Iqra National University, Peshawar

Department of Civil Engineering

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Q: 1 Answer

Risks involved during construction of Bus Rapid Transit Peshawar associated with Technical Aspects:

WHAT IS RISK?

The concept of risk can be linked to uncertainties associated with events. Within the context of projects, risk is commonly associated with an uncertain event or condition that, if it occurs, has a positive or a negative effect on the objectives of a project. Risk originates from the Latin term risicum, which means the challenge presented by a barrier reef to a sailor. Oxford Dictionary defines risk as the chance of hazard, bad consequence, loss, and so on, or risk can be defined as the chance of a negative outcome.

Risks involve during construction associated with the technical aspects of the project are:

1. Technical Complexity and innovation in design requiring new methods of construction and or erection.

2. Dangerous substances and items during construction and or commissioning.

3. Defective material and workmanship.

4. Inadequate site management.

5. Subsidence.

6. Vibration and oscillation.

7. Corrosion.

8. Extended duration of construction.

9. Removal of support.

10. Defective design.

11. Mechanical and electrical breakdown.

12. Ground movement.

13. Explosion and fire.

14. Defective temporary works.

15. Collapse.

Risk involved during construction in Bus Rapid Transit Peshawar (BRT)

Peshawar BRT was a mega project lunched by PTI government (the incumbent govt) in order to facilitate citizen of Peshawar .Its time duration was estimated about six months and cost of about 50 billion, however its time exceeds about 2 years and cost about 100 billion and still under construction. Technical Risks involved during BRT construction are given as under:

(1) Extended duration of construction:

Time set for completion of the project was only six months which was unrealistic time duration for such mega project. Contractors quoted high cost in their BOQ due to the short time duration of the project.

(2) Defective design:

There were many design changes occurred during construction phase of the project .scope were changed as about 2 km length of elevated bridge was added at later stage which effect both cost and time of the project. It may collide at station number 10, 12,15,and 26 during operation because the lane width is less than minimum required of 3m.station roofs are not built as per the design at many stations the passengers will be exposed to rain during boarding. Road marking is also defective. Significant concern of corridor lane widths at turns near BS 10, BS12, BS15 and BS 26. Current design may well result in collision between BRT vehicles.

(3) Defective workmanship and material:

Due to fast tracking nature of the project activities started parallel mainly dismantling and excavation which affect the whole traffic system badly. Tiles are slippery and directional arrow tiles are missing as well. Pillars and stairways do not align properly. Stairway steps height varies considerably. Footpaths are blocked by placement of public toilets and stairway.

(4) Mechanical and electrical breakdown:

They do not used anticut and anticlimb fencing it may be broken and stolen easily. Drainage problems may affect electric wiring system.

(5) Inadequate site management:

Contractors had no BRT experience and they had inadequate resources which also affect the project cost, time and quality. Site was not investigated properly in preliminary stages. There were lack of coordination among client, contractor and consultant.

(6) Vibration and oscillation:

Due to heavy machinery used in the project and moving of the vehicles once operated results in the cracking of nearby building.

(7) Corrosion:

Corrugated steel has been used.

(8) Safety and health issues:

Improper docking of buses at stations can causes injuries to passenger's .contractors did not follow health and safety management plan and procedure as many accidents occurred during construction phase.

4. Source & References:

1. [The K-P government started the project in October last year with the former chief minister Pervez Khattak claiming that the project would be completed within six months. The first deadline set for the completion was April 20 which was extended to May 20. The then Project Director BRT and Director General of Peshawar Development Authority Israrul Haq then told media that the project's civil work would be completed by June 20 which too has been unachievable].reference: Peshawar BRT launch further delayed till end of the year By Sohail Khattak Published: June 29, 2018.

2. The ADB has warned in clear words that BRT buses could collide at stations number 10, 12, 15 and 26 during operations because the lane width is less than the minimum requirement of 6.5 meters. "It is disappointing that the directional arrows are entirely missing from the implementation. As a remedy, it will not be acceptable to merely place taped arrows on the surface," the ADB correspondence read. In yet another glaring deviation, the curb interface between the vehicle and the platform does not meet the Kassel curb design mandated in the detailed design of the project. "The lack of an effective curb means that the docking process will be slow, inefficient and potentially damaging to the vehicle tires," the lender observed. The width of the lane, against the requirement of an at least 6.5 meters, is generally below the minimum threshold at many stations, which the ADB noted "causes concern over the safety and efficiency of the operations". "There is significant concern of corridor lane widths at turns near BS10, BS12, BS15 and BS26. Over the course of operations, the current design may well result in collisions between BRT vehicles," according to the ADB correspondence reference: [Asian Development Bank finds 'deadly flaws' in Peshawar BRT project By Shahbaz Rana Published: July 7, 2019.

3. The ticketing kiosks are also of inferior quality where corrugated steel has been used. "This is not acceptable for the effort and investment made into the Peshawar system; this will generate a very negative view of the system both [on a] national [level] and internationally," the lender

warned The provincial authorities also used “inferior material” that both harm system functionality as well as deliver an aesthetically inferior product, according to the correspondence [Peshawar BRT project: ADB] ANI | Asia Last Updated at July 7, 2019 19:40 IST.

