

IM223989

Whose Version Should We Believe?

Revising the Story with Autodesk Vault

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Learning Objectives

- Learn how to identify and describe the differences between versions and revisions
- Learn how to apply Vault categories and file lifecycles to manage change
- Learn how to use ECOs to track revision
- Discover the differences between file revision management and item revision management

Description

This class will introduce you to the powerful tools that are available in Vault Workgroup software and Vault Professional software for revision management, approval workflows, and engineering change orders (ECO). Learn how categories are used to control the flow of your data and versions and revisions are intertwined. We will also cover how to apply different revision schemes and how to initiate and track change via a change order.

Speaker

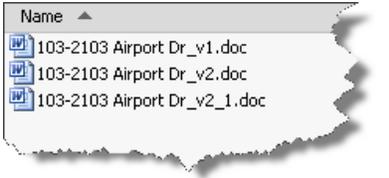
Mike graduated as the Most Distinguished Graduate from CAD/CAM Engineering Technology at SIAST, Kelsey Campus. He is specialist in the manufacturing industry with strong knowledge on the Autodesk mechanical products supplemented with a solid understanding of document management, hardware, networking, and other Autodesk technologies.

He is now the Technical Services Manager for Prairie Machine and is responsible for overseeing the company's technical operations and strategic (technical) growth. Primary duties include the ongoing support of critical computer systems and programs, the interactions between departments, providing the engineering department with effective systems and technology, and working with the General Manager on the development and implementation of a cohesive strategic plan for the technical growth of the company.

The Version of the Revision

Our engineering drawings (and models) are the language that we use to communicate from concept-to-design-to-manufacture/construction. How we manage this language and its transfer between parties is as important as the document itself.

It is important to maintain a history of a document (including drawings) to track what has changed, when it was changed, and hopefully why it was changed. This history can aid in making better decisions (hey look we already tried that), provide crucial customer information (oh, they have rev D, this is what they need to do), and provide the means to go back to a previous version of the document.

	<p>It is not uncommon for organizations to keep multiple copies of a document labeled with a prefix or suffix identifying the revision of the document.</p> <p>This provides the desired history but is a manual process and prone to user error</p>
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A **Version** is an iteration of a document, something that is different from the previous copy. **Versions** maintain the previous design in case you need to restore back to a previous copy.

Versions are important during the design phase but once the project is completed they begin to lose their importance. **Versions** represent Work in Progress (WIP) data that is used to keep the previous designs in case new ideas do not work or do not improve the design.

	<p>As a <i>version</i> is a copy of the file, and files have size, they take up file store space. It is in the Vault Administrators best interest to keep the number of versions to a minimum.</p>
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All flavours of Vault maintain **versions** of all files checked into Vault. The previous **versions** can be restored as the current **version** at any time. The number of **versions** maintained by Vault is determined by the administrator.

Webster's dictionary describes a revision as *"the act of revising, which is to make a new, amended, improved, or up-to-date version."*

A **Revision** is a milestone, the act of making a change and completing the work required for change. The **versions** are the steps to get to the revision, the **revision** is what gets released and can be made up of multiple versions.

Revisions with Vault (Basic)?

We can maintain history (revisions) within Vault by appending the revision number to the file name. A very manual process but would create the required copies of the document to maintain the various revisions. However, this would quickly become a nightmare. Did we not all move to Vault as we did not want more nightmares?

What About the Other Flavours of Vault?

Autodesk Vault Basic provides **Version control**, but not tools to manage and track change.

Vault Workgroup and **Vault Professional** move from a simple data management tool that tracks versions to a system managing the change of your files - from creation to retirement.

- **Vault (Basic)** = Version Management “*Organize, manage, and track data creation, simulation, and documentation*”
- **Vault Workgroup** = **Vault** + Project lifecycle tools to manage change on files; workflows, lifecycles, and other revision management tools
- **Vault Professional** = **Vault Workgroup** + Items and tools for managing change (Change Orders)

A **revision** is a permanent version, it will never be purged from Vault (unless specifically deleted by an administrator). For example, Revision B might be of Version 14 of a file. Revision “B” represents the milestone of completing the necessary changes to the document.

The Lifecycle of Vault

What are Lifecycles? “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.”

The basic Lifecycle process (within Vault):

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

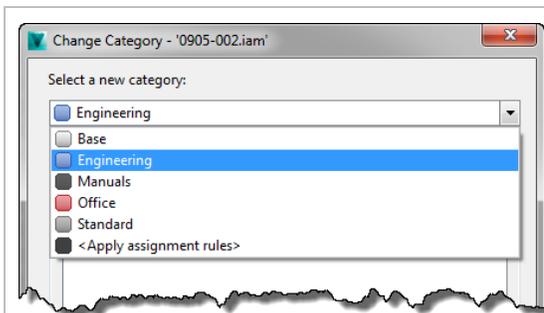


The goal here is not to explain *Lifecycles* in detail but to highlight their importance with how files & folders are revised, and the revisions tracked

Categories

Categories provide a grouping method for a set of files, folders, custom objects, or items. Categories assign user-defined properties to the objects, the available lifecycle definitions, and the available revision schemes.

With Files, adjust the **Category** manually or establish *rules* to assign the category automatically.

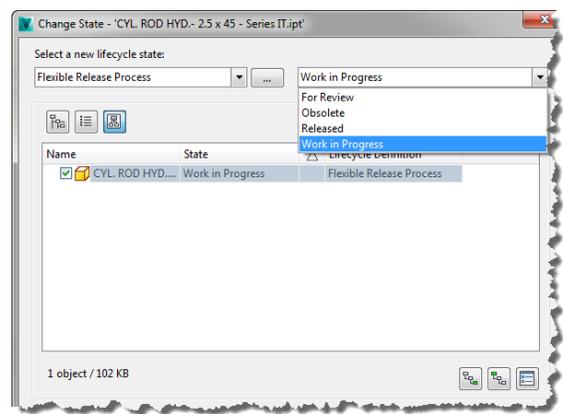


CHANGE CATEGORY

To change the Category, select the object(s) and click the Change Category button. The subsequent dialog will allow you to choose from the existing categories.

