Overhead Cost Accounting of Development Project

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Abstract— The present scenario in manufacturing industries is that there is no standardized method for project cost accounting especially the overhead costs. The current practice at TAML is to assume 15% of total cost which is lot more in the actual scenario. As all of us know, a project will have two basic phases – Design & Development Phase & Production Phase and this project focuses on the monetary resource accounting involved during the development stage of the project. In the beginning we discuss about the concepts of project management, portfolio management, program management, types of costs, cost categorization based on their behavior, types of resources, resource cost management etc. The literature survey in this area has helped in understanding the developments made in the managerial accounting and also concerns prevailing in this area thereby helped in deciding the area of focus. All the cost related data regarding an aerospace project was collected from various cross functional departments involved in that project and arrived at the total project cost. This was validated with the Project Manager of that project. A detailed project plan was created using Microsoft Project Plan by adding project activities in its order of precedence with all the predecessors linked. The resource rates were updated in the resource sheet and thereby obtained resource costs. These resource costs are the actual cost spent on each of the CFT member and other development activities. The Actual Resource Cost spent on the project was compared with the Planned Resource Cost derived from total project cost, it was found that the actual cost more than the planned cost and hence concluded that the overhead cost assumption must be increased to some extent so as to prevent the project from incurring loss.

Key words: Resource Cost (Actual & Planned), Overhead Cost, Cross Functional Team, Project Plan, PERT, SAP (Enterprise Resource Planning), Project Cost Management, Non-Recurring Cost

I. INTRODUCTION

The Project Time & Cost Management thesis provides the system for managing the development project cost at M/s Tata Advanced Materials Ltd., Bengaluru in SAP. The aim of this project work is to obtain the total expenditure made on a particular project especially during its development phase with the help of a single project code in SAP. Since this is purely project management related, it also defines some of the project management related concepts.

The concepts referred herein are based on the PMBOK Guide which contains the globally recognized & guide for the project management profession.

Project cost management is an important business process in every organization. This is usually the responsibility of the project manager to always have an account of the expenditures made on the project till date & ensure that the actual budget is always inline with the planned budget.

Based on the observations, suggestions were given to implement which upon implementation can improvise the resource utilisation, efficiency, save time and distribute the resources in a more productive manner.

II. METHODOLOGY

A. DMAIC Methodology

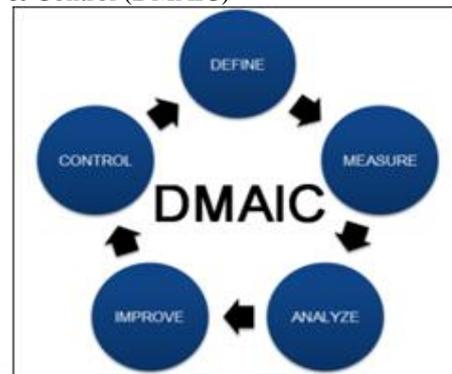The methodology followed is – Define, Measure, Analyse, Improve & Control (DMAIC)

Fig. 1: Six Sigma DMAIC Improvement Process

1) Define Phase

Activities carried out in define phase are listed below:
- Review of the customized Project Charter
- Stating the Problem
- Project Cost Structure
- Defining Cost Elements
  Tools used are as follows:
- Customized Project Charter
- Relevant Stakeholder Analysis in the company
- Planned Budget & cost estimation for the project
- Meetings with relevant stakeholders
- Flow Chart
- Gantt Charting of Project Preliminary Plan

2) Measure Phase

Activities carried out are as follows:
- Identifying the inputs & outputs of the project
- Flow Chart of Project Cost Structure
- Definitions for each of the cost element
- Collection of Primary, Secondary & Tertiary data
- Understanding the Current SAP process & mapping the same
- Listing of project milestones & activities in project plan
- Identifying the risks & corresponding mitigation action plan
  Tools used in Measure Phase are as follows:
- Process Flow Chart
- Value Stream Map
- Microsoft Project Plan (.mpp file)
- Risk Mitigation Chart / Control Chart
- Histogram

3) Analyse Phase

Activities carried out in analyze phase are listed below:

- Identifying the various causes for the problem
- Order of precedence for the root causes
- Carry out 5 Why Analysis for the root cause
- Prepare the Microsoft Project Plan with durations for individual task & predecessor
- Obtain the Network diagram for each of the Cross Functional Department
- Segregate processes whose cost are captured & not captured as per SAP

a) Tools
- Excel Sheets
- Microsoft Project Plan
- Cause & Effect Diagram
- Gemba Validation Report

4) Improve Phase

Activities carried out are as follows:

- Arriving at potential solutions
- Evaluation, Selection & Optimization
- Implementation of solution

Tools used are:

- Improved process flow diagram in SAP
- Project Plan

5) Control Phase

Activities carried out

- Calculations of the resource costs
- Conclusion
- Identify the scope for improvement in the project
- Profitability Analysis

III. PROCEDURE

The Methods will create the BOM & routing for a part no. ABC. Following this they will send out request for Finance to create the Item Code.

