

# Marine industry engineering works construction essay



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## **1. 0 ABSTRACT**

This study relates to cost control measures involve in undertaking a marine engineering construction project. To do so, one has to understand and appreciate some of the major problems encounter by most marine contractors. In general, most of the problems are related to lack of project cost control management system which involve materials shortage, changing environment, shortage of manpower, space constraints and qualified personnel and limited financial resources. Hence, having an understanding of the causes leading to high cost, it is important to identify and adopt an effective cost control techniques to contain the cost within the project budget and schedule deadlines. In order for a company to sustain growth despite of rising cost and stiff competition, a sound and effective project cost control system is important. In this study, the objective is to adopt and put in place a project cost control management system in order to monitor the progress and schedule of works which indirectly affects the cost of manpower, materials, and machinery and to complete the project with the time schedule. For this purpose, a general understanding of the various cost control techniques and concepts are defined to show how an effective cost control management system can assist to prepare a project budget, tracking of cost against periodic targets. Effective time management is able to ensure cost and expenses in doing the project is not overrun and how management can compare and maintain the cost within the project budget. An overrun cost will affect the profit margin and a delay in completion of the project will incurred additional costs. Table of Contents1. 0

## 2. 0 INTRODUCTION

In marine industry, engineering works is one of the main activities carry out in a shipyard. Apparently, most of the contractors working in the shipyard face a tight working schedule to complete their task. Despite the constraint, contractors have to ensure quality of works and to meet the high standard of performances set by the shipyard without compromising safety and to comply with all the regulations enforced by the state authorities. With so many contractors working and involved in a project and each assigned to do a specific task, the coordination of works is paramount important. To ensure a smooth workflow and coordination of works, management in the shipyard thus have to meet regularly and at the same time to ensure contractors undertaking the works are done within the time frame given. To do so, a good action plan should be place and executed. This would minimize the loss of time, risk and cost. To any entrepreneur, having an effective cost control system in place will definitely increase a company profitability margin. The mechanism of the cost control is to ensure that there is no over deployment or shortage of manpower, the facility and workplace requirement is in place and there are sufficient materials during the progress to carry out the project. As such, a basic understanding of cost control will provide a cutting edge solution to solve the various problems in managing time and costs of materials and manpower. The objective of adopting a sound and effective project cost control management system is using a process on controlling costs associated with an activity in order to carry out the project. Firstly, the cost control typically includes investigative procedures to detect variance of actual costs from budgeted costs. Secondly, have a diagnostic procedures to ascertain the causes of variance and lastly to implement corrective

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procedures to effect realignment between actual and budgeted cost. Cost control aims at building the cheapest possible project that addresses the needs of the client. The project needs to be consistent with the objectives of the owner and contractor. In most of the instances, running a project is managed and control by a project manager. An incompetent project manager will cause a downfall of a company and failure to complete the project within a specified time will overrun the cost in comparison with the project budget. Not only has the company will have suffered heavy losses, it will affect the reputation of the company. Most contractors in the modern world are finding it rather difficult to implement and adopt an effective cost control measures. There are too many factors which could affect the costing. Such as overrun budget, poor project preparedness, poor material, shortage of workers, complacency in control and management, procrastination and delays to keep timing within the schedule, unexpected rise in cost of materials, loss of materials, abrupt weather changes, poor communication and insecurity. All these problems led to increased costs due to more time spent to complete the project.

### **3.0 PURPOSE AND SCOPE OF WORK**

The main aim of this study is to identify the various cost control techniques and measures that can be adopted. The effectiveness of the cost control is have a proper planning and evaluation of the costing involved in the project and using the data information and accounting principles to prepare the project budget. The schedules, progress of activities, materials and manpower is often associated with cash flow estimates. To integrate schedule and the different cost information, the company is able to have a

better assessment and control in managing the project. Generally in doing a project, there will be a contractual and job specifications agreement. This will provide a common understanding of the requirements and scope of work to be done by the parties. This study will benefit contractor/s that does not practices or have a good effective cost control measures in the company. With the advancement in technology, in fact with the aid of a computer, many of the control measures can be easily put in place.

#### **4. 0COMMON PROBLEMS AND PRACTICES**

One of the major problems that marine engineering is facing today is cutting down the costs and schedule that go beyond stipulated time. These problems have plagued many new construction projects in the marine industry making the cost to zoom out. There are many companies involved in any marine engineering project such as engineers, owner of the project, contractors and construction manager among others. The complexities of such projects will put pressure on these people which at times can see buying of more time, therefore, more expenses. When a project goes past the estimated time, more money is needed to sustain it. It has been noted that in most projects, pressure of time, increasing cost of labour and material, and natural uncertainties can make the management of marine engineering construction project a nightmare. For any marine engineering project to be successful, it must be formally organized with proper cost control system. The system used to run it should be tested and proved by including all the engineering effort available. When it comes to project control, the most vital factor to look at is cost. The management of this project should also be keen to look into the aspect of the time required,

