A Special Report By: Randall S. Newton, Consilia Vektor

Reducing Costs

with Engineering Document Management Software

Twenty percent of the typical work day is a significant chunk of time; 96 minutes if you use an eight-hour day as the standard. According to research, (1) 20% is the amount of time employees at the typical engineering department or company look for the right version of drawings or other documents. Those 96 minutes are like mice in the pantry, eating away at the bottom line. They keep highly paid employees away from important work.

20%
of the work day is wasted looking for files

The "typical" engineering company is one that does not use Engineering Document Management (EDM) software. A generation into the personal computer era, and a majority of engineering companies still think the outdated, simplistic, and completely inefficient system of using operating system directories (AKA file folders) for data management is good enough for the modern business. Call it document management on the honor system. But at every step of the product/project lifecycle, document management on the honor system is a failure. It fails to provide automated guidance for critical workflow; it fails to guarantee immediate access to the correct version of a drawing; it fails to track and protect business processes, and it fails to generate an audit trail. And this is just the tip of the iceberg of failure.

Revision control is a major challenge, with expensive consequences if not well managed. Consider the case of the manufacturing company that built a $250,000 prototype from the wrong version of drawings, and had to start all over again. Construction companies estimate they are spending hundreds of thousands of dollars on incidents where the wrong designs are delivered. Add to that more six-digit dollar losses annually on creating, assembling and sending transmittals, finding and retrieving documents, and collaborating among disparate departments and disciplines. The cash is flying out the door.

If you are serious about high quality deliverables and efficient processes, but still live in the 1980s when it comes to how engineering documents are stored and retrieved, this is your wake-up call. EDM software like Synergis Adept can make a profound and immediate positive impact on your bottom line. It reduces costs, improves both internal and external communications, and creates new efficiencies in your operations. It is time to make EDM mission critical in your organization.

What is EDM? How does it compare to PDM or PLM?

In recent years data scientists who study engineering have come to see EDM as a distinct notion, similar but not identical to Product Lifecycle Management (PLM) or Product Data Management (PDM).

The PDM system provides deep knowledge about CAD models. PDM is department-based and CAD-oriented; it manages 2D/3D models and sometimes related documents. Most offer check-in/check-out control and rudimentary capabilities for text retrieval. Some offer more advanced workflow, BOM management, and collaboration. But ultimately, PDM revolves around the CAD product data.

The PLM system manages broad knowledge about product definition and lifecycle. PLM is a cross-organization relational database for managing products and processes. PLM is designed to be the central hub for all information relating to all aspects of product creation and use, managing all processes required to design, make, and support products.

EDM looks at the same issues, from a different angle. It starts from the more easily understood notion of the document, allowing it to be more accessible to others in the organization beyond the engineering department. As Dr. Mario Hirz writes (2), engineering data management not only links technical data and processes, it makes the information "suitable for the real business world." It does this by allowing people to interface with data in a more familiar fashion, based on documents instead of databases or models.

The three domains overlap when it comes to the documents generated by engineering (CAD drawings and models, simulations, visualizations, etc.). But generally speaking PDM and PLM manage these documents for the benefit of engineering; EDM manages them for the benefit of the entire organization. If you want to reduce costs for the entire organization, you need a solution that works for every department, not just the engineers.

Reduce the cost of data management

Hirz says EDM makes data suitable for the real world. The first essential aspect of EDM—and why you need it—is its ability to reduce the cost of creating and using engineering data.

Consider this scenario. Engineer Ron creates a CAD model and accompanying drawings for a new small machine. It has eight functional internal parts and a two-piece housing. Five of the functional parts are also used in other small machines in the company; two will be sourced from a trusted partner, and one will be manufactured in-house as a new item. Engineer Pam, in an office two time zones away, will design the new part. Manufacture of the two-piece housing will be outsourced overseas, but designed in-house by Designer Yao.

Sounds straightforward, but what happens when one of the externally sourced parts is updated by the vendor? Or the housing manufacturer can't deliver the quality you need? Or Engineer Ron decides to store all the versions of his CAD work in different folders on his personal workstation, and then is suddenly in the hospital for two weeks? Each of these problems creates not only management headaches, they create data

management headaches. Not just for the engineering team, but for the departments that make sure the ideas turn into dollars.

