



WHITE PAPER

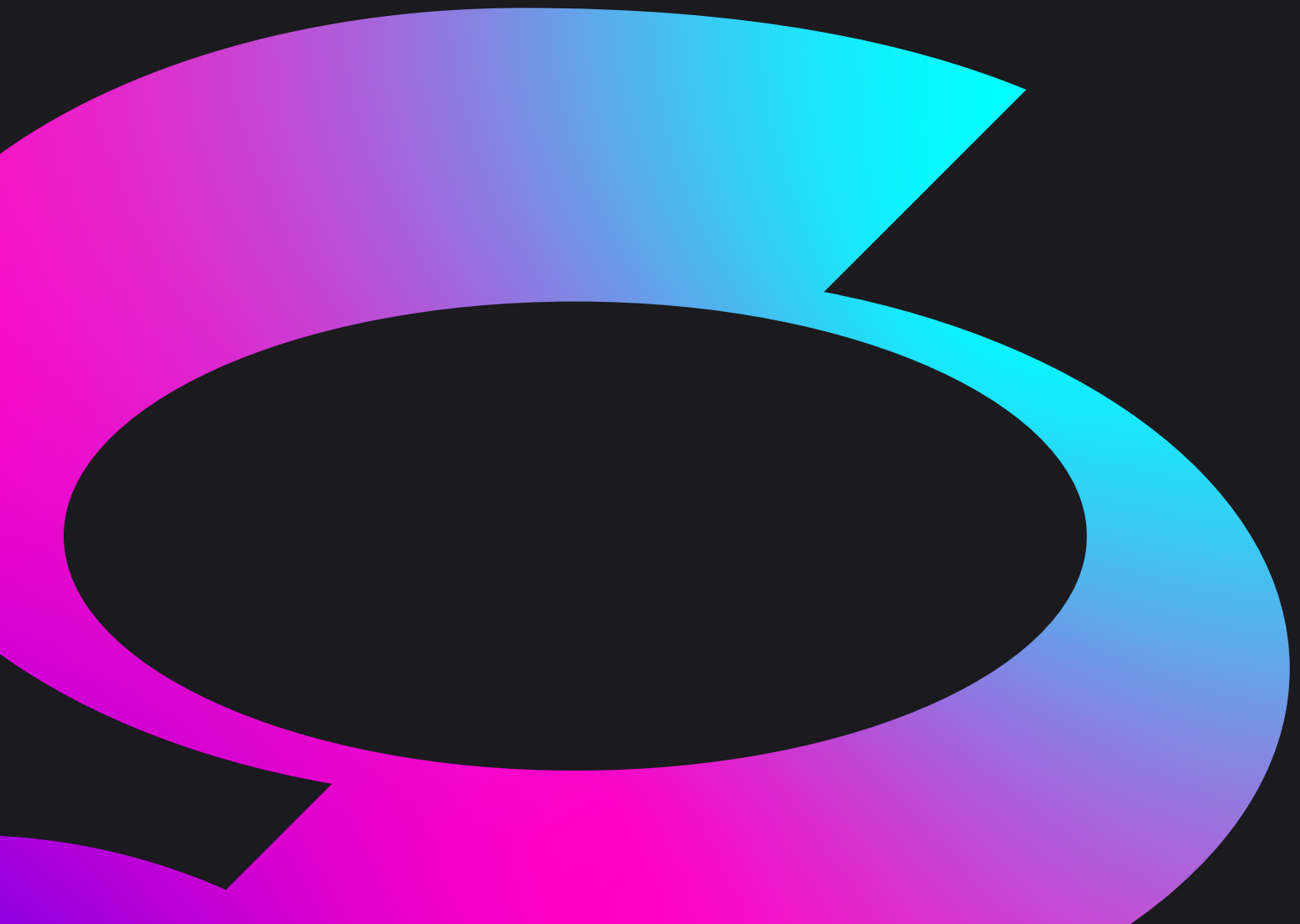
Octave Tempo Operating Procedures: The future of digital content management

Critical operational content for refining
and petrochemical facilities

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Executive summary

Learning is the process of individuals, teams and organizations acquiring knowledge, skills and expertise, through robust causal investigations and embedding lessons learned from real incidents. Causal learning is a performance improvement methodology for problem solving and incident investigations in all areas of performance (health, safety, security and environment [HSSE], production, reliability, quality, projects, financial and more). Leading process manufacturers are big proponents of causal learning, based on the premise that all performance outcomes (desirable or undesirable) have a cause and that the organization can improve future performance when it discovers the causes of performance problems, learns from the causes and acts to address them. Learning organizations support all lines of business in adopting these methodologies to improve overall performance and reduce the chance of incidents (accidents, undesirable outcomes, near misses, precursors, weak signals and unsafe conditions).

