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BOARD'S INSIGHT OF VALID PMB & CONTRACTPERFORMANCE REPORT FOR CONSTRUCTION PROJECT

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ABSTRACT

There is a prodigious essential in the construction engineering for identifying a set of common indicators to be used by construction executive and project managers in evaluating construction contract performance at the project level and board's level. The emphasis of this research was to collect management perceptions of the key performance indicators currently utilized in the construction industry. Both quantitative performance indicators and qualitative performance indicators are represented. A literature search was used to generate the initial set of set of apparent evm-eacperformance indicators, which were administered to the construction industry via analysis. A statistical analysis of the collected assessment responses provided information for the identification of a common set of perceived Key Performance Indicators (KPIs) by construction sector, management level, and experience level. Correlations were performed for both the quantitative and qualitative indicators to determine which type of indicator is used most extensively. Basic arithmetical analyses and frequency distributions provided evidence in support of some of the hypotheses of the research. The results of the assessment data analysis support the hypothesis that KPIs vary according to management's perspective and valid performance measurement baseline checks & balances. Further study displayed the purpose of the CPR is to provide early identification of problems that may have significant cost, schedule and/or technical impacts, and report the effects of management actions and project status information for use in making and validating board's decisions/insight.

Keywords—Board's Perception, Performance Measurement Baseline, Contract Performance Report, , Earned Value Management, Microsoft Project 2016, Baseline Balances, Dash Boards

I INTRODUCTION

The Contract Performance Report (CPR) and Contract Funds Status Report (CFSR) are important communication vehicles between contractors and their Clients.The Contract Performance Report (CPR) is a contractually required report to the client as defaced in Construction management regulation.The importance and demand of CPR is to provide early identification of problems that may have significant cost, schedule and/or technical impacts, and report the effects of board's insight and project status information for use in making and validating board decisions.A representative project is used for both reports to support the viewer fully understand the

correct entries and the reconciliation fields.

Accuracy of CPRis depends on accurate and valid pmbdevelopment methodology.The Contract Performance Report (CPR) is a contractually required report to the board for insight, as defined inthe construction management practice as per PMI process and PARCA Performance Assessments and Root Cause Analyses. CPR is normally prepared each month to formally provide technical, schedule and cost status information for company project management and for the government customer on major projects (typically Rs10 Cr or more or as defined in the contract). The purpose of the CPR is to provide early identification of problems that may have significant cost, schedule and/or technical impacts, and report the effects of management actions and project status information for use in making and validating management decisions.

The need to implement a major rebaselining action should be a rare occurrence in the life of a project. Some level of internal replanning is to be expected to some degree, as the actual execution of a project will always deviate from the initial plan. The initial PMB and the PMB for the remaining work needs to be realistic. Project stakeholders and most importantly, the control account managers (CAMs), must take ownership the PMB for effective performance measurement and control. Procedure and methodology to develop and validate PMB with checks and balances is mandatory in construction project practice.

The rubber baseline as initially defined (1970's vintage) was any change to the performance measurement baseline (PMB) that was incorporated to:Avoid schedule variance. The budgeted cost of work scheduled (BCWS) was moved with the current schedule instead of the estimate to complete (ETC) moving with the current schedule. Back in the 70's, this was referred to as "snowplowing".

These practices continue today in situations where project managers elect to hide schedule and cost variances instead of allowing their EVM Systems to properly function as early warning systems. To prevent from rubber baseline recommended to valid performance measurement baseline by using methodology of checks and balances as per drawing and contract documents.

Contract performance can be defined by the level and quality of projects delivered to clients. It has been a common practice however to select the least cost bidder among competing contractors to perform the job as per PMB. Predicting the performance of construction firms in such a situation is indispensable in order to ensure quality and guarantee international standards. Inefficient management of construction project can result in low performance and productivity. Therefore, it is important for contractors and construction firms to be familiar with the method leading to evaluate the performance of the construction project using contract performance report (CPR).

Performance measurement baseline is an approved integrated scope-schedule-cost plan for the project work against which project execution is compared to measure and manage performance. The PMB is formed by the budgets assigned to control accounts plus budget with identified scope that have not been distributed budget plus the undistributed budget. It does not include management reserve (MR).