States

The **State** identifies the object's status within the lifecycle. For example Work in Progress (WIP) or Released. The number and type of states the object transitions thru is based on the **Lifecycle's Transition Rules**.



CHANGE STATE

To change the state, pick the object and select **Change State**.

In the **Change State dialog**, adjust the assigned **Lifecycle definition** and choose the **State** you want to switch the object to.

Depending on the settings you might also notice the revision value change as well

Folders are like files except you cannot set the revision. After applying the desired **Category**, you can adjust the **State** of that 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 are like folders in that you cannot set the revision, only adjust categories and states. **Categories** with custom objects do not have sub-content rules to worry about like with folders and files.

Revision Schemes

Vault **Revision Schemes** define the *revision value* applied to the object and the sequence of subsequent values. You specify the format of the primary, secondary, and tertiary revisions.

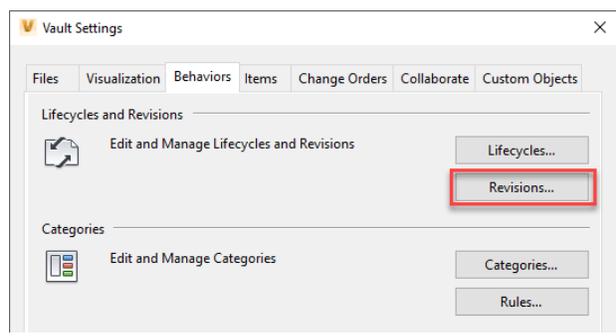
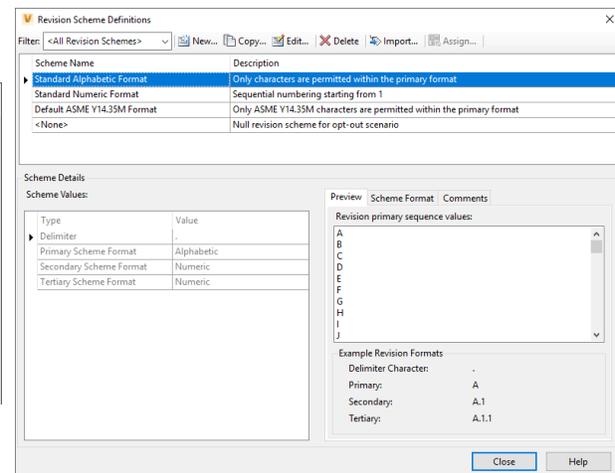
The scheme forces the users into predefined values, so they can not stray away from the standard.

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.

The “out-of-the-box” Revision Schemes

- Standard Alphabetic (A, B, B.1, B.1.1 to ZZ)
- Default Alphabetic (same as standard but starts at rev “-“)
- Standard Numeric (1, 2, 2.1, 2.1.1 to 99)
- Default Numeric (same as standard but starts at rev “-“)
- Default ASME Y14.35M (-, A, B, A.1, A.1.1 | no I, O, Q, S, X, Y)¹

To define or modify a **Revision Scheme**, within the **Vault Settings dialog** (Tools > Administration > Vault Options) navigate to the **Behaviors** tab. Within the *Edit and Manage Lifecycles and Revisions* section select **Revisions**.

The Revision Scheme Definitions dialog shows the following table of schemes:

Scheme Name	Description
Standard Alphabetic Format	Only characters are permitted within the primary format
Standard Numeric Format	Sequential numbering starting from 1
Default ASME Y14.35M Format	Only ASME Y14.35M characters are permitted within the primary format
<None>	Null revision scheme for opt-out scenario

The Scheme Details section shows the following table:

Type	Value
Delimiter	.
Primary Scheme Format	Alphabetic
Secondary Scheme Format	Numeric
Tertiary Scheme Format	Numeric

The Revision primary sequence values section shows the following example:

```

Revision primary sequence values:
A
B
C
D
E
F
G
H
I
J

Example Revision Formats
Delimiter Character: .
Primary: A
Secondary: A.1
Tertiary: A.1.1
    
```

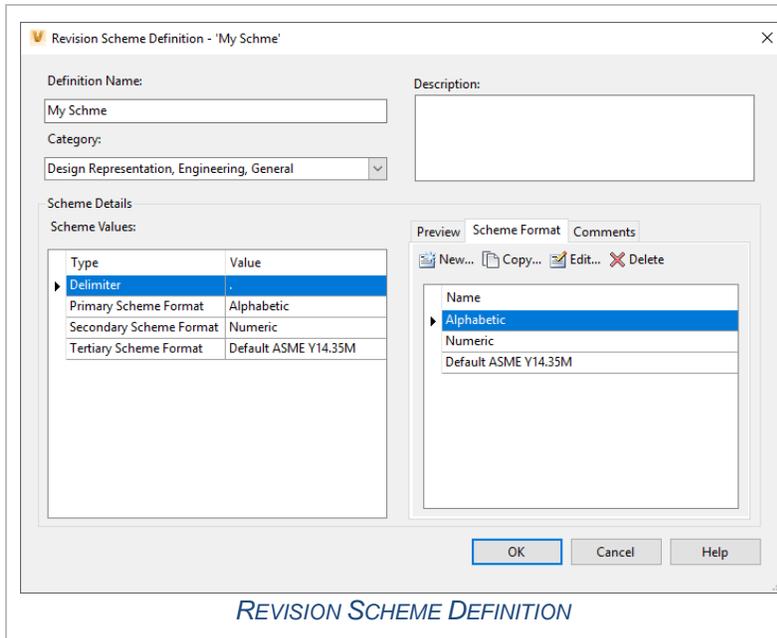


When defining a new scheme, either copy an existing scheme or start from scratch

¹ The American Society of Mechanical Engineering (ASME) standard that defines the practices for revising drawings and associated documentation, includes the methods of identification and revision documentation.

