Redefining
Building Construction Management
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DID YOU KNOW...
A digital version of *Insight* magazine can be found online. hexagonppm.com/insight-magazine
Industries that have accepted the status quo are ripe for disruption. To me, the construction industry is the example.

It’s almost comical that we can trot out facts that roll off the tongue because we have heard them hundreds of times before. Repeat after me. “Large projects take 20% longer than scheduled and are up to 80% over budget.” Construction productivity has declined since the 1990s! Declined! Profits for contractors are low and generally risky.

The construction industry needs to change, it’s an existential fact. According to McKinsey, the construction industry employs around 7% of the global workforce, yet it is among the least productive. This deficit is attributable to the rate at which it has adopted technology and the rate that it has not embraced a digitalization strategy.

But even before that shortfall, there are fundamental challenges of lack of coordination between the office and the field, work is paper-based, and the business model between owners and construction companies is archaic.

At Hexagon we aim to seize the opportunity to help businesses in this industry increase productivity and capture the economic value that is attainable within construction. When we look across our offerings, we have a unique set of technologies that can help enable digital construction.

From high-accuracy surveying and geospatial solutions, 5D BIM design capabilities, collaboration, digital project document management and project performance solutions, we feel that value can be realized in any one area and across many.

What makes us so confident we can help? Because many of the muscles needed here are ones we – across Hexagon – have built in the energy sector, an industry that had to embrace these principles and technologies as a priority for reasons of complexity, safety and efficiency.

We believe the key is to start by examining the processes which offer the greatest potential for return, which will enable a transition from doing the minimum to satisfy contract terms to doing that which provides the greatest value. It will be the glorious start of rebuilding construction.
WHAT ARE YOU USING TO MANAGE SAFETY-CRITICAL OPERATIONS PROCEDURES?

ARE YOU MISSING A VITAL HUMAN-SYSTEM INTERFACE?

Most plants have decent hardware and control systems, and collect real-time information using Data Historians. However, the human processes around these systems are often performed and recorded using inadequate tools such as paper, spreadsheets and word processor documents. These poor operations management processes have caused catastrophic incidents, creating an important requirement for more efficient, consistent and detailed data across day-to-day operations.

j5 Operations Management Software replaces paper forms, spreadsheets and scattered databases, providing an enhanced human-system interface solution. This adds value to other digital plant technology from Hexagon PPM, OSIsoft, AspenTech, SAP and IBM.

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Less Input for the Same Output

How the Right AEC Solution Can Help Save Time, Money (and CO₂ Emissions)

The advent of technology has reshaped how most industrial enterprises approach their work processes … except for the construction industry.
STENBERG: They’ve had the same challenges for decades. Productivity is low. The vast majority of projects come in late and over budget. Only 25 percent of time on the job site is tool time. The problems have gotten worse due to the size of projects.

Insight: How can Hexagon PPM help fix that problem?

STENBERG: We are a technology company, and it would be easy for me to just answer, “Buy this set of products and your issues will be solved.” While we feel we’ve built a comprehensive platform with Smart Build and our other traditional solutions, the industry must alter its culture and work processes for relevant change to occur. If I give you EcoSys but you still approach your work like you did in Excel, you aren’t going to see the improvement. Just buying software doesn’t fix anything; you’ve got to use it wisely.

Insight: Parent company Hexagon AB has announced emphasis on taking a greener approach to business. How can PPM help drive sustainability in the building and construction industry?

STENBERG: Our solutions address huge inefficiencies and waste. According to an Ernst & Young study, within $2.3 trillion of capital projects, an average of 60% are over budget. That is more than $500 billion miss. But that’s not just money. It is CO₂ emissions. It’s unnecessary work. We help our customers be more sustainable by helping them need less input for the same output.

Insight: Share the latest status on HxGN Smart Build.

STENBERG: Smart Build was first introduced more than two years ago. Due to feedback from beta customers, we have amplified it from the original intent. There were delays, as we had customers who wanted it to do things differently than we had envisioned. We had to learn about a new industry for us: different lingo, a different workflow. It is different process to create an office building rather than build an oil rig!

Customers wanted additional functionality than we had in the first iteration of Smart Build, and we are on this journey together. We collaborate with them, and we take their feedback seriously. We feel confident that we can expand the product even more. We have a handful of customers using it, and the feedback is good. We plan to go big with Smart Build in early 2020.

Insight: What have you heard about the efficacy of Smart Build on Hexagon’s own headquarters construction project in Qingdao, China?

STENBERG: Early on, there were some issues. The Qingdao campus is a truly huge R&D park, and that kind of project wasn’t in our original plan. So, we had to make the product more robust. It was fortuitous that we had the opportunity to test the solution on our own building project. We now have positive feedback from the builder and the subcontractors. That’s the thing with innovation … it’s not easy! But we believe in doing this with our customers, not in a silo. We are now on a very good path.