Earned value management (EVM) is truly a state of the art methodology for project performance management.Predicting the performance of the contractoris highly important for both the contractor and the Board.

Time performance is very important for construction projects to be completed on time, as the clients, users, stakeholders and the general public usually looks at project success from the macro view where their first criterion for project success appeared to be the completion time (Lim & Mohamed 2000). Salter &Torbett (2003) mentioned that time variance is one of the techniques for assessing project performance in construction projects. The element of time could indicate to project managers that the project was not running as smoothly as scheduled.

Furthermore, the ensuring timely delivery of projects is one of the important needs of clients of the construction industry. Construction time can be regarded as the elapsed period from the

commencement of site works to the completion and handover of a building to the client. The construction time of a building is usually specified before the commencement of construction. Construction time can also be deduced from the client's brief or derived by the construction planner from available project information.

Cost performance is defined as the degree to which the general conditions promote the completion of a project within the estimated budget (Bubshait&Almohawis, 1994). Salter &Torbett (2003) indicated that cost variance was the most common technique used to measure design performance. It is not only confined to the tender sum, but the overall cost that a project incurs from inception to completion, which includes any costs arise from variations, modification during construction period and the cost arising from the legal claims, such as litigation and arbitration.

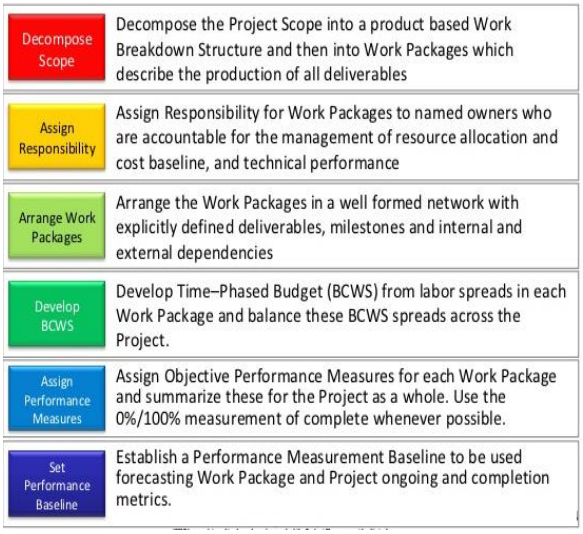
Contract Decisions-Transferring or sharing risk via a contract, as a form of risk response, will lead to the involvement of third parties. This will have an impact on how the project work will be accomplished and how the budget consumption will occur and be monitored. The use of EVM to monitor the performance of subcontracted work requires proper consideration in the PMB. For example, the visibility of work accomplishments and budget consumption will depend on the type of contract and the terms agreed upon with the vendors.

Contract performance report/evaluation is a process of ensuring that a contractor adequately performs a contracted scope of work.

2. PMB Development &Validation by checks and balances

Each project shall have a formally approved and communicated Performance Baseline (PB) that describes the integration of the technical objectives and requirements with the schedule and costobjectives. The baseline is included or referenced in the Project Execution Plan. At CriticalDecision-1, Approve Alternative Selection and Cost Range, a preliminary baseline range isadopted by the project until it is replaced by the performance baselines at Critical Decision-2,Approve Performance Baseline. The technical, schedule, and cost processes are the three key elements used to establish an integrated approach to the PB.

Fig.1 Steps To Build PMB



PMB VERIFICATION (VALIDATION)

Performance Baseline External Independent Reviews are to be conducted by personnel who are recognized a qualified in their respective fields of expertise and are outside theproject organization. These reviews assess the reasonableness of the technical approach and project scope, schedule and cost baselines. They also assess the potential for schedule and/or cost improvement. The timing and Scope of independent baseline reviews will depend on the type of project and the baseline element (technical, schedule, cost) being considered. An independent review of technical requirements, technical approach, and scope of a new project should be conducted before the baseline schedule and cost estimate are developed. Technical, scope, schedule and cost will allbe reviewed at the same time for subsequent reviews or for a baseline change package.

The principle reasons for establishing, approving, controlling and documenting a PB are to:

- Ensure achievement of project objectives.
- Manage and monitor progress during project execution.
- Define the project for approval and authorization by the client..