Select **New...**

1. Name the new scheme and enter a description
2. Select the **Categories** in which you want the new scheme to be available
3. Assign the three (3) **Scheme Formats** (Primary, Secondary, and Tertiary) and the **Delimiter**
4. If desired **Scheme Format** is not available, create a new Scheme Format

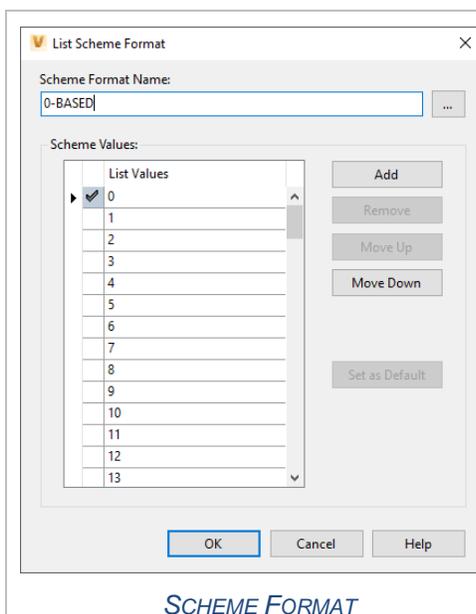


The **Scheme Definition** is simply the list of values available to the Revision.

In most cases it is easier to copy an existing scheme and tweak it, otherwise when starting from scratch you'll be defining each and every value in the scheme.

Once a scheme is used it **CANNOT** be modified. Make sure it is what you want before you start using it.

Example:



Say your company starts at rev 0 as the initial release to manufacturing, but the Vault out-of-the-box numeric options start at – or 1.

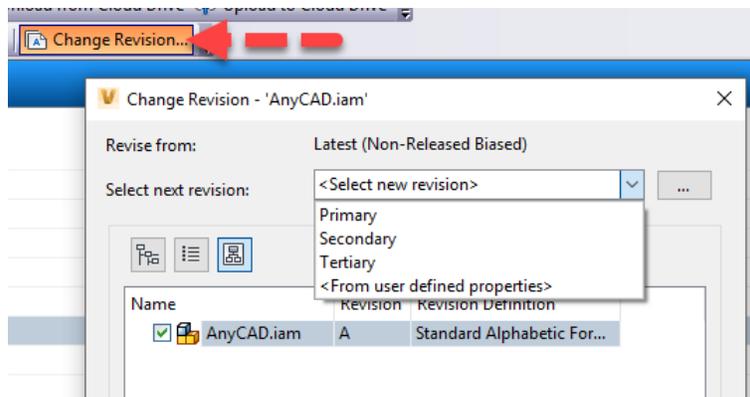
Start by copying the Default Numeric, naming it 0-BASED. It is identical, but starts at 0 instead of 1

Further, you can mix schemes in the Revision Scheme Definition, for example, using “*Alphabetic*” for Primary, “*Numeric*” for Secondary, and “*0-BASED*” for Tertiary.

Adjusting the Revision Level (Files)

Revision Bump

Use the **Change Revision** feature to *bump* the revision to the next available value in the current revision scheme. Within the dialog, select the revision level you want to bump to (i.e. are you going from 1 to 2 or 1 to 1.1) and Vault automatically goes to the next available value.



BUMP THE REVISION

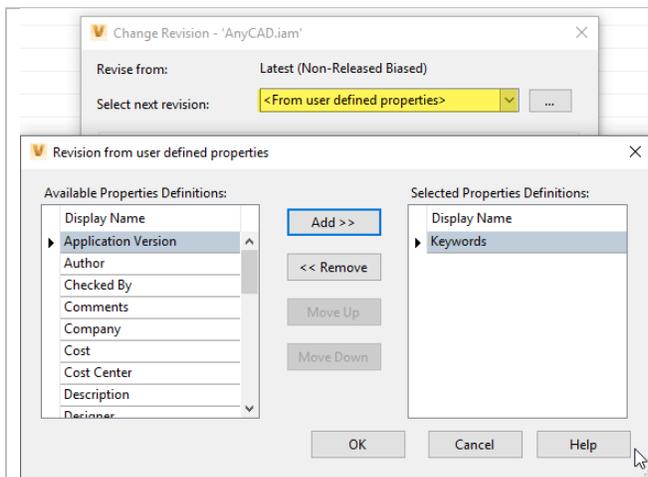


The ability to adjust the revision of the file will depend on the permissions assigned to your Vault User Account, the category the files belongs to, and the current state of the file.

Using a File Property

Alternatively, to a bump, use a **property** of the selected file to populate the revision value.

Utilizing the property is especially useful when migrating data into Vault. If a document property contains its revision, then use it to set the initial Vault revision value.



FROM USER DEFINED PROPERTIES

The property will work if the current value fits within the Scheme Definition.

For example, you could not use the description (a multi-character string) if the current scheme is alphabetical (A, B, C).

User Specified Revision Value

To adjust the revision manually, click in the Revision field and type the desired value. The value entered must *fit* within the scheme definition. For example, you could not enter “hello” if the revision scheme is A, B, C or 1, 2, 3.

Vault displays a **red exclamation mark** if the current entered value does not fit within the revision format, meaning you must change it.

Name	Revision	Revision Definition
  AnyCAD.iam	 NEW	Standard Alphabetic For...

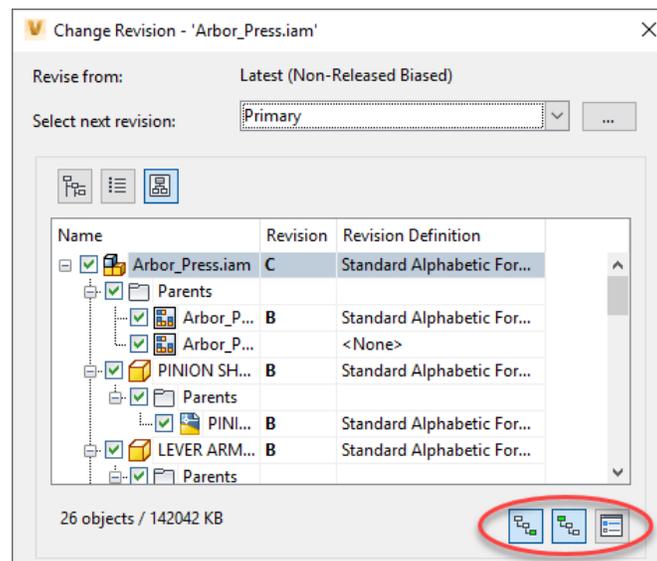
The option of setting the revision is useful with the historical revisions of files occurring before added into Vault. If you add a drawing to Vault that is currently at Rev 14, you do not need to (or want to) bump the revision 14 times. Just revise the file and set the revision to 14.