4. The stair step height varies “considerably”, which presents a safety problem. “The mild steel flooring material utilized for the ramps and stairs is of an unacceptable quality,” the ADB noted. At many places, pillars or stairways “do not align properly”. At certain stations, the stairs and escalators have been built in the middle of the stations, obstructing walking space. “The footpaths are blocked by the placement of the public toilets and stairways,” according to the correspondence. Reference: [ADB finds 'deadly flaws' in Peshawar BRT project] By: Shahbaz Rana Published: July 7, 2019.

5. The ADB noted that there were “significant design deviations from the agreed detailed design that impede or degrade system performance. The provincial authorities also used “inferior material” that both harm system functionality as well as deliver an aesthetically inferior product, according to the correspondence. By: Shahbaz Rana Published: July 7, 2019

How we could counter the risks associated with technical aspects:

1. **Managing Risks**:

   Once you’ve identified the potential risks to your project, you now need to sit down and assess each risk based on the probability of becoming reality and the impact they will have on the project if they occur. Rank the impact and probability of each risk as high, medium, or low. High impact, high probability risks should be handled first, while risks with a low probability and low impact can be tackled last. Factor in the amount of time, money, and work each risk will require to effectively managing. Now that you’ve ranked each risk, carefully review each one and determine if you can avoid, eliminate, reduce, transfer, or accept each risk.

1.1. Avoid the Risk:

This may mean turning down a project or negotiating the contract to remove the risks. There's no shame in walking away from a project if the risks outweigh the potential rewards.

1.2. Transfer the Risk:

Your company might not be the right fit to manage a particular risk. Work with the other stakeholders to determine who on the project team is best suited to assume each risk. Discuss with the client what risks they will assume and which ones you will be responsible for managing. Work with your insurance provider to determine which risks are covered under your current policies along with other options for protecting your company against risks.

1.3. Mitigate the Risk:

Eliminating, reducing and accepting risks take careful planning. Break down each risk into actionable items. Don't over commit your resources to handling multiple risks. You may need to bring in additional resources, such as hiring more workers or renting additional equipment, to manage all your risks effectively.

1.4. Accept the Risk:

Agreeing to accept a risk is a decision that shouldn't be taken lightly. It might be fine to accept a few low probability, low impact risks. Agreeing to accept a high probability, high impact risk without any type of management or mitigation could be detrimental to the project and your bottom line. Final Thoughts on Construction Risk Management: Good risk management requires a high level of collaboration and communication with all parties involved. Keeping everyone on the same page and working together will allow you to identify and manage risks before they become a problem. Remember, risks can lead to great rewards when effectively managed. Looking to avoid the risk of having issues with subcontractors and suppliers? Construct Connect has the tools to manage your bids and evaluate and choose the best companies to bid on your projects.

Few others are as under:

1. Schedule all the activities in the project give a proper time to each activity.
2. Provide extra time for the activities because if delayed the activity it will have no effect on overall project.

3. Design the project which is completed from all aspect with best designer.
4. Incorporate local geological feature of the site in design.
5. There should be no compromise on material used in the construction. Use of inferior material is compromise on overall safety of the project.
6. There should be proper communication among all stakeholders of the project including client, planner, contractor, labor and consultant.
7. There should be proper site management each stakeholder should participate in his own task.
8. Safety and health insurance of labor should be insured.
9. After completion of the project it should be run keeping all standard of design on testing base before it is open for the public use.

Q: 2

Identify the risk level in Risk Matrix

Given Data:

Annual Probability of occurrence = ID/6585200=15255/6585200=0.00231

Cost of loss, if event occurs =45,275,000US$

Required:

Identify Risk Level in the Risk Matrix?

Solution:

First find annual probability Range Value:

Annual probability range value =15255/6585200= 0.00231

Step 1:

Now to select Likelihood Categories for risk matrix, referring to table 2.1(given in Q paper)

$$0.001<0.00231<0.1$$

The Description is “Very Unlikely” and Category is “C”

Step 2:

To select the Consequence category for risk matrix, refer to table 2.2 (given in Q paper)

Given Consequence cost =45,275,000US$

This value falls in ‘Significant Loss” and “Category iv”

i.e. $10,000,000<45275000<100,000,000$

Step 3:

To find out the risk level in risk matrix, referring to below table

Starting from Probability Category C and Consequence category IV, the point of their intersection is at “L” which is highlighted and stands for LOW risk. So the risk is LOW LEVEL risk as shown in below table.

Probability Category	A	L	M	M	H	H	H
	B	L	L	M	M	H	H
	C	L	L	L	M	M	H
	D	L	L	L	L	M	M
	E	L	L	L	L	L	M
	F	L	L	L	L	L	L
		Vi	v	iv	Iii	ii	i.
		Consequence Category					

Table Showing the Risk Matrix