- Ensure accurate information on the final configuration (as-built drawings, specifications,expenditures, etc.).
- Establish performance measurement criteria for projects.

Development of the PB begins with the planning cost, schedule estimates, and the preliminary scope included in the mission need statement, and is further defined in conceptual design documents. All capital asset projects are required to have their PBs independently reviewed through an independent cost review or Independent Cost Estimate if required, which addresses the technical, schedule, and cost baselines.

PB verification (validation) is a one-time event. Once a PB is verified (validated), it should not generally require revalidation if changes are managed through a rigorous change control process. Completion of a rigorous external independent verification review should reduce the need to subject the project to additional resource-consuming audits and reviews by other organizations. The Office of Engineering and Construction Management (Client/Contractor) side is responsible for coordinating and conducting all project Independent Cost Review/Independent Cost Estimate baseline verifications/validation reviews for projects having a TPC greater than INR10 Cr.

Some of the Validation efforts are:

- Review, evaluate and critic the Work Breakdown Structure;
- Evaluate estimates of resources, schedule activity durations, and earnings;
- Check the logic: mandatory and preferential;
- Analyse the work plan strategy, means, methods, and assumptions;
- Review date constraints: milestones, external, and performance duration;
- Review resource, earnings, production, and space restraints;
- Review resource calendars;
- Check on-site long-lead item requirements: selection/approval, manufacturing,shipping & delivery to site, Inspection, acceptance, and storage;
- Perform database validity / cross-check;
- Review linear schedules of trades and materials;
- Review the submittal register and schedule: completeness and the submittal review loading histogram;
- Review the use of contingencies for activities, work-packages, and milestones;
- Review time and earning-funding reserves – buffers;
- Review earned value graphs: earnings-funding, man-days, material placements, trade performance/productivity;
- Analyse schedule and earnings performance indexes;
- Evaluate historic performance and estimated forecast at completion

The flowing standards checks should be made on each schedule that is checked:

Statistical, Activities, Codes, Relationships, Constraints, Cost, Logs, CPM Should Be Calculated, Calendar Type, Start Day Setting, Scheduling Method, Total Float Calculation, Negative Float, Early Completion Schedule, Activity Duration Checks, Activities With Work Percentages, Major Materials Purchase And Delivery, Check For Work Breakdown Structure, Multiple Relationships, Lag And Lead Checks, Constraint Analysis, Zero Free/Total Float Constraints, Active Expected Finish Constraints, Active Mandatory Constraints, Cost Analysis etc.

2.1PERFORMANCE BASELINE DEVELOPMENT

A project PB contains three elements:

- The technical baseline
- The schedule baseline
- The cost baseline.

The technical baseline is developed first and describes the desired configuration: technical,schedule, and cost performance, and characteristics of the end product. Key Performance Parameters (KP) are used to represent the PB. The scope of work necessary to provide the end product is determined using the technical baseline. The scope of work is divided into elements that become

the work breakdown structure (WBS). The scope is the basis for developing the schedule and cost baselines. These three baselines are tightly coupled. A change in one baseline generally affects one or more of the others. The WBS itself is hierarchical in the sense that each element in a WBS may be subdivided and become the basis for the next lower, more detailedWBS level (see the Practice on WBS).

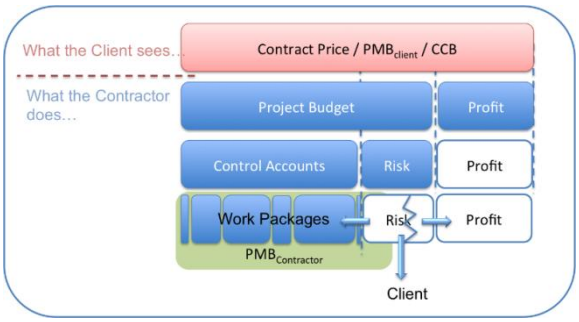


Fig.2Relationship between CP-PMB-CCB

The technical baseline is the reference set of high-level technical documents that contain the technical requirements necessary to satisfy mission needs. The schedule baseline is the set of approved milestones derived from, and consistent with, the technical logic. The schedule milestones are traceable to elements within the WBS. The cost baseline is developed by allocating resources and estimated costs against the scheduled activities for the total scope of work. The cost baseline supports the technical work scope, is traceable to the WBS, and is timephasedand aligned to the schedule baseline and mission elements.Baselines are controlled through the application of the configuration management and baseline change control processes, and will evolve as the project matures.Baseline details and precision increase as a project progresses.Projects with a TPC greater than INR 10 Cr. require an external independent review verification of PB .

