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Evaluation Planning and Scheduling of Repetitive Construction Projects in Iraq

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Abstract: ***The main goals of any successful construction project management system(s) are to complete the project on time, within the planned budget, and with the required quality limits. The three goals are inter-related where each of them is affecting, and being affected by, the others. In order to meet the time deadline of a project, an accurate scheduling should be sought. Due to the unique nature of construction projects, time contingency and project uncertainty are essential for accurate scheduling, which should be flexible enough to accommodate changes without negatively affecting the overall duration of the project Planning and scheduling is important in any construction project. Without proper that , many problems will occur such as extension of time or time overrun, exceeded the specified cost . Some of the researchers describe time and cost overrun as the most general problem in construction industry worldwide . Time overrun occur when the actual progress of a construction project is slower than the planned schedule. Cost or time overrun will affect all parties involved in the project. It will affect the profits which would be obtained if the project can be completed on the schedule. But due to that contractors had to spend more money on labor, plant and may lose the opportunity to get the next project. Hence, effective planning and scheduling management is very important and crucial to achieve successful completion of construction projects. Implementation in the best possible time depends primarily on the contractor experience and dash and motivate and financial position in contract..This is accompanied by many different factors that affect with most contractors owing the limited expertise and limited management and rush to implement in the best time and cost , that depends on the contract state ,planning , scheduling , control . Repetitive planning and scheduling methods are more effective than traditional critical path methods in the planning and scheduling of repetitive construction projects. Nevertheless, almost all the repetitive scheduling methods developed so far have been based on the premise that a repetitive project is comprised of many identical production units. In light of this requires the building conceptual model to planning and scheduling is a positive factor in all phases of the projects after studying the impact of various factors on that process for the most important party in projects (contractor) and define standards.***

Keywords:

1. Introduction

Repetitive construction projects are quite common in the construction industry, and may be divided into two categories [1]: (1) projects that are repetitive due to a uniform repetition of a unit work throughout projects (multiple similar houses, high rise building); (2) projects that are repetitive due to their geometrical layout (highways, tunnels, pipelines).

Repetitive construction projects often require resources (e.g., crews) to perform the same work in various units (locations, segments) by moving from one unit to the next unit in the project [2]. Because of this frequent resource movement, an effective schedule is important to ensure the uninterrupted usage of resources of repetitive activities between units [3]. However, a strict application of maintaining crew work continuity may lead to a longer overall project duration. Selinger [4].

Planning and scheduling are challenging processes that are needed to determine and arrange the project work packages considering the requirements of various parties and the imposed work constraints. While several commercial scheduling software tools exist in practice, however, they contain a limited set of basic features such as resource allocation and leveling, yet provide little support for examining alternative plans and do not optimize the schedule to account for project constraints. At the academic front also, several efforts have provided schedule optimization models that handle some constraints on small-scale case studies of preplanned activities. Yet, these models do not consider the dynamic nature of project constraints throughout the project lifecycle [5].

2. Strategic Planning: A Process Perspective

The lack of emphasis on strategic planning in construction relative to other sectors has been established by many scholars[7]. As a project-based industry, greater focus has traditionally been expended upon shorter-term, operational and tactical planning to execute projects [8] Often, strategic planning process may be unstructured, non-routine, non-repetitive, and more complex than operational planning[9] Recently, Soetanto et al. (2007) conducted a questionnaire survey of construction directors and managers to explore current strategic planning practices in construction organisations in the UK. The findings indicate that strategic planning is an informal process relying on personal experience and intuition. For some, planning longer-term seems difficult given the way construction order is made. This confirms the belief that construction is dynamic, highly turbulent, rapidly changing industry and therefore a low level of strategic planning [10].

Elbanna (2006) argued that strategic planning is characterised by a combination of rational, political and intuition synthesis. The interplay between these will exert significantly influence upon the perception of strategic issues,

uncertainties and risks, and communication of this perception amongst organisation members in the formation of strategy . In sum, the practice of making strategy has little resemblance to the „strategic planning" as a formal, purely rational and structured process, but more of a process of „strategic thinking" within the mind of organisation members. The manner by which organisation members perceive the future (and its associated uncertainties and risks) and mobilise this perceptive thinking (specifically, in terms of cognition and intuition) in the formulation of strategy is indeed little understood. The literature has also suggested that managers rely heavily on intuition in corporate strategic thinking, which is characterised by high degree of uncertainty and ambiguity [11]. Further, there seems to be little belief upon the merit of engaging and mobilising human capitals in strategic thinking. Implementing strategy requires a great deal of support and commitment from organisational members who will be affected (either negatively or positively). It is therefore critical that members of the organisation are involved in the strategic process. Review of individual and group perception of uncertainty and risk are described as follows.

