SAIF ULLAH APPRAISAL OF FACTORS AFFECTING DELAYS IN ROAD CONSTRUCTIONS: NEU
A CASE STUDY OF PESHAWAR CITY IN PAKISTAN 2018

APPRAISAL OF FACTORS AFFECTING DELAYS IN ROAD CONSTRUCTIONS: A CASE STUDY OF PESHAWAR CITY IN PAKISTAN

A PROJECT SUBMITTED TO
THE GRADUATESCHOOL OF APPLIED SCIENCES
OF
NEAR EAST UNIVERSITY

By

SAIF ULLAH

In partial fulfillment of the requirements for
the degree of master of science
in
Construction Management

NICOSIA, 2018

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Saif Ullah: Appraisal of Factors Affecting Delays in Road Constructions: A Case Study of Peshawar City in Pakistan

Approval of Dean of Faculty of Civil and Environmental Engineering

Prof.Dr.Hüseyin GÖKÇEKUŞ

Dean

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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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ABSTRACT

Road construction delays are the most common phenomenon in highway engineering projects in Pakistan. Therefore, it is crucial to study and analyze causes of road construction delays. The common of road construction projects in Pakistan do not get accomplished within the stipulated initially set targets of time. Road construction projects are commonly delayed due to price escalation of building materials and faulty management in Pakistan. The purpose of this study was to investigate the factors causing delays in road construction projects in Pakistan. Project delays are a common problem internationally in the road construction industry in modern times. Investigating the reasons for delay has become an important contribution to improved construction industry performance. The study studied a list of road construction delay causes gathered from different literature having different types of road construction, different countries, different periods and different numbers of delay causes and delay sets. In this research the data was collected using questionnaires which were distributed to different client, consultants and contractors. The data was analyzed using the Relative Importance Index and ranking approach. The causes were classified into seven different phases of road construction and one general causes. Financial limitations/Problems have been identified as the most important/major reasons of the delay. Poor site management by contractor is the next reason of delay as indicated by the client. Non-availability/release of funds during fiscal years is another reason of delay according to consultant. Difficulties in financing the project are major reason of delay as per contractor. Most of the top twenty causes were from the road construction phase. According to the analysis of case study, the most contributing causes and groups to delays were discussed, and some future recommendations were proposed in order to control and minimize delays in road construction projects. These findings can be helpful for project managers to mitigate the road construction delays in Pakistan. this paper is useful for both researchers and road construction parties and allows detailed and repeatable analysis of the progress of a road construction project in order to facilitate and achieve a competitive level of time, cost and quality for effective road construction projects.

Keywords: Road Construction, Construction, Delay Factors, Project Delays, Pakistan

ÖZET

Yol yapımındaki gecikmeler, Pakistan'daki otoyol mühendislik projelerinde en yaygın görülen olaydır. Bu nedenle, yol yapımındaki gecikmelerin nedenlerini araştırmak ve analiz etmek çok önemlidir. Pakistan'daki yol inşaatı projelerinin ortak amacı, başlangıçta belirlenen zaman hedefleri içerisinde gerçekleşmemiştir. Yol inşaatı projeleri, inşaat malzemeleri fiyatlarının artması ve Pakistan'daki hatalı yönetim nedeniyle genellikle gecikmektedir. Bu çalışmanın amacı, Pakistan'daki yol yapım projelerinde gecikmelere neden olan faktörleri araştırmaktı. Proje gecikmeleri, yol yapım endüstrisinde uluslararası çapta uluslararası bir sorundur. Gecikme nedenlerinin araştırılması, inşaat sektörü performansının iyileştirilmesinde önemli bir katkı sağlamıştır. Çalışma, farklı türden yol inşaatlarına, farklı ülkelere, farklı periyotlara ve farklı gecikme nedenleri ve gecikme setlerine sahip farklı literatürlerden toplanan yol inşaatı gecikme nedenlerinin bir listesini inceledi. Bu araştırmada veriler farklı müşteri, danışman ve yüklenicilere dağıtılan anketler kullanılarak toplanmıştır. Veriler Bağıl Önemi Endeksi ve sıralama yaklaşımı kullanılarak analiz edildi. Sebepler, yol inşaatının yedi farklı evresi ve bir genel neden olarak sınıflandırılmıştır. Mali sınırlamalar / Sorunlar, gecikmenin en önemli / en önemli nedenleri olarak belirlenmiştir. Yüklenici tarafından kötü saha yönetimi, müşteri tarafından belirtildiği gibi bir sonraki gecikme sebebidir. Mali yıllardaki kullanılabilirliğin olmaması / serbest bırakılması, danışmana göre gecikmenin başka bir nedenidir. Projeyi finanse etmede zorluklar yükleniciye göre önemli bir gecikme sebebidir. En büyük yirmi sebebin çoğu yol yapım aşamasından geldi. Vaka çalışmasının analizine göre, en çok katkıda bulunan nedenler ve gecikmelere neden olan gruplar tartışılmış ve yol yapım projelerindeki gecikmeleri kontrol etmek ve en aza indirmek için bazı öneriler önerilmiştir. Bu bulgular, proje yöneticilerinin Pakistan'daki yol yapımındaki gecikmeleri azaltmalarına yardımcı olabilir. Bu çalışma hem araştırmacılar hem de yol inşaatı tarafları için yararlıdır ve etkili yol yapım projeleri için rekabetçi bir zaman, maliyet ve kalite düzeyini kolaylaştırmak ve başarmak için bir yol yapım projesinin ilerlemesinin ayrıntılı ve tekrarlanabilir analizine olanak tanır.

Anahtar Kelimeler: Yol İnşaatı, İnşaat, Gecikme Faktörleri, Proje Gecikmeleri, Pakistan

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CHAPTER 1

ROAD CONSTRUCTION IN PAKISTAN

1.1 INTRODUCTION

The construction industry is a significant division for the advancement and monetary development of Pakistan that is building up the nation. There are various improvement wanders completed the process of, going on and various future ones. Development ventures are normally postponed because of value heightening of building materials and defective administration in Pakistan. The accomplishment of a task can be surveyed effectively subsequent to looking at the proposed and real cost concerning the level of accomplished targets. An undertaking can be showed as fruitful if its specialized execution is kept up as per the timetable and stayed inside the distributed planned of cost (Yaw et al., 2003). Because of specialized, budgetary and showcase conduct, development ventures are truly confronting deferral and cost overwhelms in Pakistan. Effective management tools can control these delay and cost overrun. Legitimate administration instruments and strategies can effectively enhance the execution of a venture. Postponement is the most basic factor in general execution of any development venture since it builds the cost of the undertaking. Finishing the venture on time is gainful for every one of the gatherings engaged with the task like Consultant, Client and the Contractor (Giridhar and Ramesh, 1998; El-Razek et al., 2003). In this way, it's important to recognize the components in charge of calendar delay in development ventures. engaged with the venture like Consultant, Client and the Contractor. In this manner, it's important to distinguish the variables in charge of timetable postponement in development ventures (Giridhar and Ramesh, 1998; El-Razek et al., 2003).

1.2 Problems Statement

Pakistan is a developing country; the development ventures and foundation improvement of Pakistan are regarded as a key marker of its advancement and financial development (Shaikh et al., 2010). The strategies and methods utilized as a part of the dominant part of street

development are ordinary which are not effective. Amid the development of any task particularly street development there are some of factors included. A portion of the factors that fundamentally impact the productivity of development are site area, nature of faculty, development materials, hardware, installment methods and so forth. Issues looked amid execution of maybe a couple ventures are comparative so the administration faces a great deal of vulnerabilities. These vulnerabilities may bring about postponements and cost overwhelms which can be diminished however can't be disposed of (Haseeb et al., 2011). The public-sector projects in Pakistan are especially infamous for deferral and cost overwhelm. The political framework in Pakistan is tricky. Changes of the administration have occurred commonly previously. It has been watched that the new government stops the financing of the tasks that the past government has started. This prompt defers which result in cost invades. A steady government framework with viable administration is vital for the general subsidizing of development ventures. All the general population division ventures confront postponements and cost overwhelms. Postponements and cost overwhelms have tormented the development business of Pakistan for quite a while. Its underlying foundations are profound and these are spreading more extensive with the progression of time. The effect of the issue is huge in creating nations where the gatherings of the venture are fiscally feeble. These postponements and cost invade antagonistically influence the development business and thus the monetary development. These issues are altogether connected to the most imperative urban areas in Pakistan particularly Peshawar.

1.3 Objective of the Study

Knowing the results of deferrals of development ventures in Pakistan and then study the effects of these delays on construction economy. Major objectives are

1. To explore and assesses the results of delay in a road construction project, that resulted to cost overrun in construction projects of Peshawar.
2. To categorize and classified the reasons towards corresponding to their frequency in different construction projects.

3. To determine the Impacts of different deferring factors identified with the temporary worker, customer/proprietor, specialist, material, gear, work and general condition

1.4 Scope of Study

The study mainly focuses on road construction projects in the Peshawar City. The scope involves all three parties of the project namely client, consultant and contractor. Survey responses include public agencies, private companies and semi-government organizations. Comprehensive literature review and meetings will be conducted with construction field specialists to develop questionnaire which was then circulated to various clients /owners, consultants, contractors and public/private sector construction industries to collect data from them. Main causes of delay and their effects will be extracted from the collected data, which were recurring mostly in visited construction projects, with the help of Microsoft Excel, and others software the statistical and general require analysis will be presented.

1.5 The Significance of the Study

This project is quite essential since time is among the three spine of development venture administration. The examination will add to the greater part of learning by giving attractive advancement spending design, favorable issuing of information and conclusion of framework and wander organization aptitudes. Once the most noteworthy defer causing factors are distinguished, the gatherings to the ventures should then have the capacity to channel their energies and assets to the particular effects along these lines decreasing deferrals to the tasks.

1.6 Methodology

For this project, to assess and dissect the elements causing delays in street development venture, an extensive scope of group connected to the development business of Peshawar City will be the target point. Respondents will be random across the Peshawar. The primary gatherings of respondents were temporary workers, specialists, venture supervisors, customer's delegates and development chiefs. A point by point survey will be coursed to gather helpful subtle elements from expert's gatherings having a place with the street development industry.

