

TechniCom, Inc.

970 Clifton Avenue
Clifton, NJ 07013 USA
(973) 470 9110
<http://www.technicom.com>
staff@technicom.com

Autodesk Product Data Management: A CAD Perspective

Autodesk Product Data Management solutions prove to be easy and straightforward to use, and also promise to considerably increase user productivity during product development.

This report reviews Autodesk's Product Data Management Systems from a CAD Designer point of view.

October 2006

Author: Raymond Kurland, TechniCom, Inc.

Executive Summary

Introduction

Raymond Kurland of TechniCom, the author of this paper, spent several days at Manufacturing Solutions Division (MSD) headquarters in Tualatin, Oregon in mid August, 2006, focusing on Autodesk's Data Management Solutions and their interaction with Autodesk Inventor. Ray met with Autodesk management and technical experts, the goal being to develop this paper summarizing the connection between Autodesk Inventor, Vault, and Productstream, what they provided for users, and how easy or hard they were to use.

Ray met with Eamon O'Gorman, Product Manager for the Data Management Products as well as several executives to get their perspective on the technology and where it is headed. O'Gorman focuses primarily on the requirements for these products, which include Vault, Productstream, and Streamline.

About this paper

During the process of our review we collected many images of the software functions. We have placed these images, most of which are not included in this paper because of brevity, on our web site along with explanations. You can access these images and an explanation of them at:
<http://www.technicom.com/AutodeskPDM>.

Highlights of the Autodesk PDM products

Data management allows Engineering to more easily share and secure data with a formal Engineering Change Order process which can be monitored and tracked.

This paper summarizes the most important functions of Vault and Productstream, two of the major components of Autodesk's PDM software and why they are important for prospective users. Autodesk sponsored this paper and minimally edited the final version. The impressions and conclusions are solely those of the author, an independent analyst and consultant in the CAD/CAM/CAE/PDM industry.

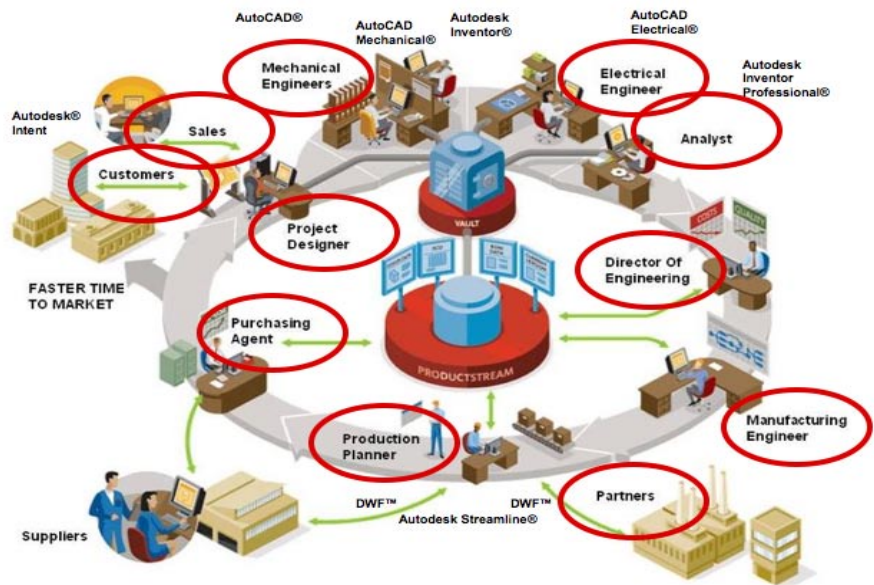
Manage Work-in-Progress Design with Autodesk Vault

Maximize return on your company's investment in design data by driving design reuse with Autodesk Vault functionality. A centralized data management application that securely stores and manages design data, Autodesk Vault is included at no additional cost with all Autodesk manufacturing design software and AutoCAD customers signed up for the subscription service. Tightly integrated with each design application, Autodesk Vault organizes all engineering data in a centralized location and reduces the time needed to find, reference, and reuse design data. The graphical UI (User Interface) offers CAD users an intuitive way to access and manage their data. As product designs evolve, version-management features in Autodesk Vault provide protection from unintentional overwriting of good designs. In addition, users can save hours of valuable design time with the powerful copy design capabilities that maximizes reuse of existing designs and reduces the time required to start a new design.

Automate Release Management with Autodesk Productstream

Maintaining control of the design data until it goes into production proves to be a major factor in getting products to market faster. Obstacles to increasing productivity include changes made to drawings and models without your knowledge, out-of-date bills of materials (BOMs), and trouble sharing design information. Autodesk Productstream automates the release-management process by managing engineering changes and bills of materials (BOMs), which allows engineering departments to maintain control over the design data after release to adjacent departments. Automating this process helps reduce costly errors and delays by minimizing manual data entry so that design changes are communicated directly back to engineering and correct parts are ordered or manufactured for a specific design. Engineering can more easily share design information knowing released information is secure and changes cannot be made without implementation of a formal engineering change order (ECO). In addition to automating release management and tracking the change order process, Autodesk Productstream manages bills of materials and enables the sharing of valuable design data with users outside engineering and applications such as enterprise resource planning (ERP) and material requirements planning (MRP) systems, as illustrated in the image below, provided by Autodesk.

It's about the process. The goal is to help customers bring standard products with options to market faster with less expense to have an advantage over the competition while providing value to the end customer.



Increase Collaboration with Autodesk Streamline

Efficient sharing of designs is crucial for maximum project visibility and collaboration. Autodesk Streamline provides an on-demand collaborative project management solution that enables users to connect, share, and collaborate with external team members, all at minimal complexity and cost. By providing a single location to securely access shared files and collaboration tools, Autodesk Streamline makes up-to-date design information available to customers and suppliers anywhere.

Share Designs with Autodesk DWF

The compact and easy-to-use Autodesk DWF file format for sharing designs offers a free and simple way for team members to publish any Autodesk design to DWF. The free Autodesk DWF Viewer allows anyone, including customers and suppliers, to easily view and print even the most complex 2D and 3D designs. Autodesk Design Review, available for a modest cost and included free with each copy of Productstream, accelerates the design review process by providing an all-digital way to review, mark up, and revise designs without the original design creation software.

Most Autodesk CAD applications include Vault at no extra charge. As you will see by the end of this discussion, it is therefore a no-brainer to use Vault instead of a file based system. We recommend that all users immediately begin the evaluation process to install and use Autodesk Vault. The benefits are enormous (as you will see from the following discussion), the risk minimal, and only a nominal initial cost for help in getting started. Here are some more details on why we came to this conclusion.