3. Uncertainty, Risk and Opportunity

Discourse about the future and uncertainty is commonly associated with risk [12]. Risk can be taken to mean an uncertainty that influence the achievement of objectives[13]. The term „risk" is often associated with adversity or threats to an entity. Although there are conflicting views upon the definition of risk and what constitutes risk in risk management literature, some scholar have realised the need to treat opportunities (the up-side of risk) in an equal footing as threats (the down-side of risk). The reason is simply that threat and opportunity are seldom independent [14], and an event may be a threat and at the same time opportunity for an entity or different parts of an entity

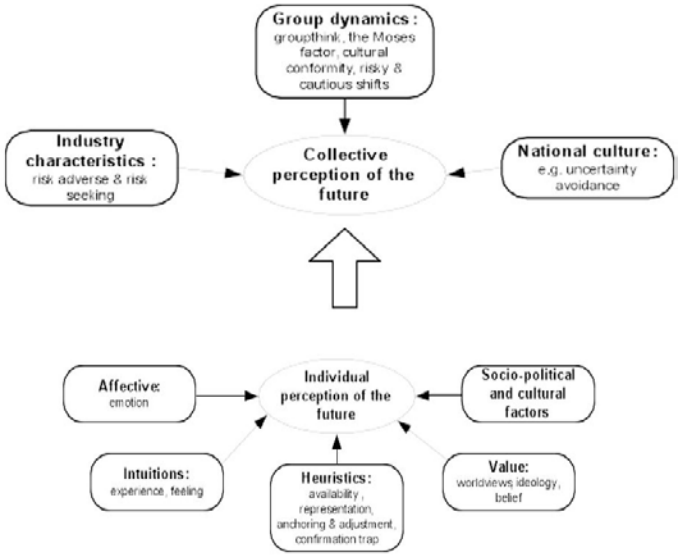


Figure 1: A conceptual model of factors influencing individual and collective perceptions of the future [15]

In sum, the model has illuminated a number of factors that may influence individual and collective"s perception of the future. Investigation of how these factors work in practice should be conducted in such a manner which appreciates interplay between these factors with other essential aspects of strategic thinking in a real organisational context. The following section presents the proposed framework, which is aimed to enhancing the capacity and capability of construction organisations for thinking about the future.
Towards an activity framework for improving strategic planning process

4. The Purpose of the Study or a Statement of the Problems

We can identify research objectives as follows:

1) Definition of the concept of repetitive construction projects to highlight the advantages and standards of design and implementation phases
2) Study the factors affecting to implementation of the project through its various stages from the viewpoint of the contractor
3) determine the effect level on implementation limitations for the factor effecting in planning and scheduling processes
4) determine the economic impact of the project
5) Build a conceptual model to planning and scheduling in repetitive projects
6) Building software program administrator recommends scientific and practical and works to use best time in project or reduce it
7) Set of conclusions and recommendations and suggestions on the subject.to lead the contractor to good implementation for the projects.

5. The Research Methodology

Research methodology is based on the conduct theoretical and practical studies to reach the desired goals of the research in theoretical study in local studies and international studies, research and scientific publications in this field, as well as to take advantage of international network services (the Internet), for the purpose of collecting information documented in the research referred Plan to this we will have **the second chapter** of theoretical study through previous studies and the reality of repetitive construction projects in the world, the region and the strategic planning and scheduling for all phases , and other , planning types and scheduling for this building , control ,constraints and factors affecting the implementation of projects and ways to solve the problems.