The perspective of temporary workers and advisors will be investigated to rank according to the aims of the project. The data collection method may include observations, questioners, interviews and documentations.

CHAPTER 2

PREVIOUS WORK ON ROAD CONSTRUCTION

2.1 INTRODUCTION

Deferrals are among most serious issues in development works. Development industry in Pakistan is still under abused as it is situated in customary venture conveyance frameworks. Street is normal in each task particularly out in the open division of Pakistan. In this section the past works would be break down. Development postpone alludes to the time overwhelm in fruition or conveyance of venture past the information on which parties concurred or venture fulfillment information determined. History of development has returned from start of human life on earth. Man has begun his excursion from holes to current expectations for everyday comforts (houses, courts, streets, dams and so on.) with the advancement in development industry. Individuals of consistently have done development ventures to carry on with their life easily. The cause of development extends in Pakistan has various cases of undertakings disappointment because of uncalled for arranging of development exercises (Sahib Zada et al., 1992). These sorts of undertaking disappointments are plainly demonstrating the deficiency of specialized supervisory staff in creating world. To ensure the economy and to maintain a strategic distance from the disappointment of fundamental development ventures it is more essential for the creating scene to improve their specialized capacities (Sahib Zada et al., 1992)

2.2 History of Road Construction Project in Pakistan

Street crashes are an expanding issue all through the world, which have enormous sectoral and monetary effects other than the fundamental death toll. Consistently an expected 1.2 million individuals are executed and up to 50 million are harmed or crippled on the world's streets. Pakistan, among seven nations in the South Asia locale, is the world's 6th most crowded nation with an expected populace of more than 170 million (Population2011). The casualty rate on the nation's street arrange stays among the most astounding on the planet at around 5565 fatalities for every year (more than 30 mishaps for each 10,000 selected vehicles). Its

broadly finished the nations having the most lessened number of fatalities, for instance, the UK (3298 uncovered fatalities for every year); regardless of how Pakistan is 6 times less automated than the UK (World Health affiliation 2009). A 40-year (1956-1996) examination of open section data has displayed a 14-cover increase in sum of motor vehicle crashes in Pakistan (Hyder et al. 2006). Regardless, the numbers are foreseen to be generously higher as incident declaring in Pakistan is assessed to be under 1% of all motor vehicle wounds (Government of Pakistan 2007). For Lahore, the second most populated city of Pakistan and situated fortieth on the planet (World's Largest Cities 2011), 2010s estimations revealed that 332 people lost their lives while 27,264 were hurt in less than a year as a result of neglectful driving, speeding or wrong-turns. More than 47% of these mishaps were purportedly caused by motorcyclists, 30% caused by methods for vehicles, 19% because of rickshaws, 6% by virtue of business vans, 0.7% caused by trucks and 0.5% occurred in light of transports (Bashir 2010). The National Injury Survey of Pakistan (NISP) uncovered that most wounds in the nation ricocheted out at people created in the locale of 16 and 45 years (Ghaffar et al. 2004). RTA also an excessive amount of effects the poorer class of Pakistani society and pushes different families advance into dejection by the loss of their providers. The cash related difficulties are surveyed at more than 2% of GDP (Asian Development Bank 2007) and, in 1998, the nation was basically expending $0.07 per capita (0.015% of GDP/capita) on street thriving (Government of Pakistan 2007). In Pakistan, at an organization level, the Ministry of Communication (MOC) works as the focal framework creator and authoritative ace for the vehicle division, be that as it may, average transport professionals and ordinary transport experts are in charge of planning, envisioning and affirming rules/endorsement. In 2000, the National Highway Safety Ordinance was grasped to control street transport. By and by, it is basically appropriate to vehicles on the national freeway street compose, with the 1965 Motor Vehicle Ordinance and common measures so far directing each and every other road in the country (Hisam 2006, Hyder et al. 2006).

2.3 Different Types of Delays in Road Construction

Road Construction delays are classified into following categories

- ✓ Excusable and non-excusable delays
- ✓ Compensable and non-compensable delays
- ✓ Critical and non-critical delays
- ✓ Concurrent delays

2.3.1 Excusable and Non-excusable Delays

Road Construction delays fall into two major categories excusable and non-excusable:

- An excusable delay can be defined as the one that legitimize an expansion for the agreement execution time. Because of these kinds of postpones contract day and age is normally broadened. Normal understandable postponements for a contractual worker incorporate outline issues, proprietor started changes, unexpected climate and catastrophic events.
- An un-excusable delay can be defined as the one that the gathering expects the danger of the cost and outcomes, for it as well as perhaps for the subsequent effect on others too. For instance, if a contractual worker experiences non-passable deferral in its execution of the agreement work because of his own bungle, subcontractors working for the prime temporary worker may likewise be postponed and the prime contractual worker might be in charge of the sub-contractual workers.

2.3.2 Compensable and Non-compensable Delays

Excusable delays may be further classified as compensable and non-compensable.

- If the postponement is esteemed compensable the gathering will be qualified for extra remuneration for the expenses of deferral, and in addition extra time for contract execution.

- For a postponement to be non-compensable to a gathering, the gathering must add to the deferral. Or maybe, the postpone must outcome exclusively from the deferral of the other party. In a few conditions the proprietor might be made up for its postpone cost if the deferral is caused by the temporary worker.

2.3.3 Critical and Non-critical Delays

Critical venture delays are the ones that expand the general task fruition date. Not all effects to the temporary worker's technique for execution result in postponement to the general venture culmination. For instance, an adjustment in the sort of electrical switch plates may not postpone considerable finish of the venture. Then again, changing the sort of basic steel individuals while the contractual worker is raising auxiliary steel on a multistory office building will probably postpone the temporary worker's significant finish of the undertaking. A variation arrange should be readied, shop illustrations for the changed individuals must be submitted and affirmed, and the steel must be created and conveyed to the venture site. While sitting tight for the steel most other significant and basic contract work can't continue. Basic deferrals are identified with utilization of basic way exercises on a CPM plan. The assignment of exercises as basic or non-basic may include judgment and tact in the arranging and booking process, prepared information of compression systems for assessing spans, relegating assets, and portraying action interrelationships. It is for the most part held that a temporary worker won't be qualified for a period expansion for a passable defer unless the deferral broadens the general undertaking finish.

2.3.4 Concurrent Delays

Simultaneousness adds another measurement to the examination of postponement. Simultaneous postponements happen when there are at least two autonomous reasons for delay amid a similar day and age. The "same" day and age from which simultaneousness is estimated, be that as it may, isn't generally actually inside the correct timeframe. For deferrals to be viewed as simultaneous, most courts don't require that the times of simultaneous

postponement absolutely coordinate. The time of "simultaneousness" of the postponements can be connected by conditions, despite the fact that the conditions might not have happened amid the very same era. A vital part of the simultaneous postponement is whether the simultaneous defer should likewise be basic, deferring general venture finishing to pardon the postponement caused by a gathering. Non-basic simultaneous postponements for the most part don't pardon extend delays by either the proprietor or the temporary worker.

2.4 Review Works on Delays of Road Construction

In India, Ravisankar, Anandakumar and Krishnamoorthy (2014) led an examination on the measurement of postpone the effects in the development of the business. The scientists demonstrated the time invades change in the vicinity of half and 80% for ventures finished around the world. The investigation uncovered that the most critical reasons for delay were: Shortage of untalented and gifted work; Design changes by proprietor or his operator amid development; Fluctuation of costs; High sitting tight time for accessibility of work groups; and Rework because of mistakes. Hasseb et al., (2011) distinguished 37 defer causes influencing development industry in Pakistan the postpone factors are evaluated by the basic appraisal criteria, for example, mean postpone factor range, mode and basic record. The review comes about demonstrated that the larger part of postpone factors are significant to customer factor which must have solid sparing capacity and monetary course of action for venture, effectively time choice. Al-Khalil and Al-Hazmi (1995) examined the reasons for delay in vast building development extends in Saudi Arabia and uncovered that the most vital reasons for delay were: Approval of shop illustrations; Delays in installments to contractual workers and the subsequent income issues amid development; Design changes; Conflicts in work calendars of subcontractors; and Slow basic leadership and official administration in the Owners' associations.

Al-Tabtabai (2002) directed an investigation on reasons for delays in development extends in Kuwait and discovered that the real reasons for delay were: Slow monetary and installment systems; Slow basic leadership process; Limited specialist among supervision staff; Risk

distribution basically on the contractual worker; and Lack of plan illustrations coordination. Kazaz et al., (2012) analyzed the reasons for time expansions in the Turkish development industry and levels of their significance together. As per the outcomes, "plan and material changes" was observed to be the most transcendent factor, trailed by "deferral of installments" and "income issues". As far as significance levels of factor gatherings, monetary variables were observed to be the main gathering, while natural components were the minimum viable gathering. Memon. Owolabi et al. (2014) examined the circumstances and end results of deferral on venture development conveyance time in Nigeria. Expressing seven in every ten tasks in Nigeria endured delays in their execution. The aftereffects of the investigation demonstrated that the accompanying were the five noteworthy reasons for delay: Lack of assets to back the undertaking to consummation; Changes in illustrations; Lack of viable correspondence among the gatherings included; Lack of sufficient data from advisors; and Slow basic leadership.

Sweis et al., (2008) considered deferrals in development extends in Jordan and the real reasons for delay were: Financial troubles looked by the temporary worker; Too numerous change orders from proprietor; Poor arranging and booking of the task by the contractual worker; Presence of incompetent work; and Shortage of specialized experts in the temporary worker's association. Ayudhya (2011) assessed the normal postpone reasons for development extends in Singapore and discovered that the real reasons for delay were: Delay in advance installment by proprietor; Adverse climate conditions; Main temporary worker money related issues; Evaluation of finished works; and Acts of God. Abdulla, Rahman and Azis (2010) considered the reasons for delay in Construction Projects and the outcomes demonstrated that the real reasons for delay were: Cash stream and money related challenges looked by Contractors; Contractor's poor site administration; Ineffective arranging and planning by Contractors; Inadequate Contractor experience; and Shortage of site specialists. Akogbe, Feng and Zhou (2013) contemplated postpone factors for improvement development extends in Benin and discovered that the real reasons for delay were: Contractor's monetary ability; Owner's money related challenges; Poor subcontractor execution; Materials acquirement; and Changes in illustrations.