The technical baseline development process requires management action to formally establishthe project mission, functional objectives, design or characterization requirements, and specifications in order to define, execute, and control the project scope of work (Figure 1). The technical requirements are the basis for development of the project's WBS, cost estimate, schedule, and performance reports.

The contractor must establish a technical baseline from which work can be accomplished andperformance measured. The contractor's technical baseline is developed after the project'smission, technical objectives, and functional requirements (or equivalent objectives such as environmental assessment requirements) are established by the PD/PM and included in project documentation. The formally approved technical objectives and requirements arebaseline at Critical Decision-1. The technical baseline and work scope definition guideline requires that the contractor's technical baseline be contained in formal documentation, such as a conceptual design report, associated drawing, or an environmental clean-up work plan, and is approved by the Client. This is the point from which technical aspects of the contract work will be subject to formal change control.

All authorized project work is defined in a WBS that represents the way the work will be estimated, scheduled, budgeted, performed, and managed. The WBS is maintained consistent with project needs throughout the life of the project, ensuring changes to the WBS are made within a formal change control process. General sequence to establish and maintain an integrated project technical, schedule, and cost baseline

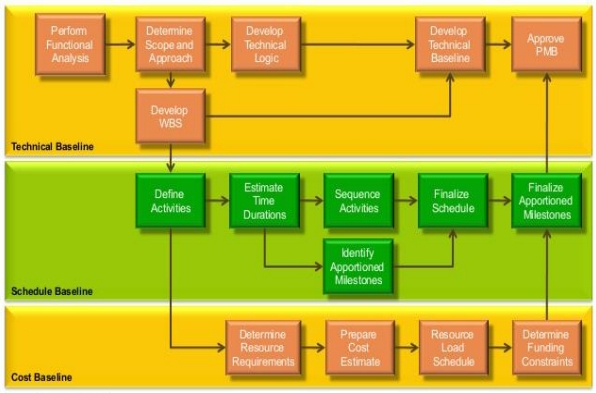


Fig.3 Establishing-The-Performance-Measurement-Baseline

The technical baseline is established such that scope performance can be measured and controlled throughout the life of the project. Monitoring and controlling scope performance

involves tracking the achievement of the technical baseline at the contractor level. The technical baseline is hierarchically related, such that monitoring scope performance at the contractor level is directly related to accomplishment of the higher level Client-controlled PBs. The technical baseline also relates to the schedule and cost baselines to allow technical performance monitoring to correlate with cost and schedule monitoring.

Changes to the WBS should not be made once work has started, although sometimes changes are necessary to make corrections. Some WBS changes, such as splitting work scope into multiple WBS elements, may cause a significant disruption to the project control system if some of the work has already been performed and actual costs incurred. Changes to the WBSnormally result as a project progresses through design, procurement, construction, test, operation, etc., and when project re-scoping occurs.

2.2 SCHEDULE BASELINE DEVELOPMENT PROCESS

When establishing the schedule baseline, all known requirements affecting a project are identified and considered in the development of project baselines. All project work is scheduled using a disciplined, integrated approach.

Schedules are developed consistent with the WBS and integrated with the cost estimate, and represent all project work scope regardless of funding source. Activity logic is developed to depict all work scope, constraints, and decision points. Time durations are estimated and assigned to activities representing work accomplishment. Development of schedules is in concert with the WBS, such that all work is represented in the schedule, and accurate durations areestablished. Schedule activities should be traceable to the cost estimate and the WBS. Schedule activities, durations, and sequencing relationships are conceptually developed in conjunction with development of the project cost estimate. The cost estimate is generally calculated below the lowest level of the WBS and provides a means for estimating activity durations.

