



## Choosing the right lifestyle with Autodesk Vault Lifecycles

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### PL1714

To move past the basics of Autodesk Vault software into the area of drawing revisions, approvals, security, and advanced property management, you need to deal with lifecycles. In this class, we look at Vault lifecycles from both a file side and an item side and help you decide which the best course of action is. We configure Vault lifecycles and discuss how they are used in the revision process and how they set the rules for state changes.

### Learning Objectives

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

- Configure lifecycle definitions
- Apply state changes
- Manage revisions
- Apply security settings and downstream usage Learning Objective

### About the Speaker

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## Lifecycles and Autodesk Vault

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Autodesk Vault Basic provides *Version* control but no tools to manage and track change. Vault Workgroup and Vault Professional move from a simple data management tool that just tracks versions to a system managing the change of your files, from creation to retirement

Looking at the three versions of Vault we have:

- Vault (Basic) = Version Management
- Vault Workgroup = Vault + “*Project lifecycles*”: tools to manage change on files
- Vault Professional = Vault Workgroup + Items and tools for managing changes to items

This class will be looking at the features and functionality contained within Workgroup (files & folders) and Professional (Items & Change Orders). If you are currently using Vault Basic and want access to these features contact your Autodesk reseller you will be more than happy to discuss your options about upgrading

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## File & Folder Lifecycles

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The Autodesk Wiki describes Lifecycles as

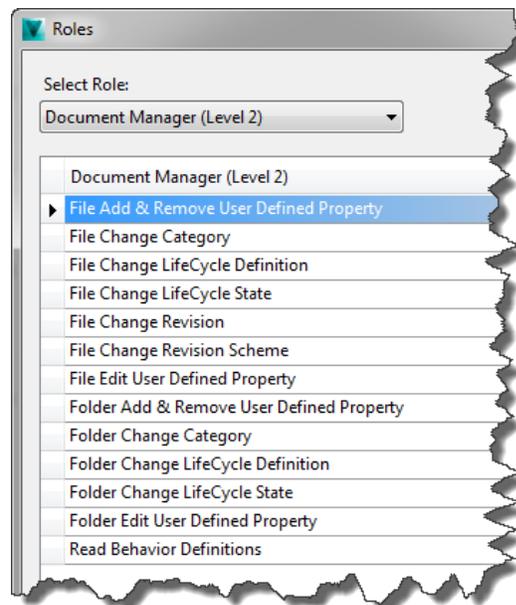
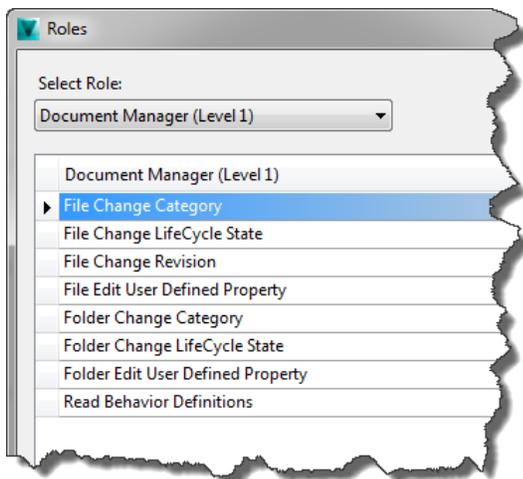
*A lifecycle definition is an engine that can be configured to automatically assign security, behaviors, and properties to Vault objects based on where the object is in the life of the design process.*

### General Steps

1. Assign the Category
2. Change the State
3. Revise the File
4. Change the State
5. Repeat

### Who can use Lifecycles?

To use File and Folder Lifecycles you must have at Document Manager Level 1 or Level 2 Roles within Vault



## Categories

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### What are Categories?

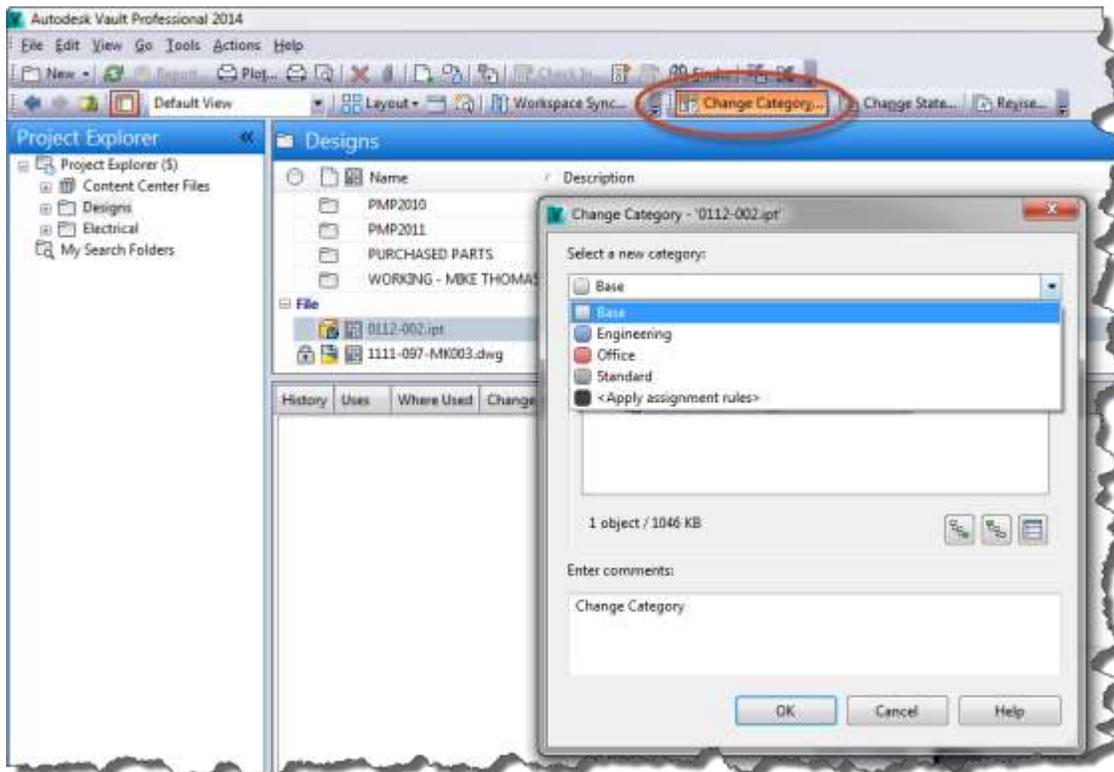
Category - 'katɪɡ(ə)ri/ (Noun)

*“A class or division of people or things regarded as having particular shared characteristics.”*

Vault Categories provide a grouping method for a set of files, folders, custom objects or items. Categories label the object providing another method of identifying, tracking, and organizing the objects.

Most importantly, Categories are a key aspect of using Vault lifecycles as they are configured to assign:

- user-defined properties to the objects
- the available lifecycle definitions
- Revision schemes

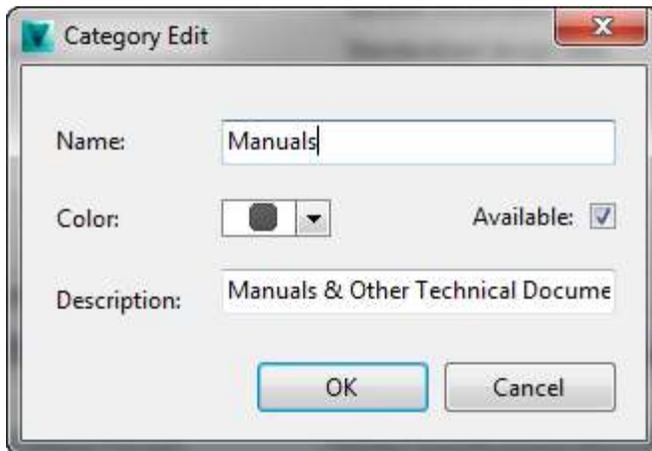


To change the Category assigned to the file, folder, or custom object select the object(s) and click the Change Category button. The subsequent dialog will allow you to select from the existing categories. [NOTE: Items are discussed later]



The Assign Category dialog has options very similar to Get / Check-out in that you can include children, parents, and / or related documentation to quickly change categories on a file and everything related to it.