Aibinu AA, Jagboro GO. (2002). Considered the impacts of development delays on consummation or conveyance of development venture in Nigerian substantial development industry and said them as: time invade, cost overwhelm, question, discretion and relinquishment. Lo et al., (2006) went for social occasion the view of common development specialists on how noteworthy the reasons for delay are. The degree of the distinctions in observation among the diverse respondent gatherings was likewise analyzed utilizing the rank assertion factor (RAF), rate understanding (PA), and rate contradiction (PD). Odeh and Battaineh (2002) distinguished 28 postpone causes influencing development ventures with conventional sort of agreements in Jordan; initial, a study survey was produced to evaluate the impression of contractual workers and advisors of the relative significance of development defer causes. Second, the poll was dispersed to an irregular example of temporary workers and specialists taking a shot at expansive ventures in Jordan. Arif and Morad, (2013) depicted "simultaneous deferrals" as circumstance when in excess of one postponement happens at the same time, both of which would alone defer the general task. The duty of simultaneous postponements is generally inferable from contradicting gatherings to the agreement, for example, proprietor and temporary worker. This frequently prompts debate concerning the degree to which every one of the gatherings is in charge of venture delay. Lopes et al., (2015) detailed that the expansion in utilizing gear in different development exercises causing delay, arranging the support of this hardware has turned out to be critical as these guides meeting venture due dates.

CHAPTER 3

METHOD AND METHODOLOGY

3.1 INTRODUCTION

Methodology is the path followed during an assignment. It is the set of activities carried out in a proper sequence. This chapter elaborates the steps in sequential request. A legitimately planned review survey was utilized to gather information from chose respondents. Point by point measurable examination will be finished with the assistance of Microsoft Excel. Results were presented in a tabular as well as graphical form.

3.2 Research Paradigm

Therefore, research used set of methods and principles to a careful study of a subject, especially in order to discover new facts or information about it. The researcher used both qualitative and quantitative research methods.

3.3 Data Collection

Data aggregation is a methodology of preparing and assembling data, for example, as a noteworthy part of a strategy change or practically identical endeavor. The purpose behind data gathering is to motivate information to keep on record, to settle on decisions about basic issues, or to pass information on to others. Data are basically assembled to give information as for a specific point. Data assembling when in doubt occurs at a fortunate time in a change wander and is routinely formalized through a data aggregation mastermind which much of the time contains the going with development. Information accumulation included kinds of information of which essential and optional information were evaluated and data collection methods that comprised questionnaires, interviews, observations and documentation (Gohel et al 2005).

3.3.1 Types of Data

Data is believed to be the most reduced unit of data from which different estimations and examination should be possible. Information can be numbers, pictures, words, figures, realities or thoughts. Information in itself can't be comprehended and to get data from the information one must translate it into significant information. The researcher used two methods of interpreting data which were primary and secondary data (Ghauri et al 2005).

3.3.1.1 Primary Data

Collection these are the first-hand information obtained by the researcher himself from the field. This is usually obtained when the researcher does a descriptive or survey and uses a number of methods under the case. Primary data are those collected a fresh and for the best of time, this happen to be original in character (Ghauri et al 2005).

3.3.1.2 Secondary Data Collection

Notwithstanding utilizing essential information accumulation techniques, narrative optional information was utilized as a part of this examination. Narrative information included composed materials, neighborhood government laws and other government handouts identified with the point, diary articles, books and different records significant to this examination. As indicated by Ghauri and Gronhaug, (2005) refered to in Saunders et al., (2007) focal points of utilizing optional information are that it gives colossal investment funds in assets, it is more affordable than to gather the information yourself, it serves to contextualize discoveries inside a broader setting and encourages triangulation of the discoveries. Regardless, auxiliary information has its hindrances as the information were gathered for a particular reason that contrasts from the exploration destinations of this examination (Denscombe, 1998) refered to in Saunders et al., (2007).

3.4 Data Collection Methods

In gathering information for this examination, the each of the four instruments were utilized which are perception, polls, meeting and documentation. After collecting the data it was analyzed with Microsoft Excel and main causes of delay with respect to contractor, consultant and client were extracted and their possible effects on project were evaluated.

3.4.1 Observation

As indicated by Verma, and Beard, (1981) characterize the term perception that, "Perception is the examination strategy, which uses coordinate contact between the analyst and the wonders under scrutiny". The scientist went to the focused-on zones/destinations and saw the day by day execution of the progressing street development extends and watched viable execution. This procedure is imperative to the analyst as it was most exceedingly utilized. Subsequently, kept away from predispositions and bias by subjects, defeat dialect hindrance and utilized whenever.

3.4.2 Questionnaires

According to Ghauri and Gronhaug (2005), characterizes the word poll as a composed rundown of inquiries that are replied by number of individuals with the goal that data can be gathered from the appropriate responses.

3.4.3 Interview

According to Ghauri and Gronhaug (2005), said that, "Meeting is a formal gathering at which some individual is posed inquiries to check whether they are reasonable for a specific occupation, for a course of concentrate at a school, college at cetera." Therefore, this involved the oral or vocal questioning technique or discussion. The interview technique required the researcher to ask questions. The researcher decided to utilize this instrument on account of its valuable as it was adaptable, point by point information acquire and addresses that asked were

both organized and semi-organized. The researcher met individual employee for interviewing on the study.

3.4.4 Documentation

As indicated by Fraenkel and Wallen (2003) characterize documentation as a composed or literature which has been created in some shape or another yearly report, work of art, bill, books et cetera. The analyst discovered most the upsides of utilizing the instrument since it was effortlessly available temperate and expels biasness.

3.4.5 Data Processing and Analysis

Simon, J. (2017). show this as a concerned about the calculation of specific measures alongside looking for example of relationship that exist among information gathering. It included evaluating the estimation of obscure parameters of populace for drawing surmising's. The real point of investigation in this examination was to decide if the perception led in the field bolster the theories that were planned before or before setting off to the field or reject them. In the journey of this examination, the analyst utilized both subjective and quantitative methods for information investigation. Quantitative information gathered from polls were dissected utilizing measurable bundle for sociologies. Subjective information was content broke down. Discoveries displayed subjectively (depictions) and quantitatively utilizing tables, rates and graphs

3.5 Important Definitions:

3.5.1 Time overrun:

Exactly when the stipulated fulfillment time is pushed forward, the endeavor is said to have experienced time overpower.

3.5.2 Budget Invade:

Right when an endeavor is done at a cost higher than what was disseminated, it is said to experience a spending invade.

3.5.3 Poor nature of finished work:

Average workmanship and use of trashy quality materials, can incite issues of poor meander quality.

3.5.4 Bad Public relations:

Exactly when wanders are put off, impermanent specialists, counsels and clients could put their open reputations in risk.

3.5.5 Litigation:

Battle can incite court cases for assurance especially when immense disciplines are being referred to. Prosecution dependably prompts additional customary postponement in the undertakings.

3.5.6 Arbitration:

The project will have extra cost and time related to the engagement of professional arbitrators.

3.5.7 Disputes and claims:

Disputes and claims arise from the losses incurred through delays by either party in the contract.

3.5.8 Total abandonment:

Delays in project execution could lead to total abandonment if issues leading to the delays are not resolved in time.

3.6 Identification of Possible Causes of Delays

Identification of a few causes from past explores and sifted them with the assistance of experienced work force. A few conceivable causes were separated and displayed in the survey for information gathering. These causes were specifically or by implication identified with every one of the gatherings of the venture i.e. Customer, Consultant and Contractor. The extent of the examination was constrained to both Public Sector ventures sand private projects including all the government institutions or agencies directly related to construction industry.

3.7 Respondents Information

3.7.1 Contractor

The contractors were divided into eight categories as per PEC financial based classification. This classification is listed as;

Table3. 1 **Categories as Per PEC Financial**

Constructor's Category	Limit (million rupees)
C-A	No limit
C-B	Up to 3000
C-1	Up to 1800
C-2	Up to 800
C-3	Up to 400

Constructor's Category	Limit (million rupees)
C-4	Up to 150
C-5	Up to 50
C-6	Up to 20

The data was collected from all the categories of the contractors because in some cases, mega projects of public sector also involve sub-contractors of low category.

3.7.2 Consultant

Consultant includes both from government agencies as well as from private organizations

3.7.3 Client

Clients include both government and private organizations.

3.8 Development of Survey Questionnaire

The questionnaire was divided into three parts

Approach t 1: General Information of Respondent.

Approach 2: Ranking of Causes.

Approach 3: Comments.

3.8.1 Approach 1

It deals with general information of the respondent including party, experience, previous completed projects, education level and experience.

3.8.2 Approach 2

It deals with ranking of all the causes.

Several possible causes identified from the literature and through the experience of personnel were classified according to the phases of the project. Causes were given importance value ranging 1 to 5showing effect of cause on delay of project.

1. Very little effect
2. Little effect
3. Average effect
4. High effect
5. Very high effect

Very little effect means one or two non-critical activities slow down but overall project is running smoothly.

Little effect means many non-critical activities slow down at a single instant of time but project work schedule is not much affected.

Average effect means one or two critical activities have been slowed down, as a result of which some part of project progress rate has slowed down.

High effect means many critical activities have occurred concurrently due to which overall progress rate of project is adversely affected.

Very high effect means causes due to which project working is stopped.

The stages of project that were considered for the design of questionnaire are as follows

Stage1: Define Objective

Phase2: Feasibility and Conceptual Planning Study

Stage 3: Design and Engineering

Stage 4: Planning and Scheduling

Stage 5: Tendering

Stage 6: Mobilization and Procurement

Stage 7: Construction

General:

The above seven phases are in chronological order while the last phase deals with the general causes leading to delays and cost overruns. General is not a phase but a group of general causes which are directly or indirectly encountered during the construction of a project.

