Analysing the factors affecting delays in UAE Road Construction

Abstract

Construction delay is considered one of the most recurring problems in the construction industry. Delays have an adverse impact on project success in terms of time, cost, quality and safety. The effects of construction delays are not confined to the construction industry only, but influence the overall economy of a country like UAE, where construction plays a major role in its development and contributes 14% to the GDP. Thus, it is essential to define the most significant causes of delay in order to avoid or minimise their impact on construction projects. A detailed questionnaire was developed and used to get input from professionals associated with the UAE construction industry. The perspective of contractors and consultants has been analysed to rank the causes of delays based on their Relative Importance Index. Contractors and consultants were in agreement on the most significant causes of delays. The research revealed that 50% of the construction projects in UAE encounter delays and are not completed on time. The top 10 most significant causes of construction delays have been identified by this research. Poor productivity , payment from the Owner   is done late ,inadequate early planning and slowness of the owners' decision-making process are the top causes of delay in the UAE construction industry.

Road Construction projects are generally completed late nearly in all countries. This comes at an economic cost. There is a great need to think about this problem and analyze the factors that lead to road construction delays - so that these factors can be minimised. In this report, we attempt to do so while also analyzing the crucial factors among the given factors.

We have identified 44 Factors divided into 9 major categories which are as follows:

Category 1: Materials

Category 2: Labor and Equipment

Category 3: Financing

Category 4: Design and Documentation

Category 5: Management and Organization

Category 6: Schedule

Category 7: Contractual issues

Category 8: Scope of work

Category 9: External issues

Introduction

We all know that the Road Construction work for any Country acts as an Engine of Growth for the economy. because it needs large number of employees and engineers. Construction is the second largest economic activity after agriculture. Contribution of the industry in terms of employment is also significant . This research focuses on the analysis of factors affecting road construction delays in UAE. There is a strong need to understand the attributes that cause the delays, understand the impact of these attributes, combine them into factors. The primary objectives of this research are to identify the various attributes for Road construction delay, to identify the relationship between these attributes by statistical methods and to predict the impact of these identified attributes on Road construction delay using a regression.

Literature Review

Generally we here the two main reason of the delay in construction first the listed above Attribute or lack of Design thinking because some project start but they don't have an Idea or Strategy that need for the completion of the project.The first stream of literature focusing on delay attributes and factors which is more relevant to this research is reviewed below.From the above-selected literature review, it has been apparent that in

most studies, priority has been given to identifying the critical causes based on perceptions of different parties in construction. However, quantification of the dependencies of one factor over others have not found widespread coverage.
For instance, steps are taken to control a critical reason might trigger a situation where other factor becomes critical and cause even more delay than earlier anticipated.
Hence it is important to identify the relationship between various factors of delay.Work is yet to be done in identifying the relationship between the various reasons for the delay and also the prediction of impact on that delay. There we use the Spearman correlation to find the relationship between the Crucial Attribute given above.

Methodology: Research Methodology

First we find the severity index of all Factors using formula
Severity Index = summation of AiNi/5*Ni*100
Frequency Index = BiNi/5*Ni*100
Importance = severity index * Frequency Index

