CONNtext

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IBM Enterprise Content Management

Minding the Engineering and Maintenance Information Gap

Phillip Crosby, business man and author who greatly contributed to management theory and quality management practices, asserted, "If anything is certain, it is that change is certain. The world we are planning for today will not exist in this form tomorrow." Truer words were never spoken.

Change is pervasive throughout a company's asset base whether the catalyst is designing, constructing, maintaining, improving, upgrading, reconfiguring, renovating, modifying or decommissioning of equipment and facilities or adhering to new or revised regulations.

Anyone who has ever worked in a complex physical asset environment is aware of the challenges of translating an engineering change package into actual changes to the physical assets and supporting infrastructure. However, most probably have not taken the time to consider the extent, impact and associated risks that can result from such gaps within their own organization.

In this paper, we are going to look at the challenge from the perspective of the divergent needs of design engineering and maintenance, where and why information gaps often surface, and how to bridge these two critical work communities during the change process.

Different Lenses and Languages

When engineers are assigned responsibility for a design, they are envisioning a future or even abstract state. Typically they think of a change in terms of a system or at a functional level.

They need to know the design requirements for the facility, such as applicable rules and regulations or industry codes or standards. Next they have to consider requirements such as licensing basis analyses, specifications and calculations.

Depending upon their role and the size and nature of the change, the engineer might not even be aware of all the equipment and components that were actually purchased and installed based on their design specification.

On the other hand, the maintenance staff views the facility as it exists today, at the discrete component level and beyond. Daily considerations can include the following:

- If a device is broken, when can it be fixed and returned to service?
- Does equipment or the plant have to be offline to work on it?
- Are replacement parts available to restore the equipment?
- Is special equipment or training required?
- What are the preventive maintenance requirements?
- Is the vendor and background information readily available?

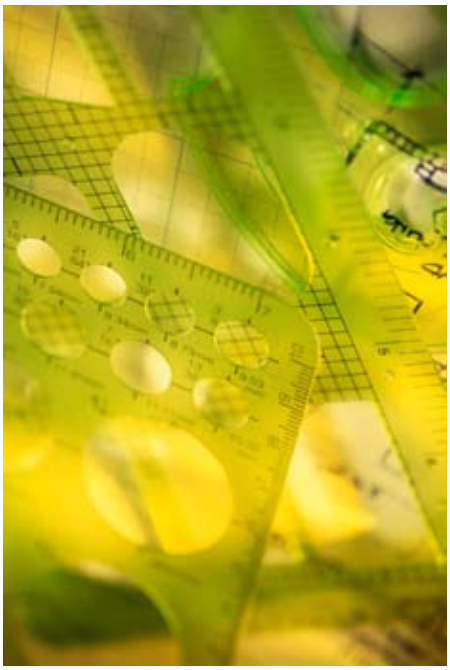
In their world, every minute detail about a device is important and must be accounted for in order to properly perform maintenance. For instance, if a new valve needs to be installed, consideration must be given as to whether a washer is also required and if so what type, as well as the kind of sealant needed. After this baseline maintenance procedure is established, any change requires revisiting and updating the full information set.

For the maintenance staff, a change goes beyond the component itself. It is all about the snowball effect or relationships that are also being impacted by what might be perceived in engineering as an isolated, simple part change.

Engineering conceives the change and is responsible for sending the requirements and instructions for implementing the change in the form of output documents such as installation drawings, specifications and procedures. With a different view of the facility that is function- and design-driven, engineering is likely not providing the change information with the level of detail that enables the maintenance staff to readily implement on a component level.

The timeframe from when an engineering change package is completed to when maintenance begins to implement maintenance activities might, in fact, be years later—further exacerbating difficulties in the exchange of information.

Outsourced engineering further complicates this handoff because the assigned engineers who have the in-depth knowledge of the change from the onset are often reassigned to other clients either before the change is implemented or at some point during the project, which further widens the gap between the two worlds.



Both the physical assets and information assets are constantly in change, each having their distinct lifecycles phases. These information stores are managed in different systems, managed by different sets of people with different lenses, and changed at different times.

Different Tools

Another contributor to the gap that occurs during the change management processes is that both work communities use different software systems as tools of the trade.

Engineering typically works within an enterprise content management (ECM) system that captures and stores such documents as design drawings, specifications, calculations, analyses, load studies and other controlled documents. A distinct advantage of using an ECM system is that control can be exercised over the information in terms of ensuring the most current version is being viewed and that only those with proper clearance can access any given document. The search and retrieval function is based on an information classification system derived by the engineering community in terms of how they think and work.

For the purposes of illustrating the magnitude of information that engineering might be dealing with in our example organization of 4 million documents, one fourth or 1 million documents might relate to engineering. Of those 1 million, one fifth or 200,000 documents might relate to designs that impact maintenance activities.

When you are trained and familiar with the ECM system, you can locate specific engineering drawings as needed. What you might not always know is “all” the relationships that exist and are required in order to enact a given change. This knowledge is reliant to some extent on the engineer’s individual knowledge of how things operate on the component level within the plant: the minutiae of the maintenance world.

The maintenance community on the other hand typically uses a physical asset management system that is more focused on work order management. The strength of this type of system is the ability to handle ad hoc processes that span multiple departments. This kind of system assists in long- and short-term planning, preventive, reactive, and condition-based maintenance, schedule management, resource optimization and key performance monitoring. It also measures and manages the availability and use of all strategic physical assets.

