



# NEW JERSEY SECTION- NEWSLETTER

April 2021

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## Section Meeting

**Program: Data-Driven Construction by Kwant.Ai**

**Date: Thursday May 06, 2021**

**Location: Virtual via ZOOM**

**Time: 12:00 PM (EST)**

Artificial intelligence and machine-learning algorithms have struggled to make sense at muddled construction jobsites. But in recent years the industry has seen a significant boom in the use of data analytics and systems have been created around it. These systems provide intelligence necessary for these machines to provide useful advice on how to plan, schedule and execute projects. Kwant.Ai is one such solution which intends to fill this gap. Niran Shrestha from Kwant.Ai will discuss their new business suite. Their new tool will enable in identifying risks, check on productivity, and built-in safety alerts.

### Speaker Bio

Niran Shrestha, Co-Founder and CEO of Kwant.ai, has a background in civil engineering and data science, with 10 years of working on 3 continents and 6 countries. With a Masters of Civil Engineering from Columbia University, Niran has grown Kwant.ai into a global leader in construction and industrial technology with a strong team of business development and engineering professionals



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Website: <https://www.kwant.ai/>



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## **Zoom Meeting Details**

Join Zoom Meeting

<https://us02web.zoom.us/j/85710491180?pwd=K2VOQXhhZ0FFL2FGZ3Z4OWVlaCtmZz09>

Meeting ID: 857 1049 1180

Passcode: 998143

One tap mobile

+13126266799,,85710491180#,,,,\*998143# US (Chicago)

+19292056099,,85710491180#,,,,\*998143# US (New York)

Dial by your location

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+1 301 715 8592 US (Washington DC)

+1 346 248 7799 US (Houston)

+1 669 900 6833 US (San Jose)

+1 253 215 8782 US (Tacoma)

Meeting ID: 857 1049 1180

Passcode: 998143

Find your local number: <https://us02web.zoom.us/j/kc6wlzU46F>



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## **Announcements**

The New Jersey Section (Region 2) is pleased to inform the second board meeting for 2021 occurred on April 15, 2021.

Article of the Month: We welcome you all to submit interesting Articles. If selected, it will be published in subsequent newsletters.



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## Article of the Month

### EFFECTIVE PROGRAM CONTROLS BY SUCCESSFUL IMPLEMENTATION OF EARNED VALUE

*By: Rohan P Mutha, CCM, CCP, PSP, LEED AP, EIT; Project Controls Practice Lead at AECOM, New York*

Earned Value Management (EVM) helps project managers to measure project performance. It is a systematic project management process used to find variances in projects based on the comparison of worked performed and work planned. EVM integrates cost and schedule and provides quantitative data for project decision making & forecasting. It is a common misconception that Earned Value is only cost effective when applied on large programs. Another misconception is that Earned Value involves too much paperwork and a lot of reporting. In this article an effort is made to show how Earned Value technique can be successfully implemented on projects and programs varying from a few thousand dollars to multi-million-dollar projects. This article lays down the steps for effective program controls by implementing Earned Value technique that will aid the Project Managers in project decision making & forecasting. Standard industry wide software Primavera P6 is used in this analysis.

#### Some Key Terminology

- BCWS (Budgeted Cost of Work Scheduled) – Planned Value (PV) – Cost of work planned from inception till the desired date.
- BCWP (Budgeted Cost of Work Performed) – Earned Value (EV) - Cost of work earned from inception till the desired date.
- ACWP (Actual Cost of Work Performed) – Actual Cost (AC) – Actual cost spent from inception till the desired date
- BAC – Budget at Completion
- CPI – Cost Performance Index =  $EV/AC$
- SPI – Schedule Performance Index =  $EV/PV$
- CV – Cost Variance =  $EV - AC$
- SV – Schedule Variance =  $EV - PV$
- ETC – Estimate to Complete =  $BAC - EV$
- EAC – Estimate at Completion =  $AC + ETC$

#### Program Controls Implementation Procedure

The five steps mentioned below are the key for implementing Effective Program Controls using Earned Value technique:

