Emerging Technology Trends:
Large Capital Asset Build (LCAB) Projects

This document is one of a series aimed at analysing the potential impact that current trends and technological advances could have on various industries and functions. This White Paper is focused predominantly on the Mining and Construction industry where large capital assets are built and then operated.

About Us

At Cadmus we have information management as our primary skill set. Our consultants are all highly experienced Information Management (IM) / Records Management (RM) and Information Governance (IG) practitioners. As such we approach solution development not from a technology or infrastructure perspective, but from a pragmatic business perspective that understands the value that well-structured, usable information can have within an organisation. Our small but highly skilled team can be the trusted advisor for all things information management.

A key differentiator with Cadmus is that we understand the dilemma faced by many organisations balancing compliance and governance concerns with usability and user productivity.

We Get It!

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Introduction

In recent years, the marshalling and management of the documentation related to a Large Capital Asset Build (LCAB) project has become nearly as daunting as the asset build itself. Invariably projects transition into operations whilst still engaging in further expansion work, so the ability to cater for multiple consumers and contributors for the same content becomes crucial. Automation, aggregation and digitalisation are now becoming mandatory.

In this article we explore a small handful of specific issues or inefficiencies that are prevalent in the sector (there are many more), and review how a number of emerging technologies and trends may finally be able to relieve or mitigate them *(with a little help from a trusted subject matter expert partner of course!).*

Specific Implications

Transmittals

The transmittals process has been used as a way to formally track delivery and acceptance of key contractual deliverables. The process generally requires the generation of a cover sheet (a document!) for submitted deliverables. This invariably then needs to be recorded in a central register (another document!) replicating the information included within the cover sheet and the attached content. When it is received, it needs to be recorded (in a document!) and an acknowledgement is sent to the transmitter (yet another document!). Eventually the deliverable is copied into the local repository or system and distributed for review and approval by the receiving organisation. (who knows what happens then or how many other copies and related documents get generated). At some point the process is iterrated until the deliverable is accepted (I wonder what happens to the paper trail and superfluous versions?).

In fairness, in recent years a number of technology solutions such as Aconex and McLaren Enterprise Engineer have done away with this cumbersome transmittal process and provided an interface where the transmitter can load the content directly to the client. This has, however, introduced a number of its own problems, not least of which are administration and security management. Furthermore, they have not removed the need for formal handover to occur (i.e. uploading to the site).

The problem is further compounded when parts of the business abandon the corporate systems that they see as not "fit for purpose" in favour of more flexible and agile consumer-style solutions such as DropBox and Microsoft's OneDrive. However, with this flexibility and informality comes a lack of consistency, transparency and control that eventually leads to an increase in risk and ultimately decreased efficiency and almost certainly a lack of compliance.

Document Naming

Historically, the need to find, aggregate and appropriately use documents and drawings (especially those created by third parties) has necesitiated the use of complex naming and numbering conventions which aim to effectively codify content by concatenanting multiple properties into a title or reference number (or both), e.g. <Asset Name> <Location> <Discipline> <Sequential Number> <Sheet no> <Revision>. Invariably, some kind of coding is used (supposedly to simplify naming); however, without the *key* to the code (generally tacit knowledge), the naming convention becomes unusable, e.g. ***Gulf -Mex-HV-001-RevG1.***

Once again, the emergence and penetration of standards such as BIM (Building Information Modelling) go some way to providing a level of consistency throughout the value chain. However, if not enforced contractually and applied religiously the value is diminished.

Transition to Operations & Maintenance

Moving from a project-based view of content to an asset-based one is usually not factored into a project cost. "Dump and run" is a common term used by operations staff after an asset build is complete and documentation is "handed over". Adding the appropriate context to the content is usually a thankless task that requires "eyes on" work for competent technical resources.

The majority of existing solutions are set up to support the project environment and therefore provide some level of process automation. Some may even have a provision to "attach" limited asset-based information to content. However, they invariably do not accommodate the richer requirements of operations, such as content that has multiple contexts (i.e. same asset is located in several locations, or content that relates to multiple disciplines or assets).

Emerging Technologies and Trends

Artificial Intelligence-Based Classification (Intelligent Metadata)

AI-based classification is a capability that is able to ascertain the most likely classification for a piece of content based on combinations of natural language processing, pattern matching and fuzzy logic. It can be employed to significantly reduce the likelihood of human error during the content creation stages. Much of the required context is already present in the content of the document and explicitly in drawings, e.g. title blocks and instrumentation codes. The use upfront of templates and proformas can further enhance the likelihood of consistency across the value chain. Even if the technology proves less accurate than its human counterparts, it is at least consistently inaccurate - a state that can be remediated. By adjusting the business rules/patterns

employed by AI classification, tweaking and refining the taxonomies and controlled vocabularies against which content is matched gradually over time, the "machine" learns and the classification becomes more and more accurate and appropriate. Improvements in processing power are starting to mean that this capability is able to take place in real-time at point of creation if needed. In the case where content has already been created, a corpus of existing content consisting of many millions of objects can be iteratively classified and re-classified with the support of a small number of local subject matter experts.

The need for dedicated document naming is far less important. Indeed, the effort and resources involved in supporting and maintaining naming conventions can now be redeployed to assist the machine learning process. More accurate classification means more accurate assignment of roles and controls to the content, in turn supporting the review and approval processes. When metadata is consistent and can be relied upon, it can be used much more successfully in process automation (workflows, etc.).

Repository Neutrality and Connectivity Frameworks

With the trend away from cumbersome "Enterprise Content Management" solutions to much more agile Content Services and Content Applications, the whole concept of custody can be turned on its head. As an example the **M-Files®** platform has a whole suite of connectors that could allow custodial control over content regardless of where it resides, including the less formal environments mentioned earlier, without impacting on their effectiveness. This could be extended further still directly into the network drive or repositories of all contributors. Imagine the process and cost efficiencies that could be realised if an appropriately authorised contributor simply changes a property on a document or drawing (from say **Draft** to **For Review**). This single change could trigger a series of notifications, squad checks and/or reviews by any of the collaborating stakeholders without the content ever moving. Every action or activity is fully audited and can be reported on for compliance purposes. Clearly, a reasonable amount of effort would need to go into establishing and maintaining the appropriate "trusts" across the system (human as well as technological), but once established the benefits to all concerned could be significant.

Key Considerations & Takeaways

Overall, it is clear that the new generation of LCAB projects and operations needs to move away from legacy ECM solutions towards agile Content Services and Content Applications, either Cloud or hybrid based.

Obviously, any move towards multi-repository environments (some or all of which may be Cloud based) will require a number of key considerations to be understood and managed:

- **Information security**
  - Multi repository identity management solutions which also cater for external or federated users may need to be investigated.
- **Ownership vs Custody**
  - Typically, in the Engineering Procurement and Construction (EPC) contractual environment this is usually well defined, but as collaborative environments emerge this delivery method will need to be carefully managed contractually.
- **Master Data**
  - Whilst it should be relatively easy to manage in a traditional single repository, our experience shows it has not been well managed. Therefore, it will be essential that a project-wide ontology, including all of the required vocabularies, terms, validation lists and conventions, is established as soon as possible and maintained throughout the project.

We do not see the new trends as silver bullets, but they will greatly assist the back office functions to manage the sheer weight of information that will be generated during an LCAB project and will mean that operations will no longer be held in a state of limbo once the asset is built while someone tries to make sense of all the data.

Contact us on info@cadmusconsulting.com.au if you would like to see how M-Files can help you manage your LCAB documentation more easily.