

ECONOMIC ANALYSIS OF COST PROPOSITIONS TO DIFFERENT FORMS OF CONSTRUCTION AND MAINTENANCE

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ABSTRACT:

Maintenance in civil engineering is a very important topic. Since the aging of different constructions and structures is a problem of concern from a civil engineers point of view. The paper discusses and reviews forms of constructions and maintenances performed in civil engineering as well as economic analysis of cost or value proposition to these different forms are also discussed in brief.

INTRODUCTION:

Construction is a process of creating a building or infrastructure. It differs from manufacturing in that manufacturing typically involves mass production of similar items without a designated purchaser, while construction typically takes place on location for a known client. The construction as an industry comprises six to nine percent of the gross domestic product of developed countries. Hence good maintenance of the construction is a compulsory task for an engineer. Construction starts with planning, design, and financing; and continues until the project is built and ready for use.

TYPES OF CONSTRUCTION:

AGRICULTURAL: Constructions used for agricultural purposes.

RESIDENTIAL: It includes houses, apartments, townhouses, and other smaller, low-rise housing, small office types.

COMMERCIAL: This refers to construction for the needs of private commerce, trade, and services.

INSTITUTIONAL: It is for the needs of government and other public organizations.

INDUSTRIAL: Buildings and other constructed items used for storage and product production, including chemical and power plants, steel mills, oil refineries and platforms, manufacturing plants, pipelines, and seaports.

HEAVY CIVIL: The construction of transportation infrastructure such as roads, bridges,

railroads, tunnels, airports, and fortified military facilities.

ENVIRONMENTAL: Deals with projects that improve the environment. Some examples are water and wastewater treatment plants, sanitary and storm sewers, solid waste management, and air pollution control.

MAINTENANCE:

“Activities required or undertaken to conserve as nearly, and as long, as possible the original condition of an asset or resource while compensating for normal wear and tear.”

OR

“Accounting: A periodic cost incurred in activities that preserve an asset's operational status without extending its life. Maintenance is an expense that, unlike capital improvement (which extends an asset's life), is not capitalized.”

OR

“Engineering: Actions necessary for retaining or restoring a piece of equipment, machine, or system to the specified operable condition to achieve its maximum useful life.”

TYPES OF MAINTENANCE:

Traditionally, 5 types of maintenance have been distinguished, which are differentiated by the nature of the tasks that they include:

- **CORRECTIVE MAINTENANCE:** The type of maintenance done after the failure occurs.
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- **PREVENTIVE MAINTENANCE:** It is a type of maintenance where prevention to failure is done through maintenance.
- **PREDICTIVE MAINTENANCE:** By using technical knowledge of experienced workers maintenance is predicted and done..
- **ZERO HOURS MAINTENANCE (OVERHAUL):** Maintenance done at a good working time ensuring zero faults.
- **PERIODIC MAINTENANCE (TIME BASED MAINTENANCE TBM):** the basic maintenance of

equipment made by the users of it. It consists of a series of elementary tasks for which no extensive training is necessary, but perhaps only a brief training.

LITERATURE REVIEW:

The Common Problems Facing the Building Maintenance Departments, Ayman Alshehri, Ibrahim Motawa, and Stephen Ogunlana

The paper discussed the maintenance problems in Saudi Arabia. The authors collected data from various resources and also conducted various interview to identify problems associated with maintenance in kingdom. They classified the factors as below

- Management problems
- Human resource problems
- Technical problems

The interviews also revealed that there are fourteen obstacles that facing the operation and maintenance industry.

Effects of Faulty Construction on Building Maintenance Okuntade Tope Femi Lagos, Nigeria

Author in this paper reveals that the success of a building project depends on its performance, which is measured based on the cost of maintenance and the quality and standard of workmanship. Which in turn expresses that cost of maintenance may play a vital role in planning stage of the project. The paper seek to identify the defects caused by faulty construction on maintenance, The study concludes that ensuring quality during construction process is dependent on teamwork and also the performance of contractor's should be monitored to avoid defects, mistake or spot inspection

Enhancing Maintenance Management Using Building Information Modeling In Facilities Management Yu Chih Su*, Yi Chien Lee, and Yu Cheng Lin

This paper proposes a BIM based Facility Management (BIMFM) system for facility managers and staffs. The BIMFM is applied in selected case study of a school maintenance project in Taiwan to verify proposed methodology and demonstrate the effectiveness of tracking and managing the related maintenance information in the 3D environment. Also this study shown the benefits, limitations and conclusions of BIM application in facilities management, and also provided suggestions for future research

Impact of Maintenance Strategies on the Performance Of Industrial Facilities In Selected Industrial Estates In Lagos State, Nigeria Oseghale, G.E

The present paper appraised the facilities and the maintenance management strategies employed in

some of the selected industrial estates in Lagos State by identifying and examining facilities maintenance strategies, and determining their impact on the physical condition of the facilities. The needed Data were sourced using structured questionnaire used on the staff of maintenance department of the industrial firms located in the estates, It is found that there was no significant relationship between the types of maintenance strategies and the respondents' level of satisfaction with the physical condition of their facilities, thus the types of maintenance strategy currently used in the maintenance of industrial facilities had no influence on the physical condition of industrial facilities.

Factors Affecting the Cost of Building Work - An Overview Tony Cunningham Dublin Institute of Technology,

The paper discusses various factor associated with the final cost of construction the issue of the cost of building work is important to the vast majority of construction clients. The paper has outlined the principle factors affecting the cost of building work within the Irish context. Also it examined the impact of procurement choices, and market conditions and concluded with an overview of the factors affecting the contractor's site production costs.

Measuring the performance of office buildings maintenance management in Malaysia

Nik Elyna Myeda Syahrul Nizam Kamaruzzaman Michael Pitt

The paper identified the key aspects of performance measurement for maintenance management of office buildings, in order to enhance maintenance service delivery. This paper proposes a performance measurement system that is proved to be practical and suitable to measure the effectiveness of maintenance service delivery of office buildings. The outcomes of this research are significant in their own right but also serve as a platform for future research in this area.

Building Maintenance Management in a Malaysian University Campuses: A Case Study

Olanrewaju Abdul Lateef, Mohd Faris Khamidi and Arazi Idrus,

The prime objective of maintenance is to ensure, as far as practicable, the continued peak performance of the building throughout its design life. This paper seeks to report the maintenance management system of a university institution in Malaysia. Primary data was gathered through the analysis of a case study. The objectives of the case study are to identify, describe and

assess the maintenance management system used by the university. The major conclusion drawn from the case study was that although university building maintenance practices are corrective and cyclical there is a lack of a comprehensive maintenance management framework that guides the decision-making processes. The case study also revealed irregularities in the university's maintenance management system

CONCLUDING REMARKS:

The review carried out above shows that the maintenance of construction is a very important aspect of a project. The cost proposition from the costumer point of view states that maintenance shares large share in building or construction cost, let it be building, road, tunnel or bridge.

Hence proper understating of maintenance aspect is essential for a civil engineer and hence it should be taken or considered as one of the most important part while planning for a construction.

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