Scheduling, Monitoring And Cost Analysis By Earned Value Method Of Phase-2 (Reach-2a From Pier No.443 To Pier No.470) Using Primavera P6

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***Abstract*—Earned Value Management (EVM) is a technique that consolidates extension, calendar, and asset estimations to survey extend execution and advance, it includes the joining of the three key components of venture which are timetable, work degree, and cost.The following study concentrate on the checking of venture process entitled "standard plan components" for a Metro extend at BMRCLSo that some missing of conventional successful framework for the monitoring and controlling task in a portion of the cost has brought about a noteworthy issues due to that occurs on disappointments of numerous temporary workers. In the development field or business because of that some clients turn into a disappointed, what they get is some of past the point of no return conveyances because of that the price will be over cost. The review is completed for built up, A viable framework for monitoring and controlling for the cost of a venture, with the goal that venture cost has the fundamental elements for success of a venture (EVM) earned esteem administration is a best procedure for assessment which is useful for the venture administration. this system helps in the spending cost and genuine cost the present ponder manages the planning and venture observing procedure , so that accommodating for the parameters which is included in the counts of EVM in common development ventures**

Key words- EVM, Earned value, Actual cost, Planned value,

I. INTRODUCTION

Development industry is a necessary part of a nation's framework and mechanical growth. Even however development industry is the second biggest industry in India, the development of this industry has been differential the country over. The rustic districts require apparatuses for monetary improvement, arrive utilize and condition wanting to adapt to the status of advancement in urban regions. The time accessible to accomplish this objective is contracting. Here emerges the requirement for compelling task management. Many issues are being confronted by development industry that must be dealt with. They include time and cost invades because of deficient venture definition, lack of common sense for usage, absence of appropriate contract arranging and administration and absence of legitimate administration amid execution. It has been evaluated by experts that normal cost of a venture goes up by 30 rate contrasted with the planned cost. Perceptions demonstrate that legitimate skillful administration is basic for the opportune consummation of the venture inside evaluated spending plan and with designated assets. Ventures with great arranging, satisfactory hierarchical hardware and adequate stream of assets can't consequently accomplish the coveted outcome. There must be some notice system, which can alarm the association about its conceivable achievement and disappointments, now and again. Extend checking is the way toward gathering, recording, and revealing data concerning venture execution that venture administrator and others wish to know. Observing includes watching the advance of the project against time, assets and execution plan amid execution of the venture and recognizing slacking regions requiring opportune consideration and activity while extend controlling utilizations information from screen action to convey genuine execution to arranged execution.Earned Value Analysis (EVA) is the venture administration instrument that can unbiasedly status cost and length of venture for the duration of the life of a venture. At the point when earned esteem (EV) of a venture Is ascertained, unique cost evaluations to the real gauges of the genuine work performed is analyzed. EV is an estimation that shows the amount of the monetary allowance ought to have been spent, when contrasting the cost of work performed with the benchmark taken a toll for the assignment or asset. In EVA, there are three primary information handle: the financial plan (or arranged) estimation of work planned, the genuine estimation of work finished, the earned estimation of the work finished.

OBJECTIVES OF THE STUDY

The goals of this review are to decide the level of mindfulness on EVM among construction of a Metro Project of Phase-2 Reach-2A OF Length 3.954 KM(APPROX) AT Bangalore Rail Corporation Limited(BMRCL).The most broad goal of arranging is to enhance to give a connection between the foundation of a compelling efficiency estimation framework and human errand of enhancing hierarchical execution by methods for changes in all or a few components of the association the general population, structure, culture and innovation.

The principle goal of this venture are as:

1. Preparing the Work Breakdown Structure indicates the breakdown of the venture into errands and sub undertakings.
2. Estimating the cost of the venture.

3. Earned esteem investigation for a development of a metro extend.
4. To recommend the significance and motivation behind checking the development work of a metro extend
5. Relative specialized, calendar, and cost execution of a metro extend
6. To enhance the group work, human relations, managerial, planning and critical thinking abilities.

II.LITRATURE REVIEW

Suketu (2002) clarified EVA with an illustrative case. EVA is a superior strategy for program/project management since it incorporates cost, calendar and scope and can be utilized to estimate future execution and venture fruition dates. It is an "early cautioning" program/extend administration instrument that empowers supervisors to distinguish and control issues before they end up noticeably unfavorable. It enables ventures to be overseen better – on time, on spending plan.