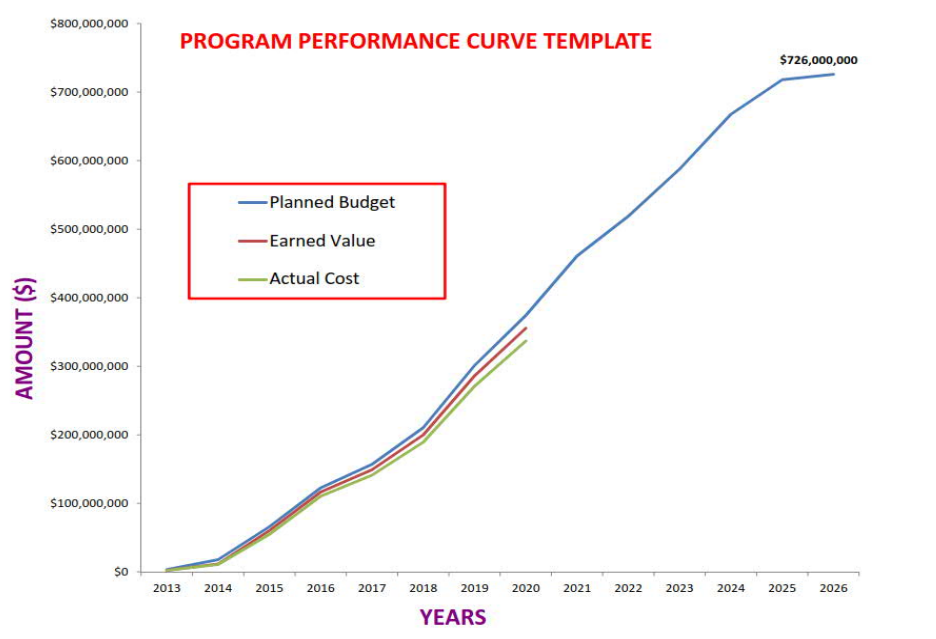
1. **Program Work Breakdown Structure (WBS):** First, an overall Program Work Breakdown Structure (WBS) should be established that will clearly identify the program scope elements in a discrete and hierarchical fashion. Getting into the technicalities, in software Primavera P6, WBS in combination with Activity Codes also aids in generating reports at various levels.
2. **Enterprise Project Structure (EPS):** Once WBS is developed, it must be mirrored in Primavera P6.



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3. **Master Schedule:** Stemming from the Program WBS, the Program Objectives will be scheduled over a period of time according to a realistic program funding scenario in order to develop the Integrated Program Schedule (Master Program Schedule) covering all phases from project initiation through closeout. This schedule will be cost loaded and will include major milestones that show interdependencies between the projects which are built into the Critical Path. The cost loaded schedule will help facilitate development of the program cash flow. The scheduling software spreads the budgeted resources and or cost over the duration of the designated activity and when added to other activities, forms the 'S curves' as shown in the image below.



4. **Earned Value Management:** As the design and construction progresses, the project controls engineer will continue to update the master schedule to reflect the actual dates and events. The Project Controls Engineer will work collaboratively with the Project Manager to measure the work progress in Physical Percent Complete (PPC). AACEI proposes the following six methods. Any or combination of these methods can be implemented to measure the progress of work The Project Controls Engineer can assist in implementing these methods:

- Units Completed
- Incremental Milestone
- Start/Finish
- Supervisor Opinion
- Cost Ratio
- Weighted or Equivalent Units

One practical way of measuring progress is to apply 'Reverse Psychology' as illustrated below:

- Apply Physical Percent Complete
- Calculate ETC
- Ask yourself – Is ETC sufficient to complete the work?



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- Assess and re-apply physical percent complete
- Last check – After applying the Actuals

Once the progress is measured, the same is applied to activities in Master Schedule in Primavera P6. The applied % Complete “earns” a portion of those budgeted resources for each activity. When totaled with other activities it creates a period & cumulative Earned Value. When compared to the baseline or plan, it creates Planned Value. The Earned and Planned values is generated from Primavera P6 as shown in the image below.

