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Benefits of Construction Management Implications and Processes by Projects Managers on Project Completion

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Abstract**—**Projects managers in construction industry usually face a difficult organizational environment especially if the project is unique. The organization lacks the processes to practice construction management correctly, and the executive's technical managers who have lack of experience in playing their role and responsibilities correctly. Project managers need to adopt best practices that allow them to do things effectively to make sure that the project can be delivered without any delay even though the executive's technical managers should follow a certain process to avoid any factor might cause any delay during the project life cycle. The purpose of the paper is to examine the awareness level of projects managers about construction management processes, tools, techniques and implications to complete projects on time. The outcome and the results of the study are prepared based on the designed questionnaires and interviews conducted with many project managers. The method used in this paper is a quantitative study. A survey with a sample of 100 respondents was prepared and distributed in a construction company in Dubai, which includes nine questions to examine the level of their awareness. This research will also identify the necessary benefits of processes of construction management that has to be adopted by projects managers to mitigate the maximum potential problems which might cause any delay to the project life cycle.

Keywords**—**Construction Methodology, Design Process, Project Managers, Scheduling and Resource Planning.

I. Background

THE nature of construction projects in Dubai presents unusual conditions in which the consultant of the project has to think during each phase of design about the constructability of the project to ensure that it will be completed on time. The impractical of project period, overseas consultants, fast growth of projects development and the nature of project design are some factors pushed contractors project managers to adopt and practice the construction processes to avoid any delay for any project

Factors that contribute to project delays have been identified by many researches through several studies, e.g. the lack of experience of project manager of managing the project resources, the lack of designer's experience of identifying the project specifications that must complies with the project requirements. Reference [1] studied and analyzed the causes of delays in large building projects in Saudi Arabia and identified material related delays as the main cause of project delay. In traditional contract, it is the contractor responsibility is to build the project according to the contract documents with in an agreed duration (time), specific budget (cost), and quality standards. The project execution is managed and controlled by the contractor project manager along with experienced staff including nominated and domestic subcontractors team. Many project managers in construction industry confirm that the inexperienced contractor team participates in project delays. [2] The construction industry around the globe faces almost the same problems such as bad workmanship, time delays and over cost. The contractor project manager should have enough experience in site management, resource scheduling and planning, cost control, and quality control to make him able to hand over the project on time without any delay. Reference [3] stated that a project may be delayed as a result of the direct action of major parties or some of their wrong actions if they participate in decision making. Lack of communication between projects parties may cause a major problem to the project completion. Reference [4] stated that in many cases some problems tend to emerge between owner client and a contractor as to whether or not the contractor is entitled to claim additional time and extra cost. Delay is the most common and costly problem encountered on construction project. Reference [5] identified the sources of delays caused by the client, the consultants, the contractors, sub-contractors. It means that the internal communication between the project parties is very poor. Reference [6] looked into the causes of delays and cost overruns in public high ways and building projects and found that there was very good arrangement between the professionals surveyed on those factors that could cause delay and cost overrun. Project stakeholders are still suffering from the impact of project delays in spite of the adopted applications, and techniques of construction management, project management implications and other different software's adopted by senior planners. Project completion dates regularly become extended because of projects managers who do not have the enough experience of sufficient site management and construction management. Lack of experience of construction managers whom they can't prepare the construction methodology in details might participate in project delays. It is important to recognize the cause of delays of the contractor to avoid any delay in completion date. Reference [7] stated that the main reasons of the project delays are the changes of the contract document, inadequate supervision, late agreement with the Sub-Contractors and insufficient labor. This can be reflected on the contractor performance which makes as in [8] saying that the

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main cause of construction delays is the project material, labor, equipment and financial factors which has not been estimated during the design. Determining, recognizing and identifying the various causes of the delay during the construction is the responsibility of the project manager to avoid any delay during the project time. The experts of construction management should investigate deeper to find other new techniques and implications to avoid delay during construction process.

