

# Every Building Has Its Price: Finding It with Autodesk® Navisworks® Manage 2014 Quantification

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# Class summary

Every building truly does have its price and one of the most time-consuming items during the estimation process is to perform and complete a building takeoff. In this lecture, we teach you how to use Navisworks Manage 2014 Quantification workflows to help you minimize your time doing takeoffs. We use 3D models (Autodesk® Revit® Architecture software) to complete our tasks in this class. You learn to understand the Navisworks Manage 2014 Quantification software interface and the tools in the software, and leave the class feeling ready to tackle the coming takeoff challenges.

# Key learning objectives

At the end of this class, you will be able to:

- Learning Objective 1: Create formulas with the Resource tool
- Learning Objective 2: Use new workflows that Navisworks Manage Quantification provides
- Learning Objective 3: Explain the concepts and processes behind virtual and model takeoff
- Learning Objective 4: Analyze, validate, and export data into XLS format

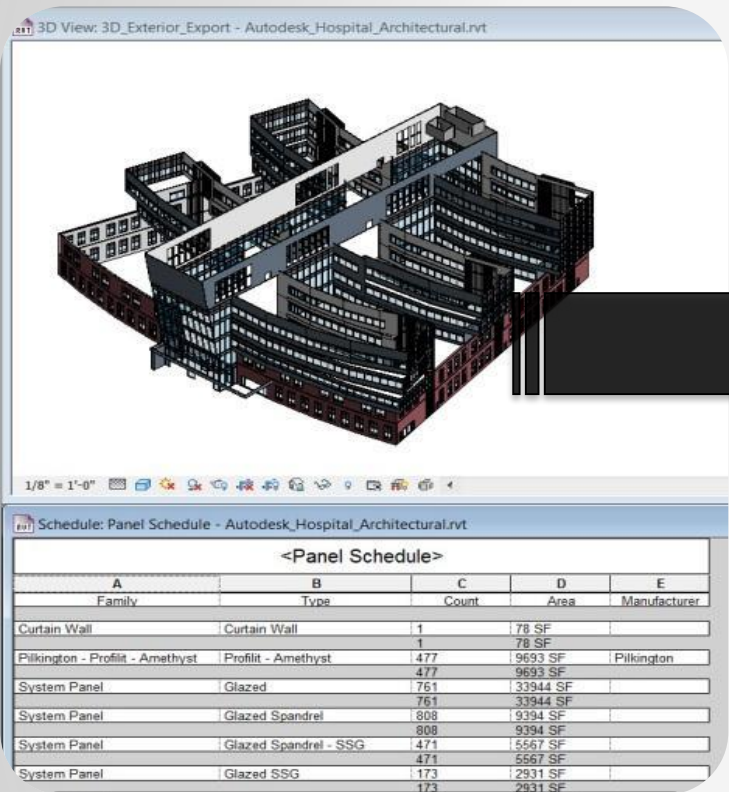
# Getting Started – Quantification Tools

Before we get into the hands on, lets explore some of the interface, terminology and tools we will be using today