Data is at the heart of today's digital transformation. Yet data only becomes valuable when it's transformed into insights that drive better decisions. High-hazard industrial organizations are responsible for managing, evergreening and disseminating large volumes of information to employees to support continuous learning. However, these content management activities are a significant burden on employees and are often overlooked. In this case study, it is estimated that 35% to 50% of a learning professional's time is spent updating documents such as manuals and procedures. Managing this content is critical, but even more consequential are the learning implications when employees can't find or connect the right information to their work. In paper-based systems, linking content to operational procedures and training materials has become nearly impossible.

Oil and gas companies have partnered with Octave Tempo Operating Procedures (formerly AcceleratorKMS) to implement automated tools to manage operational procedure content. Proven in industries such as electronics, telecommunications and IT where the pace of product release cycles and iterating technology requires the fast, efficient and accurate

creation of content to accompany products and technologies the solution is now gaining traction and adoption in oil and gas and other process sectors where it promises to deliver measurable gains. Just like physical assets, knowledge assets require up-front design, commissioning and regular maintenance to perform their function within the process. This case study explores the challenges, the solution addressing long-standing inefficiencies and the potential of a new, digital paradigm in knowledge management, one built for adaptability, speed and continuous improvement.



Introduction

Oil and gas companies have endured turbulent market conditions for several years. Driven by lower demand and a significant drop in commodity prices, executives have been forced into strategic course correction to maintain profitability. A near 50% reduction from the \$115 per barrel peak price in 2011 has driven layoffs, postponement of projects, divestitures and further cost-cutting mechanisms.

In response to the lower for longer economic landscape, executives are investing in digital technologies to a greater degree to transform current operations and create new business opportunities. The advancement of technical innovation enables connected machines, systems and business processes that can drive efficiencies across many components of the value chain.



In downstream, industry research highlights the opportunity for oil and gas companies to benefit from a several percentage-point reduction in operating costs, coupled with a significant increase in operational safety through greater adoption of automated technologies. Companies are already capitalizing on data analytics to make informed decisions with faster modifications embedded in business processes. More opportunities are being identified to adopt Industry 4.0 decentralization; the ability of cyber-physical systems to perform autonomous tasks and decisions.

Innovation has become a pervasive theme across oil and gas, and executives recognize the adoption of newer technologies as critical to navigate current economic conditions to deliver shareholder return. To capitalize on the opportunities that abound, strategic innovation investment and initiatives are being executed to deliver the value promised by digital systems.

A key challenge recognized in the process industries' digitalization journey centers around data; how to get it to the right entity, be it person or machine, at the right time. Data is a crucial asset, but challenges abound in leveraging the data to truly unlock efficiencies in operational processes. Often, a plethora of data exists from various collection mechanisms. Many companies lack the necessary technology, human capital or structured processes to truly capitalize on the value of the data they collect. Data only becomes truly valuable when it is transformed into information that can support better decisionmaking. In the age of big data, the adage that data is only as valuable as the decisions it enables rings increasingly true.

