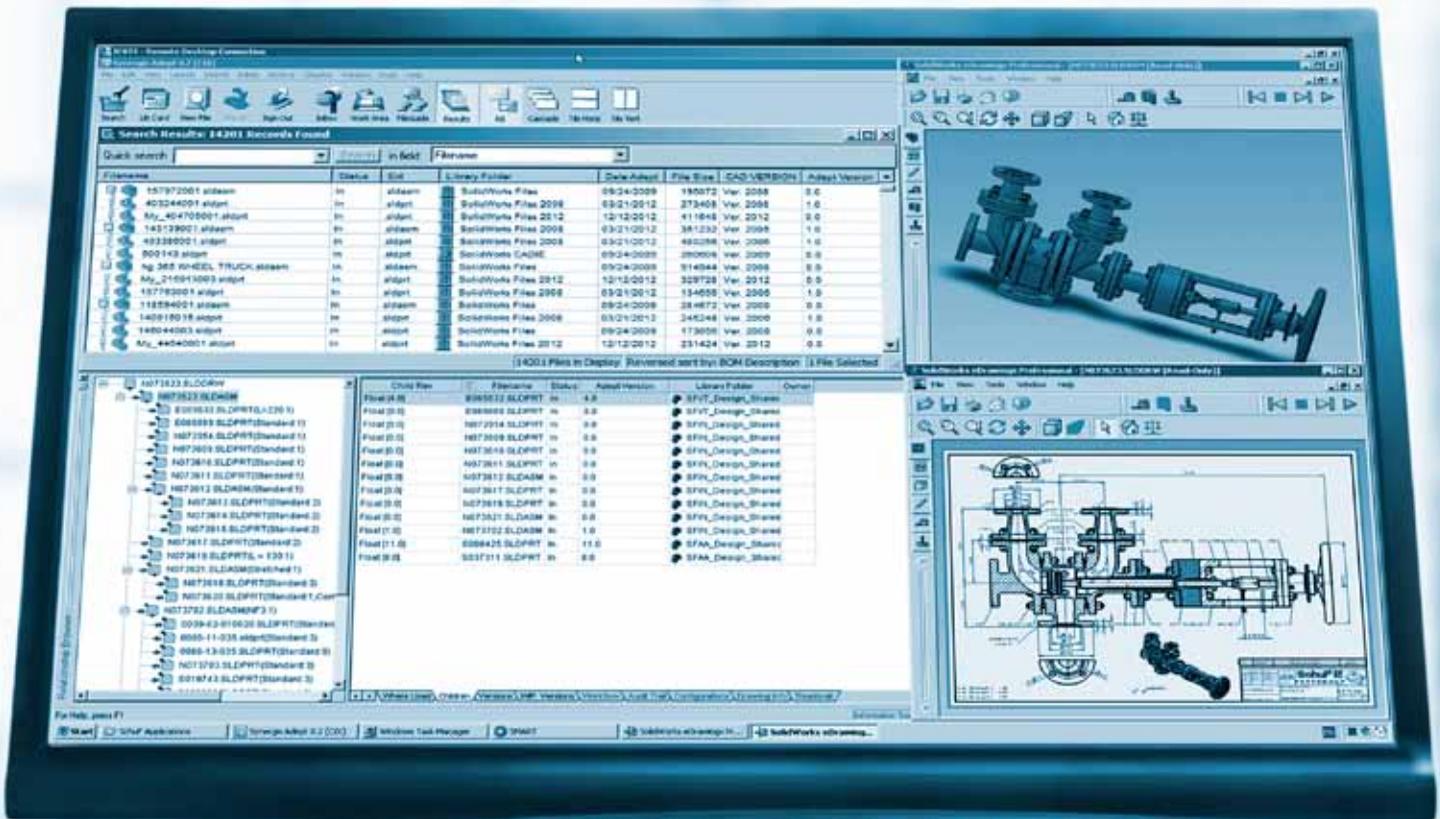# DE
Desktop Engineering®

MAKING THE CASE
FOR PRACTICAL PLM

Product data management (PDM) paired with other enterprise systems provides a practical way to break the collaboration bottleneck and streamline the design cycle.

