www.ijecs.in
International Journal Of Engineering And Computer Science ISSN:2319-7242
Volume 4 Issue 6 June 2015, Page No. 12716-12718

Deliverable Management In Projects

Aditya A Shrivastava[1], Dr S. Hariharan[2]

[1]Sardar Patel College Of Engineering, Andheri (W), Mumbai-58, India.
aditya.shrivastava03101990@gmail.com

[2]Faculty, L&T Institute of Project Management, Waghodia, Vadodara, Gujrat- 19
Hari4444@yahoo.com

Abstract: ***The purpose of this paper is to establish effective implementation of the WBS in projects. A case study of a hotel project is undertaken and analyzed for its WBS effectiveness and ways to lessen creep, uncertainty, risk and delays. This paper attempts to identify the use of deliverable oriented WBS for effective implementation. The research through the case study attempts to establish that WBS is not just a planning technique but a better control tool. It is also attempted to remove a common misconception that WBS is need for the contractor and client requires no active participation. The research attempts to identify various challenges associated with developing a quality WBS and suggest a methodology that can help practicing professionals in overcoming challenges and establish better control mechanisms in executing projects.***

Keywords: Work Breakdown Structure, Scope Creep, Deliverables, Quality WBS, Deliverable-Oriented.

1. Introduction

Any project, big or small needs proper management for its expected outcome with quality and time. Even in the most minutely planned projects, many things can go wrong though being planned and executed with precision. Researches as well as actual scenarios all over are evident of the fact that there lies three most vital project management problems viz. project schedule, project cost and project scope. Any of them if overlooked may lead to partial or whole project failure. Out of which the most vital problem as sorted by the project managers is project scope. The project scope in general defines the boundaries of a given project and decides what deliverables are in and what are out of scope of the project. When the client and contractor mutually agreed upon documented scope of the project are not achieved wholly, scope creep takes place. Project scope creep, in project management refers mainly to uncontrolled changes or added objectives in a project's scope. Its occurrence shows improper documentation of the said scope. It needs active participation from both the client and the contractor to establish and understand the need of the project in same sense, thereby documenting a proper scope of the project. To achieve this, Work Breakdown Structure (WBS) is pretty helpful project management tool.

PMBOK® guide in its third edition under the head planning process group defined three major essentials as Scope planning, scope definition and WBS development. It also advocates that creating a WBS is insurance of defining scope and delivery of project objectives and outcomes. The WBS is basically the outline of the work and not the work itself. The Work is the sum of many activities that make up the project. A WBS is a structured way of identifying the customer oriented products, services or results (also called the Deliverables of that project). It is generally not feasible to develop the entire WBS on the go and initially by team meetings and brain storming, a two to three level WBS can be formed since details of the work may yet not be defined. However with project progress and planning phase a more detailed WBS can be achieved. The upper level of WBS gives the major deliverables and it can be developed to successively lower level, the final level at which the planner finishes is called work packages. A work package is the lowest level in the WBS, where the cost estimation, resource allocation, scheduling and risk can be assessed for the work reliably.

A quality WBS is characterised with the following key attributes:

- A deliverable oriented WBS gives much significant output.
- It contain scope of the project hierarchically sub divided into more manageable chunks.
- 100% rule is followed at each level.
- It is presented in graphical textual or tabular forms.

There exist many challenges when it comes to preparation of a quality WBS which needs to be overcome such as neglect to WBS dictionary, expecting more than 100%, formal change control etc. the WBS can also be treated as a control technique over conventional management tool.

The next step to better understand each work package and the activities to achieve the deliverable is by preparing the *WBS dictionary*. The WBS dictionary provides more detailed descriptions of the work packages and control accounts. It has information like organization responsible, schedule information related to the work package, quality requirements, cost estimates, and the contact information. Once, the WBS, WBS dictionary and scope statement is completed and signed off, it can be saved as *the base line*. The last thing from the inputs provided will be *Project document update* which will helps in any changes in scope and requirement.

2. Literature Review

1958 and 1965 witnessed widespread concept of these management tools PERT and WBS which is the basis of the "Project Management Body Of Knowledge" or PMBOK. Going through various thought process year after year, the present definition of WBS (PMBOK, 2004) is "Each descending level represents an increasingly detailed definition of the project work. The WBS is decomposed into work packages." In 1959, Malcolm, Roseboom, Clark and Fazar described successful implementation of "Program Evaluation and Review Technique" or PERT. Though the WBS is not addressed directly, graphics focused on its evolving concept. In 1964, the U.S government published PERT implementation manual in which authors stated that one can make plans, schedule and network without making a WBS, but such plans and schedule may likely be incomplete or inconsistent for a given project objective and output products.

Osama Hussain (2012) identified reasons for scope creep as Ignorance of key stakeholders, Delay in project execution, Scope definition is done by the wrong people. According to Asadullah Khan (2006) Effective scope management of a project ensures the successful management of other key project management areas and hence the paper focuses on managing scope by effective WBS as a tool.

