



Managing Capital Asset Information – Lessons Learned

WHITEPAPER

Examining critical decision-making factors for selecting an
asset information management solution.

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Introduction

Every capital asset follows a standardized lifecycle encompassing design, construction, handover, operations, and maintenance. In the CAPEX world, few levers remain for addressing increasingly stringent cost, schedule, quality, and safety requirements. While innovations such as modularization and AWP offer much promise, effective management of asset information is often overlooked as an avenue for addressing these challenges.

A critical aspect of effective asset information management is the selection and configuration of a solution that:

- Enables curation and seamless transition of an asset's information from design through decommissioning
- Is selected based on rigorously defined requirements and expert user input
- Is future-proofed by avoiding customization
- Anticipates handover and O&M requirements
- Represents the “single source of truth” for asset-related documentation
- Balances information security and operational efficiency
- Protects confidential information while supporting its appropriate dissemination

Like many other business challenges, the traditional People / Process / Technology triangle applies to managing information about capital assets. Selecting a fit for purpose solution addresses technological needs, but user adoption and effective document management processes are equally critical for establishing a true information asset.

This whitepaper provides context about asset information as it is differentiated from business content, its overlapping, yet unique uses for CAPEX and OPEX, and its gradual evolution from a document-centric to an asset-centric resource. This is followed by an examination of several critical decision-making factors for selecting an asset information management solution, introduces several additional considerations focused on people and process, and concludes with some tactical insights from Access Sciences' subject matter experts at client accounts.

Context

Business Content vs. Asset Information

Business content and information about assets have different purposes and objectives.

Business content, typically managed using an Enterprise Content Management (ECM) system, focuses on collaboration, findability, and compliance, and has general applicability across most front and back-office functions.

On the other hand, asset information supports an asset’s lifecycle by focusing on highly defined and formalized processes for rapidly and accurately sharing information with suppliers (EPCs, etc.), internal review and approval of received information, version management and accuracy, and support for operational functions such as MOC. Options for management of asset information are discussed in the topic labeled *Asset-Centric vs. Document-Centric Information Management* below.

While there can be overlap between these domains, we have found that attempting to use a common software platform to manage both business content and asset information can lead to unacceptable compromises.

Capital Projects vs. Operations and Maintenance

As an asset is designed, constructed, and operated, uses for the information that describes it morph. Figure 1 illustrates how asset-related information transitions from CAPEX through handover / commissioning to OPEX.

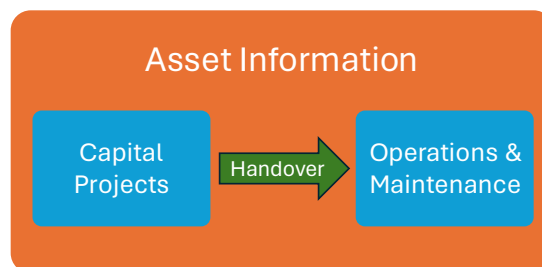


Figure 1 - CAPEX Transition To OPEX

In a CAPEX environment, working within schedule, cost, quality, and safety constraints is paramount, but at the end of a project as an asset transitions to OPEX, the primary uses for asset-related information change as well. For example, while safety and quality continue to be important, asset risk mitigation and operational efficiency replace schedule and cost constraints. Figure 2 describes and contrasts some of these uses.

Capital Projects	Operations & Maintenance
High Volume of Design Documents	Maintenance Documents and SOPs
High Transactional Speed	Accuracy and Version Control
Review and Approval Workflows	Long-term Record Keeping
Compliance Workflows	Accessibility & Training
AWP Support	Regulatory Compliance

Stakeholder Synchronization	MOC Support
IP Management	Digital Deliverable Sustainment
Digital Deliverable Governance	Systems Integration (e.g., CMMS)
Handover Readiness	Analytics-driven Optimization

Figure 2 - Asset Information Uses by Lifecycle Phase

Asset-centric vs. Document-centric Information Management

Traditional asset information management systems have been “content centric”. That means the system focuses on documents and drawings rather than the actual asset associated with them. This practice probably stems from the pre-computer era where discrete paper documents were the only practical way to represent and exchange information, and where there was no realistic way to represent an asset as a coherent thing. File number conventions that attempt to associate a document with an asset are, at best, clunky, error-prone, and don’t lend themselves to automation. Even in the modern era, this practice persists, probably due to inertia and familiarity with interacting with individual documents and drawings.