amount of materials to be used and the number of workers and manpower hours needed. With good control and proper cost control method and procedures, the project will be able to accomplish within a given stipulated time. A cost control project management system is generally used to assist in controlling the resources available for the project. It is possible to control all resources namely material, equipment, personnel, services, supplies. This is because they can be quantified and changed to money value. When planning for a project, it is good that a budget is established. This is the only way through which the project manager can know how much fund resources are required to work on a project. For cost control and monitoring purposes, the project budget is often used as a guide for management. Specific items in the detailed cost estimate become job cost elements. In addition to cost amounts, information on materials quantities and labour inputs can be used to compare with to the expected requirement. Almost all the projects needs to be guided right through out, in order to receive the required and expected output at the end of the project. It is the team that is responsible for the project and most importantly the project manager that need to be able to carry out effective controlling of the costs. There are however several techniques that can be used for this purpose. In addition to the project goals that the project manager has to oversee, the control of various costs is also a very important task for the project. Project management would not be effective at all if a project manager fails in this respect, as it would essentially determine whether or not a company is making a profit or loss. A system for measuring the progress of the project will be very vital. With an effective cost control system the project will run smoothly as planned. A control plan should document how the project is going to be run, its plan and

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how the actual work is going to take place. This system should also identify problems based on the past projects done by similar marine engineering company. Any unfavorable trends should be detailed in this plan. This will allow the project managers know how to handle situations as they arise. The historical database of the engineering company should be dug for more accurate outcome of the project.

## **COST CONTROL TECHNIQUES**

In any engineering project undertakes in the shipyard, a record keeping and project control techniques are indispensable tools that managers need to familiar with. Following are some of the valuable and essential techniques used for the efficient project cost control.

### **Planning the Project Budget**

Ideally, need to have a budget at the beginning of the planning session with regard to the project at hand. It is this budget that you would have to help you for all payments that need to be made and costs that you will incur during the project life cycle. That making of this project therefore entails a lot of research and critical thinking. Like any other budget, you would always have to leave room for adjustments as the costs may not remain the same right through the period of the project. Adhering to the project budget at all times is key to the profit from the project.

### **Keeping a Track of Costs**

Keeping track of all actual costs is also equally important as any other technique. Here, it is best to prepare a budget that is time based. This will help to keep track of the budget of a project in each of the phases. The actual

costs will have to be tracked against the periodic targets that have been set out in the budget. These targets could be on a monthly or weekly basis or even yearly if the project will go on for long. This is much easier to work rather than having one complete budget for the entire period of the project. If any new work is required to be carried out, there is a need to make estimations for this and see if it can be accommodated with the final amount in the budget. If not, you may have to work on necessary arrangements where the client will pay for the new work or the changes.

## **Effective Time Management**

Another effective technique would be effective time management. Although this technique does apply to various management areas, it is very important with regard to project cost control. The reason for this is that the cost of your project could keep rising if you are unable to meet the project deadlines. The longer the project is dragged on for, the higher the costs incurred which effectively means that the budget will be exceeded. The project manager would need to constantly remind his/her team of the important deadlines of the project in order to ensure that work is completed on time.

## **Project Change Control**

Project change control is yet another vital technique. Change control systems are essential to take into account any potential changes that could occur during the course of the project. This is due to the fact that each change to the scope of the project will have an impact on the deadlines of the deliverables, so the changes may increase project cost by increasing the effort needed for the project.



## **Used of Earned Value**

Similarly, in order to identify the value of the work that has been carried out thus far, it is very helpful to use the accounting technique commonly known as Earned Value. This is particularly helpful for large projects, and will help to make quick changes that are absolutely essential for the success of the project.

## **5. 6 The Additional Steps for Project Cost Control**

It is advisable to constantly review the budget as well as the trends, and other financial information. Providing reports on project financials at regular intervals will also help keep track of the progress of the project. This will ensure that overspending does not take place, as you would not want to find out when it is too late. The earlier the problem is found, the more easily and quickly it could be remedied. All documents should also be provided at regular intervals to auditors, who would also be able to point out to you any potential cost risks. Simply coming up with a project budget is not adequate during your project planning sessions. The project manager and his team would have to keep a watchful eye on whether the costs remain close to the figures in the initial budget. Always keep in mind the risks that come with cost escalation and need to prevent this as best as you can. For this use the above techniques explained and constantly monitor the project costs.