Agata (2008) disclosed that if EV to be actualized, the strategy ought to be utilized by its motivation: it is not a device for guaging; rather, it encourages advance checking, assurance of venture status (on time? to spending plan?), a harsh gauge of their consolidated impact on the venture's result.

Anbari (2003) definite the different ways to deal with utilize the EVA. EVA spotlights administration's enthusiasm on ventures that need most consideration and may help the prioritization and accentuation administration gives project within portfolio upgrading undertaking's task portfolio administration.

Lukas (2008) clarified the issues in actualizing the EVA, for example, no appropriate documentation; work breakdown plan (WBS) not utilized or not acknowledged; deficient WBS; off base calendar and additionally budget; incorrect advance announcing; and administration impact as well as control.

III.PRIMAVERA PROJECT PLANNER (P6)

1. Primavera Project organizer is a comprehensive, multi extend arranging and control programming for dealing with the activities of undertakings.
2. Project manager as very much committed organizers and schedulers, rely on P6 for the most entire photo of all their projects, from synopses by cost account and work breakdown structures, to proactive control of venture deadlines, issues and dangers.
3. P6 gives the capacity to plan, budget, monitor and control every one of their undertakings with effectiveness and premonition.
4. In P6 numerous activities should be possible.

STEPS INVOLVED IN P6

1**. Creating an ideal schedule**-: To make a calendar for any venture, initial step is to gather information accessible for the venture. Along these lines the accompanying strides can be followed in Primavera.

2**. Enterprise project structure (EPS)** -: Make the structure of the organization with its branches, which is executing the venture. This is known as Enterprise venture structure (EPS).

3**. Organizational breakdown structure (OBS)** -: After the EPS, OBS is made which is a chain of importance that mirrors the people in charge of the activities in the undertaking.

4**. Creating new projects** -:A venture is an arrangement of exercises and related data that constitutes an arrangement for making an item or administration. The venture is made under the particular divisions in EPS and allocated the individual in control from OBS to it. The venture can be given arranged begin and should complete dates. The venture is appointed a schedule which can be worldwide, asset or venture date-book.

5. **Work breakdown structure (WBS) -:**

WBS is a pecking order of work that must be refined to finish a venture. Each venture has its own particular WBS chain of command with top level WBS component being equivalent to that of each EPS hub or venture. Every WBS component may contain more definite WBS levels, exercises, or both.

6**. Defining activities**-:Exercises are the major work components of a venture and shape the least level of a WBS and, are the littlest subdivision of a venture. A movement has the accompanying qualities like action ID, name, begin and complete dates, action logbook, action sort, action codes, requirements, costs, antecedent and successor connections, assets, parts and so on.

7. **Relationship between activities**-: To from a system, the exercises ought to be associated with each other, which is finished by doling out going before and succeeding exercises with noteworthy relationship to the exercises. a. Complete to begin (FS) relationship. b. Complete to complete (FF) relationship. c. Begin to begin (SS) relationship. d. From beginning to end (SF) relationship.

8. **Determining activity duration**-:When arranging the work, the term is entered in the first span field. The real length must be entered for the exercises, which are finished.

9**. Activity dates**-:The accompanying are the sorts of movement dates accessible in the primavera; actual begin, real complete, arranged begin, arranged wrap up.

10. **Activity cost**-:The action cost is the entirety of all the cost brought about to finish the movement.

11. **Creating baselines**-:A straightforward pattern plan is a total copy of the first timetable which gives an objective against which a project's execution is followed.

12. **Updating schedule**-:On the off chance that the venture is advancing precisely as arranged, then just expected to gauge advance. In the event that the venture is not advancing as arranged numerous exercises are beginning of-succession, real asset utilize is surpassing arranged utilize, and afterward refresh ought to be accomplished for exercises and assets separately. Most undertakings contain a few exercises that advance as arranged and some

13. **Tracking**-:Following window is utilized for checking a project's advance utilizing distinctive sorts of layouts such as work costs, extend cost, asset anticipating, asset designation unit savvy and cost insightful.

14. **Earned value-:**Earned esteem is a system for measuring venture execution as indicated by both venture cost and calendar. The strategy looks at the planned cost of the work to the real cost.