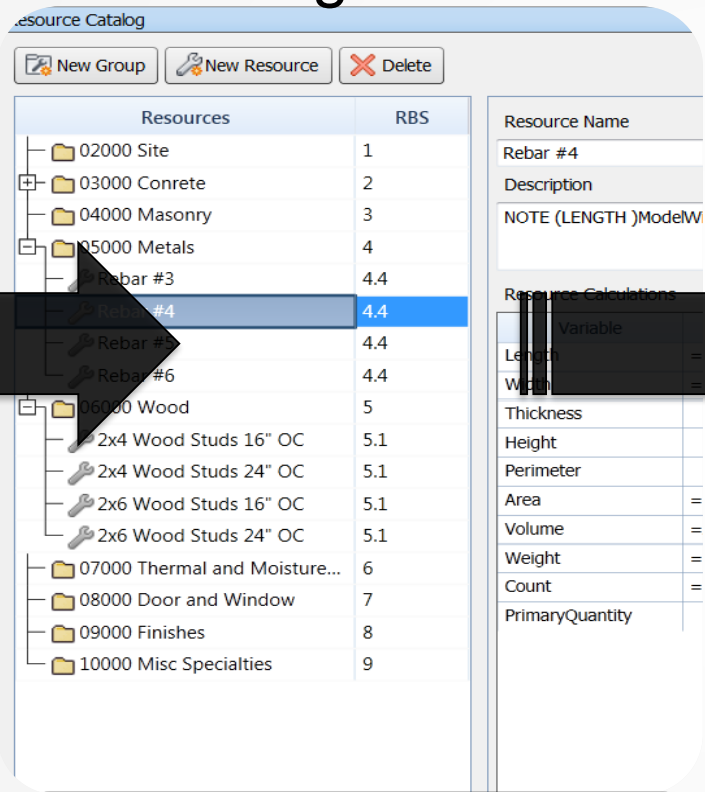
# Quantification Process Overview

## Managing Design Information



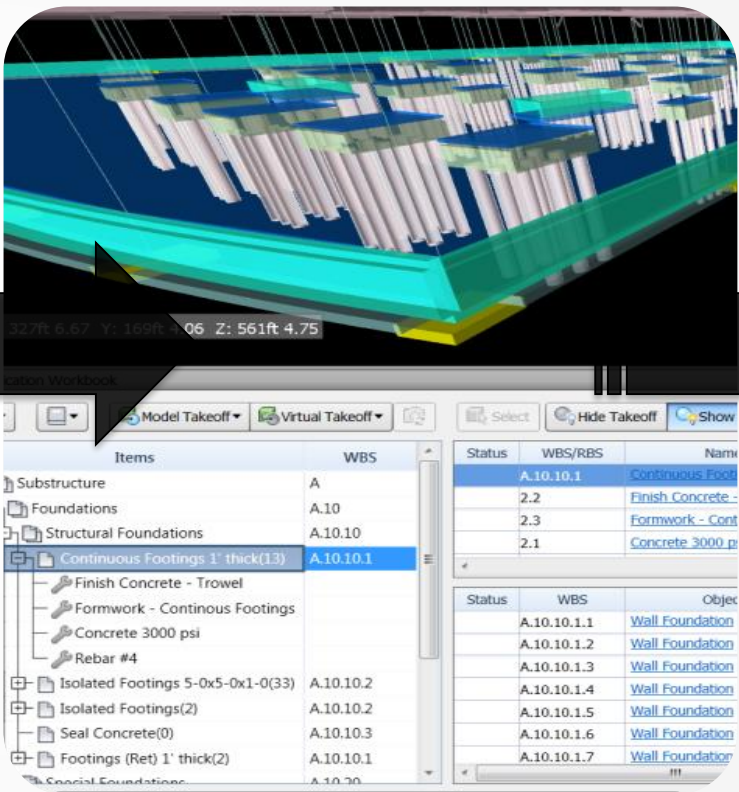
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## Item & Resource Management



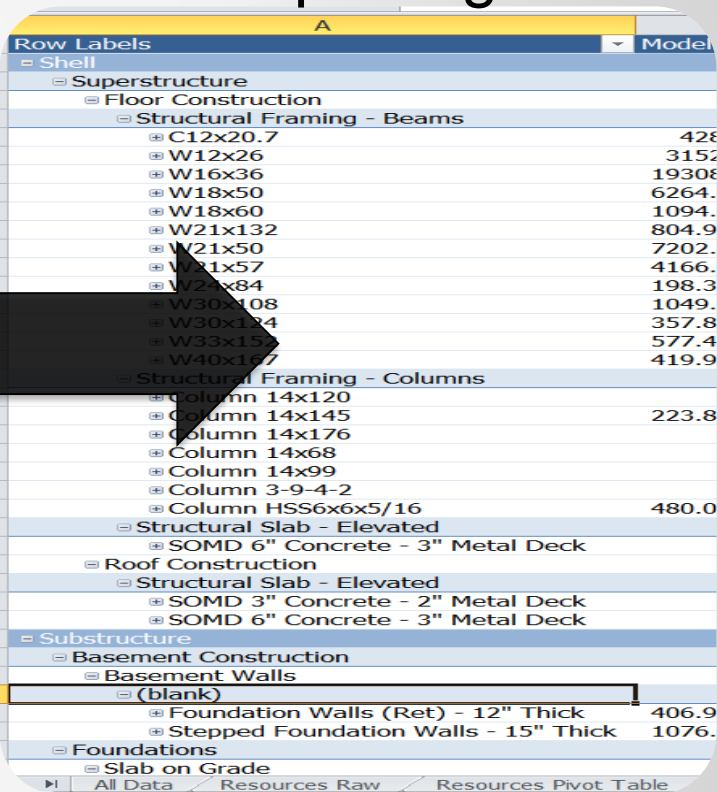
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## Model Based Quantification