## **THE PROJECT BUDGET**

For cost control on a project, the engineering works plan and the associated cash flow estimates can provide the baseline reference for subsequent project monitoring and control. For schedules, progress on individual

activities and the achievement of milestone competitions can be compared with the project schedule to monitor the progress of activities. Contract and job specifications provide the criteria by which to assess and assure the required quality of works. The final or detailed cost estimate provides a baseline for the assessment of financial performance during the project. To the extent that costs are within the detailed cost estimate, then the project is thought to be under financial control. Overruns in particular cost categories signal the possibility of problems and give an indication of exactly what problems are being encountered. For control and monitoring purposes, the original detailed cost estimate is typically converted to a project budget and the project budget is used subsequently as a guide for management. Expenses incurred during the course of a project are recorded in specific job cost accounts to be used and compared with the original cost estimates in each category. Thus, individual job cost accounts generally represent the basic unit of cost control. In addition to cost amounts, information on materials quantities and labour inputs within each job account is also retained in the project budget. With this information, actual materials usage and labour employed can be compared to the expected requirements. As a result, cost overruns or savings on particular items can be identified as due to changes unit price, labour productivity or in the amount of material consumed. In developing or implementing a system of cost accounts, an appropriate numbering or coding system is essential to facilitate communication of information and proper aggregate of cost information. As a result, a standard set of cost codes such as the master format codes may be adopted to identify cost accounts along with projects identifiers and extensions to indicate organization or job specific needs. Cost estimates are

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generally disaggregated into appropriate functional or resource based project categories. For example, labour and material quantities might be included for each several physical components of a project. For cost accounting purposes, labour and material quantities are aggregated by type no matter for which physical component they are employed. For example, particular types of workers or materials might be used on numerous different physical components of a facility.

## **Forecasting For Activity Cost Control**

For the purpose of project management and control, it is not sufficient to consider the past record of costs and revenues incurred in a project. Good managers should focus upon future revenues, future costs and technical problem. For this purpose, traditional financial accounting schemes are not adequate to reflect the dynamic nature of a project. Accounts typically focus on recording routine costs and past expenditures associated with activities. For examples, after the completion of some activity, it may be discovered that some quality flaw renders the work useless. Unfortunately, the resources expended on the flaw construction will generally be sunk and cannot be recovered for reconstruction. For project control, managers would focus particular attention on items indicating substantial deviation from budgeted amounts. In particular, the cost overruns in the labour and in the other expense category. Overruns in cost might be due to lower than expected productivity, higher than expected wage rates, higher than expected material costs or other factors. Even further, low productivity might be caused by inadequate training, lack of required resources such as equipment or tools, or inordinate amounts of re work to correct quality

problems. Review of a job status report is only the first step in project control.

## **Financial Accounting Systems and Cost Account**

The various components of cost in a financial accounting system is often used in project control and the accounting information is generally used for three distinct purposes: Internal reporting to project managers for day to day planning, monitoring and control; Internal reporting to managers for aiding strategic planning; and External reporting to owners, government, regulators and other outside parties. External reports are constrained to particular forms and procedures by contractual reporting requirements or by generally accepted accounting practices. Preparation of such external reports is referred to as financial accounting. In contrast, cost or managerial accounting is intended to aid internal managers in their responsibilities of planning, monitoring and control.

## **Control of Project Cash Flow**

Project managers are involved with assessment of the overall status of the project, including the status of activities, financing, payments and receipts. The various items comprise the project and financing cash flows. These components include costs incurred, billings to owners, payable amounts to suppliers and labour cost etc. By understanding the different components in the accounting system which comprises the job cost accounts including: expenditures and estimated cost summary of charges; summary of billings and claims to the owner; summary of payables due material suppliers, labour or sub- contractor; summary of receivables in respect to cash flow receipts from the owner and summary of the cash flow position of the project as if all

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expenses and receipts for the project is combined in a single account. The overall status of the projects requires synthesizing the different pieces of information in order to appreciate the cost and revenues status in doing the project. It also indicates from the accounting information as to whether the project is making a profit as projected in the project budget.

## **SCHEDULE CONTROL**

In addition to cost control, project managers must also give considerable attention to monitoring schedules. Undertaking a project involves a deadline for work completion, so contractual agreements will force attention to schedule. More generally, delays in the project represent addition costs due to late facility occupancy or other facts. Just as costs incurred are compared to budgeted costs, actual activity durations may be compared to expected durations. In process, forecasting the time to complete particular activities may be required. Schedule adherence and the current status of a project can be represented on geometric models of a facility. For example, an animation of the progress of the project can be shown on a computer screen with different colours or other coding scheme indicating the type of activity underway on each component of the facility. Deviations from the planned schedule can also be portrayed by colour coding. The result is a mechanism to both indicate work in progress and schedule adherence specific to individual components in the facility. In evaluating schedule progress, it is important to bear in mind that some activities possess float or scheduling leeway, whereas delays in activities on the critical path will cause project delay. As a result of this ambiguity, it is preferable to update the project schedule to devise an accurate portrayal of the schedule adherence.

