

GUIDE

The role of digital field inspections and data collection in the oil and gas industry



There are few industries more volatile than oil and gas. Between wildly changing market conditions of demand and pricing, a heavy regulatory burden, increasing environmental scrutiny, and mitigating health and safety hazards to workers and the public, it's never been more challenging to keep operations running smoothly. Some numbers behind the headwinds:

Limited oil and gas insurers

With 70 percent of the insurance market for oil and gas concentrated in only 10 insurers,¹ oil and gas companies can't shop around much for better insurance prices. In addition, increasing environmental, social, and governance (ESG) pressure is resulting in some insurers scaling back what operations they will insure, while others exit the market altogether.

Worker shortages

Like just about every other industry, energy is plagued with problems finding and retaining skilled workers. In 2020, about 20 percent of oil and gas jobs were eliminated² due to decreasing demand for energy during the pandemic, and many of those workers have not returned. Energy employers will have to raise salaries and provide other incentives to attract workers who may be getting paid more to do less labor-intensive work.

Safety concerns

Here we have some good news: the job injuries and fatalities in the oil and gas sector have decreased from a high of 3.4 cases per 100 workers each year in 2006 to 1.4 per 100 workers in 2020.³ While this is less than half of annual rate of construction and manufacturing industries, oil and gas does have a significantly higher median days away from work rate⁴ – at 24 days, this is three times higher than the median for all other industries. This shows that while the likelihood of injury is less in oil and gas than in some other sectors, injuries tend to be more severe when they occur.

ESG pressures

Environmental, social, and governance (ESG) investing prioritizes optimal ESG outcomes⁵ – and the oil and gas industry is squarely in the cross hairs of regulators, investors, and environmentalists pursuing ESG-driven agendas. Between studies revealing that oil and gas produces 25-40 percent more methane emissions than previously thought,⁶ the SEC's focus on ESG disclosure rules,⁷ and increasing pressure for investors to divest fossil fuel stock,⁸ the impact of ESG will likely increase in the future.

The oil and gas industry needs to address each of these challenges to remain competitive. Fortunately, technology in the form of digital transformation of safety, environmental, and maintenance programs can be the change that makes continued growth and industry viability possible.

According to McKinsey, while most companies have incorporated digitization into at least some of their operations, 70 percent of these projects are still in the pilot phase.⁹ If your company is one of these slow digital adopters, read on to learn why digitizing your safety, environmental, and maintenance programs through digital field inspections and data collection is smart both financially and operationally, and a lot easier to get started than you might think.

Safety challenges

When it comes to worker safety, the oil and gas industry is safer than manufacturing – heck, it’s even safer than retail (3.1 incident per 100 FTE workers versus 1.4 per 100 FTE workers).¹⁰ The difference lies in the kinds of injuries sustained by workers in each industry. For example, the most common injury in retail is muscle strain;¹¹ in contrast, the most common injuries in oil and gas are fractures.¹² The rate of serious injuries and fatalities in oil and gas is seven times higher than the average rate for U.S. industries, with amputation leading the list of most common serious injuries.¹³

The nature of the work in oil and gas exposes workers to heavy machinery, toxic chemicals, flammable liquids and gasses, inclement weather, and more. In addition, the very culture of oil and gas worksites can lead to more accidents. As noted in a 2014 Energy and Environment Daily¹⁴ report:

- Temporary, transitory workers may be apathetic to safety protocols
- A “macho” image among workers results in more risk-taking behaviors
- Smaller, outside contractors often lack safety expertise
- Remoteness and isolation of work sites can lead to substance abuse, and with it, increased accident risk¹⁵



Environmental concerns

Between the current SEC posture on making rules for ESG disclosure, including pending rules on climate risk transparency,¹⁶ and increased public scrutiny causing investors to pull back on fossil fuel investing, the oil and gas industry is facing pressure like never before to make changes in its environmental policies or risk losing investments, government tolerance, public support, or all three.

For an example of a recent finding that is ratcheting up environmental pressure, you need only to look at research on oil and gas “ultra-emitters” of methane gas. Satellite monitoring uncovered that large amounts of methane released during maintenance operations and equipment failures represent as much as 12 percent of global methane emissions from the industry, even though they are excluded from methane emission totals.¹⁷ And while in the past certain jurisdictions have allowed companies to pass on “lost and unaccounted-for gas” costs to their customers, some places are now capping these costs, giving companies further incentive to repair leaks.¹⁸

As recently as 2019, pipeline spills and leaks were not considered a “major financial concern” for gas and oil operators, and did not constitute a “material consideration” for investors.¹⁹ With pledges of net-zero emissions by four major oil companies,²⁰ eliminating leaks will likely at last become a priority, particularly if companies are caught out on their “oopsie” emissions outside of normal operations.

Maintenance initiatives

Maintenance at oil and gas plants is critical for many reasons, including safety, equipment longevity, and reduction of downtime. However, as with many areas where corners can be cut without immediate repercussions, it may be tempting to delay maintenance issues to attend to activities that generate more immediate advantages.

