

# CAD Data Management Needs Integrated Item Management

The path to referencing, dependency knowledge, and seamless data flows



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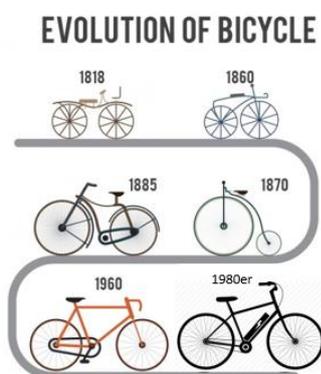
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## What does CAD data management mean anyway?

As the saying goes, "Drawing is the language of engineers." The roots of every machine and every plant can be traced back to that very first sketch – either captured on paper like back in the day or created using the software we have today. When we started using CAD systems, we had to figure out a way to manage the data they create. Reminiscent of that time, many CAD systems still come with more or less rudimentary features that allow us to store and retrieve our CAD data. Today, drawings and 3D models are among a company's most critical assets as they encapsulate its complete product knowledge along with its design and engineering expertise. Making this knowledge readily available across the enterprise is one of the key pillars of modern CAD data management. This can only be achieved in a truly practical and impactful manner with integrated item management.

## Expectations are going up

It is no longer just the mechanical drawing that describes a product, many other information carriers have been added over the years: mechatronic components, hardware and software (whose share in the finished product is ever increasing), instruction manuals, and other accompanying documents, to name but a few. When we talk about product data today, we no longer just mean CAD models, drawings, and bills of materials. It also extends to any product-related information such as specifications, calculations, operation lists, NC Programs, routings, assembly information and much more.



This can be easily demonstrated when we take a look at the history of the bicycle. Back in 1818, Karl von Drais was facing a whole different set of challenges than today's bicycle makers. While the very first dandy horse was made of wood and there was just one model, we can choose from a plethora of variants today and the technical possibilities are much greater than in the days of Drais. Going beyond the technical drawing, today's bicycle makers also have to deal with calculations, certificates, inspection reports and much more. When you factor in modern e-bikes (pedelecs), you also get mechatronic components, hardware plans, and software.

The increasing variety of products and the exponential growth in the number of variants make it that much harder to see the overall picture, which, if we use nothing but industry-specific tools, is almost impossible to put together in the first place. And even if we do, it takes too many workarounds and still leaves us with an incomplete picture.

At the same time, CAD technology advances at a relentless pace. 3D CAD has almost completely replaced any legacy systems that still rely on 2D models. The reasons for this go beyond merely adding another dimension and having the added advantage of incorporating spatial relations. 3D also means being able to work with references between heterogeneous CAD data. Any changes to a model must be reflected in the drawing. If a basic material is replaced in the CAD system, the management system automatically follows suit. All of this places enormous new demands on the field of CAD data management. The challenge here is to bring them all together in the sense of integrated process and information chains. This type of dependency knowledge is the key to making every single piece of information, from inception to the final product, available on demand.

## CAD data management vs. PDM/PLM

CAD data management is undergoing an information management evolution that takes us towards PDM and PLM systems – that is, towards linking drawings, documents, and BOMs in combination with a bi-directional integration with ERP systems and ultimately towards controlling PLM workflows and processes.

CAD data management systems that do nothing more than create drawing data silos are out of touch with the requirements faced by companies in technical industries today. After all, the number of systems that contribute to the creation of production-related information is higher than ever: MCAD, ECAD, plant and machine control systems, and the entire suite of Office applications keep generating ever-growing amounts of heterogeneous data. Managing this data is a complex challenge because the information it holds needs to be considered along the product's entire lifecycle. To overcome it, companies need the right information to flow seamlessly at every step of the product creation and product management process. CAD data management systems need to make information available and reusable to ensure it is immediately actionable for other systems. Ideally, without requiring any human interaction at all.

*"The drawing alone no longer describes the product, there is so much more information that we need to collect, transfer and leverage. And for that, we need to build dependency knowledge!"*

What, however, if we move away from theory and into practice? Flat data hierarchies and non-integrated item management are still the norm in many companies that continue to rely on the working methods of early 2D CAD systems. Worse still, many companies have grown accustomed to this outdated approach despite the fact that it is highly inefficient and cumbersome and, most of all, extremely limited in its capabilities. The way they are managing their CAD data is a sure way to spoil their future and keep them from capitalizing on the opportunities of digitalization.

