

EXTENDED ABSTRACT

Learning from Experience of Cost Imposed to Nemat-Abad Dam Project due to Construction Delay

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1. Introduction

In construction projects, a huge amount of daily data is created. However, such valuable data are not documented, analyzed and interpreted so that the construction community can learn from the experience of previous projects. Project experiences generally remain in the minds of the personnel, and when they leave the project, such a project experience is lost. This paper examines and analyzes the causes of the delay and their impact on the cost of the project in the construction of a dam project (Nemat-Abad dam) in Iran. This project with three different contracts and contractors has a great experience and valuable data. The extent and reasons for the delay are analyzed based on the involvement of project personnel in designed interviews. Lessons learned from failure in project planning and control are provided. The paper is for those who are interested in dam projects. Delay is known as one of the most important problems of the construction industry in Iran. Although there is advanced literature on delays in construction projects, little work has been conducted to address the impact of delays on dam projects. The term delay is used in this paper in the sense of Hosseinian (2016) to refer to the difference between the planned completion time and the actual completion time of the project. Identifying the causes of delay helps the project manager learn from the mistakes of previous projects.

2. Nemat- Abad dam

The Nemat-Abad dam is a soil reservoir and is located 43km west of Hamadan city and 12km northwest of Assadabad city. The purpose of this dam is to use the surface water flow to improve and develop irrigation in the agricultural lands of Asadabad plan to provide guaranteed agricultural water for the development of agricultural activities.

The design of the dam began in 2001, the first contractor was selected based on a public tender process, and construction of the dam began in 2004 with a contract price of 75,000 million Rials (Iranian currency). The height of the dam was 32 m, its length was 633 m, width was 8 m, and the volume of the reservoir was 18 Mm³. Four years later, the construction with 13 percent progress was suspended due to financial issues, and the first contract was terminated at the contractor request. Due to the effects of the continuous drought, the development of upstream and downstream uses, and the reduction of the river at the dam site, the reservoir volume was reduced to 8 Mm³. Accordingly, the dam was redesigned and its construction was awarded to another contractor with a contract price of 115,000 M Rials. Six years later due to financial difficulties, the second contract with 40 percent completion of the project was terminated. Then, due to the drought, the dam was redesigned again and the height of the dam was reduced to 22 m. The third contract was signed with another contractor with a contract price of 195,000 M Rials and now the project is almost completed. These

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data show that the project's cost and time overruns are, respectively, 118 times of planned cost and 260 times of planned time.

3. Methodology

The causes of the delay were identified based on a review of project documents and interviews with key project personnel. A questionnaire with 70 delayed project factors was then designed. In the next step, for the validity of the questionnaire, 10 experts were interviewed and the content validity ratio was calculated (Lawshe, 1975). 30 factors were selected as the main factors of delay. Among these 30 factors, 8 are related to the owner, 4 are related to consultants, 8 are related to contractors and 2 are related to other cases. The questionnaires were presented to the main personnel through face-to-face interviews and 42 interviews were conducted over four months. Kolmogorov-Smirnov, one-sample T, Freadman and one-way analysis of variance tests were conducted (Montgomery, 2012).

4. Research questions and hypothesis

The research questions are:

1. What factors related to the owner have caused the delay in the construction of the dam?
2. What factors related to the consultants have caused the delay in the construction of the dam?
3. What factors related to the contractors have caused the delay in the construction of the dam?
4. Have the laws and regulations delayed the construction of the dam?
5. Have other cases delayed the construction of the dam?

The research hypothesis is:

H_0 : There is no significant difference in the opinions of the participants in the research based on their field of activity regarding the delay in the construction of the dam.

H_1 : There is a significant difference in the opinions of the participants in the research based on their field of activity regarding the delay in the construction of the dam.

5. Results

The results show that:

1. Among the owner factors, "insufficient allocation of funds by the government during the project", "lack of reliable financial resources", "failure to allocate funds in a timely manner to the cold provinces" and "delay in payment of contractor claims due to lack of annual allocated funds" were significant in delaying the construction of Nemat-Abad Dam.
2. Among the consultant factors, "designing inappropriate criteria for selecting the contractors" was the only significant factor that has delayed the construction of the Nemat-Abad dam.
3. Among the factors related to the contractors, "lack of proper pricing for contractors to win the tender and to offer a wrong price", "inadequacy of machinery and facilities related to the work requirements and poor repair and maintenance of machinery and equipment", "postponement of the project due to the delay in payments from the owner" and "financial difficulties of contractors" were significant in delaying the construction of Nemat-Abad Dam.
4. Regarding the laws and regulations, "the incompatibility of the government price list with the real costs", "the selection of a contractor with the lowest bid price" and "low adjustment indicators to increase costs during construction due to inflation" were significant in delaying the construction of Nemat-Abad dam.

6. Conclusions

It can be concluded that the cause of the problems of delays in construction projects in Iran is mainly related to the government and the laws. Perhaps revising current policies and amending existing laws will help reduce the problem of delay.

7. References

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