Once a Revision level is achieved there is no going backwards. If I take a file and manually adjust from 1 to 11 I will NOT be able to assign revision levels 2 thru 10 to it.

Adjusting a Group of Files

As Vault maintains file relationships of the files checked into Vault you can adjust the revision level on a file and all of its dependents or parents. Use the buttons at the *bottom right-corner* to **Include Parents**, **Include Children**, and other optional files like *attachments*.

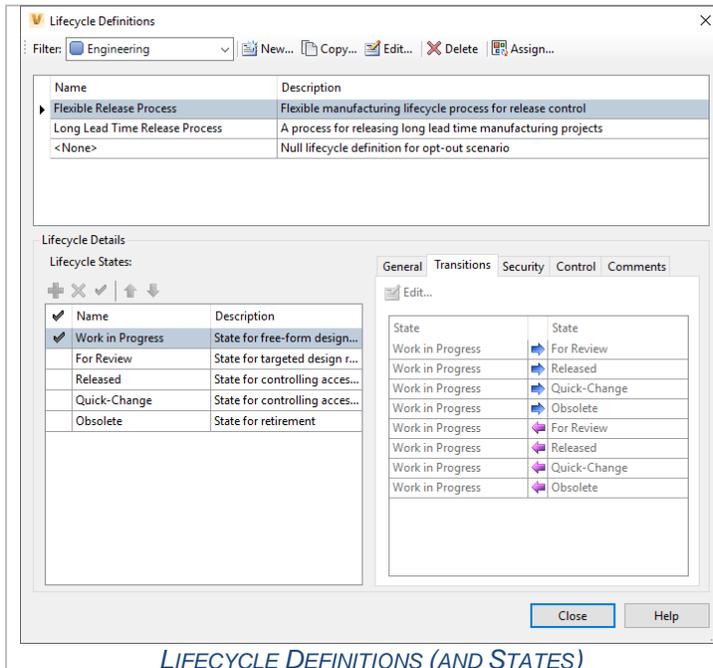


PARENTS & CHILDREN

You can also adjust the revision for multiple files in one step by selecting them in the grid view and selecting **Change Revision**. This will *bump* each file’s revision to the its next available value, NOT set them all the files to the same revision.

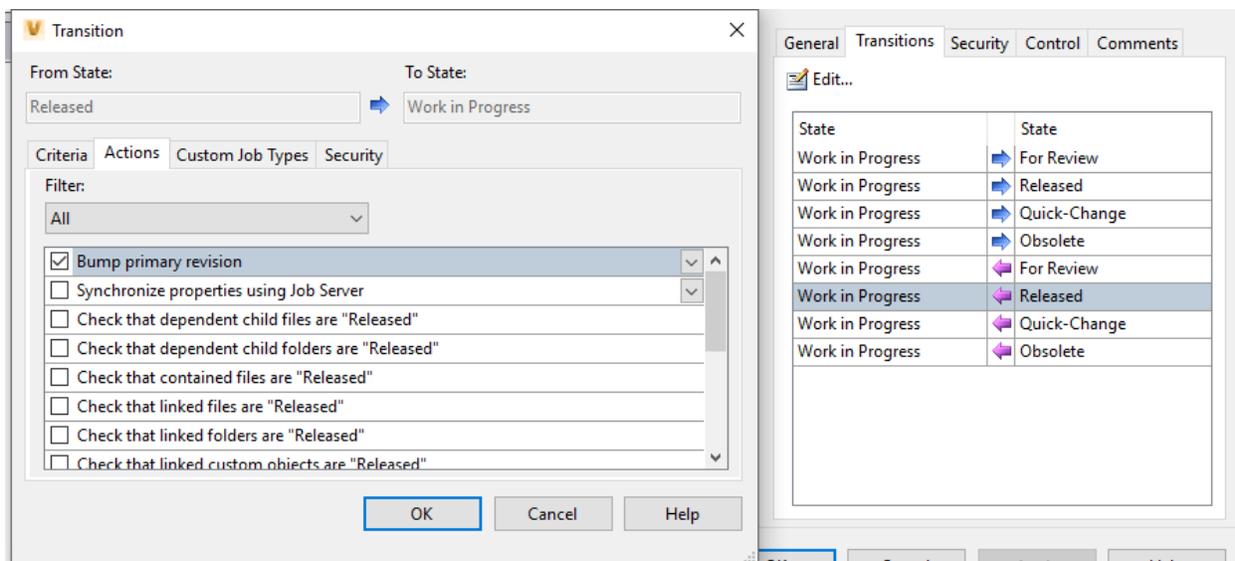
Automatic Revisions

States identify the status of your file within the **Lifecycle Definition**. By themselves the states are simply labels, representing the various stages that you want your files to transition through.