## Creating, Managing & Editing Categories



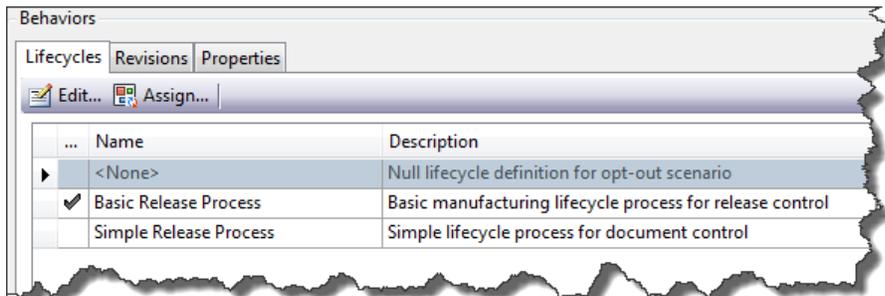
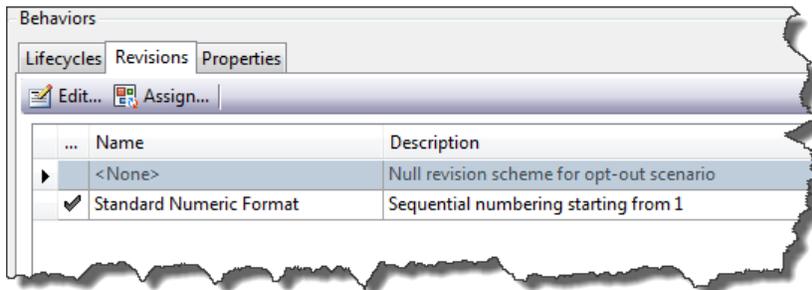
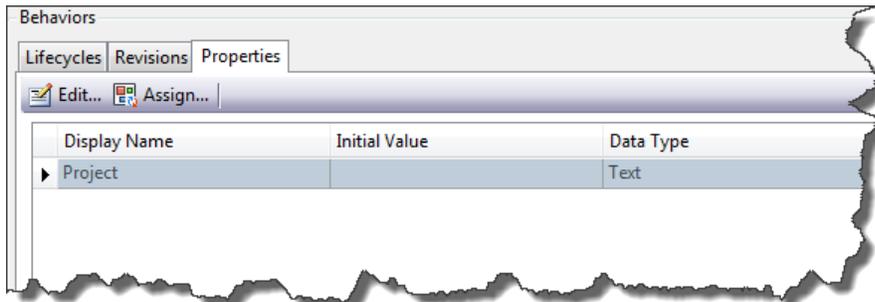
When creating a new Category you specify the Name, Color, and a Description. TIP: Copy existing Categories when only small adjustments need to be made from an existing category, much easier to reuse than redo.

After creating the category you need to edit the Category and assign Properties, Revisions, and Lifecycles (all three are discussed in greater detail later on).

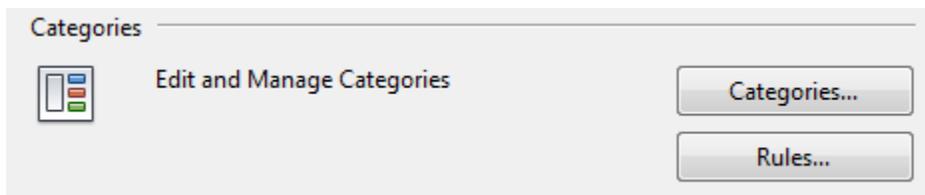
- **Properties** you assign are User Define Properties that you want to associate with the category.
- If you leave the **Revisions** as the default <None> then it will be up to the user to assign the revision of their choice. You can also assign multiple Revision Schemes which

allows for multiple workflows (for example maybe A, B, C for concept drawings and then 1, 2, 3 for released drawings)

- The Lifecycle determines how the object will get from creation to being released. Multiple Lifecycles can be assigned.

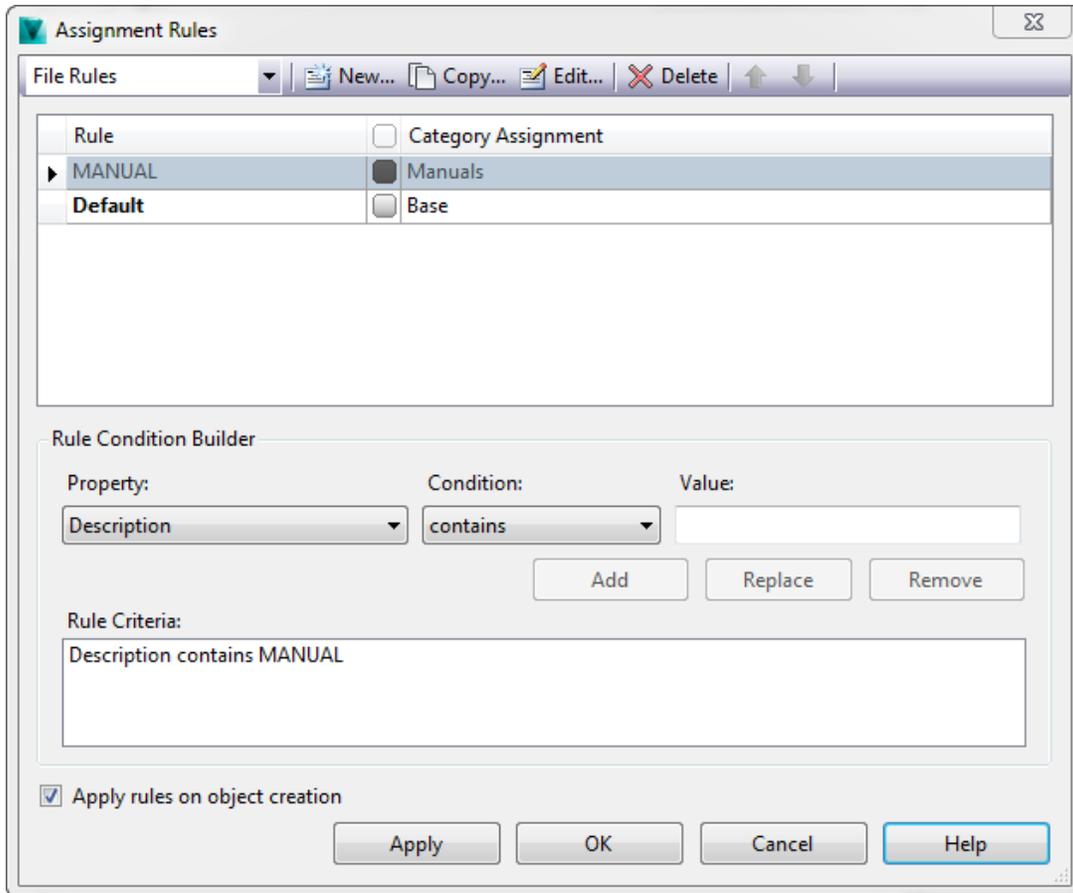


## Rules



Assignment Rules allow you to define conditions where objects are automatically assigned to the appropriate category based on the objects properties. For example anything generated from

the Inventor Content Center gets assigned to a PURCHASED category, or if the description contains “MANUAL” it gets assigned to a “MANUALS” category.

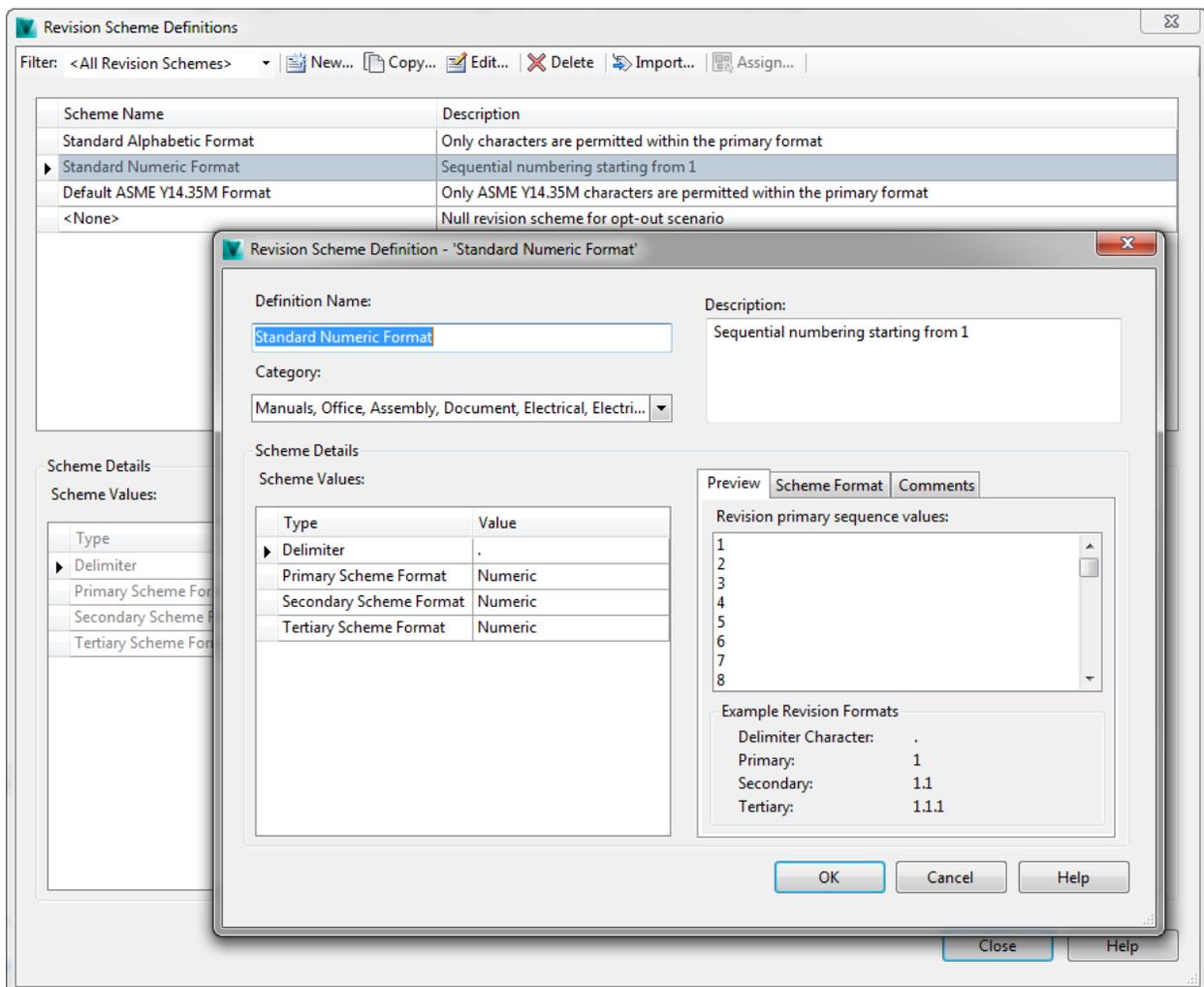


## Revisions

Revision - ɹɪˈvɪʒ(ə)n/ (noun)