3.8.3 Approach 3

It comprises of comments of the respondent.

The final questionnaire that was used for data collection will be presented in appendix A for further review.

3.9 Overall Relative Importance Index

In order to rank the causes, overall relative importance index of each cause was calculated from equation of "Jarkas and Bitar" and sorted. The Jarkas and Bitar equation for overall relative importance index is as follows:

$$\mathbf{RII}_k^i(\%) = \frac{1 \times (n1) + 2 \times (n2) + 3 \times (n3) + 4 \times (n4) + 5 \times (n5)}{5 \times (n1 + n2 + n3 + n4 + n5)} \times 100$$

Where

ORII =Overall relative importance index

i = scale value on questionnaire survey (1-5)

f = frequency/repetition corresponding to scale value

A = highest scale value on questionnaire survey i.e. 5 in this case

N = total number of respondents

Top 20 causes were separated for further analysis as they were occurring repeatedly in all construction projects visited and were permanent results of delays in construction projects.

Further ranking of causes were done

- At pre-construction level
- At construction level
- By contractor's perspective
- By consultant's perspective
- And by client's perspective

CHAPTER 4

RESULTS AND DISCUSSIONS

4.1 GENERAL

This chapter deals with the results obtained after the analysis of causes of delay with the help of Microsoft Excel. Results of analysis were also shown with the help of Microsoft Excel.

4.1.1 Respondents

The data was collected during a time period of about three months. The distribution and collection of survey questionnaire was done parallel. Total 50 questionnaires were distributed out of which five were discarded due to incomplete information. At the end total response rate was estimated to be 89% which is quite good for the analysis to be carry out. Data was collected from all the three parties.

The distribution shows that contractors and clients (organizations) were main parties for data collection. Some of the contractors and organizations of above respondents also provide consultancy services. The summary of general information of the respondents is tabulated as below:

Table.4 1General Information of Respondents

	CATEGORY	FREQUENCY	PERCENTAGE
Previous Completed Projects	1-5	2	10
	5-10	3	15
	10-15	6	30
	More than 15	9	45
Education Level	Lower than DAE	0	0

	CATEGORY	FREQUENCY	PERCENTAGE
	DAE	3	15
	Bachelor Degree	10	50
	Master Degree	7	35
	Doctoral Degree	0	0
Experience	Less than 4 years	2	10
	4-9 years	4	20
	9-14 years	2	10
	15-20	3	15
	More than 20 years	9	45

Table 4.1 shows that the previous completed projects have a percentage of 45% corresponding to the scale value of “More than 15” which means that the respondents must have faced the variability of different conditions during project life cycle. In education level the high percentages of Bachelor and Master shows that the respondents were well educated. Regarding experience, the high percentage of 45% corresponding to the scale value of “More than 20 years” clearly elaborates that the respondents were highly experienced personnel.

4.2 Ranking of Causes

Overall Relative importance index for all the causes were calculated using equation of ORII explained in Chapter 3 and have been tabulated in Table 4.2. Ranking of causes was done by using overall relative importance index and presented in descending order in Table 4.3. It has maximum scale value of 100% and the highest ranked cause has index of 79% while the lowest ranked cause has index of 1%. Top 20 causes have index more than 43% were selected for further discussion. Some of these causes are interrelated with each other while some are independent. Bar charts have been drawn using the ranking data presented above. These bar charts have ranking of causes in descending order on y-axis and overall relative importance index (ORII) on x-axis with minimum and maximum value of 0 and 100 respectively. Figure 4.2 shows top 10 causes with 1st cause "Financial limitations of contractor (cause ID C-47)" during Construction phase and 10thcause "Frequent equipment Breakdown (Cause ID C-32)".

Table.4 2 shows all causes in descending order with respect to their overall relative importance index value:

Cause ID	Cause Title	Frequency Corresponding to Scale Value					Overall Relative Importance Index	Ranking
		1	2	3	4	5		
C-47	Financial limitations of contractor	1	1	4	5	5	79	1
C-46	Delayed payments to contractor	1	2	2	5	5	78	2
C-18	Non-availability/release of funds during fiscal year	1	1	5	5	5	76	3
C-24	Change in scope of work	2	2	5	5	5	69	4
C-50	Legal disputes between parties	2	2	4	5	5	68	5
C-21	Revision of design drawings	1	1	2	5	5	63	6
C-26	Fraudulent practices and corruption	1	3	4	5	4	63	7
C-11	Selecting of inappropriate contractors	5	2	4	4	5	62	8
C-9	Fixing of Unrealistic project completion time	1	1	3	5	5	61	9
C-32	Frequent equipment Breakdown	1	1	4	5	5	60	10
C-33	Poor site management by contractor	2	2	5	4	4	60	11

Cause ID	Cause Title	Frequency Corresponding to Scale Value					Overall Relative Importance Index	Ranking
C-25	Delay in approving changes by the consultant	2	2	5	4	4	57	12
C-29	Low productivity of labor	2	2	5	5	3	56	13
C-38	Fluctuation in prices of construction materials	1	2	4	4	4	53	14
C-35	Poor site supervision and associated problems	2	2	5	4	3	52	15
C-53	Political instability	2	4	5	4	2	51	16
C-20	Problems in design drawings	2	2	4	4	3	49	17
C-39	Deficiencies in BOQ'S	2	1	5	2	3	45	18
C-28	Inappropriate construction methods	2	2	4	5	1	43	19
C-30	Shortage of skilled/unskilled labor	2	1	4	3	3	43	20
C-15	Delay in decisions regarding pre-construction phase by client or consultant	1	1	4	4	2	41	21
C-31	Shortage of required T&P with contractor	1	2	5	4	1	41	22

Cause ID	Cause Title	Frequency Corresponding to Scale Value					Overall Relative Importance Index	Ranking
C-10	Delay in contractor finalization due to external influences	2	2	1	4	3	40	23
C-7	Delay in developing detailed design drawings	2	2	5	3	1	38	24
C-37	Poor planning for procurement of materials		2	4	3	2	38	25
C-27	Escalation issues	2	1	3	3	2	35	26
C-14	Slow procedural processing	2	3	4	2	1	33	27
C-48	Disputes of subcontractors with main contractors	2	2	3	2	2	33	28
C-13	Governmental rules and regulations	4	3	2	1	2	30	29
C-51	Litigation solvation	1	2	4	2	1	30	30
C-49	Frequent change of subcontractors	2	2	3	2	1	28	31
C-8	Delay in bidding/tendering process	2	1	3	2	1	26	32
C-22	Delay in decisions by the consultant	1	1	3	2	1	25	33
C-41	Severe weather	2	1	3	1	1	22	34

Cause ID	Cause Title	Frequency Corresponding to Scale Value					Overall Relative Importance Index	Ranking
	conditions							
C-19	Unexpected subsoil conditions	3	3	1	1	1	21	35
C-42	Political interfaces	3	1	1	1	1	17	36
C-40	Lowest bidding method	3	1	2	1	0	15	37
C-3	Delay in approving project plan from concerned authorities	2	2	1	1	0	13	38
C-2	Delay in acquiring land for the project	2	1	2	0	0	10	39
C-17	Delay in dismantling of existing structure at site (if any)	3	2	1	0	0	10	40
C-45	Labor strikes	3	2	1	0	0	10	41
C-52	Contract termination	3	1	0	0	1	10	42
C-5	Delay in soil investigation data	2	2	1	0	0	9	43
C-23	Delay in decisions by the owner/client	4	2	0	0	0	8	44
C-34	Sudden failures actions	2	1	1	0	0	7	45
C-44	Safety and security threats (accidents at site)	2	1	1	0	0	7	46

Cause ID	Cause Title	Frequency Corresponding to Scale Value					Overall Relative Importance Index	Ranking
C-1	Delay in conceptual planning	2	1	0	0	0	4	47
C-16	Delay in relocation of services (if any)	2	1	0	0	0	4	48
C-36	Accessibility issues of construction site	2	1	0	0	0	4	49
C-43	Inflation	1	1	0	0	0	3	50
C-4	Delay in environmental approval of project	2	0	0	0	0	2	51
C-6	Delay in traffic survey data (for road projects)	1	0	0	0	0	1	52
C-12	Pooling among the contracting parties	1	0	0	0	0	1	53

