ADOPTING DIGITAL TO BREAK THE EHS PERFORMANCE PLATEAU

Harnessing new technologies to enhance Environmental, Health & Safety (EHS) performance across asset-intensive industries and achieve the goal of zero incidents.
THE GROWING CHALLENGE OF “GETTING TO ZERO” INCIDENTS

IMPROVEMENTS IN EHS PERFORMANCE HAVE REACHED A PLATEAU...

Across asset-intensive industries globally, improving workplace Environmental, Health & Safety (EHS) performance has never been more vital. Yet industry statistics suggest it has also never been more difficult.
WHY?

As Figures 1A and 1B illustrate, industry studies and official data show consistently that companies’ EHS performance has plateaued in recent years. What is clear is that the strong gains made in previous waves of safety innovation have run out of steam, and further improvements have become progressively more difficult to achieve. A similar pattern and stagnation point can be seen across multiple industries – oil & gas, chemicals, mining & metals, transport, utilities and more. Worst of all, these industries still suffer fatalities.

FIGURE 1A:
Total recordable incident rates (TRIR) in US asset-intensive industries, 2012-2016

FIGURE 1B:
Fatalities and fatal incidents in the global oil & gas industry, 2008-2017
Source: International Association of Oil & Gas producers
TO SET THE CURRENT PLATEAU IN CONTEXT

From 1960 to 1980

Improvements in equipment played the most important role in driving companies’ increasing safety performance. Then, in the period up to 1995, advances in management systems kicked in to enhance performance further. The decade after that was an era of safety culture and behavior-based safety programs, influenced by the Bradley Curve’s revelation of the correlation between culture and EHS performance.

Fast forward to 2005

The pendulum swung back again, ushering in a decade focused less on behaviors and more on rules and individual obligations. This period brought Life-Saving Rules (if employees break an LSR, they are choosing not to work for the company) and Socially Just Culture (while the organization has a duty and responsibility to employees, both have an obligation and accountability in terms of safety and all employees are held responsible for the quality of their choices). The latter approach balances the need for an open and honest reporting environment with the goal of creating a high-quality learning environment and culture. In combination, these and other initiatives helped to trigger a new wave of reductions in total recordable incident rates (TRIR) and fatalities.

But today,

Companies in these sectors face major hurdles as they seek to make further progress toward their aspiration of “getting to zero” in terms of EHS incidents. The challenges are increased by the tendency for EHS projects to struggle when seeking internal funding for digital investments. At the same time, the changing demographics of the workforce mean that traditional approaches to employee engagement and performance management are rapidly running out of road – a point explored in a recent Accenture report on safety in the chemicals industry.²
...AND DIGITAL IS THE WAY TO KICK-START PROGRESS AGAIN

So, what’s to be done?

To break out of the current stasis, companies need new EHS approaches and solutions that will enable and empower them to achieve better engagement and performance. The way to achieve these goals lies in harnessing the power of digital technologies to unlock new levels of EHS delivery, while also creating additional business value for the organization as a whole.

The impacts of digital on EHS are so profound that they herald a new era of safety powered by analytics. Used in combination with powerful technologies ranging from artificial intelligence (AI) to social platforms, and from mobile Internet of Things (IoT) sensors to drones, analytics has the potential to break the glass ceiling and take safety performance to a whole new level, through advances including enhanced predictive capabilities. As a result, companies could generate improvements such as TRIR reductions of 20 percent or more from today’s levels.

In this paper, we examine the changing landscape of EHS, looking at how it is being reshaped and transformed by digital. We go on to highlight the increasing role of safety as a value lever in its own right. And we focus on the huge opportunities opened up by architecting and implementing digital EHS solutions, which will both reduce operational risks and generate value throughout the enterprise.

If your business’s EHS performance has plateaued, then digital can be the catalyst for a new phase of improvement – while also delivering wider operational and productivity benefits. This paper will describe how.
THE AS-IS SITUATION:  
EHS HAS BEEN LAGGING IN THE RACE FOR IT INVESTMENT

Historically, when asset-intensive businesses have allocated corporate IT dollars for investment across the enterprise, the EHS function has not been at the front of the queue. This is because EHS has had to compete against other areas of the business offering a more immediate, visible and compelling return on investment (RoI).

