HEXAGON

White Paper

Information Challenges in Brownfield Assets Affect Your Bottom Line

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> **Only when the tide goes out will we see who has been swimming naked.”**
>
> **Warren Buffet**

It is no secret that the future will be forever shaped by how companies react to the COVID-19 pandemic. For some, the very idea of disrupting the status quo during challenging economic times – especially when it comes to brownfield assets that have been operating without issue – may seem absurd. However, further resistance to change during these uncertain times can be detrimental and could potentially leave many “swimming naked”.

This white paper highlights how information challenges in brownfield assets can have a significant effect on your bottom line. In contrast, a strong information and operations management data ecosystem can help reduce operational risk as well as address current market-driven efficiency, OPEX and profitability challenges.

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

1. Introduction

Owner operators must find information needed to maintain, inspect, repair and operate their facilities within huge volumes of unstructured data that has been generated across the asset lifecycle on a daily basis, and the older the asset, the more information there is.

In addition to unstructured information, there could be structured but siloed information in various paper files, spreadsheets, word processor documents, software applications and other disconnected databases that is not centrally managed and therefore not universally accessible.

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
- Optimum efficiency leading to greater productivity and profitability

However, unstructured and siloed information can have the opposite effect. A 2010 ARC Advisory Group study[1] reported that incorrect information management leads to an annual loss of **1.5%** of an asset's total sales.

How much would a 1.5% loss cost your facility?

2. An Industry-wide Issue

Hexagon conducted a cross-industry survey titled *"Information Challenges in Brownfield Assets"* to understand exactly how widespread information management problems are within organisations. In this survey "unstructured information" was characterised as being:

- Document-centric
- In unintelligent formats
- Poorly managed
- Heavily duplicated
- Having undisciplined distribution and version control
- Outdated

In the survey, more than half of respondents admitted to spending **20%** or more of their time searching for and validating facility information; **7%** even acknowledged spending more than **60%** of their time looking for information!

The inability to locate information isn't just 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 all information required to support an emergency response.

1 Source: Asset Information Management, Part I – the Case for Developing an AIM Strategy; ARC Advisory Group, July 2010

3. The Information Deficit

Engineering data and documentation are essential for on-budget and on-schedule projects. This information is also crucial to efficiently and safely operate dangerous manufacturing and process industry assets. Every person involved in designing, constructing, operating and maintaining a facility needs ready access to trustworthy information to achieve this.

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

As such, you can continuously use and reuse that information knowing that it is controlled, managed and reliable. Hexagon's PPM division has helped companies by empowering them with data-centric asset lifecycle information management (ALIM) solutions that provide simple, secure access to trustworthy information by managing and leveraging vast amounts of data to transform inefficient document-based work processes into data-centric, cross-application work processes.

However, in many companies, the vast majority of existing facility information is still unstructured or inaccessible, resulting in significant challenges to find 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 may be held in multiple locations – both on-site and off-site – especially when assets have changed owners.
- Multiple versions with duplicates, inconsistencies and no clear masters create confusion and require time-consuming review to identify as-is information.
- Electronic versions may come from different incompatible sources, and paper documents may remain boxed up and overlooked in various offices.
- Undocumented asset knowledge may depart with your retiring workforce, as aging assets are typically staffed by many engineers who have remained at the site throughout their professional career.

Lack of accessible, accurate information compromises plant productivity and operational integrity:

- Preparation and execution of tasks is time and cost-intensive and delays in locating and verifying data further add to operating costs.
- Out-of-date information can result in unexpected and undocumented issues when on-site work is executed, which may lead to extended downtime, reduced productivity and increased costs.
- Failure to locate documentation to demonstrate ongoing regulatory compliance may lead to the loss of your operating license.
- In the event of a serious incident, delayed responses can impact your reputation and share price and in worst case scenarios, lack of access to critical information could result in casualties.

