SYMETRI
ADDNODE GROUP

THE ESSENTIAL GUIDE TO:

PRODUCT DATA MANAGEMENT (PDM)

FOREWORD

At Symetri, we always aim to challenge people to work smarter and turn ideas into new realities that shape a better future.

This is certainly no exception when it comes to challenging companies within the manufacturing industry. We have supported many innovative companies of different sizes within product design and manufacturing industries to optimise their working methods and increase the quality of their projects by implementing PDM solutions.

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OVERVIEW

FINDING THE HIDDEN VALUE IN YOUR DATA

Any investigation you do into software applications will always be about the data question. The importance of information to a business has never been less than it is today—in our digital age—but in the past, it has been far more challenging to turn that importance into real value. Some organisations still operate in the past regarding managing their data.

Now, finding the value is not only easy, but it is also automatic. Systems automatically gather the data; any connected device generates data, touches a computer, and the data starts multiplying.

Once you appreciate where the value is in your data, you must find out how to use it.
Enormous benefits stand to be gained through a controlled approach to how you collect, store, manage and share your data, but all these actions bring their own difficulty; how to do all that.

How do you ensure control over the flow of documents and correct data that is accessible, auditable, and can quickly and confidently be checked and approved (critical best practice in modern manufacturing and engineering)? Addressing these requirements is the function of a Product Data Management (PDM) solution, an integral element of modernisation for any organisation.

WHY READ THIS GUIDE?

This guide takes you through the benefits of efficient data management and briefly examines what a PDM solution can do for your business. It addresses the misapprehension among many organisations that because they created a document, a drawing, or a model, it will always be there when needed. When they want the information, they'll be able to find it. It will be there, stored 'somewhere' on the network.

This misapprehension is fueled by three unreliable assumptions:

1)Searching gets results: All you have to do is search for the last version, and you'll find it.
2)Saving documents, or versions of anything, is common sense.
3)Data sharing is no more complicated than streaming the data through the network across a Virtual Private Network (VPN).

None of the foregoing assumptions is robust, because:

- **Where and what do you search?**
 Without controls in place, searching—whether for CAD data, CAM files, O&M manuals or any other type of information—can be a thankless task, given that not everybody will save everything in the same way, or even in the same place.

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You may need to hunt down the last known author to ensure that you're using the most recently changed version.

- **How do you define best practice?**
Common sense means many different things to almost everybody. Some save files by project name, some by-product, some by data, and some by their own function in the project. Variation in saving practice equates to inconsistency, and that equates to confusion.

- **Ever had issues with your network?**
VPNs can present reliability problems when traffic runs slow or bandwidth is compromised. Internet connections drop. Servers can be busy. Efficiency can be hampered.

This guide looks at how to avoid wasted effort and how to be confident in your data, and the standardised processes so essential to taking great care of it. If being data-centric is not in your culture now, it will be soon. We examine the considerations you may wish to take into account in preparing to benefit from one single source of the truth.

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SECTION ONE: CONSIDERATIONS

WHY ALL THE FUSS ABOUT DATA

Data is everywhere

Any and every digital action generates data. It goes somewhere. You often need to find it. Computers, networks, and systems are not the only generators of data. Paper-based records do, spreadsheets and reports do. The content of emails does. Paper and digital do not connect. This is where inefficiencies and misunderstandings begin. It's where time is wasted searching for files, sometimes with a lack of certainty about how the last users of those files may have labelled them. This is also the fertile ground for improvement.

**Data is core to everything you do
In terms of what it is, data is the Intellectual Property (IP) of your business.**

As for what it does; it is core to how your processes work, how designers and engineers share information

It is how this sharing extends beyond your company—to supply chain partners and customers— how you drive continuous improvement by learning from the past, facilitating the present, and anticipating the future. The 'fuss' about data arises from the enormity of its business and process value, combined with the speed at which it originates.

Data is now core to collaboration within a far wider stakeholder ecosystem than just the engineer community. It is essential for other stakeholders—both internal departments and third parties across the supply chain and your customer base—to gain insights from the data. Access to data is now of even greater importance with the advent of the Digital Twin, which has its roots and its value in data (gathered via sensors) for real-time monitoring of assets, and control of systems and machines

- **Data needs care and attention**
Given the unremitting speed at which data is created and the multitude of sources from which it originates, it can't be left unattended. Controls need to be in place to ensure easy accessibility and auditability.