EARNED VALUE MANAGEMENT-:

EVM incorporates extend degree, time and cost through intermittent estimations of real cost and work fulfillment. It sees extend advance as far as cost as an element of time against a firm benchmark set up toward the begin of the venture. At the point when the venture is initially arranged, it is isolated into Work Breakdown Structure (WBS) and further sub-partitioned into work bundles. These work bundles are evaluated for cost appraises and planned for a period arrangement. Taken together, WBS, ace calendar and cost spending plans shape the standard, spoken to as a diagram of arranged expenses after some time. This is the arranged esteem (PV). It essentially tells how the expenses will stream after some time as arranged. Amid the venture execution, real costs (AC) and the quantum of work finished are intermittently noted. The work consummation is ace evaluated to proportionate fiscal esteem in light of the budgetary expenses for the work bundles finished (work-in-advance bundles are surveyed on % fruition). This is the earned esteem (EV). These three numbers, i.e. PV, AC and EV drive the operation of EVM. Basically, (EV – AC) measures cost execution and (EV – PV) measures plan execution. By measuring at intermittent interims, EVM concentrates on the stream rates of genuine cost and finishing against the arranged cost and consummation. PV, EV and AC make it conceivable to register cost and time changes, and also extrapolate how much cost and time would be required for venture fruition (Figure 1). Basic figurings in light of Scheduling, Monitoring And Cost Analysis By Earned Value Method these three numbers yield a few proportions for venture control. Of these, three proportions can be viewed as vital: Cost Performance Index (CPI), Schedule Performance Index (SPI), and Cost Estimate at Completion (CEAC). By giving recorded and forward data about the venture, EVM turns into an apparatus for checking and course revisions.

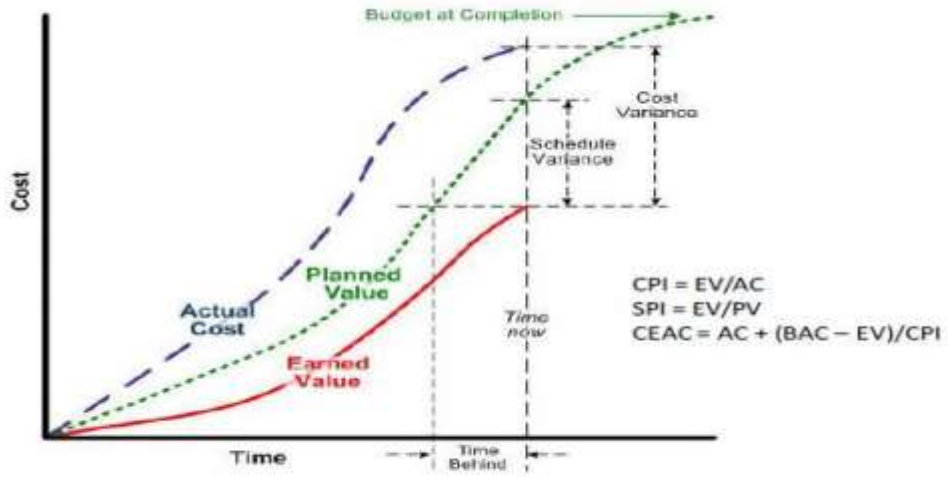

Fig. 1. S Curve Showing Planned Value, Earned Value & Actual Cost

EARNED VALUE TERMINALS

1. Earned value(ev)-: The authorized budget for work actually completed.sometimes known as budgeted cost of work performed**(bcwp).**

2. Actual cost(ac)-: The costs actually incurred in completing the work actually achieved(the work as measured by the evabove.sometimes called actual cost of work performed(acwp).

3. Plannedvalue(pv)-: The authorized budget for a planned piece of work,sometimes called budgeted cost of work scheduled**(bcws). .**

4.Cost Variance(CV)-: Taken a toll Variance is the earned esteem short the genuine cost. a negative esteem demonstrates that the real cost has exceeded the arranged esteem. Cost Variance(CV)=EARNED VALUE(BCWP)-ACTUAL COST(ACWP)

5.Schedule Variance(SV)-: Plan Variance is the earned esteem less the arranged value. a negative esteem demonstrates that the less work was really performed than was planned. Schedule Variance(SA)=EARNED VALUE(BCWP)-PLANNED VALUE(BCWS).

EARNED VALUE CALCULATION-:

As we realize that the earned esteem ascertained in three sorts and the first is least complex one is count of differences, figuring of files, and the last one is evaluated at finish.

Variances As we realize that the past one we talked about the booked variety and the cost variances. over the CV is distinctive between earned esteem and the genuine cost as same as the scheduled variance is diverse between earned esteem and the arranged out stream. By and large fluctuation is filling in according to they values. Changes are assumed in there working of negative or positive esteem if cost fluctuation is negative says that the venture is terrible position and inverse is when difference is certain its shows the venture is great position.