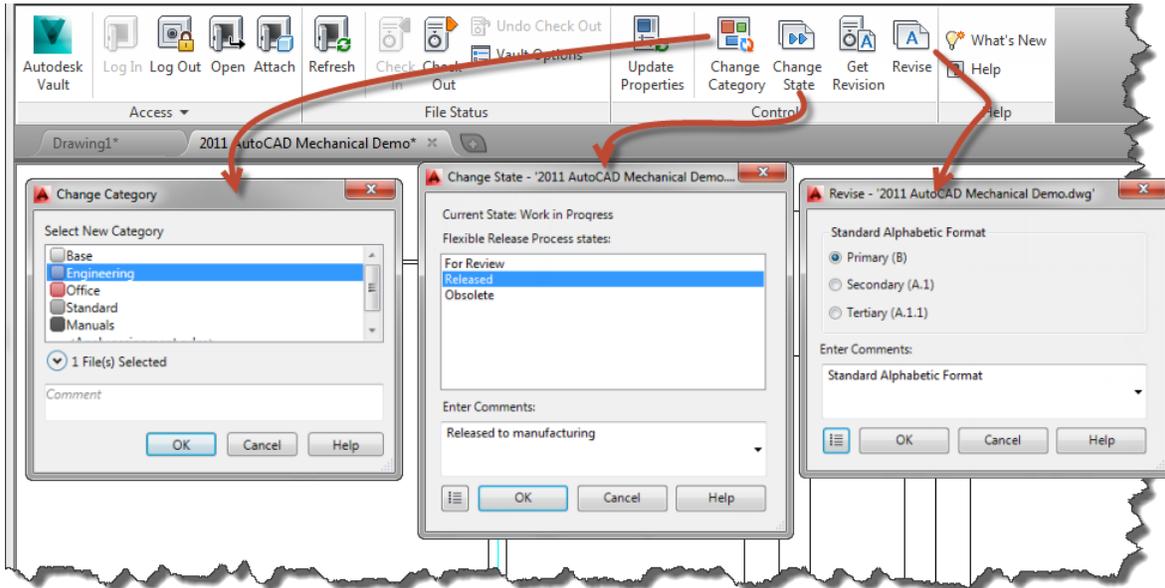
The **Transition** of a state determines many things, but with **revisions** it manages the **Actions** that happen during the state change (like revision bump), and the **Security**, as in who can make the specific state change.

In the **State configuration dialog** use the **Actions** tab to define what occurs during a state change and the **Security** tab to specify who can make the transition state change.

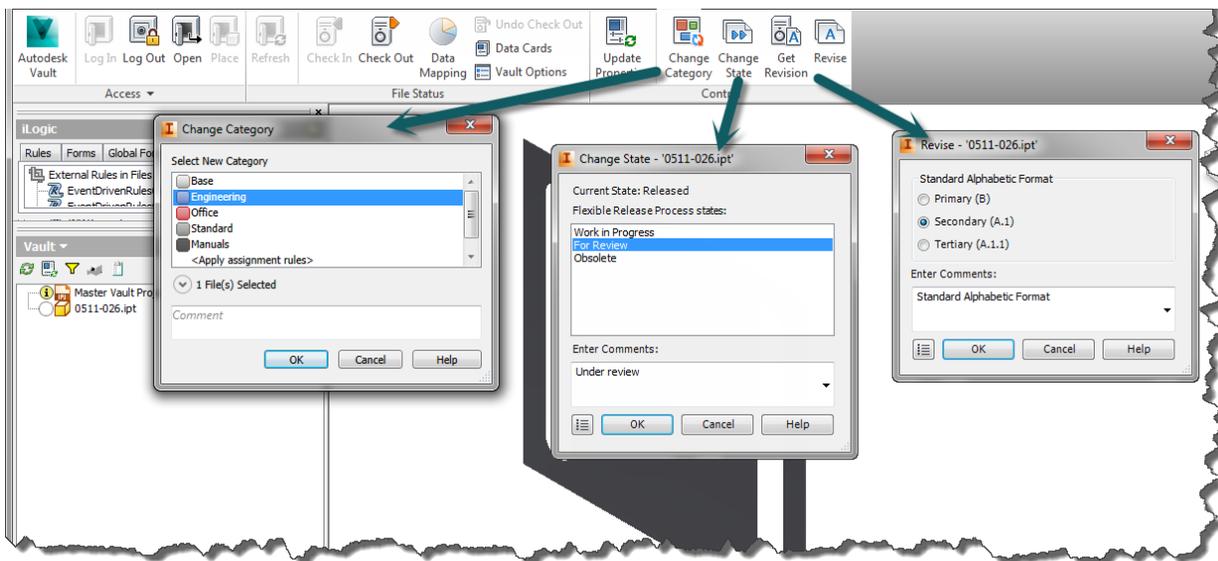


CAD and File Lifecycles

When using the Vault CAD add-in, you can perform lifecycle including changing **Categories**, **Changing States**, and **Revising**.



AUTOCAD - VAULT LIFECYCLE FEATURES



INVENTOR – VAULT LIFECYCLE FEATURES

Vault Icons

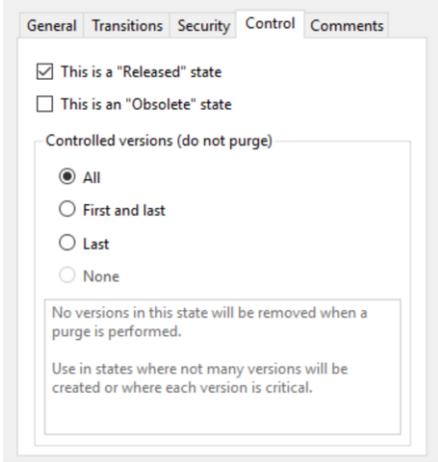
Vault uses a combination of font color and status icons to aid in identifying the status of a file. With the introduction of lifecycles, state changes, and revision bumps you will start seeing additional icons you may not be familiar with. Vault's help provides a complete list.

	The file is in vault and available for check out. This is the leading version of the leading revision
	The local copy is the released version of the latest revision but is not the latest version of the latest revision (typically caused by someone else doing a quick-change)
	The local copy is a historical revision of the leading revision in the vault.
	An unexpected revision with the file or the status could not be determined. Use the tooltip for assistance.
	The local copy of the file does not match the latest version in the vault.

Purging and Released Versions

Each version of a file is an actual file maintained by Vault. Versions consume disk space. Vault administrators do not like this. Additionally, versions are only relevant during an active project. Subsequent projects do not utilize previous versions, when they have access to the released revisions.