Autodesk Navisworks

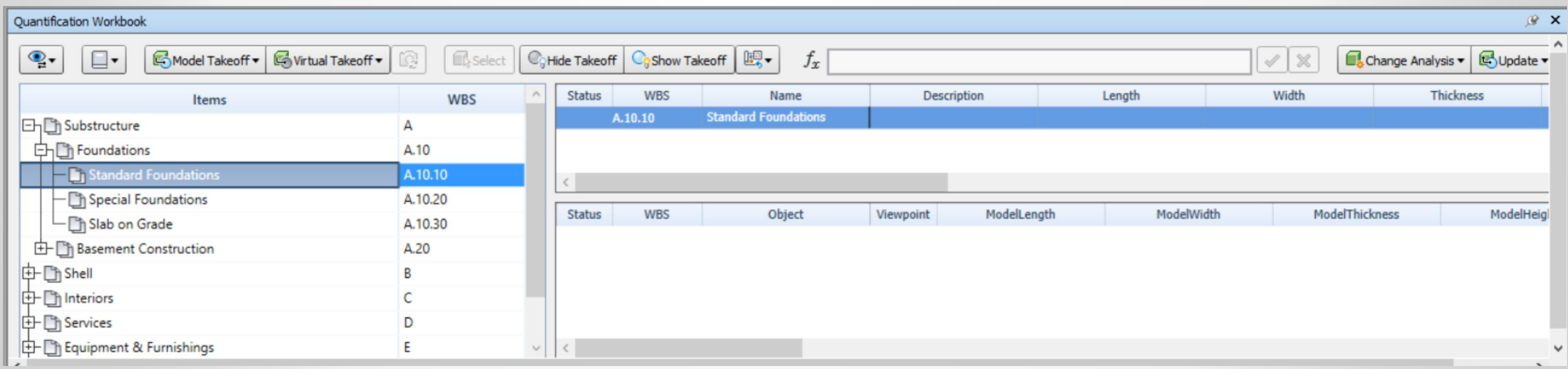
## Change Analysis & Reporting



Autodesk Navisworks/  
3rd Parties

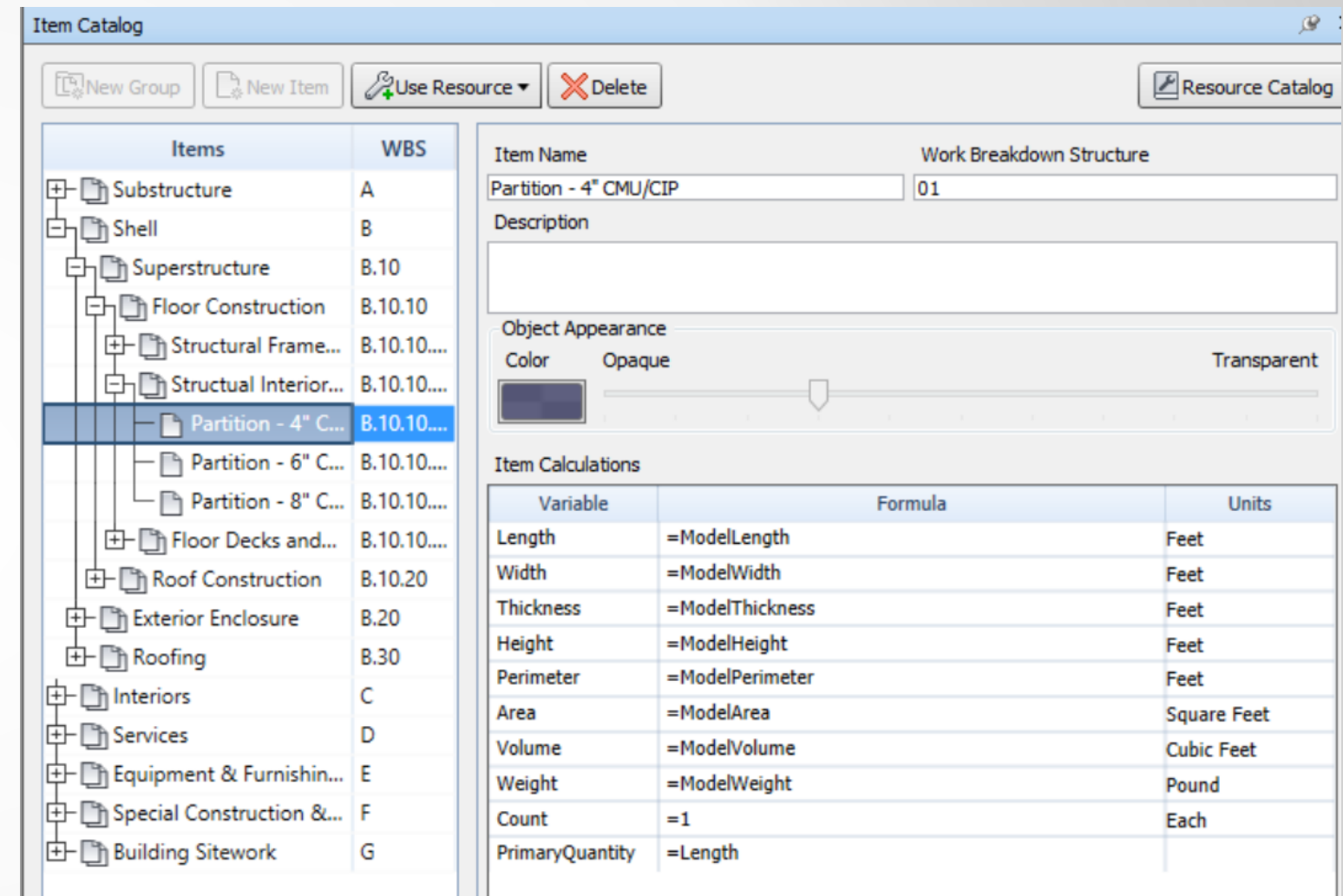
# Quantification Workbook

The Quantification Workbook is the key to Navisworks Quantification and where you will perform the majority of your takeoff efforts.



# Item Catalog

The Item Catalog is the organizational database for your takeoff. The Item Catalog and Resource Catalog share the same structure, a selection tree, variables pane, and general information. Items in the Item Catalog can be directly associated with a model object, such as a wall or window. Items can exist alone or can contain resources.





# Resource Catalog

The Resource catalog is a database of your resources for a project. Resources could be related by function and type such as materials, equipment or tools, and may include wallboard, coverings or structural components. Resources are attached to Items.

The screenshot shows the 'Resource Catalog' window. On the left is a tree view of resources categorized by function and type. The right pane shows the details for the selected resource, 'Rebar #5'.

**Resources**

Resources	RBS
03000 Concrete	03000
04000 Masonry	04000
05000 Metals	05000
Rebar #3	05000.1
Rebar #4	05000.2
Rebar #5	05000.3
Rebar #6	05000.4
2x4 Metal Studs 16" OC	05000.5
2x4 Metal Studs 24" OC	05000.6
2x6 Metal Studs 16" OC	05000.8
2x6 Metal Studs 24" OC	05000.7
06000 Wood	06000
07000 Thermal and Moi...	07000
08000 Door and Window	08000
09000 Finishes	09000
10000 Misc Specialties	10000
02000 Site	02000

