WHITE PAPER

Information challenges in brownfield assets affect

Only when the tide goes out will we see who has been swimming naked."

Warren Buffet

The future success of asset-intensive organizations will undeniably be driven by how they respond to transformative events – internally and externally. For some, disrupting the status quo during challenging economic times – especially when it comes to brownfield assets operating without issue – may seem absurd. However, further resistance to change during these uncertain times can be detrimental and potentially leave many "swimming naked."

This white paper highlights how information challenges in brownfield assets can significantly affect your bottom line. In contrast, a strong information and operations management data ecosystem can help reduce project and operational risk and address current market-driven efficiency, operational expenditures (OPEX) and profitability challenges.

Acting now rather than later could be the difference in building business resilience and agility for the future.

01 Introduction

Owners and operators must find information needed to maintain, inspect, repair and operate their facilities within huge volumes of unstructured data generated across the asset lifecycle daily; and the older the asset, the more information there is to manage.

Centrally available, structured and intelligent information streamlines work processes and enables efficiencies by providing ready access to as-is data. This offers a competitive edge in an increasingly challenging market conditions and supports two core objectives:

- Safe and legally compliant operations

In addition to unstructured information (e.g., paper files, PDFs, scans, images), even structured data (e.g., spreadsheets, databases) may be disconnected and siloed, posing challenges for accessibility regardless of the quality of the information or format.

- Optimum efficiency leading to greater productivity and profitability

However, unstructured, siloed and overall poor data quality costs organizations an average of $12.9 million (USD) a year, according to a 2021 Gartner report.[1]

What could your organization do with an additional $12.9 million a year?

02 An industry-wide issue

Octave conducted a cross-industry survey, titled "Information Challenges in Brownfield Assets," to understand how widespread information management problems are within organizations. In it, "unstructured information" was characterized as being:

- Document-centric
- Unintelligently formatted
- Poorly managed
- Heavily duplicated
- Void of disciplined distribution and version control
- Outdated

Also in the survey, more than half of respondents admitted spending **20%** or more of their time searching for and validating facility information and **7%** acknowledged spending more than **60%** of their time looking for information.

The inability to locate information isn't solely a matter of wasted time; it directly impacts a company's ability to operate safely and reliably.

Shockingly, 61% of respondents expressed a lack of complete confidence in their ability to find the information required to support an emergency response.

[1] Source: https://www.gartner.com/smarterwithgartner/how-to-improve-your-data-quality

03 The information deficit

Engineering data and documentation are critical for projects, regardless of whether they're on-schedule or meeting budget mandates. Each person involved in designing, constructing, operating and maintaining a facility needs ready access to trustworthy information for efficiently and safely operating dangerous manufacturing and process industry assets.

Accessible, structured information is well organized in form and format and in accordance with your company's data governance policy.

However, at many companies, the vast majority of existing facility information is still unstructured or inaccessible, resulting in significant challenges finding the data needed to support important day-to-day decisions.

3.1. Cause and effect

Disorganized information is the result of many factors:

- Documents and drawings held in multiple locations – onsite and offsite – especially when assets have changed owners
- Electronic versions coming from different incompatible sources and paper documents may remain boxed and overlooked in various offices
- Multiple versions with duplicates, inconsistencies and no clear masters create confusion and require time-consuming review to identify as-is information
- Undocumented asset knowledge departs with your retiring workforce, as aging assets are typically staffed by engineers who have remained on-site throughout their professional career

Insufficient access to accurate information threatens plant productivity and operational integrity:

- Preparation and execution of tasks is time and cost-intensive and delays locating and verifying data, further adding to operating costs
- Failure to locate documentation to demonstrate ongoing regulatory compliance leads to losing your operating license
- During serious incidents, delayed responses impact your organization's reputation and share price. In worst case scenarios, lack of access to critical information results in casualties
- Out-of-date information results in unexpected and undocumented issues when on-site work is executed, which leads to extended downtime, reduced productivity and increased costs

04 The cost of doing nothing

Too high a price to pay

If a facility has been operating for years with no issues, continuing the status quo is tempting – especially in a challenging economic climate. However, investing in a Smart Digital Reality strategy is an investment in the long-term health of your facility, your personnel and your bank balance.

An Octave study of 101 industrial accidents, where poor human procedures were a contributory factor, sadly found 405 fatalities and 2,163 injuries associated to these devastating incidents.

The following are three incidents from that study that highlight the importance of informed workers as a critical part of the layers of protection that help keep plant operations safe:

Tampa electric / gaffin industrial services molten slag release (2017)

Tampa Electric failed to follow energy control procedures while performing maintenance on equipment and Gaffin Industrial Services did not develop, document and implement procedures for clearing clogs in a slag tank.

