

Management of Factors Leading to Delay Construction Project: The Case of Offshore Projects

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Abstract:- Drilling platforms, oil wells, dredging operations, and wind turbines all of the previous are different forms of offshore structures, and they are utilized in a wide range due to the variation of sea depths which makes the design harder than any other structures and increases the number of delay factors, challenges, and danger that the structure will face because of the hurricanes, waves, and storms in the ocean. Accordingly, there are always unexpected problems that may happen during the work, and the percentage of completing the project on time is around 30%. Therefore, managers must be aware and have a prior experience and study in this field to avoid delay and eliminate risk. This paper illustrates the delay factors in offshore structures and what are the more common and specific delay factors. also explains the best management methods that are preferred to utilize in complex projects to submit the project on time, and how the managers are responsible for achieving all the requirements.

Keywords:- offshore structures, management, delay factors, complex projects.

I. INTRODUCTION

Deep water in the ocean represents the biggest residence for life on the planet, having hills, mountains range, deep valley, and extended plains similar to what exist over sea level. The fortunes in these deep waters like metals, iron, gold, gasoline, and many rare metals. In other words, the majority of the materials on the surface exist beyond the sea. In order, engineers started to find a way to explore and extract these precious metals, and from here came the idea of constructing fixed structures into position and extended above the surface of the sea called offshore structures, and used to facilitate the processes of exploring and extracting these metals from the core of the sea.[6] While these structures are placed in the ocean, so there are many challenges facing them daily and delaying the execution and exposing the structure to danger. Therefore, these projects need expert managers to lead the project and ensure success in completing the project on time. [16] This research demonstrates the delay factors that delaying on offshore structures and how to deal with and manage these factors to avoid delay.

Any major delay in the project may cost the company millions, also minor losses may cost a lot because offshore projects are like a row, and any problem in one of the vessels may delay the whole project to another day.[2] In most cases, the costs are indirect costs caused by inflation.

A few companies can deliver the work on time, and that describes managers' challenges and how they need to be careful in managing the project, this is in general, so what about offshore structures, which are much harder and face problems daily?

II. METHODOLOGY

The general design of offshore structures has different standard bodies and is used for several roles like in Mexico they are used for gas and oil exploration, also in the UK, wind turbines are used to provide renewable energy.[3] Offshore structures are meant to be a big challenge to managers and designers because it's compulsory to ensure the safety and stability of the product, can last for a long time, can resist high fatigue, and surly the effective cost for the customer.[8] Therefore, during the design, the environmental loading factors need to be considered, and corrosion, reliability, the mechanism of ocean waves, fatigue limits, fluids, hydrodynamics, Offshore structure size, and material density.[4]

A. Differences between Offshore structures and other structures

Construction of Offshore structures is more complicated than onshore structures, and the reasons can be classified as follow:

- The work in the water requires more methods and specific equipment costs more than any other structure, and that is because of the danger of the water and the work on an unstable surface.
- The water is affecting the structure constantly and negatively.
- The cost of offshore structures exceeds onshore structures many times.
- Offshore structures require more time than onshore structures.

III. DELAY ISSUES

Generally, Delay issues that affect offshore structures are more than delay issues that affect onshore structures, and even the workers have a different life. They need to live in the site they work, so that requires providing all facilities like health, food, entertainment, and others.[1] In addition, the location of the site might be far from the coast, and that will be expensive for transportation. Therefore, it is compulsory to consider all requirements, because any health issue or lack of something may cost a lot of work and time to be fixed, and that causes an increase in the budget. The offshore platform that is placed to construct offshore structures may cost the company several million dollars, so

accurate work is important, and the management role takes the lead here.[12]

A. General Delay Factors

- a) Financial difficulties and cash flow
Financial difficulties and cash flow Contractors may ask for financial support from an institution or a 25% advanced payment from the client to start the work and avoid delay. Otherwise, waiting for any financial aid will delay the work, while the failure to pay the sub-contractor on time from the contractor will result in a slowdown in the work, and reduce the number of workers. [7]
- b) Poor Site management
The daily routine on the site needs to be controlled carefully because any lack or failure in the management causes a significant delay, and a reduction in the quality. Which increases the chances for managers to quit their work, and forces the company to find new managers who need some time to adapt to the site environment.[1]
- c) Ineffective scheduling and planning
After getting the approval from the client according to the required requirements, planning and scheduling will be the guidelines during the work. According to this, managers need to monitor the plan moving with the schedule cautiously, and any fluctuations in the prices or shortage of workers may cause the delay. [1] Therefore, poor management of these problems will cause a delay in the whole project.
- d) Previous task
A delay of a minor phase, a major phase, or a package may impact the subsequent work because the work is like a connected chain. For example, installation needs a range of vessels, and all the work will be delayed if one of the vessels had a problem. Therefore, managers must consider the current task seriously because it will be the previous task for the next task, and so on.[14] However, it is not guaranteed to avoid delays.