Indices: They are for the most part two sorts of file are their to gauge the EVM, one needs to demonstrate the cost variance and other is booked difference. With significant to the CPI &SPI

COST PERFORMANCE INDEX (CPI)-: Taken a toll Performance Index is the Earned Value separated by the Actual cost. the esteem under 1 demonstrates the real cost have exceded the arranged esteem. Cost Performance Index(CPI)=Earned Value(BCWP)/Actual cost(ACWP).
Schedule Performance Index(SPI)-: Plan Performance Index is the Earned Value isolated by the Planned Value. the esteem under 1 shows that less work was really performed than was booked. Schedule Performance Index(SPI)=Earned Value(BCWP)/Planned Value(BCWS)
Estimate at completion cost-: Evaluate at Completion Cost is the Actual cost in addition to the gauge to finish cost. the strategy to process gauge to finish cost relies on upon Earned Value Technique chosen for the Activities WBS. Estimate at completion cost=Actual Cost (ACWP)+Estimate To Complete cost(ETC)
Estimate To Complete-: Gauge To Complete is figured from the standard as either the staying all out cost for the action or as the Performance Factor*(Budget at Completion-Earned Value).depending on the Earned Value system chosen for the action WBS.

IV. DATA ANALYSIS-:
Name of work-: Development of elevated structure of length 3.945km(aprox) Mysore pictorial road station dead end to pattangere station which includes 4nos. Of elevated metro station.
1. Nayandahalli station (135m)
2. Rajarajeswari station(135m)
3. Jnanabharathi station(135m)
4. Pattangere station(135m)

Exclusive stations-:
1. Nayandahalli Station to Rajarajeswari Station pier 443-pier 470(exclusive station)
2. Rajarajeswari Station to Jnanabharathi Station pier471-pier496(exclusive station)
3. Jnanabharathi Station to Pattangere Station pier497-pier571(exclusive station)

METHODOLOGY AND ANALYSIS
The development of a venture work is so immense and wide in present future& and we realize that itis additionally complex in nature so accordingly for improvement of a work we are utilizing a product which appeared i.e Primavera (P6). This venture is planned and observed utilizing a Primavera programming P6 variant. The WBS for a venture is made and a few exercises are recognized. The term of the few exercises are evaluated on the premise of writing audit, the relationship are inspected and connected to exercises which are included in booking and checking a ventures. Scope-:

The scope of the work involves the following.
1. Clear the Site.
2. Excavate for trail pits to identify the utility service lines.
3. Setting of pile centre lines.
4. Set up the plants and equipments.
5. Boring by using polymer slurry to stabilize the bore hole(wet process).
6. Install casting for soil protewction.
7. Pour concrete by using tremie pipe and remove the casing.
8. Pile load testing(static and dynamic load test)