Activity ID	Activity Name	OD	Start	Finish	TF	Physical % Complete	Planned Value Cost	Earned Value Cost	Budgeted Total Cost
[-] Schedule - Jul 2020 Update - DD 07.31.20		1270	15-Oct-19 A	14-Oct-24	0		\$915,238	\$717,176	\$3,139,127
[-] Phase 1 A		508	15-Oct-19 A	13-Oct-21	0		\$744,295	\$494,796	\$1,130,036
[-] Task 3 Environmental & Traffic Study		508	15-Oct-19 A	13-Oct-21	0		\$744,295	\$494,796	\$1,130,036
[-] 3.0 Program Management - Task 3		381	15-Oct-19 A	14-Apr-21	0		\$176,021	\$164,191	\$330,365
BYD-C3.00-10	Task 3.0 - HDR Cost Summary	381	15-Oct-19 A	14-Apr-21	0	49.7%	\$176,021	\$164,191	\$330,365
[-] 3.1 Environmental Site Assessment		96	11-Nov-19 A	09-Apr-20 A			\$22,387	\$22,387	\$22,387
BYD-C3.01-10	Task 3.1 - HDR Cost Summary	96	11-Nov-19 A	09-Apr-20 A		100%	\$22,387	\$22,387	\$22,387
[-] 3.2 Traffic Analysis		294	04-Nov-19 A	30-Apr-20 A			\$48,624	\$75,637	\$75,637
BYD-C3.02-10	Task 3.2 - HDR Cost Summary	294	04-Nov-19 A	30-Apr-20 A		100%	\$48,624	\$75,637	\$75,637
BYD-C3.02-20	Task 3.2 - TDB Cost Summary	294	04-Nov-19 A	30-Apr-20 A		100%	\$0	\$0	\$0
[-] 3.3 Wetlands Impacts & Ecologically Sensitive Areas		284	11-Nov-19 A	30-Jun-20 A			\$29,896	\$46,144	\$46,144
BYD-C3.03-10	Task 3.3 - HDR Cost Summary	284	11-Nov-19 A	30-Jun-20 A		100%	\$29,896	\$46,144	\$46,144
[-] 3.4 Floodplain & Steep Slope Analysis		228	20-Dec-19 A	22-Dec-20	13		\$31,882	\$18,520	\$46,299
BYD-C3.04-10	Task 3.4 - HDR Cost Summary	228	20-Dec-19 A	22-Dec-20	13	40%	\$31,882	\$18,520	\$46,299
[-] 3.5 Water Quality & Hydrology		226	21-Feb-20 A	12-Jan-21	0		\$23,969	\$19,007	\$47,518
BYD-C3.05-10	Task 3.5 - HDR Cost Summary	226	21-Feb-20 A	12-Jan-21	0	40%	\$23,969	\$19,007	\$47,518

Actual costs are derived from the Invoices. The Project Controls Engineer conducts an intellectual interrogation while performing the Variance analysis to make sure numbers make sense.

The AV/PV results in a value (ratio) known as the Cost Performance Index (CPI). In order to generate a meaningful Cost Variance and CPI, it is essential that cost of work performed by the outside contracted entities (Contractor, Vendors, and Consultants) is accrued and reflected in the Actual Costs. Typically, actual costs as reflected in the corporate financial accounting system may lag behind one or two months, and if reported without going through the accrual process will result in misleading and false cost variance.

The EV/PV results in a value (ratio) known as the Schedule Performance Index (SPI). The Project Controls Engineer identifies and performs a thorough assessment of the critical activities affecting the critical path, to ensure timely and successful completion of the program. The Schedule Variance and SPI is evaluated in conjunction with the Project Critical Path Analysis to accurately determine the schedule health of the project.