## **Schedule and Budget Updates**

Scheduling and project planning is an activity that continues throughout the lifetime of a project. As changes or discrepancies between the plan and the realization occur, the project schedule and cost estimate should be modified and new schedule devised. On fast track projects initial construction activities begun even before the facility design is finalized. In this case, special attention must be placed on the coordinated scheduling of design and construction activities. Even in projects for which the design is finalized before construction begins, change orders representing changes in the final design are often issued to incorporate change desired by the owner. Construction projects normally involve numerous activities which are closely related due to the use of similar materials, equipment, workers or site characteristics. Expected cost changes should also be propagated throughout a project plan. In essence, duration and cost estimates for future activities should be revised in light of the actual experience on the job. Without this updating, project schedules slip more and more as time progresses. To perform this type of updating, project managers need access to original estimates and estimation assumptions. Unfortunately, most project cost control and scheduling systems do not provide many aids for such updating. What is required is a means of identifying discrepancies, diagnosing the cause, forecasting the effect, and propagating this effect to all related activities. While these steps can be undertaken manually, computer aids to support interactive updating or even automatic updating would be helpful.

## **Relating Cost and Schedule Information**

The previous sections focused upon the identification of the budgetary and schedule status of projects. Actual projects involve a complex inter relationship between time and cost. As projects proceed, delays influence costs and budgetary problems man in turn requires adjustments to activity schedules. Unanticipated events might result in increases in both time and cost to complete an activity. While project managers implicitly recognize the inter play between time and cost on projects, it is rare to find effective project control systems which include both elements. Usually, project costs and schedules are recorded and reported by separate application programs. Project managers must then perform the tedious task of relating the two sets of information. Usually, a single project activity will involve numerous account categories, hence it is difficult to integrate schedule and cost information in order to provide an effective integration. To integrate cost and schedule information, the disaggregated charges for specific activities and specific cost accounts must be the basis of analysis. Like any other industries, for a marine engineering project to be carried out, one needs to ensure the availability of all the resources needed. The resources required can be categorized under the following subheadings namely machinery, materials, men and money. The performance of these resources is what will determine the success of the project.

## **8. 0 PURPOSE OF CAPITAL COST PLANNING AND CONTROL**

The process of planning and control of capital costs is very vital in any construction project including the marine engineering works. It needs to be a

priority to any project set. One good thing about implementing cost control and cost planning methods is to make sure that value for money and cost certainty are achieved. A marine engineering project involves the management of capital, therefore needs some good procedure of taming the expenses. With the adoption of best practices of capital management, the project manager and coordinator will minimize the amount of money spent on the project. Research done has shown that projects that lack a means of regulating the expenses end up costing up to double the amount allocated.

## **8. 1 Cost Planning in Marine Engineering World**

**Cost planning is a crucial step when preparing for marine engineering construction project. It is a parameter used to tell owner of the project on estimated cost of the whole project. On top of this, cost planning will show the point of the project when the cost is likely to go high. This is the key information needed to obtain financing for the project and know if by the time the project will come to an end it will be profitable or not. Property owners that venture into construction without cost planning get themselves in a big mess due to insolvency.**

Cost planning will give a preliminary feasibility of the marine engineering project. Once the project owner has come up with maximum amount of money ready to invest into the project, cost planning will help determine if the amount will be enough. If it is not, there are two options. First, the project owner can seek more funds or second, the main contractor will have a tighten budget for this project. Cost planning can be used in structuring financing of the project. It is cost planning that will inform the project owner on when to finances for the project are needed. Cost planning should be

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done after the preliminary in order to save time and money. It will also give the owner a clear picture of the suitable budget without the risk of having incorrect figures. With a cost plan, finance is made easier. Through this plan, the contractors will have access to the cost of the project. This plan will give a realistic estimate cost of the project. With this information the contractors will know how to arrange for finances. Before any banking institution awards finance to any marine engineering project, it will have to see a well-crafted cost plan. With a cost planning, a project manager can easily control the amount of money used for a given project. With a cost plan, it is possible to have a time frame of finishing the whole project. The managers can use this to come up with a cost control schedule. The aim of this schedule is to help in measuring and managing the price quotes as they arise from various supplier and traders who will be supplying construction materials. This will allow the manager to measure a project and determine if it will be complete by the money given or it will need more. Well planned cost schedules will be helpful in avoiding costs that could hit into the finances. A cost plan will help in site management. This plan will clearly show all the items that the project needs to be complete. It will ensure all the items have been bought and managed properly when they are on site to ensure work is completed as planned. With cost planning, better tender selection will be achieved. A cost plan will help the main contractors to allocate the level of jobs and find the most suitable sub-contractor. Cost planning is very vital when it comes to structuring financing of a marine engineering project. Cost planning consists of two features. It has the feature of the project budget which is the total amount of money the whole project is expected to cost. The amount is normally calculated depending on the project design and scope. Various <https://assignbuster.com/marine-industry-engineering-works-construction-essay/>