The third chapter is practical study on conducting field research through data collection and documentation of scientific cases tuition taken and then a field survey to assess the reality of the current situation and the development of the power contained therein points and getting rid of the weaknesses of this phenomenon, and in the light of this, will build conceptual model required, finally, a set of conclusions and recommendations required to overcome the direct subject

6. Data Collection and Analysis

The analysis of the factors and its importance done by using (Microsoft Minitab /SPSS statically program), using the

resulting information in building the mathematical model and software to improve the construction industry in Iraq. Extract the weights of success factors and criteria for success deduced from questionnaire survey which is built on a proposal system to check and improve the project state at its different life cycle. The Flowchart in fig (2) shows the stages of the field study:

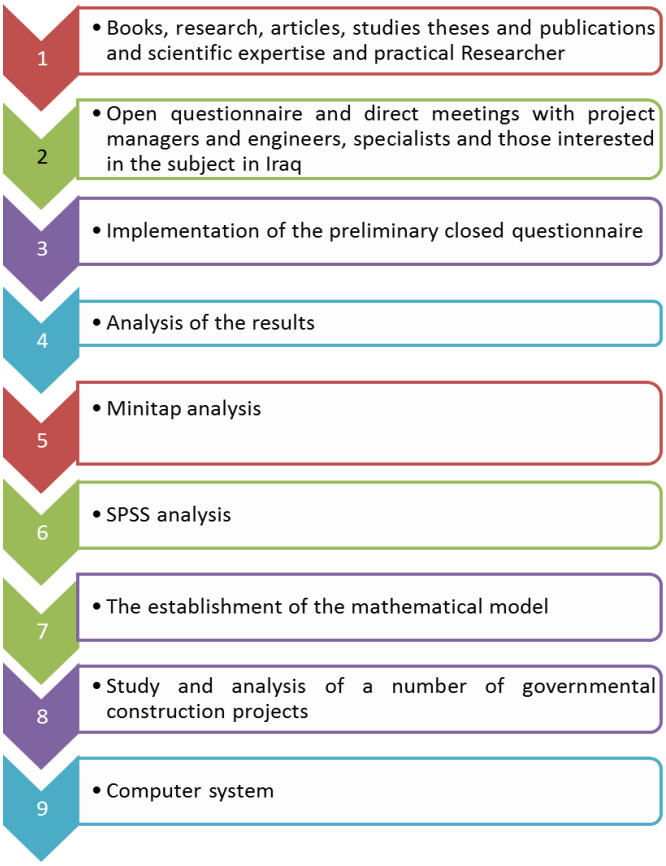
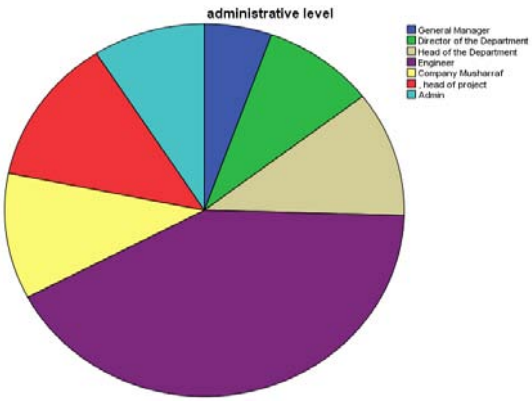


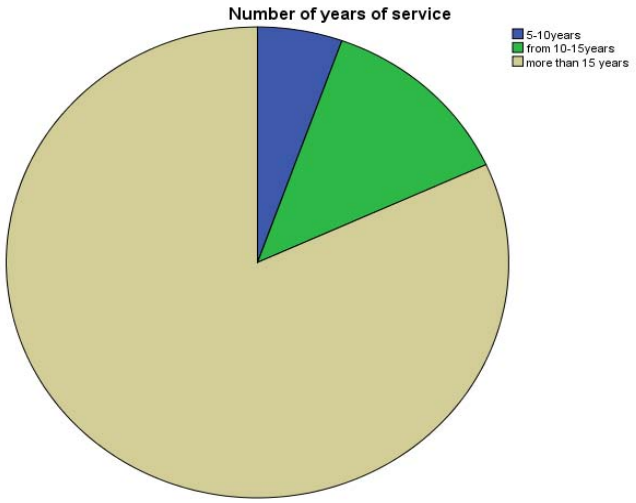
Figure 2: Flowchart shows the stages of the field study to search

In this chapter we will focus on all what is stated in the flowchart above, but case studies and software model and we will discuss them and we explained in later chapters.

