

Project management plan for the design and construction of a bridge to span a riv...

[Business](#), [Management](#)



(Course No.)

(City & State)

INTRODUCTION

The construction industry is an important sector of the economy in any country. The sector therefore desires proper management with clearly defined roles to be executed by well trained and certified professionals in the construction industry. It is essential that management duties of construction projects be delegated to professionals who possess the required skills and knowledge in project management to guarantee the success of a construction project.

Project management has transition has an internationally recognized field that comprise of management tools critical to the success of construction projects in the current work environment. The competence of a project management exercise can be measured as a function of training and certification.

CRITIQUE OR BRIDGE CONSTRUCTION PROCESSES

Management of a bridge construction process requires that the project manager reorient all the resources in such a way that project are completed without cost and time overruns. More often than not, bridge construction projects have lagged due to foreseeable and unforeseeable circumstances. The output of the work depends on how best the project is coordinated and managed. According to , apart from management, other x factors such as environmental concerns render projects undoable at certain period of the year. For instance under extreme weather conditions, bridge construction

processes will demand more resources to neutralize adverse weather conditions. If temperatures are too low, for instance, laying of superstructures will require propane and kerosene heaters to keep the temperature at 45 deg for 7 days. Considering these conditions, crew performance will also be impacted. Coupled by poor project management and coordination, all these factors subject the project into cost and time overruns.

Numerous research materials have argued that architects are best suited for project management roles in reference to their skills in the various fields of project management agrees to this fact in the argument that they are master builders who conceive the plan of a project and determine the type of structure. They are better placed in communicating with the clients as their roles traditionally place them as first point of calls.

ANALYSIS

A construction project involving a bridge entails the services of many people either directly or indirectly who take part in the designing, construction, and maintenance from the onset to completion. According to the various personnel involved in a construction project include quantity surveyor, architects, structural engineers, civil engineers, mechanical engineers, electrical engineers, planners, builders, land surveyors, estate surveyors among others. Designers and architects will be tasked with the designing and recommending the suitable area to set it up. Quantity surveyors will be engaged in determining the required space for the bridge and construction works. Civil engineers are the construction personnel that oversee the

setting up of the abutments, piers and interior bents. Through project management planning implementation, each an individual group will be engaged in his own specialty to come up with a complete structure. Of top priority in this project include architects, quantity surveyor, civil engineers, builders and estate surveyors.

The bridge spans a width of 100m across a river. It is a dual supported deck bridge. It is estimated that it will be more than sufficient to handle maximum traffic approaching from both sides. It will be build using the latest technology to ensure maximum safety, durability and efficiency. Sufficient standoff distances from primary structural infrastructure are recommended. Blast resistant designs will be incorporated using a three way approach; increasing standoff distances, structural hardening of the infrastructure, and high acceptable level of risks. When a percentage of each design is utilized, it becomes optimal to mitigate risks.

DESIGN

The project was executed in a number of steps highlighted as follows;

Phases

- Project initiation

This stage defines the project delivery options and contains flow charts that outline the process of choosing architect and engineer design teams, the client representative, and construction manager. In respect to bridge construction, project initiation involves tendering and bidding, site inspection, resource allocation among other essentials. This section also contains the responsibilities of the owner (in which case it can be private or

government departments) in respect to providing the necessary information . Before the project is commenced a survey is conducted to look into the environmental and social impacts it will have.

The environmental consequences of bridge construction are varied and include direct or indirect impacts to the biological, chemical and physical properties of rivers and riparian (or “ stream-side) environments.

Cutting down of vegetation to pave way for bridge construction and more so bridge construction activities leads to soil erosion which in turn degrades aquatic habitat in the stream leading to compromised aquatic system.

Bridge construction leads to destruction of both flora and fauna leading to disturbed food chain which leads to migration of birds and other animals previously living in the area.

The construction also leads to pollution in various forms including water, air and noise. Earth movers and trucks used for transportation of materials to the site releases exhaust gases that lead to air pollution. Consequently, the noise they produce leads to noise pollution. The release of construction materials and displacement of soil to the river pollutes the water. All this factors undermines the environmental health leading to property devaluation.