estimates will be used to determine this. The second feature is that of cost allocation over time. It involves predicting when the cost will be incurred as the project progresses. Cost planning comes with a number of benefits. It is through this plan that the contractor becomes aware of financial expectations. If the contractor has this plan at the start, they will be able to secure enough finances to run the project smoothly. Marine engineering projects that run without cost planning put the company in darkness. They are not aware if at the end they will make profits or losses. They can use this plan to borrow a loan. Instead of borrowing too much, this plan will help the owner borrow only the amount needed to complete this project. This will cut down the amount of interest paid. One thing that marine engineering project managers need to be aware of is that cost planning need to be critically analyzed before construction begins. It should be done in the initial inception stage, at the preliminary design stage and after the final design has been approved. For efficient service delivery, the plan should be updated regularly. By doing this, accuracy will be ensured. It is good that the manager is aware that even though the costs can be estimated and planned before the project starts, it is possible to change them during the actual construction. A slight change in the construction design will have a huge impact on the cost of the project. This is because a whole part of the project has to be reworked. Experts advise that the best way to work within the estimated budget is to ensure limited design change once the project has commenced. For the purposes of value achievement, cost planning should be executed in regard cost holding categories for a given marine engineering project. Each of these categories should be given certain amount of money that is a representation of a viable amount of the budget and should have <https://assignbuster.com/marine-industry-engineering-works-construction-essay/>

value for money. One thing that project manager need to be keen on is to ensure the target cost do not exceed the approved budget of the project.

## **6. 2 Cost control**

By definition, cost control is the management of costs associated with the whole process of designing and constructing a project in order to fit an approved capital budget. A tendering document needs to be prepared which will be used to measure the costs needed for the whole project to be complete. Cost control depends on action and information. For an effective cost control system to be achieved, it is vital that necessary information is gathered and then appropriate action put into play. This action will be based on the information gathered. Lack of relevant information and inefficient action are things that will make cost control in a marine engineering project almost impossible.

## **6. 3 How to achieve cost control**

Most marine engineering projects need to have a plan of operation right from start to end so that good output is achieved at the end of the project. The management team is the one responsible for coming up with the plan of action. The project manager need to be someone well versed on how the project is carried out so that he is able to carry out effective cost control.

There are a number of techniques through which cost control can be achieved. The main task of the project manager is to ensure all project goals are achieved. Controlling of various costs is very crucial for any project. It is the wish of every project owner to have its project completed using the least amount of capital as possible. If the project manager fails to achieve this,

then the project will not be termed effective. For a marine engineering <https://assignbuster.com/marine-industry-engineering-works-construction-essay/>

project to be profitable, cost control should be achieved. There are various techniques through which this can be done. Planning the project budget is the first way through which this can be achieved. The main contractor and the sub-contractor need to come up with an estimate budget before the project begins. Using this budget, the cost of the projects can be managed. It will help the management make payments where necessary. It shows all the necessary costs projected to be incurred during the life cycle of the project. Making this budget will need critical thinking and good research. A marine engineering work is like any project, therefore, will need to have a flexible budget. The budget that management team comes up with should give room for adjustment. There are a number of factors that may make the budget change; they include: Legislative changes, Change in marketing conditions, Revenue, Expenditure, Inflation. It is therefore good that the construction budget allows room for adjustment. The costs may not be the same throughout the project. However, of significance is trying as much as possible to adhere to the project budget in order to gain profits from the project. Keeping a track of costs can also help cut down the cost incurred in any marine engineering project. All actual costs need to be tracked to ensure they are within the money allocated. Most projects are done by dividing them into proportion and allocating certain amount of money to each sub-division. It is beneficial that the money allocated to each part of the project is managed accordingly. The budget prepared should be based on time. This is the only way through which one can keep track of the budget. Each phase of the project should be given an estimated budget. The budget needs to be tracked against time set in the budget. The time period can be in terms of weeks or months, or even years depending on how big the project is. A <https://assignbuster.com/marine-industry-engineering-works-construction-essay/>

budget that is split into phases is much easier to work on as compared to one complete budget. It is easier to make changes to a phase budget than a complete budget. Effective time management is good in ensuring the budget set is met. Even though this is a technique that is not used in all projects, it can be effective in marine engineering works as it is vital when it comes to cost control in a project. People who fail to achieve the deadlines of the project will find the cost of the project rising. The more time a project takes, the higher the costs incurred. This will strain on the budget allocated. For this reason, a project manager needs to keep his team on toes so that deadlines are met. This will ensure the work is finished on time to avoid extra expenses. Project change control is another vital technique of cost control in a marine engineering project. There are change control systems that can be used to cater for cost changes that may occur during the course of the work. It is almost impossible for a project to be complete without changes. One fact that project managers need to know is that changes in the scope of the project will have a huge impact on the time frame set. The bad impact of changes is the increased cost they will impact on the project. Use of earned value can reduce costs incurred when undertaking a marine engineering work. For the project managers to identify the value of the project to be carried out, the use of accounting technique is needed. This is a very helpful technique especially for huge projects. It will help in making quick changes that are essential for the success of the project. Experts have advised that constant review of the budget and project trends will help in regulating costs. There is good financial information that can be put into use to ensure reduced costs in a project. The manager of the project should constantly provide reports on how the finances meant for a given project is

