



Managing Construction Projects In Terrorism Affected Areas

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ABSTRACT

Construction projects located in Pakistan requires a lot of skill and experienced hands to handle, as it suffers from many problems and complex issues. Market fluctuation especially in Pakistan is quite unpredictable and other than that, factors like energy crises, tribal area related difficulties, economical crises and terrorism doesn't let the projects progress especially in far-flung areas, which requires real attention. The experience of managing project in such areas is an experience of unique kind, where the attitude and way of doing the things by all main stake holders government consultants, contractors, client and resident of area are totally different.

This paper highlights the issues and management techniques of construction projects to be carried out in terrorism-hit areas in Pakistan. This paper identifies practical problems and suggests different solutions to resolve them effectively and economically. The research is limited to survey / interviews of different categories of stakeholders in Pakistan, conducted in three phases. In the first phase different stakeholders were interacted, while in second stage interviews were carried out of the participants including owners, consultants, engineers, skilled labors, and contractors. In the third stage, based on the information collected in first two-phases, a questionnaire was developed and distributed. The survey findings indicate that the most important factors affecting project performance in terrorism affected areas includes: security, set mind pattern of area residents, contractor constraints, hiring of consultants, funding of project, plant/machinery availability.

KEYWORDS: construction project, project management, hilly-terrain, terrorism-hit areas.

1. INTRODUCTION

Construction industry plays an important role in the economy. Whenever the construction industry flourish it fetch employment, prosperity and development. The scale of these depends on the strength or massiveness of this industry. Its progression contributes significantly to the gross domestic product of the country. This industry faces a number of challenges in countries around the globe (Gale & Fellows, 1990; Ofori, 1990). In developing countries these challenges gets worsen due to several reasons including instability, socio-economic stress, resources shortages, economic recession, uncertainty and risks.

Most of the developing countries are equipped with natural resources but faces shortage of resources such as money, people, technical know-how and appropriate technology. There is shortage of skilled labour in developing countries although labor is in abundance (Moavenzadeh, 1984). The cost of materials, lack of funding, energy crises, terrorist activities, fluctuation of prices and fraudulent practices are the most important factors that lead to insecurity of investors, projects failures and high construction costs in the developing countries.

In a country like Pakistan among the aforementioned factors terrorism and lack of funding affects the construction industry badly. While energy crises and terrorism are the main contributing factor to the weak economy of Pakistan. Small local contractors face difficulty in obtaining loans/funding because of discontinuity in allotment of funds by government organizations, which results in discontinuity in progress of projects, due to which they are bound to use old and inefficient technology resulting in not only low productivity but also low quality. Large contracting firms (often foreign owned) although are equipped with modern technology and well versed in industry-driven procedures are reluctant to run projects in a country like Pakistan because of the security threats, fluctuation of prices and lack of support at the governmental level. This industry is strongly affected by political institutions as well in which the government mostly influences the public construction sector through policies and legislation

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regarding licenses and permits, sanitary and building codes, corporate taxes, rules on materials import and financing for construction.

Energy crises has forced almost all industrialists either to stop running their industries and to shift their businesses to other countries, or to import most of the things from developed countries like China with their brand name, hence contributing to poor financial/economic health and unemployment in Pakistan. Terrorism is quite rampant in Asia and especially, in Pakistan and Afghanistan. It is seriously impeding the development and economic progress of Pakistan. Donor Agencies avoid financing any development projects due to security hazards involved in its execution. Foreign investment has been stopped in Pakistan. Terrorism rather has brought a lot of bad name to Pakistan, which has made all the investors to flee from Pakistan.