“the action of revising”

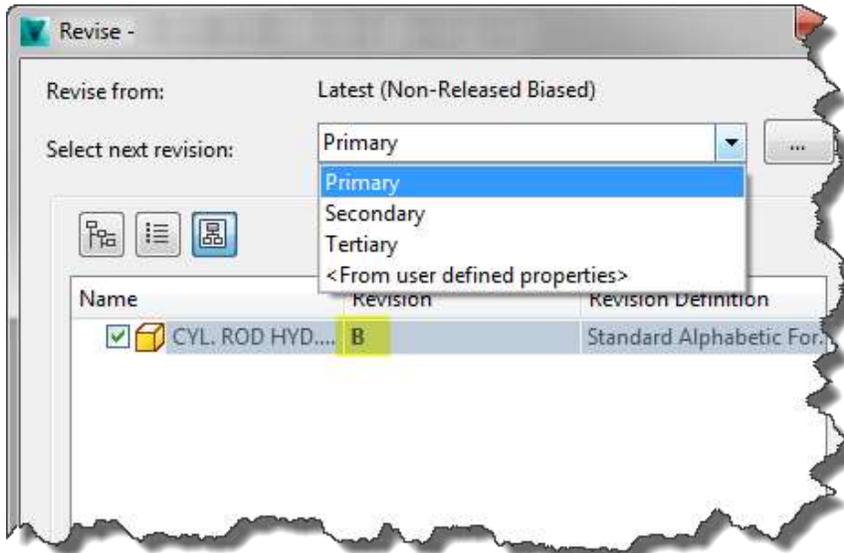
### Revision Schemes



**Revision Schemes** define the Revision value applied to the file and the sequence of subsequent values. You specify how the primary, secondary, and tertiary revisions appear. For example the *Standard Numeric Format* (one of the ones that is out-of-the-box) starts at 1 and increments by 1, not skipping any numbers.

## **Bumping Revisions (Files)**

To adjust the Revision level on a file select the file(s) and click the Revise button. Select the level you want to Bump (i.e. are you going from 1 to 2 or 1 to 1.1).



## States

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State *steyt/* (noun)

*“the particular condition that someone or something is in at a specific time”*

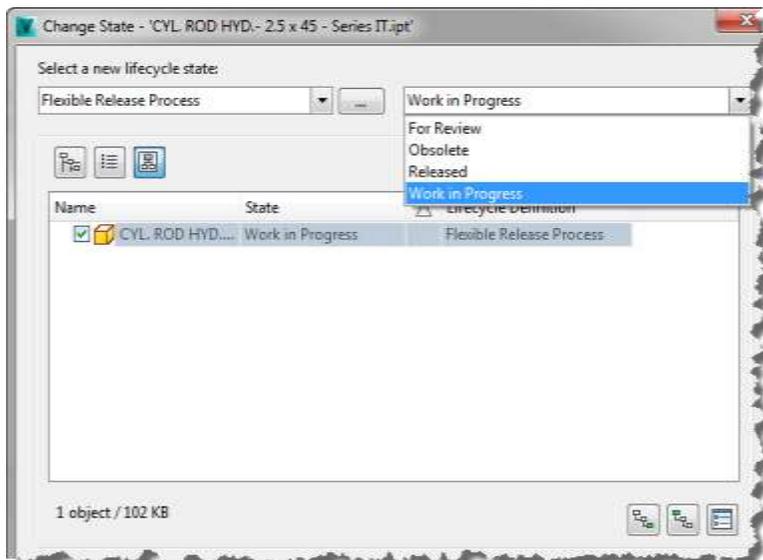
### **What are States?**

With Vault Lifecycles that state identifies the current status within the lifecycle, for example Work in Progress (WIP) or Released. The number and type of states the object transitions thru in its lifecycle is based on the Lifecycle Definition Transition Rules. The transition can occur manually or automatically.

State changes can be occurred to cause other things to happen like bumps in revisions, or changes to security.

### **Changing States**

To change the state select the file, folder, or custom object and click the Change State button. In the Change State dialog you can adjust the lifecycle state (what’s listed is controlled by the category assigned to the object) and the State you want to switch the object to. Depending on the settings you might also notice the revision value change as well



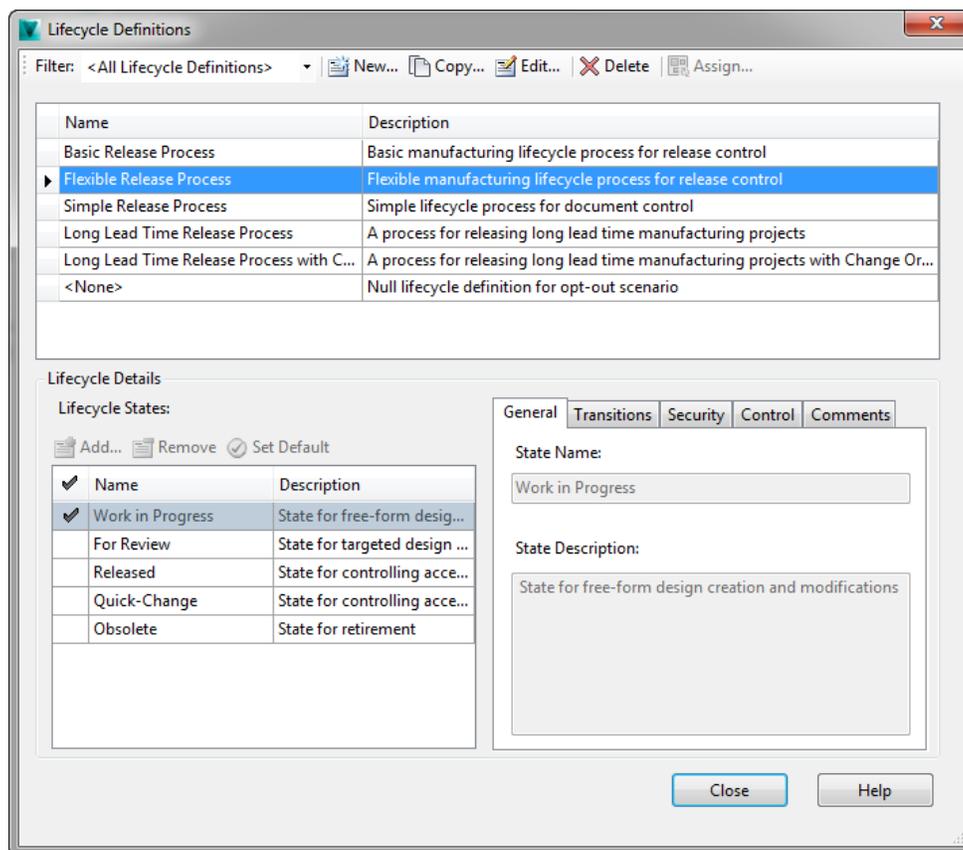
### **Defining States**

States are defined as part of the Lifecycle Definition (See below)

## Lifecycle Definitions

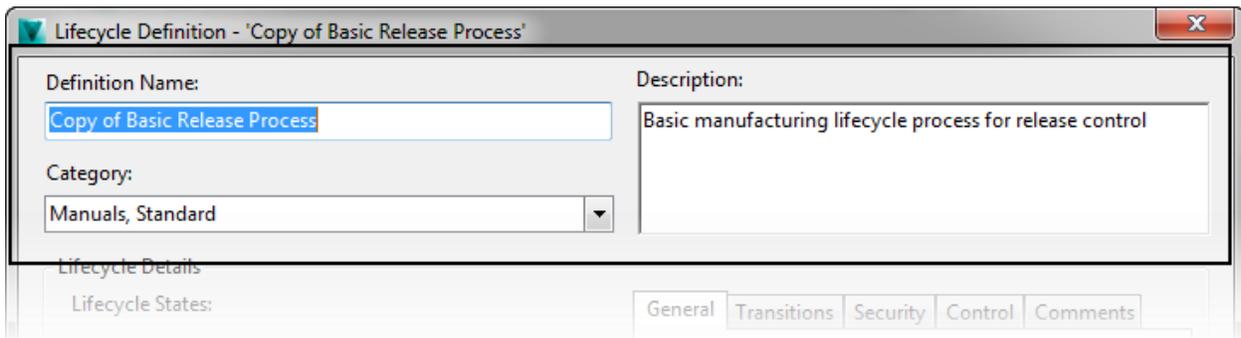
Autodesk's help describes Lifecycle Definitions as:

*“A lifecycle definition is an engine that can be configured to automatically assign security, behaviors, and properties to Vault objects based on where the object is in the life of the design process. This functionality allows you to streamline your work environment by removing the overhead involved in managing groups of files, custom objects, or an entire project.”*



“Out-of-the-box” multiple Lifecycle Definitions exist for you to use on your files. These are probably sufficient for your initial testing but will need to be tweaked for your specify needs. I would suggest copying them opposed to editing directly as it always gives you a fall-back to see what they were initially. You can also create new starting right from scratch

To make changes to a Lifecycle Definition select it and pick Edit...