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being used. This is a great way of tracking the progress of the project against the amount of money allocated. With appropriate tracking of the costs of the project, overspending will not occur. Constant review of the project will ensure everything goes as planned. Any kinks in the project will be known before it is too late. The earlier the problem is detected, the better as it will be fixed before it gets out of hand. All financial documents need to be taken to auditors at given intervals. These experts will go through them to detect any costs risks. Having a perfect project budget is not enough when preparing a project. What is most important is how this budget is going to be implemented. A good budget is the one that takes the least amount of money as capital. The management team of the project needs to be keen on the costs. They need to ensure all expenses are within the allocated budget. However, it should be remembered that there are risks that come with costs escalation. A project manager is the one responsible for preventing further cost escalation.

## **6. 4 Capital costs**

Among the types of costs that marine engineering project managers need to be aware of are capital costs. These are costs that are incurred when providing material to a construction facility. These costs are based on the current economic climate. In a project, capital cost can be fees associated with activities that take place in the initial set up of the project. These costs occur at the start of a project. The operational costs are the ones that sum up the capital costs. The initial stage of a project is the one that will needs a lot of capital. One thing project managers need to be aware of is that cost of capital will vary depending on the size and type of the project. For a project

to be successful capital costs will need to cover expenses such as labour and materials. For a marine project to be successful, operational improvement and capital cost reduction efforts should be put into play. These efforts should be focused more on outcomes and waste rather than inputs. Sustainable capital cost reduction will have a huge impact on the revenues. In marine engineering industry, a cyclical cost reduction approach will give viable results. There is need for the project managers to come up with a comprehensive focus on cost drives. A clear plan of tracking the costs should be laid down in order to continuously reduce the amount of time and money spent on the project. The cycle of sustainable capital cost reduction require day-to-day corporation from all the management involved in the project. It is a process that will need cost consciousness and continuous improvement of the project. The project managers need to take action and have the company move close to its goals of cost efficient operations. With the modern world wallowing in the effects of economic downturn, there is need for management to come up with ways of cutting down the costs. An environment of cost reduction needs to be established. In the marine engineering industry, spending capital cost effectively is vital when it comes to cutting costs. It is imperative that the project manager comes up with a detailed sequence plans on how the project will be handled right from the start. The plans should include on demand for capital from the management, execution of the project and how reduction of capital costs will take place. It is possible to have reduced capital costs in the marine engineering projects if the right techniques are used.

## **7.0 BENEFITS AND CHALLENGES OF COST CONTROL IN MARINE ENGINEERING WORKS**

The modern day economic downturn is what has made it rather challenging for marine engineering works. In this era, only companies that have adapted innovative organization will make it. In the construction industry, improved business performance is vital. In order to cut costs in such a project, good management techniques and tools should be used. Project cash flow, project estimations and value engineering are factors that need to be checked so as to come up with a perfect project with minimum costs. When we talk of project estimating we refer to a process of quantifying the cost of marine engineering works. What is taken into consideration here is labour, material, and unit cost. In marine engineering works, it is challenging to come up with a standard process of measuring the costs. This is because of the extreme diversity in project location, construction methods, work force and contractors.

### **7.1 Benefits**

Marine engineering companies that have adapted cost control procedures have found a smooth sail in this industry. There are a number of benefits companies will receive by putting these procedures into play. On top of reducing the amount of money the engineering company will spend on expenses, there are a number of other factors. Cost control will help in lowering expenses. This is the chief benefit of adapting cost control. The overall expenses of the company will shrink once the cost control procedures start operating. All a company that offers marine engineering works needs to do is limit on the amount of money each employee uses. The company needs



to put a cap on the amount of money that flows out. This will help the company have more cash on hand. The money saved can be used in clearing other expenses like debt, accommodation, salaries and capital expenses. With cost control, there will be less abuse within marine engineering works. When the company is in position to manage the amount of money spent, it is taking a huge step of helping curb abuse by employees. Through cost control procedure, the project managers can place restrictions on how much a certain project is going to cost. With a cost control procedure, both the project owner and contractors will have chance to come up with an initial budget that will act as a guide of controlling the amount of money the project will cost. Cost control procedures will help in better record keeping. With cost control, accounting and financing will be streamlined. The company will be in a position to know the amount it will spend within a given period of time. Through this information, it will be possible for managers to come up with a better planned budget. On top of this, it will be easier to account for the money spent. This can be done manually or through the use of information technology software. Cost control will create an atmosphere of thrift. A marine engineering firm that actively uses cost control procedures is seeking to make huge savings in terms of expenses. This is what will see it ride above other contractors in the industry. With the right procedures, the company will be in a position to bring the expenses below the set limit. In such an incident, it is the company that benefits the most.