II. Research Aims and Objectives

The study aims to determine the level of implications of construction management by project managers and its effect level on the completion date without delay. Some of these implications are effective site management, planning and programs, cost planning, operations, progress monitoring, site establishment, preparing the construction methodology, monitoring the plant and materials, supervision of work progress, quality assurance and control, health and safety, environment and the post contract review. In addition, it aims to identify the affect and the impact of the wrong implications and the necessary processes of construction management that should be adopted by the project manager. For each project there is a goals and objectives. Achievement of project objectives is one measure success. Project is a series of activities; it has a starting and completion date. Project manager sets up the construction timetable for the client and develop the construction methodology. He selects his experienced team and other subcontractors who will do some other works. Project manager provides and explain the necessary information for the team and other associated professionals with the project, he is responsible about coordinating and collaborating with the architects, engineers and specialists for many issues relates to project. Duties and responsibilities of contractor project manager can be obtained from tutorial resources of construction management. Questionnaire survey, interviews and study findings is used as a sign to encourage the contractor project manager to adopt processes and techniques of construction management to mitigate the determined factors of project delays. Other type of common problems in construction projects environment is the internal communication of the manpower on daily basis during the working time, it is due to their different cultural backgrounds and different languages. [9] Mentioned that the most suitable definition of culture is entire heritage of a society transmitted by word, traditions and literature. It includes all habits, religion and language. Due to the different cultural backgrounds of projects managers, they have different behaviors, beliefs, attitudes and values, this reflect there behaves in managing projects. In design-build contracts, the architects, design managers and construction manager should know how to communicate with other stakeholders of the project such as the client, their representative's and local authorities who are coming from different cultures. Project manager must also understand how to keep and maintain the communication skills, leadership skills, interpersonal skills, flexibility, and the technological skills to overcome all the problems during the work progress of the project. [10] Confirmed that a very large range of parties involved in construction projects has to be properly controlled.

III. Dubai Working Environment

Traditional types of contract are the most familiar used types in Dubai where client, consultant and contractor are the key players in the project. The selected main contractor responsibility is to implement and build what has been designed and specified. The essential feature of traditional type of contract is that the contractor should build what is identified and specified in the contract documents. The contractor project manager is responsible about verifications of the contract documents and he has to report to the tender department about all discrepancies in the documents. This should reduce the level of financial penalties due to any claims that might be submitted against the client or consultant due to these discrepancies.

Some delays could be better controlled or avoided by the project manager who coordinate and schedule the project resources, prepare an effective program, maintain an effective dialogue of communication and monitor the work progress in terms of controlling time, cost and quality. Other project managers who have lack of experience in construction management might delay the project especially if they don't have enough experience in interpretation of contractual issues. [11] stated that due to the lack of experience in contract terminologies and wrong interpretation of contract terms by both the consultant engineer and the contractor project manager and due to the lack of information's in the condition of contract of traditional type, the project will never be completed and handed over on time.

In conventional contracts, the contractor's responsibility is to build the project according to the contract documents within the specified budget, agreed time and the specified quality standards. The execution of the contract is administrated by the contractor project manager who should have the qualified team, and the committed domestic subcontractors. Submittal and approval process of the project materials requires continuous and regular coordination by the project team to expedite purchasing the project materials. [12] Confirmed that other causes of delay are attributed to inappropriate management of project materials due to the lack of experience of the detailed model of project controlled materials process. The site supervision activity is one of the important responsibilities of the project manager and any lack of experience about the stated responsibilities will cause major contractual conflicts with the other parties of the project that may cause major delay. Efficiency and performance of the contractors must be monitored by the consultant office to make sure the work progress of the project is always within the approved schedule.

IV. Principles Contractors Responsibilities on Project/ Site

The main contractor is fully responsible about all activities in construction projects. Contracting firm's assign qualified project managers who can take the full responsibility about the project. Some of these responsibilities are liaison with the client and consultant, checking all drawings, details, specifications, determining the work methodology, sequence of work activities, operation, and maintenance of plants and equipment and the administrative works on the site. implications and techniques of project management and construction management skills must be adopted to administer the project activities and resources. [13] Confirmed that even though the construction industry is a very technical oriented industry, the project manager communication, team, leadership, and stakeholder management that have been identified as the human factors contribute to success factor of Malaysian construction project.