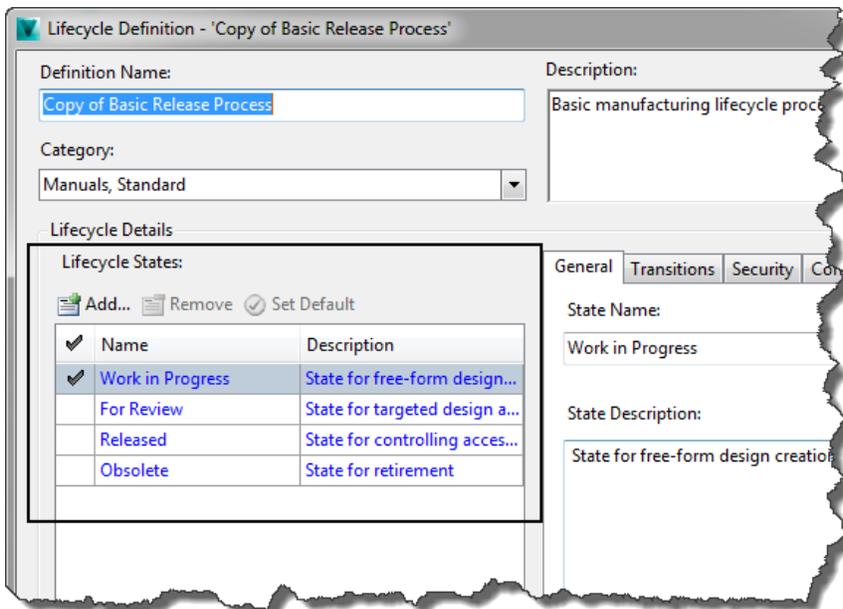


In the edit dialog you can specify the Definition Name and Description but you want to focus on the Category as only files in the selected Categories will have access to this Lifecycle Definition

## Defining States

Lifecycle states identify the current status of your file within the Lifecycle Definition. A good plan of action is to whiteboard your drawing / design release process and identify the key “stops” or “milestones” in which you want the files to transition.

A very basic workflow would be two states (like Work in Progress and Released)



By themselves the Lifecycle States are simply labels which represent various statuses that you want your files to transition thru your lifecycle path. You need at least two but can have many more.

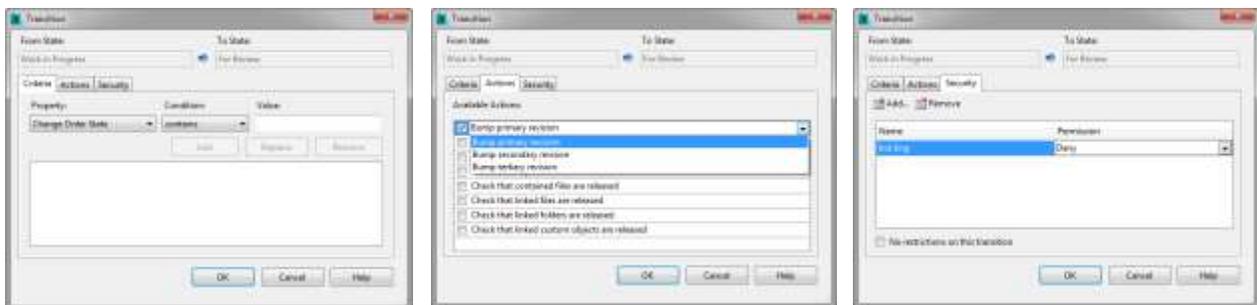
## General Settings

With the Lifecycle State selected you use the **General** tab to specify the name and description

## Transitions

The **Transition** of a State determines

1. the Property requirements (Compliance) that must be in place before the state change can occur
2. the Actions that happen during the state change (like revision bump)
3. the Security, as in who can make the specific state change



In the **Criteria** tab specify the Properties and what the property must contain before you can make the state transition. This can also be conditions like “is not empty” to insure that a property has a value.

In the **Actions** tab select from the available actions on what you want to occur during the state transition. Bump Revision? Check the contained files are released? Synchronize Properties and Update the View (DWF Visualization?)

In the **Security** tab specify who can make the transition state change. Don't want everyone to go from Work in Progress to Released skipping the In Review state? Then add the users and groups who you don't want to perform this action and select Deny or select the user (or groups) who can make this change and set the permission to Allow. If you leave this as the default *No restrictions on this transition* then anyone with lifecycle state changing ability will be able to make this change.

## Control – Setting the Released States

The **Control** of a State determine if it is a “Released” state meaning that the versions of the files in this state will NOT be purged. Four options (All, First and Last, Last, None)

## Comments

Use the Comments tab to set the default comment that appears on the file when it transitions into the state

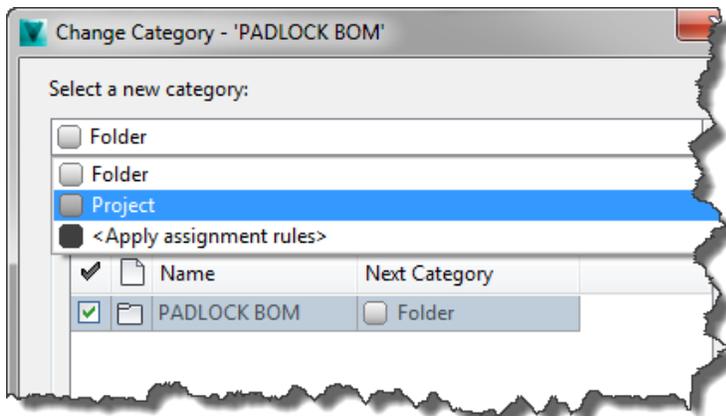
## Using Lifecycles

### Files

1. Check the Category and adjust as necessary – *Categories* can be set automatically by *Rules* so this step may not be required.
2. Adjust the Revision level, especially when moving legacy data into Vault
3. Change the State when ready to move to the next step

### Folders

Folders are similar to Files except you cannot set the revision. After applying the correct Category you can adjust the state of the folder. The state change configuration may force you to perform a state change on the files contained within the folder before changing the state

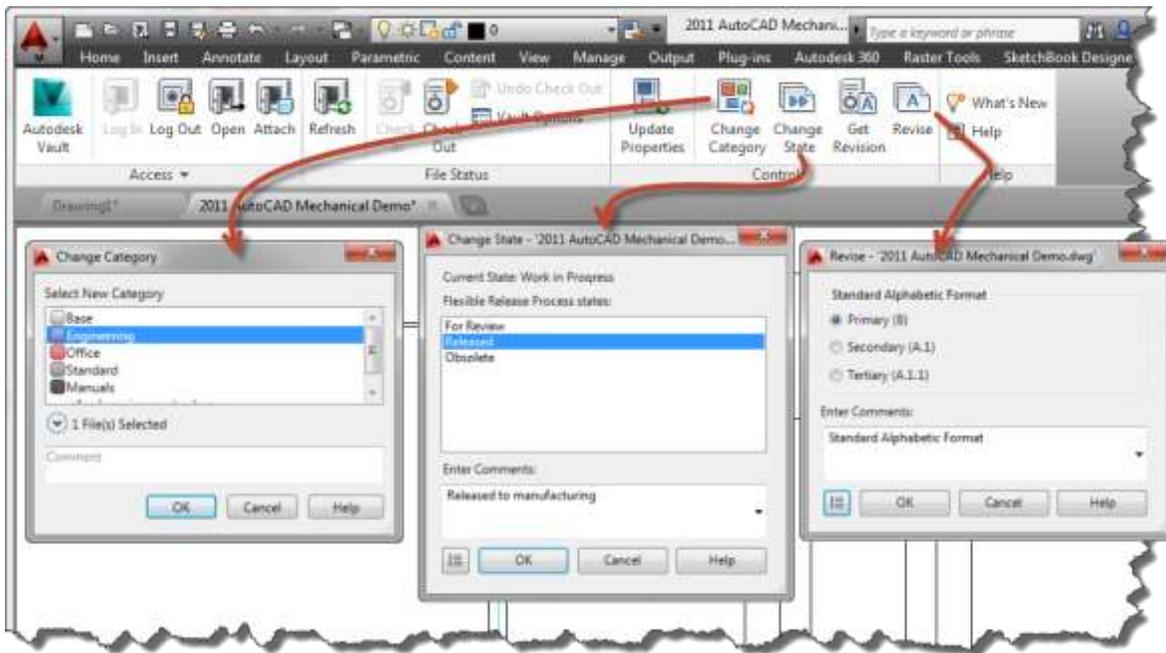


### Custom Objects

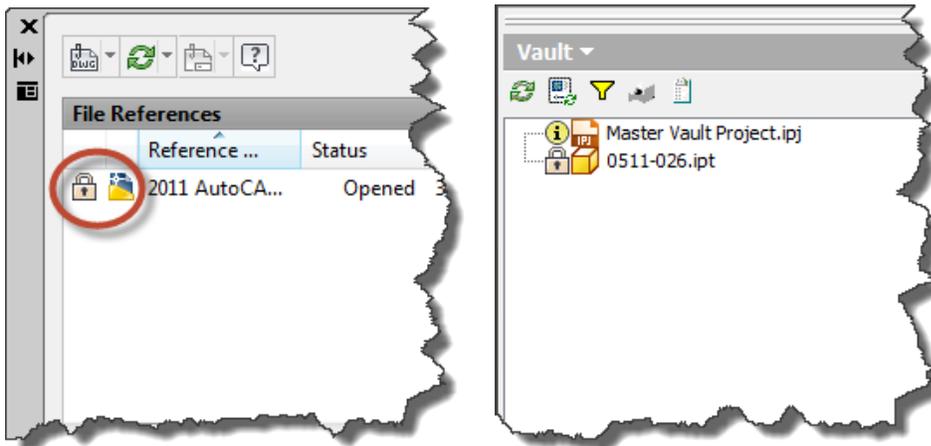
Custom Objects are similar to Folders in that you cannot set the revision, only adjust categories and states. Categories do not have sub-content rules to worry about like folders and files.