BMRCL REACH2A -REV-2 | Classic Schedule Layout | 27-Jun-17 09:42

Activity ID	Critical	Activity Name	Project Status	Start	Finish	Schedule % Complete	Original Duration	Remaining Duration	Earned Value Cost	Budgeted Total Cost	Actual Total Cost	Planned Value Cost
BMRCL-4		BMRCL REACH2A -REV-2		06-Mar-17 A	10-Aug-17	49.84%	136	56	RS25,692,119.00	RS52,048,967.00	RS25,942,850.00	RS25,942,850.00
BMRCL-4.1		Construction Activities		06-Mar-17	10-Aug-17	49.84%	136	56	RS25,692,119.00	RS52,048,967.00	RS25,942,850.00	RS25,942,850.00
BMRCL-4.1.1		Viaduct		06-Mar-17	10-Aug-17	49.84%	136	56	RS25,692,119.00	RS52,048,967.00	RS25,942,850.00	RS25,942,850.00
BMRCL-4.1.1.1		Pile to Piercap		06-Mar-17	10-Aug-17	49.84%	136	56	RS25,692,119.00	RS52,048,967.00	RS25,942,850.00	RS25,942,850.00
BMRCL-4.1.1.1.1.4.3.1.2		From Jnanabharthi to		06-Mar-17	10-Aug-17	49.84%	136	56	RS25,692,119.00	RS52,048,967.00	RS25,942,850.00	RS25,942,850.00
BMRCL-4.1.1.1.1.4.3.1.2.1.4.3.1.2.54	P443			07-Jun-17	10-Aug-17	0%	56	56	RS0.00	RS1,981,209.00	RS0.00	RS0.00
		Excavation,Pcc & Pile chipping	Active	04-Aug-17	07-Aug-17	0%	3	3	RS0.00	RS0.00	RS0.00	RS0.00
		Pedestal casting & Bearing placement	Active	20-Jun-17	21-Jun-17	0%	2	2	RS0.00	RS0.00	RS0.00	RS0.00
		Pier & pier cap Concreting	Active	15-Jun-17	15-Jun-17	0%	1	1	RS0.00	RS1,092,092.00	RS0.00	RS0.00
		Pier starter	Active	08-Jun-17	08-Jun-17	0%	1	1	RS0.00	RS0.00	RS0.00	RS0.00
		Pile 01	Active	19-Jul-17	22-Jul-17	0%	4	4	RS0.00	RS69,675.00	RS0.00	RS0.00
		Pile 02	Active	20-Jul-17	24-Jul-17	0%	4	4	RS0.00	RS69,675.00	RS0.00	RS0.00
		Pile 03	Active	21-Jul-17	25-Jul-17	0%	4	4	RS0.00	RS69,675.00	RS0.00	RS0.00
		Pile 04	Active	22-Jul-17	26-Jul-17	0%	4	4	RS0.00	RS69,675.00	RS0.00	RS0.00
		Pile cap & Pier vertical reinforcement	Active	08-Aug-17	10-Aug-17	0%	3	3	RS0.00	RS0.00	RS0.00	RS0.00
		Pile Cap Concreting	Active	07-Jun-17	07-Jun-17	0%	1	1	RS0.00	RS610,507.00	RS0.00	RS0.00
		Reinforcement & shuttering of Pier cap	Active	13-Jun-17	14-Jun-17	0%	2	2	RS0.00	RS0.00	RS0.00	RS0.00
		Staging, Reinforcement & shuttering of p	Active	09-Jun-17	12-Jun-17	0%	3	3	RS0.00	RS0.00	RS0.00	RS0.00
BMRCL-4.1.1.1.1.4.3.1.2.1.4.3.1.2.53	P444			07-Jun-17	01-Aug-17	0%	48	48	RS0.00	RS1,928,617.00	RS0.00	RS0.00
		Excavation,Pcc & Pile chipping	Active	26-Jul-17	28-Jul-17	0%	3	3	RS0.00	RS0.00	RS0.00	RS0.00
		Pedestal casting & Bearing placement	Active	20-Jun-17	21-Jun-17	0%	2	2	RS0.00	RS0.00	RS0.00	RS0.00
		Pier & pier cap Concreting	Active	15-Jun-17	15-Jun-17	0%	1	1	RS0.00	RS979,269.00	RS0.00	RS0.00
		Pier starter	Active	08-Jun-17	08-Jun-17	0%	1	1	RS0.00	RS0.00	RS0.00	RS0.00
		Pile 01	Active	10-Jul-17	13-Jul-17	0%	4	4	RS0.00	RS84,713.00	RS0.00	RS0.00
		pile 02	Active	11-Jul-17	14-Jul-17	0%	4	4	RS0.00	RS84,713.00	RS0.00	RS0.00
		Pile 03	Active	12-Jul-17	15-Jul-17	0%	4	4	RS0.00	RS84,713.00	RS0.00	RS0.00
		Pile 04	Active	13-Jul-17	17-Jul-17	0%	4	4	RS0.00	RS84,713.00	RS0.00	RS0.00
		Pile cap & Pier vertical reinforcement	Active	29-Jul-17	01-Aug-17	0%	3	3	RS0.00	RS0.00	RS0.00	RS0.00
		Pile Cap Concreting	Active	07-Jun-17	07-Jun-17	0%	1	1	RS0.00	RS610,506.00	RS0.00	RS0.00
		Reinforcement & shuttering of Pier cap	Active	13-Jun-17	14-Jun-17	0%	2	2	RS0.00	RS0.00	RS0.00	RS0.00
		Staging, Reinforcement & shuttering of p	Active	09-Jun-17	12-Jun-17	0%	3	3	RS0.00	RS0.00	RS0.00	RS0.00
BMRCL-4.1.1.1.1.4.3.1.2.1.4.3.1.2.52	P445			07-Jun-17	27-Jul-17	0%	44	44	RS0.00	RS1,873,094.00	RS0.00	RS0.00

Actual Level of Effort | Remaining Work
Actual Work | Critical Remaining W...

