The SolidWorks Enterprise PDM™ application is one of the most useful tools for Engineering content management based upon the user experience, the flexibility, and the almost non-existent end user training requirements. This document is meant to review some of the best examples of managing an ECO process within the Enterprise tool to avoid some of the costly mistakes and overhead that can happen with flexible systems.

Within any process driven application, the key to success is to continuously drive the configuration towards the simple and mundane, not towards the encompassing and complex. The simpler a configuration is the less total cost of ownership, the faster the return on investment and the easier it will be to administrate and modify.

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1. ECR/DCR/ECO/ECN

There are many definitions for objects that document the changes that occur within an organization. This document will focus on ECO, however, variations of this theme can be applied to other change processes that a company requires to be created.

The definition of these processes:

- Document why the change is being made
- To what documents/processes/products the change is being applied
- Who this change impacts
- How this change is going to be realized
- When the change should be realized through to manufacturing

2. ECO Template

The first step is to generate the ECO Template, which allows processes to be mapped to end user functions. A user can right click and see an option for an ECO. This would then bring up a form of required information and create the newly named document.

2.1 Excel Format

Excel is the most common format due to its table driven nature. However, custom scripts need to be set-up to allow variables to be mapped to named regions (auto-populate information from Enterprise PDM).

2.2 Word Format

Word documents are easier to set-up and modify as they don’t require custom scripts to be created to manage the information exchange from the database to specific fields.

3. Affected Items

Affected items can be documented through two common methods. The method you choose depends a lot on the exact ECO process that you are currently using (pre Enterprise PDM).

3.1 User-Defined References

This method uses the command Paste as Reference in order to select other documents and attach them to the ECO. These documents (and their children) then show up in the ECO’s Contains tab. An additional benefit is that the Where Used tab on affected documents will also now show the ECO.

This is the preferred method to take advantage of the most out of the box functionality of Enterprise PDM. By deploying this method reviewers can take advantage of the drag affect for workflow routings and sign-off’s.
3.2 Table/Section in Document

This method has a specifically designated area within the ECO document for individuals to clearly state which components are being impacted. This information is filled in on the initial stages of the ECO creation and is an essential part of the review prior to approval.

Note: If the document method is used for affected items, then section 6 on the drag affect of the workflow does not apply.

3.3 Both References and Document

In some cases you can utilize both methods to get the advantages of each. The obvious disadvantage to utilizing both is that time will need to be invested to set-up and maintain the accuracy of the information in multiple locations.

4. ECO Workflow

The ECO Workflow is a very important part of this entire process. The first stage (shown in the example as *Pending*) is to be used the creation of the ECO, the attachment of the affected items, and the completion of the necessary information in the Excel document.

Roles and privileges can be set up for each stage (shown in the gold boxes) and transition (shown in the blue boxes). These permissions then control who within the company has access to modify this document at the required time.

![Figure 3: Example of an ECO Workflow](image)
5. Document Workflow

The documents that are attached will have their own set of workflows and there could be multiple workflows based upon the type of document to be attached. The most important criteria is that the transitions of the document workflow be accurately named to reflect the transitions of the ECO workflow.

5.1 Drag Affect

If the transition names are the same and if the option to *Do not mark referenced files when changing state* is not used, then moving the ECO document will drag the children (affected items) with it into the next state of that document.

In this essence a reviewer of the ECO (document control, configuration manager, etc...) can process the workflows of all documents (ECO and affected items) with one easy right-click option.

Additionally the permissions for the document’s workflow should set so as to not allow un-intended approvals. The ECO reviewers should be the only group allowed to approve the ECO’s and the related Document workflows.

5.2 Example

The two document workflows shown in the examples are placed side by side to demonstrate the dragging affect. If the ECO has the document attached and the ECO passes through the color coded transitions, the document will also move through the corresponding colored transition.

![Figure 4: Example of a CAD/Document Workflow](image-url)
6. Distribution Files

Distribution files are the electronic files that are used for manufacturing. It is very common to create distribution files that are in the non-native CAD format for manufacturing, purchasing, vendors, and suppliers to utilize.

GoEngineer has a simple GoTool which allows the creation of these files (formats determined by the customer’s process). The process is set up to automatically create these files (common usage example are pdf/dxf for drawings, IGES/STEP for parts and assemblies) upon the release process.

The location of these files post-creation can be inside the vault or outside, again depending on the customer’s process needs.

7. Bill of Materials

How to control the bill of materials of a product record is always a difficult question to really answer. Enterprise PDM does supply some out of the box BOM ready capabilities, and being able to fully utilize them depends on the type of product you control, the processes that you want the changes to follow, and when the information on the BOM is modified.

If your BOM consists of mainly mechanical items (purchased parts, machined/formed, etc...), then BOM management using Enterprise PDM could be useful. However, if you have a heavy electronics, firmware, or chemical laden BOM, then a full blown product lifecycle management tool is recommended.

7.1 Named BOM

Named BOM’s are a special non-document object inside of Enterprise PDM. They are created from computed BOM’s (bill of materials that are automatically extracted from the CAD assembly) and are useful for making non-CAD changes to the bill of material. Common changes are modifying quantities (especially purchase parts) and adding non-modeled items like glue/resin/paint etc...

Named BOM’s have their own inherent workflow built-in, so they can have special permissions, routings, revisions, and sign-offs tied to them. When you create a Named BOM the association to the CAD BOM is broken. However, it can be re-imported (with a non-dynamic link) if the original CAD model is changed.

7.2 Export to PLM/MRP/ERP

There are two methods that are common for extracting the bill of material to another business application. The first is to simply export the BOM to Excel (each BOM view has an Excel export icon to simplify this), then do an import on the other system. The success of this method depends a lot on the other system and the formats that it accepts for import.

The second method is to use the Data Import/Export feature to automatically extract the BOM upon release to an XML file. XML is a structured format that is common for passing complex information between systems. This method has the advantage of occurring automatically without any user interactions. However, the importing system also must be set-up for reading the exact flavor of the XML file created by Enterprise PDM.