THE PRACTITIONER

A monthly newsletter of the Energy Facility Contractors Group's Project Delivery Working Group

Issue 49 *August 2023*

FY23 PDWG Annual Work Plan is Nearing

Greetings Project Delivery Working Group (PDWG) Team Members. As we near the end of another successful year of supporting our stakeholders, it's a great opportunity to place focus on closing in on completing the FY23 PDWG Annual Work Plan (AWP).

AWPs are the negotiated stakeholder focused engine that drives our activity and effort throughout the fiscal year. Simply said, the Energy Facility Contractors Group (EFCOG) PDWG serves at the client's pleasure, meaning we support the initiatives that benefit the Department of Energy in advancing its mission needs. This includes contractors input as given the unique insight afforded those close to many of the opportunities to optimize processes and outcomes with the projects and programs managed by our EFCOG members across the board.

The AWP offers EFCOG members the best opportunity to engage in areas of stakeholder need in helping to contribute to improvements in the way the department conducts its business as an institution, from both a contractor perspective, EFCOG Member, and PDWG Team Member.

Your contributions to the AWP could result in becoming the next EFCOG PDWG Award Winner. This was the case for Mr. Tony Spillman of Washington River Protection Solutions, Chair of the Earned Value Management Task Team. Tony is the author of the following "Best Practices" in FY23, and is the winner of the "Above and Beyond Award."

"In recognition of the expertise and passion of embracing and developing products that fully support and facilitate the IP2M METRR approach across DOE contractors and industry."

Best Practice #256 WRPS CAMP
Best Practice #257 IP2M METRR
Best Practice #258 EVMS Self Governance Assessment - Battle Rhythm
Best Practice #259 Capital Asset Preplanning CRC Checklist

So as we approach the end of the fiscal year and begin to close out our FY23 AWP, begin to think about how you may contribute to the development and approval of our upcoming FY24 AWP, which will be finalized in the September/October time frame. Are you the next EFCOG PDWG Award Winner for your contributions?

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Above and Beyond Award

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Go to the EFCOG PDWG Webpage link (below) to get an idea on where you would like to contribute. Contact Craig Hewitt for any help you need or questions you may have.

Project Delivery Working Group – EFCOG.org

Tony Spillman, EVMS compliance manager, and Wes Bryan, WRPS president and project manager, display the "Above and Beyond Award" plaque that Spillman received from EFCOG.

Going above and beyond

WRPS employee recognized by DOE group for 'best practice' submission

Tony Spillman, manager of the Project Management Programs team, recently received the Energy Facility Contractors Group's (EFCOG) prestigious "Above and Beyond Award."

The award – presented at the annual EFCOG meeting in Washington, D.C. earlier this year – was tied to a "best practice" that Spillman submitted and implemented.

WRPS was the original pilot application for DOE's Integrated Project/Program Management (IP2M) Maturity and Environment Total Risk Rating (METRR) study, sponsored by the Office of Project Management (PM).

WRPS has participated in the IP2M METRR project from the beginning, which resulted in findings now used by DOE to test and monitor the health of certified earned value management systems (EVMS) used by its contractors.

During its EVMS surveillance review on the Tank-Side Cesium Removal System, DOE noted: "PM would like to thank WRPS, and in particular Anthony (Tony) Spillman, for his input and active participation, as well as for partnering with us on piloting the methods and techniques for the assessment for EVMS maturity and environmental factors derived as part of the PM-sponsored Arizona State University (ASU) project. Joint EVMS research study applied to this review. We believe the pilot was an incredible success, as a result."

Spillman modeled the first-of-its-kind self-governance approach using the IP2M METRR to successfully implement the highly effective EVMS self-governance currently in place at WRPS. This approach has since been adopted by several contractors across the DOE complex.

"It's not what you say you do, it's what you can demonstrate you do," said Spillman. "That's the motto the team operates under. As a bit of a history buff, I'm drawn to the words of Aristotle, who said, 'We are what we repeatedly do. Excellence, then, is not an act, but a habit.'"

In addition to sharing the WRPS model and IP2M METRR experience at forums involving the DOE complex, Spillman has also presented at federal government forums including the Department of Defense and the National Aeronautics and Space Administration, along with the International Project Management community.

Congratulations, Tony!

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It Is Not One World

AI in Construction Has Landed

By: Doug Dockery, Chief Technology Officer

Artificial intelligence in the construction industry is here. It has emerged as a technology that is poised to transform our industry. As we enter this next frontier of construction technology, it is essential to understand what artificial intelligence is and how it offers unique solutions to advance the productivity and performance of the construction industry.

This article provides a foundational understanding of artificial intelligence in preconstruction. We'll explore how AI offers ways to enhance the processes that drive business for better decision-making and strategic preconstruction planning.