However, bridge construction has its benefits. To start with, it creates job opportunities which enhance economic prosperity and in turn aids in bettering the environment in general. It will lead to growth of service industries around the area resulting in increased employment opportunities and acceleration of the country’s economy.

- Design management

The work of architects, designers and engineers come in handy in this stage. The bridge needs to be constructed with the latest technology that ensures continued strength and threat resistance. This step describes the steps in each project phase from schematic Design, Design Development, Construction requirements, bidding and contract awards, construction administration, occupancy and closeout phases. The products of project design include;

Fig. 1 Bridge types

- Construction management

This step details the construction phases including; meetings, submittals, inspections, testing, alteration in the work schedule, pay requests, site visits, observation reports and project closeout. The bridge comprises of different components including foundation, substructure and superstructure. The substructure encompasses items such as support columns, pier caps and abutments while the superstructure consists of precast girders and cast in place deck. The cost of the project will be determined after the design engineer has completed the geotechnical survey and determined the appropriate design. The cost is based on estimated quantities derived from the design engineer and verified by the estimator. All the processes are handled by an appointed bridge project manager.

- Quality Assurance

Before the project commences, soil testing procedures are conducted. Likewise during the life of the project, continuous quality assurance and testing of materials and processes are carried out to ensure conformance with the set standards.

- Budgeting

The budgetary allocation of the project may be revised throughout the duration of the project. Thus the budget section is included to gather for any foreseeable and unforeseeable changes . The estimated budget of the project is determined by calculating the NPV. NPV for the project is as follows;

Present worth of the project is given as

The project is expected to be completed in the next two years.

Thus Total Present Worth = PW of Capital + PW of O&M

Given an interest rate of 10%

Then

$$827825/(1.10)^0 + 273980/(1.10)^1$$

$$P = \$989468$$

PW of O&M costs =

Where i is the interest rate, n is the duration of the project, and A is the annuity

Given that the project will take two years and the rate of interest is 10% then

$$PW = \$ 68142$$

Therefore the total cost is equal to $\$ 68142 + \$989468 = \$ 1, 057, 610$

- Scheduling

In case of variation in the cost of the project budget scheduling is provided for to fix deficits and excesses. This project is expected to span a period of two years and cost variations brought about by fluctuations is foreseeable.

<https://assignbuster.com/project-management-plan-for-the-design-and-construction-of-a-bridge-to-span-a-river-report-examples/>

ECONOMIC ANALYSIS

Bridge construction presents a host of opportunities to workers, manufacturing industries, professional bodies, supplies and transportation. The construction of a bridge will require substantial public spending while at the same time create numerous job opportunities. In a bid to improve safe and efficient transport systems governments allocate colossal sum to bridge and road improvements each year. As at 2010 the construction industry was valued at more than \$200 billion. This amount goes into generating employment opportunities directly and indirectly, generating income and improving safety. Direct employment comprises of the manual workforce, contractors, equipment operators and engineers. Indirect employment arises from the people employed by companies to supply materials, products and services used in the project. The bridge will require steel, thus, steelworkers, truck drivers, miners and more along the value chain.

The bridge is a major asset providing a link between two landfills. It is expected that the completion of the bridge will double accessibility to crucial facilities in both sides of the bridge, reduce costs and finally improve the quality of living. The transportation system is the backbone of the economy. Transport infrastructure forms an essential part of the socioeconomic system of a country. Its completion will lead to enormous benefits in both industry and individual level.

Tourism, trade, health facilities, education, and development are all possible due to efficient and operational transport infrastructure. The local community will benefit from the project. Construction personnel will visit local hotels, buy property in the area, bring their friends and explore the

culture of the people. It is common knowledge how much a country can earn from tourism and exchange of cultures. An efficient transport industry facilitates movement of people as they exploit different cultures of the world.

The benefits associated with the construction and maintenance of the bridge supersedes the cost incurred in setting up. With a total cost of \$ 1million, the amount is insignificant given the economic benefits it will bring to the users.

RISK MANAGEMENT

Project management and risk analysis has transition has an internationally recognized field that comprise of management tools critical to the success of construction projects in the current work environment. The competence of a project management exercise can be measured as a function of training and certification.