Patricia McCarter is the Senior Content Manager for Hexagon PPM Global Marketing and editorial director for Insight magazine. She is based at PPM headquarters in Huntsville, Alabama, USA.
CONNECTION:
The Intelligent Approach to Construction Management
For almost any undertaking in life, there is a budget and there is a schedule.

Those parameters of time and scope are necessary for a project – of any size – to be accountable and to conclude. However, in the construction industry, those two components are almost always unrecognizable by the time a project is completed.

**COST OVERRUNS IN LARGE GLOBAL CONSTRUCTION PROJECTS:**
- The Channel Tunnel (UK-France) 145%
- Denver International Airport (USA) – 167%
- Guangzhou City Transport Project (China) – 335%
- Scottish Parliament (UK) – 4,040%

The problem? Very few construction companies are fully digitalizing their efforts, and very few have integrated project management solutions to provide visibility into the true project status. Project schedules are quickly outdated – and in some cases abandoned – as they are too difficult to manage.

Information gaps between the office and the field leave stakeholders without timely information to make project decisions. Budgets and change orders are often in separate systems from the schedule, so the true status of the project is difficult to understand without manual collation and manipulation of data.

What construction managers need are software solutions that provide real-time insight into the planned design, schedule and costs vs the actual status. They need an interconnected environment where schedule progress deviations can be easily visualized at the first sign of a problem with the ability to drill into root causes, with bi-directional communication between all stakeholders to align planning as well as execution.

They need a mobile-enable platform to organize the complexity that accompanies the construction of massive projects – actionable information at their fingertips with all related model elements and documents so that trade crews know what they need to do and exactly when they need to do it.

So that the companies that build moderate office buildings to complex medical campuses can work in an integrated environment, Hexagon PPM has introduced HxGN Smart Build, designed to streamline building construction management while integrating other tried-and-true solutions in our portfolio.

“A true integrated digitalized solution provides the insight and ability to better control your project, the schedule and cost,” said Cathi Hayes, Vice President of HxGN Smart Build Solution Design. “We have all the pieces to impact change in construction.

“Cloud technology provides a robust BIM-based construction management solution with zero install for construction companies. This allows for quick project start-up time and unprecedented insight into projects without the need for IT department investment.”

This connects the people, processes and technology from the pre-construction planning through execution. And connection creates an environment where visibility of progress, schedule and cost gives valuable insights.

Christine Covell is the global marketing programs manager for Procurement, Construction and AEC for Hexagon PPM. She is based at corporate headquarters in Huntsville, Alabama, USA.
But what speaks even more authentically than prediction is the fact that Hexagon is using its software in the construction of its new company headquarters in China. The HxMI Industrial Park campus, located in the city of Qingdao on the mainland’s eastern coast, will host 500 employees in its office buildings and another 200 in the manufacturing facility.

**PROJECT SCHEDULE**

Design and engineering began in 2016, construction ensued in August 2018, and completion is scheduled for April 2020. The Smart Build construction collaboration platform is concurrently shared by the asset owner, general contractor and project management consultant on the project.

Key project data like project schedule, BIM models and project performance are tightly integrated within HxGN Smart Build, according to Dawei Shen, Smart Build Manager for PPM China, who has been key in the implementation of the software on the Qingdao project.
“Smart Build has been used to improve layout productivity and quality control with integration to Leica total station and high definition laser scanners,” Shen said. “It has been reported that digital layout using HxGN Smart Build and Leica iCON build and total station integration can increase productivity by seven times compared to manual processes.”

The project has implemented seven functional modules from Smart Build: model management, construction management, document management, issue management, digital layout, laser scan integration and project performance control powered by EcoSys.

WHAT THE NUMBERS SHOW
“...reporting a 60% efficiency increase in the resolution of issues."

- Yaozhong Shen, Nantong Sijian, Project Manager

WHAT’S NEXT?
For the owner, high detail as-built 3D BIM models can be used for emergency evacuation training, facility management, energy consumption analysis and other maintenance and operations work, especially for the production facility.

For the general contractor, all construction data collected by Smart Build would provide endless post project analysis possibilities in productivity, schedule-cost correlation, quality and risk mitigations. It could also be used for machine learning and application of artificial intelligence to further increase the project selection in bidding phase and optimised project planning during execution.

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To support our commitment to customers in the Architecture, Engineering & Construction realm, Hexagon PPM has added to the staff developing and nurturing HxGN Smart Build. Among those is Jon Deming, who has an impressive history in this market.

Insight: You completed your bachelor’s in construction science from Texas A&M. What first got you interested in building things?