Knowledge management organizations in process industries

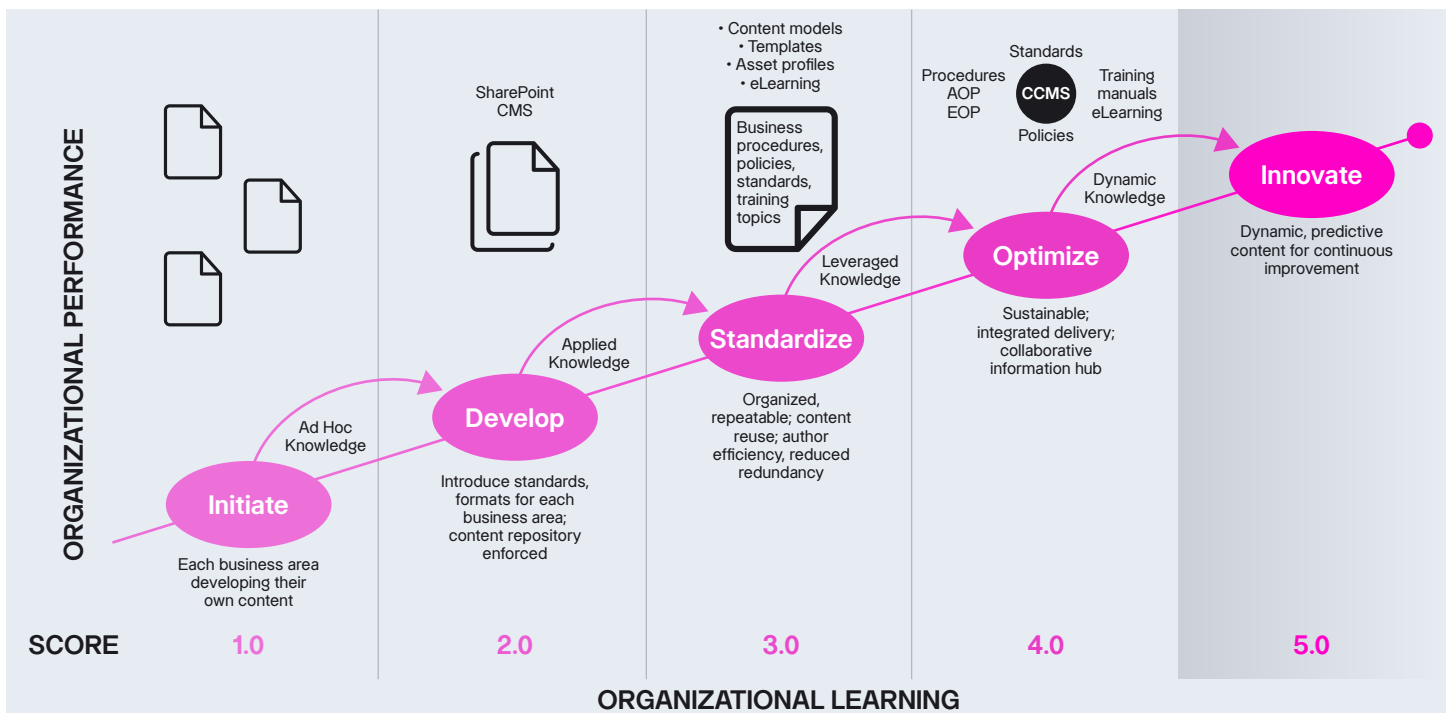
With the amount of information to be learned, it can take upwards of 18 months for an operator to complete the training curriculum to be certified to perform their job autonomously. This lengthy period, called operator "time to autonomy", is a significant cost burden on operations.



Material required to train one employee on a single job

Operations must run on very thin margins to maintain profitability and employee headcount continues to be at a premium. Expediting employee time to autonomy presents an enormous financial opportunity across the organization. Not only are new employees unable to contribute to running the site while still training, but SMEs must dedicate their time teaching, which could otherwise be spent running the site. In addition, building operational mastery, that is, the raising of front-line competencies and behaviors to drive safe operations, reliability and performance, is highlighted as a strategic priority for the organization. Site learning teams are tasked with doing "more with less" to support these priorities. Leveraging new technologies can be key to meeting these important organizational goals.

Feedback from the learning departments across the organization is that they struggle with the amount of information they must manage. Training documents are massive, redundant in content and difficult to revise. Paper-based training content is often printed. Microsoft Word documents are stored in SharePoint or file server drives. Because of limited resources, it is virtually impossible to maintain the content of the material. Imagine a school where the teachers are tasked with educating students while creating and maintaining textbook content. This is the struggle of the site learning departments; the time spent managing content must be weighed against actual time training employees. Anecdotal stories abound of new employees training on equipment that no longer exists in the field. Many of the Word documents do not contain a valid table of contents or navigational features to enable a user to quickly find pertinent information. An exorbitant amount of time is spent searching for content to update when new information is discovered. Operators struggle to locate the specific content they want to see, as it has become nearly impossible to manage the linkage between content, operational procedures and other relevant learning materials.