## CAD and File Lifecycles

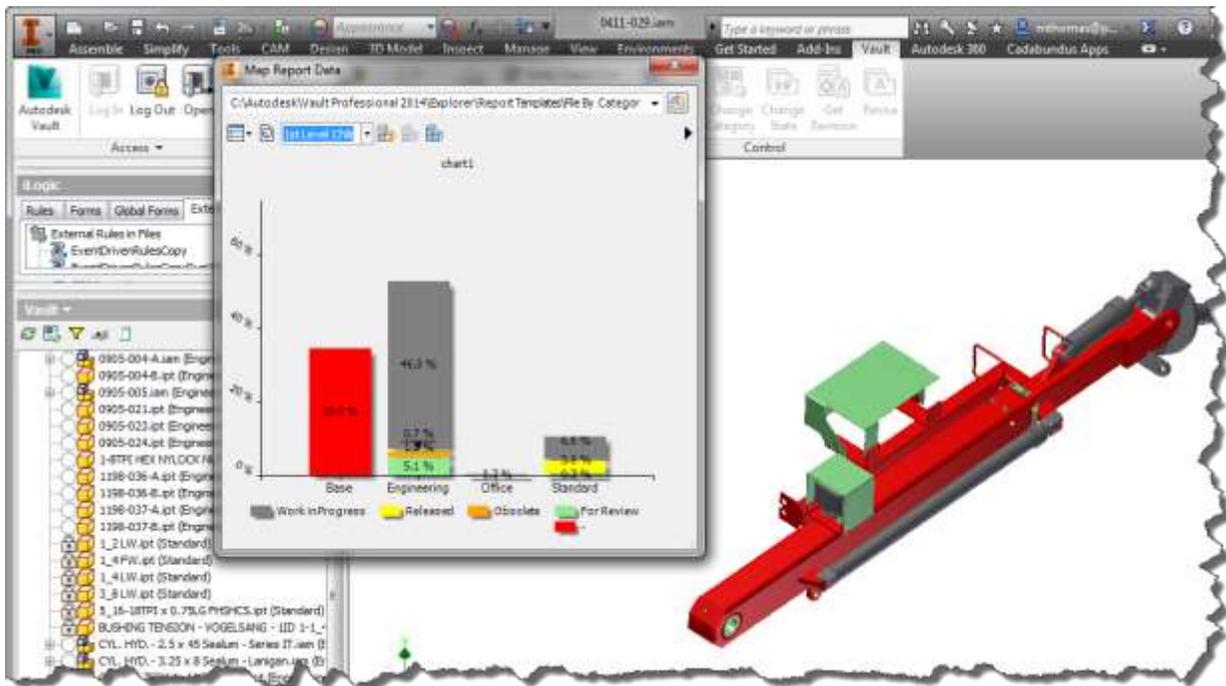
When using the Vault CAD add-in you can perform lifecycle functions from within certain Autodesk applications. This includes changing Categories, Changing States, and Revising



The CAD Applications will also understand when files are Released and locked from edit



Inventor **Data Reporting** can also report information on the component categories and state



*Mapping Lifecycle information to an Inventor Assembly*

## Item Lifecycles

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### What are Items?

Like how a recipe or business card represents information and provides a method for organization and quickly locating, items represent things within our business. **Items** represent the components that the company manage, assemble, sell and manufacture.

Each item is identified by its own unique item number (or sometimes referred to as part number). Items can represent a variety of things including parts and assemblies, instructional guides, consumable goods (fluids, lubricants, etc), and any related Bill of Material. Some items might be purchased, while others are manufactured internally.

Within **Vault Professional**, items are records stored within an item master. The item master is a master list of everything within the engineering system. Each item is assigned an unique item number (identifier) which is used to locate, edit, update, and track changes to an item.

Items are used to:

- Provide access to the data for everyone who needs access. This will also include non-engineering staff without access to a CAD application.
- Provide a mechanism for the exchange of data between systems
- Issue new numbers (i.e. stock numbers)
- Release Management (lifecycles)

NOTE: Items and the Item Master are **ONLY** available within Vault Professional

### Should I use Items?

Should you use items? Ask yourself these questions...

- Do I need to deliver data to a downstream application, like MRP, ERP, PLM, etc, etc?
- Do non-engineering or non-cad people need access to data about my parts and assemblies? Possibly manipulate Bill Of Material data?
- Do I want a method to manage revisions? And control what downstream users see of my data?
- Do I want to manage CAD AND non-CAD things?
- Do I want to release data locking it from access?
- Do I want to use Change Orders to control and track revisions?

## Item Security

There are three specific roles for accessing and working with items: Item Editor (Level 1), Item Editor (Level 2), and Item Reviewer.

- Item Reviewer grants access to the user to the item master in which they can view items but can not make any changes.
- Item Editor Level 1 provides access to the items to makes changes but they can not manually adjust revisions, change lifecycles, or delete items.
- Level 2 adds the ability to adjust item revisions, change lifecycle and delete items (conditionally) amongst other things.

## Item Categories

From Autodesk Wiki...

*“Categories are labels that provide a way to group objects logically. Grouping by category also provides a means for assigning a defined set of behaviors and rules to objects. A category can automatically assign user-defined properties to objects in the Vault. Categories can also be used to automatically assign lifecycle definitions or revision values to files.”*

**Categories** provide a mechanism to classify items to make it easier to identify what the component belongs too. For example it can be difficult if I only look at a plate with some holes in it to know what the plate belongs to. Categories also provide another mechanism for filtering and searching.

With Items Categories help manage

- Revisions
- User Defined Properties



**NOTE: Categories do NOT control lifecycle behaviour.... that is a file-level only option**

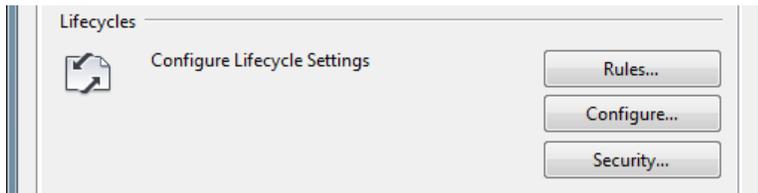
### Categories Assignment Tip

Using a combination of Properties – Assignment Rules you can have your CAD file set the initial category of the item

## Configuring Item Lifecycle Settings

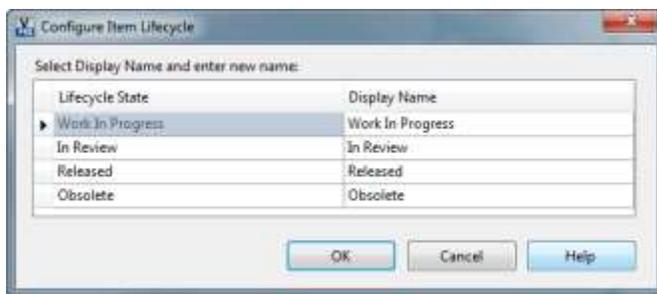
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### States



#### Configure Lifecycle Settings

With items the “out-of-the-box” lifecycle states provided are *Work In Progress*, *In Review*, *Released*, and *Obsolete*. The names of these states can be adjusted but cannot be deleted nor can additional states be created

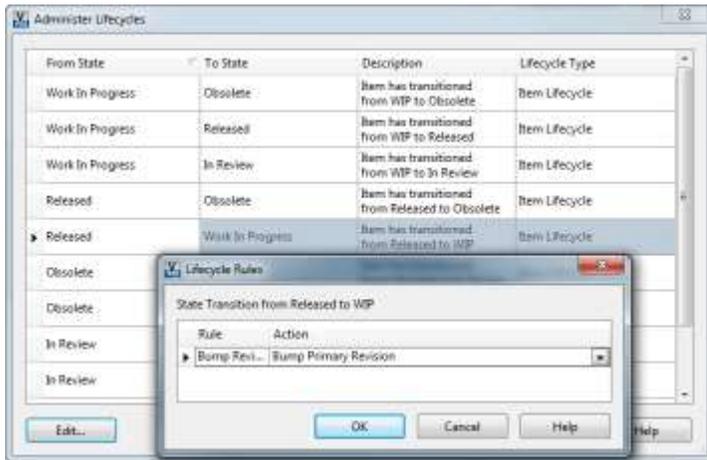


#### Configuring Item Lifecycle Names

### Rules

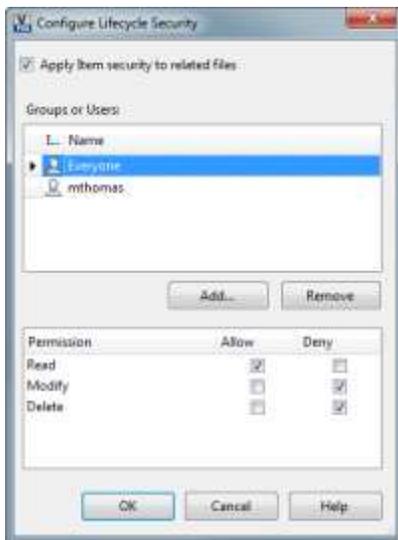
The Item Lifecycle Rules are used to control when the revision value of the item is automatically “bumped” and what revision level it is bumped to. Bumped simply refers to the action of automatically increasing the revision level, like revision 3 to revision 4. The starting revision value and the level of the revision is completely controlled by the revision scheme.