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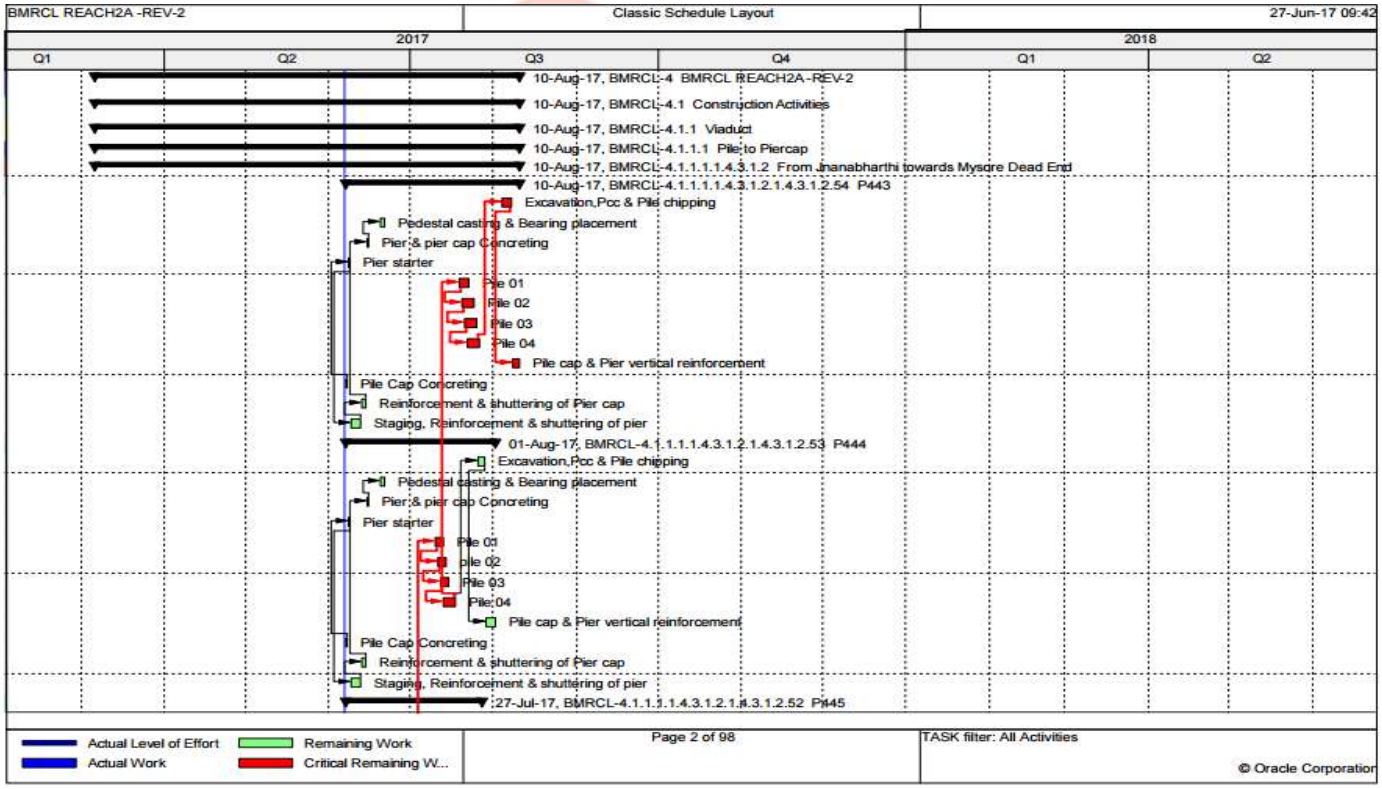