- Managing the myriad file types and inter-related files describing the CAD design created by Inventor is a complex task. The file types include .IPT (part files), .IAM (assembly files), .IDW (drawing files), and .IPN (presentation files). Why worry about where they are located and which have changed? Vault does all that for you.
- Vault maintains its data in a secure fashion. Someone with administrative permissions assigns privileges to appropriate users to move data in and out of the Vault. Thus data is delivered only to authorized personnel.
- Vault is a no charge feature of all Autodesk design applications!
- Vault provides a common location for backing up your valuable data. Not only that, but the availability of previous versions allows potentially recovering from major design errors.
- Vault automatically saves and advances to new versions when design changes are made. Assurance that you are always working with the correct released data is enormously valuable.

Conclusions

Inventor and Data Management Product Pricing

Inventor ranges in price from \$5,295 to \$7,950 USD, for quantity of one.

- Autodesk Inventor Series 11
- Autodesk Inventor Professional for Routed Systems 11
- Autodesk Inventor Professional for Simulation 11
- Autodesk Inventor Professional 11

Data Management Products are priced per seat, starting at \$495 USD, quantity of one.

- Autodesk Vault (included with Inventor)
- Autodesk Productstream Creator
- Autodesk Productstream Explorer - 5 Users
- Autodesk Productstream Reviewer
- Autodesk Streamline

Autodesk Vault and Productstream

- Vault's copy design function allows users to readily create new designs from existing ones, saving time and encouraging reuse of designs and parts.
- Vault lays the groundwork for using Productstream, a straightforward, yet sophisticated release management system.
- Vault data can be searched, the result being increased productivity by finding the correct data faster, and better reuse of existing parts.
- It is easy to get started. Qualified Autodesk resellers offer a complete installation package including existing data migration to the Vault, training, and installation for \$7,500.

When you are ready for the next step, Autodesk offers the Productstream release management system. This includes Bill of Material Management, Release Management and Change Management. While all of these can be installed and operational at once, it might be easier to take an incremental implementation approach, recommended by Autodesk. Designed to go beyond the task of maintaining the correct version, for which it requires Vault, Productstream offers many additional advantages. Only a few of these follow. Users are sure to find many more.

- The install process takes only a few minutes. When we installed from scratch, it took only 13 minutes to install from the Productstream CD. At the conclusion of the installation, we had the free Microsoft SQL server (MSDE) installed as well as the Productstream application.
 - The ability to electronically track the status of ECO's (Engineering Change Order) and open work can improve the management of engineering processes.
 - The ECO process can be changed by monitoring the routing of reviews and approvals, thus possibly eliminating bottlenecks in the process. This is impossible with a manual system.
 - The bill-of-material compare capability promises an easier review of in-process and better accuracy of completed ECOs.
 - Enacting rigorous controls for approvals allows more traceability and avoids "lost" ECOs.
 - And many more, as you will discover when reading the rest of this document.
-

Description of the functionality of Autodesk Vault and Productstream

In case these descriptions whet your appetite for seeing more details of the software, contact your appropriate Autodesk representative or reseller. Autodesk contact information is at the end of this paper. You can also contact the author with feedback at rayk@technicom.com.

Productstream provides an out-of-the-box ready solution by supporting a limited number of standard operating workflows, which can be modified.

TechniCom's descriptions and conclusions derive from discussions and demonstrations with Autodesk technical personnel and executives. We were able to interact closely during demonstrations and discussions of the functions discussed below.

Since this is a very visual business, a few screen images are included below to expand on the text. This should enable the reader of this paper to obtain an introductory "feel" for the functions. More images are on our website at <http://www.technicom.com/AutodeskPDM>.

The Autodesk PDM product family consists of Vault, Productstream and Streamline. These are buttressed by the ability to view Inventor and other Autodesk data files using the DWF file format, including DWF viewer and the new Design Review 2007.

Use Vault for work-in-process data management

Vault offers a work-in-process Product Data Management System capable of automatically producing versioning, primarily controlling file-oriented data. As you will see by the end of this discussion, it is therefore a no-brainer to use Vault instead of a file based system. We recommend that all users immediately begin the evaluation process to install and use Autodesk Vault. The benefits are enormous (as you will see from the following discussion), the risk minimal, and only a nominal initial cost for help is needed to get started.

Managing the myriad file types created by Inventor is a complex task. The file types include .IPT (part files), .IAM (assembly files), .IDW (drawing files), and .IPN (exploded assembly files). Why worry about where they are located and which have changed? Vault does all that for you.

Productstream adds additional capability to Autodesk Vault

Productstream adds additional capability to Autodesk Vault, most notably, bill-of-material management, release management and change management. As opposed to versioning, it produces revisions and operates on objects called items.

A typical work flow might be as follows. For a customer operating in the vault environment, when the work in progress is considered complete and ready for release, it would be released into the Productstream environment where changes and revisions would be managed. Productstream has a considerable amount of workflow capability. It is however, not a completely customizable system, but one oriented toward specific standard operating procedures, which can be modified. By doing so, Productstream provides a more out-of-the-box ready solution.

Productstream requires Vault as a pre-requisite. Installing Vault requires an SQL server, the Microsoft product for database management. If not installed previously, installing Productstream automatically installs one for you. Productstream not only stores data from Inventor, it stores any file format such as that from Microsoft Office. Without understanding the content, it can manage versions for any file. In addition, Productstream understands the product structure of SolidWorks and Pro/Engineer by integrating directly to these applications using their APIs. Of course, CAD authors have access to their data. But non-authors can access Productstream data from other areas of the company, such as manufacturing, purchasing, and sales, etc. Such access is granted through rich clients called Creator, Reviewer, and the browser-based Explorer. These are chargeable items ranging from \$1,795 per network license for Autodesk Productstream Creator down to as low as \$200 for Autodesk Productstream Explorer.

Streamline, the third product, is primarily a host-based product, oriented towards allowing supplier and customer access for those companies that are not part of the originating enterprise for the data. It acts as a security barrier when data is uploaded; customers can only view that data for which they have access. Built-in security provides encryption for uploading data and storage and a permissions matrix. Streamline also provides an activity log, performance monitoring information, and the ability to extensively search for data, including internal access to metadata (additional descriptive data) and content data within, for instance, drawings. Data is "pushed" (manually uploaded) from Productstream to Streamline, or this process could be automated with a minimal amount of Autodesk services consulting.

