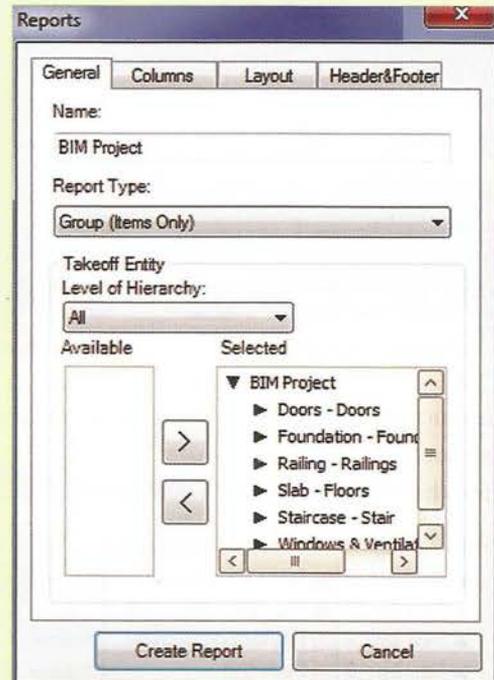


Fig 34: General Tab

- b. In the Columns tab, select the following.
  - i. Description
  - ii. Material Cost
  - iii. Labor Cost (Figure 35)
- d. In the Layout tab, select 'Show Grid' and 'Landscape'.
- e. In the Headers and Footers tab,
  - i. Header » Insert the Company Logo
  - ii. Footer » Set the page numbers (Figure 36)



Fig 35: Columns Tab



Fig 36: Header & Footer

Group(Items Only)

WBS	Description	Material Cost		Labor Cost		Total Cost
		Unit Cost	Total Cost	Unit Cost	Total Cost	
<b>BIM Project</b>						<b>Rs.2,346,780.77</b>
BIM Project.Doors						24,750.00
BIM Project.Doors.D	4'X 7'	5,000.00	5,000.00	400.00	400.00	5,400.00
BIM Project.Doors.D1	Door	4,500.00	4,500.00	350.00	350.00	4,850.00
BIM Project.Doors.D2	3'X 7'	2,500.00	5,000.00	250.00	500.00	5,500.00
BIM Project.Doors.D3	2.5' X 7'	2,000.00	8,000.00	250.00	1,000.00	9,000.00
BIM Project.Foundation						1,397,121.65

Fig 37: Abstract Estimation

- 11. Export the report to '\*.XML' format.
  - a. File » Export » Quantities
  - b. Select 'All Sheets' and 'Export Hidden Takeoff' options



Fig 38: Export Quantities



**CADD<sup>®</sup>**  
**CENTRE**

# Customer Notification

**Dear valued customer,**

We request you to keep yourself updated on the deliverables of CADD Centre and the following important steps to be taken during all processes, right from the counselling till the completion of course.

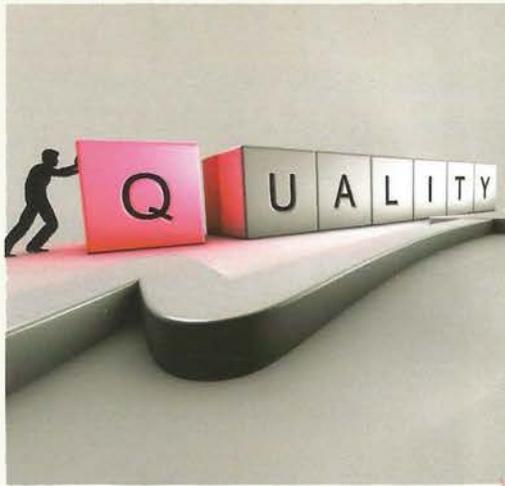
## 1 During the counselling

- ◆ Confirm that the centre has a valid "Authorisation Certificate" issued by CADD Centre Corporate Office
- ◆ Have the course objectives explained to you in detail
- ◆ Obtain the course summary brochure for future reference
- ◆ Have a Demonstration of key features of the software tools
- ◆ Look for the "Certificate of Expertise", given to the centre, to assure its technical expertise
- ◆ Check for the course chart & choose a program



## 2 During enrollment

- ◆ Pay as per the prescribed course fee; collect the receipt for fee with applicable tax paid
- ◆ Activate your student ID by clicking the link sent to your email
- ◆ Check your email account and collect your unique student ID number, it is must for your certification
- ◆ Maintain the email communication received for your future reference
- ◆ Provide your unique Student ID number to the centre and keep it for your future communication



## 3 During the delivery of courses

- ◆ Get the CADD Centre ID card to avail reference schemes
- ◆ Collect CADD Centre's printed reference guide for all modules
- ◆ Collect CADD Centre's project workbook for practical sessions
- ◆ Know day-wise course break up containing complete syllabus
- ◆ Have theory and practical training from a qualified instructor
- ◆ Tear-off the course completion form attached with each courseware; fill it with signature, submit it at the end of every module; this is a must for your certificate process

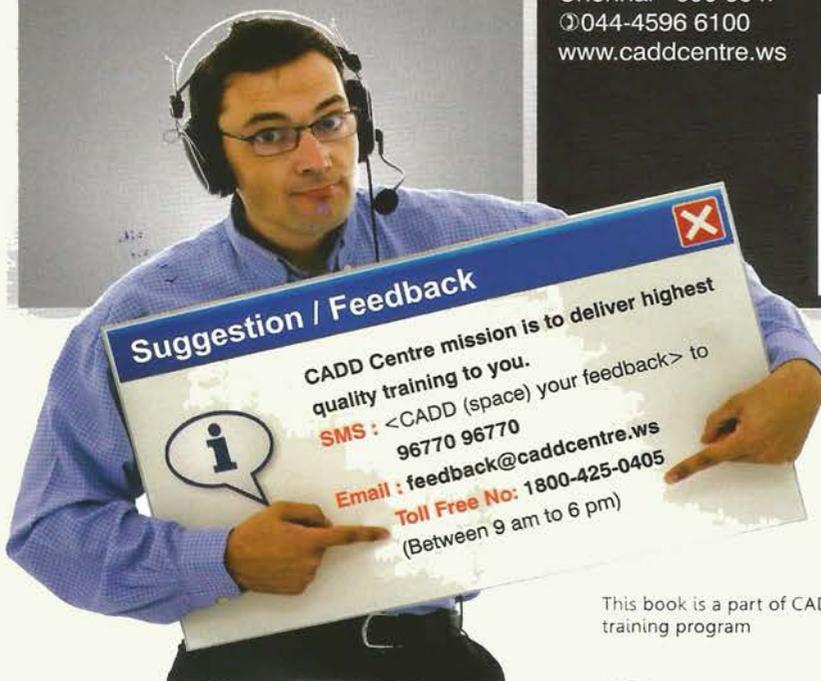
### Corporate Office:

#91, Office No: 8C & 8D, 8<sup>th</sup> Floor,  
GEE GEE Crystal,  
Dr. Radhakrishnan Salai, Mylapore,  
Chennai - 600 004.  
☎044-4596 6100  
[www.caddcentre.ws](http://www.caddcentre.ws)



## 4 On completion of the course

- ◆ You will receive your digital certificate on your registered email ID
- ◆ Verify your certificate at [www.caddcentre.ws](http://www.caddcentre.ws) with your student ID
- ◆ Upload your resume at [www.skillease.co.in](http://www.skillease.co.in) for free placement assistance



This book is a part of CADD Centre training program

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Driving Digital Designs!