DEMING: There is something about seeing progress that appeals to me. Each building project is unique and has its own challenges; one year you could be building hotels, then a train station, and maybe next a hospital. Texas A&M has the best construction management school in the United States, and this degree program is within the College of Architecture, so I was able to scratch my creative/artistic itch as well.

Insight: In easy-to-understand verbiage, what is BIM?

DEMING: BIM (Building Information Modeling) is not a single software or design file type. It is a process; a 3D model-based, information-rich mindset impacting how the industry consumes information from design through construction and then even into facility management. In the building construction industry, BIM made its entrance to industry in the early 2000s and is now becoming mainstream.
**Insight:** How is the evolution/adoption of BIM methodology/ideology changing the way construction is done?

**DEMING:** The industry is witnessing a complete cultural change. BIM is solving design issues early in the project process, and it promotes quality and accountability of the work with the potential to reduce overall project costs and schedule overruns. Investing in BIM workflows means adding personnel and tasks to the beginning of the job, but from a risk reduction standpoint, it can pay for itself many times over.

We are shifting from building jobs based on 2D paper or PDF drawings to an information-rich, 3D model-based approach. Contractors can perform clash detection to virtually compare different trades before the actual work begins (analyzing ductwork vs. structural steel to make sure everything fits). This is the bread and butter of BIM – to build and visualize the entire job virtually before the work begins on the jobsite.

**Insight:** What can be done to get more construction companies to embrace digitalizing their projects?

**DEMING:** Consistency and perseverance are keys to change. I like to do an over-the-shoulder glance every year, three years, five years and so on. Sometimes it takes external influence to drive it as we have seen in recent years in the U.K. with the government BIM mandate.

**Insight:** What’s the coolest project you’ve ever worked on and why?

**DEMING:** Over the past 20 years, I’ve worked on $5 billion of construction projects: airport train systems, hospitals, hotels, prisons, grocery stores, whiskey distilleries. But the coolest projects were the construction of new facilities for U.S. Embassies in Moscow, Beijing and Managua, Nicaragua.

**Insight:** What excites you most about the future of the construction industry?

**DEMING:** The building industry is shifting from the nomenclature of BIM to the idea of comprehensive construction technology. This includes drones, laser scanning, software implementation, machine learning/predictive analytics, robotics, etc. BIM and construction technologies have also driven real, practical ideas such as prefabrication; these things are really changing the landscape of the industry. But at the end of the day, it’s about the people and cultural change.

I have seen a big change in the way that jobsite staff (superintendents, etc.) have accepted forward-thinking technologies over the past few years. The construction industry is hungry for more, and we have a huge opportunity to drive positive change.

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**Insight:** Your LinkedIn profile is impressive. What was it about Hexagon PPM that made you want to join the team?

**DEMING:** I’ve always had a desire to make big impacts for the better, to really bring efficiency and solve big problems. I realized that my ability to change the world was limited at the contractor level. I took the leap to Hexagon PPM to be a part of a global organization and literally change the world. I’ve also lived in and traveled to over 35 countries over the years. I love working cross-culturally, and Hexagon PPM embodies this multicultural environment that I was looking for.

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JON DEMING ENJOYS CROSS-CULTURE EXCHANGES, SUCH AS THIS MEETING WITH THE HXGN SMART BUILD TEAM WORKING IN JAPAN.
How the DEEPWATER HORIZON TRAGEDY Fueled a Mission to Reduce Human Error in Subsea Operations
Digitizing human processes will help to eliminate the risk caused by human errors for heavy industry, particularly in the oil & gas sector. Human errors are the most likely cause of industrial accidents and unplanned shutdowns, and when they compound, it can have tragic consequences.

Few know the dangers of human error better than Michael Fry. The former Subsea superintendent for Transocean got a cryptic call at 10:30 p.m. on the night of April 20, 2010, asking if he could locate some schematics for the Deepwater Horizon drilling rig. Puzzled, he reached out to friends on the platform; there was no response.

Fry finally got an email from the rig supervisor telling him to get to the head office of Transocean so he could assist in the damage control efforts. Human and technological failures had combined to take 11 lives and cause the worst oil spill ever in U.S. waters. Fry personally knew six who perished that day, and since the tragedy, he’s been on a mission to eliminate the risks of human error in subsea operations.
To achieve this goal, Fry founded Deepwater Subsea to provide third-party operational support, compliance inspections and training for subsea operations. His company uses digital technology to improve the processes required by regulators to remove the risk of human error. From planned maintenance and calibration to crew competence and procedures, it’s all handled in a digital environment to ensure complete transparency and compliance.

A major component of the approach requires field workers to follow a fully digital process. The process strictly enforces digital logbooks and shift handover, improving efficiency and compliance. It also allows inspectors to access any relevant company records in under five minutes and engage in real-time monitoring of systems and processes.