Demonstrating the PDM solution

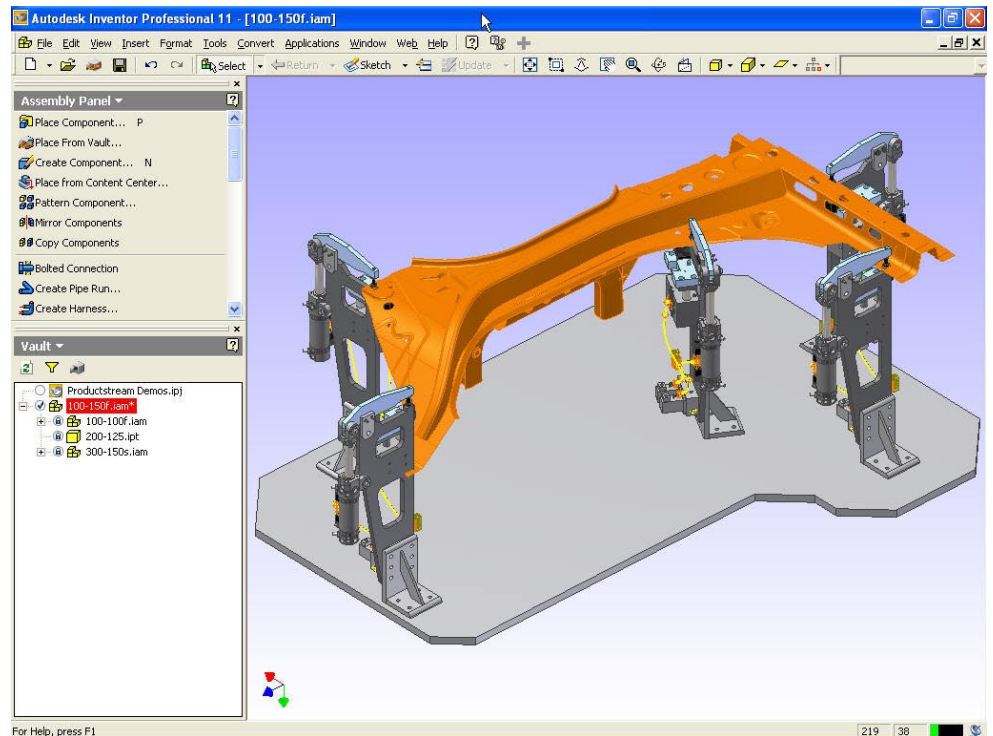
Autodesk Vault and Productstream

A Vault demonstration allowed us to examine in detail the UI (user interface) and differences between using Vault and Productstream versus a file based system. We were particularly interested in how a typical user might use the system and what benefits might result.

To demonstrate how it might be used in a normal situation, we simulated an actual problem -- to redesign an existing assembly because of a design change. This process starts with creating the EC (engineering change) describing the products involved, the problem to be solved, and the general tasks to be accomplished by engineering. Administration, CAD work, and review and approval follow, the end result being a fully executed and closed engineering change, typically resulting in a revision to the product.

First, we looked at the CAD work involved in executing this engineering change. The engineering change involves an automotive body panel, fixtured for welding and supported by five clamps. In its original design, the body panel required all five clamps to be the same height. In its new version, the auto body panel now requires one of the clamps to be of a lower height because of a change in the auto body panel. Image 1 shows that the lower left clamp will not actually clamp the new body panel. It is too tall.

Image 1 - This image shows the Vault browser within the Inventor CAD application on the lower left. Visual cues show which parts and assemblies are locked and which are checked out. The front clamp needs to be redesigned. Notice that the clamping portion is now above the part. (Ref: Image 01 on website)

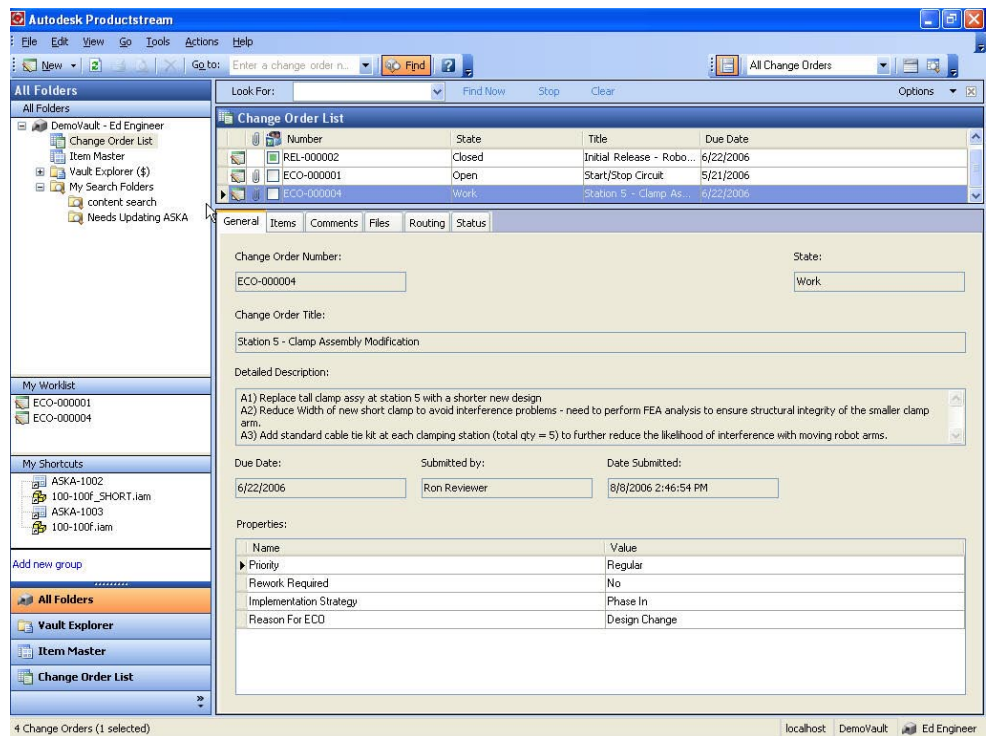


Autodesk Inventor Series (AIS) consists of Autodesk Inventor and AutoCAD. Autodesk Inventor Professional adds analysis and/or routing capabilities. All include Autodesk Vault.

The ability to electronically track the status of ECOs allows eliminating bottlenecks in the process.

