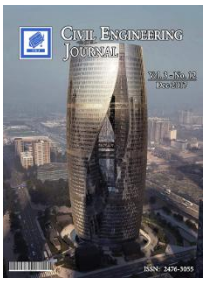
Available online at www.CivileJournal.org

Civil Engineering Journal

Vol. 3, No. 12, December, 2017



Modeling the Completion Time of Public School Building Projects Using Neural Networks

Zeyad S. M. Khaled [a*], Raid S. Abid Ali [b], Musaab Falih Hasan [c]

[a] *Assistant Professor, Department of Civil Engineering, College of Engineering, Al-Nahrian University, Baghdad, Iraq.*

[b] *Assistant Professor, Department of Building and Construction Engineering, University of Technology, Baghdad, Iraq.*

[c] *MSc. Eng., General Directorate of Education Baghdad Rusafa First, Ministry of Education, Iraq.*

Received 02 November 2017; Accepted 20 December 2017

Abstract

The Ministry of Education in Iraq is confronting a colossal deficiency in school buildings while stakeholders of government funded school buildings projects are experiencing the ill effects of extreme delays caused by many reasons. Those stakeholders are particularly worried to know ahead of time (at contract assignment) the expected completion time of any new school building project. As indicated by a previous research conducted by the authors, taking into account the opinions of Iraqi experts involved with government funded school building projects, nine major causes of delay in school building projects were affirmed through a questionnaire survey specifically are; the contractor's financial status, delay in interim payments, change orders, the contractor rank, work stoppages, the contract value, experience of the supervising engineers, the contract duration and delay penalty. In this research, two prediction models (A and B) were produced to help the concerned decision makers to foresee the expected completion time of typically designed school building projects having (12) and (18) classes separately. The ANN multi-layer feed forward with back-propagation algorithm was utilized to build up the mathematical equations. The created prediction equations demonstrated a high degree of average accuracy of (96.43%) and (96.79%) for schools having (12) and (18) classes, with (R^2) for both ANN models of (79.60%) and (85.30%) respectively. It was found that the most influential parameters of both models were the ratio of the sum of work stoppages to the contract duration, the ratio of contractor's financial status to the contract value, the ratio of delay penalty to the total value of contract and the ratio of mean interim payments duration to the contract duration.

Keywords: Construction Delay; Artificial Neural Networks; School Projects.

1. Introduction

Nowadays, all types of construction projects in Iraq are experiencing delay for some common causes like ill security, and other particular ones related to each project circumstances. A standout amongst the most imperative types of construction projects in Iraq is government funded school building projects. As indicated by the yearly statistics issued by the Ministry of Education, there are (2716) existing schools in Iraq till (2012). Around (1431) of them are utilized by more than one school with double or triple time of inhabitance (MOEDU) [1]. Furthermore, the Synopsis of National Development Plan (2013-2017) expressed that Iraq need to build (7220) kindergartens, (2250) primary schools and (791) secondary schools, keeping in mind the end goal to take care of the issue of double and triple time of inhabitance, replace mud schools and to take care of future demand because of the population natural growth which is around (3.3%) yearly (MOP) [2].

* Corresponding author: zeyadsmkhalid@yahoo.com

http://dx.doi.org/10.28991/cej-030956