GET PRACTICAL WITH PLM

Solve the Top 4 Product Data Management Challenges

WHAT COMPANY ISN'T UNDER THE GUN TO GET products to market faster than the competition while simultaneously reducing waste and cost? With companies struggling under the weight of manual processes and mountains of out-of-control product development-related data, it's time to get real about finding a solution. With a practical approach to PLM, you can connect everyone in the organization to the right data while facilitating better decision-making that results in great products.

Organizations have attacked the problem with a variety of technologies, from CAD-centric data management software to enterprise product lifecycle management (PLM) platforms, with varying degrees of success. The challenge is to manage an increasing amount of manufacturing data, and to automate business processes without getting bogged down in complex PLM enterprise deployments that consume limited resources, break already-strapped budgets and take months, or even years to get off the ground.
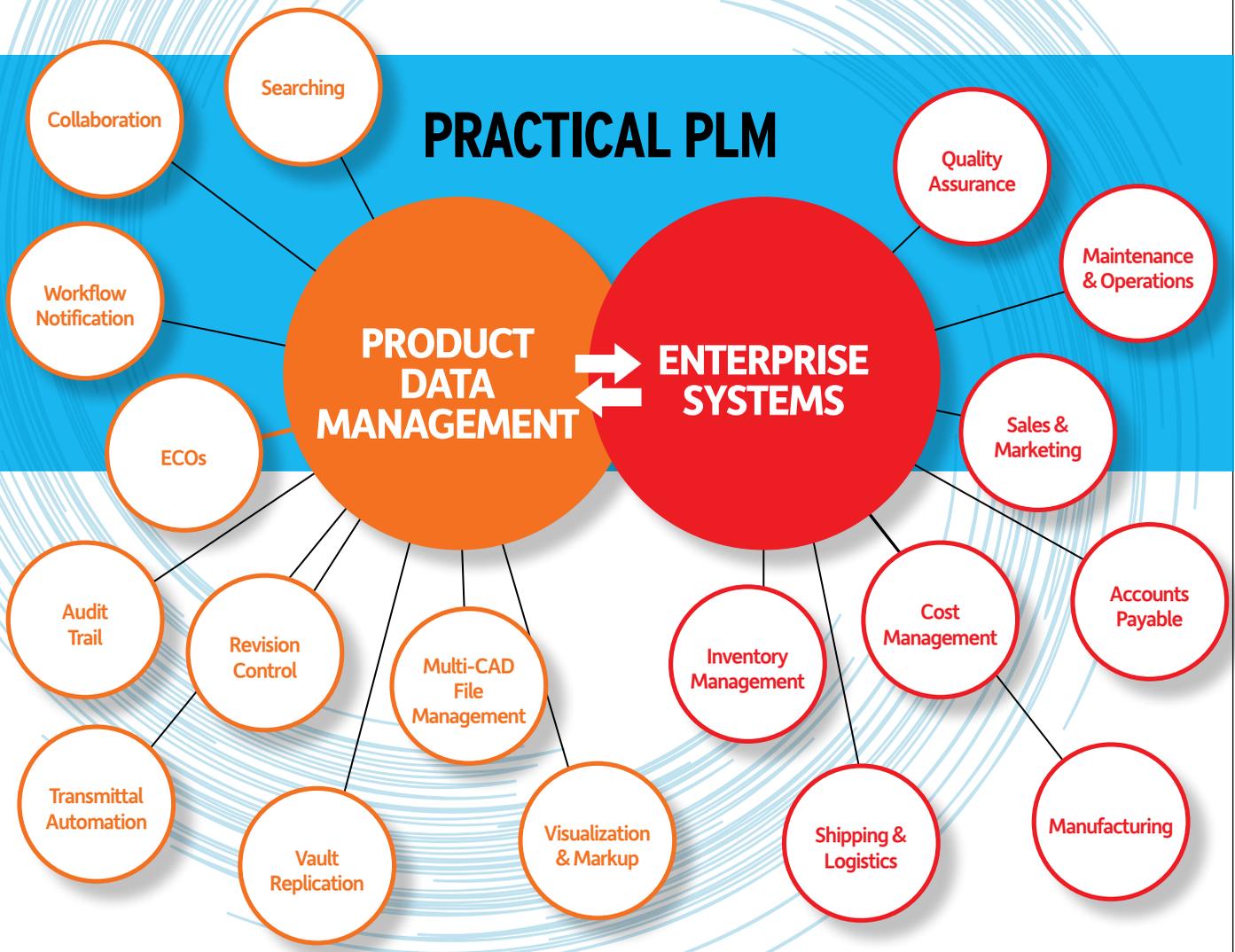
Rather than trying to "boil the ocean" and map a monolithic platform to a set of complex business processes, organizations need to zero in on the most common product data management challenges. They should then go after them with a practical PLM approach that delivers efficiencies right out of the gate, while easily scaling to meet evolving needs.