Activities and logic should be planned by theWBS element first, to permit the checking of activities and logic with the WBS element scope of work and technical requirements. After determining that adequate activity planning against the WBS element has been accomplished, integration of activity logic between WBS elements is performed. Logic links should be developed thoroughly enough to allow an accurate critical path to be calculated in order to serveas the basis for forecasting and decision-making throughout the life of the project.

An approved schedule baseline should be established that clearly depicts critical path activities and milestones from which actual performance for all activities and milestones can be compared, and from which forecast data can be generated. Resource-loaded activities, as required and at the appropriate level, will be used to develop time-phased budgets that are integrated with the schedule. Only approved changes to the schedule baseline will be permitted.

Project schedule activities (not milestones) should be resource-loaded to facilitate analyses of "what if" funding scenarios. Resource-loaded schedules assist the PD/PM in developing timephasedbudgets and spending profiles. On projects using critical-path method schedule networks, schedules should be resource-loaded at a summary level; resource loading within the same scheduling database is desired but not required.Where logic relationships are established, the detailed level of the schedule is the focal point ofa project's scheduling system from which all scheduling reports are generated.

All known project and contract requirements, major procurements, milestones, and constraints should be identified for the planning and scheduling process. Activities external to the project that could reasonably be expected to impact the project should also be considered. All project work is scheduled using a formal, documented, consistent approach. The schedules should reflect planning by the appropriate technical experts as to how the activities will be accomplished.The initial schedule, from which performance will be measured, developed, establishes the project schedule baseline, which includes project milestones.

Modifications to the schedule baseline are subject to formal change control.

The range (or roll-up) includes low-level schedule and milestone tasks that support master schedule and milestone lists.

2.3 COST BASELINE DEVELOPMENT

Cost baselines are developed to ensure budgets for labour, services, subcontracts, and materials are established at the proper levels and are "time-phased" in accordance with the project schedule. This ensures that the total project cost (TPC) is noted within the system and the project's direct costs and indirect costs are identified and managed.

Each control account includes technical, schedule, and budget requirements. That is, budget is estimated for the scope of work contained in the account, and time-phased in accordance with the project schedule. Time phasing of the budget in accordance with the schedule may be accomplished manually by the control account manager, or with a resource-loaded schedule network for complex projects. Time phasing of the resource requirements is performed in a manner that represents the way the resources will be accounted for when costs are incurred. The basis for the budget that is time-phased in the control account should be supported by, and reconcilable to, the cost estimate and schedule.

All work is represented in control accounts, and the sum of all control account budgets, contingency, reserves, and fee, equals the TPC or contract value, as appropriate.

A project's cost baseline is a budget that has been developed from the cost estimate and has been timed-phased in accordance with the project schedule. The cost baseline is referred to as a base line since it's subject to formal monitoring and controls, and is integrated with the technical and schedule baselines. Establishing adequate contingencies and reserves remains difficult to forecast as well as defend.

Table 1 Baseline Type Table

Baseline type	Documentation	Purpose
Scope Baseline	1) Scope Statement 2) Work Breakdown Structure 3) Work Breakdown Structure Dictionary	The scope baseline outlines the requirements for the scope of the project and how the work will be broken down.
Cost Performance Baseline	1) Resource estimates 2) Cost Management Plan 3) Budget development, including provisions for risk	This is a version of the budget, used to compare actual expenditures with planned expenditures, over time.
Schedule Performance Baseline	1) Project schedule	This is a specific version of the schedule, used to compare actual delivery to planned delivery.

When combined with other cost baseline components, budgets are formed with unique purposes,as listed below:

1. When added together, the sum of all cost baseline components for all contracts equals theTPC.
2. The sum of the direct, indirect, contingency and management reserve, and undistributed budget, equals the total INR amount allocated for the project/contract scope of work.

Once the technical, schedule, and cost baselines are clearly defined, documented, and approved, they are controlled through a formal and documented control management process. Project baseline changes below the threshold levels need to have various levels of approval authority.

