MANAGING COST ESCALATION. THE CASE OF GRADE ONE MARINE SHIPYARD

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ABSTRACT
This research is aimed at determining the factors that lead towards escalation of costs in a local shipyard, namely Grade One Marine Shipyard (GOMS) of Lumut, Perak. The study examined the extent to provide improvement plans to help mitigate cost escalations. This research is however limited within the scope of the particular shipyard. Constraints in collecting data was the primary reason to limit the research to only one shipyard. The data would have been different from other local shipyards due to each shipyard's uniqueness. The researcher distributed a total of 30 questionnaires to the workers of GOMS. The questions were divided into four sections that constituted of the demographical background, management of shipbuilding, cost and profit, and safety at workplace. The findings of the research indicate material procurement as the main contributory factor to cost escalation in the shipbuilding process of the shipyard. The facilities for the shipbuilding process, such as related machineries and equipment, have also been identified as a factor that leads towards overall cost escalation.

Keywords: cost escalation, maritime industry, shipbuilding, maintenance

INTRODUCTION

Shipbuilding is a worldwide industry that requires a global regulatory framework to operate efficiently. The issue of this research is to identify and manage cost escalation in a local shipbuilding industry of Malaysia. The cost escalation is the assessment of the possible evolution of the running cost with time and is aimed at providing the stakeholders with a long-term perspective of financing needs. Each component of the running cost fluctuates more or less independently according to different parameters. Nowadays, rapid growth in world maritime industry has resulted in increased activities for the production and repairing of the ships and related marine platform.

The shipbuilding industry in Malaysia includes the manufacture of a wide range of ships, barges, passenger boats or ferries, tugboats, yachts, hovercraft, and other related platforms. In Malaysia, four ports that have been identified to be turned into hubs for shipbuilding under the national maritime plan are, namely Sibu Port, Miri Port, Lumut Port and Pasir Gudang Port. To reduce escalation of cost in the shipbuilding industry, the shipbuilding sector in Malaysia needs to practice more efficient standard of ship repair or shipbuilding. It should help reduce the cost and increase the profit margin of a project. It is important to identify any potential issue that arises in the ship repair or shipbuilding environment. Shipbuilding or ship repair utilizes highly complex processes to design or to repair the ship to meet customers' requirements. This requires continuous interaction between the customer, the shipyard, suppliers and governing bodies through all phases of a shipbuilding project. In this sense, it is highly relevant to investigate some major issues affecting shipbuilding in a local shipyard of Malaysia. This research focuses on cost escalations and the means to manage them in a shipbuilding industry and the company chosen is GOMS of Lumut, Perak.

LITERATURE REVIEW

The purpose of literature review is to provide an insight into cost escalations and the means to managing this escalation in the shipbuilding industry. This paper covers past proceedings relating to the shipbuilding industry and other related issues. The literature reviewed provides an effective means to compare the data obtained from GOMS with findings done by credible past researchers that should lend credibility to researcher's own analysis and deductions. Sarder et al., (2010) provide insights into schedule slips that affect production flows in projects requiring efficient material flow scheduling. These slips would eventually result in project cost escalations that reduce profit margins. In the instance of any work progress being impeded, the issues of the inevitability of cost overruns cannot be avoided. This issue was highlighted by Touran et al., (2005) who argue that cost escalation is inevitable when prices of services and/or goods increase over the term of the project. On the aspect of shipbuilding, schedule of works also requires a strong database of suppliers, traders and service contractors where their credibility is determined through a strict vendor selection and evaluation process in the supply of shipbuilding material and parts (Beil, 2010).

PROBLEM STATEMENT

Cost escalations are the result of downtimes that cause work delays. Lack of data on what causes downtimes is slowing understanding, impeding work progress and affecting profit margins. This is further aggravated by a lack of an effective strategy to mitigate or reduce cost escalation that may affect competitiveness in the shipbuilding industry.

SIGNIFICANCE OF RESEARCH

This research would help investigate the elements of escalating costs in a shipbuilding industry that may affect a shipyard's profit margin and its competitiveness. Its outcome would throw light on possible solutions that may help derive better strategic planning on ways to better manage the shipbuilding process.

RESEARCH OBJECTIVE

This research is aimed to identify the elements that may have contributed to shipbuilding cost escalation, to discuss those elements that contribute towards cost escalation and propose improvement plans to help reduce cost escalation.

METHODOLOGY

The data compiled were analyzed in a procedural way to address the entire research questions of this study. In this aspect, explanations were given based on the analysis made on data received from the survey and the various interviews that were conducted. The data was processed and analyzed using the Statistical Package for Social Science (SPSS) software. The researchers provided a total of 30 questionnaires to the workers of GOMS, Lumut, Perak. The questions were divided into 4 sections, namely Section A, B, C and D comprising of the demographical background, management of shipbuilding, cost and profit, and safety at workplace respectively. Hence, the researcher managed to gather most of the information required from the data collected relating to the research topic and objectives set out. Collected data was analyzed with reference to the research questions. Generally, all the questions were focused on the shipbuilding activities of the shipyard.