The solution to all these issues of data change and distance is to centralize engineering data. Then the information is no longer owned by the person who created it, but by the team. This is the crucial point: Engineering data and all the information associated with it must be treated at all times like the corporate asset it truly is. There should never be a situation where crucial information is missing or inaccessible because of a single team member or sloppy record-keeping. A full-featured EDM like Synergis Adept® can organize both the structured data (CAD data, text-based forms) and the unstructured data (a note attached to an email) for full accessibility within the organization. Accessible data means it is immediately available; those 96 minutes lost every day to hunting for information are suddenly regained.

Centralization of data is just one of several ways a good EDM reduces the cost of directly handling engineering information. Consider these other common data management issues:

Vault replication

Companies with multiple locations can have their stored engineering data (the "vault") accessible from any location, even while still being stored on premise where it was created. Local access to data means fast access. And no one has to ask for a file to be sent as an email, turning one document into two. IT can better manage resources in each office to reflect the new realities of automated data sharing and vault replication across the organization. The best EDM systems, like Adept, replicate only the binary changes to the remote sites, reducing impact on bandwidth and latency.

Multi-CAD file management

The reality today is that few engineering companies use only one CAD program. A good EDM system knows how to work with multiple CAD formats; manage complex file relationships; make information available downstream; and enable visualization and markup. The less time engineers have to spend translating CAD files or creating visualizations the more time they have for the true work of engineering.

Search

There was a day when CAD files were unsearchable; today too many companies run their business as if that were still true. What a waste of time! EDM software automatically creates and updates a search database that includes every bit of text inside CAD files. From an easy-to-use interface, employees can use simple or complex queries to find the right information. Not just data inside the document, but also criteria like "most recent version" or "Approved for Release." Time is money, and better search means less time spent away from engineering.

Automated versioning

Engineering documentation goes through multiple revisions. Manual methods of document version control are usually the product of years of ad hoc decision. Such systems are a productivity trap, prone to mistakes that can prove to be expensive to solve. If an incorrect version makes it to a client, a contractor, or the manufacturing floor, the cost of the mistake can be costly in time, money and reputation. Automated versioning makes sure everyone can access the latest version, and also keeps track of prior versions.

Reduce the cost of internal communications

The word "computer" comes from its origin as an automated, glorified calculator. But today much of what we use computers for is not computation but communication. EDM software trims away much of the expense associated with both internal and external communications. Inefficient communication is expensive communication. The time saved in improving communications goes above and beyond those 96 minutes a day spent searching for files.

Specific cost-saving benefits for internal communications include:

Better workflow management

Workflow can be summarized as "I did this, now you do that." It is a communications process. Some of these processes are industry standards; others are unique to one organization. Synergis Adept provides the standard workflows, and allows the creation of custom workflows. The automation of these processes saves time but also provides greater insight and control over the process.

Audit trails

Whether for regulatory approval, an industry certification, a corporate acquisition, or a lawsuit, audits are a necessary evil. When all communications processes are brought inside the EDM, gathering the information for an audit can happen quickly. The time savings and the validity of the information can reduce exposure to (expensive) risk.

Revision control

Only in a dream world could there be product development without Engineering Change Orders (ECOs) and Engineering Change Notifications (ECNs). Manual processes make it difficult to streamline workflows, difficult to enforce policies and procedures, and hinder visibility into project status. These inefficiencies are expensive in terms of cost resources and timelines. Adept provides several ways to issue, manage, and close ECOs and ECNs. There are automated notifications, time-based alerts, and rich status monitoring capabilities. Calculate the employee hours you spend running ECOs and ECNs manually, and see what it would mean to your company to automate the processes.

## Improved access to engineering data

Remember what Dr. Hirz said about making engineering data "suitable for the real business world"? That doesn't happen by accident. Centralized document management means there is immediate access to the "one version of the truth," AKA the latest approved version. Right information means right decisions, saving the embarrassing expense of mistakes made by using a wrong version. There is also cost savings by eliminating manual document handling, ending email proliferation, and automating who has access to what information.

Compliance management

The faster you can prove compliance with regulations or customer specifications, the faster your product goes to market. Automated compliance management isn't just a nice thing to have; anything that decreases time to market increases profitability. Adept can provide a complete record of every single action. You gain a fool-proof method to prove the activity of the company and verify compliance with standards, certifications, and legal requirements.