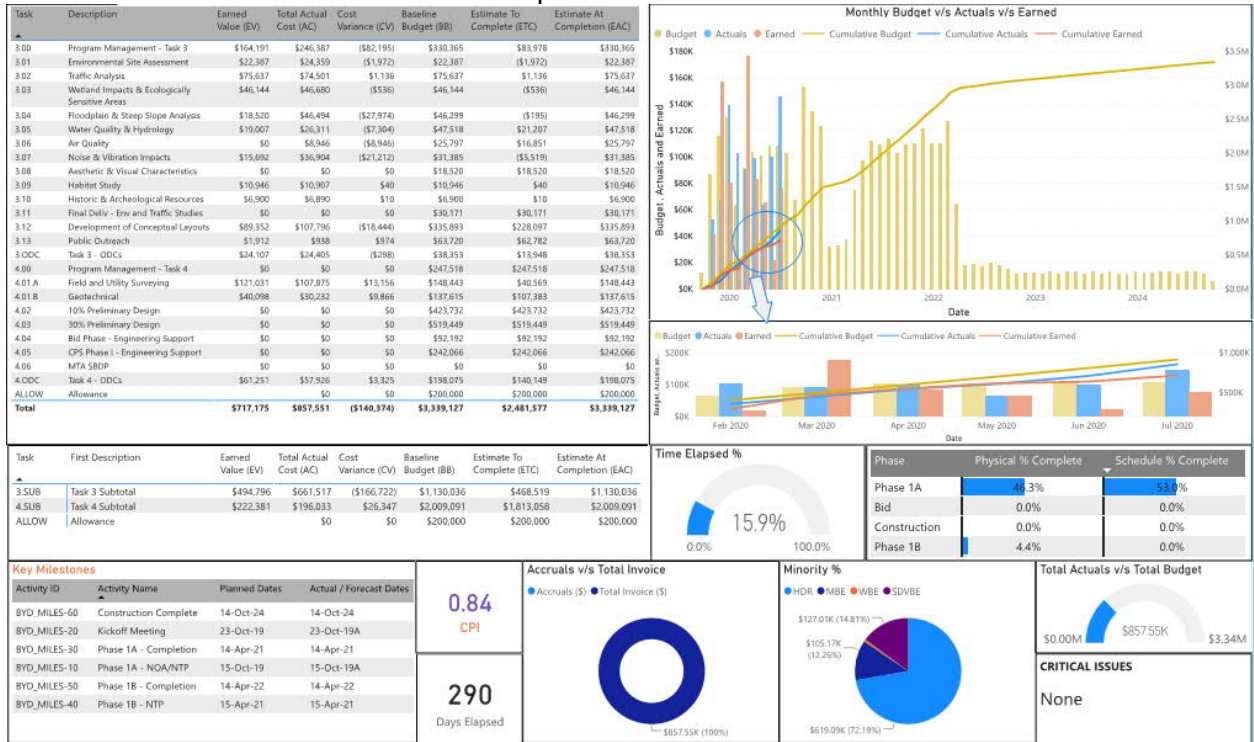
SPI and CPI can be expressed for either period or cumulative. Where period values will show greater variances period to period, and cumulative will show slower trends that can be used for forecasting. Any variance against the approved plan (such as scope, cost and/or schedule) is continuously identified and immediately reported to Project Manager such that corrective actions can be developed and executed.

5. **Dashboard Reporting:** Lastly, all the analyses performed above is portrayed on a Dashboard that illustrates the overall Program status and performance. The dashboard allows to quickly communicate program progress across a broad range of performance categories to all stakeholders.



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In summary, albeit just an overview can be provided in this article, it is important to note that the five steps mentioned above can help in effective Program Controls by successfully implementing Earned Values technique on project of any size and scale.



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## Board of Directors

The New Jersey Section (Region 2) is pleased to announce its Board of Directors for 2020-2021. Congratulations to all the members.

Position	Address	Contact Information
<b>President</b> Dr. Pei Tang	JCMS, Inc. 1741 Whitehorse Mercerville Road, Hamilton Township, NJ 08619	(609) 977-9064 ptang@mtu.edu
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<b>Director, Corporate Sponsorship</b> Sahel Daqamseh	PMA Consultants 1350 Broadway, Suite 1810, New York, NY 10018	(201) 268-4882 sahel.daqamseh@gmail.com
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<b>Director, Membership</b> Vishnu Divvela	Faithful & Gould 10 E 40th St., New York, NY 10016	(540) 449-1226 d.vishu@gmail.com
<b>Director, Newsletter</b> Rohan P Mutha, CCM, CCP, PSP, LEED AP, EIT	AECOM 605 3 <sup>rd</sup> Avenue, New York, NY 10158	(224) 532-1878 rohanmutha@gmail.com