Fatalities	5
Injuries	1
Reported Financial Costs (USD)	$160,972 (OSHA Fines)

Source: United States Department of Labor, Occupational Safety and Health Administration

DuPont La Porte Facility toxic chemical release (2014)

A series of shift communication mistakes – that began five days before the incident – led to the release of nearly 24,000 pounds of methyl mercaptan (a toxic chemical).

Fatalities	4
Injuries	1
Reported Financial Costs (USD)	$3,100,000 (EPA Fines) + $273,000 (OSHA Fines)
Financial Costs (USD)	$3,373,000

Source: United States Chemical Safety and Hazard Investigation Board

BP Deepwater Horizon oil spill (2010)

There is no evidence that BP or Halliburton ever shared the cement stability results or the OptiCem reports (showing gas flow potential) with Transocean personnel on the Deepwater Horizon or in the Houston office.

Fatalities	1
Injuries	17
Estimated Financial Costs	$144,890,000,000

Source: Bureau of Safety And Environmental Enforcement

While risk may be considered an unavoidable part of operating any industrial facility, it shouldn't be considered a "fixed cost" because industrial facilities can reduce it by investing in workplace safety.

The annual cost of insurance for these types of plants is significant. According to insurance analysts, a refiner worth $1 billion (USD) will likely pay around $2.5 million (USD) per year.

One Octave customer found it could reduce the "cost of risk" by more than $1.5 million (USD).

In this example, the main driver was shift handover. The facility, part of a leading U.S. chemical manufacturer, had experienced previous incidents but was actively trying to improve. In discussions with its insurer, the company came to understand its insurance premiums are largely driven by the "risk profile" assigned by insurance underwriters. By digitizing key processes, specifically shift handover, it could significantly improve its risk profile and reduce its overall cost-to-insure.

The value of these changes was recognized and validated by its insurer, allowing the plant to justify its entire implementation of Octave Tempo Operations Management (formerly j5 Operations Management) .

Insurance companies serving customers in manufacturing and process industries are highly motivated to help them avoid incidents and lower the risk inherent in operating large industrial facilities.

According to Marsh, a world leading insurance broker and risk advisor, the overall liability to insurers for global refining and petrochemical incidents from 2017-2019 totalled more than $12.5 billion (USD). In cases like the one above, when customers do manage to improve their risk profile, it means the insurers have a much better chance of avoiding payouts and are willing to reduce premiums to achieve it; making it a win-win for all.

By digitalizing key processes, customers can significantly improve their risk profile and reduce their overall cost-to-insure.

Two critical examples of how unorganized information can affect owners, operators and the business's bottom line are projects and turnarounds and time-critical access to plant information.

4.1. Projects and turnarounds

Problems can occur when a brownfield asset is coming back online after turnaround. During this often frantic period documents, drawings and electronic files are distributed in boxes throughout the temporary construction offices and taken on-site by craft workers. Whether all information returns to where it came is questionable.

There is also a risk that recorded changes to the as-built status of the facility may be lost or not incorporated into new as-built revisions.

As mentioned, the data is scattered around the plant on network drives, personal computers and technicians' folders and desks; or it may even be non-existent.

This presents significant challenges to knowledge capture and provide an accurate information record of a plant's as-built state to any regulating authority or insurance company. However, this isn't specific to turnarounds. Having the right information prepared is necessary to execute projects (e.g., revamps, de-bottlenecking, extensions).

Managing the information in this process is important from two angles. Firstly, once the project execution is planned, it's important to gather all the required information to send to contractors.

Secondly, when the project is in the handover stage and its information is being transferred from the contractor, the owners and operators need to capture the information, review it for completeness and validate if it's fulfilling all defined requirements.

Time-critical access to facility information

If a facility shift manager has to deal with an alarm tripping in the middle of the night, it's critical they're able to find the cause of the alarm quickly and determine a potential remedy.

However, if information is scattered across multiple locations, there could be insufficient facility personnel on-site to quickly gather all information necessary to diagnose the problem and develop an effective plan of action. The facility manager could be forced to shut down the facility and wait for resources to arrive, then find and fix the root cause of the problem before bringing the facility back online in a controlled manner.

The negative impact on production will result in significant costs and, in the long term, make the facility uncompetitive. Alternatively, the facility manager could keep it running, but this decision risks the safety of the facility and its personnel. Having quick access to information that's easy to navigate during problem evaluation is essential. It enables owners and operators to support the daily decisions required for facility operations and maintenance.

There are usually multiple systems in a facility, with multiple locations for documents and drawings. It's critical to provide owners and operators with a single point of access to engineering information – a portal to well-organized and cross-referenced information.

05 Bridging the information gap with a digital roadmap

Optimizing processes to adapt to the current economic landscape ensures business viability. After all, an investment in a Smart Digital Reality strategy is an investment in the long term health of your organization-wide safety culture, production efficiency and ultimately balance sheet's bottom line.