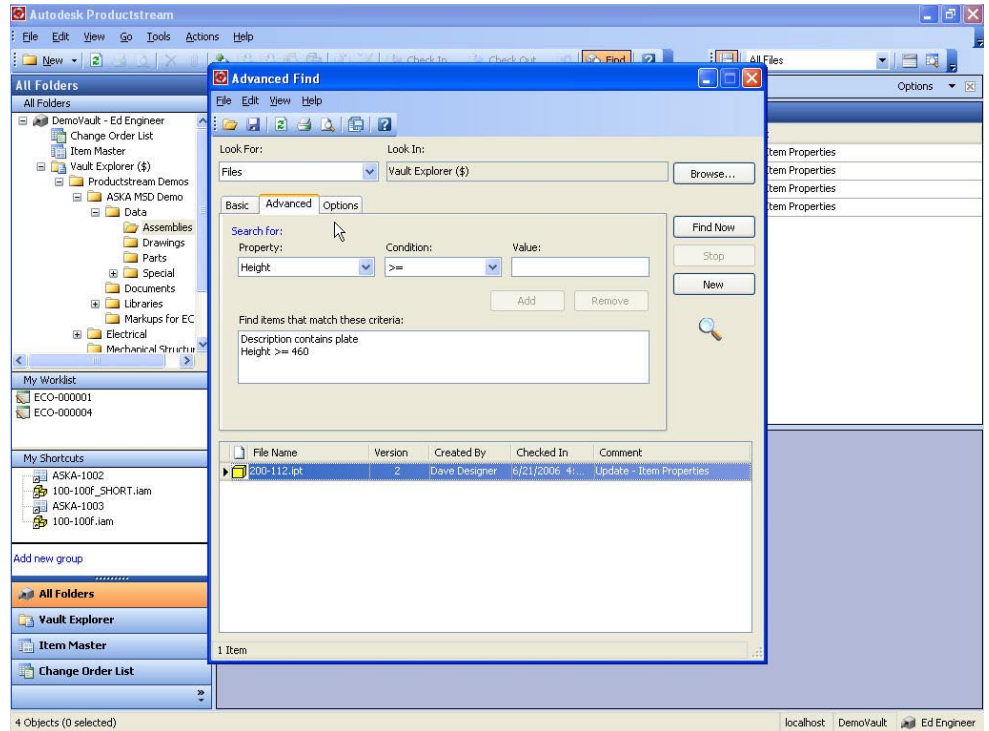
Shown below is the engineering change we need to perform. The engineering change states that we need to change the clamp, perform an FEA analysis on the new clamp, and add wire-bundling capability to eliminate interference. The state of the ECO is "Work." Substantial other information is included, such as the requester, its priority, and of course, the EC number, in this case - ECO-000004. The EC requester may have designated an engineer responsible for the work as well as the routing for review and approval. The ability to electronically track such information allows easy management reviews of ECO status and open work. Assigning and monitoring the routing allows eliminating bottlenecks in the process. All difficult to do with a manual system.

Image 2 - This ECO General tab shows details of the ECO, its state (or status) and other information. (Ref: Image 12 on website)



By reviewing the design above, we determine that we need to change the plate of the existing clamp with a shorter plate (shown in dark grey in Image 1). Knowing this, we search the Vault database for the plate part number, asking to find all plates with a plate height of 460 millimeters or more. Our search resulted in finding part #200-112. We were able to view it using the Vault find capability. Dimensioning it using the measurement function of the DWF viewer, we determined that the height was exactly 460 millimeters.

Image 3 - An advanced search dialogue allows searching using specific attributes and also Boolean searching. Ref: Image 02 on website)

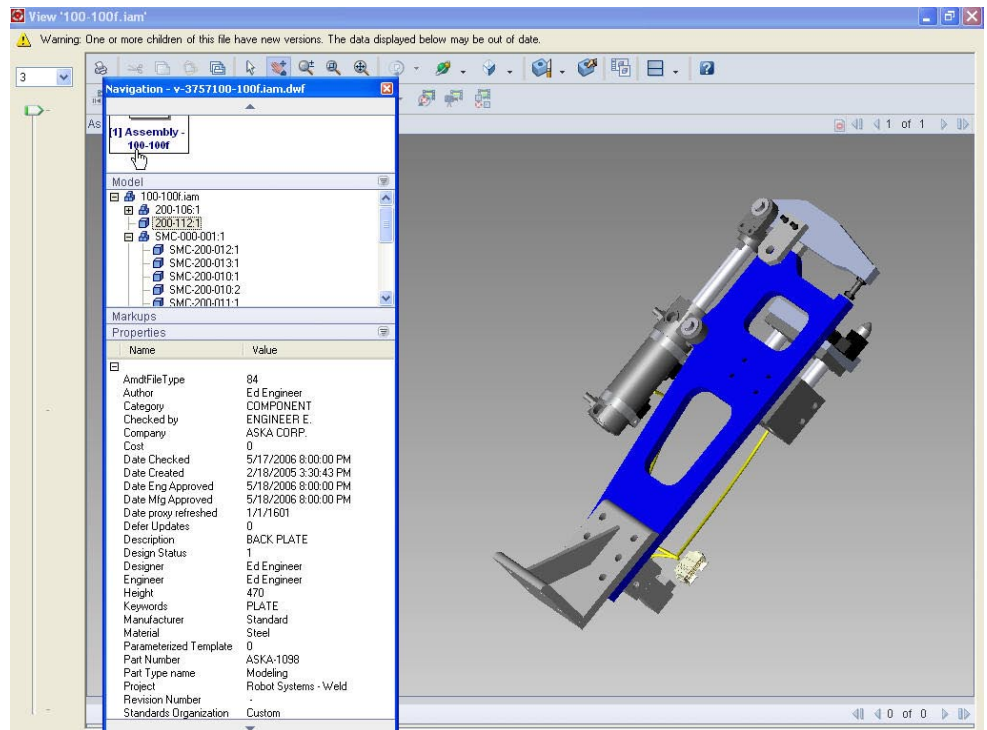


The ability to perform where-used, see the product structure, and visualize the part or assembly eases the design process.

Now that we have a plate we can use, we perform a where-used search using this existing plate (part #200-112), the result being that the plate is used in the 100-100F clamp. Thus we found the correct clamp part number, which we will use as the basis for our new design. Verifying the result, we asked to see the product structure of the clamp and saw that the plate 200-112 is used on the 100-100F clamp. The plate (part 200-112) is shown in blue in

Image 4.

Image 4 - Lightweight representation of CAD data (DWF) showing the product's structure and property information. (Ref: Image 03 on website)

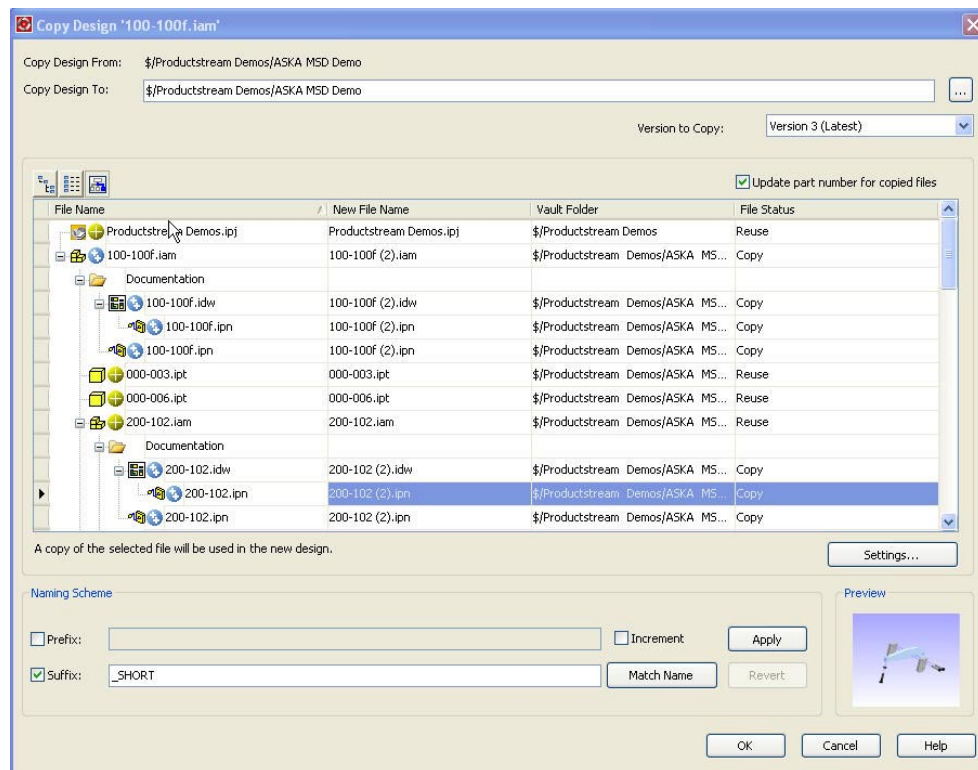


Our plan is to start a new clamp design by copying the design file for the clamp assembly and replacing the 200-112 plate with one of the correct size. Our goal is to reuse as much as possible of the existing clamp. At this point, we may need to design a new plate or use an existing plate, if we can find one that meets our specifications.