As a result, when the EHS function has sought capital funding to invest in technology, it has all too often seen that money allocated elsewhere in the business – meaning it has lagged behind other functions in terms of digital investments. Historically, the primary factor spurring top-level commitment and the flow of digital investment dollars has generally appeared to be a high-profile critical incident, highlighting a problem that needed to be fixed. This is a reactionary approach to issue resolution – and if it persists, EHS will continue to struggle for its fair share of technology spend.

**Digitized operations open up a new path to EHS value...**

Today, as digital technologies become ever more pervasive across asset-intensive businesses, this negative mindset towards safety-related technology investments needs to change, for two main reasons.

The first is the rapid, enterprise-wide penetration of new technologies – mobile, cloud, social, automation, AI and more – all of which offer clear potential benefits in EHS. These advances bring technology closer to where people need support in managing EHS risk, and integrating technology naturally into their daily jobs.

Whether specifically EHS-related or not, these technologies all present opportunities around safety. By way of example, consider the safety implications of equipping a frontline mobile worker in the field with sensors, contact with experts, control rooms and over-the-shoulder coaching; fostering improved collaboration in teams supported by a “social safety bridge”; enabling improved collaboration with contractors via cloud solutions; and using IoT and AI to provide workers with new, instantaneous insights about their surroundings. With these capabilities in place, the company can track people and assets in the facility; the control room will have real-time visibility for emergency mustering and safety/security; and dynamic barrier solutions will provide a (near-) real-time automated view of risks across operations, down to the equipment level. Automated observation of unsafe conditions and actions is possible with video analytics. It enables real measurement of safety pro-actively, which provides a good reflection for the workforce on behaviors.
Think also of how virtual reality (VR) technology can provide cost-effective and immersive learning experiences (i.e., by putting people at risk virtually so they can practice safety measures in a controlled environment). VR can also be used for EHS modelling and predictions. All of these technologies and more represent the new wave that can help

Alongside advances in technology, the second reason why the mindset towards safety-related investments must change is the industry-wide shift towards implementing integrated operating models enabled and powered by digital. This means breaking down traditional silos in the business, thereby creating more opportunity to invest jointly in digital technologies across and between different functions, and to deliver more value back to the organization.

At the same time, rapid increases in the availability of computing power allow analytics, AI and machine/deep learning to crunch data sets and combine data from siloed data sources (Operations, Human Resources, EHS, Maintenance), revealing unique insights that enable asset-intensive companies to do three key things:

1. **Predict high-potential (HIPo) incidents.**
2. **Predict inherent fatigue risk level.**
3. **Manage health and wellbeing risks.**
Together, these developments – digital capabilities and digital operating models – open the way to the achievement of two key objectives. First, the capabilities and models trigger a new wave of improvement in EHS performance to revitalize the culture and journey toward the ambition of zero incidents. And second, they boost RoI from technology investments by generating returns in multiple areas of the business at once – EHS included.

To deliver these goals, we are now seeing companies seek opportunities to invest in technology in ways that deliver these wider and higher returns. The enablers for this new focus include sustained and robust commitments from leadership, underpinned by an acknowledgement that safety is now a value lever in its own right – with any company’s TRIR performance scrutinized by stakeholders (investors, employees, suppliers, regulators), shaping the attitudes and actions of each group towards the business.

...as EHS moves to platforms...

To succeed in applying this new, more holistic lens to their technology investments, companies must first acknowledge that digitization involves much more than transforming manual processes or Excel spreadsheets to software databases and/or integrated systems. True, these steps are aspects of digitization – but it also includes integrating technology into business processes to increase efficiency, reduce risk and collect more robust data to enable better-informed decisions. By way of example, take the emerging trend towards the adoption of digitized safety processes that enable predictive safety analytics using AI and drone technology.

Against this background, digital safety is increasingly going hand-in-hand with digital advances in EHS-related functional areas including maintenance and reliability, production operations, quality management and environmental sustainability. At the same time, EHS functions are moving away from customized and local-use only applications to implement platforms that serve the entire enterprise and integrate with the enterprise resource planning (ERP) systems and other business functions to share data.