Structured vs. unstructured authoring: Overview

Structured authoring refers to the use of a markup language such as XML, a set of rules that define the structure of the content, and a transformation engine that renders the marked-up source into an output format, such as HTML or PDF. This approach enables groups of writers to author consistently structured and formatted content while generating different output formats from the same source.

Unstructured authoring refers to any other type of content authoring, such as using Microsoft Word or a text editor. Typically, this type of content is not considered topic-based and cannot be used to generate different output formats.

So, what is a component content management system (CCMS)?

What's the importance of a single source of truth? And, why pursue content reuse?

Tempo Operating Procedures is a CCMS because it stores and manages content at a more granular level than a traditional content management system (CMS) such as SharePoint. For example, SharePoint stores Word documents, PowerPoint presentations, Excel spreadsheets and other binary file formats as independent files that must be individually opened, updated and returned to the file system.

Tempo Operating Procedures stores single topics, paragraphs, sentences and multimedia assets. These are the components in CCMS. Tempo Operating Procedures breaks each procedure, training content topic or other piece of content into statements and paragraphs, allowing each statement to be programmatically reused or recombined into another procedure or training topic. As you type a new statement, the tool searches the database to find similar or exact content and prompts you to reuse an existing statement, rather than rewrite a new one.

Authoring content at this type of granularity is referred to as topic-based authoring, where a topic refers to a single, discrete piece of information about a specific subject. These smaller, more modular topics can then be combined, recombined and reused in different contexts to create actual output deliverables like the way Word documents are output; however, the management is done at the centralized database level instead of the individual document level. This process is called single-sourcing, meaning that content can be written once and repeatedly used in different output formats and deliverables.

This approach has many benefits:

- **Accuracy, standardization and safety** - By authoring a smaller amount of content in a controlled way and by reducing the chances of common cut-and-paste errors, topic-based authoring in a CCMS contributes to increasing the accuracy, standardization and safety associated with the content. The effort reduction associated with authoring and maintaining content in the method also impacts accuracy, standardization and safety, as additional scrutiny can be applied to content because there is a smaller overall volume.
- **Reduced delivery costs** - Single-sourcing allows topic-based content to be combined into a variety of different output formats such as HTML, PDF or mobile without additional authoring effort. An author can write a single topic about a subject, which can then be used in a variety of different contexts without having to rewrite and ultimately maintain multiple instances of the topic.
- **Reduced maintenance costs** - When you write a common topic once and reuse it repeatedly, your documentation set becomes far smaller and easier to manage. Also, no more formatting documents.
- **Reduced translation costs** - Most modern CCMSs provide integration with professional translation centers and translation management software. Because the content is text-based, translation centers can receive files for translation during the content development process. Files can be used to create a translation memory, whereby new revisions of the content are compared to the existing memory, so only the deltas must be translated. This allows future changes to the content to be translated quickly and cost-effectively.

- **Governance and transparency** - In conjunction with a solid content governance model, such as the one integrated into Tempo Operating Procedures, a CCMS provides the built-in workflows and reporting tools to enable effective content creation and traceability during the content development lifecycle. You can be sure that any content update was reviewed and approved, and that any error in the workflow can be traced to a negligent user or a breakdown in the process.
- **Digital information tracked, recorded and measured** - With content authored and delivered in a digital framework, each interaction with the content, training activity, procedure completion or revision can be recorded and reported. This brings the benefit potential associated with the Industrial Internet of Things (IIoT) data collection to the human capital side of the operation such as analytics, transparency and continuous improvement.
- **Simplified system integration** - Because content already lives in a structured database and is delivered digitally to various outputs, the content and usage data can be integrated into other platforms and information from other systems can be linked to the CCMS.

In addition, a CCMS enables better collaboration among users, especially when users are geographically separated. It also provides tools to manage linking (referential integrity) and metadata and provides complete version control and release management functionality.