**Resource Details for Rebar #5**

Resource Name: Rebar #5  
Resource Breakdown Structure: 3

Description: NOTE (LENGTH )ModelWidth\*ModellLength\*4= 1' spacing oc EF-TB

**Resource Calculations**

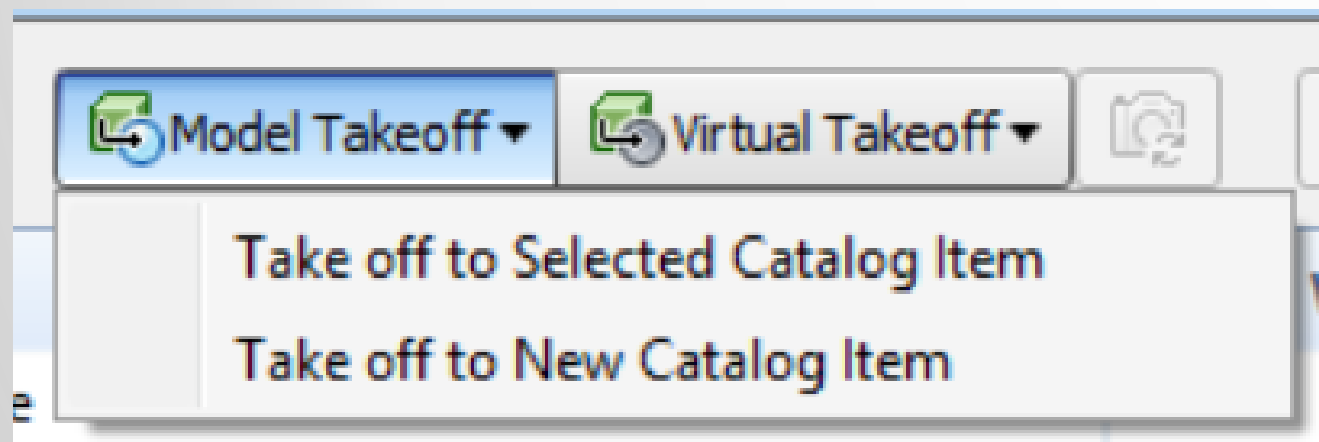
Variable	Formula	Units
Length	=ModelWidth*ModellLength*4	Feet
Width	=0.625	Inches
Thickness		
Height		
Perimeter		
Area	=3.14*(Width/2)^2	Square Inches
Volume	=Area*Length*12	Cubic Inches
Weight	=Length*1.043	Pound
Count	=1	Each
PrimaryQuantity		



# Model Takeoff

Model Takeoff allows you to quantify your models from properties or selections directly in the model or Navisworks Canvas.

To carry out model takeoff, objects must be either a group, layer or model. If you try to takeoff a model object that is an instance, or if the object does not contain a GUID or properties, an error message is displayed. Ensure your workbook is in Item view before performing takeoff.