These trends are seeing point-solution technologies give way to digital platform and service approaches, as companies’ digital safety capabilities advance and evolve. Application integration is critical to the effective functioning of these new EHS platforms, as data and capabilities expand to span different functional areas and work activities. At the same time, shareable, accessible, real-time data enables better analysis and more informed decision-making – in turn supporting rapid risk reduction, while also allowing companies to become less reactive and more proactive in managing safety.

Companies should also consider the potential of non-EHS platforms to manage certain EHS processes. They’re often ideally positioned and equipped to do this, as they have the scale to leverage mature digital technologies like IoT and AI/analytics. They can also reap the benefits of digital much more quickly than traditional EHS vendors, which are typically smaller.
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…and builds a safety culture that resonates with a changing workforce

A key aspect of the move to platforms is the embedding of a digitally enabled safety culture and continuous collaboration across the enterprise. As younger generations of workers join the oil & gas, chemicals and mining industries and then rise to management levels, they are bringing with them new and different cultural norms, based on experiences and expectations including constant connectivity, pervasive usage of technology, and peer-to-peer engagement via social media.

The kinds of on-demand, personalized services that today’s rising generation of employees expect and demand present significant safety-related opportunities in areas like training, over-the-shoulder coaching, stakeholder engagement and more. As the accompanying boxout shows, the digitally connected worker is rapidly becoming an everyday reality in industrial environments globally – and companies are in the vanguard of this advance, bringing major safety opportunities.

**DIGITALLY CONNECTED WORKERS WILL PREDOMINATE IN INDUSTRIAL ENVIRONMENTS**

According to an Accenture survey of more than 500 industrial executives in North America, Europe and Asia, 85 percent believe connected workers will be commonplace in their plants by 2020. As a result of this advance, 52 percent of companies expect improved productivity, 47 percent expect improved operational efficiency, and 31 percent expect enhanced safety and risk management.

What is more, equipped with this constant connectivity and the resulting collaboration spanning generations with digital safety capabilities, companies can improve knowledge transfer and knowledge capture – enabling them to share insights more effectively, and to avoid losing valuable experience when people retire or leave. Over the past three years, technology vendors have responded to the move toward digital EHS platforms by developing and rolling out their own solutions. As a result, the market for commercially available and easily configurable – not customizable – EHS platforms has matured rapidly over that time, and it is continuing to develop at pace.
THE WAY FORWARD: ARCHITECT AND IMPLEMENT DIGITAL EHS SOLUTIONS – WITH PEOPLE IN MIND

So, against the fast-changing background we have described, what is the best approach for companies looking to revitalize their progress towards zero safety incidents? In our view, companies should map out a journey consisting of three steps.

1. **First, identify the key areas of operational risk that are impacting both EHS and operations performance.**

In the past, safety performance and operational performance have frequently been regarded as essentially separate – and all too often, asset-intensive companies have inadvertently created two distinct perspectives that can be summed up as ‘safety versus production.’ The workforce sees this as a polarized either-or choice, which can lead to behaviors – such as rushing and taking short-cuts – that increase the risk of an incident occurring. In fact, safety and operational performance are inherently linked, since nothing undermines or disrupts operational performance more severely than an issue related to EHS.

2. **Second, collaborate with other business functions to understand where they want to invest – and are already investing – in digital technologies, to determine if that investment can be shared with EHS.**

As Figure 2 shows, research conducted for the Accenture Technology Vision 2018 finds that the top five areas for investment in emerging technologies across all industries are IoT/ smart sensors, AI, blockchain, augmented/ virtual reality (AR/ VR), and robotics/ automation. Significantly, the oil & gas, chemicals and mining industries are ahead of the curve in several of these areas:

- 67% of companies are intending to invest in IoT/ smart sensors.
- 68% of companies are intending to invest in chemicals.
- 76% of companies are intending to invest in Downstream Oil & Gas.
- 39% of companies are intending to invest in augmented/ virtual reality.
- 48% of companies are intending to invest in mining.