Here are the most common product data management challenges and how to solve them with a practical approach to PLM that integrates product data management with existing enterprise business processes.

1 **Finding Files.** By some accounts, engineers spend as much as 40% of their time searching for key files. Most companies are hamstrung by manual processes and far-flung development efforts that lock up critical product data and CAD files in siloed systems that aren't easily accessible by dispersed design teams, manufacturing or customer service.

Without a central repository and an advanced search capability to quickly find files, team members can't locate the data they need to make optimal decisions about product direction, and when and if they do, there's no guarantee they are working with a current version. The inability to quickly find information wastes valuable time that could be better spent doing real engineering work, while it also introduces errors into the design process.

Solution: A product data management platform provides a central repository for all multi-CAD design data, which can be accessed by team members based on their role and according to specified security permissions. There is no need for colleagues to dig up and email required files. Instead, there are structured metadata searches as well as full-text search capabilities that allow for a quick review of the contents of documents. Attribute or property data can provide another layer of detail for examining CAD or non-CAD documents such as Microsoft Office files, transcending what's possible with basic Windows file management. The ability to save commonly used search criteria can also ensure frequently used content is readily accessible.

PRACTICAL PLM

PRODUCT DATA MANAGEMENT ⇄ **ENTERPRISE SYSTEMS**

- Collaboration
- Searching
- Quality Assurance
- Maintenance & Operations
- Workflow Notification
- ECOs
- Sales & Marketing
- Audit Trail
- Revision Control
- Multi-CAD File Management
- Inventory Management
- Cost Management
- Accounts Payable
- Transmittal Automation
- Vault Replication
- Visualization & Markup
- Shipping & Logistics
- Manufacturing

2 Revision Control Errors. Conflicting document versions present an array of challenges, from duplication of effort to poor quality control. According to a 2012 Tech-Clarity survey, approximately 30% of organizations are hindered by inadequate revision control practices.

Manual revision control processes are error-prone and potentially costly, from both a financial and customer satisfaction perspective. Moreover, without an audit trail, companies have no record of who modified what documents, when, which opens the door to legal exposure from a compliance or litigation standpoint. It also makes it difficult to analyze workflow, identify bottlenecks, and improve overall design processes.

Solution: Along with secure and controlled access to a centralized repository of documents, a product data management system automates revision control and maintains an audit trail of changes to any one file, aiding in the traceability so critical for regulatory compliance and certification. Files with parent/child relationships are able to maintain links to current versions, and both major and minor versions and revisions are tracked to eliminate errors and ensure that all players in the design process are working from the same information, even if they are in globally dispersed locations.

3 Change Order Chaos. Engineering change orders (ECOs) are one of the biggest bottlenecks to design productivity and can cost companies plenty, especially if mistakes are made. In many organizations, ECOs are handled manually using spreadsheets, which makes them difficult to orchestrate into a consistent process. Manual handoffs provide no visibility into ECOs and no automated way to alert other stakeholders and departments involved in the workflow as to their status and final approval.

Solution: Leverage a product data management system's electronic workflow capabilities to automate ECOs and orchestrate a simple or complex routing and approval process. Workflow status updates can be sent via email, and time-based alerts can be set to identify bottlenecks and get projects completed faster. The ability to view the

> **"THE FOLKS ON THE [MANUFACTURING] FLOOR DON'T HAVE TO WONDER IF THEY ARE USING THE LATEST REVISION. ENGINEERING IS CHECKING ALL THEIR DOCUMENTATION INTO THE ADEPT DATABASE, SO WE ARE 100% ASSURED THAT PEOPLE ARE USING THE LATEST VERSION OF THE DOCUMENT."** – MICHAEL BLANK, Director of Engineering and Quality Assurance for Miller Ingenuity

status of an ECO also ensures that any remaining steps are identified and duly completed, leaving no margin for error or overlooked missteps.

