

OPEX 2019:

The drive towards operational
excellence in oil and gas



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The need for operational excellence (OPEX) in the oil and gas industry is not a new trend; companies have been talking about it for years. However, OPEX remains a somewhat vague goal as different organizations come at it from different perspectives. They know that they need to reduce costs, improve efficiency, and enhance customer experience – all promised by OPEX – but the path to achieving that goal can differ significantly from company to company.

In this report, Oil & Gas IQ offers some definition and structure to what OPEX looks like for oil and gas companies. Leveraging themes discussed during the OPEX Online 2019 conference, we'll focus on OPEX as it relates to the use of data and analytics software, digital transformation, agility, ageing assets, and risk-based inspection.

The 2019 online event, which was attended by more than 1,000 oil and gas professionals from across the globe, featured speakers and thought leaders from OpenText, Shell, Texas A&M University, Kinder Morgan, and ADNOC. This report contains highlights from the event and discusses challenges to achieving OPEX in 2019 and beyond, as well as solutions designed to help companies reach their goals.

Operational excellence is a massive part of the modern oil and gas industry, and affects every facet of engineering, operations, design, and decommissioning. However, thought leaders and attendees of the conference were most concerned with a few key areas: Data and analytics, employees and workforce, digital transformation, and ageing assets. Those priorities are reflected within these pages.

“Operational excellence means many things to many people. To the maintenance engineer it’s having all the data and documents needed to perform a work order; to the HSSE officer it’s making sure all safety processes are being followed; to the plant director it’s a live dashboard showing current performance and predicted productivity. From a strategic perspective, it means joining together and optimizing the processes and data that operate your business.”

Martin Richards

Senior Director, Energy Industry Strategist,
OpenText and OPEX Online 2019 conference chair.

PART I: Digital transformation

CHANGING INDUSTRY AND DIGITAL PRESSURES

What does OPEX actually look like in the oil and gas industry? With a diverse range of operators, vendors, and end-user oil and gas companies, the industry is almost immeasurably vast and ever-changing. However, in 2019, the main areas in which oil and gas companies are focusing are:

- Improved labour utilisation.
- Early failure warning savings, particularly related to shutdowns, turnarounds, and outages.
- Increased asset availability in multi-use, multi-purpose facilities.
- Increased percentage of the workforce's time spent on planned activities.
- Reduced maintenance costs.
- Better adherence to compliance requirements.
- Reduced unplanned downtime.
- Improved asset utilisation.

These factors are especially important in this age of increasing industry pressures, not just for the business' bottom line, but also as the business modernises.

The change in the industry is being led by compliance pressures, which require a robust strategy to navigate stringent and ever-changing regulatory and safety requirements, as well as the burden of shifting to an ever-more digital model.

Other priorities include doing more with less as margin pressure increases; making the best investments as commodity prices shift; and managing generational differences as training costs soar, equipment knowledge wanes, and institutional know-how ages out of the company.



“An operationally excellent company will have lower operational risk, lower operating costs, and increased revenues relative to its competitors, creating value for customers and shareholders.”

Martin Richards

Senior Director, Energy Industry Strategist,
OpenText and OPEX Online 2019 conference chair.

SOLUTION?

Holistic digital transformation

Many solution providers in the oil and gas space are now merging to create global leaders in business technologies to help drive digital transformation. In the OPEX sphere, these solution offerings usually relate to integrated engineering and design, asset life cycle information management, enterprise resource management, construction management, fabrication (and marine) solutions, and procurement.

Not only are mergers becoming more common, but solution providers, operators, and oil and gas companies are now learning to avoid doubling-up on in-house expertise, and instead working holistically with their partners.



This intra- and inter-company work ethic and structure is integral to achieving maximum efficiency. Agility, delivery, and value are the new benchmarks that players are striving for.



Agility

Reflecting the growing move towards digital processes and information management systems.



Delivery

Including a comprehensive approach to improvement across all functions; a continuing focus on building capability; and a permanent shift in leadership attention.



Value

Not just for the customer, but also for the wider field of consumers and the supply chain.

The end goal of this three-fold strategy should be to drive digital transformation across the entire operational life cycle to achieve improved profitability and operational excellence in this high-capital industry.