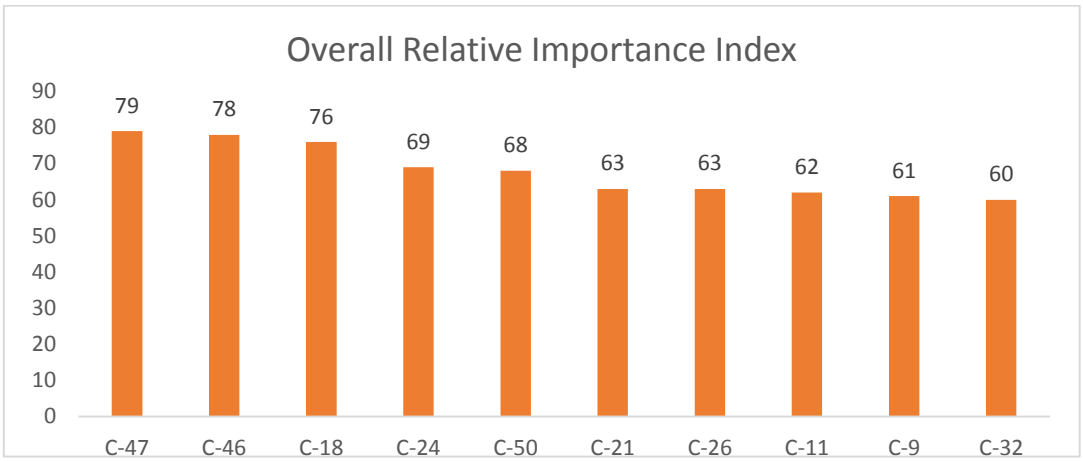

Figure4. 1 **Bar Chart of Causes Ranking 1-10**

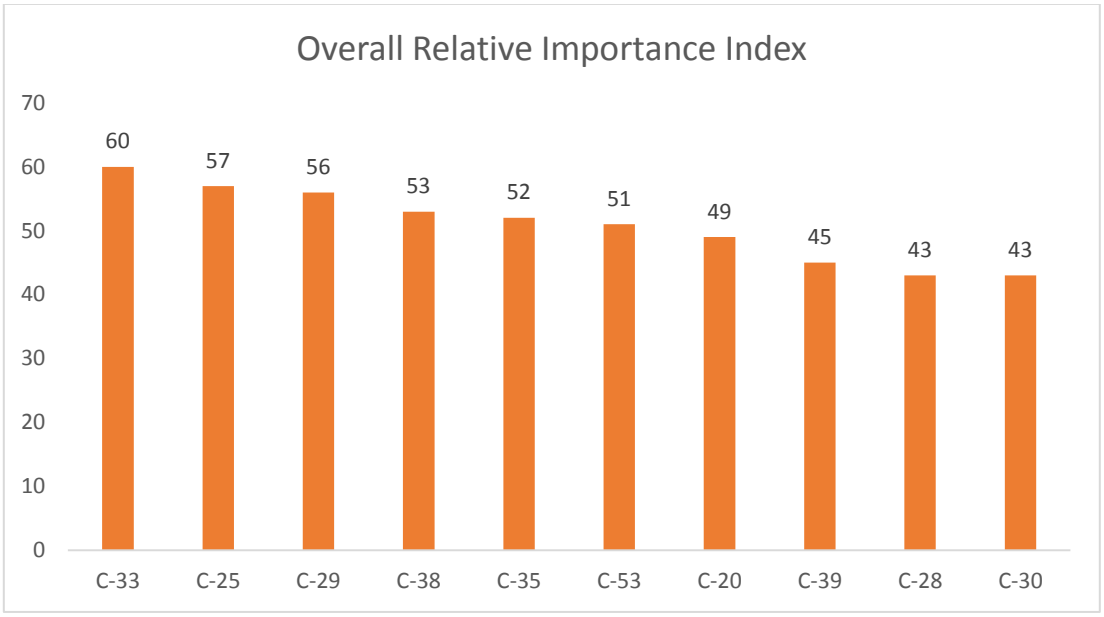

Figure4. 2 **Bar Chart of Causes Ranking 11-20**

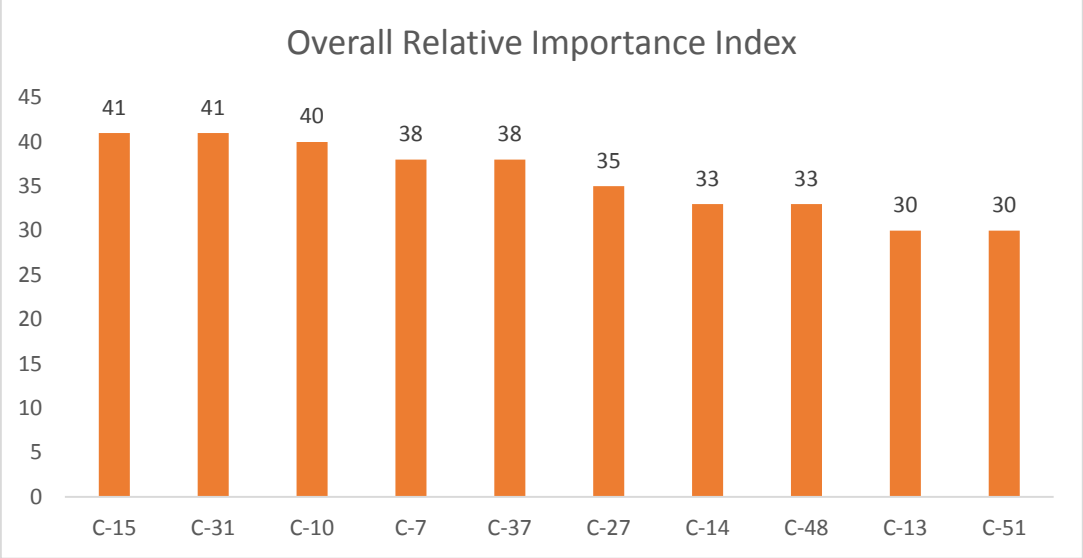

Figure4. 3 **Bar Chart of Causes Ranking 21-30**

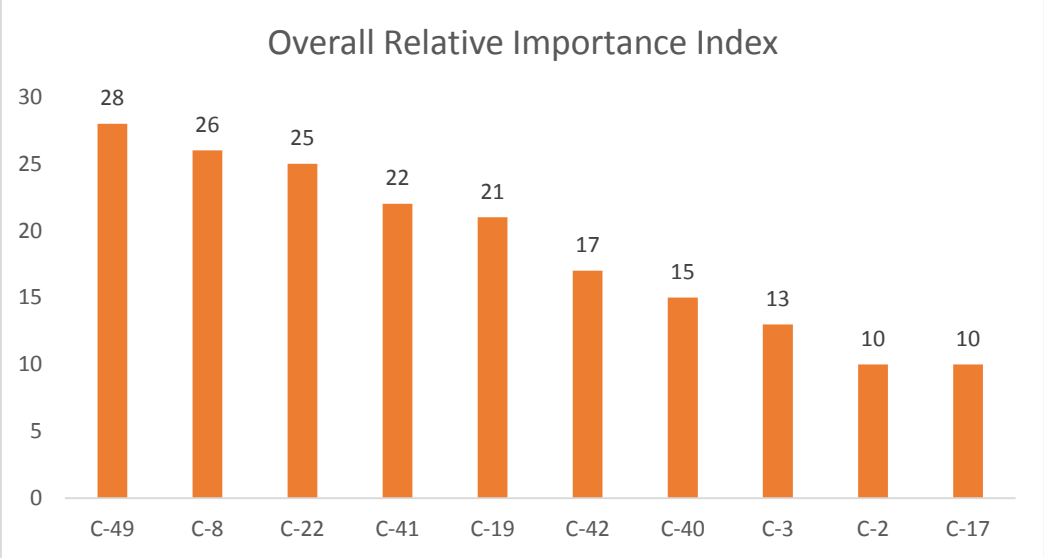

Figure4. 4 **Bar Chart of Causes Ranking 31-40**

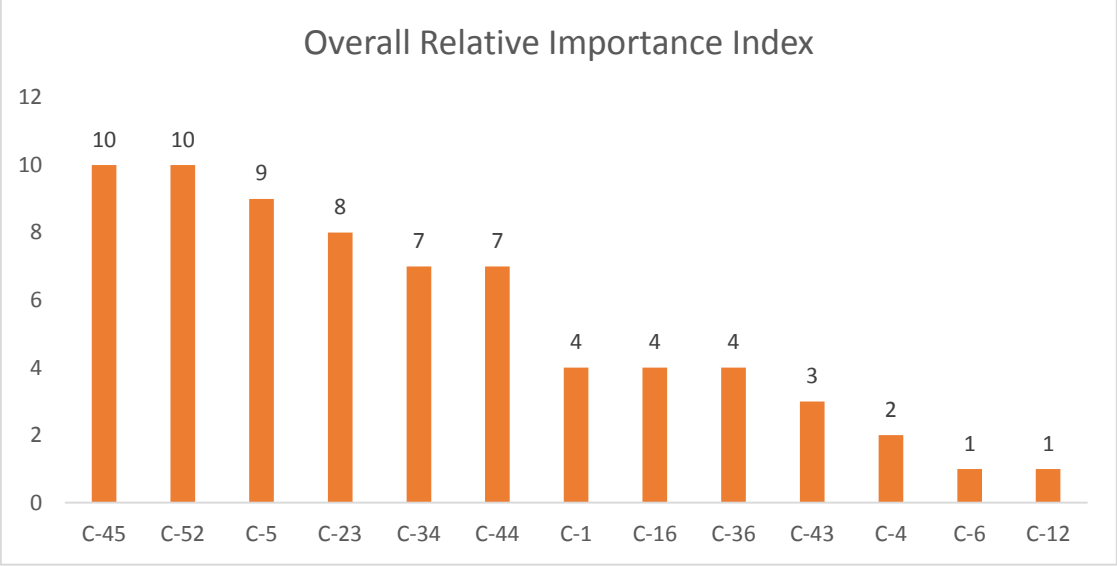

Figure4. 5 **Bar Chart of Causes Ranking 41-53**

Table.4 3 **Ten key Causes at Pre-construction Level**

Cause ID	Cause Title	Overall Relative Importance index	Rank
C-11	selecting of inappropriate contractors	62	1
C-9	Fixing of unrealistic project completion time	61	2
C-15	Delay in decisions regarding pre-construction phase by client or consultant	41	3
C-10	Delay in contractor finalization due to external influences	40	4
C-7	Delay in developing detailed design drawings	38	5
C-14	Slow procedural processing	33	6
C-13	Governmental rules and regulations	30	7
C-8	Delay in bidding/tendering process	26	8
C-3	Delay in approving project plan from concerned authorities	13	9
C-2	Delay in acquiring land for the project	10	10

Table.4 4 **Ten key Causes at Construction Level**

Cause ID	Cause Title	Overall Relative Importance index	Rank
C-47	Financial limitations of contractor	79	1
C-46	Delayed payments to contractor	78	2
C-18	Non availability/release of funds during fiscal year	76	3
C-24	Change in scope of work	69	4
C-50	Legal disputes between parties	68	5
C-21	Revision of design drawings	63	6
C-26	Fraudulent practices and corruption	63	7
C-32	Frequent equipment Breakdown	60	8
C-33	Poor site management by contractor	60	9
C-25	Delay in approving changes by consultant	57	10

Table.4 5 **Key Causes by Contractor's Perspective**

Cause ID	Cause Title	Overall Relative Importance index	Rank
C-47	Financial limitations of contractor	79	1
C-46	Delayed payments to contractor	78	2
C-18	Non-availability/release of funds during fiscal year	76	3
C-24	Change in scope of work	69	4
C-50	Legal disputes between parties	68	5
C-21	Revision of design drawings	63	6
C-27	Escalation issues	35	7
C-25	Delay in approving changes by consultant	57	8
C-38	Fluctuation in prices of construction materials	53	9
C-53	Political instability	51	10