## **7. 2 Challenges**

If a marine engineering company fails to implement cost control, there are a number of challenges it is likely to face. One thing the managers of the

company need to bear in mind is that cost control can help it achieve its objectives in regard to a given project. When it comes to cost control, the company needs to look at how the costs of operation can be minimized. They should know why the cost are the way they are and how they can be changed. Reducing the costs can be easy if the right procedures are adapted. For the company to effectively fix the cost problems, it should look at factors that make the costs go high. It should come up with ways of adjusting and monitoring costs. Lack of cost control procedures can affect the long-term plans of the company. If the company fails to know how well the future of its finances will be, it is hard to accomplish its long-term plans. A business that has no cost controls in place will find it challenging to accomplish whatever it plans. This is a common problem in both small and large businesses. The main aim of cost control is to ensure that the materials, labour and other expenses are regulated in their usage. It will make sure the expenses lie within the allocated budget. Marine engineering companies that have failed to adapt the use of cost control procedures have realized low profits or even losses. This is because minus cost control, there will be money wasting. Companies that have failed to look at ways of controlling the cost have earned decreased profits. The owner of the marine company needs to come up with a plan of cutting costs in order to make huge profits. One of the major problems that marine engineering firms are experiencing is that of resource management. Companies that miss to have cost control procedures in place will lack of resources to complete their project. It is good that the company estimates the material and labour whenever it will need to complete the project. In the event a company runs out of qualify labour, there is a lot of wastage in terms of money. It is very

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possible that the cost will have gone high hence more capital required.

Another consequence of this is delay in the project that may make the client lose trust in the company. Lack of action is another challenge of cost control.

Companies that do not have cost control procedures will not be able to recognize financial problems. Cost control will help in regulating the amount of money that flows in and out of the company. This is another reason as to why the company should come up with the right methods of tracking its expenses. A cost control procedure will help in saving money.

## **8. 0 Conclusions**

This study aimed at techniques used in cost control by contractors in marine engineering works. It has proposed the methods that will see the project completed within a given period of time using a given budget. Many companies find it rather challenging to complete projects because they fail to control the amount of money spent. At the end of the day, they find themselves in affix after spending more than the estimated budget. This is something that has seen many projects stall half-way. Some of the tested and proven methods of cost control used by contractors in the marine engineering projects are: schedules, inspection of work, project budget, site meeting, cost reports, and work performance. Any company that wants to succeed by saving more cash should look at these factors seriously. Well defined techniques need to be laid down. Some companies have opted to use traditional cost control methods which have let them down. There are modern ways of doing this. This research has managed to establish strong evidence that actually shows how the techniques are effective in cutting costs within a company. The research found out that the problem of cost

control that many companies are facing is due to lack of knowledge and poor planning. Most marine engineering companies have poor management of resources meant for projects. There are a number of problems that contractors reported that lead to failure to put up a project or delays in the same. Some of them include over budgeting, poor project preparation, poor material, lack of labour, laziness in control and management, delays in delivery, rise in cost of materials, loss of materials, abrupt weather changes, poor communication and insecurity. Other problems included pressure from activities, delayed payments from customers, delay by the owner to inspect the construction, and alteration of drawings by the owner. From the research, it came out clear that the biggest reason for delay in marine engineering works was failure by the customers to release money in time. In project control, the most vital factor to look at is cost. The management of this project should also be keen on time and quantity of material and labour needed. With good control and planning, the project will be accomplished within a given time. With an effective cost control system the project will run smoothly as planned. A control plan should be documented how the project is going to run, its plan and how the actual work is going to take place. This system should also identify problems based on the past projects done by the same marine construction engineering company. Any unfavorable trends should be detailed in this plan. In this research, questionnaires were used to gather information. The main reason for this is because most people in the modern world are familiar with questionnaires. This makes them more apprehensive and less prone to bias. Questionnaires have uniform question hence information gathered is very accurate. The questionnaires were designed aimed at identifying cost control in main contractors and sub-

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contractors. In this particular study, questionnaire used had close-ended questions that were constructed using the Likert scale. The main reason why the Likert scale was used is because it is easy to construct. It gave the respondents a wide variety of choices. The research showed that lack of cost control procedures can affect the long-term plans of the company. If the company fails to know how well the future of its finances will be, it is hard to accomplish its long-term plans. In the marine engineering industry, improved business performance is vital. In order to cut costs in such a project, good management techniques and tools should be used. Project cash flow, project estimations and value engineering are factors that need to be checked in order to come up with a perfect project with minimum costs. Having a project control system in marine engineering works is a major factor that will see the success of the project. It is what will show the steps to be taken in completing the project. The one thing project managers need to be aware of is that controlling costs is not an easy task in a engineering project. Because an engineering project is particularly complex due to a large number of processes involved and it should be well scoped for huge profits to be realized. The study showed why it is good for project owners to search for contractors who have right tools and equipment to reduce the time taken to complete given projects. They should take time to negotiate for right prices. Project managers should be equipped with the right information so that quality work is done, within the estimated budget. For effective management and cost control in marine engineering works, a properly structure organization chart should be adapted.