Enabling re-use of existing parts and assemblies.

By generating a new copy using the copy design function, we now have a new assembly that we named 100-100F_short that we've placed in the Vault. Portions of the original part were re-used (referenced) and other portions copied (duplicated). A quick engineering view of the assembly determined which parts needed to be copied (which are expected to be changed) for the design change needed. Image 5 shows how simple starting from an existing design can be.

Image 5 - Copy Design facilitates intelligent re-use of design data. (Ref: Image 05 on website)



Copy design proves to be enormously productive.

One of the most powerful capabilities of Vault was the ability to use an existing design and copy all or pieces of the existing design into a new design. The high productivity results from the fact that vault automatically manages which files are to be copied and which aren't, automatically retaining the correct links, proves to be enormously powerful. Without the vault capability, this would be a highly-error prone operation and extremely inefficient, since users often copy many more parts than they need. By itself, this capability could provide enough justification to install Vault simply by eliminating potential errors, were this to be performed manually.

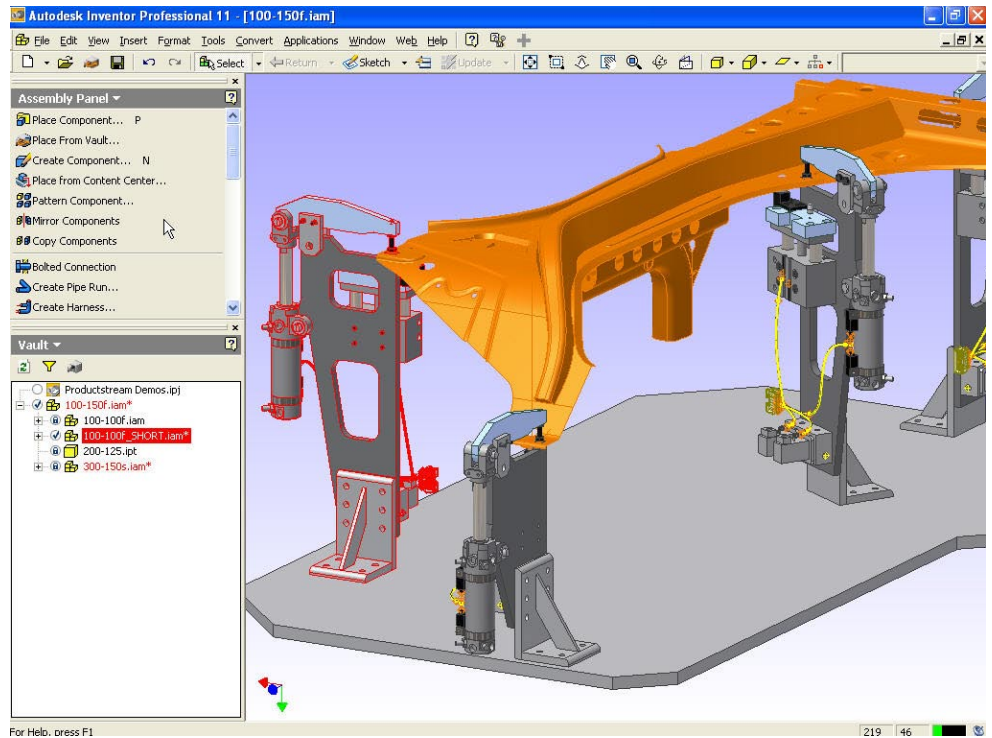
To do the necessary CAD work, we get the latest version, which brings the new assembly to the local machine. Our next step is to modify the new clamp part _short so we can use it in a design for the new body panel assembly, which is 100-150F.

We selected the part in Inventor and replaced 100-100F with the 100-100F_short. By replacing, the new part is placed into the same place as the prior one. The newly copied files are available for modification. The others remain locked because they are already released.

Adaptive modeling proves its value at capturing this design intent.

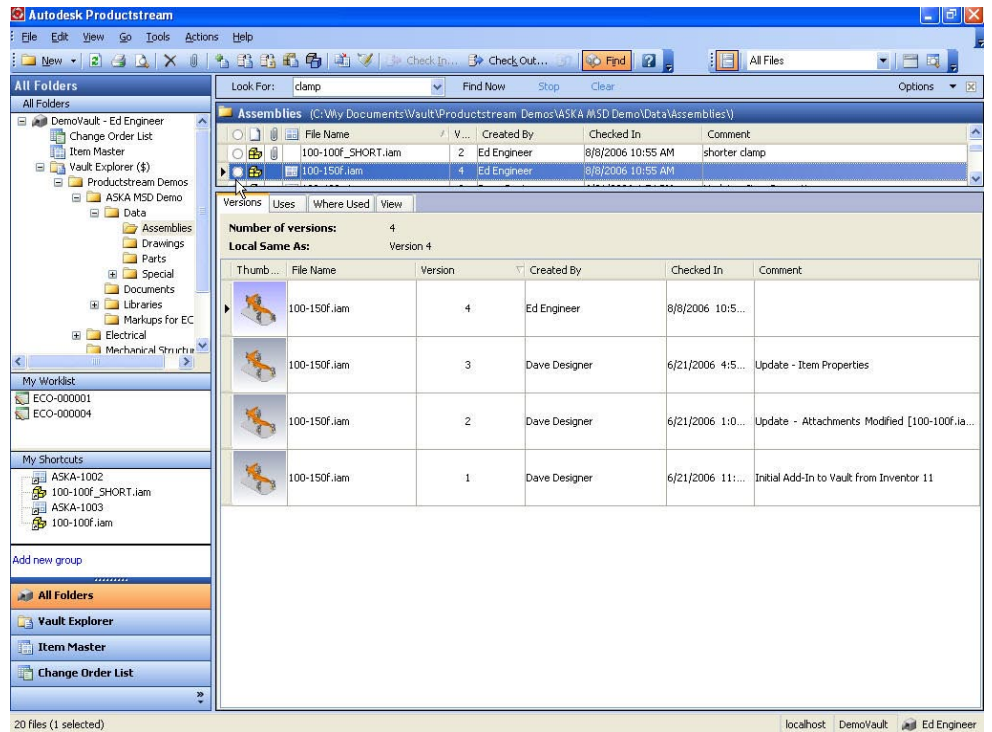
We made the clamp assembly and the plate part adaptive, by choosing them and then selected the option - adaptive. Then, by simply changing the height of the part, the adaptive capability (having been previously programmed), automatically produced a new assembly with its correct children. We are also able to see from Image 6 that the clamp plates now have the slots removed. The original design for the plate specified that, if the height were below a certain value, then the slots would be eliminated. **This adaptive change proved to be extremely powerful, saving time and perhaps considerable redesign effort on the plate.**