Main contributing factors for uncontrollable terrorism was the, and is the lack of attention towards the border areas of Pakistan in the KPK and Baluchistan. Now even if the government wants to do some thing in main hubs of terrorism hit areas (i.e., *North Waziristan Agency (NWA)*, *South Waziristan Agency (SWA)* etc.,) cannot do any thing due to fin crunch, while the development in such areas starts with the development of road and building infrastructure, which includes schools, colleges, dispensaries and other allied facilities. Still nothing is gone and it is thought that terrorism can be mainly reduced and then eliminated after educating these areas and making them accessible to law enforcing agencies and government organisation which is possible if construction activities at excessive scale are conducted in these areas to make, education and basic facilities accessible to the people of area. Conducting quality construction activities in these areas is the most difficult task due to obvious reasons that includes high risk area, funding, security, and views of the local natives such as roads are being made to make us accessible to the forces and schools will take us away from Islam.

In the last decade, many projects finished with poor performance in these areas because of many reasons such as: obstacles by locals, non-availability of materials, roads closure, lack of raw material, safety, security, and price fluctuations etc. In addition, there are three important issues related to failures and problems of performance, including political, economic and cultural issues. In these terrorism-hit areas Jirga, tribal assembly of elders, holds the prestige of court in cases of criminals conduct. Jirga also plays a key role between the militants and the government, contractors etc. It is therefore required to first take in confidence the local Jirga, to let the development work to be carried out smoothly in the area. Most of the times they are influenced through different favors.

This research will evaluate the factors affecting the construction projects in the terrorism-hit areas, and will suggest techniques / measures to assist owners, consultants and contractors to overcome performance problem and improve project executing methodology of their construction projects. The remainder of the paper is organized as follows: Section 2, survey the work that studies the difficulties faced by construction industries in developing countries. Section 3 describes the research methodology used in this work. Section 4, focuses on the factors affecting the performance of construction projects, Section 5, focuses on the suggestions, to help overcome the factors affecting construction projects in terrorism-hit areas, Section 6, concludes the paper.

2. LITERATURE REVIEW

To the best of our knowledge there does not exist any work, which studies the factors that affect the project performance in the terrorism-hit areas. In this section, we will highlight the work, that studies the difficulties faced by construction industries in developing countries. Performance of the construction industry is the source of concern for both public and private sector clients (Okuwoga, 1998). The failure of which may result in the failure of construction project. Orgunlana et al. (1996) stated that performance problems in developing countries are classified in three layers: (i) shortages in industry infrastructure and availability of resources, (ii) problems caused by clients and consultants, and (iii) problems caused by contractors. Okuwoga (1998) identified that performance problem is related to poor budgetary and time control. Long et al. (2004) find out that in large construction projects the main reasons which results in performance problems includes: incompetent designers/contractors, poor estimation and change management, social and technological issues, site related issues and improper techniques and tools. Mir Hadi et. al. (2013) accentuates on the importance of the role of human resource managers in construction projects. They revealed that employing competent human resource managers can lead a construction firm

to not only improve quantity and quality of products, but also helps in achieving strategic goals efficiently.

Cheung et al. (2004) studied the performance problem related to project managers. It is identified that web-based construction project performance monitoring system can help project managers in implementing construction project performance indicators (e.g., time, cost, quality etc.) and therefore can help in monitoring and accessing project performance.

Jha et al. (Iyer, & Jha, 2006) find out through a survey conducted among Indian construction professionals that the factors which adversely affected the quality performances of projects included: conflict among project participants, hostile socio-economic environment; harsh climatic condition, lack of knowledge, faulty project conceptualization, and aggressive competition during tendering.

Kulchartchai & Hadikusumo (2010) examined the performance problem related to the safety culture in Thailand's large construction industry. Their findings revealed that the associated factors are the workers, the characteristics of construction, the subcontractors, the supervisors, and external factors. The three most frequently discussed problems are unskilled workers, unsafe worker habits, and high worker turnover.

Abdel-Razek (1998) has find out that the most important factor in contributing improvement in project quality in Egypt is 'improvement of employee satisfaction'. Tadayon et al. (Tadayon, & Jaafar, & Nasri, 2012) stated that most common risks that prevent the completion of construction associated with Iranian construction projects include financial risks (project funding problem), construction risks and demand/ product risks.