We listed the 44 Attribute and analyze the crucial Attribute among these Attribute
Listed Attribute are following:-
we find the severity index, Frequency index, and Importance Index, of three states of the UAI Country these state, are Abu Dhabi, Dubai, and Sharjah and after that we severity index, Frequency Index, and Importance Index of Overall UAI
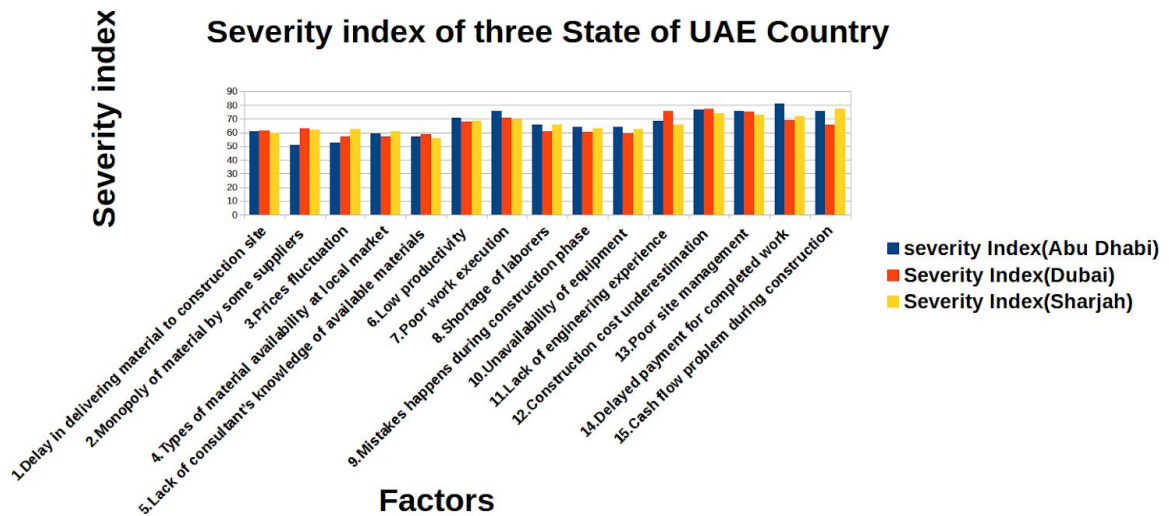
44 Attribute are as follows ;-

1.Delay in delivering material to the construction site
2.The monopoly of material by some suppliers
3.Prices fluctuation
4.Types of material available at the local market
5.Lack of consultant's knowledge of available materials
6.Low productivity
7.Poor work execution
8.Shortage of laborers
9.Mistakes happen during the construction phase
10.Unavailability of equipment

11.Lack of engineering experience

12.Construction cost underestimation

13.Poor site management

14.Delayed payment for completed work

15.Cash flow problem during construction

16.The high rate of interest

17.Contractor's financial difficulties

18.Increase in salaries of skilled laborers

19.Change design

20.Errors and omission in design

21.Incomplete design drawings and specifications at tendering stage

22.Delay in preparation and approval of drawing

23.Inaccurate quantity take-off

24.Long period from the planning of the project to construction

25.Delays in issuing information to the contractor during the construction stage

26.No practical use of earned value management system

27.Lack of cost planning/monitoring during pre and post contract stage

28.Poor communication between client, consultant, and contractor

29.Insufficient coordination between local authority who is responsible for road projects and service authorities