4 Collaboration Complications. It's the rare company today that doesn't have a need to collaborate beyond its four walls. Regular communication with globally dispersed departments, suppliers, partners and even customers is part and parcel of the modern-day development process, and remains a headache for most engineering organizations.

Without a "single version of the truth," organized and accurate collaboration is impossible. The rampant use of email only complicates matters, proliferating uncontrolled versions and resulting in product data management chaos. Moreover, sending large CAD files and assembly drawings across multiple sites through email or FTP is painfully slow because the files aren't replicated locally at each team's site.

Solution: With a centrally managed and controlled document repository, collaboration is transparent. Project data can be replicated across sites so everyone is working from the most current version without any degradation in performance. The ability to manage and view native, multi-CAD files can simplify design reviews, allowing non-engineering users to view, mark up and compare designs without having to purchase expensive CAD seats or deal with cumbersome and error-prone file conversions.

By integrating a core product data management platform, such as Synergis Adept, with existing enterprise systems, organizations can make collaborative product design the stuff of reality, not PLM fiction.

BY THE NUMBERS

40%
Can't find data they're trying to find. [1]

73%
Don't know the cost of engineering change orders. [3]

200
The number of people, on average, that use information associated with a design created by an individual engineer. [5]

36%
Organizations suffering severe consequences related to regulatory compliance as a result of failures in document-related business processes. [7]

6 weeks
The time it takes manufacturer SchuF-Fetterolf to develop a new valve enabled by PDM, compared to competitors who typically spend anywhere from six to 12 months on valve development. [9]

39%
Cite frequent design changes as the biggest obstacle in the way of efficient design. [2]

42%
The amount of duplicated data, according to company estimates. [4]

33%-50%
The total engineering capacity consumed by handling engineering change orders (ECOs). [6]

3X
The likely increase in being "very effective" at managing design projects with effective document management. [8]

$400,000
The average annual cost of a manual transmittal process for Taggart Global that was saved by automating data management and document management processes. [10]

[1] Tech-Clarity Perspective: "Best Practices for Managing Design Data," 2012, Jim Brown. Available online at http://www.plm.automation.siemens.com/en_us/Images/Tech-Clarity_Perspective_Design_Data_Best_Practice_tcm1023-184552.pdf

[2] Aberdeen Group; "Top CAD Tips For Designing Today's Products: What Are The Right Tools For The Job?", March 2012

[3] http://www.industryweek.com/companies-amp-executives/how-much-do-your-engineering-change-orders-cost-you

[4] Symantec State of Information: Global Results, 2012. Available online at http://www.symantec.com/content/en/us/about/media/pdfs/2012-state-of-information-global.en-us.pdf

[5] http://www.plm.automation.siemens.com/en_us/about_us/newsroom/press/press_release.cfm?Component=25802&ComponentTemplate=822

[6] Terwiesch & Loch, 1999. http://cdn.intechopen.com/pdfs/432.pdf

[7] IDC white paper, "It's Worse Than You Think: Poor Document Processes Lead to Significant Business Risk," 2012. Available online at http://mds.ricoh.com/files/knowledge_center/IDC_Risk_WP_Ricoh_Eng.pdf

[8] Tech-Clarity Perspective: "Best Practices for Managing Design Data," 2012, Jim Brown. Available online at http://www.plm.automation.siemens.com/en_us/Images/Tech-Clarity_Perspective_Design_Data_Best_Practice_tcm1023-184552.pdf

[9] Tech-Clarity Insight: "Managing Engineering Data: The Role of Product Data Management in Improving Engineering Efficiency," 2010, Jim Brown