Table.4 6**Ten Key Causes by Consultant's Perspective**

Cause ID	Cause Title	Overall Relative Importance index	Rank
C-18	Non-availability/release of funds during fiscal year	76	1
C-26	Fraudulent practices and corruption	63	2
C-29	Low productivity of labor	56	3
C-39	Deficiencies in BOQ'S	45	4
C-11	Selecting of inappropriate contractors	62	5
C-9	Unrealistic project completion time	61	6
C-33	Poor site management by contractor	60	7
C-32	Frequent equipment Breakdown	60	8
C-28	Inappropriate construction methods	43	9
C-31	Shortage of required T&P with contractor	41	10

Table.4 7 **Ten Key Causes by Client's Perspective**

Cause ID	Cause Title	Overall Relative Importance index	Rank
C-33	Poor site management by contractor	60	1
C-30	Shortage of skilled/unskilled labor	43	2
C-29	Low productivity of labor	56	3
C-39	Deficiencies in BOQ'S	45	4
C-18	Non-availability/release of funds during fiscal year	76	5
C-28	Inappropriate construction methods	43	6
C-37	poor planning for procurement of materials	38	7
C-31	Shortage of required T&P with contractor	41	8
C-13	Governmental rules and regulations	30	9
C-53	Political instability	51	10

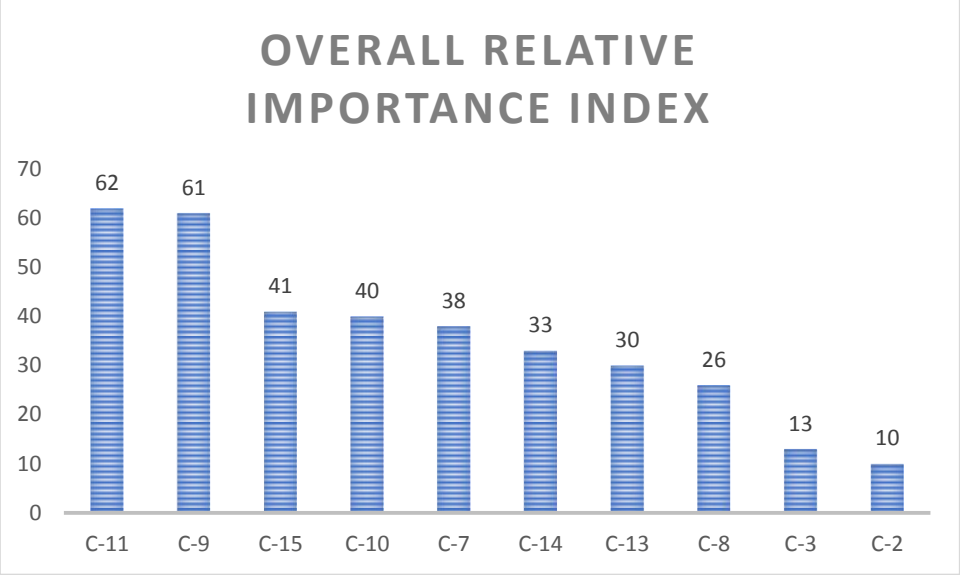

Figure4. 6**Ten key Causes at Pre-construction Level**

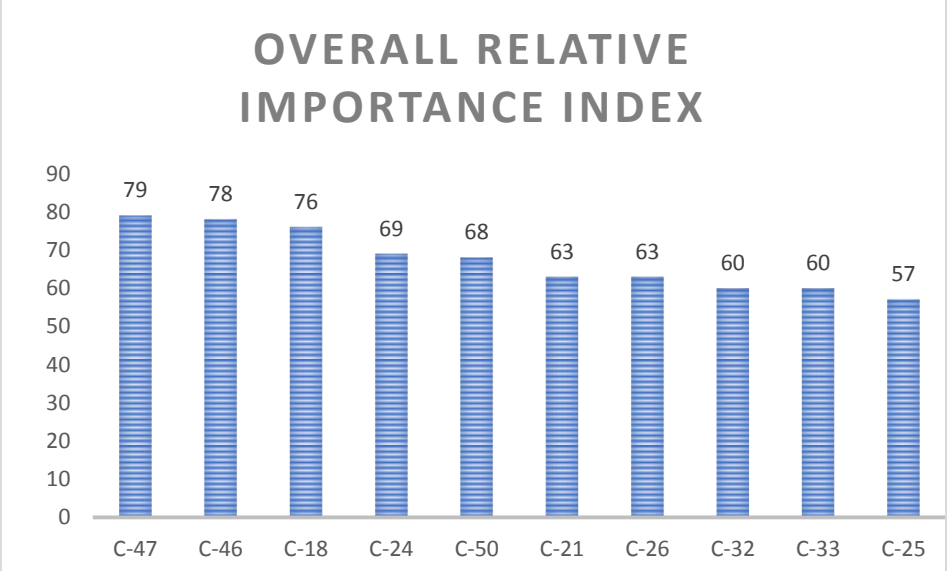

Figure4. 7**Ten key Causes at Construction Level**

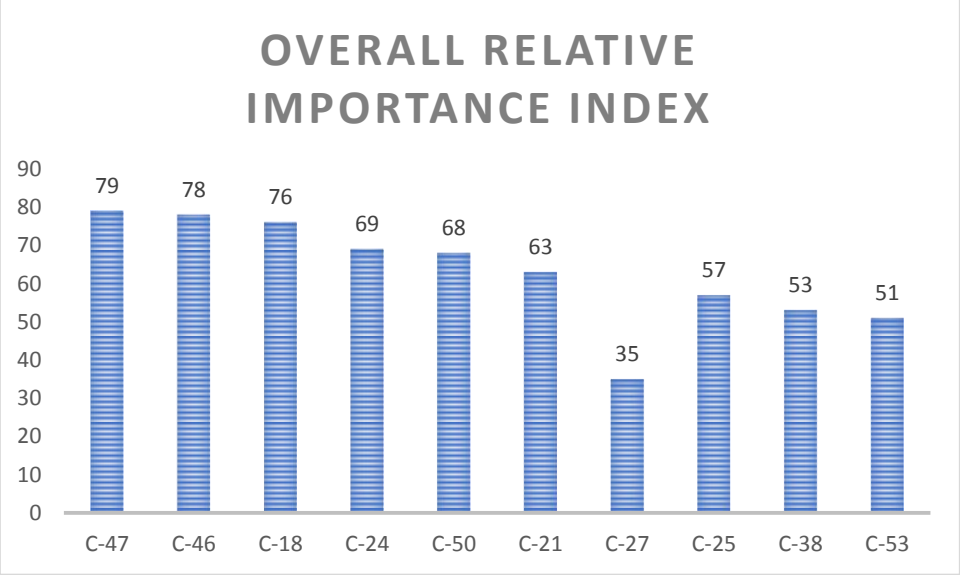

Figure4. 8 Ten key Causes by Contractor's Perspective

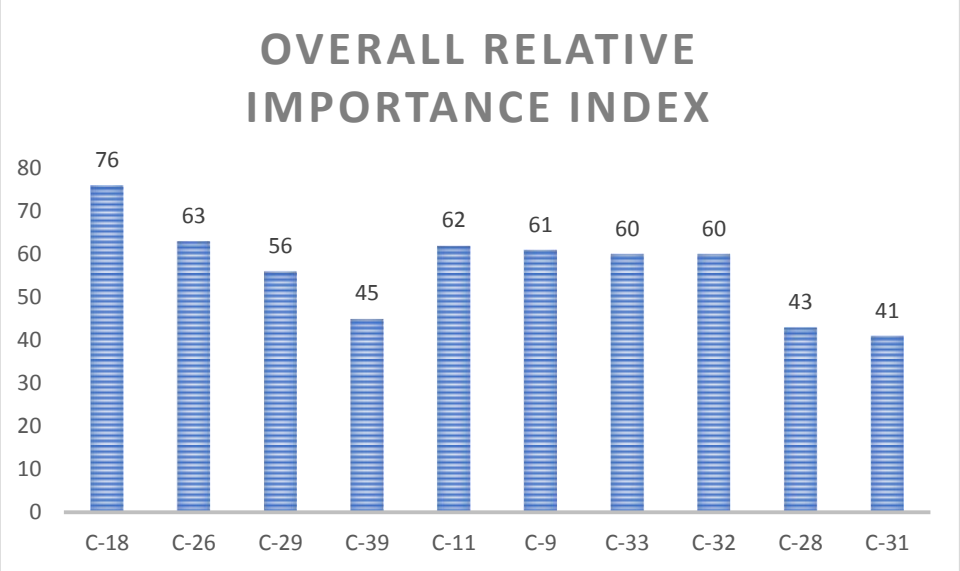

Figure4. 9 **Ten key Causes, Consultant's Perspective**

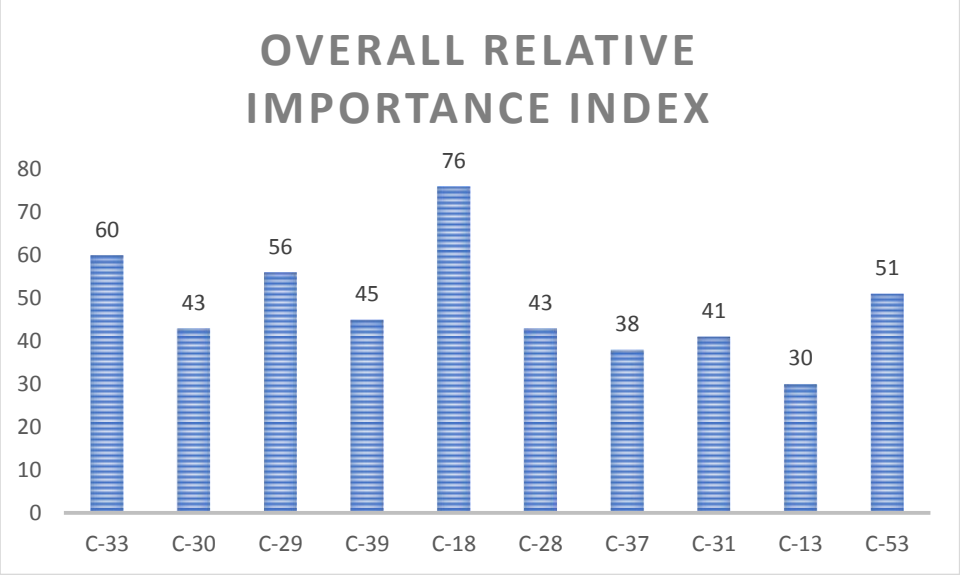

Figure4. 10 **Ten key Causes, Client's Perspective**

4.3 Analysis of Causes

From the ranking of overall relative importance index, top twenty-two causes are selected for further analysis having index value greater than 43%.