Removing the human factor is at the forefront of Fry’s commitment to 100% compliance, 100% of the time. No matter how hard organizations may try, humans introduce some degree of chaos to operations. By removing or minimizing that chaos, Fry believes that not only can you avoid accidents and maximize uptime, you can also protect your organization by being able to document every action.

BUILDING AN ECOSYSTEM

With the goal of recording all the information about assets digitally, Fry faced a steep challenge. Not only did he want to record significant events like installation and maintenance, but he wanted everything from serial numbers to metadata combined with the ability to monitor processes in real-time. This technology stack – or “ecosystem,” to use Fry’s term – proved immensely challenging for the team. It wasn’t until a chance meeting at a conference with a team from Hexagon’s j5 International that it all came together.

Deepwater Subsea had already been using OSIsoft’s PI system as the core component of its technology stack, but the company was looking for a system that could provide customizable, web-based access to operational data. As a third-party vendor, they needed the ability to interface with process data from different systems while still being easily accessible remotely.

With j5, Fry said Deepwater Subsea found a flexible tool it could use to adapt to whatever system they needed: “It was one of the fastest sales ... it does everything that I want. It’s customizable, it’s web-based, and I don’t need anybody else to help me build it.”

Now, its inspectors can easily search for and retrieve data, document findings and load reports directly, thanks to j5’s suite of software. This, according to Fry, is one of the key components allowing Deepwater Subsea to meet its compliance goals. Inspectors can, for example, verify the calibration of a gauge, document that calibration by recording device readings, upload pictures of the process and attach a physical and digital sticker.

The whole process is thoroughly documented, so customers have a real-time, completely transparent view of the process.

Recently, Fry has invested in HxGN SDx® Operations software to enhance his technology stack further. Now his team can use smart P&IDs to integrate with j5’s IndustraForms and pull PI system data, enhancing his inspectors’ ability to access and document data in the digital environment.

While Fry has had great success integrating Hexagon solutions into his business, he initially wanted to build his
SUCCESS MAKES IT CLEAR THAT DIGITIZING OPERATIONS ISN’T A SHORT-LIVED TREND BUT A MONUMENTAL SHIFT IN OIL & GAS

success makes it clear that digitizing operations isn’t a short-lived trend but a monumental shift in oil & gas. After creating a homebrew solution proved too challenging, he sought out consultants, all of whom wanted to charge him exorbitant amounts and take months or years to build the software. Eventually, he concluded that using vendors and buying “software as a service” was the simplest, cheapest, most effective solution.

“For me, I think it was the best decision we made ... I’m tired of trying to reinvent the wheel. I’m going to hire other smart companies who have already built the wheels, and I’m just going to bolt them under my car and take off and run,” Fry said.

INVESTING IN DIGITAL

Fry’s vision for his company – and the oil & gas industry as a whole – is one of fully digitized operations, and he sees a real advantage to his company being one of the first to be completely digital. However, this doesn’t necessarily show up in the commonly used metric of ROI.

“If you looked at the investment that we as Deepwater Subsea have made in technology, we’re probably a negative ROI,” Fry said. However, the value of digitization isn’t represented in the bottom line; instead, it provides a long-term competitive advantage that is more difficult to quantify.

“You might not see ROI until a year, two years down the road, but management sometimes doesn’t want to hear that. They want a quick fix,” he said. Instead, he wants the industry to view the value of digitization as one that comes up daily in how workers operate, rather than a line on their balance sheet. On any given day, minutes or hours might be saved, and that can be multiplied by hundreds or thousands of workers for larger industrial firms.

Even more importantly, digitization can speed up the ability for inspectors to notice safety issues, potentially preventing tragedies like the Deepwater Horizon disaster. As technology advances, Fry sees even more opportunities for digital tools to enhance safety and compliance, incorporating 4K video and virtual reality into their inspections.

While some are leery of the digital revolution, Fry looks forward to a more digital world, one where he and other inspectors are freed from the monotony of data entry and better able to do their jobs. He envisions a future of self-populating reports that show real-time data, enabling engineers, workers and management to spot potential failures easily.

“I get excited about it,” he said, “because we’ve never had the opportunity to do the things that we’re doing today, and it’s the digitization of the work that we’re doing that allows us to have this opportunity.”

Deepwater Subsea’s success makes it clear that the digitization of operations isn’t a short-lived trend, but rather a monumental shift in oil & gas. By removing as much human error as possible, it is increasing productivity, improving worker safety and maximizing its client’s uptime.

By leveraging Hexagon’s solutions with its knowledge and experience, Deepwater Subsea has created a world-class technology stack that is setting the standard for future oil & gas operations.

Andrew Storrier is Hexagon PPM’s Content Marketing Lead for the Asia Pacific Region. He works in the company’s office in Sydney, Australia.
The longtime relationship between Hexagon PPM and Aspen Technology is getting stronger.