[10] Synergis case study

Top Product Data Management Challenges vs. Adept

PRODUCT DATA MANAGEMENT CHALLENGES

SYNERGIS ADEPT CAPABILITIES

INEFFICIENT FILE SEARCH

- Centralized access and control to all business and product design information.
- Immediate access to "one version of the truth" — the latest approved version.
- Structured metadata search capabilities, including the ability to easily comb through attribute, property and tag data contained in AutoCAD, Autodesk Inventor, SolidWorks, MicroStation and Microsoft Office files.
- Full text search capability for searching the contents of documents under management by Adept, including 2D Inventor, SolidWorks and AutoCAD drawings, Word, Excel, PowerPoint, PDF, DWG and others.
- FileGuide Browser allows users to browse for files based on any combination of metadata, rather than a network location.
- Support for Boolean search terms like "and," "or," "near" and "not."
- Auto-naming feature for creating easy-to-use, error-free naming standards.
- Tight integration inside mainstream CAD applications, allowing designers to find and reuse files and view file relationships without ever leaving their design tool.

ERROR-PRONE REVISION CONTROL

- Saves previous versions and maintains the historical metadata, delivering access to a snapshot in time as well as the complete version history.
- Creates an audit trail of who did what, and when for each document throughout its lifecycle.
- Check in/check out feature ensures that only one user can edit a document at a time, preventing overwrites and duplicates.
- Can save major and minor versions.
- Maintains version control within complex file relationships like XREFs and SolidWorks or Inventor parts, assemblies, drawings and configurations.

CHANGE ORDER CHAOS

- Integrated workflow capabilities for automating simple or complex engineering change management and business processes.
- Support for automatic engineering change notifications via email and status alerts.
- Time-based alert notifications can be used to improve workflow efficiency and identify bottlenecks.
- The ability to view the workflow status of any project, including steps completed and remaining.

BROKEN-DOWN COLLABORATION

- Centralized repository serves as a single source for document management and control.
- Support for granular access rights control to keep documents secure.
- Built-in visualization delivers engineering data across the enterprise.
- Native document viewing for hundreds of file formats, including mainstream CAD and Office files as well as raster and graphics formats.
- Transmittal process automation.
- File replication ensures dispersed teams have local access to the most current version for optimal performance.
- Integrates easily with enterprise business systems like ERP, MRP, MRO and CRM.

ONE SCALABLE SOLUTION

How three companies meet product data management challenges with Adept.

A PRACTICAL APPROACH to product lifecycle management (PLM) means being able to achieve significant gains by scaling product data management functionality in a reasonable and measured way — whether automating a single business process or doing a complete overhaul of engineering-related product data management design practices. It also means getting immediate value out of a system or business process initiative without getting waylaid by complexity or excessive deployment costs of enterprise product lifecycle systems.

With that in mind, here's how three companies were able to effectively leverage Synergis Adept to take on their most pressing product data management and collaboration challenges. By flexing their product data management capabilities, these manufacturers were able to quickly achieve significant business benefits, from dramatic cost reductions of core processes like ECOs and transmittals to improving collaboration and boosting overall engineering productivity.