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Activity ID	Critical	Activity Name	Project Status	Start	Finish	Schedule % Complete	Original Duration	Remaining Duration	Earned Value Cost	Budgeted Total Cost	Actual Total Cost	Planned Value Cost
	☐	Pile 02	Active	07-Mar-17	10-Mar-17	100%	4	0	RS69,289.00	RS69,289.00	RS69,289.00	RS69,289.00
	☐	Pile 03	Active	08-Mar-17	11-Mar-17	100%	4	0	RS69,289.00	RS69,289.00	RS69,289.00	RS69,289.00
	☐	Pile 04	Active	09-Mar-17	13-Mar-17	100%	4	0	RS69,289.00	RS69,289.00	RS69,289.00	RS69,289.00
	☐	Pile cap & Pier vertical reinforcement	Active	25-Mar-17	28-Mar-17	100%	3	0	RS0.00	RS0.00	RS0.00	RS0.00
	☐	Pile Cap Concreting	Active	30-Mar-17	30-Mar-17	100%	1	0	RS610,506.00	RS610,506.00	RS610,506.00	RS610,506.00
	☐	Reinforcement & shuttering of Pier cap	Active	05-Apr-17	06-Apr-17	100%	2	0	RS0.00	RS0.00	RS0.00	RS0.00
	☐	Staging, Reinforcement & shuttering of p	Active	01-Apr-17	04-Apr-17	100%	3	0	RS0.00	RS0.00	RS0.00	RS0.00
Activity ID	Critical	Activity Name	Project Status	Start	Finish	Schedule % Complete	Original Duration	Remaining Duration	Earned Value Cost	Budgeted Total Cost	Actual Total Cost	Cost
		BMRCL-4 BMRCL REACH2A -REV-2		06-Mar-17	10-Aug-17	49.84%	136	56	RS25,692,119.00	RS52,048,967.00	RS25,942,850.00	Planned Total Remaining Tota Actual Total
		BMRCL-4.1 Construction Activities		06-Mar-17	10-Aug-17	49.84%	136	56	RS25,692,119.00	RS52,048,967.00	RS25,942,850.00	Planned Total Remaining Tota Actual Total
		BMRCL-4.1.1 Viaduct		06-Mar-17	10-Aug-17	49.84%	136	56	RS25,692,119.00	RS52,048,967.00	RS25,942,850.00	Planned Total Remaining Tota Actual Total
		BMRCL-4.1.1.1 Pile to Piercap		06-Mar-17	10-Aug-17	49.84%	136	56	RS25,692,119.00	RS52,048,967.00	RS25,942,850.00	Planned Total Remaining Tota Actual Total
		BMRCL-4.1.1.1.1.4.3.1.2 From Jnanabharthi to		06-Mar-17	10-Aug-17	49.84%	136	56	RS25,692,119.00	RS52,048,967.00	RS25,942,850.00	Planned Total Remaining Tota Actual Total
		BMRCL-4.1.1.1.1.4.3.1.2.1.4.3.1.2.54 P443		07-Jun-17	10-Aug-17	0%	56	56	RS0.00	RS1,981,299.00	RS0.00	Planned Total Remaining Tota Actual Total
	☑	Excavation,Pcc & Pile chipping	Active	04-Aug-17	07-Aug-17	0%	3	3	RS0.00	RS0.00	RS0.00	Planned Total Remaining Tota Actual Total

Actual Level of Effort | Remaining Work | Actual Work | Critical Remaining W... | Page 23 of 98 | TASK filter: All Activities | © Oracle Corporation