Rank 1: Financial limitations of contractor (Cause ID C-47)

All the three parties of project agreed on this cause. As the most of the biggest clients in construction industry of Pakistan are Government agencies. According to contractors, Government approves a project but they don't have availability of funds to complete that project, and sometimes funds for a project approved by a Government are either not released by new Government or reduced for that particular project, in this scenario; contractor is under financial crisis and project delays. Clients also agree that due to non-availability/release of funds during project completion time causes difficulty for contractors to finance the project from their own resources as a result of that, project delays.

Rank 2: Delayed payments to contractor (Cause ID C-46)

This cause is also related with funding problems during construction. In Government funded projects either the funds are not available to level that is required or the process of release of funds to contractors is very cumbersome. According to contractors, interim payment application has to be approved by a lot of authorized Government representatives and sometimes their interim payment application is approved after a considerable amount of time. In this period contractor has to pay his labor, machinery cost and solve all other project financial issues on his own. This cause leads the progress rate of construction to a slow pace which causes delay in the projects.

Rank 3: Non-availability/release of funds during fiscal year (Cause ID C-18)

This cause is related to "Financial limitations of contractor (Cause ID C-47)" and has been explained under this cause.

Rank 4: Change in scope of work (Cause ID C-24)

This cause is ranked in top ten by the client. Due to non-availability of funds or national slump in economy the client is left with only one way i.e. to change or reduce the scope of work. During this process designs are reviewed, hence causing delays.

Rank 5: Legal disputes between parties (Cause ID C-50)

This cause is due to any of all three parties of project. Legal disputes between parties of project cause hurdles in smooth running of project. According to contractors, when scope of project reduces they have to be compensated by client to minimize their loss of profit. According to consultants, contractors do not effectively mobilize their resources at site, they hire sub-contractors and their quality of work is not up to technical specifications (world standards). As a result of that legal dispute between parties of the project arises and cause delay in project.

Rank 6: Revision of design drawings (Cause ID C-21)

All parties agree on this cause of delay. According to them, when project scope changes or there is an error in design drawings then construction work stops until the availability of revised design drawings. This causes delay.

Rank 7: Fraudulent practices and corruption (Cause ID C-26)

Consultant has placed this 2nd major cause of delay. According to them, contractors do not follow technical specifications and standards during execution of the projects, their bill of quantities contain discrepancies, which causes slowness in procedural processing. And whenever any part of constructed structure is identified as not according to standards then contractor at his own expense has to construct that part of structure which affects the work schedule as a result of which project delays.

Rank 8: Selecting of inappropriate contractors (Cause ID C-11)

The consultants have ranked this among top of causes of delay. In their point of view, it is the most critical cause for the delay and cost overrun of the Government funded projects. In public sector organizations, bribing is done to win the tender or contract of a particular project. Because of the false practices those contractors are selected for the projects that are not capable of doing the project or those that do not have sufficient resources to complete projects according to technical specifications (tender documents).

Rank 9: Fixing of unrealistic project completion time (Cause ID C-9)

Both contractors and consultants agree on this cause. Usually in public sector projects, the client desires an unrealistic project completion date because of the poor project planning tools and political pressure of non-technical persons.

Rank 10: Frequent equipment Breakdown (Cause ID C-32)

Consultants and clients have ranked this cause in top causes. Mostly contractors do not have required construction machinery with them or they do not have skilled persons to

use that machinery as a result of that almost every day either of any of the construction equipment is out of order.

Rank 11: Poor site management by contractor (Cause ID C-33)

This cause has ranked among top by clients and consultants. According to them, most of contractors hire sub-contractors to perform a work and quality of work performed by sub-contractors is not up to standards, which leads to repairs.

Rank 12: Delay in approving changes by consultants (Cause ID C-25)

This cause has been raised by contractor. Mostly when changes in drawings are to be approved by consultants, they take long time for it which delays the project.

Rank 13: Low productivity of labor (Cause ID C-29)

This cause has got importance in consultant's perspective. This is explained in "Poor site management by contractor (Cause ID C-33)".

Rank 14: Fluctuation in prices of construction materials (Cause ID C-38)

All three parties of project agreed on this cause. As Pakistan is a developing country so there is no stability in prices of construction materials in the market which causes problem in smooth running of projects.

Rank 15: Poor site supervision and associated problems (Cause ID C-35)

In consultant's point of view, usually, the contracts are awarded to contractors based on personal judgment and personal benefits, not on technical basis. It justifies the reasons behind the cause "Less qualified technical staff of contractor".

Rank 16: Political instability (Cause ID C-53)

When the Government changes, the new Government terminate or halt the projects initiated by the previous regime. It changes the policies and starts new projects depending upon their own priorities. As a result of this process projects are delayed.

Rank 17: Problems in design drawings (Cause ID C-20)

This cause has been prioritized by contractor and consultant. Sometimes design drawings are problematic as the field conditions are not according to conditions which have been considered during design of project.

Rank 18: Inappropriate construction methods (Cause ID C-28)

Most of construction methods employed in Pakistan are traditional contractors do not have required construction machinery and their techniques deployed for construction of projects are not up to the international standards.

Rank 19: Shortage of skilled/unskilled labor (Cause ID C-30)

Some of the contractors do not have skilled labor in proportion which is required as a result of that quality of work is not up to mark.

4.4 Management of Causes Leading to Road Delay

From previous studies on causes of delay in construction projects and their effects, following two results have been obtained. First question was "Can the identification of causes help in saving time and money?" 61.5% of the respondents strongly agree that identification of these causes can lead to reduce the delays and cost overrun in construction projects. This response demonstrates that the respondents were interested in the control of these causes. These results show the necessity for the recognition of the possible causes. Time and money are two of the most important resources for a company so it should be on the top priority of the management division to find possible causes so that remedial measures can be taken well in time. For the second question i.e. "Can research and development department improve the performance of an organization?" 47.7% have strongly agreed and 41.5% have agreed. This response was very large. It means that the respondents in the construction industry regard research and development as very essential.

CHAPTER 5

IMPACT AND MITIGATIONS OF DELAYS IN ROAD CONSTRUCTION

5.1 GENERAL

Road Development extends regularly keep running into delay, paying little heed to whether because of temporary worker blame, demonstrations of the proprietor/boss, or conditions crazy of either party, and their belongings and cures are basic. For the most part question, arrangements, and over cost and so forth are the impacts of defers which apply on every one of the gatherings associated with the task. The results of postponements are diverse for various gatherings. The general results are the loss of cash and time. For proprietor, postpone implies the loss of cash and non-accessibility of offices. For contractual worker, postpone implies the loss of cash for additional consumptions on hardware and materials and procuring the work and also loss of notoriety.

5.2 Effects of Delay on Road Construction Projects:

The most imperative postpone impacts in street development industry are time invade, cost overwhelm, relinquishment and debate which have been given beneath. Time overwhelm alludes to the late culmination or late conveyance, from the time indicated or as concurred by all gatherings, of development venture. The primary driver for the time invade have been recognized as monetary issues, late installments for the finished work and progressing work, change orders, authoritative changes and so on. Cost overwhelm alludes to the expanded expenses of work, working power, materials and gear and so forth. Primary driver for the cost invade are change orders, botches in the agreement, changes in illustrations, increment in extent of works and so on. Deserting alludes to the aggregate relinquishment of the street development venture each work or suspending the task for long time. The fundamental driver for surrender have been recognized as authoritative changes, administrative changes, accounts and installments, catastrophic

events and so forth. Numerous expansive street development ventures are briefly or for all time relinquished because of money related emergency, catastrophic events, hierarchical changes and so on. Arrangements and court cases alludes to the transactions and going to court to take care of the issues and it requires a long investment to take care of the issues, in court cases the time span for these keep going for a long time. The fundamental driver of arrangements and court cases have been distinguished as late installments for finished work or progressing work, change orders and so forth. Question allude to the little issues in the middle of various gatherings in the street development venture. The fundamental purposes behind question have been recognized as moderate or late installments for finished or continuous work, customer impedance, neighbor issues, change in necessities, circulation of work, poor correspondence among the planning parties, subcontractor issues and so on.

5.3 Relationship between Causes and Effects on Delays

There are both immediate and aberrant connection amongst circumstances and end results of postponements in huge street development ventures. All causes which are not solved with in suitable time become catastrophic lead to delays, cost overrun, Lawsuits and finally to abandonment.

5.4 Remedies for Delays in Road Construction Projects

Road construction project as often as possible continue running into delay, paying little heed to regardless of whether because of short lived worker blame, displays of the business or conditions outside of the control of either party. Cases identifying with delay are exceptionally hard to tackle as no gathering needs to take obligation of postponement and turn into a casualty of deferral.

5.4.1 Role of Liquidated Damages

Road construction contracts as often as possible oblige the portion of 'sold damages' (i.e. a pre-agreed settled aggregate) in respect of particular sorts of burst. Road advancement contracts routinely give which if the brief specialist fails to complete the works by the date, or inside the day and age, stipulated in the assention (as adjusted by any extensions of time properly surrendered under the understanding), by then the authoritative laborer must pay to the business (or the business will be met all requirements for deduct), traded hurts at an agreed each day or week after week rate, starting from the errand fulfillment date until the point that the moment that wander is extremely wrapped up. The fuse of traded hurts arrangements of this nature has purposes of enthusiasm for the two social events. From the brief specialist's point of view, such arrangements are frequently thought to be an imperative of the legally binding laborer's commitment for delay, empowering the authoritative specialist to grasp the level of its peril for late perfection and assume that risk the sensitive cost. From the business' point of view, sold damages arrangement gives the business a definitive perfect to compensation at an agreed rate, making it unnecessary for the business to look for after a claim against the legally binding specialist for general damages for break of assention (which would require the business to offer affirmation to exhibit the honest to goodness hardship he has persevered).