“In-house expertise and third-party expertise, in an ideal situation, should work together. In-house expertise should primarily manage the day-to-day, and the basic design should be supported by ongoing continual support in-house. A lot of this becomes tribal knowledge. However, you may need to rely on third-party expertise to fill in gaps in your knowledge, to help during a transition, or to deal with topics that are too technical and specific to require a full-time in-house professional.”

Earl Crochet

Director of Engineering and Operational Optimization,
Kinder Morgan and OPEX Online 2019 conference speaker

PART 2:

Analytics and data

CHALLENGES TO ACHIEVING OPEX - VITAL DATA

Attendees of our OPEX Online 2019 conference expressed widespread concern regarding the collating of data from multiple sources and the transmission of that data to the teams who need it. Getting that operational data into one place and then connecting a team to an advanced analytics tool that's interactive and intuitive seems to still be difficult for many. There is evidently a need to shift focus to time series or preface data to finally tackle these challenges.

The main concern is aligning data. After all, data could have different time stamps or different units of measurement, and it might need converting with varying types of interpolation. So how do companies look only at the data they want in the timeframe they're interested in? How do they pan and zoom across dates and make sure they're focused on the data from the desired period?

A common first step is data cleansing, however, anyone who has worked with process data knows this method is inherently noisy. It could involve removing noise from the data so that it doesn't interrupt analysis, or it could require tools that allow companies to smooth out data and fill in gaps to provide a sound foundation for analysis.

Companies also need to be able to do some difficult calculations, yet many analytics applications struggle with time-weighted statistics, such as the area under a curve. Having a tool that allows engineers to quickly do these difficult analyses is critical.

Finally, companies need data contextualization. This is important because engineers cannot look at all data all the time. It's more useful to examine a specific period of time: Data during a unit shut down or start up, or when batch operations are running at a certain grade.

SOLUTION?

Advanced analytics and data leveraging

There is a huge amount of data in a manufacturing environment. With the right analytics tool, employees can gain insights from data so that manufacturing results can be improved and operations can be optimised.

Before employees can be empowered to analyse data and unlock its power, the data has to be accessible - ideally in one location. Subject matter experts (SMEs)

therefore need applications that allow them to tie together all of their data. This could include processed data from sensors stored in a historian; lab data from a different system; data stored in a SQL database; data stored in unstructured format such as documents; and other types of contextual data. The goal is not to move or copy the data - it's perfectly fine being stored where it currently sits - but to make the data easily accessible for analysis.

PART 3:

Employees and workforce

THE STRUGGLE TO EMPOWER

Once data is made accessible to employees from one location, there remains the matter of empowering and enabling the workforce to utilize this data. It is a real challenge for many companies to connect their SMEs to the applications that provide the data. These SMEs could be new to the company, or they could be operators with decades of plant experience who are struggling with a technological transition. In either case, the applications that enable analysis should be interactive and intuitive.

“Empowering employees” is essentially the refining of intelligent colleagues’ hunches. Companies should provide applications that allow them to explore data and back up what would have been human expertise with data-led evidence. However, such an analytics application is often seen as expensive and unnecessary.

SOLUTION?

Self-direction

When discussing analytics applications, “self-direction” is often brought up as a preference, but what does it mean? Put simply, it means the application gets SMEs moving quickly with their ideas. So if an SME has an idea, within 15 minutes the low cost of curiosity can be formed into a rough draft of that idea.

However, the analytics tool in this instance must be highly visual, as visual feedback makes any tool more intuitive. If a company wants to visualize their results immediately, before fine-tuning their approach to find exactly the results they are looking for, a strong analytics tool would allow this. The right tool also needs to be iterative to enable companies to analyse at the speed of thought, rather than in a few minutes’ time (as was the case 20 years ago) or even seconds (as is still the case in many oil and gas companies). As we approach the 2020s, it is vital that the oil and gas sector be able to

interact with tools spontaneously and be able to devise hypotheses on their data instantaneously.

Therefore, the right tool must also be flexible to accommodate a wide variety of different calculations and analyses for different types of engineers, sites, operations, and across different scales. Truly scalable tools will not only be reliable when it comes to on-demand data, but will also allow interaction across asset groups, in different plants, and across corporations working in partnership.

Finally, this application or suite of applications has to be “modern”; it can’t slow down existing applications or be a burden on IT in charge of maintaining and troubleshooting it. All support software should deliver ease of use and ensuring that this filters down to the “boots on the ground” is vital.