Beyond the challenge of managing thousands, potentially hundreds of thousands, of asset-related documents and drawings over an asset’s lifespan, transitioning these to O&M during handover has traditionally been a significant pain point. Industry efforts such as CHIFOS are helping to address the tactical information handover challenge, but many organizations are also starting to consider a more strategic approach – defining and focusing on an asset during design and construction, then “seamlessly” transitioning the asset through commissioning to O&M while retaining its key information and supporting documentation. In this model, documents that support the asset are associated with it as illustrated in Figure 3. Documents and drawings can be added to (or even removed from) the asset as its lifecycle progresses, but users are presented with a consistent set of information about the asset at any point in time.

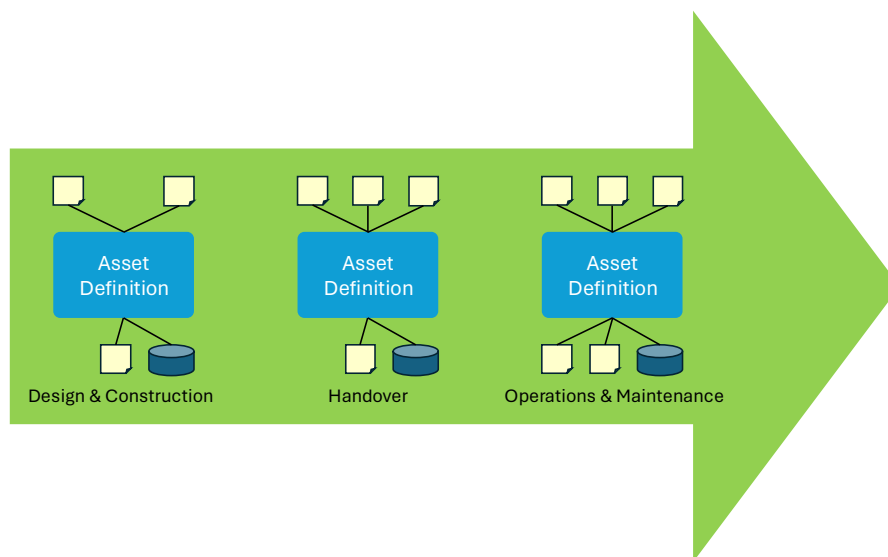


Figure 3 – Asset Lifecycle Information Transition

One prerequisite for this approach to work is that it requires a common asset information management platform that can support a user's needs at each phase of the asset's lifecycle.

Solution Options

Before selecting platform, it is helpful to understand the landscape of content and asset information management solutions. While there are many products on the market and just as many ways to classify them, they can be sorted into three general categories:

- **SharePoint**
Due to its ubiquitous nature, Microsoft SharePoint belongs in a category by itself. For better or worse, SharePoint dominates the business-oriented enterprise content management space and its inclusion in Microsoft's licensing bundles makes it difficult to ignore. Unfortunately, despite many attempts to use it as an asset information management solution, it can't meet many of the most common requirements such as document control, CMMS integration, digital model management, etc.
- **Enterprise Content Management (ECM) Systems**
Traditional ECM platforms were first implemented to support front and back-office operations, but SharePoint's maturation, its availability at little incremental cost, and the emergence of AI tools that support the Office platform are making these alternatives increasingly difficult to justify. To support asset information requirements, these platforms often have bolt-on functionality for engineering document control, revision management, drawing management, etc., but lack the ability to manage asset information as described in the preceding section.
- **Engineering Information Management (EIM) Systems**
Over the past 15-20 years, platforms that specialize in asset / engineering information management have come to market. Many of these are document-centric, but a handful of asset-centric solutions have recently emerged, especially those associated with engineering design product suites.