Wellington et. al. (2012) performed study to view the relationship between job satisfaction and performance level of construction employees in the Sudanese construction firms. Their findings revealed positive relationship between personnel job performance and job satisfaction. Moreover, they have found weaknesses in the job analysis of personnel. Lack of satisfaction among employees resulted in a decrease in the level of quality of job delivered and the duration of delivery of jobs is deliberately delayed.

Arditi & Gunaydin (1998) find that generic factors that affect process quality includes continuous quality improvement, management leadership in promoting high process quality, quality training of all personnel, efficient teamwork to promote quality issues at the corporate level, and effective cooperation between parties taking part in the project.

Frimpong et al. (2003) conducted study to identify and evaluate the relative importance of the significant factors contributing to delay and cost overruns in Ghana groundwater construction projects. It has been found out that main causes of delay and cost overruns in construction of groundwater projects included: monthly payment difficulties from agencies, poor contractor management, material procurement, poor technical performances, and escalation of material prices.

Yahya et. al. (2013), conducted study to explore the causes of delay in construction projects of Punjab-Pakistan. They find that the factors related to contractor, client, consultant, material and equipment have significant impact on delay in construction project whereas labor and general environment factors have no effects on delay.

Albert et al. (2004) conducted a study to identify a set of critical factors influencing construction durations of high-rise public housing projects in Hong Kong. Based on the collected information a prediction model has been proposed, that is based on the set of scope factors, construction method and housing scheme chosen.

3. RESEARCH METHODOLOGY

This research presents the main factors affecting the performance of construction projects in the terrorism-hit areas in Pakistan. The main methodologies obtained were: questionnaire survey, and interviewing. This research was concluded in three phases. In first phase problem areas were identified through interaction with different stake holders to include contractors, architect, consultants, designers, clients, provincial government officials, police authority, political agents, government coordinating officers of concern cities and never the less funding agencies. In second stage 25 skilled labour, 15 Jirga members, 20 contractors, 10 local residents and 18 operators of different plants and machinery like asphalt plant, crush plants and operators of dozers, grader etc., were interviewed.

Based on the collected information in the first and second phase, questionnaire was prepared in the third phase and was forwarded to 100 participants physically and through electronic media. The

participants included project managers, site engineers, office engineers, owners, provincial government officials, consultants / designers, political agents, and contractors. Total of 80 responses were received. Items in the questionnaire were scored using a five-point Likert scale as: *not important, slightly, moderately, very, and extremely important*. The questionnaires included items related to the factors affecting construction projects including cost, quality, security, time, interaction with Jirga member, scheduling, machinery and energy crises etc. Following ranking method is used to determine relative importance of the identified performance factors. Where W is the weight given to each factor by the respondents and ranges from 1 to 5. N represents the total number of respondents and $\sum W$ represents the sum of weights for each factor.

$$\text{Rank} = \frac{\sum W}{N}$$

4. Factors affecting the Performance of Construction Projects

4.1 Security

Security is the main concern of the terrorist-affected area due to which the project management techniques and standing orders varies from those applied in normal areas. Following are the main factors in these areas which differentiates it from others: (i) almost 70% of the residents above 20 years of age holds weapon, (ii) about 70% of population is illiterate, (iii) rocket launcher, mines and ammunition of every type is available in the area, (iv) terrorists are expert of fixing *Improvised Explosive Devices*(IEDs) of all kind, (v) people are hostile towards NGOs and government organization, (vi) kidnapping mainly for ransom, and (vii) suicidal attack is not a big deal. No body in the area can move without safety precautions even in the day light due to security concern, while all transport other than local has to move in the convoy or got to have the blessing of some Jirga member in the area.

The management of all activities including travelling of high officials, consultants, contractors, executive staff and transportation of supplies/equipment are to be monitored and moved with security elements, so as to avoid risk of attack from terrorists, which not only waste time rather enforce employment of additional resources like protection vehicles and guards etc. Safe communication in such areas is a bit issue because of intercepts by terrorists. Table 4.1 lists the concerns that can affect the performance of construction projects.