Contractor project manager must have enough contractual experience by having enough information and knowledge of contractual statements and conditions of contracts, mainly common conditions used in the "Red book" – Conditions of Contract for Construction for building and engineering works. First edition, 1999 and Conditions of Contract for Plant and Design-Build. The new yellow book 1999.

V. Principles of Construction Management

Resources scheduling, project planning and control processes are some of the important tools that project managers should adopt before they start the work. preparing the construction methodology by project manager and executing it is more efficient than starting the work immediately without planning for any projects. Executive's managers and project managers must do things correctly to minimize the possible potential risks, and they have to specify the project requirements in terms of time, cost and quality. The organization must have processes for evaluating and prioritizing projects to enable them identify the required resources based on priorities related to the time, cost and quality of the project. The project managers must know how to do project planning which should comply with the criteria based on the identified technical specifications. Many project managers fail to meet project deadlines due to lack of information about process of managing construction projects. Many questions relate to the work progress from technical, legal, contractual and financial side must be raised and discussed by all participants during the project regular meetings to avoid any conflicts. In addition, preparing the construction methodology of the project is a part of the contractor and construction project manager responsibility.

VI. Design of Questionnaires Survey and Data Collection

Questionnaire is developed and prepared to gather data information for answering the research questions. The questionnaire comprises of questions alert on level of adopting processes and techniques of construction management that support the work progress of the project as shown in Table I. The questionnaires designed based on the scale of the listed nine essential points that ranges from the point of view of participants.

1) Effective and efficient site management
2) Planning and programs
3) Operations and cost analysis
4) Site establishment and constructability
5) Managing plants and materials
6) Monitoring the progress and project control
7) Analysis of all potential risks
8) Health, safety and environmental regulations
9) Quality assurance and control

TABLE I
Process of Construction Management

S.no	Question/ Process	Validity	Mean	Rendering	Standard deviation
1	Effective and efficient site management	100	2.55	42%	1.993
2	Planning and programs	100	2.43	38%	1.57
3	Operations and cost analysis	100	4.62	54%	2.67
4	Site establishment & constructability	100	3.94	51%	2.54
5	Managing plants and materials	100	2.37	39%	1.63
6	Monitoring the progress and project control	100	4.78	56%	2.87
7	Analysis of all potential risks	100	3.88	48%	1.66
8	Health, safety &environmental regulations	100	2.54	41%	1.901
9	Quality assurance and control	100	2.45	39%	1.601

The survey of questionnaire is conducted to evaluate the perceptions of contractor's projects managers to construction management techniques. The survey is designed based on nine important subjects obtained through an extensive literature review of the same subject. Participants invited to point out the level of importance of each process.

VII. Analysis of Collected Data and Findings

The aim of this part is to act upon the analysis of the responses rendered through the questionnaire. The analysis of the data collected through questionnaire is incorporated based on regression analysis founded among the relationship of the variables and the calculated frequencies to provide the point of view of participants responded to each particular question.

The aim of the results analysis is to evaluate the collected regarding the study of the effect of the awareness of applications of construction management by project managers in construction industry. Questions developed and distributed to project managers who work in contracting companies and have enough experience in different kinds of construction projects. Questions are listed in Table I. The feedback shows that participants are interested in using the implications of construction management. They confirmed that the applications are very useful and helpful tools to deliver