30.Delays in decisions making by the approval authorities

31.Change schedule

32.Stoppages because of work being rejected by consultant

33.Lowest bid price

34.Insufficient time for preparation of contract documents

35.Discrepancies in contract documents

36.Underestimation of time for completion of the project

37.Extension of time with cost claims

38.Scope and specification changes

39.Changes in client requirements

40.The frequency of variation orders and additional works

41.Rework due to an error in execution

42.Weather conditions

43.Accidents during construction

44.Delay in getting NOCs from different government authorities

First we find the 15 Factor 's   severity index of the three state of the UAE country and find some results as there are the 44 Attribute we rank the Attribute on the basis of severity index on the basis of severity index   30 .Delays in decisions making by the approval authorities Attribute have highest severity index. In 15 Attribute 12.Construction cost underestimation is the highest Attribute .
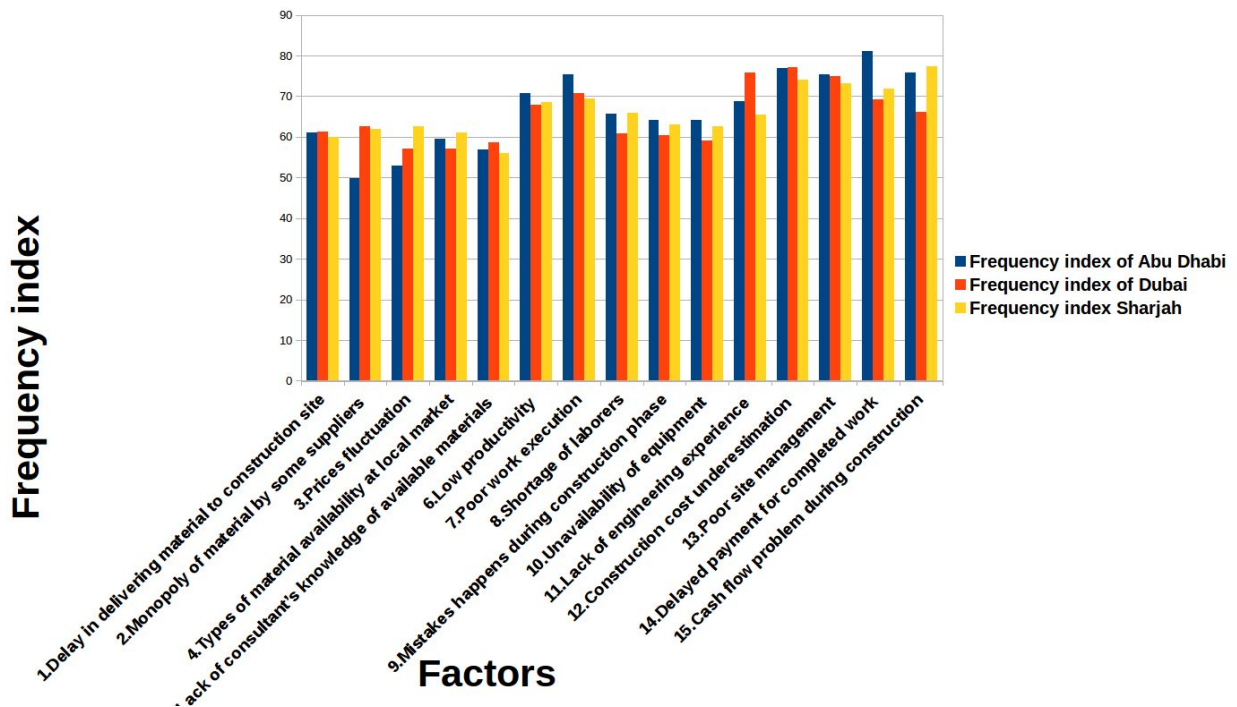
The severity index of 15 Attribute in three state of UAE country are follows;-

Severity index of three State of UAE Country

Factors (x-axis):
1. Delay in delivering material to construction site
2. Monopoly of material by some suppliers
3. Prices fluctuation
4. Types of material availability at local market
5. Lack of consultant's knowledge of available materials
6. Low productivity
7. Poor work execution
8. Shortage of laborers
9. Mistakes happens during construction phase
10. Unavailability of equipment
11. Lack of engineering experience
12. Construction cost underestimation
13. Poor site management
14. Delayed payment for completed work
15. Cash flow problem during construction

Legend:
- severity Index(Abu Dhabi)
- Severity Index(Dubai)
- Severity Index(Sharjah)

First we find the 15 Factor 's Frequency index of the three state of the UAE country and find some results as there are the 44 Attribute we rank the Attribute on the basis of Frequency index on the basis of Frequency index on the basis of Frequency index 14.Delayed payment for completed work Attribute have highest Frequency index.