What is Artificial Intelligence?

The data-rich, complex modern construction environment offers a potential advantage to those businesses that can harness data, produce intelligible insights, and make informed strategic decisions. AI is establishing a footing in the construction industry following years of development and imagination.

AI is here now because of advances in computing power, algorithms that follow precise steps, the large sets of data the industry produces, and innovations in the systems that combine these advances. The time to understand and integrate AI into your business is now.

Artificial intelligence is not a new idea, its roots can be traced back to the 1950s. Arthur Samuel, a pioneer in the field, defined it as "the field of study that gives computers the ability to learn without explicitly being programmed." In other words, AI involves computers and systems that learn from experience. The purpose of AI is to make machines do things that humans are presently doing, but do them better and faster.

Artificial Intelligence, Machine Learning, and Deep Learning

Artificial intelligence is a field in data science that blends computer technology with hefty amounts of data to enable problem-solving. You may have experienced AI in a voice search with Amazon's Alexa or Apple's Siri. Search engines also power results with AI to collect and retrieve relevant information based on user inquiries. Videos suggested to you by YouTube or Netflix are AI-driven results that recommend titles based on learning your preferences and viewing habits.

You may hear machine learning mentioned in the same breath as artificial intelligence, but the terms are not entirely interchangeable. Machine learning is a subset of artificial intelligence that learns from experience, adapts, and improves performance without being explicitly programmed.

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AI in Construction

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A third part of artificial intelligence getting a lot of exposure today is deep learning. All AI aims to mimic human thinking, and deep learning is designed to extract maximum value from our way of processing information. Our brains use what scientists call neural networks, which are the collection of brain cells that help us process information by connecting signals. Deep learning uses artificial neural networks to process large amounts of data and solve problems with limited human help. These artificial intelligence networks are valued for their ability to handle lots of data, continue to improve as it trains and learns, and solve complex issues.

Artificial Intelligence in Preconstruction

Before building starts on a commercial construction project, a variety of people and teams from different disciplines and expertise must collaborate and plan how the project will proceed. Preconstruction, as it's called, refers to the phases of construction that take place before the actual construction work begins. Building owners, architects and engineers, trade contractors, general contractors, building product manufacturers, and many others take part in preconstruction.

The preconstruction process in commercial construction helps to ensure that the project is completed on time, within budget, and to the client's satisfaction by identifying and addressing the sequence of people and events that will get the project completed.

Just like the projects being built, solid foundational work in preconstruction carries over greatly into the strength of the project. Variations in preconstruction stages occur depending on variables such as the type of structure or project (e.g., hotel, school, road, or bridge), project delivery methods, the scope of work involved, or if it is a public or private construction project.

AI In Preconstruction Project Stages

The following preconstruction project stages provide a framework for the steps before construction starts and how artificial intelligence is changing how this planning is performed.

Pre-Design: This phase includes the conceptual design, initial project planning, project development, and feasibility studies. The project team typically begins with the concept of the structure, performs a site analysis to identify potential obstacles, and develops a plan to address them. This phase also includes the development of a rough or working project scope and budget.

AI in the pre-design or initial project planning and development phase is helpful for feasibility studies to determine if a project is viable. Risks can be identified and analyzed with various data, including financial data, market data, and data on the project's potential impact on the environment. Risk analysis can assist in deciding whether to proceed with the project. AI is a powerful tool at this stage because it offers thoroughness and accuracy, along with a general lack of bias.

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Design Development: This phase includes the development of detailed design documents that steer the project. Documents included in this stage include architectural, structural, mechanical, electrical, and plumbing plans.

Design development is a critical phase in the project development process. It involves taking the conceptual design and turning it into a more detailed and buildable design, moving from general ideas to more specific ones. The design development phase is where many important decisions are made that will shape the final project, including cost, energy efficiency, and overall functionality. Artificial Intelligence can play a significant role in this phase by providing new tools and techniques to improve the efficiency and quality of the design development process.

Construction Documents: This phase includes the development of final construction documents, including detailed construction plans, building product specifications, and contract documents. The finalization of the construction schedule is prepared, which outlines the sequence and expected duration of all activities required to complete the project.

AI-based tools can be used to automate the process of extracting, analyzing, and processing data from construction documents. For example, natural language processing (NLP) can be used to analyze project requirements and create a detailed project scope document based on two-dimensional construction plans like PDF files. NLP has been around for over a half-century and is the component of AI that understands and interprets human language, written and spoken. This can save time and resources compared to the tedium of traditional methods, such as manual data entry or spreadsheet calculations.

Bidding and Negotiation: This phase includes distributing the plans to trades, contractors, and manufacturers for bidding. The project team will review the bids, negotiate with contractors, and select winning bids. For general contractors and trade contractors, this is the essential phase that includes producing and delivering detailed takeoffs and estimates to submit a competitive bid.