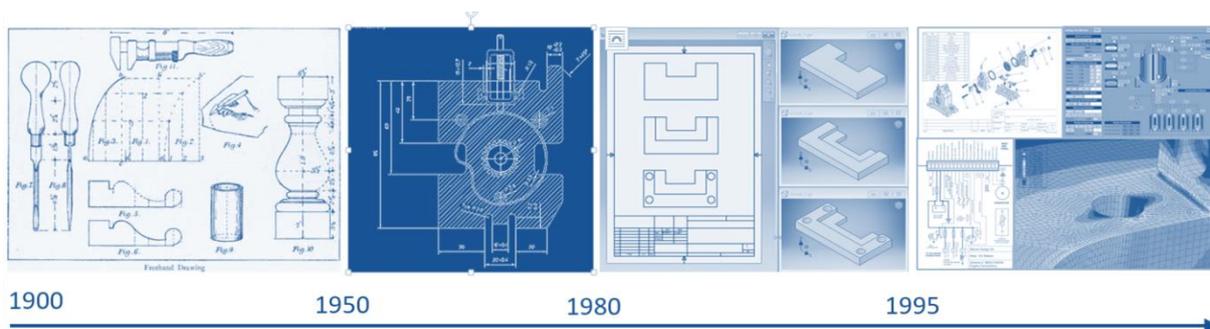


Figure 1: The CAD data management evolution

What's the better way to go? For this very reason, the purpose of a CAD data management system is to create references and links between all the different pieces of information needed to describe a product – this is also known as dependency knowledge. It creates a network of knowledge that is readily available without any manual effort. The error rate goes down, time and resources can be better spent elsewhere, and it becomes that much easier to handle product data and the information it conveys.

So, today, anyone who saves a design drawing, indexes it, and creates a corresponding BOM is engaging in PDM. Those who don't are stuck with mere CAD data management. Here's the dilemma: This process of checking in documents and linking them may make some people feel like this only adds to their development workload. Those who frequently reuse individual

elements and already work in a structured manner will not feel this way. But there are also those who are no stranger to starting their design from scratch when in doubt and who don't think that getting the BOM to the production team is part of their job; and they certainly will. A company that is looking to introduce PDM and PLM, however, cannot concern itself too much with taking such sensibilities into consideration because the company as a whole will benefit greatly: Warehousing costs and error rates will go down and the overall process will be accelerated. This means that the additional time and resources developers spend on creating an item will be outweighed by the benefits to the company at large. And while this additional effort should be kept to a minimum and supported by the PDM/PLM system, there is no way to eliminate it completely.

## What to look for in modern CAD management/PDM

If you are looking to purchase a new CAD data management system, you should make sure that referencing, linking, and integrated item management are already built into the standard – or put simply: go for PDM rather than CAD data management.

The belief that no one needs this type of system is simply misplaced. Some people may be unaware of its benefits. Others may argue that the introduction of a modern PDM/PLM solution will tie up too many resources, that it would be way too big for the company's needs, or that it wouldn't be worth their while.

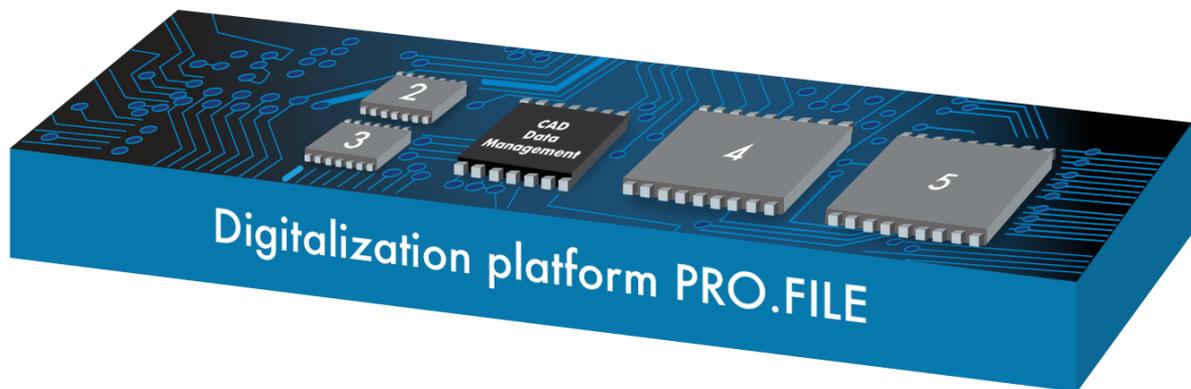
This could prove to be a grave error in judgement. Because regardless of their size or industry, companies simply cannot afford to not address the demands of digitalization and what has been described above is one of the pillars of digitalization in the fields of product creation and product management. The evolution towards collaborative PLM will – sooner or later – affect every technical company.