Checking and approvals with every change to any dataset, be it a model, a Digital Twin, a document, a CAD drawing, a technical spec — basically anything that has been subject to intervention by various parties involved in a project — have to be clear and unequivocal. Above all, data as to be correctly stored, and backed up. It has to be managed.

WHAT IS PDM?

PDM solutions and software enable you to organise, manage and track data creation, simulation and documentation processes for design and engineering workgroups within your company.

The distinction between PDM and PLM (Product Lifecycle Management) is sometimes misunderstood. They are not the same. Product Lifecycle Management integrates different functions within a business—such as new product introduction (NPI), supplier collaboration and quality management, among others—in one connected system of communication, to which Data Management is intrinsic.

Product Data Management is a strategy for managing your product-related data and information, with an overriding engineering process, all in one central location.

At first glance it may seem as if PDM is just about tidier admin; designed to avoid all that searching for files and documents which different users may have named and saved in different ways. It may appear to be a not a lot more than virtuoso filing. Even if it were just that, it would still represent a step-change for some organisations, where paper-based systems prevail or where, if digital processes are more mature, siloes still exist between departments and roles; but it is far more than that.

The efficient tracking of data, resulting from standardisation of how it is treated, is tidier admin to an extent, but to view it in this way is to overlook the resounding impact that PDM has throughout the business.

Changing workplaces, changing data focus
In the very recent past the dominant view of the value of best practice data management was that it was the underpin of effective collaboration. Handled correctly, with the right systems in place to manage the data, it does serve this goal.

In the even closer past, the world has been shaken by a pandemic, and styles of working have changed. Many people work almost exclusively at home, others work in a hybrid fashion (sometimes at home, sometimes in the office). Remote working has become far more embedded in the workplace culture than could have been imagined in 2018. Effective collaboration has been joined at the top of the priority list by the need for data accessibility.

PDM'S SIX PILLARS OF VALUE

Defining the value of a robust approach to data management is only partly about identifying the many benefits it brings, the workflows it underpins, and the risk reduction that comes along with it.
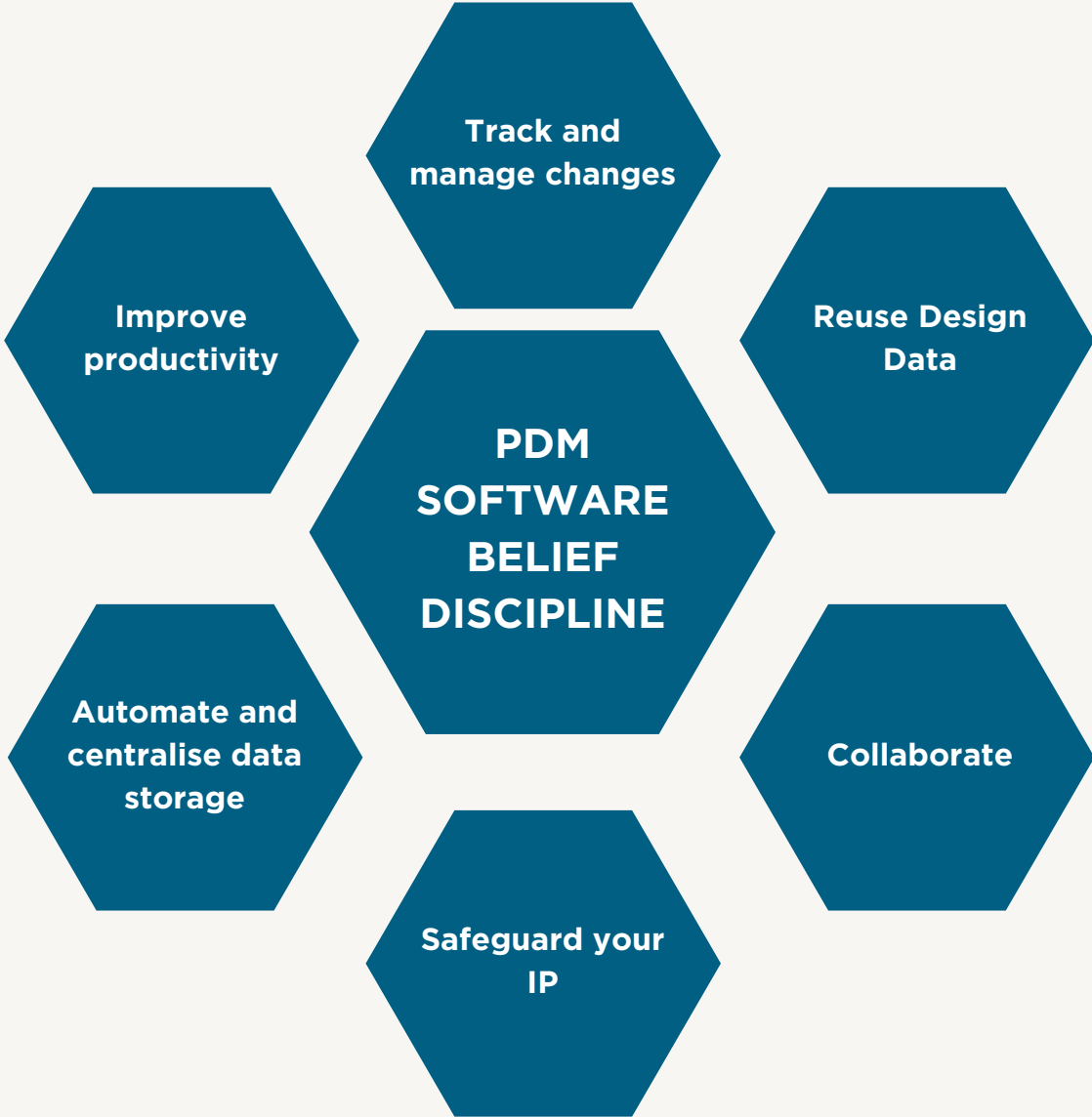
Strategically, the value comes from the discipline it automatically creates across the organisation that ensures that information is always correct, always up to date and always trustworthy.
This all adds up to confidence among your teams; belief in the data and the systems that take care of it.