3. Methodology And Case Study

PMBOK suggests finishing the scope statement and requirements prior to starting the WBS. But when it comes to implementation all three goes hand in hand. The technique used in this paper is Deliverables decomposition. The scope of the project is analyzed, based on which deliverables are identified. The identified deliverables are then further disintegrated into sub-deliverables and then those sub-deliverables are further disintegrated up to the work package level. Then the Bottom Up approach of estimating and scheduling the project is done comprehensively. The data so obtained by this approach is considered as the baseline for the project. With the baseline available, the actual progress of the project is monitored and controlled. The comparison with the baseline with the actual schedule and cost is analyzed and the major causes for the deviations are highlighted in the paper.

Case study: Aureole Hotel, off Andheri-Kurla road, Andheri (East), Mumbai.

(a 3-Star Hotel construction project)

Project area: 4880 sq. ft.
Owner: *A1 Heights and Hospitality Pvt. Ltd.*
Contractor: Milan Inter built Private Limited, Mumbai.
Time estimated: 304 days.
Actual time: 476 days.
Cost estimated: Rs. 10 crore.
Actual cost: Rs. 13.7 crore.

The input data required for a quality WBS are procured by site visits and questionnaire. The scope of the project was to construct a 3 star rating hotel with a view of utility to business class and tourist comfort. Scope statement included the following:

1. G+7 storey building with 5 guest floors each was having 9 rooms, a total no. of guest rooms to be constructed as 45.
2. 1 Banquet hall with a capacity of 150 people, 1 Restaurant for 50 people at a time serving.
3. Terrace swimming pool, gymnasium and cafeteria with a provision of recreational area as well.
4. Good ambience and greenery in the periphery.
5. Kitchen, Lounge and bars with adequate capacity suffice all guest thereby maintaining standards as well.
6. Guest Rooms to have all the luxury and comfort as per specification of 3 star with additional in room complimentary
7. All necessary services like telephone, electricity, Wi-Fi, cameras and utilities like reliance connection, Mahanagar gas connection, BMC registration for sewage, water and drainage.
8. Best in class lobby and reception area, security and general requirements.
9. Parking lot and Staff area with adequate facilities.
10. Necessary MEP work and safety work be done as per norms.

For the case study a 3 leveled WBS was prepared with 13 major deliverables supporting WBS dictionary was also prepared. This data along with the planned schedule, here we put up as baseline schedule and actual execution duration were input to MS project 2013. While the cost estimation was estimated in MS Excel. Software named WBS schedule pro was used to make the WBS chart and also comparison purpose.

4. Results

Following are the results obtained from the case study as presented in bar graph and pie chart format. Fig.1 and Fig.2 shows the comparison between baseline and actual duration and costing respectively. The majorly affected 4 deliverables are critically analyzed for their work packages and causes for the same are identified and presented in pie chart in Fig.3. In that the deliverables are as follows:

WBS code	Name of the Deliverable
1.1	**MEP**
1.2	**Fire Protection**
1.3	**Main Services**
1.4	**Guest rooms**
1.5	**Public convenience**
1.6	**Dining area / Restaurant**
1.7	**Kitchen and wash-ups**
1.8	**Banquet**
1.9	**Staff Area**
1.10	**Other amenities**
1.11	**Lounge and Bars**
1.12	**General**
1.13	**Food storage**