4. The Cost of Doing Nothing

Too High a Price to Pay

If a facility has been operating for years with no issues, it's tempting to continue the status quo – especially in a challenging economic climate. However, an investment in an asset lifecycle information management strategy is an investment in the long-term health of your facility, your personnel and your bank balance.

A Hexagon PPM division study of **101 industrial accidents** where poor human procedures was a contributory factor sadly found there were **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 – eventually 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)	
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 (USD)	**$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 take steps to reduce it by investing in workplace safety.

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

One Hexagon customer found that it could reduce the "cost of risk" to the tune of over $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 some incidents in the past but was actively trying to improve. In discussions with its insurer, the company came to understand that its insurance premiums are largely driven by the "risk profile" assigned to it by insurance underwriters; by digitizing key processes, specifically shift handover, it could significantly improve that 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 j5 Operations Management Solutions implementation on the basis of insurance savings alone.

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

According to **Marsh**, 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 outlined above, when customers do manage to improve their risk profile, it means the insurers have a much better chance of avoiding pay-outs, and they are willing to reduce premiums to achieve this, making it a win-win for all.

By digitizing 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 owner operators and the bottom-line of the business include projects and turnarounds as well as time-critical access to plant information.

4.1. Projects and Turnarounds

Problems can occur when a brownfield asset is coming back online after a turnaround. During this often frantic period, the documents, drawings and electronic files are distributed in boxes throughout the temporary construction offices and taken onto the site by craft workers. Whether this information returns to where it came from 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 previously, the information is scattered around the plant on network drives, personal computers or technicians' folders and desks; it may even be non-existent.

This presents significant challenges to knowledge-capture and an accurate information record of a plant's as-built state to any regulating authority or insurance company, but this is not only specific to turnarounds. Having the right information prepared is necessary in order to execute projects such as revamps, de-bottlenecking or extensions.

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

Secondly, when the project is in the handover stage and the project information is being handed over from the contractor, the owner operator needs to capture the information, review on completeness and validate if the information is fulfilling all requirements defined.

4.2. 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 is critical that 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 the information necessary to diagnose the problem and develop a plan of action. The facility manager could be forced to shutdown the facility and wait for resources to arrive, then find and then 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; in the long term this can potentially make the facility uncompetitive. Alternatively, the facility manager could keep the facility running, but this decision risks the safety of the facility and its personnel. Having quick access to information that is easy to navigate during problem evaluation is essential. It enables owner operators to support the daily decisions required for facility operations and maintenance.

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

5. Bridging the Information Gap with a Digital Roadmap

Optimizing processes to adapt to the current economic landscape will ensure business viability. After all, an investment in an asset lifecycle information management strategy is an investment in the long-term health of your company-wide safety culture, production efficiency and ultimately the bottom line of the balance sheet.

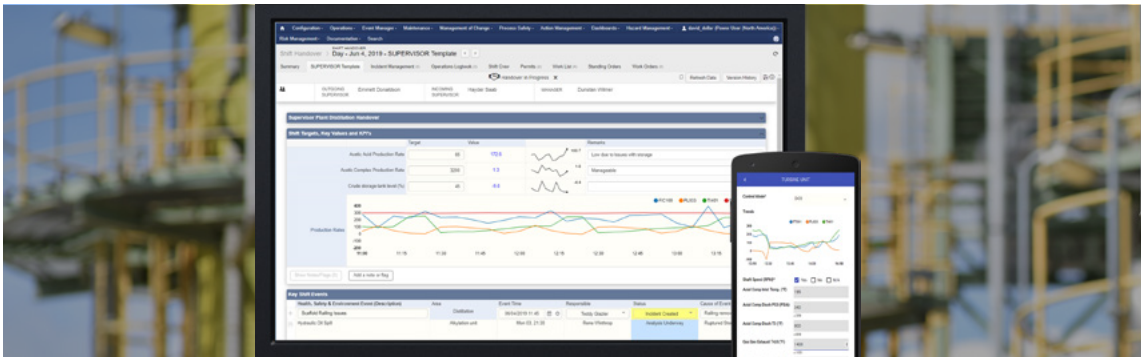
Hexagon solutions create intelligent information from both unstructured, duplicated and disconnected data and documentation, as well as structured digital data sources and databases, and consolidates these.

