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**Paper: Risk & Disaster Manag.**

**Const & Manag**

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**Date: 26/04/20**

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**Question 1. Considering the Bus Rapid Transit (BRT) Peshawar, what were the risks involved during construction associated with the technical aspects of the project?**

**Ans: 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.”

- 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.
- Risk originates from the Latin term *risicum*, which means the challenge presented by a barrier reef to a sailor.

**What is Risk in Project Management?**

- Risk is any unexpected event that can affect your project — for better or for worse.
- Risk can affect anything: people, processes, technology, and resources.
- This is an important distinction: risks are not the same as issues. Issues are things you know you’ll have to deal with, and may even have an idea of when they’ll occur, like a team member’s scheduled vacation, or a big spike in product demand around the holidays.
- What is risk in project management? Risks are events that *might* happen, and you may not be able to tell when.
- Like flu season hitting your team all at once, or a key product component being on backorder.

**When determining what a risk in project management is, consider these five elements:**

- 1. Risk event: What might happen to affect your project?**
- 2. Risk timeframe: When is it likely to happen?**
- 3. Probability: What’s are the chances of it happening?**
- 4. Impact: What’s the expected outcome?**

## 5. Factors: What events might forewarn or trigger the risk event?

Prepare a Risk Assessment to get a better understanding of the kinds of risks your project is facing and their possible consequences. If you want to learn how to manage risks in a project, read this article for a step-by-step guide to creating a risk assessment.

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

Risk associated with technical aspect of project is sort of machines, processes, and materials risk in industry, transport, communication.

Some of major's risk in technical aspects are given bellow.

#### **Extended duration of construction:**

- In most of the projects it seen that when the duration increase for project, greater chances of hazard can occur because project exposed to environment for risk occurrence.
- Where BRT extend from 6 month to 2.8 years. However, in certain circumstances, there are seasonal hazards which occur at specific times of the year and thus require special consideration if the period of construction is to be extended.
- These hazards include rainfall, temperature changes, flood, storm and wind.
- To illustrate this point, the example of BRT Peshawar may be cited.it is a project in very congested area which is exposed to every type of accident such as vehicle accident, traffic jam machinery fail, girder fall and heavy rain, due to BRT Peshawar, traffic every time jam in few areas, vehicle accidents occur and also due to time extension budget increase from Rs49 billion to Rs68 billion.

[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.)

**[The cost of the Peshawar Bus Rapid Transit project has gone up from Rs49 billion to over Rs68 billion due to the changes to its design and ‘adjustment’ of the Asian Development Bank funds, the provincial cabinet’s last meeting was informed on Thursday].**

**REFERENCE:**

(BRT cost goes up to Rs68bn Bureau Report May 25, 2018.)



### **Technical complexity and innovation in design requiring new methods of construction and/or erection:**

- When traditional materials or methods are used in construction, the familiarity of those involved with the design or the work itself may permit an occasional ambiguity in the drawings or specifications without them being misinterpreted.
- It may even provide correction of a mistake. However, in a new design, material or construction method, what is needed is precise and thorough communication between the

designer, manufacturer or contractor, as the case may be, and others involved in the construction process. Examples

*BRT Peshawar is a new project and all technology new for a developing area such as KP where the designer was also a foreigner which was not familiar as required for such backward area project. Where BRT was design in first time.*

### **BRT Peshawar working and machines:**

*‘BRT Peshawar working and machines latest technology the BRT is one of the mega project in Peshawar in this project is showing you latest technology is used like mixture machine and concrete machine and so on. ‘*

*Reference: [BRT Peshawar working and machines latest technology].*

### **The Design of BRT is DEFECTIVE:**

The Design of BRT is defective which a Risk is:

- **Financial Risk**
- **Design Risk**
- **Failure Risk**
- **Time Risk**
- **Scope Risk**
- **Budget Risk**
- **Tripe Constraints Risk**

In project planning stage a lot of items are missed such as drainage routes, gas pipe line and crossways are not included in designing therefor during project execution stage engineers as well as executer face a lot of problem

**After completion of major part of BRT**, when buses was brought from china and start testing on road, the given design was defective and not suitable to given design. According to following paragraph.

### **ADB (ASIAN DEVOLPMENT BANK) WARNING IS A RISK:**

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** correspondencerefrenc: [Asian



## **Development Bank finds 'deadly flaws' in Peshawar BRT project]**

**By Shahbaz Rana Published: July 7, 2019**

*(From the Source Pictures It is seen that Sanitary & Sewerage of BRT is in Risk)*

### ***Dangerous substances and items during construction and/or commissioning:***

*‘It is stated that poor substances low quality material is used during construction of BRT Peshawar. Such as corroded steel used and concrete which initial setting time over run, due to these dangerous substances the time as well as authenticity become lower. According to following statement:’*

### **ADB STOPS FUNDS WHICH IS AN ANOTHER RISK ELEMENT:**

The ADB stopped the provincial government from making future payments to contractors because of the poor quality of work. The ADB loan will not be disbursed further until the provincial government introduces changes in the design to address “critical” deficiencies. The inferior quality construction could damage the project’s reputation at the international level, warned the lender that had approved a \$335 million (Rs53 billion) loan for the project in mid-2017.