projects on time. 26% of the respondents stated that small projects can be delivered on time through limited applications because projects are very limited and can be easily monitored and controlled by the project manager. Regarding the effective and efficiency site management, the value of standard deviation is 1.993 means the variables are notably increase across the mean 2.55. As rendered based on Table I that 42% are implementing the process of project site management preparations. Planning and programming is one of the main responsibilities of project managers as listed in Table I, value of standard deviation is 1.570 shows that results are greatly spread across the mean value of 2.43, which suggests that around 38% of the respondents devoted themselves to this task during mobilization phase of the project. The standard value deviation of operation and cost analysis is 2.67, shows that the results spreading across the mean value of 4.62 as shown in Table I, where 54% of the respondents stated this activity is one of the most important activities to control projects during the phase of construction. Regarding the site establishment and constructability of project, the results are range across the mean of 3.94 as shown in Table I, standard deviation of this activity is 2.54. It is found that 51% of respondents agreed that preparing the plan of site establishment and method of project construction is essential task for project managers that he must prepare once the project is started. The means of the activity of managing plants and materials is 2.37 and the standard deviation is 1.63 indicates that 39% of the participants prefer to assign operation engineers who should be fully responsible about managing materials and equipment's during the project construction progress. Proper records and data analysis about the status of project materials and equipment should be submitted to the project manager in regular weekly reports. Monitoring progress and project control is very important task approved. It is adopted by all project managers as confirmed by 56% of respondents. Its standard deviation is 2.87 for the mean of 4.78. Regarding the analysis of potential problems, standard deviation value is 1.66 which means the variables are notably increase across the mean 3.88. 42% of respondents are preparing the risk assessment plans for each main work activity during the construction phase of the project. Between 39% to 41% of respondents stated that health, safety, environment plans and QA/QC plans are important activities that should not be ignored or neglected. These activities have to be regularly monitored and controlled by the project team. Means values of both activities are 2.54 and 2.45 as indicated in Table I. [14] stated that successful project delivery requires concentrated effort by the project team to carry out the various project activities

VIII. Conclusion

Project manager in construction industry should focus on construction management system that covers many activities in contracting organization when they undertake construction project. It is important to understand the applicable key management functions and processes throughout the site works of the construction project by considering the principles that impact the management functions of construction management. The processes of construction management should be very clear and understood by all assigned projects managers. The contractor project manager should be fully aware about the objectives of the construction company that he belongs to. Technical and managerial knowledge of construction management is essential thing to help the project manager improve his experience to deliver projects on time.

Project manager must prepare in advance the construction method of each work package of main work activities of project to enable him monitor and control the working process. Reading and understanding the project general and particular conditions of the contracts in conjunction with drawings, specifications and bill of quantities reduce level of contractual claims and disputes with any of the project participants. [15] It is important that general management keeps track of the project's progress to reduce the possibility of delay occurrence or identify it at early stages.

Project manager must classify the components of project that comes under his responsibility in details. He has to schedule and plan human and non-human resources that he needs during the phases of construction to eliminate factors that may cause any delay. Project finance is another important factor that project manager must consider during the cash flow preparation. The follow-up of irregular payments of the approved monthly payment certificates of the executed work is one of significant issues that have to be considered.

Evaluating the profile, experience, capabilities of the nominated subcontractors for any specific work in the project is necessary where conditions of the sub-contract agreement must be carefully reviewed for continuing effectiveness of the work progress.

Developing systematic process for spreading the awareness of benefits of learned lessons and knowledge management that add good value for the adopted system of construction management in the project, it is a part of the communication process that project manager has to focus on. [16] Numerous research efforts have focused on applications of knowledge management in construction that used to find out how explicit knowledge are captured, stored, shared, and used in forthcoming projects, as well as to identify major drivers and barriers in knowledge management. Effective knowledge management work in construction projects requires support and communication tools among project managers and site engineers

Process of implementing the construction management system depends on major planning, staffing, and scheduling, monitoring and regular updating through a systematic documentation and communication plan approved by the project manager. Project managers should be familiars in preparing the outline the contractual and technical obligations in details and formulating an executable work sequence based on planning and programming process to mitigate any potential problem or conflict that might arise during the work progress. Failing to practice the contractual obligations by the project manager may become major delay factor to the project itself. [17] Confirmed that the common issues and problems associated with construction process lie in the ill-considered

procurement selection, traditional separation of design from construction, poor communication channels, uncertainties in design and construction, changing internal and external environment, project complexity and characteristics, as well as contractual and commercial matters.

