An Introduction to PTC® Windchill®

How PTC can help you better manage your product content
Within today’s highly competitive, geographically dispersed design and manufacturing environments, effectively managing product content has never been more important. The consequences of using outdated versions, losing files or failing to properly incorporate engineering changes can be severe, resulting in revenue and profitability declines as well as market share erosion.

PTC is a recognized leader in helping manufacturers achieve sustained product and service advantage.

PTC Windchill is an important part of delivering that value to customers.

By introducing and demonstrating a sampling of PTC Windchill core capabilities, this eBook illustrates how PTC Windchill can help your organization meet its product related challenges.
Storing and Searching for Product Information

For designers and engineers, locating product-related information is consistently among their most pressing concerns. Many organizations are frequently hampered in their search efforts by deficiencies in their existing systems. Sharing files on network drives does not allow for meaningful search and reuse of existing content. This difficulty is compounded as the complexity and quantity of products increases.

PTC Windchill is the central repository for all product information. As such, there is a “single source of truth” for all product related content such as CAD models, documents, technical illustrations, embedded software, calculations and requirement specifications. PTC Windchill also remembers the entire history for every piece of content as well as the relationships between content so you can easily answer questions such as — “Who accessed this content?”, “What changes were made?”, and “Which products use a particular component”.

To quickly find content, the PTC Windchill user interface always gives you immediate access to searching and browsing capabilities; from a generic toolbar at the top of the main screen to functional specific windows such as the part structure tab. Searches can be generic (e.g. find all products that begin with “101”) or complex (e.g. find all components created by me after a certain date that have been released).

Definitions

- **Content**
  Any information - CAD models, Microsoft Word documents, PDFs or spreadsheets - related to the design, development manufacturing or service of a product that is stored in PTC Windchill.

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Easy-to-access search and browse tools, context-sensitive help and other features make it easy to navigate PTC Windchill.
Managing PTC Creo® Models

Many organizations utilize PTC Windchill to centrally manage models created with PTC Creo, PTC’s premier design software. If you want to change a model, you first need to “check-out” the model from PTC Windchill to ensure that only one user at a time can make design changes. This prevents the confusion that results when multiple changes, some of which can be contradictory to one another, are made simultaneously. PTC Windchill also enables you to keep track of who made which changes and when those changes were made. This provides a significant degree of control over the CAD information and ensures that all stakeholders are accessing and using the most up-to-date designs.

Definitions

- **Check out**
  This function allows you to “lock” an item indicating their intent to modify the item and prevent other users from submitted conflicting modifications.

- **Check in**
  This function relinquishes exclusive control of the item; thus giving other permitted users the ability to change it.

- **Workspace**
  A workspace is a private area where you can manage your CAD work and perform CAD data management operations.
Managing Multi-CAD design environments

Although most organizations attempt to standardize on one specific MCAD modeling tool, many are compelled to manage more than one type of MCAD tool since they work with multiple clients, vendors and partners — each of which may use a different system. PTC Windchill works efficiently with all major MCAD systems so it can be used to store and control access to all MCAD information. And, just like PTC Creo, users can access and leverage PTC Windchill capabilities (like check in and check out) without leaving their native MCAD environment.
Managing Product Structures

A product structure contains all the individual parts for a given product and is also known as the Engineering Bill of Material (eBOM). PTC Windchill can define this structure and associate all relevant information such as material specifications, manuals and test results. Given its ability to “read” CAD models, PTC Windchill can also import a CAD model and generate a part structure based on the CAD model information. Once defined, this part structure can be used to streamline tasks — such as exporting a BOM to obtain a vendor quote or transfer information to an ERP system.

Different structures can also be defined for different phases of the product's life-cycle (i.e., Plan, Design, Assemble, Support).

In essence, the product structure serves as the framework in PTC Windchill that contains all residing content.

Definitions

- **Product Structure**
  Sometimes generated from a CAD model, a product structure contains all content - such as CAD files, specifications and assembly drawings - relevant to the product.

- **Associate**
  By establishing “links” between one product and another or between a content item and a part, associativity helps engineers understand relationships and allows for affected content to be automatically updated.

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Navigating the product structure within PTC Windchill is easy using the Product Structure Browser.
Configuration Management

Any particular part in PTC Windchill can be reused across numerous product structures; the original part definition is automatically referenced within other product structures. As such, when you make a change to a part in PTC Windchill, the updated information automatically appears in any product that uses that part. By reusing existing content, this type of “building block” design saves a great deal of time and enhances overall efficiency.

Version management is used to keep track of all of these changes while maintaining the same part names. For example, if part A is modified, PTC Windchill will define the new item as part A version 2.