**Reference: [Inferior quality material used in Peshawar BRT project: ADB**



## **Defective workmanship and material which is RISK:**

- The warranty of incorporating or using only good workmanship and material is implied in construction contracts. Despite that warranty, one finds that as long as quality means perpetual care and high cost, this risk of defective workmanship and material will always exist. Even the smallest defect can sometimes cause a disastrous effect, as happened in the case described below.
- 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.

## **Defective Design, Workmanship and Quality Control**

### **MAJOR RISKS AT BRT:**

The critical deficiencies would result in improper docking of buses at the stations and could cause injuries to passengers as well. The tiles are slippery and directional arrow tiles are missing as well.

- **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.**

**The lender’s third major objection relates to the lack of adequate construction supervision and communication. The ADB seeking modifications to remove the defects might not only slow down the completion of the already much-delayed project, but also further surge its cost.**

Reference: [ADB finds 'deadly flaws' in Peshawar BRT project]

By Shahbaz Rana Published: July 7, 2019





## Inadequate site management which Is RISK:

- The inadequacy of site management not only delay the project but also sometime cause the main failure of whole project. See the following paragraph about BRT Peshawar.
- Considering his position at the BRT as an assistant engineer, Gohar went on to say, "The contractor has not yet submitted any schedule for the completion of BRT project nor progress report has been submitted to any concerned department.
- "The contractor of the project has [sublet] the entire project to different non-technical people who don't even know about construction."
- He further claimed that the site inspector did not have any "drawings and specifications of the project" with him to help guide the engineers.
- "The engineers were found just to visit the site without any drawing and specifications.

“reference[Peshawar BRT management dismisses corruption allegations as 'baseless']

PUBLISHED IN Thursday May 31 2018



GEO NEWS



## **Corrosion is an Risk to BRT:**

The corrosion seems to be an all-pervasive phenomenon causing widespread destruction of all types of structures in all countries across the world and has come to be termed as ‘Cancer’ for concrete.

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.

**Reference: [Asian Development Bank finds 'deadly flaws' in Peshawar BRT project]**

**By Shahbaz Rana Published: July 7, 2019**





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							

Figure 2.1 Risk Matrix (L: Low, M: Medium, H: High)

**Given data:**

Annual probability of occurrence of Hazardous event is (ID/6585200), where “ID”

**ID No: 14357**

**Name: Asghar Badshah**

If the event occurs, then the cost of the loss will be **45,275,000 US\$** (consequence).

NOTE: [By referring table 2.1 and 2.2]

**Requirement:**

Identify the risk level in risk matrix in **Figure: 2.1**

**Solution:**

First to find out the annual Probability from above mention statement.

**Annual Probability value=ID/6585200----- (i)**

**ID = 14357**

**Putting the ID value in Equation (i), we get**

**14357/6585200 = 0.0218 or 1/458.32**

**Step no#2**

To select likelihood category for **RISK** matrix from **table 2.1**

Table 2.1

Likelihood Categories for a Risk Matrix

Category	Description	Annual Probability Range
A	Likely	$\geq 0.1$ (1 in 10)
B	Unlikely	$\geq 0.01$ (1 in 100) but $< 0.1$
C	Very unlikely	$\geq 0.001$ (1 in 1,000) but $< 0.01$
D	Doubtful	$\geq 0.0001$ (1 in 10,000) but $< 0.001$
E	Highly unlikely	$\geq 0.00001$ (1 in 100,000) but $< 0.0001$
F	Extremely unlikely	$< 0.00001$ (1 in 100,000)

Putting the value in table 2.1

Table 2.1

Likelihood Categories for a Risk Matrix

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E	Highly unlikely	$\geq 0.00001$ (1 in 100,000) but $< 0.0001$
F	Extremely unlikely	$< 0.00001$ (1 in 100,000)

From Table 2.1, The Category for Risk Matrix is

**Category = "C",**

**Description = Very Unlikely**

**Step no#3**

**To select the consequence category in table 2.2 for a risk matrix in monetary amount.**

Table 2.2

Example Consequence Categories for a Risk Matrix in Monetary Amounts (US\$)

Category	Description	Cost (US\$)
I	Catastrophic loss	$\geq 10,000,000,000$
II	Major loss	$\geq 1,000,000,000$ but $< 10,000,000,000$
III	Serious loss	$\geq 100,000,000$ but $< 1,000,000,000$
IV	Significant loss	$\geq 10,000,000$ but $< 100,000,000$
V	Minor loss	$\geq 1,000,000$ but $< 10,000,000$
VI	Insignificant loss	$< 1,000,000$

Putting the value in table 2.2

**45275000 > 10,000,000 but < 100,000,000**

Table 2.2

Example Consequence Categories for a Risk Matrix in Monetary Amounts (US\$)

Category	Description	Cost (US\$)
I	Catastrophic loss	$\geq 10,000,000,000$
II	Major loss	$\geq 1,000,000,000$ but $< 10,000,000,000$
III	Serious loss	$\geq 100,000,000$ but $< 1,000,000,000$
IV	Significant loss	$\geq 10,000,000$ but $< 100,000,000$
V	Minor loss	$\geq 1,000,000$ but $< 10,000,000$
VI	Insignificant loss	$< 1,000,000$

**Category = IV**

**Description = Significant Loss**

So from given table it show “category IV” “significant loss” will occur

**Step no#4**

To find out the risk level in the risk matrix fig.2.1