This confidence and belief are validated when people discover that the time they used to take in organising and finding data and correct versions are no longer necessary, that the quality of their designs has improved, so much that they once had to do manually is now done automatically by the PDM system. Meanwhile, the benefits are best summarised as:

PDM'S SIX PILLARS OF VALUE

Track and manage changes

Improve productivity

Reuse Design Data

PDM SOFTWARE BELIEF DISCIPLINE

Automate and centralise data storage

Collaborate

Safeguard your IP

SECTION TWO: BECOMING DATA-CENTRIC

TAKE THE PDM TEST

How do you decide if a PDM system is appropriate for your business? How do you identify the needs or create a business case for the necessary investment?

The best place to start is by accepting that PDM is not just a file manager or an admin tool.

Consider the strategic long-term and ongoing value it can bring to your workflows, processes, and users. Imagine the gains you can achieve by adopting a holistic view of data-centricity; one which touches as much on processes and people as it does simply on the data

DATA	PEOPLE	PROCESS
Data is all about managing the files and metadata that make up the source code for your product.	The 'people' aspect is about the challenges your engineering and non-engineering staff have while developing the product.	Process is about the challenges with maintaining standard procedure throughout development.

Here is a quick test to help you identify where improvements may be required within your business:

Data:
Has your company ever lost product data?
If you have, was there an easy recovery procedure in place with a reliable backup system?

Have you ever started the manufacturing process using data that turned out to be wrong or outdated?
Did you identify how much time was lost or the cost incurred? Did you identify the root cause of it? Were you able to ensure such a catastrophe would never happen again?

Are you able to copy design data as much as you think you should? What is the value of copying designs?

Do you measure it in productivity, reduced product costs or quicker time-to-market

Do you have engineering best practices?
How are they administered?

People:

How easy is it for your engineering team to collaborate with other departments, such as manufacturing, purchasing or sales?

Do these connections and liaisons involve meetings, phone calls, and emails? Do they depend on people being aware of requirements in-depth or being able to seek further information without having to re-contact the project lead?

Can you easily share data and information with outside suppliers and customers?

If your supply chain collaboration is not seamless and software-enabled, does it slow down product development? Does it result in errors that need correcting later in the development process?

Can managers and executives easily see the current project status? Are your processes standardised and consistent?

Do silo departments run their own parts of a project in their own way? Or is your process seamless from end to end, a truly joined-up organisation?

How would you characterise your ability to ensure compliance?

