

Non-Excusable Delays in Public Sector Highways Projects in Pakistan and Suggested Remedies

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Abstract— Construction industry is so far a backbone of every developed and developing country. It changes the entire appearance of counties. In a growing need of urbanization, construction industry faces different challenges, from which non-excusable delays are the major factors affecting its serviceability. This study was aimed to obtain critical factors causing non-excusable delays in public sector highways projects in Pakistan and their suggested remedies through a questionnaire survey. In this study questionnaires were distributed among the 150 stakeholders and the obtained data was analyzed through average mean value method. Results found 14 critical factors and their remedial measures were obtained through content analysis technique of unstructured interviews from 20 experienced professionals having experience more than 10 years. It concludes proper scheduling, Performance of contractors, imposing fines, availability of raw materials, on-time selection of materials, proper planning, everyday progress, skilled labor, proper practice, proper supervision, motivation towards work, proper management, limited responsibilities and minimizing rework will have breakthrough to non-excusable delays in public sector highway projects in Pakistan.

Index Terms— Highway Projects, Non-Excusable Delays (NED's), Remedial Measures for NED's.

1 INTRODUCTION

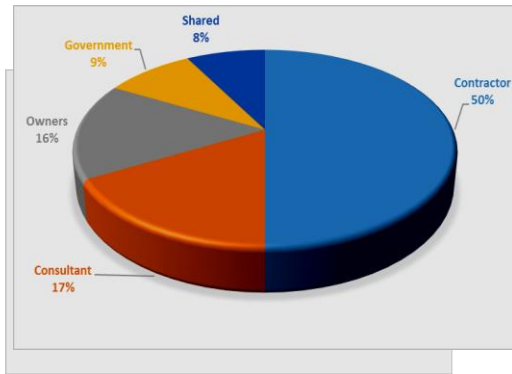
Construction schemes are unrepeatable activities with several exclusive characteristics, such as time limitations, complex procedures, tremendously challenging situations, monetary capabilities, and vibrant organization arrangements [1],[2],[3]. The overall successful completion of a project involves efforts and expertise of various stake holders including consultants, contractors, suppliers, financiers, and labor. Due to increasing competition in the construction industry; the clients need a rapid and quality-based completion of project in order to utilize their space and budget more quickly and effectively [3],[4]. In such competitive situation, the unnecessary delays are always undesirable. Various researchers provided different definitions of the term 'delay' according to construction point of view [5]. declared that the construction delay is actually "an additional amount of time required to complete the project from what decided between the client and contractor." Another definition of Delay was proposed as "a late in accomplishing a task in pre-defined period" [6]. Suggests that delay is "an undesired elongation in the project completion resulting in huge increase in overall cost". The definition of delay described was "the amount of time spends in order to apply corrective actions to complete the project after the decided due date for the completion" [7]. A definition of construction delay was defined as "a state of affairs in which the stake holders are mutually or separately responsible for the unsuccessful completion of project in the pre-agreed time limit"[8][9][1]. The delay in project is mainly characterized into two broad classifications: the excusable delays and non-excusable delays (NEDs). The excusable delays are defined as the delays which are unpredictable, sudden or away from the control of take

holders. NED are delays that are governable and can be reduced or minimized by appropriate efforts.

2 CAUSES OF DELAYS

Similar to several other countries, the construction industry of Pakistan incorporates a vital contribution in the development of country's economy. According to a plan of Pakistan government, namely, "Construction sector in Pakistan 2014. Development forecasts for 2015-2020", Pakistan is aimed to grow his construction industry up to a 4.2% contribution in the GDP of the economy in 2014. During the initial six months of 2014, the goals were considerably achieved, with growth fuelled mostly by civil engineering construction activity. The economy of Pakistan was improved by the contribution of housing and infrastructure development, however, a great flaw in fulfilling the agreed upon time period of projects was observed. This revealed a lack of understanding of the delays encountered by the stake holders during construction projects in Pakistan. A number of projects suffered an unexpected loss of money to the stake holders. There is a need to identify the role of NEDs in the elongation of time agreed for the completion and the influence of NEDs on the overall quality of the project.