One case study of an oil and gas company compared years where maintenance was carried out regularly versus when maintenance was outsourced and performed at rates between 39 and 88 percent of the recommended rate shows the consequences of inadequate maintenance:²¹

- Decrease of average annual availability from 97 percent to 79 percent
- Annual financial loss of 13 percent of sales turnover
- Increase in unplanned downtime versus planned downtime (250,878 hours vs 27,742 hours)
- Unplanned stoppage of production causes flaring of residual gas, with gas loss of \$35M annually²²

In addition to the costs of unexpected repairs being on average 10x greater than the cost of scheduled maintenance,²³ regular maintenance also reduces the risk of injury and helps to maintain warranty coverage on equipment.²⁴

Finally, when fuel prices are low, it's critical to avoid unnecessary costs caused by downtime and equipment repair that will eat into tight margins. When fuel prices are high, lost time equals lost revenue in dollar amounts that quickly become substantial.

Digitization for safety, environmental, and maintenance management

It's not easy to get everyone on the same page when it comes to workplace safety. In addition to the intrinsic factors making the oil and gas industry more dangerous, the many different contractors/subcontractors working on each project as well as multiple job sites means that achieving an across-the-board safety focus is a challenge.

The same holds true for environmental initiatives and maintenance upkeep – the more spread out the workforce, jobsites, and management, the more difficult it is to maintain consistent environmental standards and maintenance schedules.

Let's explore how a digital field inspection platform can help with safety, environmental, and maintenance goals, no matter where your team is working.

Onboarding

The first few days of any new job is hard; this is doubly true if you're in the field with a trainer who may be a 10-minute walk away – or not on site at all. With a digital field inspection platform, help is always at hand in the form of a mobile phone or tablet. Step-by-step instructions along with reference photos and videos convert a handheld device into a field bible, guiding new workers – and keeping them safe – as they learn the ropes.



Supervision

As in the scenarios above where a supervisor is not readily available, a digital field inspection platform gives managers the ability to check in with their field staff wherever they are, including monitoring work performed, items inspected, or data collected in real-time. This results in near-instant feedback on tasks to avoid time-wasting do-overs. Even better, errors can be identified early so bad habits that can lead to safety accidents, environmental incidents, or maintenance missteps don't become entrenched and harder to overcome.

Location mapping

Natively collected GIS data helps your field teams in several ways. First, the data guides workers to the precise location where work, inspections, or data collection must be performed – for example, for pipeline inspections, workers are directed to an area of pipeline, then narrowed down to each individual pipe joint.

The GIS data available on the worker's mobile device ensures that the work is done at the right location and on the correct component, guaranteeing that safety, environmental, and maintenance tasks are not overlooked. In addition, should a problem be detected, the worker can immediately summon help to the precise location of the issue, eliminating any guesswork or ambiguity that can slow remediation.

Community reporting

On a worksite, hazards can become so commonplace or ingrained that workers don't notice them anymore, and a fresh set of eyes can help point out issues that are missed. Instead of relying upon inspections by people with "safety" or "environmental" in their titles, community reporting allows everyone to report safety and environmental concerns, even if they're not on the team, are not safety/environmental professionals, or perhaps don't even work at the same company.

Community reporting helps make safety a shared responsibility, which is only right – when **anyone** can be hurt, everyone should have a stake in keeping worksites safe. And when an environmental issue can hurt not only workers but the public at large, expanding reporting to anyone who notices an issue provides another layer of protection against potentially devastating environmental impacts.

OSHA/EPA/regulatory compliance

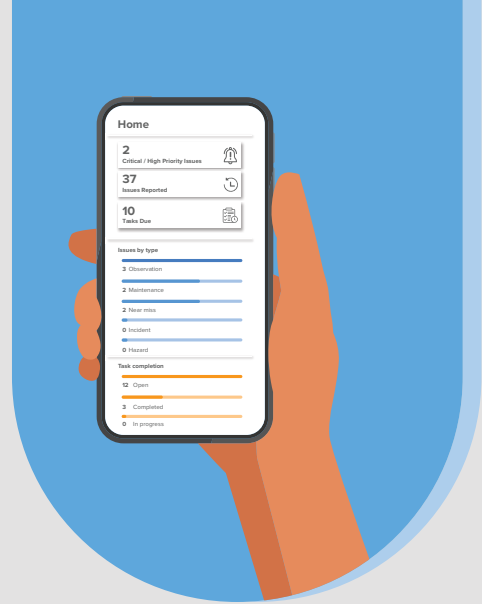
Not only does a digital field inspection platform help to keep worksites regulatory compliant, it also easily creates the detailed reports OSHA, EPA, and other regulatory bodies demand to determine site compliance. When every toolbox talk, inspection, maintenance task, remediation, and safety initiative is recorded and available for scrutiny, proving compliance involves little more than a few mouse clicks and sharing of files – a far easier task than rooting through piles of paper to somehow compile into a usable reporting document.

Conclusion

With the highs and lows of oil ranging from about \$37/barrel in April 2020²⁵ to \$145/barrel in 2008,²⁶ and natural gas at a low of \$1.73/per million BTU in 2016 versus a staggering \$8.81/per million BTU in August 2022,²⁷ it's no secret that the oil and gas industry is incredibly volatile.

Increasing pressure from legislators, regulatory agencies, investors, and the public ensures that reducing the environmental impact of fossil fuels will continue to cause economic hurdles as oil and gas companies struggle to adapt.

A digital field inspection program that serves to keep workers safe, the environment protected, and equipment operational, will help companies survive uncertainty, shifting investor and regulatory priorities, and market instability, whatever changes might come along.



LEARN MORE

To find out more about the Fulcrum field inspection management platform and how it can help you improve performance, increase compliance, and prove the effectiveness of your safety, environmental, and maintenance programs, visit fulcrumapp.com



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