DATA ANALYSIS AND FINDINGS

Management of shipbuilding project

The table below represents the mean of worker attributes. The higher mean of 4.47 reflects the high usage of Critical Path Method for every project. Meanwhile, the lower mean of 3.33 indicates no delay in the procurement process.

Research Question 1: Whether the current management is carrying out the project effectively?

Table 1. Mean value and standard deviation in management of shipbuilding project

	N	Min	Max	Mean	Std. Deviation
Good management indicates good project planning	30	3	5	4.13	.819
Proper schedule indicates smooth work progress	30	3	5	4.20	.761
The management team has proper planning for every project	30	3	5	4.00	.910
Management team always in control during work progress	30	3	5	4.03	.890
There is always an authority monitoring every work progress	30	3	5	4.23	.817
CPM is used for every project	30	3	5	4.47	.860
Raw material is used in correct portion	30	3	5	4.10	.712
Material flow is always efficient	30	3	5	4.00	.743
No delay in procurement process	30	2	5	3.33	1.241
Raw material received are always correct	30	3	5	4.33	.758
Valid N (list wise)	30				

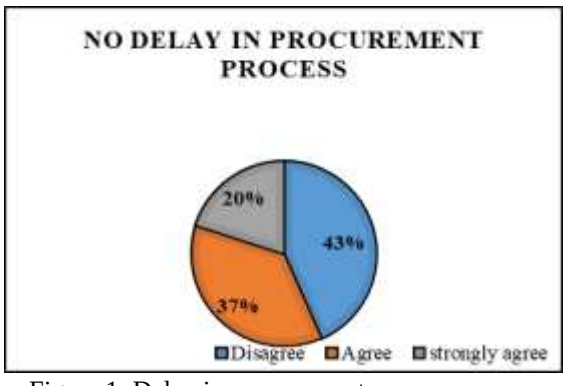

Figure 1: Delay in procurement process

Data collected from respondents' answer to question on 'No delay in procurement process' shows the highest disagree percentage of 43%. Meanwhile, respondents who agree on that question is 37%, while those who strongly agree is 20%. The results show that most of the respondents disagree that the procurement process was done efficiently and that there was no delay on the raw materials for shipbuilding projects. Thus, it can be concluded that poor management in procurement department may reduce the efficiency of managing a shipbuilding project. This shows how important the management team need to ensure that ship materials and equipment are readily available as scheduled. This is to prevent work from delays due to non-availability of materials or equipment when required. When works are delayed, it means that the ship will stay longer in the yard, and that will increase its cost. Vendors who can no longer provide the shipbuilder with certain materials when required and without the availability of materials as planned by project schedule, production may come to a halt. This usually causes a schedule slip that translates into cost escalations due to delays (Sarder et al., 2010).

Cost and Profit

The table below represents the mean of worker attribute. The results have the same mean value 4.57 on three questions which are 'the project delay greatly affects the profits', 'proper material flow can reduce cost' and 'any incident happen during work progress will affect the cost'. Meanwhile, the lowest mean is 4.33 which is 'good management planning indicates no additional cost' and 'overall profit comes from good management planning'.

Research Question 2: How can poor shipbuilding project management be related to cost escalation during shipbuilding process?

Table 2: Mean value and standard deviation of cost and profit

	N	Min	Max	Mean	Std. Deviation
Good management planning indicates no additional cost	30	3	5	4.33	.758
Overall profit greatly comes from good management planning	30	3	5	4.33	.758
The project delay greatly affects profits	30	3	5	4.57	.626
Proper material flow can reduce cost	30	3	5	4.57	.728
Any incident happen during work progress will affect the cost	30	3	5	4.57	.568
Good networking with supplier will affects the efficiency of dealing the raw material	30	3	5	4.37	.718
Reducing handling material cost will affect the profit	30	3	5	4.43	.728
Valid N (list wise)	30				

Figure 2: Relationship between project delay and profits

Based on the figure above it shows the result distribution on survey of cost and profit. The higher percentage of the response for question 'the project delay greatly affects profits' were 63% strongly agree with that statement. Meanwhile 30% agrees and the other 7% was neutral. Most of the respondents strongly agree on the statement that any kind of project delay can greatly affect the profits. The most vital influential factor is an efficient project management that can help improve poor cost handling and reduce cost escalation, which is a common phenomenon in many shipyards. A major concurring factor is that management and site workers play important roles to ensure the project runs smoothly and efficiently without any interruption to cause work delays and impede work progress. Most are aware that cost may escalate whenever work progress is impeded and does not run as planned. Cost escalation is inevitable, when the prices of services and/or goods increase over the term of the project (Sarder et al., 2010).