Table 4.1: Impact of Security on Construction Projects

	Concerns	Rank
a)	Delay in project completion	4.41
b)	Availability of skilled labour	3.13
c)	Application of modern designs	2.96
d)	Availability of transport locally	2.3
e)	Effects on move of project staff	3.6
f)	Quality of project	4.1
g)	Increase in cost of project	4.65
h)	Restriction on use of construction machinery	2.5
i)	Employment of good contractors and consultant	4.68
j)	Timely availability of required construction material	4.33
k)	Efforts required for safety of staff	4.59
l)	Increase in demand of modern communication means	3.5

4.2Set Mind Pattern

In these areas the people generally have following mind set: (i) all foreigners who speak English language are the enemies of Islam, (ii) education detract people from Islam especially woman, (iii) road infrastructure are if being made/developed is basically to facilitate North Atlantic Treaty Organization (NATO) forces in future, and (iv) modern communication means (like Internet) will have negative impact on the customs and behaviour of residents of the area. Table 4.2 lists the concerns that highlight the impact of set mind pattern on the performance of construction projects.

Table 4.2: Impact of Set Mind Pattern on Construction Projects

Concerns	Rank
a. Difficulty level of changing their attitude	2.2
b. Difficulty level of changing their beliefs/customs	4.12
c. Impact of negative attitude on project	4.15
d. Positive effects of following on project progress	
i. Interaction with Jirga members	4.1
ii. Spread of Education	2.51
iii. Development work in the area	2.5
iv. Awarding small contracts or jobs to Jirga members or their relatives.	4.01

4.3 Contractors Constraints

Non-governmental good quality firms are generally not willing to work in such areas. Instead local contractor may work in these areas that too on comparatively high rates. In this case quality assurance and schedule meeting becomes a question. Mostly the works / contracts are awarded to contractors having political connections, who are never checked for quality neither has competitors, so the rate and quality is of there will. Sometimes the projects are awarded to the lowest bidder, and less attention is paid on assessing their skills, plan, site management and resources availability. Table 4.3 lists the concerns and their ranking emphasizing the impact of set mind pattern on the performance of construction projects.

Table 4.3: Contractors constraints affecting Construction Projects

Concerns	Rank
a. Number of contractors interested to work in these areas	0.65
b. Quality of local contractor available	1.58
d. Recommendations for award of contracts to private contractors	0.55
e. Whom out of following main type of contractors, are best suited for terrorist hit area, keeping in view mainly rates, security situation, management of major projects, difficulty of area, quality and schedule completion	
i) Semi-government organizations	4.52
ii) Private large contractors firms	1.53
iii) Foreign large firms	1.5
f. Contracts awarded through fair and open bidding	0.11

4.4 Funding of Projects

Funding of projects in these areas always the last priority of the government. Even, if the funds are allotted to these areas for construction projects they are released in instalments. Usually, there is a gap in instalment release, resulting in the deterioration of work in progress because of the environmental factors. Large projects are usually funded through loans from international agencies or developed countries. Table 4.4 lists the concerns and their ranking emphasizing the impact of funding on construction projects.

Table 4.4: Impact of Funding on Construction Projects

Concerns	Rank
a. Government priority for project funding	0.53
b. Major sources of funding	
i) Donor agencies / foreign aid	4.65
ii) Government /semi-government	1.22

4.5 Plant & Machinery

Mostly large local/foreign firms are never interested to work in these areas. One of the reason is the

difficulty to secure their major machinery and plant pieces like asphalt plant, crush plant and Dozer/Grader etc., due to the threats from area local citizens and terrorists. Major equipment has to be secured while other like Dozer/Grader etc., are to fall back to secure places, which not only waste precious time rather effect the plant/equipment efficiency while travelling idol. Table 4.5 lists the concerns and their ranking emphasizing the impact of plant & machinery on construction projects.