Figure 2: Choosing the right system will enable the digital evolution towards collaborative PLM

One of the simple reasons why companies should steer away from using on-board tools, that is, the data storage capabilities that are often built into the CAD software, to manage their CAD data is the fact that many design departments today use software products from a variety of vendors. A CAD data management system should therefore deliver true multi-CAD capabilities, supporting both the MCAD space and the software and ECAD space with deep integrations into the systems. A CAD data management implementation that fails to incorporate mechatronics collaboration is short-sighted and not thought all the way through. It is imperative to focus on an integrated product data management approach.

What's more, there are implementation methods available today, such as PROCAD's EASY.CON method, that allow you to gradually work towards that goal strictly based on configuration rather than tedious programming. Taking this route allows companies to lay the foundation for a future expansion towards PDM and PLM and still start out small. In conclusion: Start out as small as you like, but make sure to have the foundation for future expansion in place.



*Figure 3: The PRO.FILE digitalization platform allows manufacturing companies to start out small and gradually expand their installation towards PDM and PLM*

## The solution: dependency knowledge from creation to operation

A PDM/PLM system that allows companies to rise up to the challenges of digitalization will, for example, know exactly which version of a product is available in which status and with which dependencies with other products. All of this information can be accessed from a central location. Tasks are generated and assigned based on actions and dependencies. PLM is system-driven collaboration across the entire lifecycle and not just data storage.

Having a PDM/PLM system with deep integrations with authoring systems (CAD) and ERP systems means that your item master data, product structures (assemblies), bills of materials, and MCAD and ECAD documents are automatically transferred from the CAD system to the ERP system and back. This in turn enables you to synchronize your development, purchasing and production processes at the item level and eliminate errors such as redundant ordering, re-designing an existing stock part or producing from the wrong BOM.



### **The benefits of PDM/PLM over CAD data management**

- Eliminates the need for manual copying to the ERP system
- Automatically provides production with valid product information to produce from
- Leverages digitized product information integrated from MCAD, ECAD, electronics, Office, and email sources
- Consolidates information in customer, machine and lifecycle files to give you a complete at-a-glance picture
- Keeps everything synchronized by creating an integrated information platform

The analysts at Tech Clarity described in great detail the benefits of PDM in their report entitled "[The Business Value of Product Data Management](#)". They explain how companies can leverage PDM/PLM to achieve strategic business benefits such as faster time to market, improved quality, more innovation, higher efficiency, and lower product costs.

## **Conclusion: well positioned for the future**

Nowadays, CAD data management without integrated item management is not just antiquated, it will spoil a company's future chances. The evolution of information management in technical environments has long surpassed simple CAD data management. Companies that insist on merely implementing CAD data management without PDM/PLM functionality should, at the very least, put a system in place that possesses the technological capabilities for future expansion. In short, implement a system that can be expanded until you reach collaborative PLM and integrated item management.

Modern systems such as PRO.FILE by PROCAD allow you to take such a gradual approach. The company gets to work from an integrated platform and with it on an integrated product data backbone from day one, even if the initial implementation is limited to the design department. Guided by the principle of platform thinking, users will not implement a system that is either too small for their needs or too complex and costly. They will rather rely on an all-encompassing platform to configure a CAD data management approach that fits their current needs. If their demands grow over time, they have the option to effortlessly add new functionality that takes them further towards PDM and PLM – without additional migration hassles.

Users no longer have to make the hard choice between a sluggish PLM suite and a simple CAD data management solution for their drawing management.

With its offering, PROCAD closes the gap between CAD data management solutions that fall short and sluggish suites with implementation methods that frequently set them up for failure,

thereby eliminating the contradiction between necessary functionality, project budgets, and practicability. All of this is characterized and driven by the principle of platform thinking: You start out small and expand the system where required without having to install new software but rather by way of configuration and unlocking additional features.

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