Due to the involvement of several unwanted factors, the researchers discovered a high percentage of failure in the completion of projects within the decided time period and hence, resulted in an overrun of cost. From 2000-2005; almost 70% of the projects were delayed due to various NEDs [5]. The study was based on the construction industry of Libya. They concluded that improper planning and unskilled professionals are the key reasons that caused NED in construction projects [10]. In a percentage-based contribution of stake holders responsible for NEDs of the projects which is as follows: contractors 50%, consultants 17%, owners 16%, government 9%, and miscellaneous 8% [11]. As shown in figure 1.



3 PRELIMINARY SURVEY

In this study different factors of NED's were obtained from literature. Based on their importance in the area of research they are included in the pilot study. Following are the factors with their reference of origin are mentioned as, Late in selection of material[5], Delay in supply, Suspension in manufacturing[12], Untrustworthy provider[13], Scarcity of material, equipment or labour[14], Lack of Planning, Bad quality of work, Bad supervision[15], Delay in imported material/equipment[16], Fragmented materials, Lower output[17], Untrained Apparatus operative[18], Internal Issues of labors-conflict[19], Nonattendance[20] Unexpected holidays, Overloaded responsibilities[21], Unqualified personal management[22], Apparatus collapse[23], Lack of modern apparatus[24], Inappropriate apparatus, Unsuitable construction techniques[25], Involvement of inexperienced stake holders[26], Deficiency of amenities[27], Unfriendly behavior of labor and staff[28], Insufficient amount allocation, Deficiency of resources[29], Unscheduled payment to stake holders[30], Lack of motivation towards work[31], Weather related delays[32], Incomplete contract[33], Communication gap[34], Inappropriate practices/procedures[35], Bankruptcy of any stake holder[36], Need of rework[37], Unskilled contractor[38], Unusual replacement of sub-contractors[39], Location of project[40], Inadequate choice of contractor[41], Undesired results of completion[42], Unavailability of monitoring database[43]. The questionnaires were distributed among the stakeholders having experience more than 10 years in the highway projects. Based on the number of factors the sample size of questionnaire were calculated as,

$$\text{Sample size} = \text{No. of factors} \times 2.5,$$

$$\text{Sample size} = 40 \times 2.5 = 100.$$

4 METHODOLOGY

The major methods of analysis suggested by researchers are scaling or measurement and average index method [7]. This study follows the average index method for data analysis and then systematic. It should be noted that the cost and quality of data analysis results depend on the selected method of analysis.

A method of ranking the data according to average indexing is used [7]. This method illustrates the findings in the rating of Likert (ordinal) scale categories. For this study, five types of

ratings were proposed in the questionnaires:

- 1= Not important
- 2= Less important
- 3= Important
- 4= More important
- 5= extremely important

The ratings mentioned above were used in order to evaluate the significance of influential parameters on the progress of a construction project noticed by the stake holders involved in the project. Average indexing is performed as follows [7].

$$\text{Average Mean Value} = \frac{\sum_{i=1}^5 a_i x_i}{5 \sum_{i=1}^5 x_i} \quad (1)$$

Where as

i = The Rank

a_i = Constant of weightage assigned to i .

X_i = Variable showing the frequency of the reply for the value of i = (1,2,3,4& 5)

5 RESULTS AND DISCUSSIONS

The outcomes of the data analyzed are discussed and the results showing parameters are arranged in tabular form as in table 1.

TABLE 1
HIGHEST AVERAGE MEAN OF FACTORS FOR CORRESPONDING MAJOR CLASSIFICATION GROUP OF DELAYS

From the table 1, Factors with the highest mean value were selected for the corresponding major classification group of delays. In order to mitigate the above delay factors. Remedial measures were suggested by the professionals having experience more than 10 years in the field of highway projects. The remedial measures for the

| Sr.# | Major Classification | Factors | Average Mean Value |
|------|------------------------------|--------------------------------------|--------------------|
| 1 | Material Related Delays | Delay in supply | 4.39 |
| 2 | Equipment Related Delays | Untrustworthy provider | 4.34 |
| 3 | Labour Related Delays | Scarcity of material | 4.42 |
| 4 | Financial Related Delays | Suspension in manufacturing | 4.50 |
| 5 | Lack of Control | Lack in selection of material | 4.35 |
| 6 | Improper Planning | Lack of planning | 4.30 |
| 7 | Sub-Contractor Related Delay | Low output | 4.27 |
| 8 | Techn: Personnel Shortages | Involvement of unskilled stakeholder | 4.39 |
| 9 | Poor Coordination | Inappropriate practices | 4.52 |
| 10 | Inadequate Supervision | Bad supervision | 4.40 |
| 11 | Improper Const. Method | Lack of motivation towards work | 4.39 |
| 12 | Poor Communication | Unqualified personal management | 4.37 |
| 13 | Improper Scheduling | Overloaded responsibilities | 4.20 |
| 14 | Slow Decision Making | Need of rework | 4.10 |

corresponding critical factor causing non-excusable delays are discussed in table 2.