Their newest collaboration is the first to market a fully digital design and engineering process with integrated economic evaluation; the AspenTech and Hexagon PPM software suites will align to help customers better manage the financial risks of complex projects, which is a major challenge today.

“We’ve been partners for 20 years, and we decided to take it one step further, deeper, tying it to integration and closer collaboration,” said Hexagon PPM President Mattias Stenberg. “It is driven in part by the digitalization trend we are seeing in the industry.

“People don’t accept manual integration anymore. It needs to be automated. We decided to invest more time and money to tie it together ... in terms of R&D, joint marketing and engagement with customers.”

The goal is to automate work flows and data flows by digitizing across a project’s life cycle – design, construction, operations and maintenance.

“Based on our assessments and engagements with joint customers, we are confident there is potential to impact both project and operational efficiency,” he said. “Aligning project costs to decisions early in the design process reduces budget and schedule risk.”

This newest collaboration was announced in June in Las Vegas at HxGN LIVE, a four-day conference...
that highlights the latest trends in groundbreaking information technologies designed to drive dynamic decision making across industrial and geospatial applications.

AspenTech President/CEO Antonio Pietri said this partnership brings together the “No. 1 companies” within their roles in the design space.

“It’s all about value, always,” Pietri said. “By digitizing these integration points between our products and Hexagon PPM’s, we will be able to eliminate inefficiencies that exist in the different hand-offs between functions in the design phase and eventually into operations and maintenance.”

Working together, AspenTech and Hexagon PPM can provide a more complete digital twin, inclusive of both the plant infrastructure and the chemical processes occurring within that physical infrastructure, to allow operators to make better decisions that maximize throughput, quality and up-time.

AspenTech’s planning, scheduling and reliability software, coupled with the Hexagon PPM expertise for the detailed engineering phase of facility and plant design, will help operators leverage engineering models during operations and allow them to respond better to changing market conditions.

“This collaboration will allow customers the flexibility to choose solutions from market-leading providers across the full life cycle, from the design phase into the systems that operate and maintain a plant,” Pietri said. “Engineering, procurement and construction (EPC) firms and owner-operators will be able to accelerate their digital transformation with complete confidence, supported by best-in-class solutions.”
Stockholm, Sweden, certainly lived up to its nickname of “Beauty on the Water” as host of Bricsys 2019, recognized throughout the industry as the CAD event of the year.

The Brewery Conference Centre, with its Neo-Gothic silhouette located along the Swedish capital’s waterfront, welcomed more than 400 attendees for this year’s conference.

Bricsys’ first year underneath the Hexagon AB umbrella was highly successful, and those present in Stockholm in mid-October were eager to learn about what’s next. Bricsys rolled out technology updates, announced new partnerships and lifted the veil on a handful of surprises for its AEC and mechanical CAD (MCAD) users.

The ninth edition of Bricsys’ signature event gave attendees two full days to find out more about the BricsCAD® family of products for 2020. They had the opportunity to hear multiple customers – HOK, McConnell Dowell, Gammon and Mouton, among them – share real-world examples about how industry-leading Bricsys software is adding value to their respective businesses.

Bricsys founder and PPM Senior Vice President Erik De Keyser kicked off the conference with a brief look back at the company’s first year since being acquired by Hexagon in October 2018. Addressing the one-year anniversary, De Keyser told the rapt audience, “There is a lot of synergy now with Hexagon companies. (But) the DNA of our company didn’t change.”

Robert Green, Director of Implementation, then shared how Bricsys sought face-to-face input from its customers during development of the new BricsCAD V20 core.

“It occurred to us that if we got feedback from people who are actually using our products and examined their usage...
cases, and asked about their points of pain ... we might be able to build a bigger, better BricsCAD V20.

“We did Zoom meetings across 14 different time zones. We did all kinds of roadshows and we held training at HxGN LIVE (in Las Vegas, Nev., USA). We took notes, we listened, and we tried to understand exactly what our customers are experiencing so that we could figure out how to do a better job for them.”

Green drew an enthusiastic response when revealing what the No. 1 most-requested feature was – Dark UI, a new user interface and much-anticipated dark screen mode, optimized to reduce eye strain.

The Bricsys Advanced Technologies team showed off the latest developments in artificial intelligence (AI) and machine learning, plus some next-generation AR/VR technologies currently under development, during “The Future of the BricsCAD Platform” keynote. Chloe Guidi and Elise Lapierre addressed the addition of AI to CAD and how it has immediate benefits in time-consuming workflows such as adding BIM data, detailing and organizing drawing content.

“Eighty percent of repetitive tasks come from the 20% of creative design,” said Guidi. “So, we focus our AI work on the elimination of time-consuming tasks.”