Image 6 - Top level jig assembly showing the new shorter clamp assembly in place. (Ref: Image 06 on website)



Now that the CAD work is complete and the shorter clamp redesigned, we check in the clamp and all of its children (into the Vault), automatically creating a new version and new DWF files. Autodesk allows streamlining the user experience to eliminate certain of the dialogue boxes by using the Vault options to eliminate certain user input requirements for check-in and check-out. This could be useful for making sure that it's typically used by more engineers. This is particularly useful for checking in drawings, as opposed to complex assembly. The next step is to check-in the top-level assembly; it automatically now gets a new version number. The 100-150F went to version 4; previously it was at version 3.

Image 7 - Version history of jig assembly showing newly created version 4 of the top level jig assembly. (Ref: Image 09 on website)



Viewing previous versions allows users to recover from mistakes.

We also have the option to view a previous version in case we made an error in making changes. A very nice option.

Using Productstream to complete the ECO

Productstream helps manage the ECO through its approval, review, and modifications stages.

The revision we made above primarily centered around CAD, creating and controlling the parts and assemblies to build a new design. Thus, we used the Autodesk Vault work-in-process functions. Now, with the CAD design complete, we need to move into the release phase. Our next tasks, thus involve administration of the BOM, release management, and change management, all part of Productstream.

Assigning item numbers

First, we execute an “assign item” wizard function to change from the engineering part numbers to item numbers. The system automatically assigns item numbers that meet company standards sequentially or using a mapped numbering scheme. For instance, in our case, this was ASKA XXXX, with the four-digit number sequentially numbered by the system for every new item. Alternatively, item numbers can be derived from file names. We call these item numbers rather than part numbers, because items may include not only parts, but other objects in the bill-of-material besides in-house manufactured parts, such as electronic documents, purchased parts, specifications, etc.

Changing from a part number to an item number still retains all the CAD part relationships; the CAD files are now attached to the item.

To complete the engineering change for our clamping fixture, we have design work remaining beyond the geometric CAD design -- performing an FEA analysis, adding cable ties, and the approval and release of the design. The following steps now become more process-centric, rather than CAD-centric, but are key steps in completing the design process.

Sending automated notifications

In each case where we changed the state of the ECO (for instance, from in-process to design complete) or initiate ECOs, the system initiates and sends e-mail notifications to the appropriate parties, as controlled by routing information previously defined during the creation of a new user, by the administrator.

Image 8 - The ECO Routing tab defines who participates in the ECO process and what roles they play. Multiple routings can be created to define different processes. The ECO Status Tab (shown here) shows the workflow process. The yellow box indicates the current step. (Ref: Image 15 on website)

Number	State	Title	Due Date
REL-000002	Closed	Initial Release - Robo...	6/22/2006
ECO-000001	Open	Start/Stop Circuit	5/21/2006
ECO-000004	Work	Station 5 - Clamp As...	6/22/2006

The Routing diagram illustrates the following workflow:

- CREATE ECO** (Start) leads to **OPEN**.
- OPEN** can transition to **WORK** (highlighted in yellow) via **Submit**.
- WORK** can transition to **REVIEW** via **Submit**.
- REVIEW** can transition to **APPROVED** via **Approve**.
- APPROVED** can transition to **CLOSED** via **Set Effectivity**.
- REVIEW** can transition to **REJECTED** via **Reject**.
- REJECTED** can transition to **OPEN** via **Re-Open**.
- REJECTED** can transition to **CANCELLED** via **Cancel**.
- OPEN** can transition to **CANCELLED** via **Cancel**.
- WORK** can transition to **OPEN** via **Withdraw**.
- APPROVED** can transition to **OPEN** via **Submit and Force Approval**.

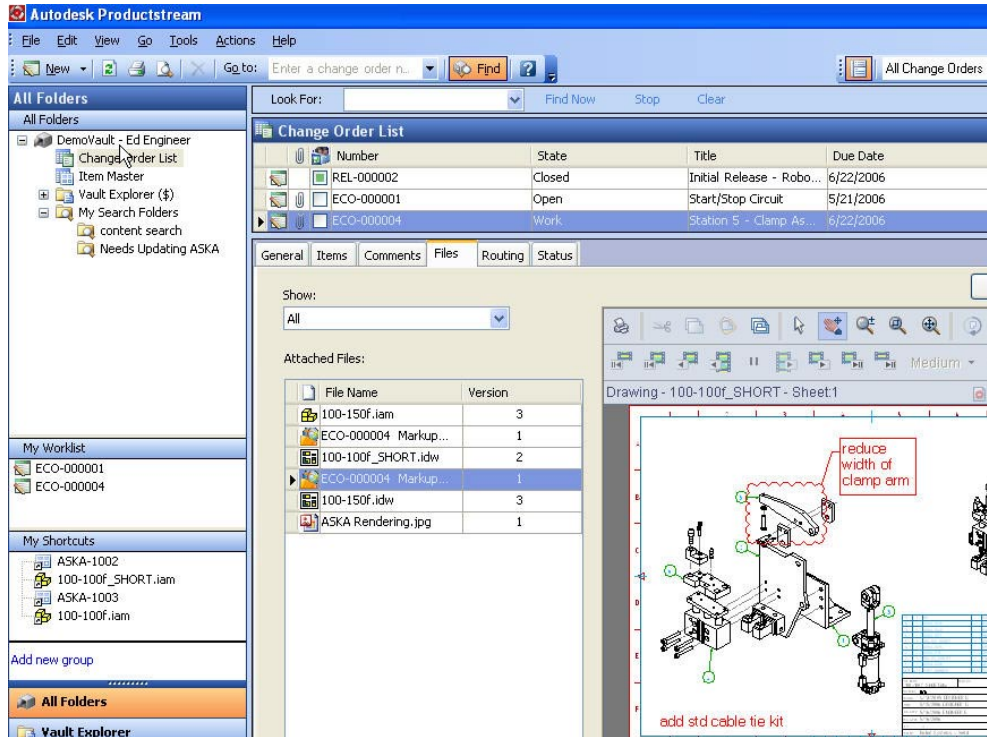
Reviewing and marking up the ECO

Typically, the reviewer would work with a DWF file, adding suggestions for changes, as shown in Image 9. Editing the ECO allowed us to access the proposed design using Autodesk’s design review capability (Design Review 2007), included with Productstream. Markups are stored as part of the ECO, retaining a history of the design. At any stage of the ECO, we are able to access the markup. The ECO moves through a series of stages

Autodesk Vault and Productstream

(workflow sequence) as defined in the status tab and moves from one state to the other. Users with the correct permission approve a move to the next state.