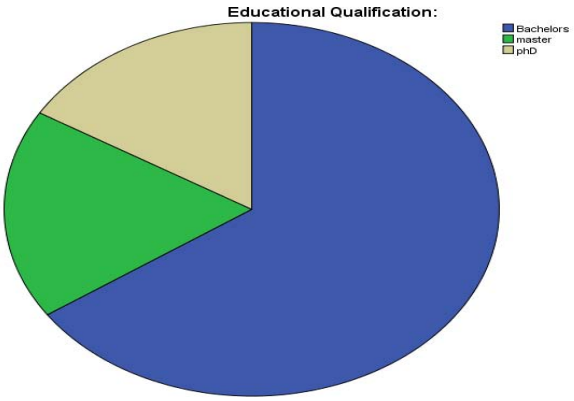
1) Field administrative level: fig (3) shows the distribution of the research sample administrative level of Percentages 100 % (55 total number):



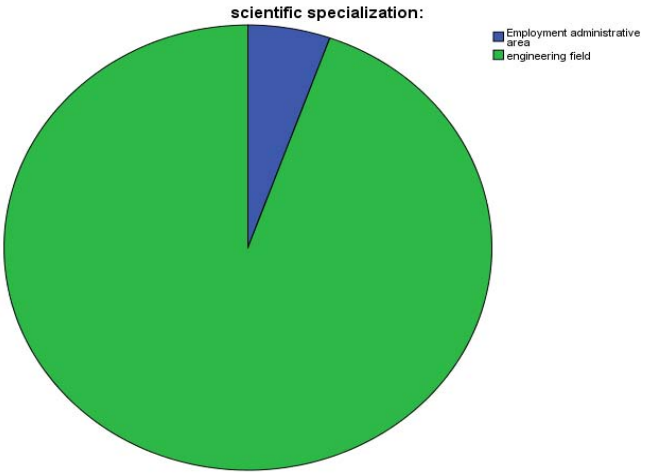
2) Field experience in engineering: fig (4) shows the distribution of the the research sample experience of Percentages 100 % (55 total umber):



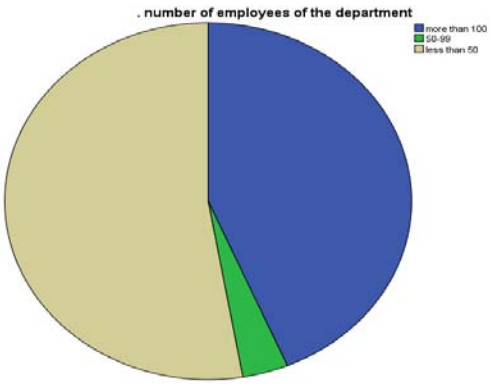
Educational attainment: We note from fig (5) below, which shows the educational attainment of the sample individuals that most of the sample of campaign bachelor's degree and is what exists in most of the service department's staff in Iraq, fig (4-4) shows the distribution of the sample of Percentages 100% (55 total number) :



Scientific expertise in the field of construction project management: most of the sample of specialty Civil Engineering with experience from the literature of construction projects and the rest of the sample administration may have either self-development or through training courses offered by the competent departments, fig (6) shows the distribution of the sample of Percentages 100% (55 total number)



Number of employees of the department: fig (7) shows the distribution of the research sample number of employees of the department of Percentages 100 % (55 total number



Before we start analyzing the data, we have to make sure of the honesty and reliability of the sample and the information in the form. Then show the the way in which extract Weights and importance of the factors and criteria based on the mean and standard deviation

7. Validity and Reliability

Validity: The validity one of the necessary conditions for building the tests, standards and honesty demonstrates the extent to measure the paragraphs of the phenomenon to be measured, and that the best way to measure honesty is the virtual honesty, which is to present the paragraphs of the scale on a group of experts to rule on its validity, was achieved sincerity ostensibly scale of through the presentation of paragraphs to a group of specialists in the field of construction project management as all the paragraphs and the factors and criteria listed in the questionnaire belong to the field .