Table 4.5: Impact of Plant & Machinery on Construction Projects

	Concerns	Rank
a.	Availability of sophisticated plant & machinery in area	0.45
b.	Feasibility of incorporating latest design / machinery	1.93
c.	Can machinery & plant be employed in this area as in other parts of Pakistan i.e., with minimum protection/ security of only one to two guards.	0.29
d.	Availability of local repairing facility	0.03
e.	Difficulty of transportation and fixing	3.18

4.6 Interaction with Jirga Members

Normally in such areas due to fear, the project managers avoid interacting with Jirga members to share their views and to give their own views. This creates a lot of misunderstanding and ultimately lead to bottlenecks in the way of successful and timely completion of project in a profitable way. Table 4.6 lists the concerns and their ranking emphasizing the impact of interaction with jirga members on construction projects.

Table 4.6: Impact of Interaction with Jirga Members on Construction Projects

	Concerns	Rank
a.	Necessity of interaction with Jirga members.	4.2
b.	Effect of interaction on project	4.69
	(i) Positive	
	(ii) Negative	1.12
c.	Frequency of interaction	1.65
d.	Places of interaction	
	(i) Offices	4.62
	(ii) Residences of Jirga members	0.09
	(iii) Public places	3.59

4.7 Quality

It is very difficult to ensure quality of construction in these areas. Major factors include non-availability of resources, skilled labour, quality contractors, weather conditions, and security. Due to security concern, it is not possible to ensure continuous and round the clock supervision. In addition, lack of information technology infrastructure, continuous supervision at longer distances cannot be ensured as required. Table 4.7 lists the concerns and their ranking emphasizing the impact of quality assurance on construction projects.

Table 4.7: Level of Quality Assurance

	Concerns	Rank
a.	Meeting required specification	3.6
b.	Availability of skilled labour	2.53
c.	Quality of available equipment's and raw materials	2.69
d.	Decision making efficiency by mangers/inspectors	2.15
e.	Quality assessment system in organization	2.5
f.	Quality assurance	3.09
g.	Quality training / meeting	1.59

4.8 Timely Project Completion

It is very difficult to ensure completion of project on time. The main contributing factors for

non-completion of project within time includes: (i) explosion of improvised explosive device at some point, (ii) threat intercepts of terrorist conversation, (iii) security arrangement entails slow progress as the working parties work under protection, (iv) non-availability of skilled labours, transport, plants, equipment and construction material as planned through project duration, (v) non-availability of local repairing facility of plant /equipment, and (vi) hilly-terrain with extreme weather conditions at few places. Table 4.8 emphasizes on main causes of delay in construction projects.

Table 4.8: Main Causes of Delay

	Concerns	Rank
a.	Time required for site preparation	0.9
b.	Time needed to perform repairs	1.4
c.	Average delay in claim approval	2.22
d.	Average delay in payment from owner/ government to contractor	2.69
f.	Delay due to non-availability of resources as planned through project duration	3.1
g.	Delay due to unpredictable security situations	4.3
	(i) Private firms	
	(ii) Semi government firms with integral security elements	

4.9 Hiring of Consultants

Availability of personals with qualification and experience leads to better assurance of quality, cost and less completion time of projects. It is very difficult to hire consultants for such kind of hard areas as no engineer from other provinces/country is willing to serve in such area at any cost, which ultimately results in lack of supervision. Table 4.9 lists the concerns and their ranking related to hiring of consultants.

Table 4.9: Hiring of Consultants affecting construction Project

	Concerns	Rank
a.	Private consultant willingness to serve in terrorist-hit area	.051
b.	Feasibility for employment of consultants	
	i) Semi-government	4.11
	ii) Private	1.44
	iii) International	1.01
c.	Feasibility of employing following technical staff	
	(i) Local residents	3.55
	(ii) Residents of other provinces	1.92
	(iii) Foreigners	.05
d.	Capability of handling projects with only integral resources	2.31

4.10 Type of Construction

Application of modern construction techniques is practically difficult in these areas, as it require modern equipment. Transportation of equipment to such areas is very difficult and costly. Furthermore, ensuring the curing and material standard for project quality is very difficult. Table 4.10 lists the concerns and their ranking related to feasibility of design techniques on construction projects in terrorism-hit areas.