Image 9 - Markup and redline information added in the context of the ECO further explain the details of the change. Additional supporting information is also added. Files can be attached. (Ref: Image 13 on website)



Performing the analysis on the redesigned assembly

Analysis data can be added to the product data being captured.

The next step is to do the analysis, activate the part and execute the predefined stress analysis. In our case, since we did not significantly modify the part, we were able to re-run the previously defined stress analysis on the new part's shape and evaluate the analysis report, showing that the new part still had a good margin of safety. We saved the analysis report to a file, later to be added to the engineering change data being stored using Productstream.

Productstream automatically updates the drawing / documentation

In the drawing of the new short clamp assembly, Productstream had populated the drawing with the newly changed item numbers and added data into the title block that correctly identified the name, the new revision number, and the date. **There was no need for any manual updating of the drawing. Productstream gathered CAD data using Vault and its own ECO data and populated it into the drawing.** Very impressive -- a substantial time saver and less error prone than doing this same task manually.

Productstream allows easy review and the ability to move the ECO to the next step in the process.

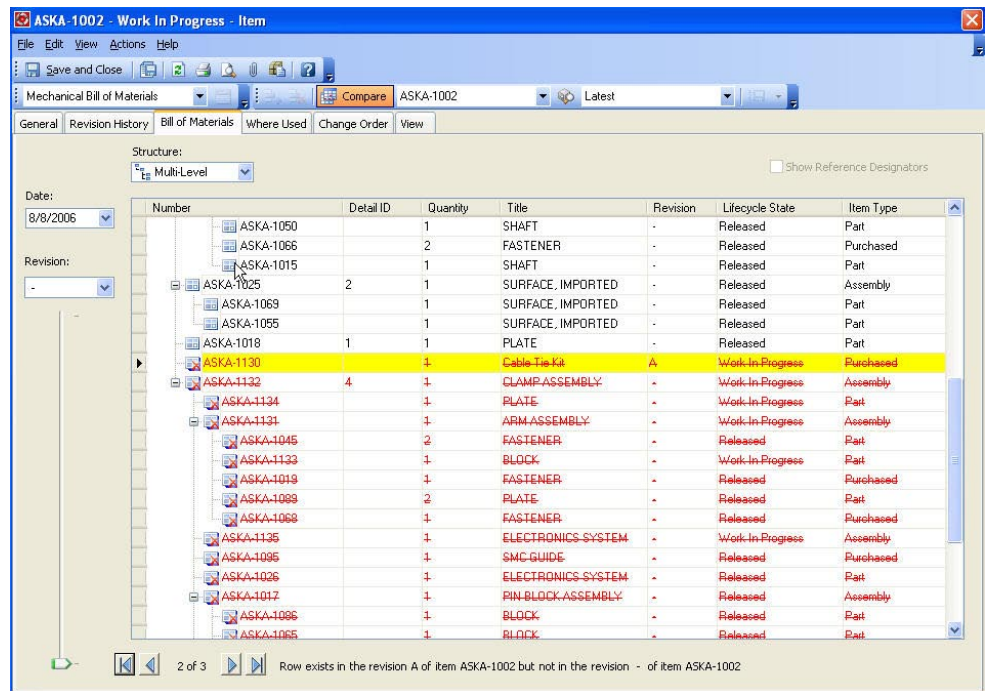
Saving the work completed so far records the new item numbers to the vault, updates all the items with the CAD file that changed, and adds the FEA file report to the ECO. Moving the ECO to the next state involved, if the user has the correct permission, simply involves a right mouse button click on the ECO, and clicking on "approve". This standard process (included in Productstream) is not modifiable by the administrator. **We liked this, because it simplifies the installation and maintenance, requiring less IT resource and implementation time.**

Pre-defined, standard processes make Productstream more of an "out-of-the-box" installation.

The approval process for the EC

So far, we completed most of the tasks required of the EC, including an updated bill-of-materials and updated drawings and design. The ECO now needs management approval. To do so, the manager now likely compares the bill-of-materials for the released items and the latest design configuration.

Image 10 - BOM Compare capability. Automates the process whereby a user can analyze the differences between two different revisions of a BOM. (This can also be applied to different items.) (Ref: Image 22 on website)

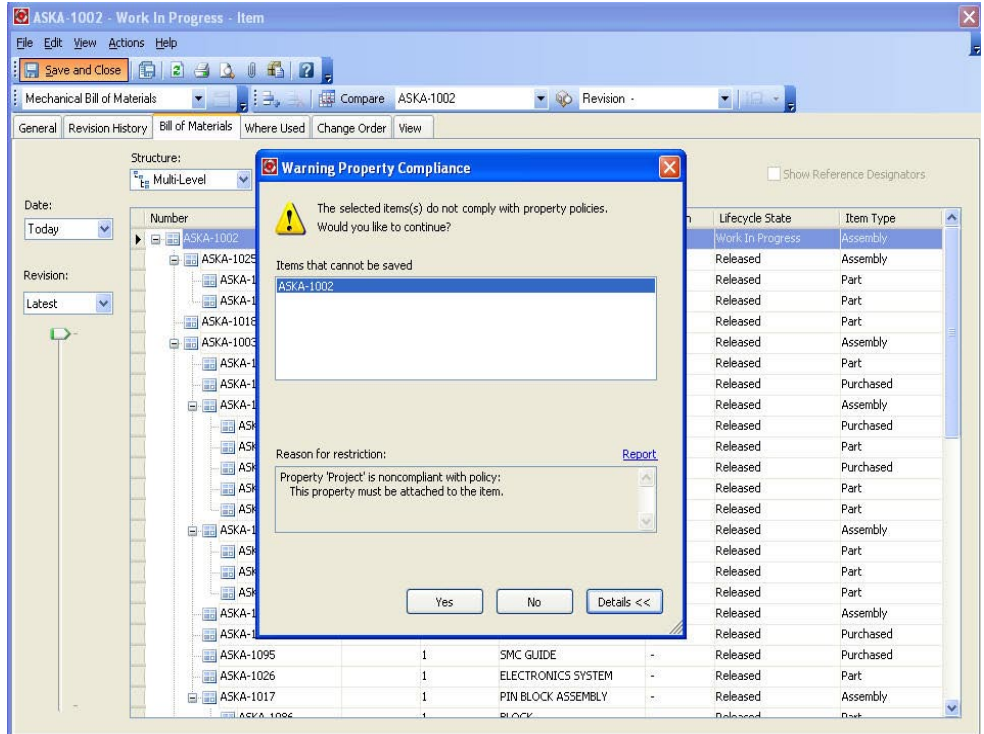


Adding non-CAD items to the bill of material is straightforward.