Octave creates intelligent information from unstructured, duplicated and disconnected data and documentation. This includes structured digital data sources and databases, consolidating all of it into a unified system.

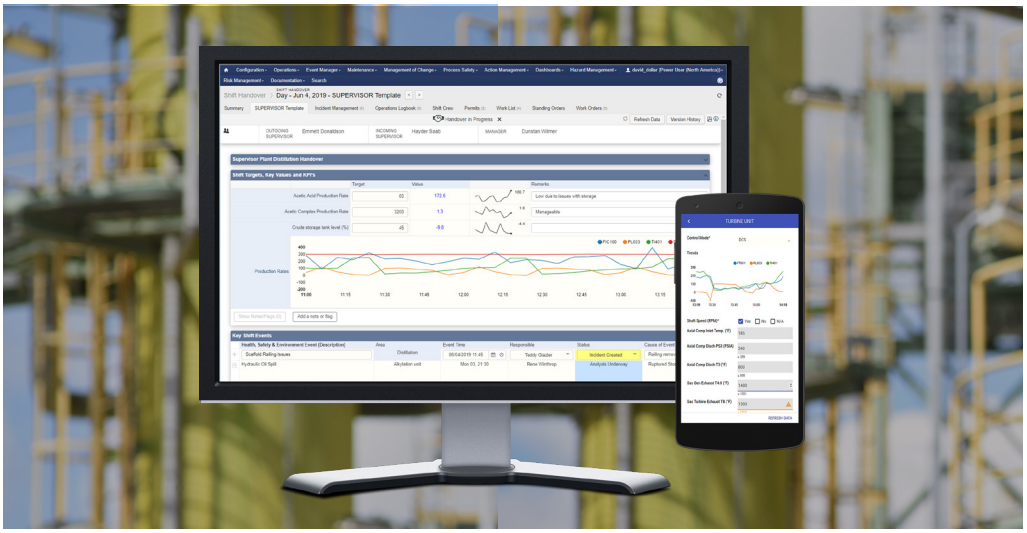
Here's how these solutions can be deployed: from digitalizing your project and operations management procedures and processes to adopting a comprehensive asset lifecycle information ecosystem.

STEP 1

Digitalize human procedures

A strong information and operations management data ecosystem begins with digitalizing your operations management procedures and processes. Critical facility information should be captured digitally and (more importantly) organized to support critical operations processes.

Tempo Operations Management makes important shift, operator round, personnel, safety, maintenance and process information visible to users across the plant. This fosters greater understanding, coordination, knowledge transfer and communication between teams and improved decisions.



STEP 2

Connect operational data with human procedures

Siloed information stored in different formats and on different systems is detrimental to the operations of a facility. Essential data must be seamlessly integrated into the business processes and systems that support it.

Octave InConcert (formerly HxGN SDx2) is solutions for engineering and operations excellence designed for digital transformation by addressing this challenge in practical, cost-effective ways.

InConcert is a digital platform that centralizes and unites operations, maintenance, safety, engineering and real-time data. Uniquely combining human operations procedures, maintenance work orders, real-time and historical process data, engineering schematics and technical documentation with 3D Models and Laser Scans, and enabling a comprehensive Digital Twin for projects and operations.

InConcert can also be fully interfaced with Tempo Operations Management , adding even more value along a digital road map aided by Octave.

STEP 3

Build a digital twin

This ongoing stage of value addition can also include advanced analytics, artificial intelligence, machine learning and predictive and prescriptive analytics to reduce downtime.

When deploying a comprehensive digital twin, it's crucial to efficiently dissect the associated data to gain a clear understanding and transform it into actionable information. To facilitate this, InConcert's situation awareness capabilities provide authorized personnel a comprehensive view of past events, current developments, potential scenarios, anticipated outcomes and scheduled activities via a high-level operational dashboard that incorporates all the visual elements of a digital twin.

Overall, the goal of any digital twin is to increase asset efficiency and offer a digital representation of current and historic plant configurations, along with related performance information. Enlightened, data-driven decision-making becomes the norm and the easy sharing of digital twin data with multiple departments increases collaboration and reduces operational risk.

Octave helps people design, engineer, construct, operate and maintain industrial assets, while a digital twin enables asset owners and operators to build and maintain an information management data ecosystem throughout the asset lifecycle. This fosters a continuous journey toward operational excellence.

Conclusion

Ineffective information management significantly impacts your OPEX. Its repercussions can endure throughout the prolonged lifespan of a brownfield facility, resulting in diminished efficiency, reduced output and an increase in avoidable safety risks. This should be a high priority for all owners and operators committed to safeguarding business resilience and future-proofing themselves amid ever changing economic, regulatory and competitive environments.

How does your operations management system compare to the leading edge?

Take this short survey to assess your current capabilities and discover how your organization would benefit from an improved process.

| Reveal your growth areas

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.