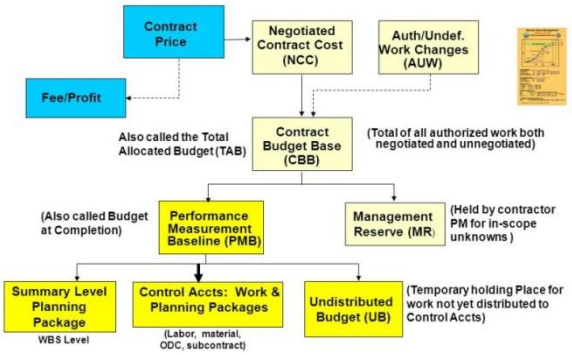


Fig.4PMB formation & Budget Allocation

The PB identifies the performance requirements, schedule requirements, and cost requirements (TPC) for a project.

External independent reviews are those used to verify the completeness and reasonableness of cost and schedule baselines and any other estimates or schedules used to analyseproject alternatives or support management decisions. These reviews are typically performed before approving the cost and schedule information for use to support budgetary document or

managementdecisions, and should be thoroughly documented for future reference.

2.4 PERFORMANCE BASELINE AGREEMENT

With the objective of enhancing project stability and controlling costs, we, the under-signed,submit this baseline document for approval. Our intent is that the project be managed within the performance, schedule and financial constraints identified. We agree to support the full required funding in the budget submission.

3. EVM TERMS

The basic terms associated with Earned Value Management

Planned Value (PV): It is the amount of money budgeted to be spent at a particular point of time.

Earned Value (EV): It is the amount of work in terms of cost that is actually accomplished at a particular point of time with respect to the planned value.

Actual Cost (AC): It is the actual amount of money spent for the corresponding planned and earned value.

Cost Variance (CV): It is the difference between Earned Value and Actual Cost. (EV-AC)

Schedule Variance (SV): It is the difference between Earned Value and Planned Value. (EV-PV)

Cost Performance Index (CPI): It is the ratio between Earned Value and Actual cost. If CPI greater than 1 then the project is under budget and CPI less than 1, then the project is under budget.

Schedule Performance Index (SPI): It is the ratio between Earned Value and Planned Value. It indicated how much ahead or behind schedule the project is at a particular point of time.

Critical Ratio (CR): It is the product of Cost Performance Index and Schedule Performance Index. It indicates the overall performance of the Project with respect to both cost and time.

Estimate at Completion (EAC): It's a prediction of the total project cost based upon the current trends in project performance.

Variance at Completion (VAC): It is the difference between the planned budgets at the beginning of the project to the Estimate at Completion. This value denotes how much more profit or loss the contractor will make on that Project

Time Estimate at Completion (EACt): It predicts the completion time of a Project based on its current performance. EACt = (BAC / SPI) / (BAC / months)

Performance measurement baseline (PMB) is an approved integrated scope-schedule-cost plan for the project work against which project execution is compared to measure and manage performance. The PMB is formed by the budgets assigned to control accounts plus budget with identified scope that have not been distributed budget plus the undistributed budget. It does not include management reserve (MR).

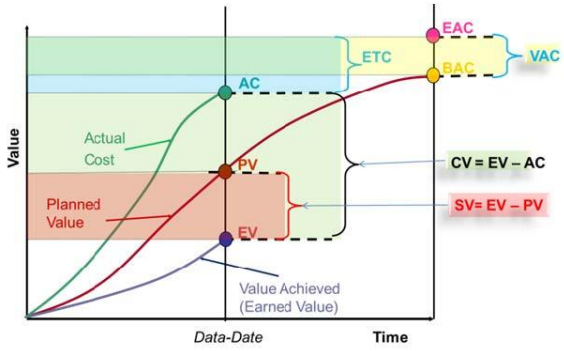


Fig.5 EAC, BAC&VAC Relationship

The performance measurement baseline (PMB) is the budget and schedule against which project performance is measured. It is formed by budgets and is assigned to control accounts, summary level planning budgets, and undistributed budgets. It equals the PBB minus the management reserve. The PMB is maintained by project management, and all changes within the PMB are approved by the project manager.

1 Undistributed Budget

2 Summary Level Planning Budgets

3 Control Account Budgets

The performance measurement baseline (PMB) must include, but is not limited to the following elements:

- Schedule start and completion dates for each work package and planning package in the WBS
- Budget for each work package and planning package, and its time-phased distribution, decomposed by the resources allocated.