PTC Windchill can keep track of multiple versions at the same time, so you can easily see which part versions were used in the same product over time. And for time-sensitive products, an effectivity date can be assigned in PTC Windchill to enforce that a certain version shouldn’t be used before or after a certain date.

Since PTC Windchill aggregates all content within its central repository, PTC Windchill makes it easy to find and reuse information that already exists. This prevents anyone from inadvertently generating multiple definitions of the same part — an all-too-common occurrence that can have serious consequences.

PTC Windchill also has reports and tools that make it simple to compare part structures with one another; even in large assemblies with hundreds of parts.

Finally, PTC Windchill allows you to preserve a configuration from a particular point in time; called a baseline. Having these historical snapshots makes it easy to do “before and after” comparisons.
Managing Documents (Ex. Microsoft Word or Adobe PDF)

Organizations accustomed to storing documents on shared network drives often have difficulties locating files, determining authorship and managing changes. Using the same tools that are used with CAD documents, like version control and check in/check out, PTC Windchill also helps organizations efficiently manage documents.

Many document management activities can be done in Microsoft Windows, with PTC Windchill running “in the background.” You can browse through PTC Windchill content and folders in Windows no differently than looking at other PC files. When a Word document is opened, PTC Windchill asks if you wish to check out the document. After editing the document, PTC Windchill asks if the document should be checked back in. If so, all comments and changes will be automatically captured by PTC Windchill.

In addition, PTC Windchill can automatically generate and associate additional formats. For example, if you are working on a Word document and want colleagues to review it without making changes, you can configure PTC Windchill to automatically generate a PDF copy every time the Word document is checked in.
Change Management

Many organizations lack processes for effectively managing change. Frequently, difficulties arise because changes are "managed" on an ad-hoc, haphazard basis. In fact, being accustomed to informal practices, such organizations may even resist the idea of clearly defining a change management process — even though such processes are critical to maximizing success.

PTC Windchill offers organizations comprehensive change management that builds upon the CAD management capabilities that everyone is already using. It is ideally suited for today’s complex manufacturing environment — one in which stakeholders tasked with approval responsibilities are often scattered around the globe. PTC Windchill makes sure that every required approval has happened and then prescribes an appropriate course of action (e.g. If the change is approved, automatically generate a change notice).

PTC Windchill also “knows” the supporting information — such as an inventory, associated costs and analysis data — that one needs to see before approving a change. You can also define different sequences of change tasks (e.g., one set of steps for a design engineering change; a different set of tasks if the manufacturing team needs to update tooling or confirm manufacturability). And PTC Windchill provides a complete audit trail of the entire review process.

Definitions

- **Workflow**
  Workflow defines the steps involved in completing a task; from origination to completion.
- **Change Request**
  A change request contains all information pertaining to a proposed change, including detailed supporting information that provides rationale for the change
- **Change Notice**
  Generated when a change request is approved, a change notice gets distributed to all affected stakeholders and stipulates an activity or action. For example: notifying manufacturing engineers that tooling needs to be modified.

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PTC Windchill lets you modify the sequence of tasks that should occur within a change notice
Project Execution

PTC Windchill lets you define and manage all the different tasks that need to be performed to execute a project. PTC Windchill determines which tasks are interrelated, which can be done in parallel and those that must be done sequentially. PTC Windchill allows you to confirm that steps within tasks are assigned timeframes and tasks in the aggregate are proceeding on schedule.

An important aspect of the project execution capabilities of PTC Windchill is its ability to connect tasks with relevant content stored in the central repository. For example, if a given task necessitates approval of a requirements document, a link is established between the two — so when an individual is assigned a task, they simultaneously have access to the document. Given such integration, there’s no need to search for the information ... so no time is wasted.

Since many already utilize Microsoft Project, PTC Windchill has bi-directional interaction with Microsoft Project. Accordingly, you can choose to define tasks in Microsoft Project and then “push” that information into PTC Windchill for task management operations — or vice versa.

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Navigating PTC Windchill Project Plans
Collaboration

To foster collaboration in today's geographically dispersed organizations, PTC Windchill provides a centralized location in which all stakeholders — including members of different external groups, such as partners, vendors and customers — can share content like designs and other critical information. Furthermore, you can securely control the content each participant sees and accesses. For example, a contractor can only see selected subsets of product information — or bids can be solicited from multiple partners with each partner only able to see their copy of an assembly drawing.

In serving as a collaboration platform, PTC Windchill streamlines the exchange of files – large and small. PTC Windchill can manage straightforward collaboration activities (e.g., enabling multiple colleagues on different continents to iterate Microsoft PowerPoint) as well as more involved situations (e.g., enabling separate teams to pursue multiple design concepts in parallel).

