



EVM World 2010 EVM and Construction Workshop

By Niyi Ladipo, Gregg Hughes, Tony Barrett, Michael Nosbisch, and Eleanor Haupt

What are the best practices for applying earned value management (EVM) to construction contracts? A workshop chaired by **Niyi Ladipo** (McDonough, Bolyard Peck, Inc.) at the recent EVM World 2010 Conference addressed this topic and other key questions through an audience poll, short lead-off presentations, and workshop discussions. Participating in the workshop panel were **Gregg Hughes** (CH2M HILL), **Tony Barrett** (Valued Technology, Inc.), **Michael Nosbisch** (SM&A), and **Eleanor Haupt** (Earned Value Associates, LLC). The presentations can be viewed in the PMI College of Performance Measurement's electronic library at [http://www.pmi-cpm.org/members/library/WS_02\(2\).pdf](http://www.pmi-cpm.org/members/library/WS_02(2).pdf).

Ms. Ladipo set out the goals of the workshop, which were to discuss lessons learned, opportunities, and challenges faced by owners (customers) and contractors alike when implementing EVM on construction projects. She conducted a quick audience poll revealing the following about the participants: about half were involved on construction projects, one-third were employed by the government, and another third were employed by contractors and the aerospace and defense industry.

EVM in Construction

Gregg Hughes began with a few remarks about how planning for EVM in construction is paramount. He discussed the importance of aligning the basis of estimate, work breakdown structure, and schedule and provided some key points for success, such as early contractor involvement, training, keeping it simple, and providing weekly status. He further described how construction work should be measured by completion of line items on the "schedule of values." He clarified this with an example at Bagram Air Base, where the construction of C-17 parking pads was measured in square feet. This schedule of values is

considered a best practice on construction projects and serves as the basis for progress payments on the contract, but it should also be used to claim the budgeted cost of work performed, or earned value. Mr. Hughes also described the importance of accruals in maintaining accurate and meaningful variances.

EVM in Construction vs. Defense Contracts

Tony Barrett described how EVM on construction contracts differs from traditional aerospace and defense contracts. He defined these differences as the triple constraint. The first constraint is that the requirement for a performance bond for a specific project usually results in the creation of a separate corporate entity on contracts greater than \$300 million in value from a group of companies, typically a joint venture (JV). This results in the return on investment (ROI) for the JV's EVM System needing to be paid off within that particular project's scope and schedule. The perceived cost benefits must outweigh the implementation costs for a specific project. The second constraint Mr. Barrett noted was that EVM should be seen as an inherent part of risk management, with a hard focus on preventing schedule slippage and scope creep. The final constraint is cost, in that indirect costs on construction contracts are held to less than 5%, with typical winning bids running less than 3.5%. Implementing EVM under this cost constraint can be challenging.

Mr. Barrett also stated that EVM implementation on construction contracts typically resulted in full compliance with 22 of the ANSI/EIA 748 guidelines, partial compliance with seven of the guidelines, and no compliance with three of the guidelines. The reason for the partial or non-compliance with 10 of the guidelines is that the portions of the guidelines related to indirect costs, which are typically waived under the risk-based and scalability clauses of the

ANSI/EIA-748 standard and the NDIA/PMSC guidelines to keep the EVMS implementation costs low and within the triple constraint. Tony recommended using earned schedule, which states schedule variance in terms of time, to keep the focus on managing schedule risk and being able to communicate more effectively with the project's stakeholders.

New Project Delivery Method — Early Contractor Involvement

Mike Nosbisch described a new project delivery method called early contractor involvement (ECI), which was instituted by the U.S. Army Corps of Engineers (USACE). This concept is also known as Integrated Design-Bid-Build, and USACE has more than \$5 billion in active solicitations. Under this concept, the general contractor provides pre-construction services, concurrently with the design effort, but there is no guarantee that the general contractor will be awarded the construction part of the effort. Typically, when the design is approximately 85% complete, the contract will be converted to either firm fixed price (FFP) or fixed price incentive – successive targets (FPIS). Under the latter, EVM is continued to include a validation review dependent on contract value. Mike also described the benefits of EVM to construction projects, whether or not they are contractually required to be fully compliant with the ANSI Standard.

Integrated Baseline Review

Eleanor Haupt described how the integrated baseline review (IBR) is important to construction contracts, as achieving a mutual understanding of the baseline realism is crucial to both the customer and the contractor. She pointed out that the IBR should focus on work scope, schedule, and the impact of local and federal government actions (such as environmental permits) on the contractor's ability to maintain schedule. Ms. Haupt described various options for IBR conduct, including conducting incremental IBRs conducted at key points, such as 15%, 30%, and 85% design completion and at the beginning of the construction phase. IBRs can also be phased to match the development of the various baseline parts, i.e., work definition, schedule, and phased budget. Benefits to construction projects

from effective IBRs include: up-front work definition, fewer disruptions and changes, customer understanding of the baseline and work scope definition, and a basis for informed risk management/mitigation and fewer claims.

Audience Participation

The attendees were asked to participate in two discussion groups and discuss their experiences and best practices. Both groups provided their feedback at the conclusion of the workshop.

One group reported that there are EVM success stories in the construction industry, and this success usually entails

- tailoring EVM to the particular project
- completing an up-front IBR and agreement between the builder and the owner on the performance measurement baseline (PMB)
- using earned schedule on FFP contracts
- contractors employing EVM in-house as a best practice where there is no contractual requirement because they realize it is the right thing to do

This group also reported that challenges to using EVM on construction projects include changing

- mind sets to use EVM as a risk management tool in lieu of a primary focus on using EVM as a cost management tool
- cultural barriers against a broader release and use of actual cost data on FFP contracts

The second group reported that

- It is important to claim earned value at a higher level, at the commodity level on the schedule of values, rather than expanding the number of work packages.
- In the same vein, the schedule can be resource loaded with physical work accomplishment and commodities for measurement, not labor hours.

This group reported challenges including the following:

- Maintaining visibility into the work breakdown structure (WBS) across the organization and increased involvement of the construction functional organization in the development of the WBS

- Another area for improvement is the optimization of engineering, procurement, construction (EPC)
- The IBR process would benefit from a focus on the need to understand the impacts of baselining the schedule to either the early or late start, as well as the need for the customer to understand the roll-up of budget to the commodity value on the Schedule of Values, and the need to educate customers regarding EVM.

Success stories from the audience included implementation on U.S. school construction projects, U.S. capital improvement projects, and on various international projects in South Africa, Australia, and Venezuela.

The recent closer collaboration of PMI-CPM with the Association for the Advancement of Cost Engineering International (AACEi) was also mentioned as a way to leverage lessons learned from both customers and contractors.

The group concluded its discussion with the perceived need to continue the dialogue through additional workshops at future conferences and relevant publications. Ms. Ladipo thanked the audience and panelists for their contributions.

About the Authors

Niyi Ladipo works for McDonough, Bolyard Peck, Inc., **Gregg Hughes** works for CH2M HILL, **Tony Barrett** works for Valued Technology, Inc., **Michael Nosbisch** works for SM&A, and **Eleanor Haupt** works for Earned Value Associates, LLC.



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