- Time-phased distribution of the quantities of the resources allocated to each work package andplanning package
- Description of the risks covered, including: their value, the time period to which they refer and possiblythe types considered (for example, a cost reserve may include separate limited amounts forexternal services and for internal resources)
- List of constraints and assumptions regarding work progress, corresponding budget, and resourceConsumption.

3.1The Estimate at Completion - EAC

Project managers are continually asked by company management and the customer toverify that the project's cost and schedule goals can be met within the authorized budget, the Budget at Completion (BAC), and the Planned Completion Date (PCD). The Estimated at Completion (EAC) and the Estimated Completion Date (ECD) are the measures used to provide the answers to this question.

The Earned Value Guidelines define the EAC as the sum of the contracts cumulative to date Actual Cost of Work Performed (ACWP) plus the company project manager's best estimate of the time-phased resources (funds) required to complete the remaining authorized work, the Estimate to Complete (ETC). This relationship is often expressed by the formula EAC = ACWP + ETC. Thus, the EAC is a forecast of the project's finalcost. The project manager may revise work priorities, re-plan remaining tasks on the project schedule and/or adjust the technical approach to complete the project's goals within the estimated remaining resources. The goal is to complete all of the contract work scope within the Contract Target Cost (budget) and Contract Completion Date (schedule).

As with all estimates, the level of uncertainty of an EAC will vary with the type of remaining work, the available information, and the perceived remaining risks. Prudent management needs to know how valid an EAC is, especially when the EAC varies significantly from the project's authorized budget (BAC). Thus, the objectives of project management include the identification of the level of uncertainty associated with the remaining schedule, establishing the cost estimate for the remaining work, and managing the impact of the uncertainty upon the project cost goals.

For these reasons, the Contract Performance Report (CPR) and the Integrated Program Management Report (IPMR) require three separate EACs in an attempt to capture information regarding the level of cost uncertainty or the magnitude of the known project risks. These reports require EACs which represent the Best Case (or lowest potential cost), the Worst Case (or highest potential cost) and the Most Likely EAC (the project manager's best estimate) with their respective forecasted completion dates---generally referred to as Estimated Completion Dates (ECDs).Financial statements published by issuers are required to be accurate and presented in a manner that does not contain incorrect statements. Note that the financial information on CPRs and IPMRs directly feed corporate annual reports and that serious overrun or under run conditions will affect the profit statements in these reports. The Act also imposes penalties and fines and/or imprisonment for altering, destroying, mutilating, concealing, falsifying records, documents or tangible objects with the intent to obstruct, impede, or influence a legal investigation.

Since the actual cost to date is a known value, EAC uncertainty is a function of the Estimate to Complete. The ETC is prepared by re-estimating the resources required to complete the remaining authorized work using the cost experience to date and then applying a number of other factors; such as current direct and overhead rates, Schedule Risk Assessment (SRA), Monte Carlo simulations, root cause analysis, etc.

A well-conceived ETC also considers purchase order commitments, anticipated labourefficiency and rate, material price and usage, Other Direct Cost (ODC) price and usageperformance, risk and opportunities, resources by type, and other factors identified byhigher management. Additionally, as the ETC is being developed it should be mappedto the current schedule consistent with the Estimated Completion Date (ECD).

As a means to cross-check the EAC, a mathematical or independent estimate of the EAC is typically prepared using performance indices based upon the cost and schedule experience to date. For example, the Cost Performance Index (CPI) (cumulative Budgeted Cost for Work Performed / ACWP) can be used to complete the EAC by dividing the project BAC by the CPI. The resulting EAC is often referred to as the Independent EAC (IEAC) to distinguish it from a formal or grass roots EAC. The IEAC can be quickly prepared and then used to test the reasonableness of the current cost estimate and to indicate when a comprehensive EAC should be undertaken. It is important to note that these calculations do not consider any "thinking" about the considerations mentioned above with respect to anticipated labour efficiency and rate, risk and opportunities, SRA, etc. It is often said that they are independent of sanity, logic and judgment but are calculated for comparative analysis---an important purpose.