Greg Schleusner, Director of Design Technology Innovation for HOK Architects, took the stage in the afternoon of Day 1 to discuss the complex remodel of the Kentucky International Conference Center in Louisville, the company’s initial project using BricsCAD.

The results were well-received, and Schleusner said HOK will do more with BricsCAD – a fact emphasized a few hours later with the unveiling of a three-way partnership between Bricsys, Leica Geosystems (a Hexagon company) and HOK to advance ‘Scan-to-BIM’ technology. “The Scan-to-BIM initiative, in partnership with Bricsys and Leica Geosystems, is another step in our continued goal of enabling our project teams to focus on making quality design decisions vs. spending time manipulating data,” he said.

For a video wrap-up of Bricsys 2019 visit:
blog.bricsys.com/this-way-bricsys-conference-2019-the-after-movie/
Eni, a multinational company headquartered in Rome, has been recognized by the Carbon Disclosure Project for working toward the decarbonization of the energy system. To further its mission of becoming more sustainable, Eni launched the “G2 Project” to convert its downstream Gela facility in Sicily from a traditional refinery into a bio-refinery. It was designed for a production capacity of 750,000 tons/year of vegetable oil, with food production waste that will be converted into 600,000 tons/year of green diesel.

Eni is connecting its people, processes and tools with Hexagon PPM solutions as part of a centralized engineering hub, allowing data to be created once and leveraged by all to improve the quality of the design and shorten the project cycle.

Eni piloted this connected ecosystem strategy on the front-end engineering design stage of the G2 project. After that was successful, Eni expanded the ecosystem into production as the project went live. This allowed for the automation of redundant, manual, error-prone activities while facilitating communication between project stakeholders.

Utilizing the connected ecosystem strategy allows all engineering disciplines to collaborate effortlessly and build Eni’s digital twin. Having a digital
Global Biofuel Production from 2000 to 2018

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ECO FOX, headquartered in Vasto on Italy’s Adriatic coast, aims to reduce dependence on crude oil with the production of vegetable oil biodiesel and, as a by product, crude glycerin. The company currently produces more than 200,000 tons of vegetable oils per year.

To increase profitability, ECO FOX decided to improve its glycerin refining process in its existing refinery. To do this, several changes were required with regards to the existing plant’s processes, equipment and overall layout. Rather than design, fabricate and install entirely new equipment from scratch, ECO FOX decided to purchase and install existing equipment from another plant located elsewhere in Italy.

The project was awarded to OMA S.p.A., a leading Italian construction company, which conducted a constructability study to evaluate how to retrofit the purchased equipment into the existing facility. The major challenge was to map equipment inside the existing structure to ensure that any new piping routes and tie-ins needed for the new equipment were optimized and clash-free.

OMA chose Hexagon PPM’s CADWorx® & Analysis Solutions for the project. Due to the limited space at the Vasto facilities as well as the inconsistency of existing plant information or total absence of documentation, OMA proposed using laser scanning technology to obtain an accurate 3D point cloud of the existing facility.

Using the as-built model and point cloud as the design basis, OMA developed new piping designs easily and accurately. The purchased equipment was also scanned in the laydown area and modeled to provide 3D models that could be used during construction simulations.

Whether the current structure would require changes to accommodate the additional weight of the new equipment was also evaluated. Several modifications were identified, and CADWorx Steel was used to design new structures and align the elevations of key supporting beams.

A key benefit for ECO FOX was the handover of intelligent engineering information and high-quality documentation, including isometrics, P&IDs, equipment details, general arrangements and layouts for future plant modifications.

Eni has utilized Hexagon PPM solutions since 2000, including SmartPlant® Foundation, SmartPlant Enterprise for Owner Operators, Intergraph Smart® Instrumentation as well as Intergraph Smart Cloud services.

ECO FOX has used CADWorx® Plant Professional, Isogen®, PV Elite®, PV Fabricator® and CAESAR II®.
Redefining Indonesia’s Infrastructure

DAXTER CHUA, SPEAKS ABOUT THE WAYS IN WHICH INDUSTRY PLAYERS ARE EMBRACING DIGITALIZATION IN PROJECTS IN INDONESIA AND THE MOST IN-DEMAND SERVICES AND SOFTWARE RELATED TO THIS SHIFT.

What models are being used for smart engineering and construction in Indonesia?

The terms “smart construction” and “smart city” are relatively blurry in this country. In oil & gas, there is a lot of talk about Industry 4.0 and digitization. In addition, some companies have begun to embrace the model of Advanced Work Packaging (AWP) in the area of planning. It will be precisely AWP that will drive smart construction and more so when it comes to oil and gas. However, AWP is not widely implemented in Indonesia.