Activities conducted by maintenance often require access to a wide assortment of information sources beyond the drawings and facility configuration documents managed by engineering, including maintenance procedures, material safety data sheets and previous work orders. These activities also often involve referencing external documentation as well such as vendor technical manuals, equipment records, videos, pictures and catalog cut sheets.

Within the physical asset management system, maintenance information has been classified by terminology that resonates within their daily operational world.

Assessing the Gap Risk within Your Organization

How big is the gap in your organization? What is the efficiency impact and overall operational risk? With a little leg work, you can get a picture pretty quickly on whether you have an opportunity, a danger or both as a result of your own organization's unique gap between the engineering and maintenance communities.

Key points of inquiry include the following:

1. What type of control exists over maintaining document relationships?
2. Are document relationships mostly reliant on knowledge workers and their experience?
3. Does engineering have a view into other changes and maintenance projects impacting the document that they are currently working on?
4. How does maintenance ensure that they are working with the latest version of documentation?
5. What type of search and retrieval capabilities does maintenance have over their plant asset management system today?
6. How many document and equipment lists are you maintaining?

Bridging the Engineering and Maintenance Worlds

So, as we explored, different views of the plant and work languages along with use of different systems create a gap between engineering and maintenance that can turn into significant risks during the change process. How big of risk depends on the complexity of operations and the impact of making a mistake to those inside the facility as well as to those outside parties that rely on the safety and efficiency of facility operations in some manner.

While having each community cross-train on the two different systems sounds like a solution, the document classification hierarchy based on each work community's work world prevents that solution from being the easy fix. In addition, simply learning "an additional" system is not that simple, and statistics are against that becoming a reality in most organizations that are already highly automated.

We are now left with how to integrate information technology with operational know-how so that ongoing changes to the facility operations achieve these goals:

- Changes are more effective, efficient and safe.
- Changes are captured in a manner that allows them to be shared at the level of detail needed by all impacted parties.
- Change history is documented to the degree required by regulators.

If your engineering department is still using a manual process or a silo system that does not manage information enterprise-wide, adopting an ECM system is likely to be your first step in closing the divide.

If you already have an ECM system, then the next step is to assess how it communicates with your physical asset system. Your organization might have created some manner of customized interface that offers a measure of relief, but when you look a little closer, these home grown fixes often fall short when evaluated in terms of being able to find documents and adequately determine their relationships.

Often these custom interfaces can be characterized as “clunky,” requiring a lot of IT support and making routine changes difficult. Once more, because they are hard-wired, they require custom coding every time one or both of your systems are involved in an upgrade, which translates into lost time and lost dollars.

To those organizations using IBM Maximo Asset Management as their system, Armedia offers a more streamlined and flexible means of closing the gap with their CONNtext solution, which connects IBM Maximo with IBM FileNet Content Management.

Because the CONNtext interface includes a defined and controlled lookup list that bridges the two work worlds, an automatic translation between engineering and maintenance language emerges.

To facilitate this initial translation effort between systems, CONNtext employs a classification filtering scheme that identifies the organizational documents pertinent to maintenance. In our earlier example, we identified 200,000 documents that were germane to maintenance in that organization. The CONNtext solution is designed to help an organization further group those documents by maintenance terms to create views that enable automating the engineering to maintenance logic into a manageable process.

As a result, the Armedia CONNtext solution bridges the two worlds.

Maintenance users can now accomplish these tasks:

- Access engineering drawings and documents within IBM Maximo without having to learn a new system.
- Receive prompts to ensure that they are working with the most current version of the documents.
- Have searchable access to unstructured documents within IBM Maximo such as video, pictures, and documentation created in Microsoft Office.
- Avoid downtime as a result of web services eliminating code changes to the interface when IBM Maximo upgrades are undertaken.
- Provide regulators with a complete work history of changes on the configuration of assets and their components.

Engineering users can now accomplish these tasks:

- Identify loopholes in previously captured document relationships.
- Be automatically prompted for required relationships when creating new documentation.
- Gain visibility into other changes and projects in process that are affecting the document that they are currently planning to change.
- Avoid downtime as a result of web services eliminating code changes to the interface when IBM FileNet Content Manager upgrades are undertaken.
- Eliminate the need to separately visit records management to access documentation.

To learn more how your organization can mind the information gap in order to improve productivity, enhance safety and reduce regulatory non-compliance and fines, contact:

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About Armedia

Armedia is an established ECM systems integrator and IT solutions company, with more than $10M in revenue and 55 employees. Armedia is a veteran owned company with the following accreditations: 8(a)/SDB-certified, GSA Schedule IT70 holder and CMMI Level 3-certified. Our offices are located in Atlanta, GA; Vienna, VA; and Huntsville, AL.

For more information visit:
www.armedia.com

About IBM ECM

IBM's Enterprise Content Management software enables the world's top companies to make better decisions, faster. As a market leader in content, process and compliance software, IBM ECM delivers a broad set of mission-critical solutions that help solve today's most difficult business challenges: managing unstructured content, optimising business processes and helping satisfy complex compliance requirements through an integrated information infrastructure. More than 13,000 global companies, organisations and governments rely on IBM ECM to improve performance and remain competitive through innovation.

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