## 9.0 Recommendations

The issue of cost control is caused by poor management of resources. It is propelled by laxity in supervision of project. This was concluded from analyzing the questionnaires sent to various sites. It is therefore recommended that contractors attend courses to gain new skills of cost control. This research proved that lack of knowledge in cost control is what has seen many companies lag behind. Inadequate cost control methodology has proved to be among the major problems why marine engineering projects are stalling. In most sites that this study was done, it was found out that workers were not aware of the company targets. Lack of communication can therefore be stated as another loophole through which wastage of money and resources take place. Cost planning is a crucial step when preparing for marine engineering construction project. It is a parameter used to tell owner of the project on estimated cost of the whole project. This plan will give a preliminary feasibility of the marine engineering project. Once the project owner has come up with maximum amount of money ready to invest into the project, cost planning will help determine if the amount will be enough. A cost control plan will give a realistic estimate cost of the project. With this information the project owner will know how to arrange for finances. Before any banking institution awards finance to any marine engineering project, it will have to see a well-crafted cost plan. It is beneficial that a company comes up with well-planned cost schedules as they will be helpful in avoiding costs that could hit into the finances. A cost plan will help in site management. This plan will clearly show all the items that the project needs to be complete. It will ensure all the items have been bought and managed properly when they are on site to ensure work is completed as

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planned. In terms of material, this study recommends that wastage can be cut down if materials are delivered as specified in the right quantity. Good storage should also be done to ensure no theft or spoil from bad weather. To avoid theft, the site should be hoarded with security system to monitor the facility. Contractors are encouraged to adapt the correct use of machines at the site of project as this equipment is efficient and effective. They can help cut down the cost. With a well-planned cost control procedure, marine engineering works will be completed in the allocated time using the estimated budget.

## 8. 0CASE STUDY (PROSPER ENGINEERING &

### ENVIRONMENTAL PTE LTD)8. 1Background of Prosper Engineering &

Environmental Pte Ltd (PEE)The main activity of the company is to undertake new project by providing steel and piping works in two major shipyards in Singapore. The company entered into this business about four years ago and to date, the company started with a workforce of less than 20 workers undertaking repairs works in the shipyard, to date, the company has a work force of more than 500 workers. The two shipyards had endorsed PEE with a residential status whereby the shipyards engaged the company as part of their team to construct new projects for the oil and gas industry. For the first year (2010), PEE had turnover revenue of SGD \$2. 5 millions dollars, for the second year (2011), the company turnover was SGD\$5 millions, for the third year (2012), the company turnover was SGD\$10. 5 millions and for the coming year (2013), the company has successfully tender for a total of SGD \$24 millions. PEE maintains a profit margin between 18% and 22% for each project, the company undertakes. PEE undertakes and takes up the

challenge to construct the largest collar structure used in the drilling of oil at the Oilfield and other project in constructing living quarters (accommodation

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quarters for workers working in the oil rig). For every engineering project in which the company tender, the management applied the cost control techniques in their evaluation of the project cost and budget. At the same time, the company has to ascertain that the price quoted is competitive. Material wastage is another common problem that most marine engineering works experience. There are a number of circumstances that can lead to this. To curb this problem, a supervisor should be hired in the work site. He should be on the look for any loopholes that may lead to material loss and wastage. Research done by Hendrickson showed that material wastage take place during storage, during the procurement process, and during utilization. Wastage that occurs during procurement is due to buying wrong material, or buying more than what is required. Other reasons can be improper handling of material, buying at the wrong time, buying poor quality material and wastage during transportation. During storage, wastage can also occur due to depreciating value as a result of incorrect storage, breakages and damages when handling, lack of proper maintenance, loss due to unexpected happenings like fire, theft and exposure to bad weather like rain. It is possible to have material wastage due to lack of coordination and preparedness, poor storekeeping, lack of accounting skills, carelessness and negligence, over-storage that sees deterioration in quality and failure to return excess material to the store. There are some incidences where wastage cannot be avoided. This is especially during utilization. In such a case, the project managers are advised to be extra careful so that not much of the material is wasted. Excessive wastage will see the cost of doing the project go high hence affecting productivity in a big way. Most of the problems of material wastage occur when ordering, during requisition,

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checking of deliveries, handling and offloading, storing and distributing to the site of the project.