Regarding infrastructure, major general contractors (GC) in this country have started to leverage on building information modelling (BIM), to drive productivity and reduce rework. This is based on the concept of using technologies to drive and design construction while linking all the different stakeholders, consultants, architects, GCs and facility or building owners. Today, some project owners, including oil & gas companies, have started requesting that contractors use BIM. When you talk about BIM, you are talking about “smart” construction.

How is high-tech software being implemented in the construction of mega-projects across the country?

If we talk about construction, Pertamina is developing the Refinery Development Master Plan (RDMP) in which it focuses not only on revamping existing refineries but also on building new ones. The first project is the Balikpapan refinery. EPC contractors are using smart design tools from Hexagon to design and construct the refinery. If we were to look at non-state-owned companies that have been applying this software, we have players such as BP, which is building the Tangguh LNG Train 3. We have been partnering with them on the EPC side of the business.

What opportunities does Hexagon PPM see in the Indonesian market at the moment?

Pertamina’s RDMP is a window of opportunity for us. The Balikpapan refinery is just the start, and there will be a few other refineries coming up that all represent an interesting chance for us. Both new projects and the revamping of existing facilities present opportunities.

The technology and software that we provide is not restricted to oil & gas; it also applies to power generation and petrochemicals, anything that has a process and a lifecycle. Looking beyond oil & gas to energy, PLN has a 35-GW program that is ongoing, and they are planning to build additional capacity. This opens up another door for technology providers such as ourselves.

Moreover, some of the major players have been told by the government that they ought to adopt Industry 4.0 approaches. Some time ago, President Jokowi issued a press release saying...
that the “Making Indonesia 4.0” plan would target five sectors, among which petrochemicals was highlighted as a crucial one. The whole idea is to apply high technology to the supply chain. It helps when the government starts to take the lead, but I think the government could do much more. As an example, government incentivization should be used more to spur the development of companies. This backing would further open up opportunities in the market.

**What challenges are found in trying to advance digital fabrication and automation?**

This is an area where Indonesia is still lacking. Looking at the fundamentals in oil & gas, a capital project involves the project owner, EPC and a fabricator. The average Indonesian player has a local content of around 30% to 40%. The fabrication jobs will be done here, but the problem is that fabricators have not adopted technology sufficiently. Accordingly, we have something to offer them, but there has to be some sort of initiative coming from them. However, I do not see fabricators taking advantage of the momentum, as they are still traditional.

In addition to an “old school” mentality, fabricators have the impression that technology is expensive. But there are two sides to this argument. If you look at how Indonesia’s capital projects or EPC projects work, fabrication is outsourced to reduce costs, as it is very manpower intensive. However, technology can provide a long-term solution and prevent having to outsource. Here, automation becomes the solution.

In countries such as Singapore, the government is offering a voucher to help companies, especially SMEs, transition into the so-called Fourth Industrial Revolution. This has been a very positive way of incentivizing the country and the industry toward automation. Perhaps this could be a model that Indonesia can explore.

**What benefits do owner operators find in the application of smart plants?**

Smart plants are on the rise, and they are being taken a step further as owners use data to do predictive maintenance. In Industry 4.0, IoT allows us to be predictive. You only need to have the right data and applications. If you are a fuel worker, and you see something not working as expected, you need to instantly report back to control so that they can take action.

Today, what we realise in this industry, especially in Indonesia, is that a lot of things are still paper based. In the case of a leakage in a plant, the lack of data or instant communication through a digital platform might delay the process of reporting and turn out to be hazardous, costing a lot of money.

Owner operators are aware of this, and they are looking to technology to help them. It is here where the concept of “smart” comes in, with interconnectivity, digital and real-time data input crucial elements covering the existing gaps found in the industry. Almost all the key players in this country are looking at how to be more effective and how to operate more safely. Here, smart plants are the next step.

**What type of software is most in-demand in the market today?**

From a project owner point of view, information management and operation management software are in high demand. In addition to this, project performance software has turned out to be a crucial tool, as it looks at how to do investment better, how to secure projects and how to draw up a contracting strategy. On the other hand, from an EPC perspective, some major local EPC players are looking at how to enhance constructability and commissioning. It is here where technology is key.

**What specific technology does Hexagon PPM offer in terms of facility management and tracking?**

We have supplied a specific type of technology to operators in the area of tracking of manpower. We have a tracking-tag system by which we can see where all the workers are on a map. Thanks to this, we can see if employees are straying off the site or going beyond the boundary. If one part of the plant has a lot of orders pending, we can see that as well.

In this sense, we offer a total solution for customers when it comes to facility management technology. BASF has been one of our long-term users.

**What new projects do you expect to provide services for in the near future?**

For Indonesia, we want to focus on brownfield operation and maintenance. There are a lot of aging facilities here that need to be revamped. Not all project owners have the financial means and muscle to do a grassroots project, so brownfield is a good area to be in. Moreover, we would like to be involved in the shutdown, turnaround and outage (STO) line of business.