Is it a best practice approach, assured in the background of your unified systems, or is it a manual approach that requires regular checking and remediation when you discover shortfalls? In these areas, a regulatory body might express cause for concern. Do compliance issues slow down your product development process, or have they ever resulted in lost business or customers?

Are engineers at different sites able to access data easily?
Are you getting the full value out of multiple engineering or manufacturing sites that you would expect?

Are your people satisfied with your technology?
Do your teams ever express frustration that you may not be as digitally supported and enabled as other companies they encounter in their daily roles or even in their personal lives where there's every likelihood that they have a high level of digital-savviness?

Process:
Is change automatically for you or one big labour-intensive effort?
 How do you handle change and releases today? Are these processes efficient? Do they include all necessary parties?

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THE DESIGN AND MANUFACTURING ADVANTAGE

If you're looking to implement a PDM system, the critical first stage is to be clear about what you want from it. Is it essential for your business to reduce the time taken on projects, eliminate mistakes and reduce costs? Such goals are among the most common that companies share, yet they can be grouped under the heading of 'tactical' gains.

The longer term is an altogether more ambitious consideration. Whatever your current status, the benefits to your company, your processes, and your people will quickly provide a worthwhile return on investment in your chosen PDM solution.

WHAT DOES PDM ACTUALLY DO?

The core capabilities to look for when selecting a data management software solution are:

- The ability to organise data, keeping files in one location for easy access.
- Manage and track data creation, simulation and documentation processes. All files and associated data are stored on a central server (on-premise or cloud-based for easier access); team members should be required to check files to prevent more than one member from editing the same file simultaneously.

Once a file is checked back, other team members access the latest version. All file versions must be retained to never misplace or accidentally replace past versions.

- Aligned to the requirements of design, engineering and manufacturing teams.

The company perspective

| SECURITY | REPORTING | ACCESS | INTEGRATION |

Security

Robust security is a priority concern for any business in today's digital world, in terms of both user access security and data centralisation for backup procedures critical to Disaster Recovery. Security must be a central and integral component of the system, alongside the ability to secure access to your data at a granular level, almost certainly addressed by any reputable vendor or provider.

Reporting

Reporting is an important element of any business-critical system, and companies are now increasingly realising that design and engineering data should be treated in the same way. A PDM solution should offer the ability to map analytical report data directly onto a CAD model within the CAD application.

This functionality enables you to highlight and quickly select data based on key reporting parameters such as status, compliance, material, and lifecycle status, sharing updates to the wider business via dashboard-style reporting tools to ensure that every project stakeholder has the level of information required when needed.

Access

Post-pandemic, it has become common for businesses to have distributed assets, separate design offices or remote working members of staff, as well as the different manufacturing locations already in place pre-Covid. Such extended ecosystems present a communication issue, with disparate data, multiple versions of the same data or poor data access routes.

Multi-site data replication was once a luxury but has become necessary, requiring different configuration options to suit your infrastructure and access demands, which may also include multiple international sites.

Integration

PDM helps to ensure smooth collaboration with other departments and integration with the numerous applications which may require access to the same data— data types. These applications may include Enterprise Resource Planning (ERP) applications, such as SAP, Microsoft Dynamics or Sage, or another Document Management System (DMS), such as Microsoft SharePoint or Documentum, and Product Lifecycle Management (PLM) platforms, such as Autodesk Fusion Lifecycle, SAP PLM or Aras. .

PDM, together with these wider business units and systems, can bring your data closer together and easier to access for those who need it at the correct time, making it possible to collaborate or share information with external parties.

- **The personal angle**

| STRESS-BUSTING | TIME-SAVING | ENRICHING |

Stress-busting

Significant time savings result from improved searching and reuse of design data across a business. This is a pivotal reason many companies review and adopt a Product Data Management solution. It enables users to search and find exactly what they need by the snippets of information they may know at the time. For example, if two users try to find a piece of data, they will not necessarily search for it with the same terms. One may know the data by its Part Number or Stock Number; the other may look for it by Material or Finish. The power of indexing and storing all metadata allows both users to find the same data, but not necessarily from the same entry point.

Compared with a standard Windows folder structure—where everyone must find a file by just its name—a PDM system can expedite this regular task.

Time-saving

When you save time, you relieve the tedium, and, of course, you increase productivity. You allow your teams to more fully apply their real talents, being able to reuse design data.