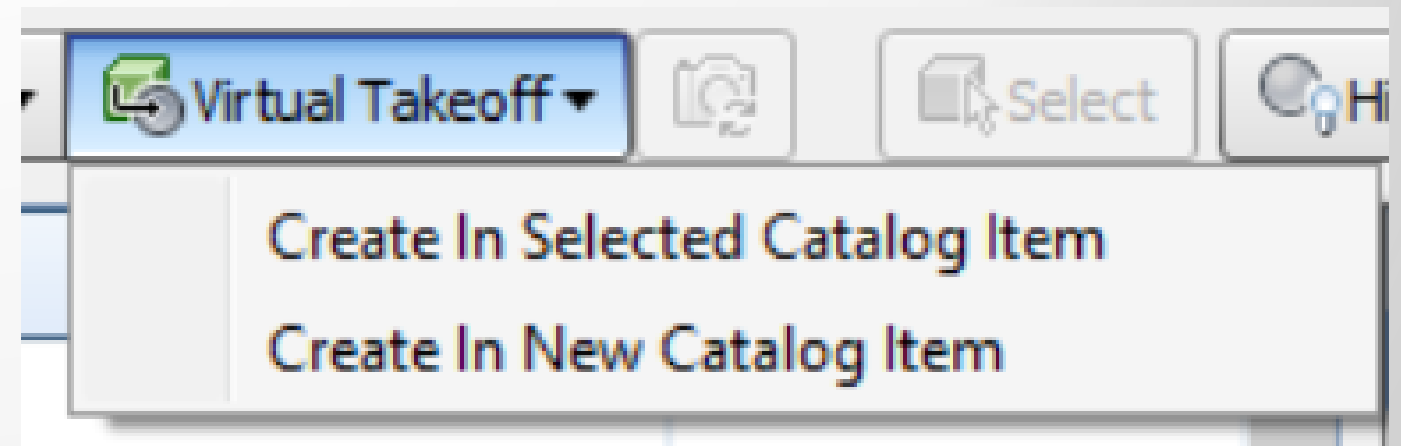


# Virtual Takeoff

Virtual takeoff can be carried out when you want to add takeoff objects that are not linked to a model object or item, for example:

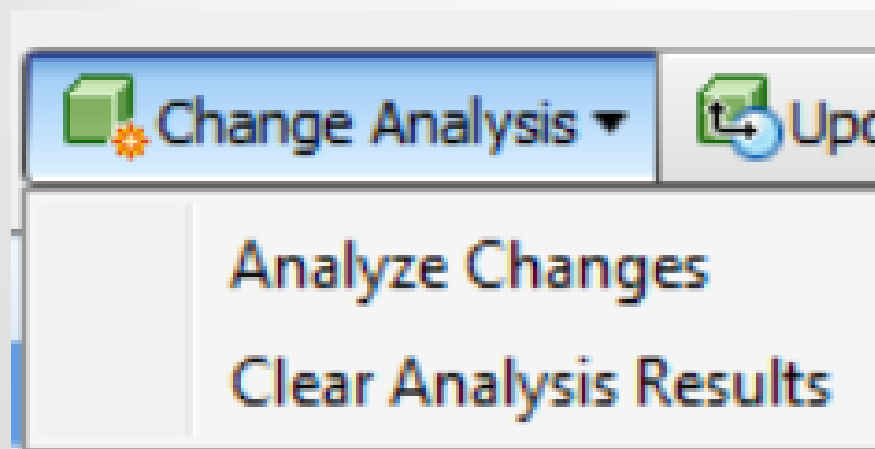
- Where an object has geometry, but has no properties
- Where an object does not have geometry, and has no properties

This could be the case if you did not save the properties from the original design application with your file, or that the object you want to takeoff does not exist in the model. In both cases, you can associate a viewpoint with the virtual takeoff object so you can navigate your way back to it during the takeoff process.







# Change Analysis

Change Analysis enables you to compare changes to properties between model versions. You can then review the changes to decide whether to give approval. If you make changes to your takeoff data in a project, you receive status notifications in Quantification that highlight what has been changed and what type of change has been made.



# Change Analysis – Status Notifications

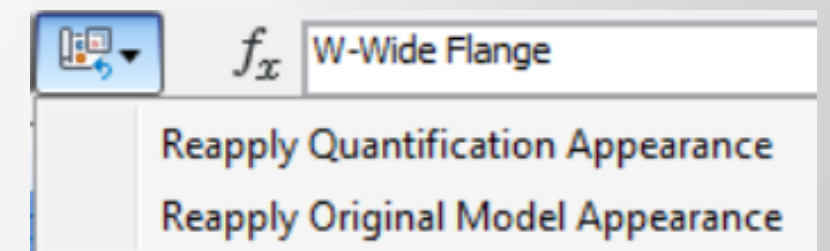
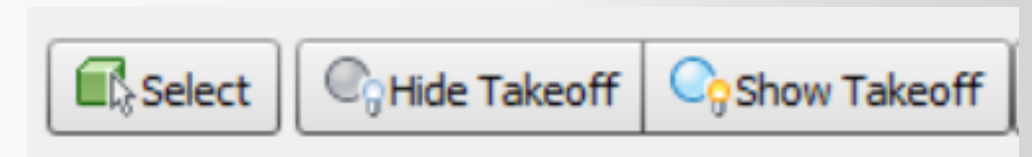
When an item or group is changed, a warning flag appears in the Navigation pane and a green or blue triangle appears in the cell. The overridden formula also appears in bold in the Item Catalog. Once Change Analysis is carried out, the following notifications appear in the Status column of the Quantification workbook.