Productstream, before closing the ECO, checks for compliance with company standards previously defined by the administrator.

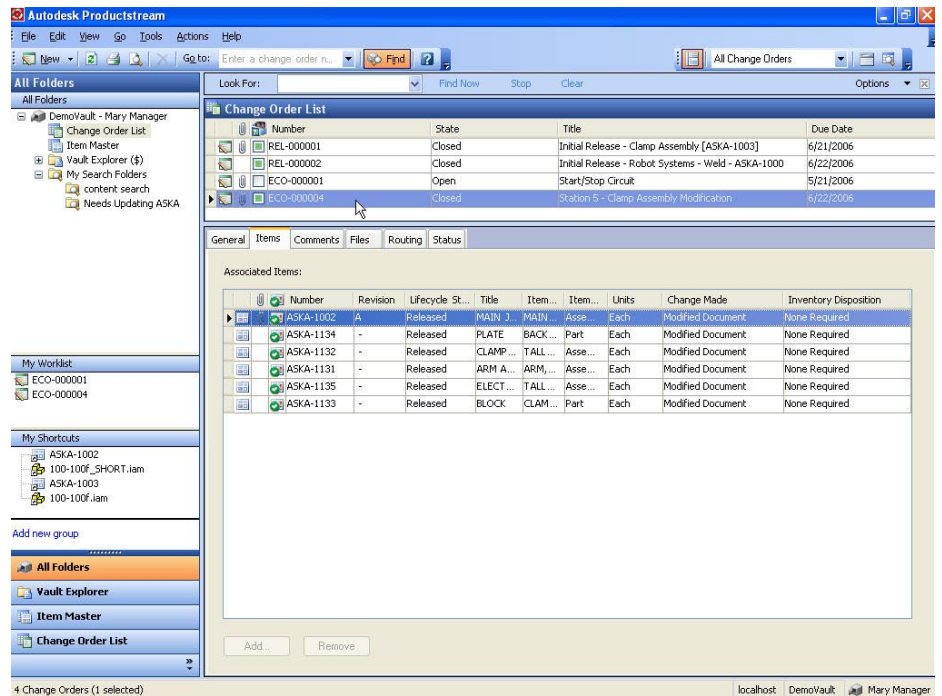
Two items were completed on the ECO - the clamp redesign and the FEA analysis of the new design. We can check the clamp redesign by comparing bills-of-material, as can be seen in the image 10. Completing the ECO requires adding a cable tie kit, by adding a new bill of material line item (Productstream calls this a new row). We opened the bill of materials and added a new row to the bill of materials. This put us into a dialogue suggesting that we find what we wanted to add. **Note the guidance suggested by the system.** Because we know the vendor of the required cable tie kit, we performed a “find operation,” looking for the vendor name. Voila, we found the correct cable tie kit. Selecting it completed the required information for the new line item in the bill of material. The manager completes checking, updates the ECO, and approves it. However, after approving the ECO, the system noted that there was non-compliance with a property, as a warning message. This optional warning is one of the administrative tasks that can be defined, and can help in assuring that filed data complies with company standards. In our case, we were missing a required property. We easily edited the cause of the violation noted in the property compliance warning, and then saved the ECO.

Image 11 - Warning message flagging non-compliant property. Item property policies are set up to enforce compliance and data integrity. (Ref: Image 20 on website)



The next step, setting the effectivity date, controls when the new product revision will be used. Once set, the ECO is closed and the product is released.

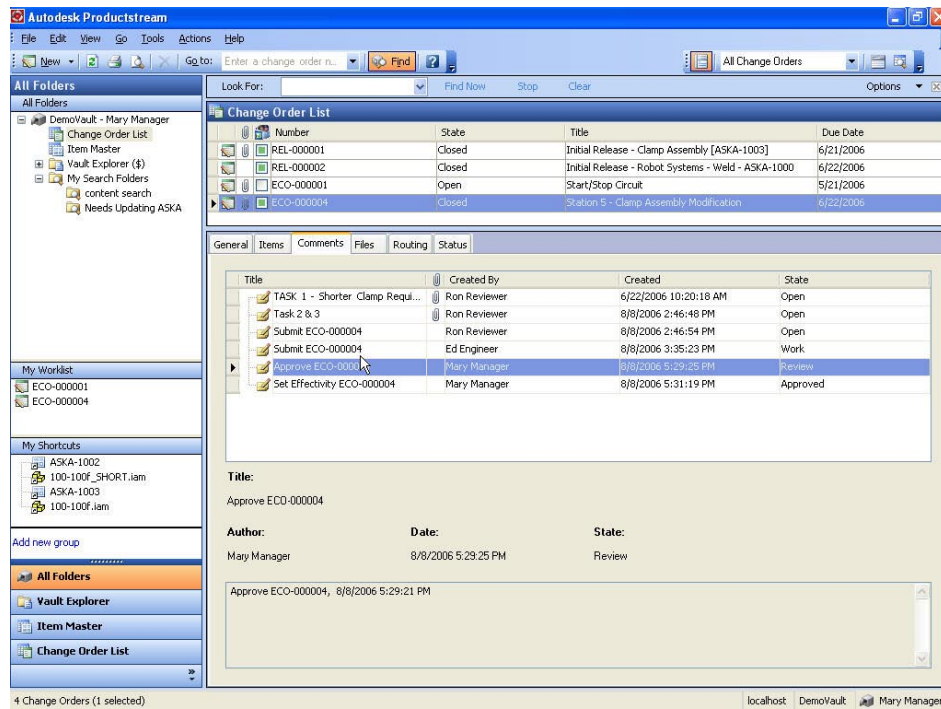
Image 12 - These items were released by this ECO. (Ref: Image 24 on website)



The ECO is complete! The process has been clear, with all of the steps guided, captured, verified, and visible.

We have completed the ECO using a pre-defined process flow, which was easy to follow and accurately records the steps and approvals as they are made. Not only that, but a complete record exists. See Image 13.

Image 13 - ECO sign-off history. Shows all comments and actions taken throughout the ECO process. (Ref: Image 25 on website)



Conclusions

Our conclusions are in the Executive Summary at the beginning of this paper.

About this paper

This paper, using an example ECO, summarizes Autodesk's data management solution, why it is important for prospective users, and illustrates the solutions ease of use. The impressions and conclusions are solely those of the author, an independent analyst and consultant in the MCAD industry.

About the author

Raymond Kurland is president of TechniCom, Inc. and its principal consultant and editor. His firm specializes in analyzing MCAD and PLM systems and has been involved in reviewing and comparing such software since 1987. Ray frequently consults with both vendors and users. He can be reached at rayk@technicom.com.

Contacting Autodesk

Autodesk can best be contacted via their website at <http://www.autodesk.com>. For sales, click on the Reseller tab.