Content creation: SharePoint vs. Tempo Operating Procedures (CCMS)

Consider the conventional training manual or procedure. A typical manual or procedural document includes several chapters or sections (components), where many of these components contain information that is typically found in many other training manuals, often at different sites. For example, a chemical hazards chapter is a simple glossary of chemical hazard information. Similarly, the emergency response chapter outlines procedures for handling emergencies at each site. When written in a Word document and stored in a traditional CMS, these chapters are simply cut, pasted and stored repeatedly in many documents. When the content changes, the writer must locate every instance of this chapter, then open each document to make the changes. This time-consuming process is costly and error-prone and made more challenging because document-specific content (for example, content inside a Word document) cannot be searched from a learning management system (LMS).

By comparison, topics written and stored in a CCMS, using a topic-based approach, can be used repeatedly. In this scenario, the emergency response topic can be written once using minor site-specific variables, then used in many different documents across sites. When the content changes, for example, when a phone number or procedure step changes, the writer can log into the CCMS, make a simple change to a variable or topic and the change will propagate to each document that uses the common piece of content. This saves time and money and increases the accuracy, standardization and safety associated with the information.



Digitization

Content stored in a Word document will always be just that.

When authoring, using a topic-based approach and storing that content in a CCMS, the content can be transformed into any number of different output formats and ultimately used in different ways. Furthermore, content is enriched by adding metadata (data about data) to enable better search, sorting, rendering and filtering of information.

One of the greatest advantages of digitizing content is the ability to put content online in a single, trusted location. Creating a single source of information enables users to quickly and easily find the information they need to do their jobs. A well-designed content repository enables different types of users to find different types of information. Putting content online makes it available for mobile devices, from within augmented reality (AR) and virtual reality (VR) environments and by enabling code scanning and radio-frequency identification (RFID) technology to enable the real-time push and pull of content to operators in the field as they need it.

The role-based nature of the content interaction environment is also supported by using a CCMS. For instance, users assigned the writer role can write. Users assigned to the operator or trainee role are consumers of the content but do not have access to change or amend the documentation (although feedback mechanisms like the ones in Tempo Operating Procedures offer a powerful grassroots improvement mechanism). SMEs review content and those with the authority to approve and publish content are responsible for that function. The system coordinates the activity by following a defined workflow and each actor plays their role in contributing to high-quality, technically accurate and standardized content.

Importance of this approach

Digitizing content, adopting a topic-based approach to content creation and implementing a modern content governance model, help the organization to get a handle on its information needs. This approach is important for the following reasons.

Increased process safety

Reducing the overall volume of content, reusing existing content where applicable and implementing a proper governance model can greatly increase the technical accuracy of the content. Writing with a topic-based approach, making content available to the people who need it and using a CCMS to manage content ensure that operators and trainers have the latest and most up-to-date versions of their procedures and training material. This improves the overall safety of the process and reduces the risk of information-related process safety incidents.

Digital/mobile information delivery and workforce efficiency

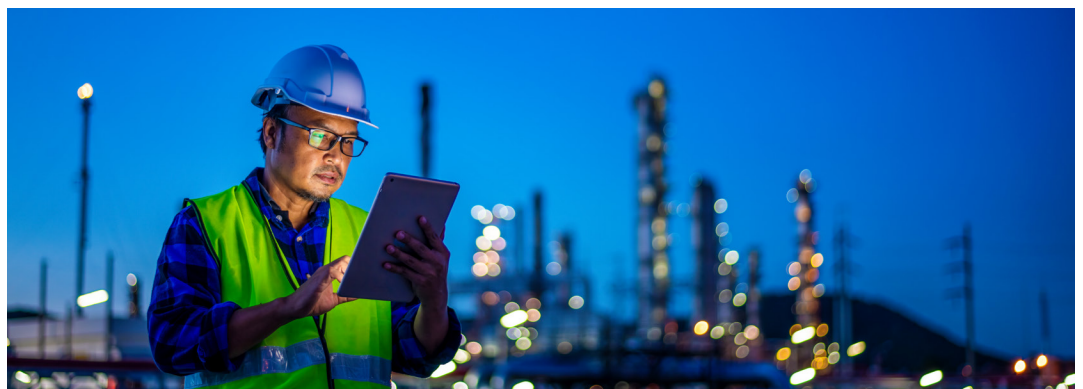
When operators can find the information they need to perform their job quickly without having to ask for help and when a trainer can spend less time updating volumes of content or manually grading assessments, the overall efficiency of employees significantly improves. The workforce of tomorrow will expect information systems that function like the information systems in their day-to-day lives. Consider Google, YouTube and Facebook. The only difference is that when an employee gets information from a centralized information system, they know it will be right.