In the example shown below the state change of moving the item from Released to Work in Progress is configured to Bump the Primary Revision. For example depending on the revision scheme applied to the item this would mean that the item could go from 1 to 2 or from A to B



Lifecycle Rules

## Item State File Control



By default when an Item is released the files associated with the item are also locked meaning that the files can only be edited when the item is in the Work in Progress State.

By adjusting the security specific users can be granted the ability to modify files and / or delete them even when the item is released and locked. This can be useful for certain functions like migrating Inventor data without having to WIP the items or bump the item revision level

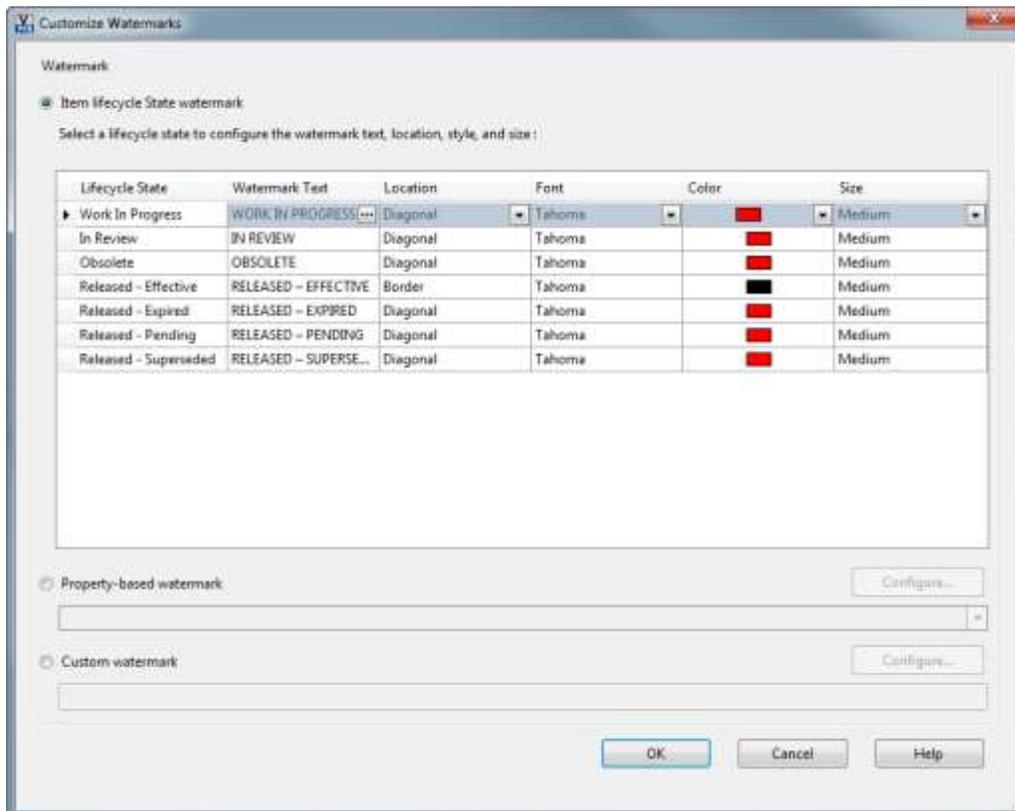
## Item Watermark Settings

When viewing the files associated to the Item Vault can be configured to display a watermark on the associated DWF(x) Visualization so that users can quickly and easily identify the current state of the file and item. This helps prevents using the drawing / data when it is currently not ready, as in not released.

Lifecycle state based watermarks like “Released” are the default and most common. Property based (limited to one property item property) or a custom static value can also be used but are very limited in the formatting.



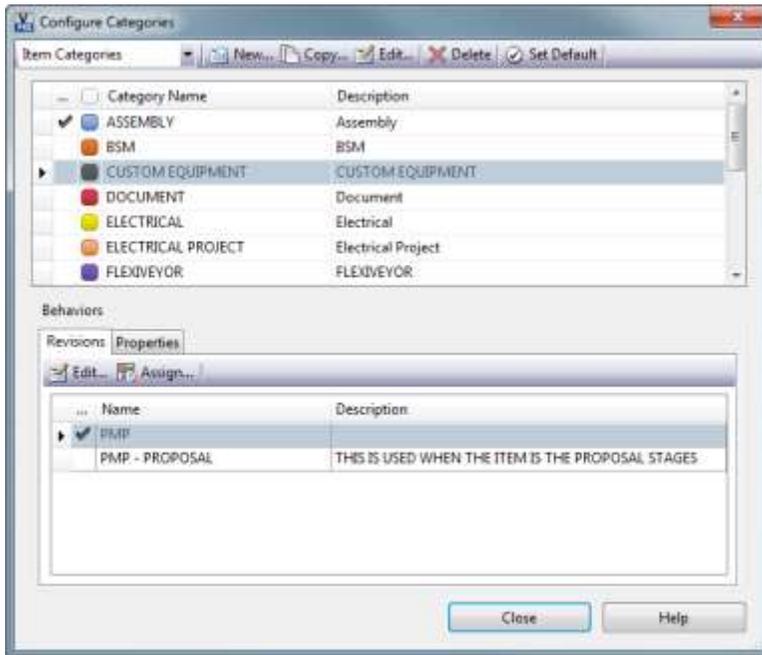
WIP Watermark



Watermark Configuration

## Item Category Configuration

Categories provide a mechanism to classify items to make it easier to identify what the component belongs too. All items are assigned to a category.

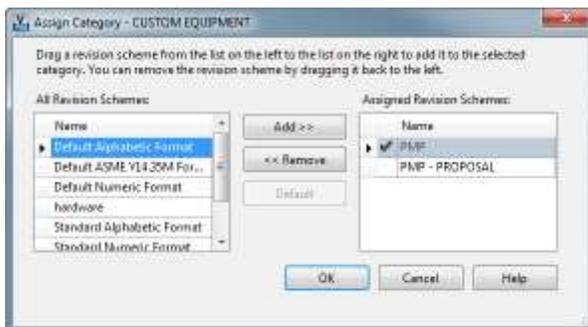


In the Vault Settings dialog box the **Behaviors** tab provides category management options.

### Configure Category Dialog

Use the **New** button to define a new category and specify the name and colour of the category icon. This dialog is also used to set the default category. Using the drop-down in the upper left corner you can filter the list to only show item categories

You assign Revision Schemes to the Category making these revision schemes the only available options to items assigned to that category. You also set the default scheme to use with that category



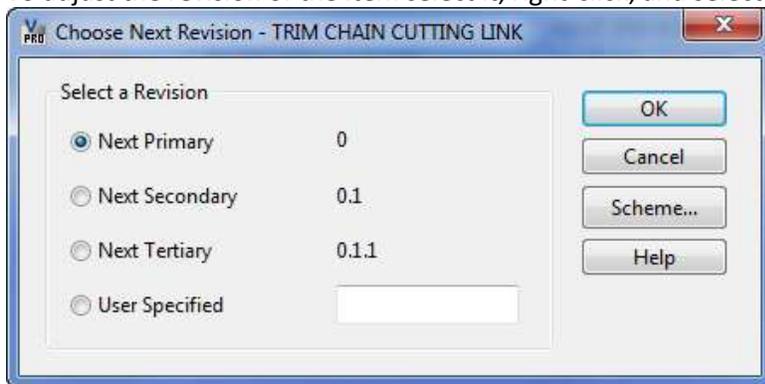
### Category Revision Schemes

## Using Item Lifecycles and Item Revisions

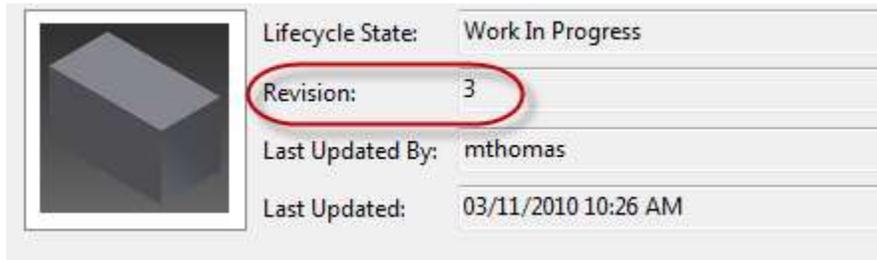
### Adjusting the Revision Level of an Item

Revisions are used to track the history of changes applied to an item. Once the item is created you can use item lifecycles to manage the revisions. Unfortunately there is no current method of having the file set the initial revision level of the item. However once the item is created the item revision will then be used to set the file's revision.

To adjust the revision of the item select it, right-click, and select **Change Revision...**



You can use the **Scheme** button to switch the Revision Scheme to a different type



After update properties the file will match the item's revision level

**NOTE:** There is NO turning back the clock... once a revision level has been used you cannot go to a lower value!

## Lifecycles

The lifecycle state of an item tracks the state of the item through the manufacturing process. This shows the state from the item creation (inception) to when the item is no longer required (retirement)

The initial state of items is **Work In Progress (WIP)** which shows that the designs attached to the item are not ready for manufacturing. In this state the files attached to the item are still editable and you can get the latest version of any attached CAD file. In this state the item can be updated. When the item is first created and still in WIP any “downstream” user, for example the ones will only access to the Web Client, may not have access to the item. At any time the only way to make changes to the files attached to the item is by setting the lifecycle state of the item to **Work in Progress**.