Decision Making Factors

Regardless of whether your organization opts for a document-centric or asset-centric approach, selecting the optimal solution for managing your asset's information is critical. This section examines several critical factors for selecting a solution that best fits your asset's needs.

Prioritized Requirements-Driven Procurement

When selecting software solutions (and this applies to any software procurement, not just asset / engineering information management), prioritized business and technical requirements should **always** drive the decision process. Over the past four decades, we've seen organizations base software selection on an individual's prior product experience and / or subjective marketing influences, typically with substandard results.

The only non-subjective process that we've found is to rigorously define business and supporting technical requirements, prioritize these according to the organization's operating environment and objectives, and then evaluate candidate platforms in an apples-to-apples comparison. Missed or ignored requirements frequently pop up later causing issues long past the point of no return.

Best practice requirements development is a three-step process that ensures business needs drive solution selection. First, functional requirements are identified that address specific business and operational needs. One or more technical requirements are then defined that address each functional requirement. When this methodology is followed, no technical requirement is identified that does not directly support a functional need. Recognizing that each organization is somewhat unique, the final step is to prioritize the functional requirements to meet the organization's specific needs and constraints.

Configuration vs. Customization

Many organizations have found the need to customize solutions to conform to their specific process requirements, especially when designing and deploying workflows. While this practice can provide short term benefit to the organization, it can (depending on the specific software product) make future version upgrades difficult, time consuming, expensive, and in a few cases, impossible. In other words, the practice prevents the organization from "future proofing" their investment.

We strongly recommend that organizations use configuration to adapt a platform's standard workflows to best fit the organization's work processes. With cloud-based solutions, this is frequently the only option.

Involve Document Control Early

In a greenfield environment, where no engineering information management (EIM) program or asset information management platform exist, two primary activities are required:

- 1) Selecting, implementing, and configuring an asset information management solution
- 2) Standing up a document control function

Due to document control's intimate involvement with the system, it is important to involve (at a minimum) the document control team lead in the system's configuration design, implementation, actual configuration, testing, and roll out.

Following this approach, the solution implementation team benefits from the document control lead's past experience from other implementations and operations and that resource becomes familiar with the system at a deeper level than might otherwise be attainable.

This is a win-win.

Additional Considerations

Single Source of Truth

Often, asset information is fragmented into multiple siloes (e.g., the asset information platform, file shares, SharePoint, etc.) and it is difficult to establish a single source of truth. We've found that if an organization designates one repository as the official platform and implements the practice of referencing links to documents within the repository (rather than passing around duplicates), this issue can be mitigated, if not eliminated. The logical platform for this is the asset information system.

Information Security

Some organizations, especially those that have been around for a long time, have a tendency to over secure information. This is often done with the best of intentions, especially in an environment of increasingly frequent external attacks. Note that this observation is focused on internal security (i.e., behind the firewall), not cross-firewall interactions with the outside world.

While some asset information (e.g., confidential vendor information, design IP, etc.) certainly requires robust security controls, much of the data associated with an asset doesn't.

One client who struggled with inefficiencies caused by overly secure information chose a different approach. Their default approach is to treat all information as openly accessible (in their words "no harm to know") and then only secure the information that really requires it. Their organization has clearly benefited by removing artificial barriers and gate keepers from the process while still maintaining the ability to secure what needs to be secured.