Reliability Statistics

Cornbrash's Alpha	N of Items
.801	151

Reliability: a measure of consistency in the results as giving the same results after its application twice in two different time on individuals themselves, Stability was measured in two ways:

A. Pearson Correlation Coefficient: A Pearson correlation coefficient measures the strength and directions of the relationship between two quantitative variables. It ranges from -1 (perfect negative correlation) to +1 (perfect positive correlation). It is calculated by dividing the covariance of the variables by the square root of the product of their variance. Correlation is a measure of how two random variables X and Y "move" with respect to each other. Pearson‟s r is computed by:

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \sum (y - \bar{y})^2}}$$

The Pearson correlation coefficient between the scores of the two halves has reached lower value (0.719) and using the Spearman Brown equation corrective reached stability in this way coefficient (0.869), a high stability coefficient.

B -coefficient (alpha) for internal consistency: the Alpha coefficient provides us with a good grade in most situations and adopt this method on the consistency of the individual performance of a paragraph to another and extract stability according to this method was the use of all forms Search of (55) form, then used the equation (Alpha) has reached the stability of the scale factor (0.801) for the success criteria and (0.801) for the factors and the scale is internally consistent, because this equation reflects the consistency of paragraphs internally.

8. Mean and Standard Deviation

A) Mean : data collected from responses were analyzed using the means score , Where the factor or criteria that get A higher rate to be more importance than the rest of factors and criteria. Point scales were used to calculate the mean score for each response factor or criteria . The mean scores were then used to rank options in descending order or importance. The mean score for each factor or option was calculated by using the following formula (Siegel, 2005)(275):

$$Ms = \sum_{k=0}^{n} (X_1 * S_1 + X_2 * S_2 + X_3 * S_3 + \cdots X_n * S_n 3)/N$$

where
Ms = mean Score (1≤MS≤5) (Because we used the five scale, The larger rate whenever the larger significance, In other words, the relationship is a positive).

9. Standard Deviation Technique

The standard deviation (S) measures the amount of variation or dispersion from the mean .A low standard deviation indicates that the data points tend to be very close to the mean (also called expected value); a high standard deviation indicates that the data points are spread out over a large range of values. Calculation of the standard deviation(S) for respondents for each criterion is based on the following equation :

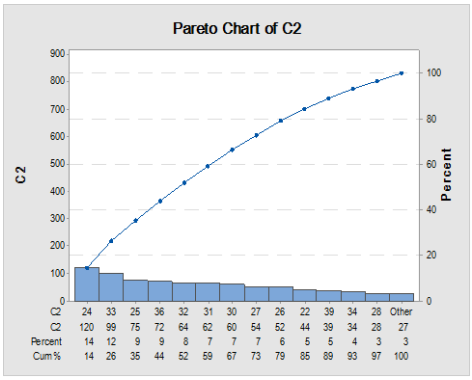
$$S = \sqrt{\sum_{k=0}^{n} (xi - x)^2 \ * \ fi \ / (\sum_{k=0}^{n} fi)}$$

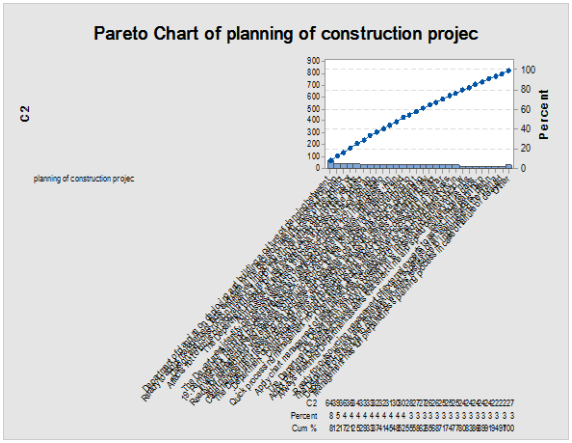
where
S = standard deviation
x= mean score
xi= degree of the criterion importance
fi= frequency , the calculation of mean and standard deviation using the ((Minitab /SPSS statically program)

The researcher found through the first stage that there are 11 workers , a positive impact has been applied in most of the projects, and also reached through the second stage that there are 12 positively affects the planning and programming of structural project. One of the main reasons that reached by the researcher that affect the planning and programming stage management is: are available at the construction management plan Asttratejah clear of the planning process and Ttaiwiramlah planning and have construction administration to prepare for re - planning process in the event of failure or delay work (where they get degrees accept 4.60, 4.49, and 4.38, respectively , and as a measure of leckart quintet).
Table (1-1) refer toRating factors by importance according to the Lakert Quintet standard weights were calculated by using the statistical program spss As well as using Minitab statistical significance is calculated by repents for the factors