Trade contractors, general contractors, and building supply manufacturers assess the project scope, identify opportunities to pursue, analyze bidding strategies, and decide which projects clear the hurdle for success. Trade contractors can use the power of AI to streamline processes, automate repetitive tasks like takeoffs, and improve the speed at which decisions like vetting profitable projects are made.

Permitting and Approvals: This phase includes the submission of the construction documents to the appropriate governmental agencies, where appropriate, for review and approval. Artificial intelligence is used in this phase to validate building code compliance and manage the building permit process.

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Finalize Preconstruction: This phase includes finalizing contracts, mobilization of the contractors, and the start of construction activities. Effective preconstruction planning and strategic decision-making are key components of profitability for trades, general contractors, and building product manufacturers.

The finalization of the construction schedule is prepared, which outlines the sequence and expected duration of all activities required to complete the project.

The preconstruction stages can become more complex due to the nature of the project, the inherent need for effective communication and collaboration among teams, and local and national regulations, among others. Time and budget issues are consistently make-or-break drivers of a profitable construction project. Technology like AI offers an opportunity to improve performance throughout the preconstruction lifecycle.

Where Else AI and Construction Are Teaming Up

Aside from preconstruction, AI is a technology continuing to emerge in other areas of construction, enabling improvements in performance and safety. Some examples include:

Predictive maintenance: AI can be used to analyze data from building systems, such as HVAC and electrical systems, to predict when maintenance will be needed and prevent equipment failure

Site safety: AI-powered cameras and sensors (even some worn by workers) can monitor construction sites for potential safety hazards and alert workers and managers to potential dangers.

Robotics: The efficiency of AI and machine learning have found their way into robotic bricklaying, welding, and even building entire structures with 3D printing.

Project management: AI can optimize the allocation of labor and materials, making the scheduling of construction tasks more efficient and cost-effective.

Quality control: AI-powered cameras and sensors can monitor the quality of construction work, identify defects, and alert workers and managers to issues that need to be addressed.

Building performance: AI could be used to analyze data from building systems to optimize energy efficiency, indoor air quality, and other performance metrics. Simulating building efficiency with AI, for instance, allows the identification of potential energy-depriving areas for better design and construction.

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The Knowledge and Insight Enhancer

It is common to hear that computers trained to think like humans are a threat to stealing jobs from people. But construction is inherently reliant on the vast institutional and individual knowledge, something that AI cannot replace. Where human judgment is involved, and we know that's everywhere throughout the construction project lifecycle, AI does not have the capability we humans do.

It's more likely that certain roles and responsibilities will change as AI is implemented. AI combined with a company's organizational knowledge will offer much greater strategic opportunities than those not adopting the technologies to streamline performance and make better data-driven decisions.

Bright Future for AI in Construction

The present and future of AI in the construction industry are promising as more AI-based tools and techniques become integrated into workflows. As technology advances, AI is expected to become an even more integral part of the construction process, helping to improve efficiency, reduce costs, and enhance construction performance outcomes. AI in the construction industry has landed. Get ready for it.

— *From Constructconnect.com*

Project Management

"Collaboration is important not just because it's a better way to learn. The spirit of collaboration is penetrating every institution and all of our lives. So learning to collaborate is part of equipping yourself for effectiveness, problem solving, innovation and life-long learning in an ever-changing networked economy."

~ Don Tapscott , Executive Chairman of the Blockchain Research Institute

Remember:
Compliant data is Current, Accurate, Complete, Repeatable and Auditable.©

Just for Fun: August's Notable Events and Famous Birthdays

1 — Explorer William Clark (1770) and national anthem author Francis Scott Key (1779) were born, World War 1 began (1914), **the first Six Flags amusement park opened in Texas** (1961), and MTV made its debut (1981).

2 — The Declaration of Independence was signed (1776), Pres. Warren G. Harding died (1923), the Vietnam War began (1964), and Iraq invaded Kuwait (1990).

3 — Christopher Columbus set sail from Spain (1492), Calvin Coolidge became president (1923), entrepreneur Martha Stewart was born (1941), the NBA was founded (1949), and quarterback Tom Brady was born (1977).

4 — Champagne was invented (1693), and jazz musician Louis Armstrong (1900), President Barack Obama (1961), and racecar driver Jeff Gordon (1971) were born.

5 — The first federal income tax was imposed (1861), the first traffic light went into service in (1914), astronaut Neil Armstrong was born (1930), actress Marilyn Monroe was found dead (1962), and the NBA and ABA merged (1976).

6 — The first execution by electric chair was carried out (1890), comic actress Lucille Ball (1911) and pop artist Andy Warhol (1928) were born, the first atomic bomb was dropped on Japan (1945), and African-Americans were guaranteed the right to vote (1965).

