

DIGITAL THREAD VS. DIGITAL TWIN: DIFFERENCES, BENEFITS AND WHY YOU NEED BOTH

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As discussed in our recent webinar, *How Advanced Work Packaging Increases Project Certainty by Focusing on the End Goal*, the combined benefit of adopting an AWP-based framework and AI/machine learning yields benefits for contractors and owners alike. Together, these rapidly emerging technologies are enabling oil and gas CAPEX projects to better forecast and, more importantly, better execute upon an agreed upon plan.

One of the additional benefits of this next-gen planning approach is the residual digital footprint of the project. This footprint exists not only during the project itself, but long after once the asset becomes operational. This digital footprint can be segmented into two sub-elements – the Digital Twin and Digital Thread.

DIGITAL THREAD

The formal definition of a Digital Thread is “the record of a product or project timeline, from creation to its completion.” Perhaps more meaningfully, think of a Digital Thread as an information trail that becomes a permanent record of the work executed by an EPC or contractor as part of the path towards project completion. A Digital Thread is the intersection of information pertaining to work expended and can include schedules, cost estimates, daily execution plans, materials installed and so forth.

The AWP process supports the continuous enrichment of a Digital Thread from very early concept select phase all the way through detailed design through execution and handover. Such a permanent record can then be used as needed not only for the project in question (e.g., claims and delay analysis) but also as a benchmark for subsequent projects when forecasting future delivery and productivity rates. This can have immense value in challenging installation environments such as offshore installation campaigns.

For the first time, such previously disparate information stemming from multiple sources in multiple formats can now be both captured through AWP and intelligently mined using AI and machine learning.

DIGITAL TWIN

If a Digital Thread reflects the work executed by the EPC or contractor, then a Digital Twin can be viewed as a permanent digital record of the asset being delivered. A Digital Twin is defined as “the current representation of a product or asset mimicking a company’s machines, controls, workflows and systems.” A Digital Twin pertains to the asset rather than the work expended to deliver the asset – it is a snapshot of the deliverables being handed over by the EPC or contractor to the owner.

Digital Twin data includes specs, 3D models and 2D plans. The real value of a Digital Twin is its ability to optimize the operation and maintenance of a physical asset or system after project completion. Digital Twins provide previously hard-to-determine insight for both planned and unplanned maintenance and shutdown for operating assets.

Many offshore North Sea oil and gas assets are now reaching end of life and, as such, there is a surgency in decommissioning projects. These projects are strewn with risk and uncertainty in the absence of a digital record of the asset that was constructed 20 to 30 years prior. Going forward, having a Digital Twin will assist in the planning and execution of today’s newly built assets, as they themselves enter their operational end-of-life phase.

In the future, Digital Twins should also be considered for assisting with lessons learned on the life expectancy and longevity of an oil and gas asset.

CONCLUSION

It goes without saying that CAPEX projects are not undertaken with the primary objective of capturing a digital record of themselves. However, the benefit of recording both the work executed (Digital Thread) and the asset being delivered (Digital Twin) is perceived by owner organizations to be so valuable that some are now assigning monetary value to the asset itself when these digital assets are present. Short of being a true warranty, having both a Digital Thread and Digital Twin associated with the project results in a much more valuable end-result operational asset.

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