Table 1 Represent WBS code with the name of the deliverables

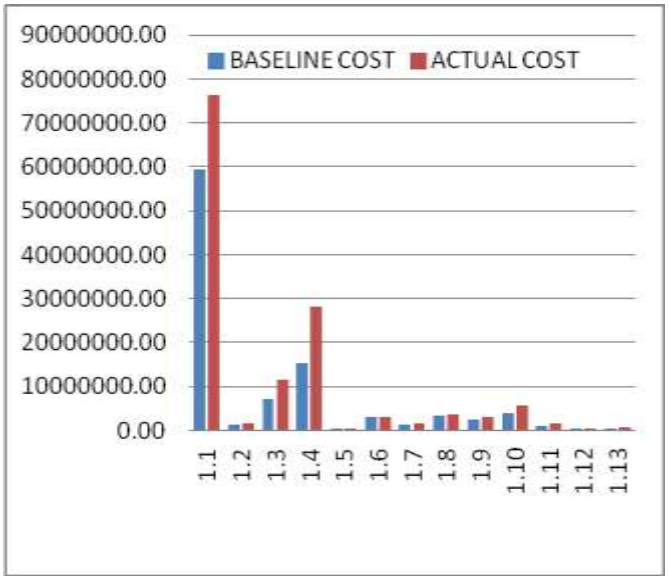

Fig.1. Comparison of baseline and actual cost

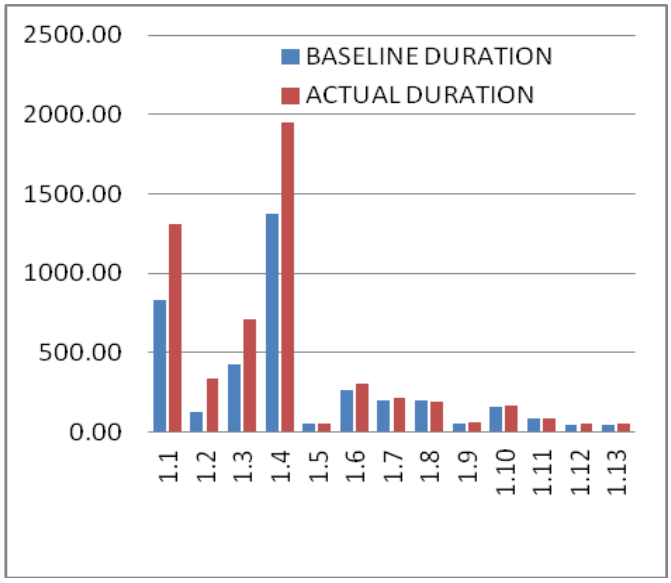

Fig.2. Comparison of baseline and actual duration

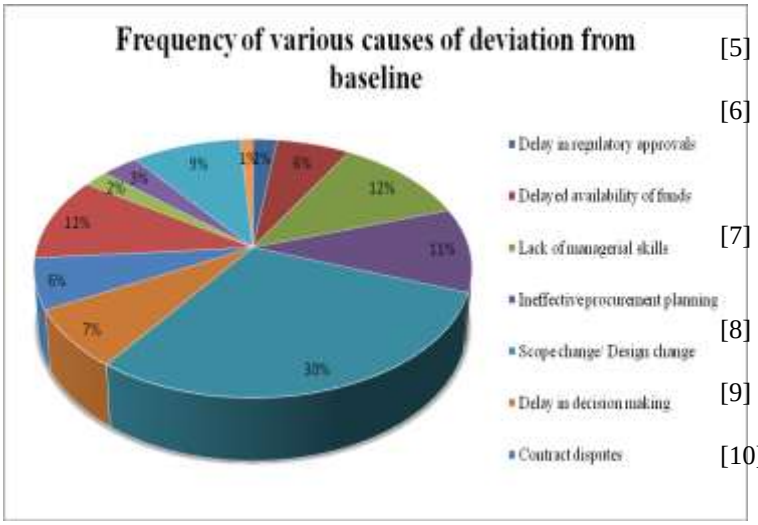

Fig.3. Pie Chart representation of the frequency of factors of deviation from baseline

Results shows that the major cause of delay and cost overrun for the case study have been Scope change/ design change (approx 30%) followed by lack of managerial skills and subsequently followed by clash of ineffective procurement planning and ineffective control and monitoring.

5. Conclusion

The following conclusions are withdrawn from the research carried out that a proper and effective WBS served as:

1. A sort of Map for the project, thereby guiding the project.
2. Tool to assure the project manager that all products and work elements are identified, to integrate the project with current organization, and to establish a basis for control.
3. A better work management tool to achieve cost resources and time control.
4. Each project deliverable can be clearly assigned to a team member, resulting in greater levels of accountability.
5. The project manager can measure team members' performance against completion of these smaller deliverables.
6. A tool for the client to keep track and the contractor to execute deliverables.

Through this study it is evident that approx 42% of overrun could have been reduced significantly if there had been an efficient project manager and a quality WBS had been developed. Through this paper it is being established that a WBS is not just a planning technique but is also a better control tool.

References

[1] Abramovici, Adrain. "Controlling Scope Creep." *PM Network* (January 2000).

[2] 'Practice Standard for Work Break down Structures,' by Project Management Institute, USA, (2006).

[3] Chapman, James R. 2004. *Work Breakdown Structures, Version 2.01,* November, 2004. Available from http://www.hyperthot.com/pmwbs.html .

[4] Work Breakdown Structure by Eric S Norman et al, Wiley Publication.

[5] Haugan Gregory T. PERT (Baltimore, MD: Marietta Space System Division, 1962).

[6] Malcolm, D.G., J.H Roseboom, C.E. Clark, and W. Fazar, "Application of technique for research and development program evaluation" *operations research, The Journal of the operations research society of America* (1959).

[7] Project Management Institute Standards Committee. *A Guide to The Project Management Body of Knowledge* (upper Darby, PA: Project Mnagement Institute, 2000).

[8] U.S government coordinating group. *PERT implementation manual* (Draft Copy), August 1964.

[9] Khan, Asadullah. "Project Scope Management" Cost Engineering June 2006. Vol. 48, issue 6.

[10] Hussain, Osama. Global Journal of Management and Business Research vol. 12 issue 14 (2012).