1) Finance will assess the documents, run the cost evaluation software and get the "value" for this part number. This is calculated by adding the man hours & the machine hours indicated in the routing and the materials cost. Following which they create the Work Order and link it to the P/N: ABC.
2) Against this work order the production order or development code is created and then the part manufacturing is taken up. Each part no. can have more than one development code.
3) Once the trial part is proved, FAI code is released for First Article manufacturing.
4) Download MS project
5) Meet Finance head n get inputs.
6) Include the SAP screenshots under each activity and
7) Current process SAP screen shots
8) Identify the process for improvements (in table)
9) Map the process for improvements (flow chart to direct the SAP flow) to integrate with SAP
10) CPM & PERT to describe the time study to validate the current overhead cost.
11) Suggestion recommendation for improvement.
12) Network diagram for milestones.
13) Network diagram for Breakup of sub-activities to show actual overhead cost.

14) Calculate the actual overheads and compare with the companies 15% assumption

A. Preparation of Microsoft Project Plan

The project plan is a commonly used project management tool in all the manufacturing companies. This is basically used to track the project schedule, whether it is inline or ahead or lagging behind with the planned schedule (Baseline Plan 1/Baseline Plan 2 etc….). Here the activities will be arranged in the form of level-0, level-1, level-2 and level-3. The main activity is called as Milestone activity which will have sub-milestones and that will in turn have many activities under it.

The right hand side of the project plan displays the gnat chart in line with the schedule of activities. The gnat chart clearly differentiates the normal activity from that of a milestone activity. Most importantly it highlights the Critical Path in red color allowing the user to identify the critical activities whose slippage in schedule can affect the whole project plan. Hence these risky items have to be managed very efficiently.
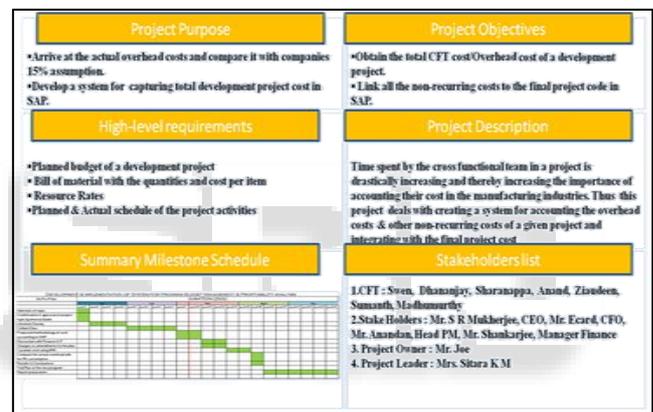
IV. PROJECT CHARTER

Fig. 2: Customized Project Charter

V. COLLECTION OF DATA

A. Measure Phase

The various costs collected for this project is as listed below:

- Raw Material
- Tools – Standard tools, Shop Aids, Support Aids
- Standard Parts
- Consumables
- Cutting Tools
- Metallic Parts
- Composite Parts & Assemblies
- The aim of this project is to focus on the non-recurring costs of a given project and find a system to capture all these costs through SAP and add it to the final project cost.
- Following are some of the Non-Recurring Costs which are normally not being tracked for a given project:
1) CFT Cost (Study of Drawings & models, Conversion of MBD Data into required formats, Layout Planning, Creation of training document, Inspection related documents, LOB, Master Project Plan, BOM, Process

Sheets, Internal Review Meetings & External Review Meetings (Conference Calls)

2) Configuration / Engineering Change Management
3) Tool Design Cost
4) Tool Manufacturing Cost
5) Process Trials
6) Process Qualification
7) Post Qualification
8) Travel/Training
9) MOQ issue for standard parts & consumables
10) Material Shelf Life

Each of the manufacturing cost of the above parts has a break up consisting of the following:

– Documentation Cost
– Idle Time Cost
– Labour Cost
– Machine Run Cost
– Machine Setup time Cost
– Raw materials consumption cost