When it comes to short-term goals, we aim for customers to be more effective in their production and adoption of technology. In the energy industry we aim to operate facilities safely without compromising productivity. In any case, what we do is much more than just provide software. We want to be an agent of change, encouraging and inspiring the younger generations to adopt change.
CONGRATULATIONS TO THE HEXAGON PPM 2019

VISIONARIES

GOLDEN VALVE WINNERS:
Recognizes the most innovative and well-executed uses of software supported by Hexagon, and the subject matter must relate to the process, power, offshore, shipbuilding or mining industries.

BEST OF SHOW
Fandy Maulana Sayh Rizal | PT. Rekayasa Industri (Indonesia) - pictured

PHOTOREALISM
1st Place: Mike Paschke | Linde Engineering Dresden (Germany) - pictured
2nd Place: Adhitya Pratama | PT. Rekayasa Industri (Indonesia)
3rd Place: Huang Chen | East China Engineering Science & Technology Co., Ltd. (China)
Honorable Mentions: Ruben H. Soriano | AESA (A-Evangelista SA) (Argentina);
Li Meng Shun and Tao Yue Lai | CSEEC (China); Chen Mengyao | Sinopec Ningbo Engineering Co. LTD (China); SmartPlant Team | Wison Engineering Ltd. (China)

JUDGES’ CHOICE
Process: William M. Fronheiser | Selas Linde North America (USA) - pictured

MINING: Engineering Digital Center | CBMI Construction Co. Ltd. (China) - pictured

DISCIPLINE-SPECIFIC
1st Place: Rendering and Physical Modeling Group | PGESCo (Egypt) - pictured
2nd Place: Yana Septiana | PT. Rekayasa Industri (Indonesia)
3rd Place: Xianbo Wang, Liang Liang, Cong Hu, and He Zhang | ACRE Coking & Refractory Engineering Consulting Corporation (Dalian), MCC, China (China)
Honorable Mentions: Zhang Wei and Bao Yanbing | East China Electric Power Design Institute Co., Ltd. of China Power Engineering Consulting Group (China); Lin Jin | Sinopec Petroleum Engineering Corporation (China)

JUDGES’ CHOICE
Mining: Engineering Digital Center | CBMI Construction Co. Ltd. (China) - pictured

PHOTOREALISM
1st Place: Rendering and Physical Modeling Group | PGESCo (Egypt) - pictured
2nd Place: Yana Septiana | PT. Rekayasa Industri (Indonesia)
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Honorable Mentions: Zhang Wei and Bao Yanbing | East China Electric Power Design Institute Co., Ltd. of China Power Engineering Consulting Group (China); Lin Jin | Sinopec Petroleum Engineering Corporation (China)
Hexagon PPM Visionaries: Golden Valve winners continued

PLATINUM PIPE WINNERS:
Honored for their innovative automation ideas and implementations of Hexagon PPM’s Design and Visualization solutions: Intergraph Smart® P&ID, Smart Electrical, Smart Instrumentation, Smart 3D and Smart Review.

ENGINEERING & SCHEMATICS
1st Place: Surface Systems Engineering | Petrobras (Brazil)
2nd Place: Fernando Bacchin and Guillermo Pocalujko | Techint Engineering and Construction (Brazil)
3rd Place: Zhou Feng | China Tianchen Engineering Corporation (China)
Honorable Mention: Wang Aiping | China Sedin Ningbo Engineering Co. Ltd. (China)

INTERGRAPH SMART® 3D
1st Place: Wang Peng | China Tianchen Engineering Corporation (China)
2nd Place: Yang Guilin | Shanghai Waigaoqiao Shipbuilding Co. Ltd. (China)
3rd Place: Shinhyun Kang | SEONGHWA Industrial Co. Ltd. (Korea); Surface Systems Engineering | Petrobras (Brazil)
Honorable Mentions: Ouyang Shuai | China Tianchen Engineering Corporation (China)

INTERGRAPH SMART REVIEW
1st Place: Tetsuya Miwa | Toyo Engineering (Japan)
2nd Place: Kevin Dmonte | Wood (UK)

TRAILBLAZERS OF DIGITIZED OPERATIONS:
Recognizes customers who are moving their company and industry forward in digital transformation, making the path easier for everyone following.

Deepwater Subsea LLC (USA)
Petrobras (Brazil)

The Golden Valve winners are available as desktop calendars; go to www.hexagonppm.com
Empowering an Autonomous Future

Hexagon is putting data to work across urban and production ecosystems, empowering them to become increasingly connected and autonomous.

When we use data to do well for our businesses – boosting efficiency, productivity, and quality – we do good for the planet.