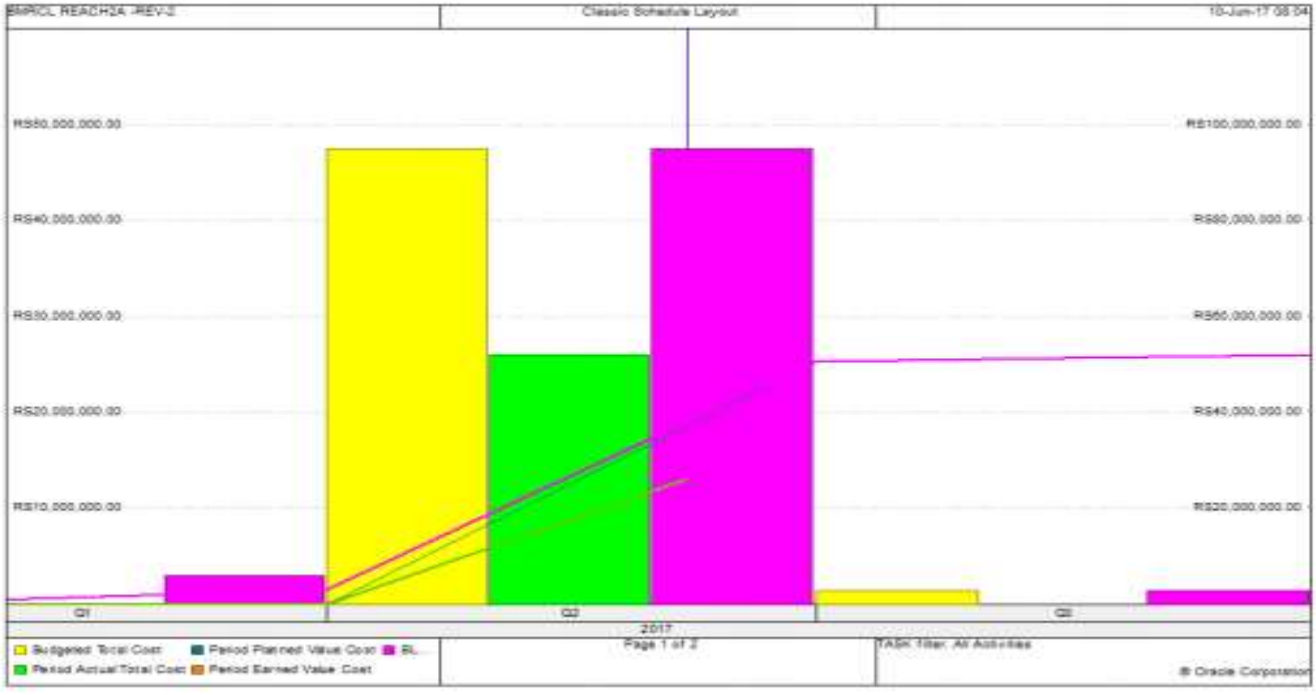


Fig.2. 4Months Cost Breakdown

V. RESULT & DISCUSSION

RESULT-:
Earned value analysis work has been carried out and earned value management parameters are calculated

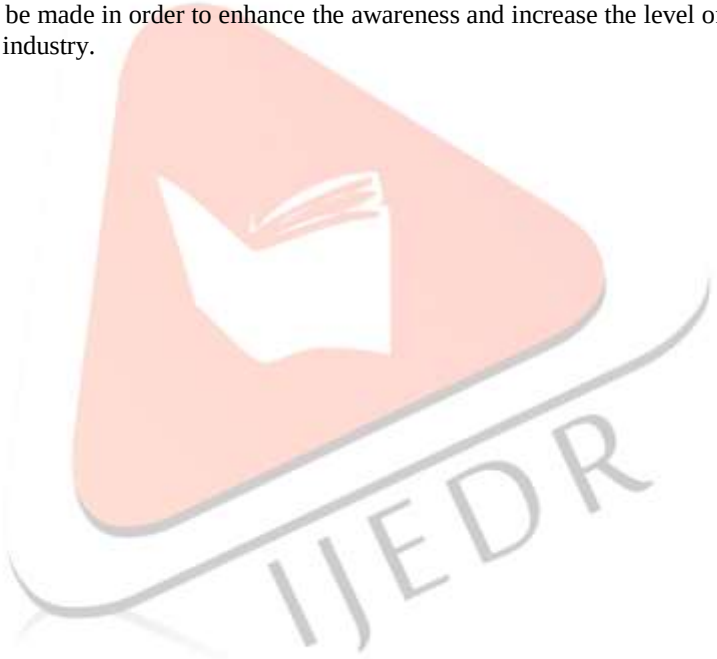
TABLE SHOWS RESULTS EVALUATED FROM S CURVE

PLANNED VALUE COST	RS.25942850.00
TOTAL BUDGETED COST	RS.52048967.00
EARNED VALUE COST	RS.25692119.00

1.According to planned schedule from pier no.443 to pier no.470 the earned value till now got is Rs 25692119.
2. The project started on 6th march 2017 and ends on 10th august according to schedule planned
3. Till now 49.84% has been completed
4. Pier no 470-pier no.459 100% work has been completed
5. Pier no 458 –pier no 452 the work is under progress around 30% work has been completed
6. Remaining work has to be started according to planned schedule

VI. CONCLUSION

The main objective of this study was to understand the role of monitoring and control in the progress and timely completion of a construction project. This objective was achieved through revision of literatures and methodologies involved in monitoring and control Using a Earned Value Analysis method (EVA). The study proved to be a guideline in understanding the progress of Standard design factory construction work and also to identify the specific problems arising during the process. Results of this study show the drawbacks of the present project management system in SDF project and the importance efficient planning, monitoring and controlling, as well as the need and effectiveness of a project management software like Primavera P6 in a construction project. It is recommended that much efforts to be made in order to enhance the awareness and increase the level of application on EVM among the key players in the construction industry.



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