TABLE 2
REMEDIAL MEASURE FOR CORRESPONDING CRITICAL FACTORS OF NON-EXCUSABLE DELAYS (NEDS)

| Sr.# | Factors | Remedial Measures |
|------|-----------------|--|
| 1 | Delay in supply | A proper scheduling and an advance notice with sufficient time limit to supply the material and apparatus should be given to contractors/ suppliers and a proper |

| | | |
|---|--------------------------------------|--|
| | | follow up of the decided notice should be maintained. |
| 2 | Untrustworthy provider | The performance, ability and reliability of the hired contractors/suppliers should be inspected according to clause postulated in regulations providing guidance about constructional laws and a proper inspection of contractor's application documents should be performed. |
| 3 | Scarcity of material | During the time of contract, a specific amount of penalty should be decided to impose on the contractors/suppliers in the case of shortage or delay in the supply of required amount of material/equipment and labor. |
| 4 | Suspension in manufacturing | The common observation is that before finalizing a deal with the manufacturer, the previous performance of the manufacturer should be analyzed by discussing with several previous clients. |
| 5 | Lack in selection of material | The selection of material is the responsibility of both the resident engineer and contractor. A mutual and regular communication between the stake holders minimizes the late. Ideally, a strict check on contractors' overall performance may help in this case. |
| 6 | Lack of planning | This reason is purely related with the skills of the engineer and management. The client should seek to handover the project to a firm which has maximum number of professionals have sufficient past experience in the similar construction projects. |
| 7 | Low output | A proper database should be developed and maintained by the managers including the details of everyday progress of the project. And the database should be analyzed by the end of the day to identify the adverse and positive progress of day by day work. |
| 8 | Involvement of unskilled stakeholder | It should be noted that in order to save the cost of project, hiring a number of inexperienced professionals at lower salaries may not be a feasible solution to optimize the project. By contract, it is feasible to hire a smaller number of people with sufficient and recognized experience in the field similar to the project. |

| | | |
|----|---------------------------------|--|
| 9 | Inappropriate practices | Several construction codes and laws are available in every country, so as for Pakistan. A strict following of official building codes shall help to avoid inappropriate practices, hence minimize the project cost and reduce the need of repeated activities. |
| 10 | Bad supervision | The common opinion is that the managers and contractors should deploy an organized surveillance and governance which should take into account the accuracy of work performed, unnecessary and un-informed holidays by labor, proper following of standard procedures and demand-supply ratio. This will help in reducing the NEDs caused due to bad supervision. |
| 11 | Lack of motivation towards work | A job satisfaction, proper incentives when required, appreciation of excellently performed work and a friendly working environment help to overcome the lack of motivation towards work. |
| 12 | Unqualified personal management | A series of sub-ordinates and co-ordinates and a mutual understanding among the management may help to identify and strike out the unqualified personals from the project. |
| 13 | Overloaded responsibilities | The responsibilities should be decided prior to the beginning of the project. Assigning full time additional responsibilities to an individual in the middle of work may affect the quality of work performed under actual responsibilities. In case of emergency, an alternate should be hired rather than assigning the overloaded responsibilities to any individual. |
| 14 | Need of rework | Following construction codes and regulations will minimize the need of rework. However, in few cases when corrective actions are needed, the contractor should be efficient enough to provide an alternate. |

6 CONCLUSION

This study concludes that for counteracting the effects of critical factors causing non-excusable delays, some strategies that are extracted through this research such as proper scheduling, Performance of contractors, imposing fines, availability of raw materials, on-time selection of materials, proper planning, everyday progress, skilled labor, proper

practice, proper supervision, motivation towards work, proper management, limited responsibilities minimizing rework should be focused and implemented effectively in the projects.

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