Visit synergissoftware.com for more information, including how other companies benefitted from implementing a practical PLM solution with Synergis Adept.
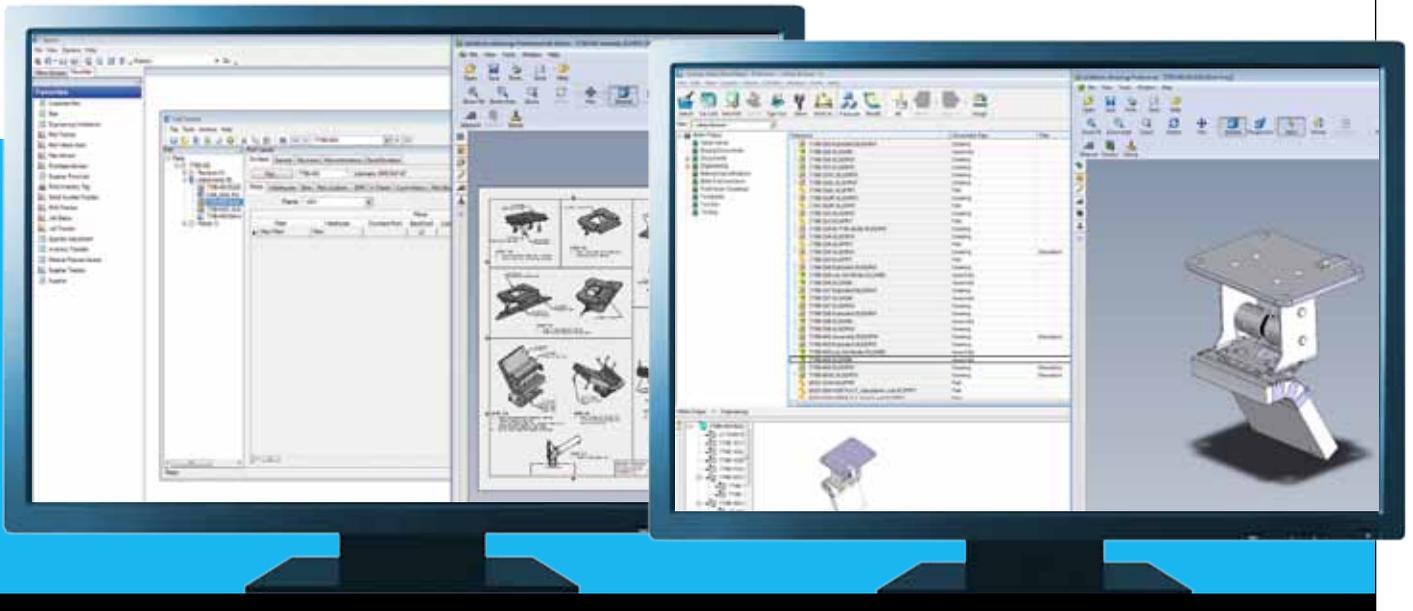
PRACTICAL COLLABORATION

COMPANY: W. L. Gore and Associates, a global technology- and science-based enterprise

PROBLEM: With design teams located in both the United States and United Kingdom, and with manufacturing centers scattered throughout the Far East, W. L. Gore and Associates' global footprint presented some real challenges when it came to communicating design ideas among disparate design teams. Time zone differences made for sluggish customer response time, often taking as much as 72 hours to initiate action. Manufacturing and lead times also got caught up in delays — a result of using slow and error-prone email to exchange engineering- and product-related files.

REQUIREMENT: W. L. Gore and Associates needed an alternative to email as its core collaboration and data-sharing mechanism so users located anywhere in the world could quickly and securely access documents and engineering data. They wanted to respond more quickly to customer requests while also eliminating bottlenecks in the company's product design cycle and manufacturing processes.

RESULT: By standardizing on Adept for collaboration, W. L. Gore and Associates was able to unify its design, manufacturing and customer services processes across its global locations. Replacing email with a single collaboration platform and document repository helped reduce customer response time from greater than 48 hours to 15 minutes, on average. In addition, centralized data access helped facilitate design reuse, which reduced its time-to-market cycle while also aiding in a streamlined ISO compliance process.

PRACTICAL PROCESS AUTOMATION

COMPANY: Taggart Global LLC, an international engineering, construction, and procurement management company

PROBLEM: Taggart was spending $760,000 annually on non-billable, non-design-related manual processes in two primary areas: its drawing register for document tracking and its transmittals for sharing those documents with external partners and customers. Designers were spending three to four hours daily modifying Excel files to manually track their files instead of doing design work. A full-time person was also devoted to the paperwork and manual labor associated with filling out and orchestrating document transmittal packages, which sometimes numbered up to 20 a day.

REQUIREMENT: Taggart local and global offices needed a better way to manage and access project files quickly and easily, while marketing required a system for sharing design changes easily with customers. In addition, revision control and audit trail capabilities were required to prevent expensive mistakes.

SOLUTION: Adept is used to automate processes at every stage of a project lifecycle, from request for proposal, through estimating and design, all the way through construction and maintenance in the field. By leveraging Adept's drawing management, transmittal automation and workflow capabilities, Taggart has seen across-the-board cost savings, including a more accurate estimating process. The company has also been able to sync up design and manufacturing far earlier in the process, which has streamlined ECOs, shortened overall project schedules, and promoted design reuse.