They can completely copy a design, decide where the new files should be located, what the new names should be and update metadata. All data can be centralised, searched and referenced in an uncomplicated way for all involved.

Enriching

Many companies encounter problems when using design applications requiring data relationships such as linking to relevant parts, drawings, images or spreadsheets, or Autodesk AutoCAD drawings with external references (refs) between documents.

Traditional methods of storing the information in Windows folders can fail when links between files are broken by renaming the files and when data is reorganised into different folders or even accidentally deleted. A robust PDM system indexes and constantly monitors relationships between files, allowing users to simply rename or move a file, with the confidence that the next time they try to open the documents everything will still be found and in the right place.

In addition, users will gain insights into where files are used, for example, which products use a particular component. This allows businesses to fully appreciate the impact of a design change across several different designs.

- **The Process enhancement**

| SYNCHRRONISE | VISUALISE | EXTEND | APPROVE |

Synchronise

A well-chosen PDM system automatically synchronises metadata and revision tables with design files during a release process, also providing an option to consistently convert CAD data into various file types, such as STEP or STL.

Visualise

Visualisation files such as Autodesk DWFx or PDF can be produced and filed within your project structure, providing all the correct data where you need it and in the correct format for others downstream.

Extend

In addition to designing content, you may need to organise and manage independently published components created by users or standard component libraries. Autodesk Inventor Content Center, for example, provides over 750,000 standard components, such as bolts, washers, nuts, steel sections and bearings. A PDM system can manage all this content, regardless of creation method, with the same security constraints you would apply to your design data.

Approve

The Lifecycle and Revision Management functionality within a PDM solution enables you to introduce different levels of digital document approval via user or group security on workflow transitions, only permitting certain users to move a file to a particular state.

You may require only Senior Engineers or Project Managers to move a component's status from Review to Release for Manufacture. For more involved processes, where you may want to control approval, lifecycles can be linked to an Engineering Change Order (ECO) management system. This can be configured to unlock files when a change request has been logged and progresses to a specific stage in the process.

Engineering Change Order management (ECO) helps replace manual change requests/orders or introduce this type of record for those not currently documenting and tracking this type of information. The process allows all users within a business to add design change requests, from goods-in to manufacturing or quality control to sales/service. The result is a complete record of changes, however small, across your product range, ensuring that your product is the best it can be throughout its lifecycle.

FINAL THOUGHTS

Managing data correctly brings significant benefits—accelerating product development and improving internal and external collaboration—but also brings responsibilities; it cannot be left alone if the benefits are to be realised. PDM's core function is to take these responsibilities off your shoulders and automate the processes that fulfil them.

It is remarkably easy to become confused by the proliferation of data within your business. You create it every day, everywhere, in multiple formats stored in diverse ways. Without centralised control and a single view of the truth, the data becomes hard to handle and virtually impossible to extract the deepest value from without effort.

As this effort is undertaken, there will always be a degree of uncertainty as to whether or not it is the latest or even the correct data. In a digitised world, there is no margin for uncertainty or doubt. They both waste time, and, ultimately, they both cost money. It could be time to eliminate the negative and accentuate the positive.

TAKE THE NEXT STEPS

Symetri can help you assess your requirements because we understand how each business operates in its own way, with workflows, priorities and design approaches that differ from others. We will help you enable your users with streamlined and confident data access anywhere at any time. Many PDM solutions are on the market, so it's important to understand which is right for your business. We can advise you on that journey.

You'll gain in speed to market and productivity. You'll look back in amazement at your previous approach to data and look forward to the knowledge that it will all be infinitely more robust.

Contact us to learn more about how to get started and eliminate doubt and uncertainty across your processes by taking control of your data.

ABOUT SYMETRI

WE CHALLENGE PEOPLE TO WORK SMARTER FOR A BETTER FUTURE

Symetri helps manufacturing and engineering companies to optimise working methods and increase the quality of their projects. Our mission is to help you remove waste from engineering and business processes to create more value and increase productivity by incorporating Lean solutions. Our passion is to help you resolve everyday challenges, so your team can focus on innovation and business-critical tasks.

The solutions and services we offer cover the whole lifecycle of your products from Design to Production, Sales, and After Sales & Services. We focus on helping you improve your company's business performance based on high-quality design output, automated routines and efficient use of product information throughout your business operations.

Symetri is part of Addnode Group.

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