IX. Recommendation

Behind the success of any construction project is the effective site management of the works by the principle contracting organization. Construction management process provides best practices and guidelines to the key concepts, principles, and implications which influence management functions and the process carried. Construction does not only mean physical work or site activities involving materials, men and machinery but also covers the whole scope of each work activity from the commencement date of the project till completion. Thus, management of human and non-human resources such as materials, man-power and machinery requires operative, real and effective planning and resource scheduling of each activity. The contractor project manager must dedicate additional time and efforts to maintain all necessary activities based on a comprehensive understanding the objectives of construction management. Project managers should be fully familiar about the processes of construction management that maintains the quality of the workmanship, delivering the project within time, cost and quality. One of the main responsibilities of the contractor project manager is preparing the work organization structure based on the analyzed work breakdown structure. This depends upon the experience of the project manager in planning, scheduling, organizing, staffing, directing and controlling the project resources and the work progress. The Contractor's Project Manager needs to understand the characteristics of the project and technical difficulties in order to deal with many issues to make him successfully delivering the project on time without any delay. Construction management offers and provides rank for best utilization of all project resources. It results in delivering any construction project with correct use of available resources.

References

[1] Assaf, S.A. and Mohammed A.H. "Causes of Delay in Large Building Construction Project" *Journal of Construction Engineering & Management* Vol. 2, Issue No.11, Page 45-62 1995
[2] Harrington, J., & Voehl, F. (2012). Applying TQM to the construction Industry. *The TQM Journal, 24*(4), 352-362.
[3] Bramble, B.B. "*Construction Delay Claims"* Engineering and Project Management Vol. 132, No.07, Page 667-685, 1992
[4] Murali Sambasivan, Y.W.S., Causes and effects of delays in Malaysian construction industry, in International Journal of Project Management. 2007. P. 517-526
[5] Ajibade A. and Henry A. "Construction Delays and their Causative Factors in Nigeria" *Journal of Construction Engineering and Project Management* Vol. 132, No.07, Page 667-685, 2006
[6] Mansfield N.R.; Ugwuo O.O. & Doran T. "Causes of Delay & Cost Overruns in Nigerian Construction Projects" *Journal of Construction Engineering & Management* Vol. 13, No.04, Page 254-260. 1994
[7] Scott S., "Delay Claims in U.K. Contracts" *Journal of Construction Engineering & Management* Vol. 123, Issue 03,
[8] Hensey M." Essential Tools of Total Quality Management" *Journal of Construction Engineering & Management* Vol. 9 Issue 4 Page 329-339. 199
[9] Hofstede G. "Impact of Culture" *Hand Book School of Engineering & Technology* University of Glamorgan, Glamorgan, U.K., 1991
[10] Semple C; Edwin H.; Ann T., "Contract Strategy for Design Management in the Design & Build System", International Journal of Project Management, 23 (2005) 630-639 P. Published by E1 Sevier Ltd, U.K, 2005
[11] Anderson W. "*Contract Procedure"* University of Glamorgan School of Technology Published by Glamorgan, Wales, UK 1997
[12] Naief M., "A Comparative Evaluation of Construction and Manufacturing Material Management" *International PhD Journal of project management* Vol. 20, Page 263-267, 2002
[13] W. A. W. Maimun, Critical Factors In Project Success: A Study ff Public Sector Construction Projects In Malaysia, PhD Thesis, and University. Malaya, Kuala Lumpur, May 2010.
[14] E. Muneera, A. Anuar, and A. S. Zulkiflee Preparing Project Managers to Achieve Project World Academy of Science, Engineering and Technology Vol:7 2013-02-20 Success International Scholarly and Scientific Research & Innovation 7(2) 2013 P. 294-299
[15] Tumi, S.A.H., H. Omran, and A.H.K. Pakir, Cause Of Delay In Construction Industry In Libya, in The International Conference on Administration and Business. 2009: University of Bucharest, Romania
[16] S. Kivrak, G. Arslan, I. Dikmen and M. Birgonul, "Capturing Knowledge in Construction Projects: Knowledge Platform for Contractors," Journal of Management in Engineering, vol. 24, no. 2, pp. 87-95, 2008
[17] H.T.Ong, "Effective Project Management - Essential Elements for Successful Projects", in 2007 Proc. Of The Inaugural Construction Conference, Singapore.

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