Action	How Indicated	Icon	When Shown
Override	Green light in Status column		When a formula has been overridden and Change Analysis has not been run. Hover the icon to see a tooltip.
Change	Blue light in Status column		Where a model object has changed and differs from the associated takeoff item in Quantification Workbook. Hover the icon to see a tooltip.
Error	Red light in Status column		Where there are computation errors with the formula or model item. Hover the icon to see a tooltip.
Delete	Black light in Status column		Where a takeoff's model item has been deleted. Hover the icon to see a tooltip.



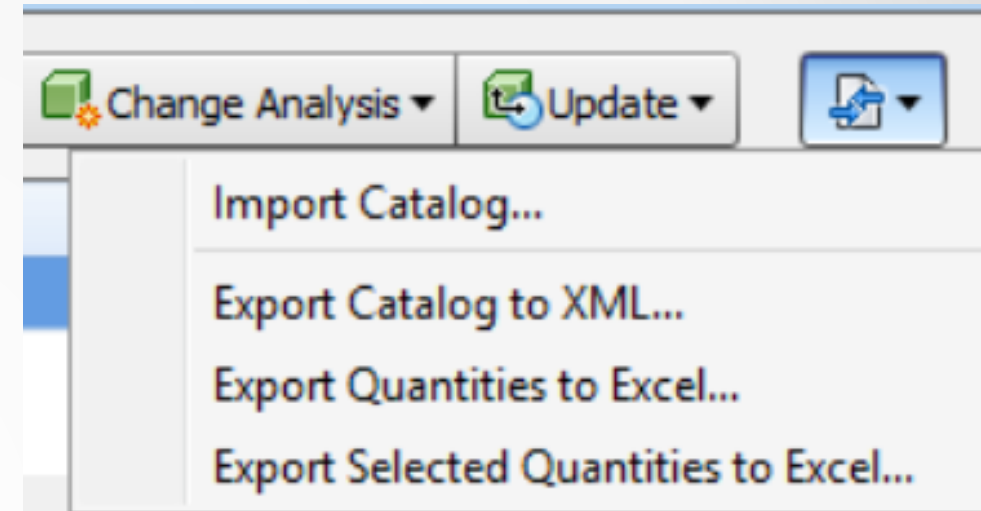
# Quantification Appearances and Selection

- Select
  - Select Model items that correspond to takeoff items
- Hide Takeoff
  - Hides all items that have been takeoff
- Show Takeoff
  - Hides all model items that have not been takeoff and shows taken off items
- Quantification Appearance
  - Controls the appearance of the model



# Importing and Exporting

- Use this drop down to import and export catalogs and quantities
- Catalogs can be exported to XML and opened in Excel for editing



# Let' Get into Hands on Time

Open Navisworks!



# Resource Formulas

## Concrete 3000 PSI

- Length Formula  $\text{=ModelLength}$  Units " Unspecified "
- Width Formula  $\text{=ModelWidth}$  Units " Unspecified "
- Thickness Formula  $\text{=ModelThickness}$  Units " Unspecified "
- Height Formula " Unspecified " Units "Unspecified"
- Perimeter Formula " Unspecified" Units "Unspecified"
- Area Formula  $\text{=Length*Width}$  Units "SquareFeet"
- Volume Formula  $\text{=(Length*Width*Thickness)*0.03704}$  Units "CubicYard"
- Weight Formula  $\text{=Volume*4050}$  Units "Pound"
- Count Formula  $\text{=1}$  Units "Each"

## Formwork

- Length Formula  $\text{=ModelLength}$  Units "Feet"
- Width Formula  $\text{=ModelWidth}$  Units "Feet"
- Thickness Formula  $\text{=ModelThickness}$  Units "Feet"
- Height Formula " Unspecified " Units "Unspecified"
- Perimeter Formula " Unspecified " Units "Unspecified"
- Area Formula  $\text{=((ModelWidth+ModelLength)*2)*ModelThickness}$  Units "Square Feet"
- Volume Formula  $\text{=Area*0.333}$  Units "Cubic Feet"
- Weight Formula  $\text{=Area*9}$  Units "Pound"
- Count Formula  $\text{=1}$  Units "Each"



# Resource Formulas