80% planning of construction projects this axis aims to find out the criteria for recurrent projects and Planning Department solos

Factor	Weight	Rang	Frequency
1. Administrative factors affect the success of the project	4.6	Very agree	33
2. Political factors and Government instructions on project success	4.49	Agree	22
3. Operational factors affect the success of the project	4.38	Agree	26
4. Design and construction initiatives impacting on the success of the project	4.27	Agree	36
5. The Department is training of engineers and managers on programs and planning tools.	4.15	Agree	28
6. Ready to adopt management facts and data in the decision making process from project planning process	4.07	Agree	39
7. Care management measuring the progress of work for the purpose of monitoring and evaluation	4.07	Agree	30
Factor	**Weight**	**Rang**	**Frequency**
8. Affects not to focus on programming time for the surveillance and monitoring of progress of work in the project planning process project	4.05	Agree	36
9. Department of planning on deploying and building a culture of planning between the team members.	4.02	Agree	36
10. Administration provide effective communication activities between engineers, managers and planners.	3.93	Agree	33
11.Department of removing barriers and obstacles that could intercept a planning time programming application programmer.	3.89	Agree	30
12. The Department prepare for review and acceptance of the results.	3.89	Agree	27
13. Always Planning Department asserts that short time and speed delivery of its most important goals	3.87	Agree	34
14. Ready for management and reverse feedback received from engineers, managers, and accept good proposals and adopted.	3.87	Agree	24
15. Management has full preparedness planning process in case of failure or delayed or discovers the flaws in it.	3.84	Agree	31
16. Invite experts gaps.	3.80	Agree	16
17. The Department identify processes (activities) the basic planning that can be applied in the project.	3.78	Agree	21
18. The Department has clear strategic plan for the planning process	3.76	Agree	25
19. Permanently Planning Department seeks to develop and modernize the planning process and measure their success.	3.75	Agree	32
20. Department of planning on deploying and building a culture of planning between the team members	3.75	Agree	31
21. Apply chart management of new initiatives that have proven successful in similar projects.	3.75	Agree	25
22. The Department review and review skills and expertise of all team members, planning and evaluation	3.73	Agree	24
23. Quick processing management moved to the gaps and shortcomings in awalmarfh skills or expertise to plan.	3.73	Agree	26
24. Investment planning process affects site qualification process for implementation on project planning process	3.71	Agree	32
25. The Department is working on removing obstacles to innovation and creativity in planning.	3.69	Agree	25
26. Clear strategic planning department have for development planning	3.67	Agree	25
27. Adopt Planning Department reveal poor planning in its mission and Endeavour to work to fix that	3.58	Agree	27
28. Ready for outsourcing management of external experts to assist in the planning process.	3.55	Agree	24
29. Department of planning to persuade workers resistance to implementing the plan and vocabulary chart.	3.45	Neutral	22
30 affect focus more on operational plans for implementation of the project planning process project	3.42	Neutral	11





10. Conclusion

1) Through the study of projects and direct meetings with a number of heads of departments and data engineers, Show that there is a weakness and a clear imbalance in project management and in scientific knowledge in this area and lack of its practicality. Despite the significant benefits gained by any organization through the application of the principles and the basics of construction project management.
2) Search results also showed that there are factors that have an effective impact on the performance of projects, which require attention, planning and control in order to prevent the failure of projects
3) Repetitive projects in Iraq aimed through the study of the reality of the projects in various provinces to increase and improve the quality and uses optimization of the resources of the project

11. Recommendation

In order to get successful projects has to be attention to the following:

1) The use of the principles and the basics of project management construction in addition to the full knowledge of all the requirements.
2) Attention to training and development for all individuals working in governmental organizations.
3) Ensure existence of an efficient comprehensive administrative system for monitoring, follow-up and controlling of projects in addition to build an extensive and comprehensive database for all projects data.
4) Pay attention to the external circumstances surrounding project implementation to take advantage of the positive aspects and to prevent or minimize the negative effects on projects.
5) Attention to the feasibility studies in addition to the full identification of all project users' requirements in general and the project in particular.
6) Contracting with companies sober for design and engineering consulta

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