Risk analysis has been involved with estimating the probabilities required as input data for the evaluation of decision alternatives. Risk analysis weighs the probability of an event occurring in the construction industry and the impact of such an occurrence.

Numerous risk factors come into play in the construction of a bridge. Some of the notable risk factors include site of operation, construction machinery on site, construction activities and X factors including manmade and natural occurrences which lead to inefficiencies. In order to design robust risk management mechanisms for the bridge construction, these factors need to be conclusively studied and analyzed. Risk management plans involve the identification and design of risk plans to minimize project effects. Project

risks have an effect on the resources and schedules of the project. In turn, the quality and performance is compromised leading to overall slag of the project.

Step by step execution is exercised to ensure conclusive and fault-free construction process. Primavera Expedition is already in place to be used to monitor and track the course of work. It entails collaborative management by the owners, surveyors, contractors, assessors, engineers among others. A robust risk management, technical, economic and environmental plan should comprise of all these processes. Risk analysis accesses the likelihood and consequences of risks while risk planning draw up plans to reduce the impacts of the risk. Risk monitoring tracks the risks and monitor them throughout the project execution period .

CONCLUSION

The Construction of a bridge will impact human and environment in the neighborhood in a positive and a negative way. It is expected that the completion of the bridge will double accessibility to crucial facilities in both sides of the bridge, reduce costs and finally improve the quality of living. Ultimately, the bridge construction process will create job opportunities for the locals as well as promote mobility. Business entities will benefit as costs associated with transportation will be significantly slashed.

On the converse, the construction will impact negatively on the flora and fauna. Construction work will result in pollution which will ultimately impact negatively on aquatic animals. Earth mover will destroy vegetation while chemicals used in the construction process will lead to soil pollution. It is,

therefore, essential that proper environmental analysis is carried out to control.

Economically, road construction provides a means for thousands of workers and goods manufacturers to earn a livelihood. Thousands of workers are involved in construction work while others work in industries where construction materials are made. Professions such as architecture, surveying and mapping would have no significance if the practical aspects of it – bridge construction, would be inexistent. Apart from mobility, it facilitates the economy of the country to move forward.

References

Burke, R., 2003. Project Management: Planning and Control Techniques, 4th ed.. New York, USA. : John Wiley & Sons,.

Critchlow, J., 2012. Making Partnering Work in the Construction Industry. s. l.: M-Y Books Distribution.

D., A. A., 1984. Managing Construction Projects:. s. l.: International Labour Organization.

De Cieri, H. K. R. N. R. A. H. J. R. G. B. A. W. P. M., 2008. Human Resource Management in Australia. 3rd ed.. s. l.: McGraw-Hill Australia Pty Ltd.

Fewings, P., 2005. Construction Project Management: An Integrated Approach. s. l.: Taylor & Francis.

Finkelstein, L., 2008 . Pocket Book of Technical Writing: for Engineers and Scientists. 3rd ed. ed. NY, USA: Mc-Graw Hill.

Finkelstein, L., 2008. Pocket Book of Technical Writing: for Engineers and Scientists. s. l.: Mc-Graw Hill.

George Ritz, S. L., 2013. Total Construction Project Management 2/E (EBOOK). s. l.: George Ritz, Sidney Levy.

Jack Gido, J. P. C., 2009. Successful Project Management. s. l.: Cengage Learning.

Liebing, R. W., 2001. The Construction Industry: Processes, Players, and Practices. s. l.: Prentice Hall.

London, M. o., 2012. The construction Industry in London and Diversity performance. s. l.: London Development Agency.

Neale, R. H., 1995. Managing International Construction Projects:. s. l.: International Labour Organization.

Quinlan & Bohle, L., 2010. Managing OH and S. Australia. : Pan Macmillan.

Smith, K. A. a. I. P. K., 2007. Teamwork and Project Management, 3rd ed.. s. l.: Mc-Graw Hill.

Wells, J., 2006. The Construction Industry in Developing Countries:. s. l.: aylor & Francis.

William Hughes, P. M. H. D. G. W. K., 2006. Procurement in the Construction Industry: The Impact and Cost of Alternative Market and Supply Processes. s. l.: Taylor & Francis.