During the development phase each part number will have a development code or production code. The part may be produced under one or more development code; following this the FAI codes will be created and accepted as First Article Inspection.
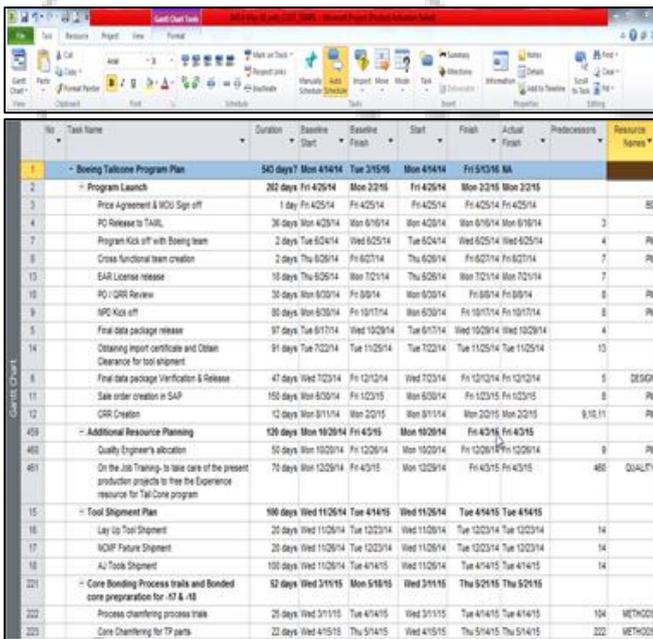
VI. ANALYZE PHASE

Fig. 3: Microsoft Project Plan (Tail Cone Project)

VII. IMPROVE PHASE

The significant improvement made w.r.t. project plan is the inclusion of resource names & rate respectively. By doing this we can easily obtain the cost of each activity in the project plan. We can also get Cash Flow chart, Resource Cost Overview, Task Cost Overview, Project Cost Overview etc. From these results one can analyze the major cost consuming activity or a milestone and try & find ways to minimize its duration or its predecessor duration thereby reducing the cost.

COST DETAILS
Cost details for all work resources.

Name	Actual Work	Actual Cost	Standard Rate
Sharanappa/Viswanathan	0 hrs	₹0.00	₹50.00/hr
Sharanapp / Viswanathan	360 hrs	₹18,000.00	₹50.00/hr
DESIGN	1,664 hrs	₹83,200.00	₹50.00/hr
Saptharishi /Dhananjaya	116 hrs	₹5,800.00	₹50.00/hr
Senthil / Bhaviya	40 hrs	₹2,000.00	₹50.00/hr
Senthil/Bhaviya	0 hrs	₹0.00	₹50.00/hr
Dhananjay/Sharanappa/Saptharishi	2,312 hrs	₹198,832.00	₹86.00/hr
Dhananjaya/Murugesh/Anand.A.G	256 hrs	₹12,800.00	₹50.00/hr
Viswa/Ramanjulu/Vijay	403.2 hrs	₹34,675.20	₹86.00/hr
TAML	1,216 hrs	₹60,800.00	₹50.00/hr
BD	8 hrs	₹400.00	₹50.00/hr
DESIGN	376 hrs	₹18,800.00	₹50.00/hr
PM	2,208 hrs	₹110,400.00	₹50.00/hr
QUALITY	15,269.2 hrs	₹763,460.00	₹50.00/hr
METHODS	6,637.92 hrs	₹331,895.42	₹50.00/hr
Purchase	520 hrs	₹26,000.00	₹50.00/hr
Boeing	40 hrs	₹0.00	₹0.00/hr

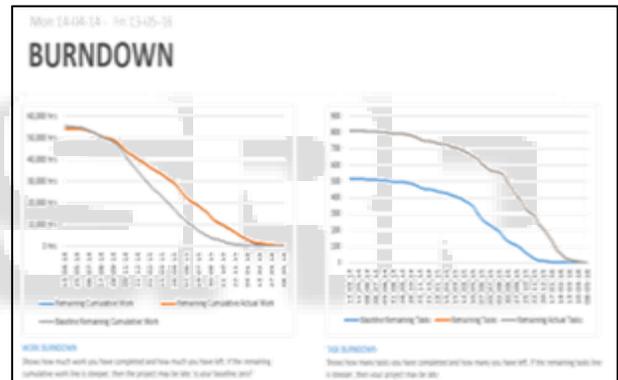Fig. 4: Resource Cost Overview

A. Burndown Chart

Fig. 5: Burndown Chart

The above chart shows the work burndown & task burndown. The work burndown chart shows how much work you have completed and how much you have left. If the remaining cumulative work line is steeper, then the project may be late.
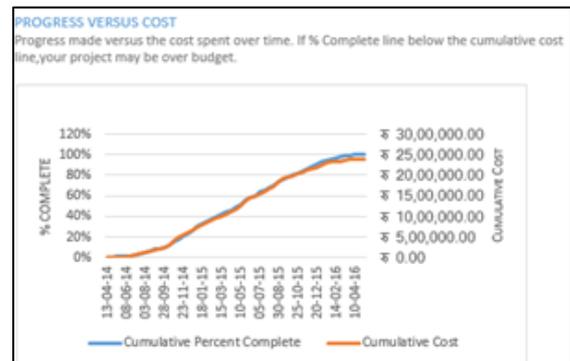
B. Cost Overview

Fig. 6: Images represent the various results obtained from project plan

Following images represents the various results obtained from project plan.