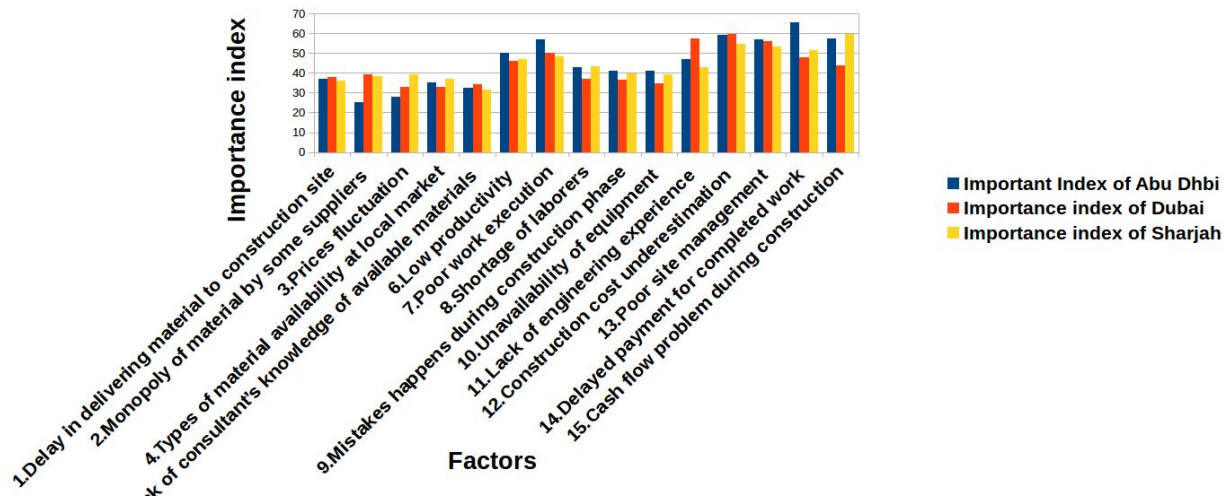The Frequency index of 15 Attribute in three state of UAE country are follows;-

Frequency index of three STATE OF UAE

First we find the 15 Factor 's   Importance   index of the three state of the UAE country and find some results as there are the 44 Attribute we rank the Attribute on the basis of Importance index on the basis of Frequency index 14.Delayed payment for completed work Attribute have highest Importance   index.

The Importance index of 15 Attribute in three state of UAE country are follows;-
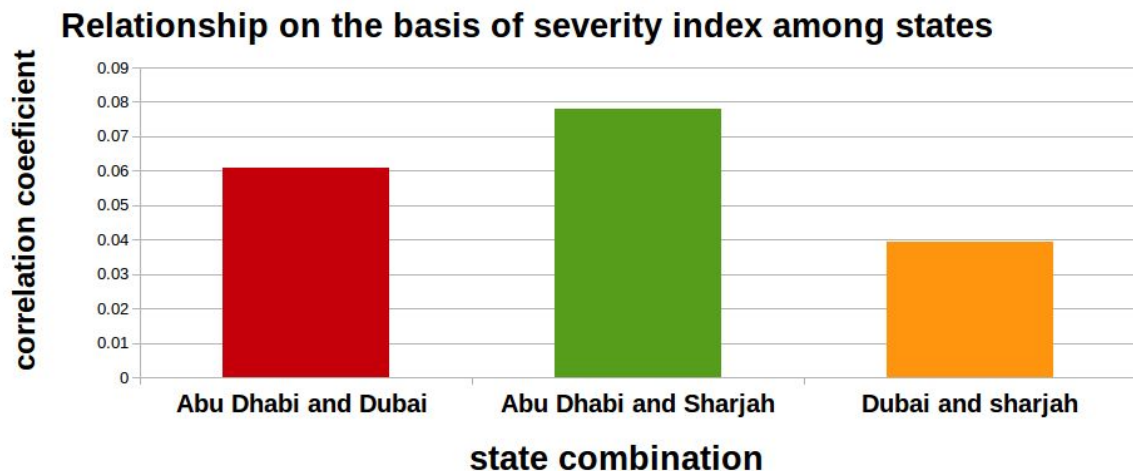
Importance index of the three State of UAE

We also see the Relationship on the basis of Severity Index ,Frequency index and Importance index. For seeing the Relationship Between the Factors and the states I used Spearman