Improve operator time to autonomy

You can decrease the time it takes for an operator to gain the confidence required to perform tasks independently by improving the content quality and making it available on-site, in a more consumable fashion. If operators have access to rich content, videos, infographics and animations that describe how to perform a task or how to carry out a procedure, then operators will quickly perform those tasks without the need to contact an SME or more experienced operator for help.

Dynamic information on-demand

When content is broken into smaller pieces, it can be pushed or pulled in several different ways. A bot on a webpage uses chunked information, along with metadata and a specialized search engine, to pull consumable nuggets of information from a body of content. This enables a user to ask a question and receive an answer almost instantly.



Two additional examples of a CCMS in practice

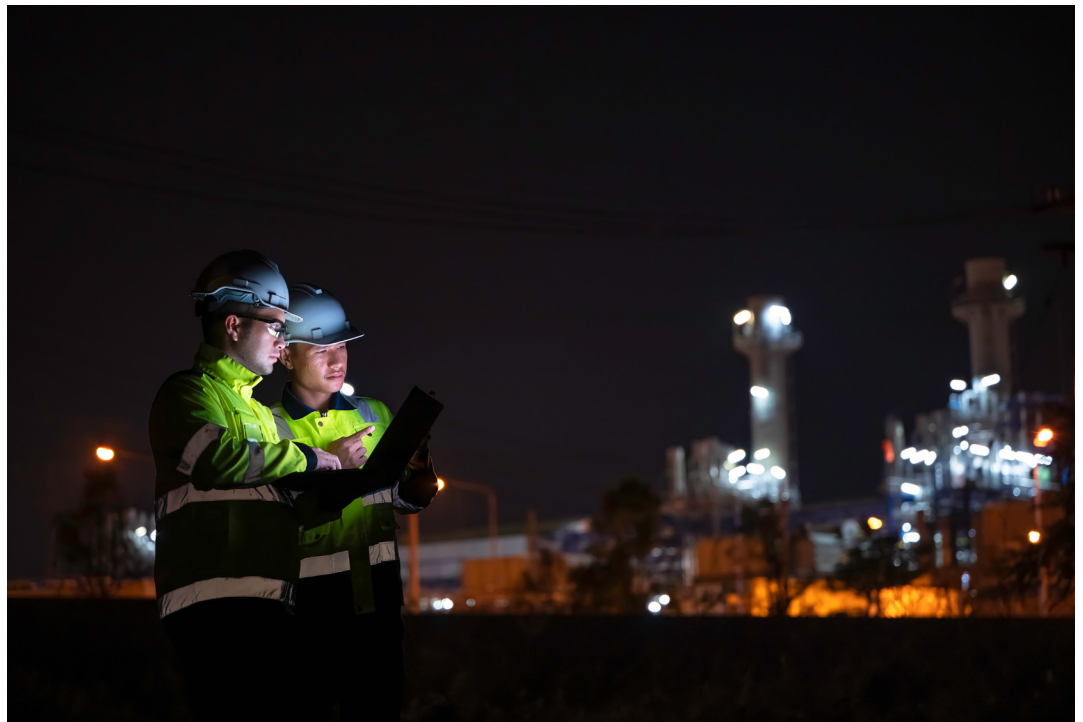
Case study one:

CCMS and topic-based authoring for a current oil and gas client

Octave designed and built a custom information CCMS for a large Canadian oil and gas company. The client needed a single source of knowledge where employees of all different types could get the very latest and most up-to-date versions of procedures, training and operations manuals. Furthermore, the client needed a way not only to render their prescriptive information but also to associate it with the various pieces of information that existed on the SharePoint server.