Sharing Confidential Information

In a CAPEX environment, confidential information must sometimes be shared with an owner's general contractors and appropriate subcontractors while safeguarding that information from improper disclosure. This challenge is exacerbated by:

- The arms-length nature of LSTK contracts
- A cascading hierarchy of contractors, subcontractors, and sub-subcontractors with limited visibility to the owner
- An ecosystem of EPCs and subcontractors where project teams repeatedly form and disband

While technology alone can't solve this dilemma, a combination of an asset information management solution with the right capabilities, workflows, and human oversight can be very effective.

Change Management

One concept that should be woven through all aspects of an asset's lifecycle is change management. Often easier articulated than accomplished, change management should be thoughtfully embedded into the selection and implementation of an asset information management platform. Some things to consider include:

- Having the right stakeholders engaged early and often (think end users, those that need to support the platform long term, and those that represent the voice of the business)
- Clear articulation of the end goal of each lifecycle phase and how the current processes and platforms support each phase. This will help with team consensus and gap identification before it becomes an issue.

Insights From Document Control

While not directly related to asset information management solutions, Access Sciences' document control leads at client accounts provided the following observations and suggestions which we thought valuable to include.

Manage EPC Contracts in the Asset Information System

All email messages, clarifications, correspondence, reporting, etc. between the owner and its EPC (and other suppliers) should be stored and managed in the asset information system. This supports the ability to respond to any audit or inquiry confidently and accurately, regardless of EPC team changes.

Govern EPC Information Exchanges and Delivery

By policy and procedure, use the asset information system to publish, evergreen, and issue Project Information Management (IM) requirements, schema, contractor deliverable requirements and process, etc. These should be integral to every contract and reinforced from project kick-off to turnover. Importantly, compliance with these should be tied to contractor payment.

Govern Counterparty Information Exchanges and Delivery

Per the IM policy and procedure, manage all counterparty data sharing by defined document control transmittal process with distribution and approvals in the asset information system. Counterparties could include joint venture partners, legal and tax entities, and regulatory and government agencies.

Define Operations Deliverable Requirements

Per the IM policy and procedure, develop all Operations deliverable requirements and asset data elements for DFO, turnover, digital twin, and operational systems in the asset information system. As above, these should be integral to any appropriate contract.

Conclusion

In conclusion, effective management of asset information is vital for addressing the challenges faced in capital asset projects and later in O&M. As described in this paper, selecting and configuring a solution that enables the efficient transition of asset information throughout its lifecycle is critical. Its selection must be requirements-based and should consider future proofing and anticipate operational needs. Moreover, the traditional People / Process / Technology triangle applies, highlighting the importance of not only technology adoption but also user engagement and robust document management processes.

Distinguishing between business content and asset information is essential, as each serves distinct purposes and requires specific management approaches.

The distinction between asset-centric and document-centric approaches emphasizes the evolution towards a more cohesive asset-focused strategy. This shift requires a common platform supporting the asset throughout its lifecycle, facilitating seamless transitions from CAPEX to handover to OPEX.

When considering solution options, prioritizing requirements, avoiding customization in favor of configuration, and involving document control early are crucial steps. Additional considerations such as establishing a single source of truth, balancing information security with operational efficiency, managing confidential information sharing, and incorporating change management practices further enhance the effectiveness of asset information management.

Insights from document control professionals highlight the importance of managing contracts, governing information exchanges, and defining operational deliverable requirements within the asset information system.

In essence, effective asset information management is not merely about technological solutions but also about aligning processes and engaging stakeholders throughout the asset lifecycle. By addressing these critical aspects, organizations can enhance efficiency, mitigate risks, and maximize the value of their capital assets.

Our Vision

Taming Information Chaos... by delivering purpose-driven projects and managed services across your information infrastructure. Let's create a partnership and solution that makes finding, accessing, and sharing information the easiest part of making any business decision.

Imagine that.

Access Sciences Corporation HQ

1900 West Loop South

Suite 300

Houston, TX 77027

713-664-4357

Visit and follow us:

www.accesssciences.com