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

STEP 1 Digitize Human Procedures

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

j5 Operations Management Solutions make important shift, operator round, personnel, safety, maintenance and process information visible to users across the whole plant. This fosters greater understanding, coordination, knowledge transfer and communication between teams and improved decisions.

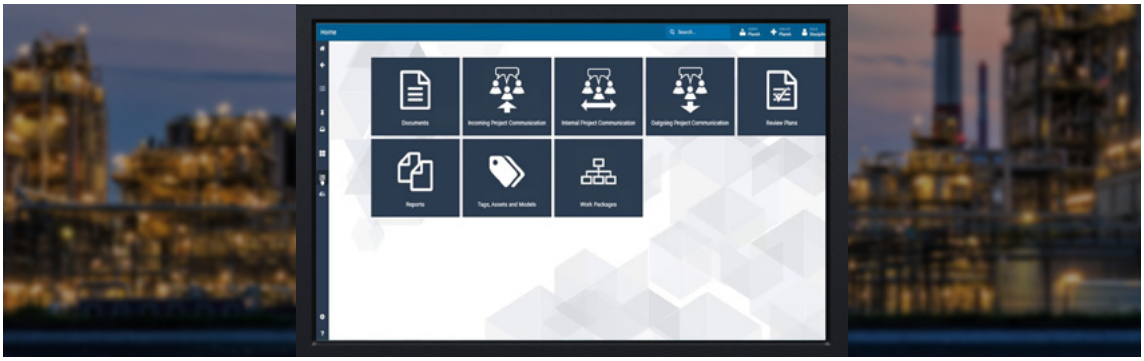


STEP 2 Connect Operational Data with Human Procedures

Siloed information that exists in different formats and on different systems is detrimental to the operations of a facility. All necessary documents must be integrated well with the business processes and systems that support them.

HxGN SDx® Operations, part of HxGN SDx, is an information management solution designed for digital transformation by addressing this challenge in practical, cost-effective ways. HxGN SDx 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 operations.

HxGN SDx can also be fully interfaced to j5 Operations Management Solutions, adding even more value along a digital road map aided by Hexagon technologies.



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 a comprehensive Digital Twin is deployed, the associated data needs to be efficiently dissected to understand it and to also transform this into actionable information. To help achieve this, the **Hexagon Situational Awareness** solution – powered by Luciad – allows personnel to clearly see what's happened, what's happening, what could happen, what should happen and what's scheduled to happen in a high-level operational dashboard that includes 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.

Hexagon solutions help people design, engineer, construct, operate and maintain industrial assets, and a Digital Twin enables asset owners and operators to build and maintain an information management data ecosystem throughout the asset lifecycle, allowing for a continuous journey of operational excellence.

Conclusion

It's clear that inadequate information management has significant effects to your OPEX.

But that's not all; its impact can persist throughout the extensive lifetime of a brownfield facility and cause lower efficiency, output and increase unnecessary safety risks. It's an issue that should be a high priority for every owner operator who is keen to ensure business resilience and future-proof themselves in a post-COVID-19 economy.

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 could benefit from an improved process.

Reveal Your Growth Areas

HEXAGON

Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous — ensuring a scalable, sustainable future.

Hexagon's PPM division empowers its clients to transform unstructured information into a smart digital asset to visualize, build and manage structures and facilities of all complexities, ensuring safe and efficient operation throughout the entire lifecycle.

Hexagon (Nasdaq Stockholm: HEXA B) has approximately 20,000 employees in 50 countries and net sales of approximately 3.9bn EUR. Learn more at hexagon.com and follow us @HexagonAB.

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