The Cost Status chart indicates the cost spent for project. Actual Cost spent, Remaining Cost & the baseline cost will be indicated. Howere baseline cost is not applicable for this project.

C. Over Allocated Resources

This graph indicates the amount of work allocated to each of the resources such as Methods, Project Management, Business Development, Production Planning & Control, Production, Programming etc.

The below bar graph depicts how the quality personnel are over allocated due to dumping more work on one person to be accomplished in the same give time. The below graph depicts the actual work (blue colour) which can be completed in the given time, whereas the additional work (remaining work) assigned is not only a burden to the resource but requires additional time to complete it.
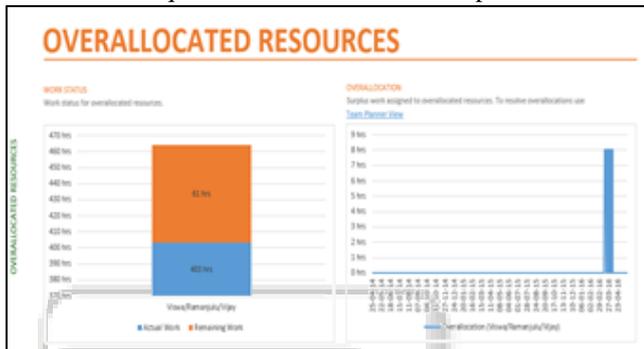

Fig. 7: Over Allocated Resources

D. Resource Cost Overview

This graph will describe what is the cost of each resource for a given set of activities and its corresponding pie chart. The three types of cost are Actual Cost, Remaining Cost and Baseline Cost. However baseline cost is not applicable for this plan, majority portion of the cost is actual cost and only few resources have a very little percent of remaining cost. This remaining cost can be accounted to the extra work allocated to them.
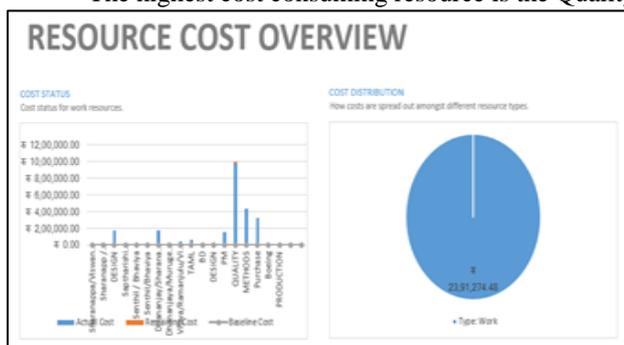
The highest cost consuming resource is the Quality.

Fig. 8: Resource Cost Overview

VIII. RESULTS & CONCLUSION

Total cost per assembly or ShipSet Cost =11700000
Cost per Trial Assembly =12054000
Percentage assumed for Overhead Cost = 15%
Planned Overhead Cost = 0.15*1170000=1755000/assembly
Actual Overhead Cost (Resource Cost) =2391274 as per IMS

Therefore Actual Overhead Cost > Planned Overhead Cost 2391274 >1755000
Whereas by considering 20% for overhead cost,
Total Planned Overhead Cost =0.20*11700000 =2400000
Therefore from the above it can be concluded that the 15% assumption for overhead cost during budget planning stage should be increased to meet the actual overhead expenditure.

IX. SUMMARY

The resource cost accounting (Overhead accounting) for a development project can be done either with the help of Microsoft Project Plan or ERP SAP.

The former method is cost effective and is quite reliable. A Project Plan will serve the following purpose:
1) Monitor & Control the overall project status in file.
2) Highlights the Critical tasks thus assisting the project manager in prioritizing project activities.
3) Obtain Network diagram
4) Resource name & resource rate allocation can be done to each of the task and therefore provide – a) Resource Cost b) Over Allocation of Resource c) Resource Utilization Chart

The current method at TAML is to consider 15% of the total cost as the overhead cost during the planning stage.

However from the above calculations we can conclude that the actual resource/overhead cost incurred is greater than 15% i.e., by considering 20% of the total project cost amounts to the actual overhead cost.

Therefore the percentage assumption of the overhead cost should be increased by 4 or 5% i.e., TAML to consider approximately 20% of the total project cost as overhead cost for the future projects.

This change will increase the profit ratio of future projects at TAML.

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