When an item is set to **In Review** it is basically waiting for the next step, say someone reviewing the design before releasing it for manufacturing. Any file attached to the item can not be edited and the item can not be updated.

**Released** items are then available for manufacturing allowing anyone with access to the Vault to see the item. Similar to In Review files attached to the item can not be edited and the item can not be updated. When changing the state to **Released** you specify the effectivity. **Effectivity** sets when the new item or changes to existing items should be put into effect, as in when it is actually ready for manufacturing and should be released. The default date is immediate

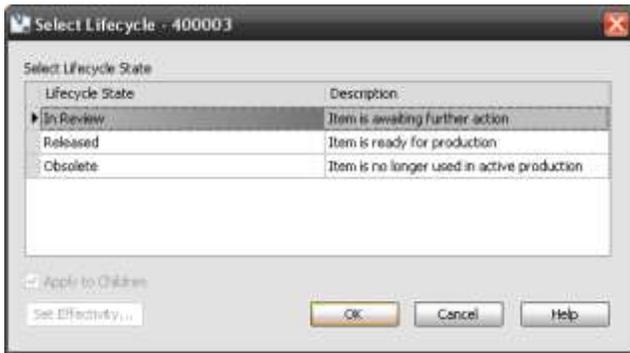
You will want to set an item to **Obsolete** when it is no longer required in production. An item set to obsolete can not be updated

### NOTES:

- Multiple items can be selected holding SHIFT to apply lifecycle changes to the items selected
- The states do not need to be applied in order. For example an Item can be moved from WIP to Released skipping the In Review state
- The Vault Administrator can limit lifecycle changes to Change Orders (discussed later) making this functionality inaccessible
- Releasing an item captures that revision. After an item has been released previous revisions can be restored.

## Changing the item lifecycle state

To change the lifecycle state of an item select the item, right-click, and select Change State. Select the desired state and click OK.

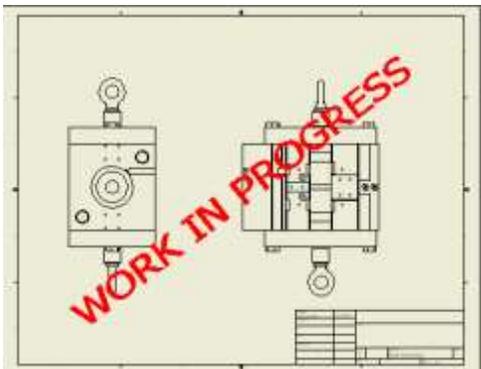


Depending on the files attached to the item the Apply to Children option may become available. When this is toggled on the selected lifecycle state will be applied to the item and all children (i.e. related components) of the item. In the case of an assembly the lifecycle state would be applied to the assembly and all of its components (sub-assemblies and parts)

## Watermarking

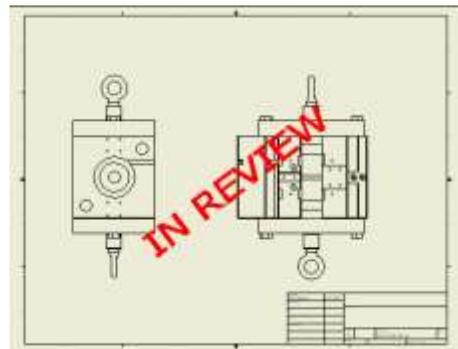
The lifecycle state has a direct impact on watermarks shown when viewing the files attached to the item (either using Vault Explorer or the Web Client).

The watermark labels are customizable by the Vault Administrator, the following images show the watermarks using the “out-of-the-box” default options. In the following example a released item is moved to Work in Progress so that changes can be made to the design. Viewing the visualization file shows the previously released version of the drawing, with the watermark WORK IN PROGRESS across the drawing.



As the related CAD files are adjusted the view of the file will always shows the most current checked-in version of the file. It is not until the item is updated does the item visualization update with the changes although the watermark is still applied

When the state of the item is changed to In Review the watermark label on the drawing visualization file is adjusted to match. When the item is set to released the watermark is either removed or adjusted to show the state of the revision (configured by the Vault Administrator)



## Roll Back Lifecycle State Change

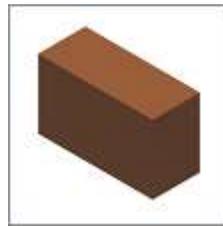
Lifecycle changes can be rolled back to a previous state. A few examples of when this might be used:

1. An item is released and it's been determined that further changes are required. It is desired that these changes are part of the same revision opposed to creating a new revision level. The state can be rolled-back to WIP, the changes made, and the item re-released
2. An item is put into WIP to make some changes. After it was decided that the changes are not required. The lifecycle can be rolled back to RELEASED restoring the files back to their previously released state

In the following example the RELEASED item (revision #1) is put into WIP. Changes are made to the file and it is checked back in and the item is updated.



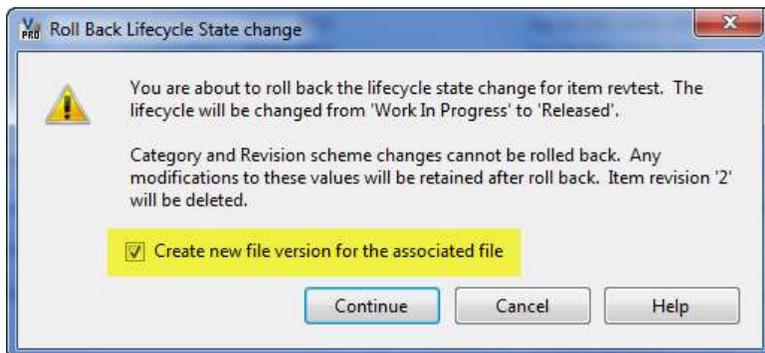
Initial version of the file (Rev 1 – Version 5)



Modified version of the file (Rev2 – Version 6)

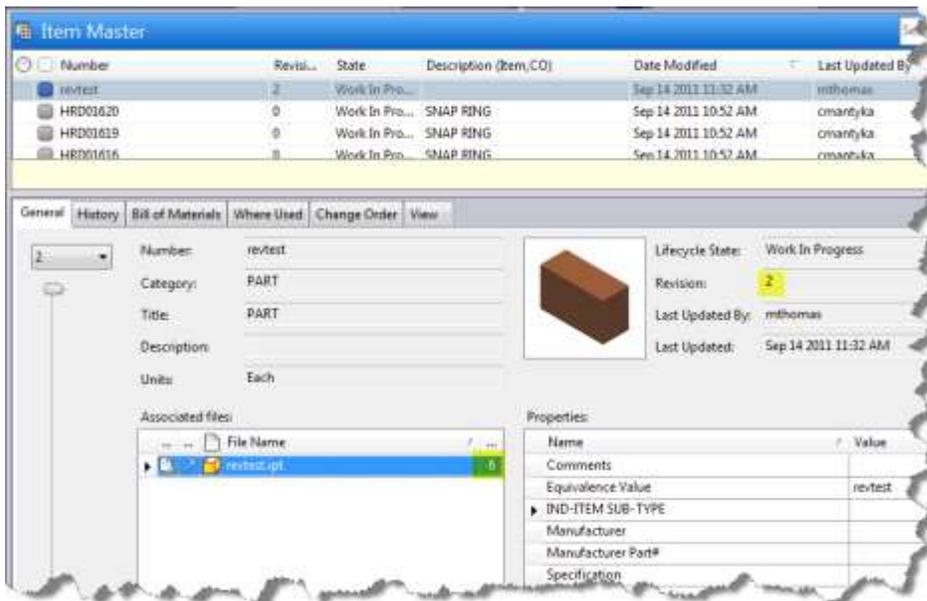
After the modifications it has been determined that the changes aren't really required. The item (and file) need to go back to the previously released revision of the item. **Roll Back Lifecycle State Change** will revert the item back to whichever state it was previously in.

When initiated you will be warned about the ramifications of rolling-back the lifecycle. **Most importantly** pay attention to the toggle *Create new file version for the associated file* as you will always want this enabled when rolling back from WIP to Released. This ensures that the version of the file goes back to the version of the file attached to the released revision of the item.