Learn More

PTC Windchill allows you to securely distribute the same product data to multiple vendors at the same time.
Advanced Capabilities of PTC Windchill

Thus far, this eBook has focused on the core capabilities of PTC Windchill. However, PTC Windchill also offers a myriad of advanced capabilities that, as you deem appropriate, can be leveraged for your product related challenges. These include:

- Requirements Traceability
- Program Portfolio Management
- Quality & Reliability Management
- Software Management
- Product Variability Management
- Digital Mockup
- Manufacturing Process Management
- Cost Management
- Risk & Compliance Management
- Lifecycle Assessment (LCA)
- Component & Materials Management
- Supplier Management
- Enterprise Interoperability
- Business Reporting
- Product Social Development
- Service Information Management
- Spare Parts Management

As such, the remainder of this eBook provides a select sampling of advanced capabilities within PTC Windchill.
Managing many variations of a single product

With more and more customers demanding product variations — both subtle and pronounced — organizations need to manage the ever-increasing amounts of design and manufacturing data that define those variations. For example, while a basic product may consist of the same primary parts and design, 12 different retailers may each want their own “tweaks” to the product. Historically this has meant that 12 different product definitions are required.

PTC Windchill can help organizations more efficiently manage the content complexities inherent in product variations. PTC Windchill combines the overloaded BOM (i.e., a BOM containing the universe of components required to yield all possible variations of a product) with the ability for product experts to define the rules and logic on how different components can be combined together. The result is a checklist that everyone can use to create valid product configurations. Now the expertise of a few can be utilized by many.

Learn More
**Design In Context**

PTC Windchill allows you to check out portions of a CAD model or assembly drawing, rather than the entire assembly (which immediately freezes all access by anyone else). This design-in-context capability can significantly enhance productivity, since multiple sections of an assembly can now be updated simultaneously. For example, an engineer working on a car’s front brakes can check out only those sections within ten centimeters of the brake assembly — thereby allowing a second engineer to check out the rear section of the car and work in parallel on the trunk.

**Learn More**

Only check-out parts within a certain area by applying a Product Structure Spatial Filter.
Top-Down Design

As discussed earlier, PTC Windchill is typically used to generate a part structure from a previously defined CAD model. With the top-down design capability, the process can be done in reverse - you can create a variation of a CAD model from a part structure.

This capability can help improve productivity at organizations that regularly experiment with new product and model variations since there’s now no need to create an entirely new CAD model each time. Instead, once a variation of a part structure is settled on, PTC Windchill processes the information to produce an initial CAD model in PTC Creo. From there, the model can be refined.

Learn More

PTC Windchill let’s you create a CAD Document while creating a part
Manufacturing processes

All too frequently, there are communication gaps between engineering and manufacturing departments. Manufacturing may not be aware about some engineering activity until designs are completed and handed off for production. These situations impede manufacturing from gaining insights and making contributions early in the design process that can prevent major problems downstream — such as extensive rework, production delays and cost overruns.

PTC Windchill helps streamline time-to-market by offering the same set of tools to manage the development, review and routing of both eBOMs and mBOMs (manufacturing bill of materials). Since engineering and manufacturing use the same system, communication is greatly enhanced. Manufacturing stakeholders can now be kept "in the loop" regarding new product designs - involved at a point when designs have not yet been finalized.

PTC Windchill also provides manufacturing with a robust set of tools to leverage this up-to-date engineering information in the creation of mBOMs, process plans and other manufacturing information. All of this content takes advantage of the tools (e.g., version control, history and traceability) that PTC Windchill already offers to engineering.

Definitions

- **eBOM**
  An eBOM, or engineering Bill of Material, is a compilation of all the different parts defined by engineering that comprise a product.

- **mBOM**
  In addition to incorporating parts from an associated eBOM, an mBOM (or manufacturing Bill of Material) includes additional materials required to manufacture a given product (ex. glue, labels, tooling, etc.).
Find out more about PTC Windchill

PTC has many free tools and resources to help you learn more:

EXPLORE

The Windchill Interactive Experience allows you to see, experience and learn about PTC Windchill through videos, demonstrations and other resources.

DISCOVER

Visit the PTC Learning Exchange for free tutorials created by PTC product experts.

LEARN

Learn from the experts at PTC University with role-based courses that are offered online as well as in classrooms around the world.

DISCUSS

Join the conversation with other users at PTC Community to discover more about PTC Windchill.

Learn more about PTC Windchill today!