All of these leading-edge technologies bring major potential not only to improve operations, but also to enhance EHS.
Third, leverage the new digital landscape to access more data, and implement analytics that progress the organization from reactive to predictive models.

A further finding from the Accenture Technology Vision 2018 research⁶ is that executives say data is being used at unprecedented scale to drive critical and automated decision-making. The majority (88 percent) of chemicals industry executives agree this is the case⁷ – and many believe that it is vital for them to be leaders in leveraging data effectively. While just 27 percent of organizations across all sectors say it is “very important” for them to be a pioneer in AR/VR, or what Accenture calls Extended Reality (XR) solutions, this figure rises to 37 percent in chemicals and 39 percent in metals & mining. And while 17 percent of all respondents expect the volume of data exchanged with ecosystem partners to increase significantly over the coming two years, the figure in downstream oil & gas is 28 percent.⁸ To generate the most value from data, businesses need to pull together higher volumes of data from the full range of available sources, and apply analytics that enable them to anticipate issues before they emerge – generating clear benefits in terms of both operations and EHS.

<table>
<thead>
<tr>
<th>Technology</th>
<th>Adoption Rate</th>
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<tbody>
<tr>
<td>IoT/ Smart Sensors</td>
<td>67%</td>
</tr>
<tr>
<td>Artificial Intelligence</td>
<td>66%</td>
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<tr>
<td>Blockchain</td>
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<td>AR/ VR</td>
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<tr>
<td>Robotics/ Autonomous Robots</td>
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<td>3D Printing</td>
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<td>Autonomous Vehicles</td>
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<tr>
<td>Wearables</td>
<td>29%</td>
</tr>
<tr>
<td>Drones/ UAVs</td>
<td>23%</td>
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**FIGURE 2:** In which of the following new and emerging technologies is your organization making investments over the next year? Select all that apply.⁵

Source: Accenture Technology Vision Survey, 2018
THE KEY: DIGITAL MUST SERVE HUMANS – AND MUST BE TAILORED TO BUSINESS USE CASES

To realize the full potential of digitization both for EHS and operations, a key principle is that technology must serve humans, not the other way around.

To make this happen, it is vital to leverage data from wherever possible – equipment sensors, wearable sensors, finance, logistics and more – to enrich EHS understanding and situational awareness. Then the organization should apply worker-centered “design thinking” to imagine what safe behaviors look like, and then identify how to forge them.

In simple terms, design thinking is a concept applied to embed a digital technology successfully (see Figure 3). In theory, every technologist can build a prototype of a new technology in his or her “garage”. But the only way to ensure that a digital solution will deliver value and can be deployed at scale is to build it in a specific business context, seamlessly integrated into the natural way people work, and in an ethical and socially just way. Failing to apply these principles can result in proofs of concept (PoCs), prototypes and pilots ending up stranded without a viable business use – something we see happening in all too many organizations.

“Design Thinking is a human-centered approach to innovation that draws from the designer’s toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success.”

TIM BROWN,
CEO of IDEO
A leading Design Thinking firm
FINALLY, A WORD OF CAUTION.

Using digital technologies is not about going to the maximum and applying everything to the full. For example, excessive use of mobile devices might distract workers from their jobs, which could even pose an additional safety hazard. Similarly, social media has the potential to disrupt people’s work as well as augment it. The key is to apply a balanced approach, aimed at using these technologies wisely at the right time and place, in a way that’s closely governed and well-controlled.

A methodology such as design thinking will ensure a company takes this type of approach. It will also ensure that the people factor is always considered: this is imperative, because experience shows that any change that ignores humans will in turn be ignored by humans – something that is arguably truer in EHS than in any other domain.

A future founded on digital collaboration

The message is clear. Going forward, EHS functions must increase their collaborations with other parts of their businesses, in a joint quest to seek out and seize mutually beneficial opportunities to embrace the digital revolution. In asset-intensive industries, good safety is good business – and digital technology supports both. Now is the time to break out from the EHS performance plateau. And digital will enable you to do it.
About Accenture

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Sources

7 Chemical industry trends, technologies and opportunities.