B. Delay Factors related to Offshore Structures

- a) Sea conditions and Weather
High waves cause delays frequently during installation and transportation as well, while every six or seven seconds there is a wave striking the side of the platform, which may cause huge damage to the crew and the platform. On the other hand, Hurricanes and Storms' official season starts in June and ends by the end of November endanger the coastal structures, causing damages, forcing crews to evacuate, moving ships out of the project, and postponing the work for a couple of months.[9] Crews, ships, and work starts again immediately after the landfall of the storm season and perform damage assessments to start the repair if required, all that delaying the work and controlling these projects in a period and a lot of losses.[13]

- b) Location:
The location can play an important role because there is a big chance of needing to use trucks and ships to transport equipment to the site. Additionally, if the location was in the ocean, so safety materials will increase, which led to one of the delay factors because the company is responsible for any health issue that happens to the workers during the work.
- c) Offshore Vessels:
Operational purposes can be served by Specific ships such as construction work at high sea depths, oil exploration, drilling, and providing supplies.[10] This describes the importance of the vessels, so any engine failure can delay the work and causes loss in cost and time at the same time.

IV. MANAGEMENT OF DELAY FACTORS

Only 30% of companies are delivering projects on time, in other words, 70% of companies are not lucky in submitting the projects on time, and they face some delays issues.

The management of coastal structures does not differ from onshore structures except for some structural and coverage details. Providing successful management is essential for achieving a successful project, and considering coordination management has a significant impact on the success of the project completion.[11] Having effective managers can convert strong management to a successful project,[5] and it is not easy to find successful managers who can expect, control, solve, and deal with the problem properly because the percentage of facing sudden problems in big projects is very high, so dealing with complicated and sudden obstacles to avoid any possible delay in the deadline of the project need experiences.[15]

Usually, managers are in the lead, and they are in charge of everything that happens in the project. Therefore, the manager has to be friendly and kind to the crew to gain their trust and friendship, at the same time, the manager has to be strict to avoid problems as much as possible.

A. Management methods to avoid the delay

- a) Critical Path Method (CPM)
The critical path shows the start plan and the end of the activities to avoid delays.[19] Offshore structures can be considered complex projects, and using the CPM technique can be like an alarm for managers. [21]
- b) Keep good records:
Writing down documentation as a reference is crucial to identify early any potential issues.[19] It is a good technique for managers to record work diaries, meeting minutes, photographs, correspondences, progress reports, and updated schedules. [17]
- c) Time slice method:
A comparison study of the updated project schedule and the progress to assess project delays. This method depends on good records keeping of the progress

reports and updated schedules also it is almost impossible to use this method without having good records. [19]

d) Retrospective longest path:

This track build-up the sequence of the occurred events and shows the actual recorded progress information, which should be considered during the occurrence. In case the project schedules and records are not comprehensive, this method will be time-consuming. [19]

e) The time impacts analysis method:

This method requires accurate records from the start of the delay, understanding the delay event, and considering all cases of the project when the delay begins.[19] it also needs to consider good records. Otherwise, the delay event will stay unknown until it occurs. [18]

Offshore structures are very complicated projects, and their environment is different from other structures. Accordingly, advanced management techniques can be utilized in these structures to guarantee the delivery of the project on time. Managers in these structures need to be aware and record continuously because these structures may face problems with corrosion due to the waves and the location also their transportation vessels are exposed to problems in the engine. Thus, managers must be aware and provide all possible techniques to expect and avoid delay issues. [20]

V. CONCLUSION

According to this research, there are general delay issues in all projects. On the other hand, some specific delay issues are related only to offshore structures, as well as the case in the management methods.

Offshore structures are used for many purposes and cannot be neglected due to the valuable fortunes that exist in the deep water. The high speed of the wind over the sea can be consumed and used as energy by placing wind turbines. The work in the water is more complicated than the work on the land, and that is such a good reason to consider offshore structures as complex structures. Additionally, the water, salt, and waves are affecting the age of the offshore platform. As a result, honesty, caution, and management are the main parameters in the work, specifically in these structures, because they are more exposed to danger and face many delay issues.

In principle, the management of an offshore project does not differ from the management of any other project except for structure details and coverage details. That means the delay issues on offshore structures are the same as onshore structures with more delay factors like the weather. Therefore, submitting the project on time means the managers were able to pass all delay issues, and that shows the high quality of management that applied to the project because offshore projects rarely can be submitted on time.

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