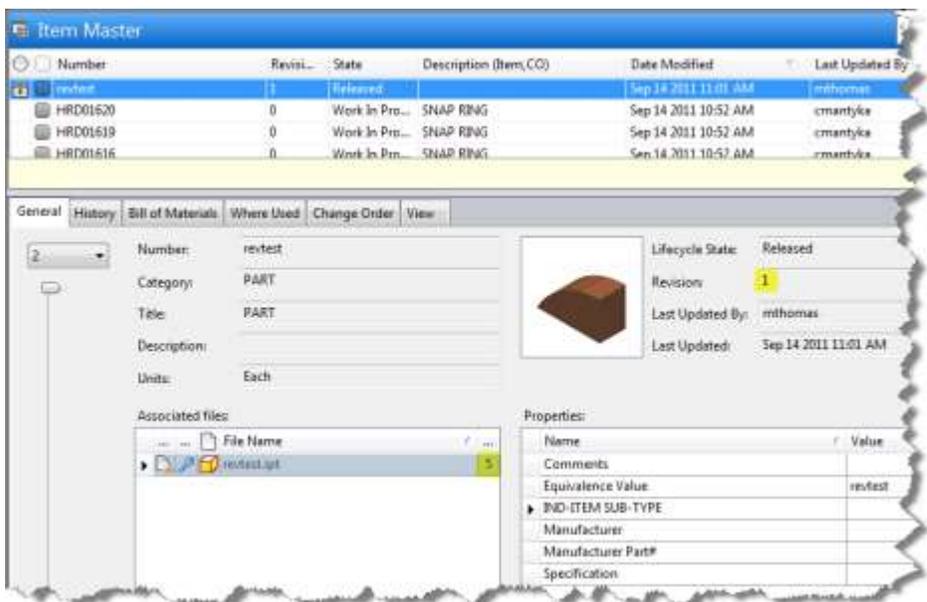


Lifecycle Change Warning

PL1714 - Choosing the right lifestyle with Autodesk Vault Lifecycles



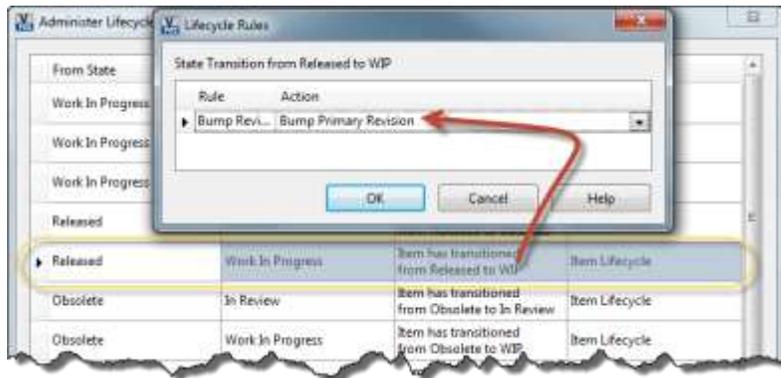
ITEM prior to lifecycle Rollback



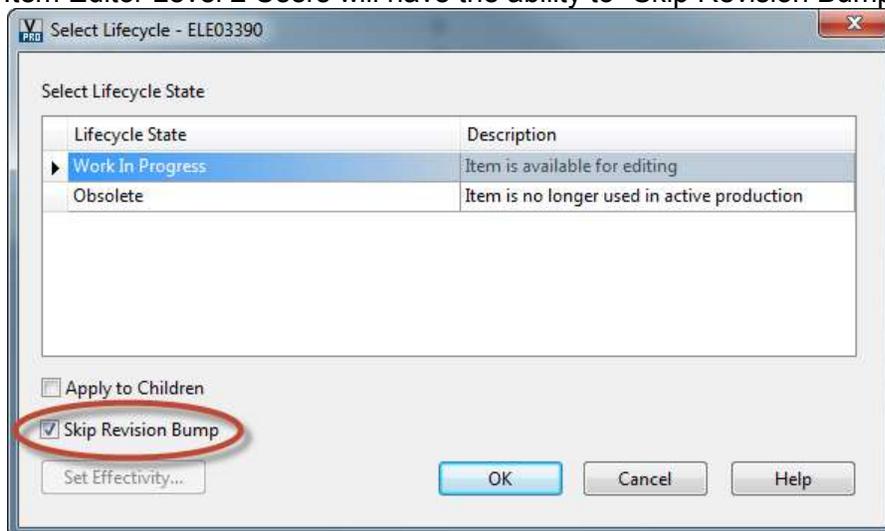
ITEM after lifecycle rollback

## Automatic Revision Bumping

Item lifecycle changes can be configured to auto-bump the revision level



Item Editor Level 2 Users will have the ability to “Skip Revision Bump” which does exactly that



## Purging Items

Vault maintains a history of every version of an item, which is generated each time the item is updated, edited or changed state... this version history can be purged. Most common case of using this is that an item is renamed in a later WIP state, Vault will hold onto the previous item number. By purging you can reuse this number.

## Lifecycles – Files vs. Items

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Autodesk Wiki...

- *“A lifecycle definition is an engine that can be configured to automatically assign security, behaviors, and properties to Vault contents based on where the content is in the life of the design process. “*
- *“A lifecycle definition uses states to identify the content's status in the lifecycle. Changing the lifecycle state of a file enforces certain lifecycle behaviors configured by the Vault administrator”*

As a general rule File lifecycles and Item lifecycles do NOT mix

You want to use one or the other but not both...

- If you release the item it will automatically lock the file
- If you release the file this will NOT release the item. If you subsequently release the item when you put it back into WIP it will NOT WIP the file.
- File revisions and Item revisions are NOT tied together

Here’s a chart depicting what should occur if you decide to use Item Lifecycles vs. what should occur when you use File Lifecycles

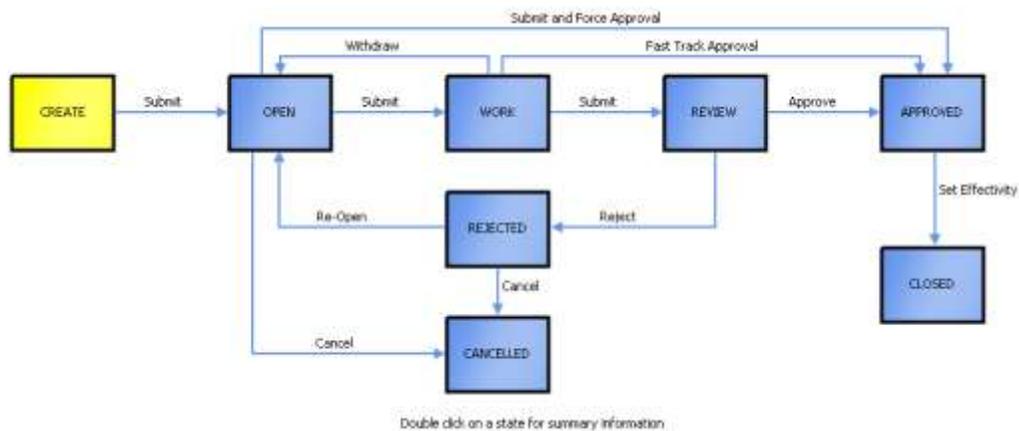
Items are Released	Files are Released
Change Orders are completed on the Item NOT the file	Items are never released, remain in the WIP state
Item Lifecycles are used which will lock the file preventing changes	Files categories are used and their state controls the lifecycle
The revision is controlled by the Item	The revision is controlled by the file
Files remain in the Base category and their state never changes	Change Orders are completed on the files NOT the item
	The item master is used solely for the creation of items and their BOM for export

## Change Orders

### What are Change Orders?

When a design requires a change or modification you want to put controls in place to help manage the change. A record of the changes provides a history “trail” of what was changed, why it was changed and when the change occurred. Vault Professional provides **Change Orders** to capture the changes and manage the change as the modifications are completed, reviewed, and released to be manufactured. The change order is the historical “paper trail” of the why, how, when, who, and what of the design modifications

**Change Orders** are not available to everyone. You need to have at least basic level privileges to the items to create or participate in change orders. If you are unsure of your privileges talk to your Vault Administrator



#### Change Order Workflow

The purpose of this document is to show how files and items integrate into Change Orders, not to explain how Change Orders work. For more information visit the Autodesk Help.

Also note that Change Orders are available in Vault Professional only

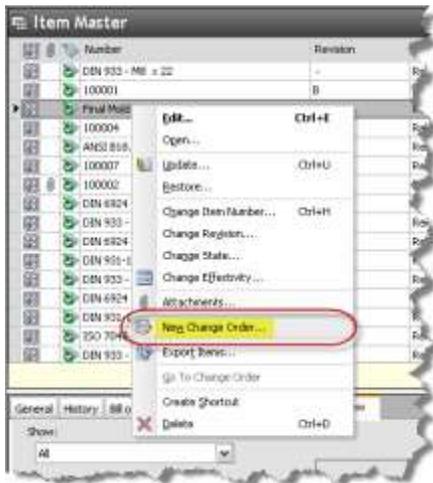
## Creating New Change Orders (and Submitting for Work)

### Quick Procedure

1. Locate the *item* or *file* requiring the change
2. Create the Change Order
3. Describe the change required
4. Markup the drawing (as required)
5. Assign the Routing
6. Submit it

### Creating the Change Order

The first step to create the change order is to locate the item requiring the change, right-click, and select **New Change Order**. This puts the change order into the **Create** stage



At this point you will put in information about the required change. On the **General** tab the change order title and summary (description) are entered as well as the expected due date of the required changes.

### Creating a New Change Order

The **Items** tab lists all the items requiring changes. Additional items that are not directly related / tied to the active item can be added to the Change Order using the **Add** button. This can include other assemblies or components requiring changes

## **Completing the Required Changes (aka doing the work)**

Once the change order enters the Work stage the Responsible Engineer can start making the required changes and modifications.

### **Quick Summary of the steps:**

1. Add related files (the files requiring changes)
2. Change the lifecycle state of the files to Work In Progress
3. Adjust item revision levels as necessary
4. Check-out the files and make the changes
5. Check-in the files
6. Update the items within the change order
7. Change the lifecycle state of any WIP items to "In Review"
8. Submit the change order for review

Once the items are updated and you are satisfied with the changes you can change the lifecycle of the items to In Review. Submit the change order to move to the next stage (Review)

## **Reviewing, Approving, and Setting Effectivity**

In the **Review** stage **Reviewers** can view the change order, make markups, and add comments.

In the **Review** stage **Approvers** can either Reject or Approve the changes. Rejecting the changes moves the change order back to a **Rejected** state where further decision can be made. Approving the changes moves the change order into the **Approved** state where the change order will await the setting of effectivity.