PART 4:

Ageing assets

INCREASING RELIABILITY AT END-OF-LIFE

How do oil and gas companies attempt to increase the reliability of infrastructure in the autumn years? One approach relies on a series of predictions over the next few decades:

- 1 The wide-scale implementation of and adherence to a reliability culture that is compatible with OPEX.
- 2 The eventual decline and replacement of ageing assets currently in operation.
- 3 An energy shift - in this case, to solar - to give but one example towards the end of the century.

To achieve a proper asset investment management (AIM) strategy, the design and construction of the assets themselves need to be risk-profiled, taking into account age, location, purpose, fuel type, and market risk. The reliability of the asset also needs to be monitored, with data spanning as long a time-frame as possible and collated to provide a picture of the asset's reliability to date, thus enabling an OPEX team to use analytics to determine the likely degradation in the future. This will hopefully translate into what we've termed operational calmness - or, of course, the opposite: A serious wake-up call!

When the wake-up call does occur, spills, erosions, and corrosion due to fuel and water need to be immediately measured, along with any other known risks. If the asset is beyond repair, or is no longer financially viable, then decommissioning is the only viable alternative. The prediction is that enough decommissions will occur to make a switch to alternative fuels feasible.

“Alongside analytical problems, key issues within the industry include ageing, unknown asset conditions, obsolescence, underperformance, change in use, and budget. An analytical tool can help with this.”

Manish Kamble

Team Leader, ADNOC and
OPEX Online 2019 conference speaker



SOLUTION?

Improving efficiency, agility and cost performance in ageing assets

Critical situations are frequent in the oil and gas industry. A few seconds is often the only thing separating an unforeseen incident and a major disaster. Unfortunately, many of the accidents in oil and gas can be linked back to a main or root cause of a lack of alertness, particularly in sites that may be ageing and becoming unpredictable.

Oil and gas companies need to become predictive using technologies that can help them to be aware of what will occur so they can increase asset availability by:

- Monitoring, to know what is happening right now by gaining a near-real time view of process and asset status.
- Becoming prescriptive to understand what should happen. This will allow companies to clearly look at the options and make decisions that will optimize operations.
- Becoming descriptive to understand and be able to explain up through management what happened and share these insights with the organization to help make informed decisions.

“So the first and the foremost issue which has been faced in major oil and gas companies is the ageing issue. Most of the facilities around the world are beyond 30 or 40 years of operation and some maybe even older than that. Particularly in ADNOC Gas Processing, we started operating since 1978, so it’s quite a broad spectrum of facilities.”

Ali Al Shammari

Manager, Reliability & Asset Life Extension,
ADNOC Gas Processing and OPEX Online 2019
conference speaker

“Process safety is constructed of design, engineering, and process management. It starts at a basic conceptual level and follows the business through to the point of mitigation of risks and building control. Failure to do this can lead to oversight, such as corrosion, and can cause an unsafe operating environment.”

Sandeep Singh

Director of Health, Safety, Environment & Quality Management, Linde Engineering North America and OPEX Online 2019 conference speaker

Conclusion

At Oil & Gas IQ, we believe that the oil and gas industry is on the cusp of a revolution that will unlock efficiencies that have hitherto been out of reach. Systems that manage large amounts of data and content should be upgraded to or replaced with smarter systems that can provide data to the workforce almost instantaneously. Ageing assets should be managed and maintained far longer than what was previously thought possible, enabling leaner, more agile oil and gas enterprises to employ more advanced technology to further manage the journey to true operational excellence.

Companies looking to move along their journey towards true operational excellence have a lot of hurdles to overcome, but also a lot of options. The benefits they should focus on are:

- Leveraging their existing data for meaningful insights: Augment their traditional data and content management systems, potentially with predictive analytics or AI software.
- Streamlining HSE and regulatory compliance within the organisation to gain efficiencies and to attempt full synchronisation of the information required to remain compliant.
- Unifying the wider business: Control data uploading and provide data access across departments wherever appropriate.
- Building a solid foundation to progress to true operational effectiveness: Efficiently managing the entire asset data cycle, from creation, through review and approval, and down to access.

It is our firm belief at Oil & Gas IQ that aiming for a full review of how data is managed and accessed, and striving for the ability to efficiently draw on data sets will allow companies to automate simple decisions and use their analytics to improve production uptime. The bottom line is, indeed, your bottom line.

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