The solution featured:

- A complete end-to-end content governance workflow, using a topic-based design to create operations manuals, training guides and procedures.
- A structured content publishing environment, where content was authored in XML-DITA and published to the server.
- A dynamic menu navigation system that allows users to traverse through the content. The navigation was filterable, meaning that employees could enter their role, discipline and location to fine-tune the list of topics that appeared in the menu.
- A full taxonomy that used metadata to associate the rendered structured content with pre-existing animations, diagrams, images and unstructured documents that were stored in the client's content library. When rendered on-screen, each topic would display a dynamically-generated list of related files from the client's content library. This was a very powerful feature that allowed the user to find related pieces of content of all different types.
- A feedback mechanism that enables users to provide suggestions to content authors.
- An ask an expert feature that enables users to pose questions to SMEs.



Case study two:

CCMS and topic-based authoring in the telecom industry

Topic-based authoring and CCMSs are ubiquitous throughout the IT industry. One of Octave's clients, a major telecom company, uses a CCMS to manage its vast amounts of information.

The client uses the CCMS to:

- Reuse their content at the smallest level, ensuring that content is not cut and pasted and that messaging is consistent across the company's many product lines. The client has a large number of product suites, each consisting of many different sub-product lines. The documentation suite for each product line is typically authored by different teams in different geographic locations. Care must be taken to ensure that content is consistent and accurate and that it is authored with reuse principles in mind. Authoring content in a structured environment, using topic-based authoring techniques, ensures that the content is accurate and cost-effective.
- Single-source their content by creating a variety of different and diverse output formats. The user documentation team, the marketing communications team and the training team all share the same repository of content and all use a common subset of topics.
- Allow the user documentation team to publish their content to an online, self-serve technical documentation portal.
- Allow the marketing communications team to publish their content, including some common topics, to a series of whitepapers in PDF format on the company website.
- Allow the training team to publish their content in PowerPoint format, where it is used for classroom-based training.
- Translate their content seamlessly and cost-effectively into 32 different languages.
- Perform change management to ensure that content is always updated correctly and that all changes are reviewed and approved using the defined governance workflows.
- Follow an agile release model, meaning that products are released on a biweekly cycle. For each release, the repository is branched and versions are created for historical purposes. Users often work in multiple branches, meaning they are concurrently working in two different versions of the product.
- Publish their content on an online portal. The portal houses technical documentation for all the client's products, as well as a blog, marketing information and a community. By using metadata, the portal enables the user to filter the content by limiting the search results to only the content that the user wants to see. The portal also uses the same metadata to tune and enhance the search results. In a future version of the portal, metadata will power a question-and-answer bot. The user can ask the bot a question and have the answer returned instantly in the same window. This single source of information helps the client's users quickly find what they are looking for.

Conclusion

A component content management system (CCMS) tailored to a specific type of content can bring enormous value to content creation, management and delivery. Content reuse of common statements represents an important method for achieving long-term sustainability in scenarios that require large volumes of content to be up-to-date and of a high standard of quality. These content classes reside in areas such as:

- Operations, maintenance and emergency response as standard operating procedures (SOP)
- Learning/training as operator training manuals and learning from incidents (LFI) reports
- HSSE as SOPs, contextual training, manuals and management of change records
- Legal as contract templates and localized agreements
- Corporate management as policies and standards

The primary benefit of CCMS implementation and adoption is improved process safety, sustainability and standardization. Unreliable human performance leads to a variety of incidents stemming from knowledge management. Considering the user experience and investing in quality are important for addressing information-related incidents. In the future, structured authoring is an important stepping stone to achieving a higher level of digitization in the human capital aspect of the operation. Digital deployment, analytics regarding usage and outcomes and integration to other systems are natural extensions that can be layered on a digitized content management framework to offer increasing benefit to the organization.



About Octave

Octave is a leader in enterprise software, turning data into decisive action and intelligence into your edge. Our software solves for and simplifies complexity, from the design and build to operations and protection of people, property, and assets— for any scope, at any scale. For decades, we've partnered with customers to sharpen performance, elevate efficiency, and amplify results. From factory floors to entire cities, our solutions are tuned to scale up what's possible from day one onward.

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