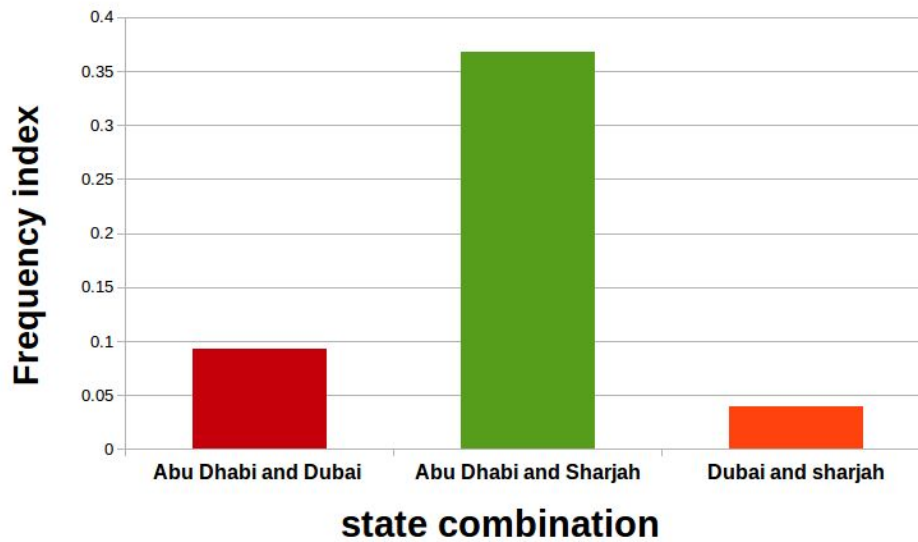$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

correlation Formula
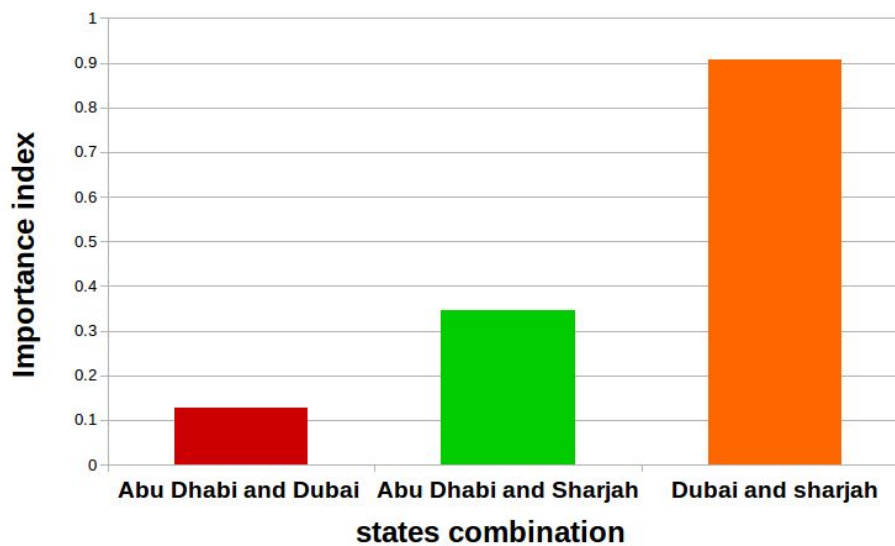
Relationship on the Basis of Severity Index

Relationship on the Basis of Frequency index

Relationship on the basis of Frequency index among states

Relationship on the Basis of Importance Index

Relationship on the basis of Importance Index among States

The above sheet we ranking the factors on the Basis of severity index ,Frequency index and Importance index

Conclusion

From above analysis we fInd that the delay in payment and poor site management are the crucial Attribute or Factors that are mostly responsible for delay in Road construction project in UAE . if see state wise so in Abu Dhabi most of the project delay because of delay in Payment of the owner .In Dubai most of the project delay because Lack of engineering experience and in the sharjah state most of the Road construction delay because Cash flow problem during construction these analysis are basis on the Severity index of the Factors among the three state. if we see the delay in road construction on the basis of Frequency index most of the Road construction delay in Abu Dhabi Because Delayed payment for completed work
 In Dubai state most of the Road construction delay because Construction cost underestimation And in the Sharjah state most Road construction delay because Cash flow problem during construction .
On the basis of importance Index most of the Road construction delay in Abu Dhabi because Delayed payment for completed work and Cash flow problem during construction is the main reason in the Dubai for delay in construction .Cash flow problem during construction is the main reason in Sharjah for delay in Road construction project.

seeing the Relationship among states on the basis of severity index Abu Dhabi and Sharjah are relative . on the basis of Frequency index Again Abu Dhabi and Sharjah are related but on the basis of Importance index sharjah and Dubai are related.