Table 4.10: Feasibility of Design/Techniques on Construction Projects

	Concerns	Rank
a.	Adopting contemporary techniques requiring modern machinery.	1.34
b.	Adopting old / existing techniques of areakeeping in view resources constraints.	3.51

4.11 Construction Cost

Construction costs in these hard areas are comparatively higher than normal stable areas, and the obvious reasons for that are: (i) non-availability of local transport, (ii) long distances for transportation of construction material, (iii) security concern, (iv) lengthy administrative/logistic tails, (v) excessive coordination requirements, (vi) hilly terrain, and (vii) lack of construction material like sand, crush, cement and water etc. Table 4.11 lists the major causes and their ranking affecting construction cost.

Table 4.11: Impact of major causes on construction cost

	Concerns	Rank
a.	Non-availability of local transport	4.1
b.	Long distances for transportation of construction material	3.9
c.	Security concern	4.41
d.	Lengthy administrative/logistic tails	2.35
e.	Excessive coordination requirements	2.5
f.	Hilly terrain	2.3
g.	Lack of construction material like sand/crush and water	3.32

5. DISCUSSION

The only way to clear the views of residents in terrorism-hit area is a close interaction with local elders and Jirga members by government administration, project managers and security forces. Project manager must ensure a close liaison with the Jirga members of the area, which is possible through social gathering in the project camps. This process let the message convey to the whole area immediately due to the non-availability of other fastest means of communication. The Jirga members prove to be very resourceful in the area and best source of information.

Efforts must be made to hire skilled people / engineers speaking the native language or who are already working with the consultants in different cities. These workers should be convinced to work in their native areas, as being familiar to area and its customs will prove fruitful. Efforts be made to give main contract to semi-government organizations that can arrange security effectively and being the biggest construction companies can handle the project well. Different incentives for timely and quality works be given e.g., more profit margin and work at attractive location be given to contractors as incentive or additional payment be fixed against achievement of different objectives. To bring the project estimate within range and ensure quality with local labour, it is suggested that most of designs should be based on material which is locally available and do not involve heavy machinery / plant e.g., structure like retaining, breast walls and Culverts design should be stone machinery based rather than concrete as stones are locally available which require less curing and do not require batching plant rather concrete mixer will suffice. Effort be made to follow such construction designs which should not involve Asphalt plants and Batching plants as it require elaborate security arrangements etc.

For better life span of facilities rich specification be incorporated rather than following new designs involving sophisticated machinery and skilled labours not available locally e.g., following stone masonry structures instead of concrete, as concrete require more water for curing and sophisticated plant for mixing while stone is locally available on cheap rates along best skilled labour. Accordingly roads should follow *Double Surface Treatment* (DST) and *Triple Surface Treatment* (TST) designs rather than premix road design as it involves sophisticated heavy machinery and more costs.

To ensure timely completion of project in these areas risk management plans should be very effective fully thought over and amended / improved time to time. A separate coordination branch must be established under administration wing, which should plan, and coordinate all works and moves in the area from up to down and down to up on daily basis to save time and money by optimum utilization of resources.

6. Conclusion

The growing instability and insecurity in certain regions of Pakistan emphasize the need of developing tailor-made strategies and methodologies for implementing construction projects effectively

in such areas, which conforms to quality and scheduled time frame. After thorough research in three stages and collection of expert opinions from stakeholders, led us to devise engineering management methodologies and signify certain policies and concerns that would help the managers at all level to ensure successful accomplishment of construction projects safely and in the stipulated time period with desired standards.

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