PRACTICAL INTEGRATION WITH ERP

COMPANY: Miller Ingenuity, a railway component solutions company

PROBLEM: Miller Ingenuity experienced widespread disruption to new product design because departments outside of engineering were unable to easily access the right information, while copious amounts of paperwork complicated communications among departments and with customers.

REQUIREMENT: Miller Ingenuity had three core requirements for a product data management solution: It needed a platform that didn't scramble or encrypt their files and folders like previous solutions; it required a flexible transmittal capability for tracking and managing documents sent outside the company; and it wanted to automate information exchange with its Epicor ERP system.

SOLUTION: Miller Ingenuity used Adept's vaulting methodology to provide the security and control needed without encrypting or scrambling the company's folder structure or filenames, and without importing documents into the database itself. Miller Ingenuity's proprietary, mission critical corporate documents are accessible should the company ever need to retrieve them outside of Adept, or should it ever choose to move its information to another repository.

Miller Ingenuity also integrated Adept with its ERP system, allowing design documents and metadata stored in the Adept repository to be easily, reliably cross-referenced with the part number information stored in Epicor ERP. By doing so, the manufacturing and engineering groups could share information without much human intervention or redundant data entry, while Adept ensured that shop floor personnel were working with the latest engineering documents and files.

A ROAD MAP TO PDM SUCCESS

Product data management is the foundation of your practical PLM strategy.

IT TAKES YEARS, SOMETIMES DECADES, before a company finds itself mired in product data management (PDM) chaos, trapped by manual processes and siloed repositories that make it difficult to share data and collaborate effectively with partners and peers.

PDM disorder doesn't happen overnight, but it can be resolved practically, and without a multi-year effort. With Adept, companies can become more organized, efficient, connected and automated in days — not months or years.

Synergis Software offers two approaches to implementation: a QuickStart to help get companies up and running as quickly as possible with minimal investment, and a more comprehensive implementation to maximize ROI. The QuickStart takes between five and seven days, and a comprehensive implementation generally takes eight to 15 days, depending on scope.

TYPICAL IMPLEMENTATION

4 TO 5 DAYS: ADMINISTRATOR TRAINING
Subject matter experts and future Adept administrators learn Adept's capabilities, administration and workflow configuration options, and legacy document import tools. This foundational step ensures stakeholders are educated as they move into Implementation Planning and Design.

1 TO 3 DAYS: IMPLEMENTATION PLANNING AND DESIGN
Synergis experts consult with company representatives to design a project blueprint based on a set of business objectives and associated requirements. The goal of this phase is to maximize results by uniting the client's business knowledge with Synergis' understanding of Adept and best practice implementations. At the end of this session, the overall design of the Adept implementation is in place, from database fields, to workflows, to user and group permissions and more.

1 TO 3 DAYS: SYSTEM AND WORKFLOW CONFIGURATION
During this phase, the Adept software is installed and the database is properly configured. Vaults are set up and replicated to global sites. Links to attributes and properties are established. User permissions, workflows and transmittal automation are configured, along with other implementation details.

1 TO 2 DAYS: BATCH DOCUMENT IMPORT
Most organizations have tens or hundreds of thousands of documents that need to be managed. Adept scans all of the client's relevant folders and creates a one-to-one relationship between each file on the server and a corresponding Adept database record. In just a matter of minutes, the client's legacy files are being managed by Adept.

During this process, Adept extracts metadata (attributes, properties and tags) from AutoCAD, SolidWorks, Autodesk Inventor, MicroStation and Microsoft Office files to populate the Adept database. This bidirectional attribute/property link ensures the database has relevant, accurate information for searching and reporting, and eliminates manual data entry. Adept also understands and displays complex CAD file relationships, and ensures they remain intact throughout their lifecycle.

1 TO 2 DAYS: USER TRAINING
Now that the system is configured and documents have been imported, the next step is user training. Synergis can train all users of the system in just a few days, and offers a "train the trainer" option as well.

QUICKSTART IMPLEMENTATION
In the QuickStart Implementation, the above steps are consolidated to get as much done in five to seven days as possible, including going live on the final day. During a QuickStart, clients may not have all of their data imported or all of their workflows configured. However, the client's staff will be given the training needed to carry out the implementation.