The **Control** of the **State** sets the **purge preference**.

 <p>The screenshot shows the 'Control' tab in Vault. It has two checkboxes: 'This is a "Released" state' (checked) and 'This is an "Obsolete" state' (unchecked). Below is a section for 'Controlled versions (do not purge)' with radio buttons for 'All' (selected), 'First and last', 'Last', and 'None'. A note at the bottom states: 'No versions in this state will be removed when a purge is performed. Use in states where not many versions will be created or where each version is critical.'</p>	<ul style="list-style-type: none"> • As a Released state, Vault always retains at least one version of the file in this state • Controlled versions (do not purge) <ul style="list-style-type: none"> ○ All – no versions in this state are purged ○ First and Last – all versions, except the first and last, are removed during purging ○ Last – all versions, except the last are removed ○ None – no versions are retained during a purge (except those required by a parent file)
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The purge version control settings apply only to new file versions. All files existing in the Vault use the legacy settings.

Item Lifecycles

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.

The **item master** is a master list of everything within the engineering system. Vault assigns a unique number (an identifier) to each **item** and uses it to locate, edit, updated, and track the changes to the item.

Items can represent a variety of things including parts and assemblies, instructional guides, consumable goods (fluids, lubricants, etc.), and any related Bill of Material items.

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

- Do I need to deliver data to a downstream application, like MRP, ERP, PLM, 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 use Change Orders to control and track revisions?
- Do I want to manage CAD AND non-CAD things? Do I want to release data locking it from access?

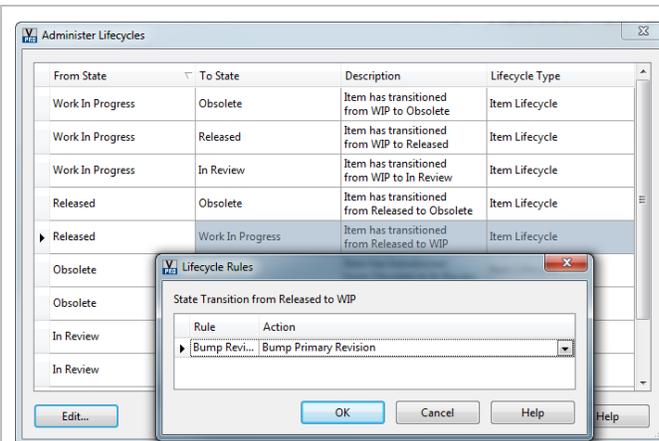
Item Categories & Revision Management Configuration

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.



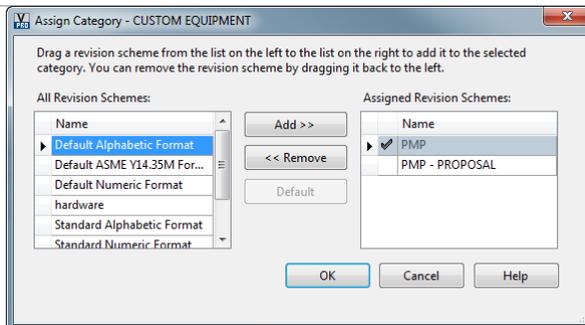
Categories do NOT control lifecycle behaviour.... that is a file-level only option

Vault uses the **Item Lifecycle Rules** to control when the revision value automatically bumps and the revision level it bumping to. The revision scheme controls the initial revision value.



In this example, the state change *Released to Work in Progress* is configured to **Bump the Primary Revision**.

LIFECYCLE RULES



You assign **Revision Schemes** to the **Category** making these the only revision schemes available to items assigned the category.

You also set the default scheme to use with that category.

CATEGORY REVISION SCHEMES

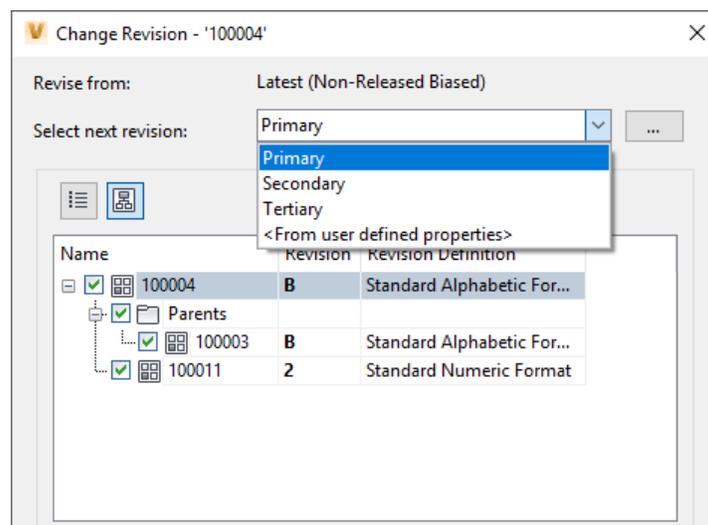
Adjusting the Revision Level of an Item

Use Revisions to track the history of changes applied to an item. After creating the item, use the item lifecycles to manage the revisions. Use the item's revision to populate the file's revision.



There is NO turning back the clock... once a revision level has been used you cannot go to back to it.

To adjust the revision of the item use **Change Revision**. You can use the **Scheme button** to switch a different Revision Scheme.



CHANGE REVISION

Lifecycles - Automatic Revision Bumping?

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).

Item lifecycle changes can be configured to auto-bump the revision level, meaning that a change of state can automatically bump the revision.



Lifecycle changes can be rolled back to a previous state using Roll Back Lifecycle State Change

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.

Getting the previous version of a revision

Vault tracks versions of a file and the revision of an item which is of a version of that file. To make a previous version of a file the current version the Item needs to be in WIP (Work in Progress). Then:

1. Switch to the Project Explorer view and locate the file.
2. Check out the file (use the Vault Client, not the CAD application).
3. Insure that the “Show all versions” is enabled
4. Select the version you want to restore, right-click, and select Get / Checkout. Click OK to restore that version of the file. You will be prompted to replace the existing file, click yes to all
5. Open the file in the CAD application. Make sure you open the file locally and not from the Vault.
6. From the CAD application check the file back into the Vault which will become the new version.