The capability to regularly prepare an EAC along with the calculation of the Best Case, Worst Case, and Most Likely EACs is becoming an industry best practice. At least annually, a complete "bottoms-up" EAC, called the Comprehensive EAC, is required on those projects subject to the construction project management policy Earned Value Management System requirements. A comprehensive EAC is also often prepared at the start of a major project phase; such as the start of production or construction. Consequently, it can reflect the reduced uncertainty resulting from a design release and/or a released bill of material, which enables the project manager to answer these questions:

- Are the remaining authorized funds sufficient to complete the project?
- Is prior cost experience a predictor of future cost performance?
- Should the remaining project be modified based upon the performance todate?
- Will the project cost performance impact the corporate financial condition?

Thus, a timely and realistic EAC and ECD should be an integral part of both project management and corporate financial management practices. Both should require routine comparison of the EAC and ECD with the contract targets to forecast realistic financial performance for customers and stockholders.

4 Contract Performance Report (CPR)

The Contract Performance Report (CPR) is a contractually required report to the customer as defined in Construction Management regulation.

The CPR is normally prepared each month to formally provide technical, schedule and cost status information for company project management and for the government customer on major projects (typically Rs200 Cr or more or as defined in the contract). The purpose of the CPR is to provide early identification of problems that may have significant cost, schedule and/or technical impacts, and report the effects of management actions and project status information for use in making and validating management decisions.

The report consists of five Formats; four contain data that measure the contractors' cost and schedule performance, and a fifth that addresses problem analysis, corrective action plans and technical, schedule and cost impact explanations.

- Format 1 includes cost and schedule performance data by product-oriented Work Breakdown Structure (WBS) elements and includes hardware, software, and services.
- Format 2 provides the same data by the contractor's organization (functional or Integrated Product Team (IPT)) structure. Both Formats 1 and 2 include the current period and the cumulative to date Budgeted Cost for Work Scheduled (BCWS), Budgeted Cost for Work Performed (BCWP), Actual Cost of Work Performed (ACWP), their associated cost and schedule variances, the Budget at Completion (BAC) and Estimate at Completion (EAC) as well as the Variance at Completion (VAC).

- Format 3 provides the budget baseline plan against which performance is being measured as well as any changes during the reporting period.
- Format 4 provides staffing forecasts for correlation with the Estimate at Completion by the same organizational elements reported in Format 2.
- Format 5 is a narrative report used to explain significant cost and schedule variances reported in Format 1, other identified contract problems and topics, uses of Management Reserve and Undistributed Budget, an explanation of any significant shifts in the budget baseline reported on Format 3, and to provide technical, schedule and cost impacts based upon root cause analyses, corrective action plans and the anticipated results from those corrective action plans. Other explanations provided on Format 5 are the differences between the Best Case, Worst Case and Most Likely EACs. Format 5 provides the contractor's project manager an opportunity to address the overall health of the contract.

The elements of the following deliverables should be considered during the development of the CPR:

- Project Charter
- Integrated Master Schedule
- Integrated Baseline Review
- Project Management Plan
- Test Plan
- Implementation Plan
- Training Plan
- Budget/Funding Deliverables & Activities
- Other Project Management Deliverables & Activities
- Change Requests
- Corrective Action Plan

5. Conclusion

Board's Insight of Valid PMB & Contract Performance Report for Construction Project is of great importance especially in a highly completive market & infra projects in Indian construction market. Global software tool Primavera & Microsoft project help in infra project industry to evaluate contract performance report for decision making to support insight of boards.

In the years ahead, the construction industry in India has to overcome various challenges - be it with respect to housing, environment, transportation, road, fly-over and bridges. Board's associated with the Indian construction industry need to employ innovative technologies and skilled project handling strategies to overcome these challenges for board member [Performance Measurement Baseline (PMB) &Evaluate Contract Performance Report (CPR)]. CPR is to provide early identification of problems that may have significant cost, schedule and/or technical impacts, and report the effects of management actions and project status information for use in making and validating board's decisions/insight.Board's insight about CPR1-5 for making discussion & decision of contract with summary analysis,Analysis of Significant Variances.

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