Safety in work place and equipment used

The table below represents the mean for worker attributes. The higher mean of 4.67 is about 'Effective safety training is provided in a shipyard'. Meanwhile, the lower mean of 3.93 is about 'Equipment is well maintained and it works properly'.

Question 3: Whether there is any effect on cost escalation regarding safety in workplace and equipment used?

Table 3: Safety in work place and equipment used

	N	Min	Max	Mean	Std. Deviation
Equipment is well maintained and its work properly	30	3	5	3.93	.583
Safety officers and safety committee always remind the employees on safety	30	3	5	4.53	.681
Effective safety training is provided in a shipyard	30	4	5	4.67	.479
Safe workplace will reduce operating cost	30	2	5	4.57	.817
Valid N (list wise)	30				

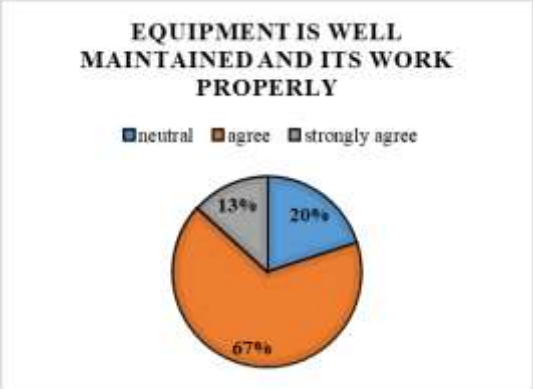

Figure 3: Maintenance and proper working of equipment

Based on the Table 3 and Figure 3, the percentage of respondents' answer on question about 'Equipment is well maintained and it works properly' shows 67% agreed, 13% strongly agreed while 20% remained neutral with that statement. The facilities and equipment used by the workers are important for work progress in shipbuilding. If the equipment does not work properly and when it takes a long time for maintenances it can cause project delays and will ultimately increase the cost in shipbuilding.

CONCLUSION

In conclusion, the whole aspects of management of shipbuilding, including that of project management planning, controlling and monitoring, material management, safety management, and cost estimation, may contribute towards the overall cost escalation in a shipbuilding industry if they are improperly managed. Based on the analysis made, the procurement process stands out as the main factor contributing towards cost escalations in shipbuilding of GOMS. Shipbuilding is a very dynamic and diverse activity, procurement of materials and services plays a vital role in this field. Sourcing and assuring an uninterrupted supply of materials is the main objective for smooth functioning of shipbuilding and other related shipyard activities. If any delay occurs during the shipbuilding process, there would also be delays in other related downstream activities, thus contributing towards overall costs, such as when the ship has to stay longer in the shipyard.

Furthermore, facilities for the shipbuilding process, such as machines and related equipment, have also been identified as a factor that may lead to overall cost escalation. It is important for facilities at the shipyard to be reliable or well-maintained so as to reduce costly breakdown repairs. Failure to do so may shorten the life span of the machines or equipment. Thus, when it comes to the time that the workers need to use the machines or equipment, the machine ought to be available and serviceable. If they are not operable, the shipyard has to fix or replace them. If it is a complex machine, it would surely takes time to replace, thus delaying the shipbuilding process. The longer it takes to replace or repair, the longer jobs are put on hold, thus increasing costs that may lead to overall cost escalation. GOMS also needs to consider on buying new machines and equipment in order to be more cost operative. As we know, most of the latest machines and equipment in the market are technologically advanced that may help increase efficiency and reduce wastage, thus contributing towards overall cost escalations. On maintenance, planned maintenance approach or even predictive maintenance through condition monitoring should address issues of cost escalations relating to facilities upkeep.

In order to improve the development of products and services in shipbuilding process, GOMS needs to consider and look further on their shipbuilding management aspects. More effective approaches and work processes in the procurement department need to be in place to overcome related delay problems that may arise. Since the shipyard has virtually no control to make up for any delays in their materials procurement, it is important to have other optional and better networking with suppliers. Moreover, with better database and improved ICT systems connected to suppliers, there should be less problems in dealing with material delays.

On the same score, the procurement department also needs to be strict with vendor and supplier selection. Sourcing should be done with competent vendors especially when dealing with raw materials required for shipbuilding. Supplier or vendor performance can be monitored by their track record and company profiles. Maintaining a wide and strong database of suppliers, traders and service contracts through a strict vendor selection and evaluation process in serving the shipbuilding material and parts play an important role in the shipbuilding schedules. If GOMS do not take remedial action, further problems may arise that may result in losing its competitive edge over its competitors

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