History	Uses	Where Used	Change Order	Preview	
Number of versions:		7	(Local = Version #7)		
Number of revisions:		3	<input checked="" type="checkbox"/> Show all versions		
File Name	Revision	State (Historical)	Created By	Checked In	Comment
▶ Arbor_Press.iam	B	Released	mthomas	9/23/2018 6:54 ...	
Arbor_Press.iam	B	Released	mthomas	12/27/2017 6:54 ...	Released to manufact...
Arbor_Press.iam	B	Work in Progress	mthomas	12/27/2017 6:52 ...	
Arbor_Press.iam	B	Work in Progress	mthomas	12/27/2017 6:45 ...	Available for editing
Arbor_Press.iam	A	Released	mthomas	12/27/2017 6:45 ...	Released to manufact...
Arbor_Press.iam	A	Work in Progress	mthomas	12/27/2017 6:44 ...	Change Category
Arbor_Press.iam			mthomas	12/27/2017 6:43 ...	

HISTORY TAB



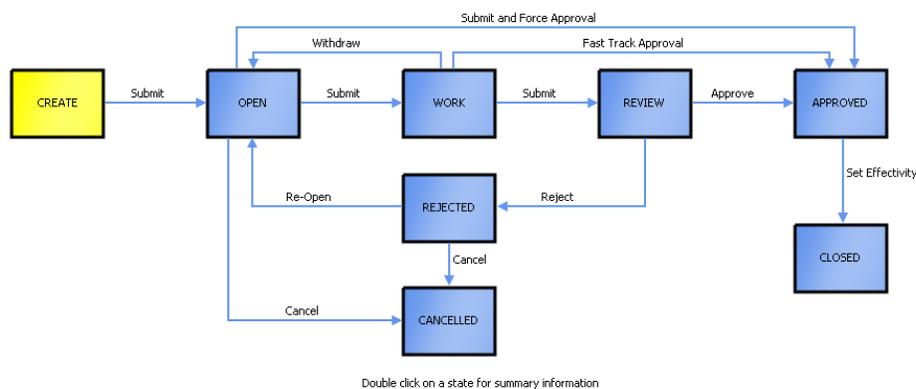
CONFIRM FILE REPLACE

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 ORDER WORKFLOW



Change Orders are not available to everyone. You need to have at least basic level privileges to files or items to create or participate in change orders. Participants can create a change order, and anyone assigned can review a change order.

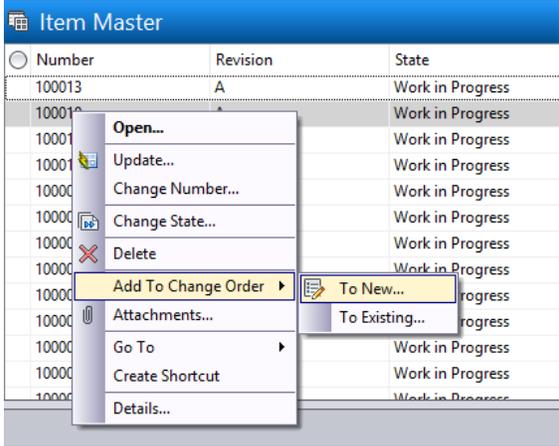
In addition, only *Administrators* or *Change Order Editors* can affect change orders:

- **Change Order Editor (Level 1)** – create, edit, participate, and read change orders
- **Change Order Editor (Level 2)** – Level 1 + add/remove from an approved ECO

Creating New Change Orders (Quick Procedure)

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

Creating the Change Order



CREATING A NEW CHANGE ORDER

The first step is to create the change order is to locate the objects requiring the change, *right-click*, and select **Change Order > New**.

Alternatively, from the **Change Order List view** select **New**.

This puts the change order into the **Create stage**

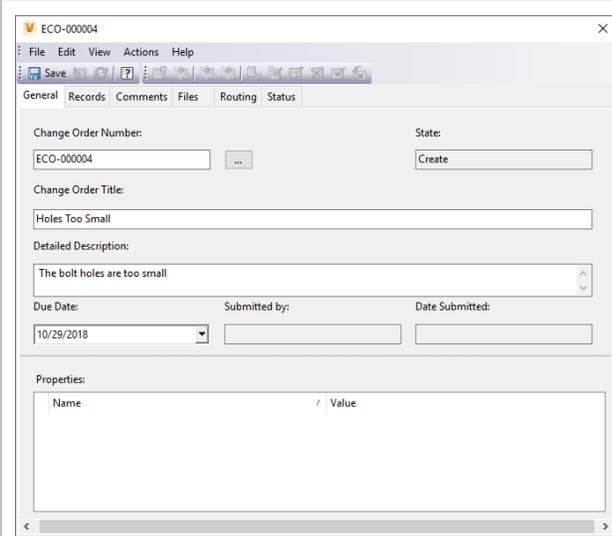
With the new **Change Order**, enter information about the required change. On the **General tab** the change order title and summary (description) are entered as well as the expected due date of the required changes. The **Change Order Number** auto-populates based on the applied numbering scheme.

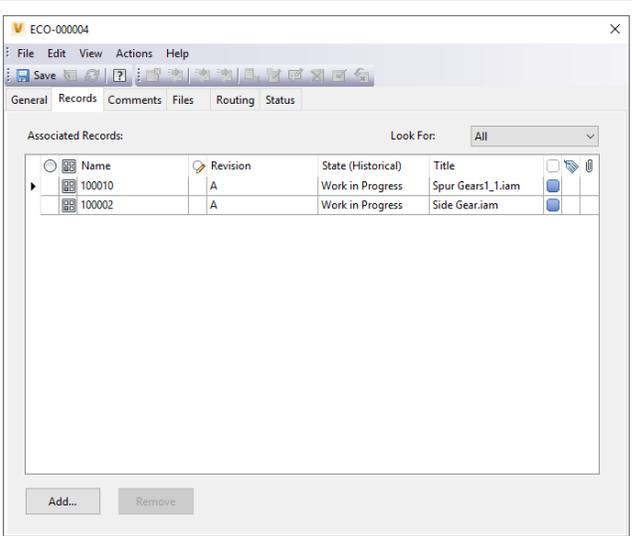


As a best practice, it is useful to add all files affected by a design change. For example, changing a part can impact the parent assembly.