The enforceability of any sold harms proviso under “FIDIC (general conditions of contract)” and “PEC STANDARD FORM OF BIDDING DOCUMENTS (Civil Works) revised on June 11, 2007, Clause 48 and Clause 43”is subject to different guidelines, fusing the keep running in association with "discipline conditions". As demonstrated by this run, all together for the announcement to be enforceable the traded hurts must be set at a level which reflects a real pre-measure of the business' conceivable hardships rising up out of any postponement.

5.4.2 Extensions of Time

Development extends more often than not keep running into defers in this manner standard shape advancement contracts commonly make course of action for the transitory laborer to affirm a development of time to the legitimately restricting date for complete under such conditions.

For example, condition 8.4 of the FIDIC Silver Book (1999 Edition) states that:

" The Contractor should be qualified subject for Sub-Clause 20.1 [Contractor's Claims] to an expansion of the Time for Completion if and to the degree that summit for the clarifications behind Sub-Clause 10.1 [Taking Over of the Works and Sections] is or will be put off by any of the running with arrangements:

a) A Variation (unless a change in accordance with the Time for Completion has been concurred under Sub-Clause 13.3 [Variation Procedure]).

b) A reason for defer giving a privilege to augmentation of time under a Sub Clause of these Conditions.

c) Any postponement, obstacle or avoidance caused by or owing to the Business, the Employer's Personnel, or the Employer's distinctive transitory specialists on the Site."

Being developed law, if the business makes delay the satisfaction of the works and the assention does not contain a framework for the legitimately restricting completing date to be extended due to such deferral, by then the business will lose the advantage to guarantee exchanged damages.

In these conditions, time is accepted to be "everywhere", construing that the predestined time for fulfillment is never again enforceable; rather, the legitimately restricting worker is obliged to finish the works inside a sensible time, and the business will be possessed all the necessary qualities for state general harms on the off chance that he neglects to do everything considered. A specific issue in relationship with claims for advancements of time rises where no under two occasions add to a similar deferral – in like manner called "Synchronous Delay". As per "PEC STANDARD FORM OF BIDDING DOCUMENTS (Civil Works) changed on June 11, 2007, Clause 44.1 of General Conditions of Contract, Extension of Time for Completion "Development of time to impermanent specialist may be given;

In case of:

(a) The sum or nature of additional or extra work,

(b) Any reason for defer alluded to in these Conditions,

(c) Exceptionally unfavorable climatic conditions,

(d) Any deferral, obstruction or anticipation by the Employer, or

(e) Other extraordinary conditions which may happen, other than through a default of or rupture of assention by the Contractor or for which he is reliable, being, for instance, tolerably to qualifies the Contractor for a development of the Time for Completion of the Works, or any Section or part thereof, the Engineer may, after due talk with the Employer and the Contractor, choose the measure of such growth and should tell the Contractor as necessities be, with a copy to the Employer. This situation can be particularly

troublesome if the delay is caused both by a "business danger" event (in respect of which the brief specialist would be fit the bill for an increase of time) and a "legally binding laborer shot" event (for which the contract based worker couldn't assert an expansion).

5.4.3 Delay and Disruption Claims

Where the work is delayed for reasons outside the authoritative specialist's control, the impermanent laborer may be fit, in particular conditions, to ensure a development of time, and additionally additional costs rising on account of the deferral. For example, stipulation 2.1 of the FIDIC Silver Book (1999 Edition) gives the impermanent laborer a legitimate perfect to ensure additional portion if the business fails to permit the legally binding specialist possession and furthermore access to the site inside the time communicated in the assention, and the transitory specialist perseveres through deferral and additionally achieves costs as needs be. In conditions, for instance, these, the heads of incident for the most part ensured by transitory laborers may include:

- Head office overheads;
- Expanded preliminaries;
- Back charges;
- Loss of benefits;
- Loss of profitability.

How much a brief laborer will have the ability to recover such disasters will depend on the wording of the specific articulation on which the legally binding specialist is attempting to depend and is every now and again furthermore an issue for game plan with the business and furthermore game plan of such cases in the appropriated spending design. Sometimes the assention communicates that the 'Understanding Price' consolidates a settled total for head office overheads and advantage which isn't fit for modification, and that no cases by temperance of such costs will be made against the business, in which case it may be

troublesome for the legally binding laborer to fuse such costs in any case for hardships. The assention may similarly shield the brief laborer from recovering certain sorts of mishap except for specifically conditions: for example, the significance of "Cost" in the FIDIC suite of understandings keeps away from advantage, and especially recognizes the conditions in which a Contractor may state "sensible advantage" in any case "Cost" (normally in conditions where blame joins to the business)

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

This work includes identification and ranking the most critical twenty causes out of the selected possible fifty-three causes. The causes were classified into seven different phases of road construction and one general causes. The results were related to previous studies carried out on topic. On the same lines the association of experience, level of education and previously completed projects was also tested to check whether they had any significance on the rating of the causes. The following conclusions and recommendations are presented here on the basis of aforementioned methodology.

CONCLUSIONS

Financial limitations/Problems have been identified as the most important/major reasons of the delay.

Poor site management by contractor is the next reason of delay as indicated by the client.

Non-availability/release of funds during fiscal years is another reason of delay according to consultant.

Difficulties in financing the project are major reason of delay as per contractor.

Most of the top twenty causes were from the road construction phase.

The causes in “define objective” phase and “tendering” phase was ranked least important.

In the remarks/comments section of questionnaire, experienced engineers discussed and portrayed their view of the expected results but the final results of the report were entirely different. In other words what they believed were the causes of delay and cost overrun turned out to be misconceptions. Most of the factors mentioned by the respondents in comments were unable to compete for top twenty major causes of delay and cost overrun.

A few of these misconceptions have been given below:

- Old road construction practices.
- Relocation of existing public services or utilities.
- Permits and regulations (No objection certificates, NOCs) from government agencies.
- Lack of co-ordination among the parties
- Award of contract to lowest the bidder.

From parties' point of view, the client blamed contractor for the major delays and cost overruns while consultant response was intermediate (both for client and contractor). Contractor believed that client is responsible for delay and cost overruns. The proposals depend on the above conclusions and no presumptions have been considered. Questionable outcomes have been discarded and legitimate thought has been paid to the reasonability of these suggestions for:

Monitoring the cash flow is beneficial for project. Poor cash flow results into delays and procurement of materials cannot be done in time. For client, delay in payment means contractor has no option but to decrease the pace of road construction work or in worst conditions can cease the pace of work. To avoid delay both parties should monitor cash flow carefully. For better site control and management, contractor may introduce a project management unit to manage the site properly. The same unit may be used to incorporate changes into schedule and work out the required efficiency. The client, at the time of bidding may ensure that the bidders are financially strong and competent enough to handle the project. Further, their technical ability may be checked to match the complexity of the project. New tools and software like Project manager or Primavera may be used for the planning so that a realistic project completion date is achieved. It will also facilitate real time monitoring of the project by the personnel in hierarchy.

It is recommended that a periodic evaluation of the project is to be done to identify the short comings in the planning. On the basis of these evaluations the processes may be redesigned or modified to rectify the mistakes. Delays due to conflicts can be avoided by involving a third

party as mediator. The contract may include a mechanism of conflict resolution. Law and litigation may be avoided at any stage by adopting policy of transparency. The top management or the hierarchy is recommended to ensure that no delay is caused due to pending decision or the conventional processing time as well as attitudes. The technical decisions are advised to be taken by the engineers not by others. Some of the causes like slump in economy, conventional bureaucratic style, political instability and unsupportive policies by government can only be catered by good governance and fair intensions. All the parties of project are recommended to employ people with capabilities matching to the job. In case of mismatch, delays result when people are unable to fulfill their responsibilities. Adopting the merit system for recruitment can solve this problem. The project planning may be done on the probabilistic approach of occurrence of cause so that float may be provided at the right place. The critical phase that is road construction phase may be given more consideration in the planning. There should be mechanism for implementation for a transparent procurement policy in order to dismantle the corruption and bribery as well as undue influence of notables. Temporary workers ought to enhance their venture administration abilities and lucid their assets so as to address there two issues for the advantages of their own and additionally the activities. Advisors and customers as a rule don't give opportune endorsements. Each action in the street development administration design is bridled with CPM. Postponement in finished movement imperils the courses of events of succeeding exercises. In the long run venture slip out of endorsed cost benchmark. With a specific end goal to keep away from this circumstance, applicable partners should give convenient endorsement of the illustrations, shop illustrations and some other submittals. PMIS fills in as eyes and ears of any street development ventures. All exertion as far as machine and materials can be utilized ideally by utilizing a compelling PMIS. Non-point by point Planning prompts development of impossible calendar which the contractual worker can't take after. Point by point arranging wipes out the odds of calendar delays. Keeping in mind the end goal to defuse strain, clashes, conflicts and inflexible state of mind among essential partners, there ought to be an arrangement of open entryway approach.

Larger part of the tasks get postponed or deserted because of lack of assets. The customers must guarantee and keep up supply of assets according to income requests. Pointless

interruptions of money streams or unnecessary budgetary controls impede the execution and the efficiency. Visit showcase vacillations and value climb by few market players truly influenced the street development industry. The administration ought to advance stringent system and approaches to capture such sort of unfortunate patterns.

This is the most neglected aspect in road construction projects. The projects get delayed as well as over budgeted due to heavy sick ratio in workforce. In case of any major causality at job site, the whole momentum is drastically slowed down. It is always recommended that a Health and Safety Program should be evolved so that projects can be completed on time and within the allocated budget.

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