7 — The Purple Heart was created (1782), Earth was first photographed from space (1959), and actress Charlize Theron was born (1975).

8 — Actor Dustin Hoffman was born (1937), and President Richard Nixon announced his resignation from office (1974).

9 — **Cartoon character Betty Boop debuted** (1930), actor Sam Elliott was born (1944), the second atomic bomb was dropped on Japan (1945), singer Whitney Houston (1963) and athlete Deion Sanders (1967) were born, and Gerald Ford became president (1974).

10 — Missouri became the first state west of the Mississippi River (1821), President Herbert Hoover was born (1874), the electric guitar was patented (1937), and *Red Dawn* premiered as the first movie with a PG-13 rating (1984).

11 — Wrestler Hulk Hogan was born (1953), hip-hop was created (1973), the longest major league baseball strike began (1994), and actor Robin Williams died (2014).

12 — Filmmaker Cecil B. DeMille was born (1881), the Spanish-American War ended (1898), and The Wizard of Oz premiered (1939).

13 — Filmmaker Alfred Hitchcock was born (1899), Cuban president Fidel Castro was born (1926), and baseball legend Mickey Mantle died (1995).

14 — The Social Security Act was signed (1935), comedic actor Steve Martin was born (1945), the Whiffle Ball was patented (1953), and basketball star Magic Johnson (1959) and actress Halle Berry (1968) were born.

15 — French emperor Napoleon Bonaparte (1769) and chef Julia Child (1912) were born, the Panama Canal opened (1914), construction began on the Berlin Wall (1961), the Woodstock Music Festival opened (1969), and **actor Ben Affleck was born** (1972).

16 — The Klondike Gold Rush began (1896), baseball legend Babe Ruth died (1948), TV personality Kathy Lee Gifford (1953) and singer Madonna (1958) were born, the punk rock revolution began (1974), and singer Elvis Presley died (1977).

17 — Lou Gehrig became baseball's ironman (1933), and actor Robert De Niro was born (1943).

18 — Explorer Meriwether Lewis (1774), baseball legend Roberto Clemente (1934), and actors Robert Redford (1937) and Patrick Swayze (1954) were born, and basketball legend Larry Bird retired (1992).

19 — Aviator Orville Wright was born (1871), the first race was held at the Indianapolis Motor Speedway (1909), Star Trek creator Gene Roddenberry was born (1921), Adolph Hitler became president of Germany (1934), and President Bill Clinton (1948) and actors Matthew Perry and Christian Slater (1969) were born.


EXTRA EXTRA EXTRA EXTRA
San Francisco Chronicle
RUSS INVADE CZECHS
Soviet Armies Take Over In Swift, Surprise Move

20 — President Benjamin Harrison was born (1833), the National Football League was organized (1920), and **the Soviet Union invaded Czechoslovakia** (1968).

21 — Oldsmobile was founded (1897), basketball legend Wilt Chamberlain (1936) and singer Kenny Rogers (1938) were born, Hawaii became the 50th U.S. state (1959), the Ruby Ridge standoff began (1992), and swimmer Michael Phelps won a record 8th Olympic gold medal (2004).

22 — The first America's Cup yacht race was held (1851), the International Red Cross was founded (1864), and Nolan Ryan recorded his 5,000th strikeout (1989).

23 — The tire chain was patented (1904), basketball star Kobe Bryant (RIP) was born (1978), baseball legend Pete Rose was banned for life (1989), and the first case of West Nile virus in the U.S. was reported (1999).

24 — Mt. Vesuvius erupted, instantly burying two cities (79), British troops set the White House on fire (1814), the waffle iron was patented (1869), and **baseball ironman Cal Ripken Jr. was born** (1960).

25 — The first person swam across the English Channel (1875), actor Sean Connery (1930) and TV personality Regis Philbin (1933) were born, The Wizard of Oz debuted (1939), and Paris was liberated by Allied troops (1944).

26 — Women gained the right to vote (1920), the first televised baseball game aired (1939), and aviator Charles Lindbergh died (1974).

27 — Mt. Krakatoa erupted in the world's most powerful volcanic blast (1883), President Lyndon B. Johnson (1908) and Mother Teresa (1910) were born, and the **first edition of "The Guinness Book of Records" was published** (1955).

28 — Martin Luther King, Jr. made his "I have a dream" speech (1963).

29 — The Soviet Union detonated its first nuclear test bomb (1949), singer Michael Jackson was born (1958), and Hurricane Katrina made landfall on the Gulf Coast (2005).

30 — Baseball legend Ted Williams was born (1918), and Thurgood Marshall became the first African-American Supreme Court justice (1967).

31 — The first solar-powered car was demonstrated (1955), and boxing legend Rocky Marciano died in a plane crash (1964).