Files and items can only be associated with one active change order at a time

The **Records tab** lists the objects (and related items) added for changes. Additional items are added to the Change Order using the **Add button**. This can include other assemblies, components, or really any document requiring changes.





Adding Comments and Markups

Use the **Comments tab** to add comments (text) and attachments (i.e. markups, photos) and reply to these comments. You must be a routing participant to add (or reply) comments.



Change Administrators can add comments during any state except Create. **Any role** can add comments during the Work state. **Reviewers** add comments once it moves into the Review state.

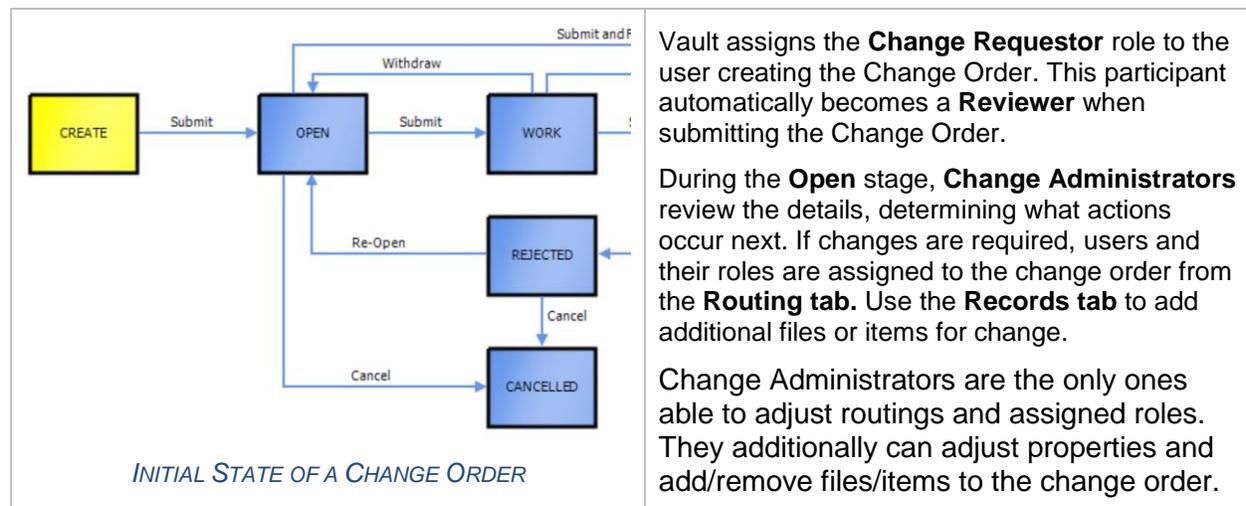
Vault (automatically) creates DWF visualization files of CAD files (during check-in). Use these to markup and add comments to the change order. Any routing participant can add a markup when adding a comment.

Change Order (Initial) Review

Initially the Change Order sits in the **Create** stage and must be submitted to **Open**. During **Create** no work on the items occur as this stage is intended for the collection of information and for documenting what has to change and why it has to change. When complete, *submit* the Change Order, moving it into **Open**.



Before you create a change order: Make sure that a routing has been created by the administrator. The routing should contain everyone that needs to review, be responsible for, and approve the change order.



To make changes submit the Change Order to **Work**. To perform no changes, but keep the Change Order as a record, submit it to **Cancelled**. A third option, **Fast Track Approval**, approves the Change Order and automatically approves and closes it.

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. With the work complete, the Responsible Engineer submits it for review.



The **Change Order Administrator** can make the item editable in all states except Canceled and Closed. The **Responsible Engineer** can make an item editable in the Work State, changing the lifecycle state.

Summary of the “Work” steps:

1. Add related files (the files requiring changes)
2. Change the lifecycle state of the files/items 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** 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.

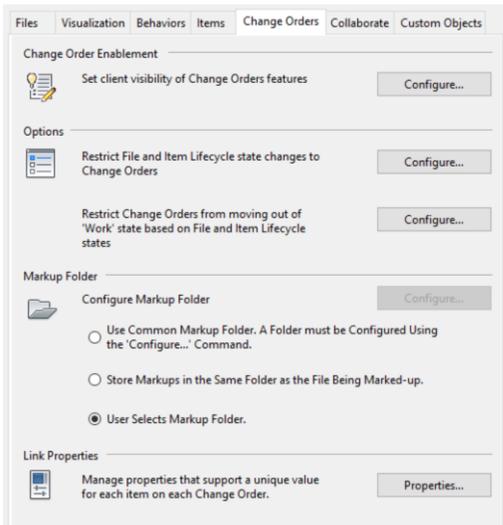


The change order must be in the Approved state before it can be closed.

Notification Users receive notification when the change order is closed. This is useful for participants who need to move changes downstream.

Change Order Administration

The **Change Orders** tab contains options for controlling change order behavior, configuring the markup folder, and managing change order link properties.

 <p><i>CHANGE ORDER ADMINISTRATION</i></p>	<p>Change Order Enablement – if you are not going to use Change Orders, might as well make it invisible</p> <p>Restrict File and Item Lifecycle state changes to Change Orders – No Lifecycle changes unless its in a Change Order</p> <p>Restrict Change Orders from moving out of Work state based on File and Item Lifecycle states – no objects in WIP when transitioning out of the “Work” state</p> <p>Markup Folder – configure how and where Vault stores DWF markups created on a Change Order</p> <p>Link Properties – link user-defined properties to change orders</p>
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In addition to the Change Orders tab, define numbering schemes (Behaviors tab) to auto-label the change orders.