Reduce the cost of external communications
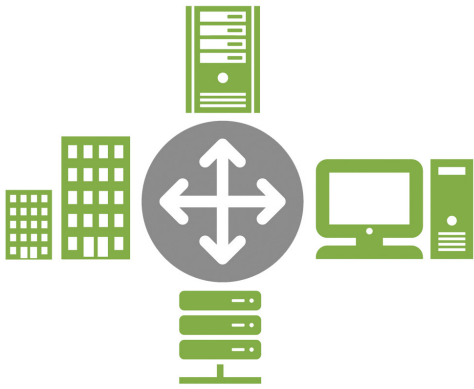
The demands of external communications overlap with internals in such areas as compliance management and audits. But there are also issues specific to external communications that can drive costs through the roof when not managed well.

Transmittals

Every project has stages where all the data must be gathered as one neat package, the transmittal, and sent to the client, a contract partner, the shop floor, or to purchasing to name a few. In organizations without automated data management, this can take days. But in Adept, the process is as close to "push a button" as it can get. The chances of errors are greatly reduced; any search for documents is an automated process; and there is a relationship established between the transmittal cover sheet and the documents being sent. And the whole process has an audit trail. If the client can take the transmittal as a set of PDFs, even more time and money are saved.

External collaboration

One of the largest users of Synergis Adept is The DOW Chemical Company. A champion of Six Sigma operational efficiency, it prides itself on streamlined, efficient engineering and business processes. When the Six Sigma professionals looked at engineering data management and the ability of engineers to collaborate with teams all over the globe, they found a mess. After years of acquisitions, there were at least 23 document management systems in use. After careful evaluation of alternatives, DOW standardized on Synergis Adept. The result was more than expected. DOW says the use of Adept increased the speed of projects, and it changed the way it does business because of increased flexibility in unusual document management situations. Originally deployed for the division that managed plant construction and operations globally, DOW continues to expand the use of Adept throughout the organization, uniting facilities around the globe.

Reduce the cost of Disaster

Saving money through computer automation is not a new idea, but it is astounding how many engineering companies of all sizes have not seriously considered automating their engineering data management.

According to research firm Business Advantage, less than 30% of all CAD-using firms are also using some kind of engineering-specific data management application. Engineering data is a company's mission critical asset. In this paper we have emphasized how EDM can save money. But there is one more important consideration, one that can't be measured in dollars and cents until disaster happens.

Among EDM products, Synergis Adept is unique in the way it vaults your mission critical documents. It provides security and control by wrapping around the existing folder structure without encrypting or scrambling your intelligent filenames and folder structure. And it does not move your documents into a proprietary database. Data is both secure and accessible.

If the data management server becomes inaccessible for any reason, an Adept administrator can easily share relevant folders to users to keep them productive. And because the folder structure and file names are retained, any links to other applications will work as they always have.

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Final thoughts

Synergis Adept is a mission critical solution. It is a gateway to engineering corporate documents that has been fine-tuned over many years; it is mature and stable. Relying on nothing more sophisticated than the file management options of the operating system, or a product that just manages check-in and check-out of engineering drawings, is a disaster waiting to happen. One unexpected audit or one bad transmittal could more than pay for the cost of Adept.

Some Adept customers have been using the product since the 1990s, and continue to rave about reliability and the value it provides. Don't be the person who buys theft coverage on their homeowners insurance after they've been robbed. There is too much to gain and a lot worth losing (productivity stealers, manual practices, and outdated methods). It is time to reduce costs and gain new levels of productivity by going with Adept.

96 minutes
a day for every employee wasted looking for information ... do the math.

Footnotes:
[(1) Jim Brown, president, Tech-Clarity: http://tech-clarity.com/reduce-nva-work/4133
(2) Hirz, Mario, et al. "Engineering Data Management." Integrated Computer-Aided Design in Automotive Development. Springer Berlin Heidelberg, 2013. 331-332.

About the Author

Randall S. Newton is managing director of Consilia Vektor, a boutique research firm specializing in technology for engineering. He is also a contributing editor to Desktop Engineering, Cadalyst, and AEC Magazine, and a senior editor at Jon Peddie Research.

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